

WORLD'S END PIT (EML 6507)

CHANGE IN OPERATIONS APPLICATION

Prepared for:
S.C Heinrich & Co Pty. Ltd.

Date:
November 2024

File Ref:
2377.610.007 V2

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Project / Report Details

<i>Document Title:</i>	World's End Pit (EML 6507) Change in Operations Application
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<i>Ref. No.</i>	2377.610.007 V2

Document Status

<i>Issue</i>	<i>Description</i>	<i>Date</i>	<i>Author</i>	<i>Reviewer</i>
V0	World's End Pit (EML 6507) Change in Operations Application	07 March 2024	E Pearson	M Jones
V1	World's End Pit (EML 6507) Change in Operations Application – amended in response to DEM RFI	August 2024	E Manuel	M Jones
V2	World's End Pit (EML 6507) Change in Operations Application – amended in response to second DEM RFI	November 2024	E Manuel	M Jones

Distribution Record

<i>Recipient</i>	<i>Delivery Method</i>
S.C. Heinrich & Co Pty. Ltd.	1 Electronic
Department for Energy and Mining	1 Electronic

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Attachment 2	Native Vegetation Management Plan
Attachment 3	Visual Amenity Assessment February 2024
Attachment 4	Asbestos Testing Results
Attachment 5	Wind Rose Data
Attachment 6	Implications of mineral extraction for Vegetation Identified as a Terrestrial GDE (Low Potential) Summary
Attachment 7	Worlds End PEPR November 2024

Declaration of Accuracy

I, Malcolm Heinrich the applicant, have taken the following steps to review the information in this proposal to ensure its accuracy:

- Independent peer review by a suitably qualified and experienced consultant - Groundwork Plus (SA) Pty Ltd.
- An internal process for review and sign off by management.



Name: Malcolm Heinrich
Position: Director – S.C. Heinrich & Co Pty. Ltd.
Dated: November 2024

Site Details

An overview of the tenement details is summarised in Table 1 – Tenement Detail Summary.

Table 1 – Tenement Detail Summary

Tenement Number	EML 6507
Tenement Holder / Operator	S.C. Heinrich & Co Pty. Ltd.
Registration Grant Date	10/02/2020
Expiry Date	09/04/2041
Commodities	Limestone
Legal Area (hectares (ha))	18.09
Commodity Categories	Construction Materials

Table 2 – Site Contact Details summaries the Site contact details.

Table 2 – Site Contact Details

Contact Name / Position	Malcolm Heinrich
Phone Number	0418 859 294
Postal Address	PO Box 2256 Clare SA 5453
Email	moose@scheinrich.com.au

1. Introduction

S.C. Heinrich & Co Pty. Ltd. (S.C. Heinrich) operates the **World's End Pit**, located on Satchell Road, Worlds End, overlain by Extractive Minerals Lease (EML) 6507 (the Site). The Site is located approximately 19 kilometres (km) from the township of Burra and 20 km from the township of Robertstown. The Site is located along unsealed Satchell Road accessed via Worlds End Highway. The Site location is highlighted on Drawing No. 2377.DRG.001– Site Location Plan and Tenement boundaries and Site access map and Site entry is shown on Drawing No. 2377.DRG.015 – Site Access Map.

S.C. Heinrich have undertaken additional drilling investigations within EML 6507 to determine the depth and additional availability of resource with the tenement. Significant infrastructure projects are occurring within the Mid-North region requiring limestone particularly windfarm construction.

The Site's current approved operational document MPEPR2020/004 was approved under the Defined Impact assessment model 26 February 2020. The mining operations under this approval were for a limited disturbance footprint within the EML restricted to three (3) ha open at one (1) time including active rehabilitation areas, excavation to a five (5) metre (m) depth, no blasting and no vegetation clearance.

In order to meet the demand to fulfill contracts for the new construction projects in the area, a larger footprint and deeper extraction profile is required and is supported by resource investigation outcomes.

S.C. Heinrich has engaged Groundwork Plus to undertake an assessment of proposed changes to operations than those covered by the Program for Environment Protection and Rehabilitation (PEPR) dated 26 February 2020 (PEPR No. MPEPR2020/004), for the Site.

This report provides a description of the purpose and reason for the proposed change, a description of the Quarry operations that are changing, an assessment of any changes to environmental impacts and an assessment of the lease and / or licence conditions for the Site.

Within the Quarry Development Plans (ODP) for the Site, elevation and survey data is provided in GDA94 under UTM Zone 54. The Reduced Level (RL) references throughout this document are to metres Australian Height Datum (mAHD), the vertical height or elevation above Mean Sea Level which forms the National Standard benchmark to which all height measurements are referred.

2. Purpose and Reason for Change

This Change in Operations Application (COA) proposes a change to the operations as authorised by the approved PEPR in so far as the depth of the quarry, staging of quarry development, native vegetation clearance, the amount of disturbance area for extraction, change of operational hours and blasting may be required in order to achieve the proposed Quarry Development Plans (QDP).

The amendments to the QDP and operations are in order to meet the demand to fulfill contracts for the new construction projects in the area and therefore reduce the costs of the projects as suitable quarries unable to fulfill the volumes are not located within proximity to these projects.

Resource drilling undertaken onsite supports the availability and quality of resource available and informed that groundwater was not present to 25 m below ground level (m BGL) within the EML.

The proposed change as defined by Terms of Reference (TOR) 025 is categorised as:

- 1.1 A change to the authorised operations to be carried out under the Tenement and,
- 1.4 A change to the criteria to be adopted to measure a particular outcome.

The following COA identifies the changes to the operations and management of environmental impacts.

A revised PEPR has also been provided as Attachment 7 – Worlds End PEPR November 2024 in alignment with the activities outlined in the COA including an updated description of operations and amendments to Management of Environmental Impacts.

3. Change to Operations

3.1. Description of Change to Operations

The current regulatory approval document for the Site is the PEPR dated 26 February 2020 (PEPR No. MPEPR2020/004).

The Site is currently approved to work under a Defined Impact assessment model limiting extraction depths to five (5) m from surface level, three (3) ha open at one (1) time (including active rehabilitation activities) and the quarry footprint limited to the extraction area.

This COA proposes a change to the operations authorised by the approved PEPR as outlined below:

- Extract to a depth of 23 m through a three (3) staged quarry development process.
- Extension of extraction area to the full area of the Tenement resulting in an increase of the total disturbance area of approximately 6.09 ha.
- Introduction of blasting as required or to a maximum of once per annum.
- Extension of operational hours.
- Potential increase in traffic volumes during campaigns.

A review of sensitive receptors within a three (3) km radius was undertaken in consultation with the landowner who confirmed the sensitive receptors previously identified with MPEPR2020/004 are not residential and consists of a mixture of farming infrastructure, an abandoned church, and an uninhabitable residence. The nearest residential receptor is located approximately 3.5 km to the south west and the next nearest 4.5 km south west of the Site as per Drawing No. 2377.DRG.017 –Land Access Map. New powerline infrastructure has been constructed within the area in addition to wind farm projects post EML grant.

3.2. Elements of the Proposed Change in Mining Operations

The below sections outline changes to Mining Operations as a result of the expansion of the depth and operational areas, vegetation clearance and extraction method.

3.2.1. Resources

There is no change to the commodity listing or resource (limestone) to be extracted.

An increase to the resource availability is provided below in Table 3 – Resource Estimate. This has been determined via resource drilling within the Site and determining volumes and bulk density of 2.5 tonnes per cubic metre (t/m³). Refer to Attachment 1 – Drill Logs May 2023 identifying available resource to a depth of 25 m.

Table 3 – Resource Estimate

Stage	Volume (cubic metres (m ³))	Tonnes (t)	Stage Life (years)
Stage 1A	470,000	1,175,000	
Less Stage 1A currently extracted		95,795	
Stage 1A revised tonnes		1,079,205	21
Stage 1B	740,000	1,850,000	37
Stage 2	1,230,000	3,075,000	62
Total	2,440,000	6,100,000	120

Volumes were calculated using Surpac by reporting the volume above the pit designs and below the topography taken on the UAV Survey. This reserve calculation has been completed by a Principal Resource Consultant at Groundwork Plus, reviewed and deemed to have been appropriately identified and estimated.

** Note – approximately 4.78 hectares (ha) has been disturbed and extracted since the approval of the DI PEPR in 2020 to an average depth of four (4) m below ground level (BGL) (refer to Figure 1 - Current disturbance and Extracted Area – Stage 1A) and approximately 95,795 tonnes which reduces the balance of Stage 1A remaining tonnes to 1,079,205 tonnes and an approximate life of 21 years.

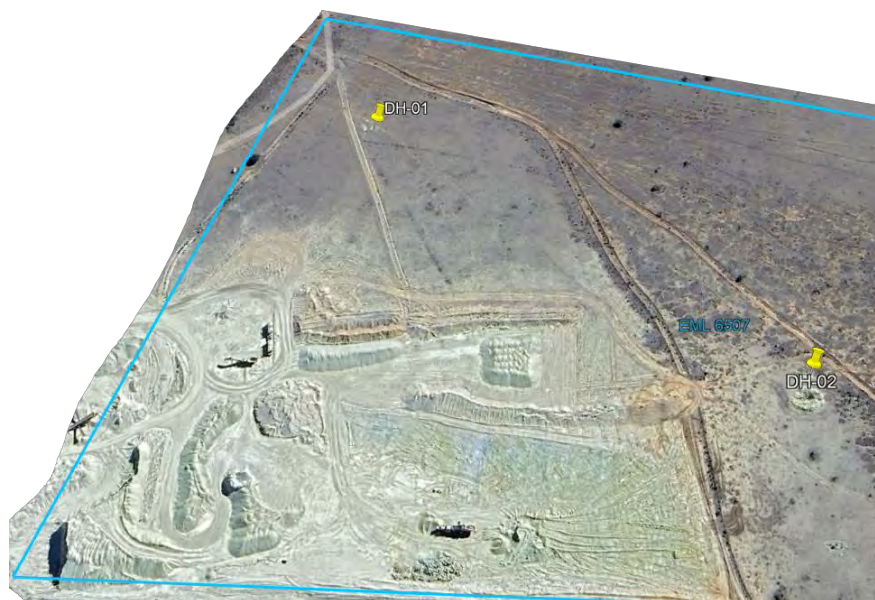


Figure 1 - Current Disturbance and Extracted Area – Stage 1A

3.2.2. Production Rate and Products

A revised estimated life of the quarry is reduced to 120 years based upon the increased production rate. Stage 1A will be approximately 21 years but worked in a staged manner with active rehabilitation occurring behind.

The annual production rate will be increased from 10,000 t to 50,000 t per annum. Importantly, the above estimated figure of extraction may fluctuate up and down dependant on project works at the time. Currently at the time of writing this, there is commensurate major project works within the vicinity of the Site for wind farm development and therefore extraction rates are expected to be higher initially to meet project demand.

The target market is unsealed road base networks and construction materials therefore 100 percent of material would **suit either a Class 2 or Class 3 specification. There will be no “waste” as such.**

3.2.3. Type or Types of Quarry Operation to be Carried Out

Resource drilling undertaken during May 2023 informed the quarry development planning to increase the depth of the quarry and extraction area.

The Site will be extracted using traditional open cut quarry techniques. Where and when achievable, the resource will be extracted with the use of a bulldozer (D10 or equivalent). If the rock becomes too hard to rip and push, then conventional drill and blasting will be undertaken to dislodge and reduce the insitu rock size mass to a manageable Particle Size Distribution (PSD) effective for delivery into a crusher for further manufacturing into the required sizing and shape for the end user. Blasting is anticipated to only occur as needed or to a maximum of once (1) per annum.

The Site will be using mobile crushing and screening equipment to produce required end products and will be located within the pit floor. Stage 1A involves the Site commencing rehabilitation of the south and western boundaries already disturbed by battering to a 1V:3H slope. Work will then continue to extract to depth within Stage 1A (an area approximately five (5) ha) with some commencement of stripping activities in Stage 1B to prepare the Site and ensure safe access for plant and machinery is provided in the pit floor. Stage 1B demonstrates quarrying advancement moving

to the east and north east of the Site and deepening of the pit and then extension to the north west corner in Stage 2. Product stockpiling will also occur within the Pit floor.

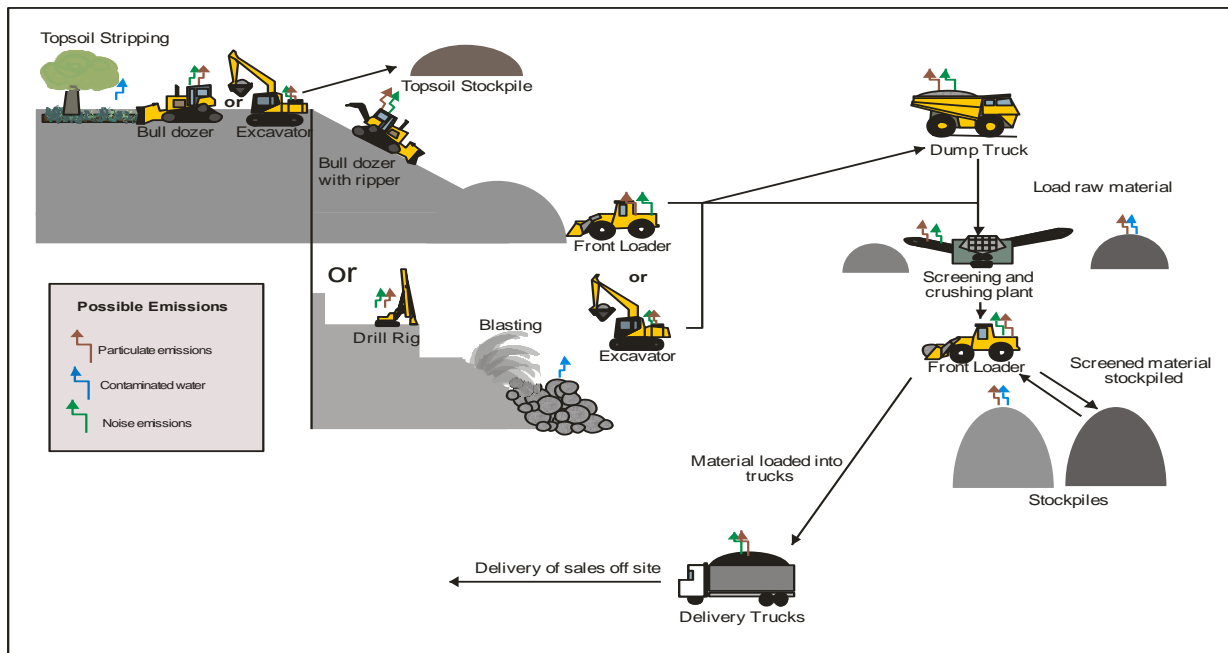


Diagram 1 – Conceptual Onsite Extraction Operations

3.2.4. Sequence of Quarrying and Progressive Rehabilitation

The Site has been developed with a series of three (3) stages that include progressive rehabilitation in a staged manner.

The following information is provided:

Stage 1A Quarry Development Plan

Drawing No. 2377.DRG.030A – Quarry Development Plan - Stage 1A and Drawing No. 2377.DRG.030B – Quarry Development Plan - Stage 1A Cross Sections A-A' to C-C'.

Extraction activities under the MPEPR2020/004 have commenced within the south western corner of the Site as outlined in Section 3.2.1 Resources of approximately 4.8 ha has been disturbed and 95,000 tonnes extracted to date.

Operations will continue to develop the south western corner moving in a easterly direction with the development of a benched open pit design. Stage 1A includes the creation of the first bench along the south eastern boundary of the Site to a height of 351 metres Australian Height Datum (m AHD) and extraction of the Stage 1A pit floor to a depth of 339 m AHD and approximately 4.56 ha of active extraction and progressive rehabilitation area open. All edges and faces will be battered to a one (1) vertical (V) to three (3) horizontal (H) (1V:3H) batter consistent with the intent of the currently approved pit designs.

The focused operations for the next five (5) - 10 year period include stripping the remaining Stage 1A area and progressively lowering the pit floor while establishing batters and benches.

Topsoil will be stored along the boundary of the southern and eastern edges of the pit. All product stockpiles and mobile crushing and screening plant will be located within the pit floor.

Rehabilitation activities of battering pit edges of terminal areas **will occur as the Site's development occurs** with approximately 0.76 ha rehabilitated.

The estimated timeframe to achieve Stage 1A design is 21 years depending upon market demand.

Stage 1B Quarry Development Plan

Drawing No. 2377.DRG.031A – Quarry Development Plan - Stage 1B and Drawing No. 2377.DRG.031B – Quarry Development Plan - Stage 1B Cross Sections A-A' to C-C'.

Operations will continue to develop moving in an easterly and north easterly direction with the development of a benched open pit design. Stage 1B includes the extension of the first bench along the south eastern boundary of the Site to a height of 351 metres Australian Height Datum (m AHD) and extraction of the Stage 1B pit floor to a depth of 339 m AHD and approximately 8.33 ha of active extraction and 3.53 ha progressive rehabilitation area. All edges and faces will be battered to a one (1) vertical (V) to three (3) horizontal (H) (1V:3H) batter consistent with the intent of the currently approved pit designs.

Due to the increased extraction depth and required extraction footprint, native vegetation clearance will be required within the eastern and north eastern sections of the Site as outlined within the Native Vegetation Management Plan (NVMP) and the required Significant Environment Benefit (SEB) payment will be paid prior to clearance. Refer to Section 3.2.19 Vegetation Clearance for detailed description of vegetation removal and associated payments.

Progressive rehabilitation activities for this stage include battering slopes to 1V:3H and respreading topsoil over the batters once terminal extents are achieved along the southern and eastern perimeters of the Site as per the QDP of an approximate area of 3.53 ha. The remaining area remains active for commencement of Stage 2 as per Drawing No. 2377.DRG.031B – Quarry Development Plan - Stage 1.

The estimated timeframe to achieve Stage 1B design is 37 years depending upon market demand.

Investigations will be undertaken within the lowest pit floor level of 339 m AHD (i.e. via a drill hole investigations) prior to progression of Stage 2 to confirm a final bench floor of 325 m AHD **at it's lowest point in the north west area of the pit** will not intersect groundwater and can maintain a minimum two (2) m buffer or greater.

Stage 2 Quarry Development Plan

Drawing No. 2377.DRG.032A – Quarry Development Plan - Stage 2 and Drawing No. 2377.DRG.032B – Quarry Development Plan - Stage 2 Cross Sections A-A' to C-C'.

Stage 2 includes the extension of the extraction area and bench design from the north east corner along the northern boundary to the western boundary to the full extent of the EML.

Deepening of the pit floor includes creation of a second bench at 339 m AHD and lowering of the pit floor to a final depth of 326 m AHD and approximately 11.02 ha active extraction area. Benches and pit walls will continue to be battered at 1V:3H angle.

Topsoil will be stored along the northern boundary of the pit edge. All product stockpiles and mobile crushing and screening plant will be located within the pit floor.

Progressive rehabilitation activities will continue the battering of slopes to a 1V:3H and placement of topsoil on the terminal bench and faces within the southern, eastern and northern sections of the Site as terminal extents are realised (approximately 6.61 ha) as per Drawing No. 2377.DRG.032A – Quarry Development Plan - Stage 2.

The estimated timeframe to achieve Stage 2 design is 62 years depending upon market demand.

3.2.5. Topsoil and Subsoil Stockpiles

Topsoil of approximately 300 millimetres (mm) thick on average across the remaining undisturbed area is anticipated to be stripped and stored as per Drawing No. 2377.DRG.030A – Quarry Development Plan - Stage 1A, Drawing No. 2377.DRG.031A – Quarry Development Plan - Stage 1B and Drawing No. 2377.DRG.032A – Quarry Development Plan - Stage 2 and will be utilised in rehabilitation activities for the Site. The estimated volume of topsoil

as an average across the Site is shown below in Table 4 – Topsoil Estimate. The rehabilitation design can be achieved with use of a bulldozer to shape the landform then topsoil will be spread over the top to enhance rehabilitation activities.

Table 4 – Topsoil Estimate

Stage	Volume (m ³)
Stage 1A & 1B	36,600
Stage 2	15,000
Total	51,600

Topsoil will continue to be placed in a bund along the boundary of the pit edges. Topsoil will continue to be stored to the south and east of the pit during Stage 1A and Stage 1B as per Drawing No. 2377.DRG.030A – Quarry Development Plan - Stage 1A, per Drawing No. 2377.DRG.31A – Quarry Development Plan - Stage 1B and north during Stage 2 as per Drawing No. 2377.DRG.032A – Quarry Development - Stage 2.

There will be no overburden stockpiled onsite.

3.2.6. Product Stockpiles

Stockpiling of product will continue to occur within the pit floor as per Drawing No. 2377.DRG.030A – Quarry Development Plan - Stage 1A, per Drawing No. 2377.DRG.030B – Quarry Development Plan - Stage 1B and north and west during Stage 2 as per Drawing No. 2377.DRG.032A – Quarry Development - Stage 2.

Given the forecasted volume of extraction, product stockpiles will be limited to a safe and stable height not exceeding 10 m. The stockpiles will be generated with the use of the crushing plant conveyor or assisted with the use of a Front End Loader (FEL).

3.2.7. Use of Explosives

Explosives will be used for blasting where the rock becomes too hard to rip and will be undertaken by an experienced licensed contractor. Blasting of stone of this type usually uses detonation of Ammonium Nitrate-Fuel Oil (ANFO) mixture which is common to this type of quarrying. Detonation is undertaken using nonel initiation systems. Details of blasting, equipment and materials used are always dictated and determined by the licensed contractor at the time. Assessments are made in accordance with the geology and weather conditions.

There will be no explosives or associated products stored onsite. All materials are brought in when required by the licensed contractor.

Blasting will occur on an as needs basis or to a maximum of once per annum, depending upon the hardness of the rock being extracted and market demand.

3.2.8. Modes and Hours of Operation

A change of hours is proposed for the operation to meet market demand.

Quarry operations will be on a campaign basis in response to market demand with the following proposed hours:

General Quarry Operations including Crushing, Screening, Drill and Blast (if required), Sales and Maintenance

Monday to Saturday 6.00 am – 6.00 pm

Sunday (when required) 6.00 am – 6.00 pm

(This includes all crushing, processing, drill and blasting (if required), loading, hauling, maintenance, and product transport tasks undertaken onsite.)

Sales, Freight Haulage and Ancillary Operations (Outside of General Operations (if required))

Monday to Saturday 6.00 am – 10:00 pm
Sunday (when required) 6.00 am – 6.00 pm

(This includes Sales, Freight Haulage, Maintenance, Water Carting etc).

In the event that disaster response (flood repair works etc) or major infrastructure works is required outside of the abovementioned hours, S. C. Heinrich will gain required authorisation from the Director of Mines prior to undertaking any such works onsite.

3.2.9. Plant and Equipment

No change to this section – mobile plant continued to be utilised within the Site.

A list of fixed and mobile plant typically used onsite is provided in Table 5 – Fixed and Mobile Equipment below.

Table 5 – Fixed and Mobile Equipment

Details of Equipment	Approximate number of units	Mobile / Fixed
Portable crusher and screening plant (on tracks)	1	Mobile
FEL 966 (CAT) or equivalent	1	Mobile
Excavator 20 t or 30 t (dependant on availability)	1	Mobile
Dozer (stripping) CAT D6 + CAT D10	1	Mobile
Dump truck (rehabilitation works) 35 t	1	Mobile
Watercart	1	Mobile

3.2.10. Processing Wastes

There will be no processing wastes generated throughout the life of operation, due to all material extracted being sold and therefore creating no overburden.

3.2.11. Industrial and Domestic Waste

No change to the section with all wastes to be removed from the Site or stored and disposed by an appropriately licenced third party and relevant Environment Protection Authority (EPA) waste tracking certificates retained onsite where required and as currently undertaken.

3.2.12. Access Roads

There is no change to access route currently utilised. Refer to Drawing No. 2377.DRG.015 – Site Access Map. Satchell Road has been upgraded as per the agreement during the initial MLP consultation outcomes with the Goyder Regional Council and undertaken during the early stages of the quarry development. Ongoing commitments to road maintenance will continue to be undertaken.

Due to the increased production rates there is an increase of traffic movements anticipated from 20 loads per day up to approximately 50 loads per day during the height of campaigns, however, this will vary depending upon market demand and or projects being supported within the region. Satchell Road is also heavily accessed by trucks and contactors for the powerline development, wind farm project and Council borrow pit.

3.2.13. Accommodation and Offices

Temporary storage such as a shipping container, will be located on the west boundary of the EML as per Drawing No. 2377.DRG.028 – Site Layout Map. Suitable hardstand areas will be constructed to accommodate parking for Site personnel and visitors, as well as lay down areas for equipment.

No accommodation will be located onsite.

3.2.14. Public Services and Utilities used by the Operations

No change to this Section.

3.2.15. Visual Screening

No change to this section, the nearest sensitive receptor is located 3.5 km south west and has no views of the quarry with vegetation north of the residence and natural topography providing screening of the Site.

Confirmation from the landowner that a house approximately 0.5 km south west is an uninhabitable ruin and the other structure located approximately 1.4 km south west is an uninhabitable house and farming infrastructure.

Vegetation to the west of the Site provides natural screening with no views experienced by Satchell Road users.

Stockpiles and mobile plant are currently and will continue to be located within the lowered pit floor. Topsoil banded along the perimeter of the Site will also provide further shielding of activities.

3.2.16. Fuel and Chemical Storage

No fuel or chemicals are proposed to be stored onsite. All fuel will be transported to Site as required for refuelling of machinery.

If required, blasting will be undertaken by a licenced contractor that will supply all materials and no explosives will be stored onsite.

3.2.17. Erosion, Sediment and Silt Control

There is no change to this section with surface water will continue to drain into pit floor where it will absorb or naturally evaporate.

3.2.18. Vegetation Clearance

Previous vegetation assessment was undertaken for clearance of roadside vegetation along Satchell Road. The DIMLP Site inspection on May 2019, confirmed that the majority of the Site was historically cleared and subject to heavy grazing, however noted scattered trees and shrubs increasing in numbers towards the north east corner were located within the Site and quarry development plans were designed to avoid scattered Native Vegetation through the establishment of a minimum five (5) m battered buffer around the dripline of the vegetation and no quarrying activities proposed within the north eastern corner.

For future operations it is now planned to remove the scattered trees and the vegetation within the Site to allow for extraction profile to be developed as per Drawing No. 2377.DRG.031A – Quarry Development Plan - Stage 1B and north and west during Stage 2 as per Drawing No. 2377.DRG.032A – Quarry Development - Stage 2. However, due to the amendments to the size and depth of extraction areas it is not practicable to retain these measures and hence an assessment to remove the scattered trees previously identified to be extracted around and retained has been undertaken.

An assessment of native vegetation within the Site was undertaken in May 2023 by Groundwork Plus Native Vegetation Accredited Consultant to assess the native vegetation present onsite and determine the SEB payment required to clear vegetation to allow for extraction to occur to the full extent of the EML. A Native Vegetation Clearance Data Report is attached as Attachment 2 – Native Vegetation Management Plan identifying the vegetation to be cleared (1.44 ha) and offsets to be paid to the Native Vegetation Fund (NVF) prior to clearance. The expansion of the quarry development has considered the health and condition of vegetation within the Site. The majority of the quality of vegetation is degraded due to historical disturbance from vehicles, earthworks and grazing at the Site of which the extent of native vegetation clearance has been reduced as much as possible historically.

The client intends to make the SEB as a single payment (including admin fee of \$733.10) of \$14,062.19 into the NVF.

A Native Vegetation Clearance Data Report is attached as Attachment 2 – Native Vegetation Management Plan identifying the vegetation to be cleared (1.44 ha) and offsets to be paid to the NVF prior to clearance.

The expansion of the quarry development has considered the health and condition of vegetation within the Site. The majority of the quality of vegetation is degraded due to historical disturbance from vehicles, earthworks and continued grazing at the Site of which the extent of native vegetation clearance has been reduced as much as possible historically.

3.2.19. Site Water Management

Although there are no residential sensitive receptors within three (3) km of the Site, dust suppression will be undertaken on haul roads and stockpiles. Sprayers will be utilised on the crushing plant and screening plant as required. Due to the increase in production Annual water demand is anticipated to increase to approximately 10,000 kilolitres (kl) to reflect and manage the increase activities within the Site.

The water will continue to be trucked to the Site from an offsite SA Water mains location as per current operations.

3.2.20. Description of Site at Completion

At the completion of extraction activities and progressive rehabilitation work, it is envisaged that the Site will be returned to the historic and current use of agricultural land used for stock grazing.

For this reason, Drawing No. 2377.DRG.021AR1 – Conceptual Final Landform Plan and Drawing 2377.DRG.021BR1 – Conceptual Final Landform Plan Cross Section A-A' to C-C' have been designed to outline a conceptual final landform that will ensure that the intended land use of grazing can successfully be achieved. The Conceptual Final Landform will be reviewed throughout each Stage of quarry development to ensure that it is consistent with the ongoing land use of the surrounding areas.

As a general guide, the following measures may be used to prepare the final landform:

- Using earthmoving equipment to progressively shape and trim the workings to the desired design profiles and flattening the gradients of batters to a stable angle of repose 1V:3H on reaching the terminal limits of extraction.
- Rounding or marrying the contours into the natural ground surface to soften the visual impacts and reflect the surrounding landscape.
- Topsoiling of contours.
- Providing access to the terminal workings to allow maintenance of rehabilitation works.
- Designing landform and drainage to control erosion for the particular hydrological regime.

The following measures are to be implemented for topsoil spreading:

- Areas to be spread are to be re-profiled prior to placing of overlying materials.
- Equipment used to spread materials should be scheduled to avoid compaction.
- Before spreading, subsoils are to be loosened to break up any compacted or surface sealing and to enable keying of soils.
- Topsoil is to be removed from stockpiles in a manner that avoids vehicles travelling over the stockpiles.
- Topsoil is to be respread in the reverse sequence to its removal where possible so that the original upper soil layer is returned to the surface to re-establish the entrapped seed content of the soil where possible.
- Ensure all exposed subsoils are covered.
- After spreading topsoil, ensure the surface is left in a roughened state to assist moisture infiltration and inhibit soil erosion.
- Prior to any planting, cultivate any compacted or crusted topsoil surfaces.
- Soil spreading will primarily be left to naturally revegetate or will be seeded with pasture grass suitable for grazing as agreed with the landowner.

- If erosion occurs on treated surfaces, the area is to be profiled and re-spread as necessary (note: traversing tracked machinery parallel to the slope gradient may assist in reducing the erosion potential of the re-profiled surface).

At the cessation of quarrying, all plant and equipment will be removed and the Tenement will be surrendered. At this time the land will be entirely handed back to the landowner to continue grazing activities.

A formal landowner agreement will be established prior to the closure of the Site to document the requirements for ongoing management of the Site along with any potential residual liabilities that may remain within the agreed final landform. A copy of the Landowner Agreement will be provided to the administering authority prior to the final rehabilitation and decommissioning of the Site.

3.3. Assessment(s)

S.C. Heinrich undertook a drilling campaign of four (4) drill holes to a depth of 25 m to determine the availability of resource within the remaining undisturbed areas of the Tenement. Refer to Drawing No. 2377.DRG.022 – Drillhole Location Plan for the location of the drill holes, refer to Attachment 1 – Drill Logs May 2023 for results of the drilling campaign.

The additional benefit of the drilling is that it determined that groundwater was not present to a depth of 25 m and substantiates the landowner's confirmation that groundwater is not accessible within the area and reflected in the lack of groundwater users within three (3) km of the Site. The final depth of the drill hole at the lowest elevation that did not intersect groundwater was 321 m AHD in the northwest corner (Hole 1). A final pit floor of 326 m AHD (a maximum depth of 23 m) has been designed which demonstrates a buffer of two (2) m AHD between the lowest pit floor level and the lowest drill hole measure that still had not intersected groundwater. The drill hole depth and lack of groundwater interception has been included on the Conceptual Final Landform plan and cross sections (refer to Drawing No. 2377.DRG.021AR1 – Conceptual Final Landform Plan and Drawing No. Conceptual Final Landform Plan Cross Sections A-A' to C-C') to visually identify a two (2) m gap from pit floor depth to drill hole depth where it has been proven groundwater is not being intersected.

Native vegetation assessment was undertaken to determine the SEB amount payable to clear native vegetation within the proposed mine footprint, refer to Attachment 2 – Native Vegetation Management Plan.

3.4. Maps, Plans and Cross – Sections

The below listed maps and plans are provided that are considered to be applicable to the proposed change:

Site Location Plan	(Drawing No. 2377.DRG.001)
Site Access Map	(Drawing No. 2377.DRG.015)
Land Access Map	(Drawing No. 2377.DRG.017)
Quarry Development Plan - Stage 1A	(Drawing No. 2377.DRG.030A)
Quarry Development Plan - Stage 1A Cross Sections A-A' to C-C'	(Drawing No. 2377.DRG.030B)
Quarry Development Plan - Stage 1B	(Drawing No. 2377.DRG.031A)
Quarry Development Plan - Stage 1B Cross Sections A-A' to C-C'	(Drawing No. 2377.DRG.031B)
Quarry Development Plan - Stage 2	(Drawing No. 2377.DRG.032A)
Quarry Development Plan - Stage 2 Cross Sections A-A' to C-C'	(Drawing No. 2377.DRG.032B)
Site Layout Map	(Drawing No. 2377.DRG.028)
Conceptual Final Landform Plan	(Drawing No. 2377.DRG.021AR1)
Conceptual Final Landform Plan Cross Section A-A' to C-C'	(Drawing No. 2377.DRG.021BR1)
Drillhole Location Plan	(Drawing No. 2377.DRG.022)
Adjacent Landowner Consultation Map	(Drawing No. 2377.DRG.026)
Visual Assessment Map	(Drawing No. 2377.DRG.029)
Vegetation Associations	(Drawing No. 2377.DRG.018)

3.5. Scope of Proposed Change to Authorised Operations

Table 6 – Summary of Operational Changes outlines the key changes in operations from the currently approved PEPR to the activities outlined in the COA.

Table 6 – Summary of Operational Changes

Item	Current Operational Conditions	New Operational Conditions	Section Addressed in COA
1. Change of Operational Hours	<p>Mining will occur on a campaign basis with the following operating hours during campaigns:</p> <p>Monday – Friday: 7am – 6pm*</p> <p>Saturday: 7am – 6pm*</p> <p>Sunday: Nil</p> <p>Public Holidays: Nil</p> <p>*Additional hours may be required for major infrastructure projects occurring. Additional hours will be applied for and approved by the Mining Regulator prior to undertaking additional hours.</p>	<p>General Quarry Operations including Crushing, Screening, Drill and Blast (if required), Sales and Maintenance</p> <p>Monday to Saturday 6.00 am – 6.00 pm</p> <p>Sunday (when required) 6.00 am – 6.00 pm</p> <p><i>(This includes all crushing, processing, drill and blasting (if required), loading, hauling, maintenance, and product transport tasks undertaken onsite.)</i></p> <p>Sales, Freight Haulage and Ancillary Operations (Outside of General Operations (if required))</p> <p>Monday to Saturday 6.00 pm – 10:00 pm</p> <p>Sunday (when required) 6.00 am – 6.00 pm</p> <p><i>(This includes Sales, Freight Haulage, Maintenance, Water Carting etc).</i></p> <p>In the event that disaster response (flood repair works etc) or major infrastructure works is required outside of the abovementioned hours, S. C. Heinrich will gain required authorisation from the Director of Mines prior to undertaking any such works onsite.</p>	<p>Section 3.2.8 Modes and Hours of operations</p> <p>Section 4.2 Noise</p>
2. Increased extraction footprint	<p>Limited extraction area with EML.</p> <p>Up to five (5) m depth.</p>	<p>Extraction to full EML boundary limits.</p> <p>Two (2) benches (12 m height each) up to total 24 m pit depth.</p>	<p>Section 3.2.4 Sequence of quarrying and progressive rehabilitation</p>

Item	Current Operational Conditions	New Operational Conditions	Section Addressed in COA
			<p>Drawing No. 2377.030A – Quarry Development Plan Stage 1A</p> <p>Drawing No. 2377.031A – Quarry Development Plan Stage 1B</p> <p>Drawing No. 2377.DRG.032A – Quarry Development Stage 2</p>
3. Increased active open quarrying areas	Three (3) ha open at one (1) time.	Two (2) stage QDP Stage 1 – 10.61 ha active and progressive rehabilitation area of 1.27 ha Stage 2 – 10.57 ha active and progressive rehabilitation area 6.61 ha	<p>Section 3.2.4 Sequence of quarrying and progressive rehabilitation</p> <p>Section 4.3 Air Quality</p> <p>Section 4.5 Visual Amenity</p> <p>Drawing No. 2377.030A – Quarry Development Plan Stage 1A</p> <p>Drawing No. 2377.031A – Quarry Development Plan Stage 1B</p> <p>Drawing No. 2377.DRG.032A – Quarry Development Stage 2</p>
4. Increase production rate	10,000 t.	50,000 t (subject to market demand).	<p>Section 3.2.2 Production Rate and Products</p> <p>Section 4.3 Air Quality</p> <p>Section 4.2 Noise</p>
5. Blasting	No blasting.	Blasting if required – up to once per annum.	<p>Section 3.2.3 Type or Types of Quarry Operation to be Carried Out</p> <p>Section 3.2.7 Use of Explosives</p>

Item	Current Operational Conditions	New Operational Conditions	Section Addressed in COA
			Section 4.1 Blasting
6. Traffic	20 loads per day during campaigns	Approximately 50 loads per day depending upon market demand.	Section 3.2.13 Access Roads Section 4.6 Traffic

Collectively the changes proposed are aligned with the existing operations and associated control and management strategies currently implemented within the Site. Based upon the scope of the proposed change and the analysis provided in Section 5 Assessment of Changes to Environmental Impacts, the changes are considered moderately material alterations to the existing operations of the Site but are unlikely to result in a non compliance with the existing lease conditions for the Site as demonstrated in Section 7 Assessment of Lease and / or Licence Terms / Conditions.

3.6. Assessment of Alternatives

As discussed in Section 2 Purpose and Reason for Change, the change is proposed to increase the resource availability of the quarry to meet demand for limestone to be used in local construction projects in an area of significant infrastructure development. The increase in resource is to be gained through an expansion of the disturbance area and increase in the depth of quarry from the previously approved operational plans.

Alternatives were investigated as follows:

1. Transporting from other S.C. Heinrich quarries located further away. This option is not feasible as this increases costs of the material due to transportation costs and also places additional strain on road networks to deliver the material greater distances.
2. Opening a new site is also not a feasible option due to time constraints of establishing a new mining lease and that the resource is required in the immediate future. Additionally, the costs of starting up a new mining lease rule this option out. This Site is well suited to meet the needs of the Neon Windfarm project located within proximity to the Site and also being within an area of limited sensitive receptors (residential).

4. Consultation

S.C. Heinrich were active in engaging identified stakeholders to inform, consult and involve stakeholders on the project to gain an understanding of the environmental impacts considered most important to them, suggested management strategies and to assist inform the management of environmental impacts where appropriate.

4.1. Stakeholder Identification

The following parties were identified for consultation on the proposed Changes to Authorised Operations consistent with previous stakeholders identified and consulted with for the Defined Impact Mining Lease Proposal (DIMLP):

- Landowner
- Regional Council of Goyder
- Adjacent Landowners

Refer to Drawing No. 2377.DRG.026 – Adjacent Landowner Consultation Map.

Factors considered in the identification of stakeholders included:

- That the quarry is situated in a rural / agricultural area predominantly surrounded by grazing and limited cropping and minimal residences (review of residential receptors identified nearest residential sensitive receptor is 3.5 km south west).
- The quarry is currently operational and there have been no additional receptors identified from previous consultation activities.

4.2. Consultation Methods

A total of three (3) stakeholders were consulted with (due to limited residences within 3 km and one (1) stakeholder owning the majority of land holdings adjacent the Site) of which two (2) items of feedback were received.

The above Stakeholders were consulted with via phone and email to advise of the proposed Change of Authorised Operations Application and supporting PEPR Review. Numerous emails and phone calls were undertaken and invitations to attend a meeting onsite were also provided but unable to be accommodated due to conflicting priorities on the adjacent landowner and quarry operator, an onsite meeting may be arranged in the future.

The following items as outlined in Table 7 – Stakeholder Consultation Summary of Changes were discussed with each Stakeholder and copies of Quarry Development Plans and Conceptual Final Landform Plans were also provided for reference:

Responses to Consultation and outcomes of the consultation are summarised in Section 4.3 Stakeholder Feedback and Outcomes of Consultation.

Table 7 – Stakeholder Consultation Summary of Changes

Item	Current Conditions	New Conditions
<p>1. Change of Operational Hours</p>	<p>Mining will occur on a campaign basis with the following operating hours during campaigns:</p> <p>Monday – Friday: 7am – 6pm*</p> <p>Saturday: 7am – 6pm*</p> <p>Sunday: Nil</p> <p>Public Holidays: Nil</p> <p>*Additional hours may be required for major infrastructure projects occurring. Additional hours will be applied for and approved by the Mining Regulator prior to undertaking additional hours.</p>	<p>General Quarry Operations including Crushing, Screening, Drill and Blast (if required), Sales and Maintenance</p> <p>Monday to Saturday 6.00 am – 6.00 pm Sunday (only when required) 6.00 am – 6.00 pm</p> <p><i>(This includes all crushing, processing, drill and blasting (if required), loading, hauling, maintenance, and product transport tasks undertaken onsite.)</i></p> <p>Sales, Freight Haulage and Ancillary Operations (Outside of General Operations (if required))</p> <p>Monday to Saturday 6.00 pm – 10:00 pm Sunday (only when required) 6.00 am – 6.00 pm</p> <p><i>(This includes Sales, Freight Haulage, Maintenance, Water Carting etc).</i></p> <p>In the event that disaster response (flood repair works etc) or major infrastructure works is required outside of the abovementioned hours, S. C. Heinrich will gain required authorisation from the Director of Mines prior to undertaking any such works onsite.</p>
<p>2. Increased extraction footprint</p>	<p>Limited extraction area with EML boundary.</p> <p>Up to five (5) m depth.</p>	<p>Extraction to full EML boundary limits.</p> <p>Two (2) benches (12 m height each) up to total 24 m pit depth.**</p> <p>Copy of Drawing No. 2377.DRG.019A – Quarry Development Plan - Stage 1, and Drawing No. 2377.DRG.020A – Quarry Development Plan - Stage 2 provided**.</p> <p><i>**NOTE: these plans have since been amended to break Stage 1 into Stage 1A and Stage 1B and lift the pit floor by one (1) m AHD.</i></p>
<p>3. Increased active open quarrying areas</p>	<p>Three (3) ha open at one (1) time.</p>	<p>Two (2) stage QDP Stage 1 – 10.61 ha active and progressive rehabilitation area of 1.27 ha Stage 2 – 10.57 ha active and progressive rehabilitation area 6.61 ha</p>

Item	Current Conditions	New Conditions
		<p>Copy of Drawing No. 2377.DRG.019A – Quarry Development Plan - Stage 1, and Drawing No. 2377.DRG.020A – Quarry Development Plan - Stage 2 provided**.</p> <p>There are no more additional sales to be pursued, the expansion to meet demand for wind farm construction and effectively manage the Site such as stockpiling requirements. Crushing and stockpiling to continue to occur within the pit floor as per current activities.</p> <p><i>**NOTE: these plans have since been amended to break Stage 1 into Stage 1A and Stage 1B and lift the pit floor by one m AHD.</i></p>
4. Increase production rate	10,000 t.	50,000 t to meet market demand.
5. Blasting	No blasting.	Blasting provision added if required – up to once per annum. Although not expected to occur annually based on resource drilling outcomes.
6. Traffic	20 loads per day during campaigns	<p>50 loads per day during campaigns.</p> <p>No change to Site access point or traffic route (via Worlds End Highway and Satchell Road).</p>
7. Quarry Life	135 years	Reduced to 119 years.
8. Vegetation Clearance	Nil proposed	Clearance of vegetation proposed to extract to east and north east of Site with appropriate approvals.
9. Conceptual Final Landform	<p>Return to grazing. Battering and replacement of topsoil.</p> <p>1V:3H batters</p>	Shaping of the final landform with 1V:3H batters, respread of topsoil, stabilisation with grasses if required additional to natural revegetation in accordance with Drawing No. 2377.DRG.021AR1 – Conceptual Final Landform Plan.

4.3. Stakeholder Feedback and Outcomes of Consultation

4.3.1. Air Quality

One (1) adjacent landowner raised queries regarding dust impacts from traffic along Satchell Road on his neighbouring adjacent property and potential impacts to crops, vegetation and water trough facilities livestock have access to.

The adjacent landowner also queried operations on windy days and lack of water truck present onsite to mitigate dust generation.

The adjacent landowner also raised queries regarding potential for asbestos to be contained within the rock source.

Response:

A review of the traffic route identified Satchell Road remains the best route due to lack of sensitive residential receptors and most direct access to the bituminised Worlds End Highway. A visual assessment was undertaken 06 February 2024 by Groundwork Plus including an inspection of the roadside along Satchell Road identified conditions along the fence lines are consistent with the landscape within the neighbouring properties and vary considerably based on land use (i.e. some areas heavily grazed exposing hard rock surface) and soil types. Refer to Attachment 3 – Visual Assessment February 2024 and Drawing No. 2377.DRG.029 – Visual Assessment.

Water troughs are located approximately two (2) km west of the Site and are near a water tank storage area for the wind farm development regularly accessed by wind farm contractors and trucks. Visual inspection undertaken 06 February 2024 by Groundwork Plus sighted troughs had no dust cover, some were of diminished condition, and one (1) contained no water, refer to Photo Location 6 and Photo Location 7 within Attachment 3 – Visual Assessment February 2024 and Drawing No. 2377.DRG.029 – Visual Assessment.

Feedback regarding dust generated on the Council owned Satchell Road has been provided to the Regional Council of Goyder as the road owner / caretaker. The Regional Council of Goyder advised no dust complaints have been received regarding road condition or volume of dust from traffic along Satchell Road. Regional Council of Goyder has advised use of water for dust suppression on Satchell Road could likely impact the condition of the road surface and is not recommended for the maintenance of the road.

A sample of the extracted rock was tested and confirmed there is no asbestos detected within the rock. This evidence has been provided to the landowner and is provided as Attachment 4 – Asbestos Testing Results.

Resolution/s proposed:

Regional Council of Goyder advised the road permit issued to S.C. Heinrich includes a reduced speed limit of 80 km per hour (km/h) to assist with potential dust generation and traffic impacts to Satchell Road.

The road maintenance agreement for Satchell Road between Regional Council of Goyder and S.C. Heinrich to be formalised.

S.C. Heinrich are experienced operators and manage dust impacts as per the control and management strategies required for the Site. The rock source contains a low level of moisture and reduces dust impacts. Photo 1 - Crushing and Screening Operations February 2024 demonstrates water supply to crushing and screening plant as an example of dust mitigation strategies undertaken onsite.



Photo 1 - Crushing and Screening Operations February 2024

Dust mitigation strategies are included within Section 5.3 Air Quality.

4.3.2. Traffic

One (1) adjacent landowner and one (1) stakeholder (Local Government) raised feedback about traffic and Satchell Road as follows:

Regional Council of Goyder advised a written formal agreement is to be executed for road maintenance activities and discussion has commenced with S.C. Heinrich to finalise this agreement. S.C. Heinrich have the required road use permits for truck use along Satchell Road.

One (1) adjacent landowner advised traffic movements are deteriorating Worlds End Highway.

Response:

Worlds End Highway is a State Government Road approved for truck use. Visual inspection undertaken 06 February 2024 by Groundwork Plus shows the roads are in a good condition. Wind farm employees and contractors also have high usage of Satchell Road to access gates, water tank storage areas and a Council borrow pit is located on Satchell Road. It was also noted a hardstand area previously utilised for a concrete batching plant was situated on the property located at the corner of Satchell Road and Worlds Ends Highway and remains an area used for product stockpiling for the infrastructure construction company, therefore not all traffic is attributable to quarry related traffic impacts. Some drag out was noted on Worlds End Highway and is attributed to all road users particularly the contractors accessing the corner property. Refer to Photo Location 4 and Photo Location 5 within Attachment 3 – Visual Assessment February 2024 and Drawing No. 2377.DRG.029 – Visual Assessment.

S.C. Heinrich have repaired minor potholes along Satchell Road as required in the past three (3) years and the visual assessment shows Satchell Road to be in a well maintain condition refer to Photo Location 10 within Attachment 3 – Visual Assessment February 2024 and Drawing No. 2377.DRG.029 – Visual Assessment.

Resolution/s proposed:

S.C. Heinrich has the required road use permit to drive trucks on Satchell Road and the road maintenance agreement is under development with Regional Council of Goyder to grant authorisation to continue to carry out works under Section 221 of the *Local Government Act (1999)* for maintenance activities.

Worlds End Highway is a State Government Road and defects to the intersection will be reported to Department for Infrastructure and Transport (DIT) when required.

The road permit has a reduced speed limit of 80 km/h applied which assists in mitigation of dust and traffic impacts.

Refer to Section 5.6 Traffic for control and management strategies.

5. Assessment of Changes to Environmental Impacts

A review of the potential impact events listed within the PEPR was undertaken to assess whether the proposed changes in the operations are likely to result in any new or altered environmental impacts that may arise as a result of the proposed changes to the operations.

The following environmental impacts have been identified as potentially effected as a result of the proposed changes:

- Noise
- Air Quality
- Public Safety
- Groundwater
- Visual Amenity
- Traffic
- Native Vegetation.

The following new environmental impacts have been identified for the Site which will require new Outcomes and Measurement Criteria due to the change in operations are:

- Blasting.

Environmental Impacts and, Outcome and Measurement Criteria that have not changed based on the proposed COA are:

- Topsoil Management
- Waste Management
- Heritage
- Protection of Third Party Property
- Surface Water (Erosion, Silt and Stormwater Management).

The below assessment has been undertaken to comply with the requirements set out in TOR 025 including an assessment of the location, magnitude, extent, duration, frequency and stakeholder feedback of the proposed activities in consideration of each above identified environmental impact.

5.1. Blasting

This is a new impact that was not previously covered under MPEPR2020/004. Due the increase of the depth of extraction, blasting may be required if the rock becomes too difficult to extract mechanically. Blasting is anticipated to rarely be required or up to a maximum of once per annum.

As outlined in Section 3.2.7 Use of Explosives, drilling and blasting activities may be undertaken by a licensed contractor up to once per annum if required and mechanical extraction is not suitable. All blasts will be designed and undertaken to ensure compliance with AS2187.2 requirements.

A review of sensitive receptors undertaken by Groundwork Plus on 06 February 2024 confirmed the nearest residential sensitive receptor is a residential dwelling approximately 3.5 km to the south west and another approximately 4.5 km south west of the Site Drawing No. 2377.DRG.017 – Land Access Map. Farming infrastructure such as sheds or tanks and a disused church (non-heritage listed) were incorrectly identified as sensitive residential receptors in the previous PEPR. A shearing shed is located approximately 65 m west of the Site, and consultation identified the shed is used on occasion but very infrequently.

There were no concerns with blasting raised during consultation.

5.1.1. Impact Assessment

Quarry Phase	Potential Impact Event			
Operational	Potential for fly rock, vibration and air overpressure causing damage to nearby infrastructure and / or environmental nuisance to nearby sensitive residential receptors.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
B1	Blasting of rock	Air and land	Residential structures and adjacent farming infrastructure as per Drawing No. 2377.DRG.017 – Land Access Map.	Yes
Uncertainty and Assumptions		<p>Blasting activities will be required for the development of the quarry extraction area where rock cannot be mechanically extracted and may cause fly rock, vibration and overpressure. This has been indicated up to a maximum of once per annum, with some years will not require blasting to occur, reducing the frequency of the impact.</p> <p>A review of residential receptors was undertaken 06 February 2024 by Groundwork Plus and identified the nearest sensitive residential receptor is located 3.5 km south west of the Site and the next nearest 4.5 km south west. A shearing shed is located approximately 65 m west of the Site, and consultation identified the shed is occasionally used but very infrequently. The building located 1.4 km south west will remain uninhabitable.</p> <p>No additional residential developments will occur within proximity of the Site, with land use remaining used for agricultural purposes.</p>		
Sensitivity to change		The degree of fly rock, vibration and overpressure that may occur is dependent upon the planning and design of each blast.		

Justification for the confirmation / non-confirmation of Source, Pathway and Receptor	An impact although low could potentially occur given the proximity of nearby farming infrastructure.
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5.1.2. Control and Management Strategies

Control and Management Strategies
<p>Operational</p> <ul style="list-style-type: none"> • Design process to consider the Maximum Instantaneous Charge (MIC) and drill hole diameter to ensure that maximum ground vibration and overpressure of each blast does not exceed the specified limits. • Quarry records demonstrate that all blast related complaints are acknowledged and actioned in a timely manner. • All blasts will be designed and undertaken to ensure compliance with AS2187.2 requirements. • Blasting operations will be designed and implemented by suitable qualified contractors. • Explosives will be transported and handled by the blasting contractors and will not be stored at the Site.
Uncertainty and Assumptions of Control Strategies
Control measures are considered standard practice for the quarry industry and are proven to be effective in the prevention of potential impacts.
Sensitivity to Change of Assumptions
A potential impact could occur if the standard policy and procedures are not implemented, however this is considered unlikely to occur.

5.1.3. Assessment of environmental outcomes

This is a new activity requiring a new Environmental Outcome and Measurement Criteria.

5.1.4. Proposed Environmental Outcome and Measurement Criteria

Operational	
Proposed Outcome	Proposed Outcome Measurement Criteria
The Tenement Holder must, during construction and operation, ensure that there is no damage to infrastructure or public health and / or nuisance impacts from airblast, flyrock and vibration caused by blasting.	<p>Quarry records demonstrate that all blast related complaints are acknowledged within 48 hours and closed out within seven (7) days to the satisfaction of the Mining Regulator.</p> <p>If complaints are not able to be resolved to the satisfaction of the Regulator blasts are monitored to comply with the following:</p> <ul style="list-style-type: none"> • Ground Vibration – 5 mm per second (mm/sec) with up to 5 percent allowable to 10 mm/sec or less in a 12 month period • Overpressure - 115Db (Lin Peak) with up to 5 percent allowable to 120 Db (Lin Peak) or less in a 12 month period. <p>No incidents of fly rock leaving the Site.</p>

5.1.5. Proposed Measurement Criteria

Blasting	
Quarry Phase	Operational
Outcome Measurement	
<p>1. Outcome Achievement Quarry records demonstrate that all blast related complaints are acknowledged within 48 hours and closed out within seven (7) days to the satisfaction of the Mining Regulator.</p> <p>If complaints are not able to be resolved to the satisfaction of the Regulator blasts are monitored to comply with the following:</p> <ul style="list-style-type: none"> - Ground Vibration – 5 mm/sec with up to 5 percent allowable to 10 mm/sec or less in a 12 month period - Overpressure - 115Db (Lin Peak) with up to 5 percent allowable to 120 Db (Lin Peak) or less in a 12 month period. <p>No incidents of fly rock leaving the Site.</p>	
<p>2. What will be Measured and the Form of Measurement Records of blast related complaints acknowledged and action(s). Ground vibration and overpressure (where complaints are unable to be resolved). Visual monitoring of Tenement boundary to monitor of fly rock.</p>	
<p>3. Location of Measurement Within EML 6507.</p>	
<p>4. Frequency Records maintained following a complaint and monitoring as required by the Mining Regulator.</p>	
<p>5. Control / Baseline Data Not applicable.</p>	
<p>6. Leading Indicator Criteria Not applicable.</p>	

5.2. Noise

As per Section 3.2.8 Modes and Hours of Operation, operational hours are extending to meet project demand where required on a campaign basis.

A review of sensitive receptors confirmed the nearest residential sensitive receptor is a residential dwelling approximately 3.5 km to the south west and another approximately 4.5 km south west of the Site Drawing No. 2377.DRG.017 – Land Access Map. Farming infrastructure such as sheds or tanks and a disused church (non-heritage listed) were incorrectly identified as sensitive receptors in the previous PEPR. Visual assessment undertaken 06 February 2024 by Groundwork Plus confirmed the residence located approximately 1.4 km south west of the Site is uninhabitable refer to Photo Location 22 within Attachment 3 – Visual Assessment February 2024 and Drawing No. 2377.DRG.029 – Visual Assessment.

No concerns were raised regarding noise during consultation.

5.2.1. Impact Assessment

Quarry Phase	Potential Impact Event			
Operational	Potential for an increase in noise generated from extension in hours of quarry operations to negatively impact on sensitive receptors (residential).			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
N1	Noise generated from Heavy Mobile Equipment (HME), truck movements, and operations.	Air	Nearby Sensitive Receptors (residential).	No
Uncertainty and Assumptions		<p>Operating hours are increasing as per Section 3.2.8 Modes and Hours of Operation and are provided to meet project demand when required.</p> <p>The nearest sensitive receptors are located 3.5 km and 4.5 km south west of the Site. The building located 1.4 km south west will remain uninhabitable.</p> <p>Consultation with the Landowner has confirmed buildings within three (3) km of the Site are ruins and uninhabitable or are farming infrastructure. Visual amenity assessment undertaken 06 February 2024 confirmed no residential receptors are located within three (3) km of the Site and is not anticipated to change.</p> <p>Adjacent land use is utilised predominately for grazing and some cropping and this is not anticipated to change.</p> <p>Review of the Bureau of Meteorology (BoM) Climate Data Online (2023) at the nearest station (Eudunda Station No. 024511) identifies the predominate wind direction for the morning is westerly and the afternoon predominate wind direction is westerly and south westerly which will further prevent noise impacts as no receptors are located to the east of the Site.</p>		

Sensitivity to Change	Changes to the operational activities and duration could result in changes to noise emissions generated onsite. This may result in a low degree of change to noise emissions reflecting potential additional HME and haulage trucks utilised onsite.
Justification for the Confirmation / Non-confirmation of Source, Pathway and Receptor	Due to the lack of residential receptors within three (3) km of the Site or located along Satchell Road, it is reasonable to expect that there is no receptor identified or impacted.

5.2.2. Control and Management Strategies

A review of control of management strategies has included previously approved control and management strategies and the inclusion of additional strategies in line with S.C Heinrich's operational strategies.

Control and Management Strategies
<p>Existing Controls:</p> <ul style="list-style-type: none"> Trucks will be advised to avoid using air brakes in built up areas. Operations shall adhere to approved operating hours. <p>Additional Controls:</p> <ul style="list-style-type: none"> Equipment is to be maintained in accordance with the original equipment manufacturer's specifications. Avoid unnecessary operation of plant and / or revving of engines, pumps, compressors (and shut down when not in use). Fit broadband reversing alarms on mobile equipment where practicable. Noise complaints are recorded, investigated and responded to in a timely manner. Crushing and screening mobile plant to be situated on the pit floor, utilising the surrounding natural topography and lowered extraction area and pit walls to shield the equipment from the direction of the sensitive receptors.
Uncertainty and Assumptions of Control Strategies
Potential impacts associated with noise nuisance are further reduced through the implementation of the control and management strategies which are considered reasonable and industry standard practice to protect sensitive receptors from noise nuisance.
Sensitivity to Change of Assumptions
The sensitivity to change of assumptions is low based on the local topography, campaign-based nature of the operation.

5.2.3. Environmental Outcome and Measurement Criteria

Based upon the outcomes of the Environmental Impact Assessment the existing Outcome and Measurement Criteria is considered appropriate for the ongoing management of noise from the Site. No further amendments have been identified.

Existing Noise Outcome and Measurement Criteria are considered to be appropriate as outlined below.

Operational	
Outcome	Outcome Measurement Criteria
The Tenement Holder must, during construction and operation, ensure no public nuisance impacts from noise as a result of mining operations.	Records from Mine Logbook will demonstrate that any noise complaints received were resolved with the complainant within 48 hours (or other time as agreed with Mining Regulator).

	If complaints are not resolved the Tenement Holder will conduct noise monitoring at the sensitive receptor to demonstrate noise emissions comply with the <i>Environment Protection (Commercial & Industrial Noise) Policy 2023</i> .
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5.3. Air Quality

A review of sensitive receptors confirmed the nearest residential sensitive receptor is a residential dwelling approximately 3.5 km to the south west and another approximately 4.5 km south west of the Site Drawing No. 2377.DRG.017 – Land Access Map. Farming infrastructure such as sheds or tanks and a disused church (non-heritage listed) were incorrectly identified as sensitive receptors in the previous PEPR. Visual assessment undertaken 06 February 2024 by Groundwork Plus confirmed the residence located approximately 1.4 km south west of the Site is uninhabitable.

A change is planned for the disturbance area of the quarry to increase from three (3) ha open at one (1) stage to 10.61 ha open during Stage 1 and 10.57 ha during Stage 2 with progressive rehabilitation (1.27 ha Stage 1 and 6.61 ha Stage 2) occurring as areas become terminal.

Review of the BoM Climate Data Online (2023) at the nearest station (Eudunda Station No. 024511) identifies the predominate wind direction for the morning is westerly and the afternoon predominate wind direction is westerly and south westerly (refer to Attachment 5 – Wind Rose Data) which will further prevent dust impacts as no receptors are located to the east of the Site.

Figure 1 – 9am Average Wind Speed and Figure 2 – 3pm Average Wind Speed demonstrate the maximum mean wind speed for the area is 14.7km/h at 9am in September and 16.7 km/h at 3pm in August.

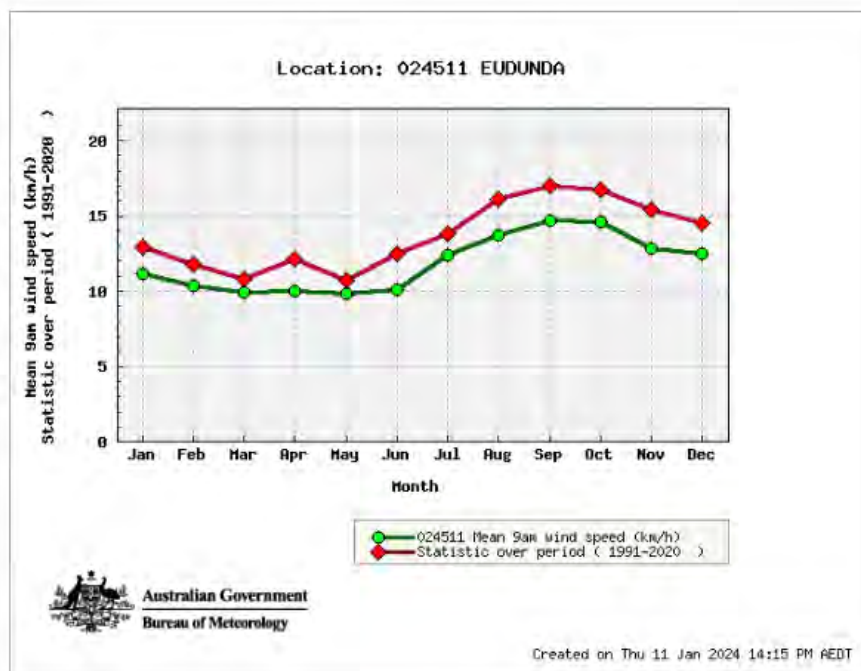


Figure 1 – 9am Average Wind Speed

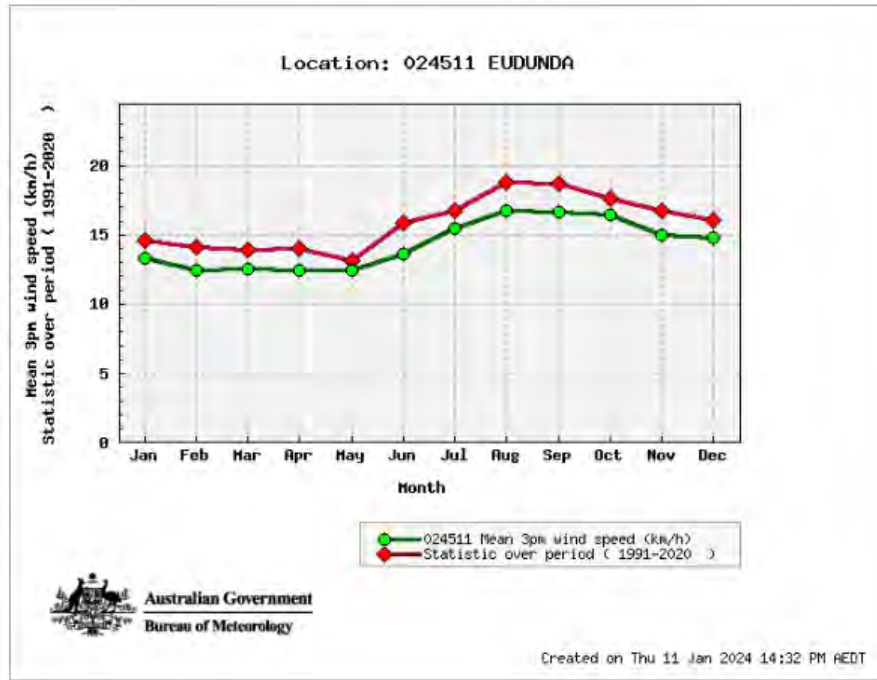


Figure 2 – 3pm Average Wind Speed

Consultation with an adjacent landowner raised concerns regarding the potential for asbestos to be contained with the rock. Testing of the rock confirmed the absence of asbestos within the extracted rock and evidence of testing has been provided to the landowner refer to Attachment 4 – Asbestos Testing Results.

Windfarm trucks and personnel regularly utilise Satchell Road to access water storage tanks west of the Site approximately halfway along Satchell Road. Powerline construction contractors also utilise Satchell Road for development of powerline infrastructure and access gates to powerlines. A hardstand area for mobile concrete batching plant and product stockpiles is located on the property at the intersection of Worlds End Highway and Satchell Road.

5.3.1. Impact Assessment

Quarry Phase	Potential Impact Event			
Operational	Potential for an increase in nuisance dust emissions generated by an increase in operational activities to negatively impact on sensitive residential receptors, potentially including free silica content (residents) and asbestos.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
D1	Dust generated from onsite activities such as vehicle movements, product handling and dry weather conditions.	Air	Nearest sensitive residential receptors as per Drawing No.2377.DRG.017 – Land Access Map.	No
Uncertainty and Assumptions		Dust emissions from the application area may be influenced by changes to operational and climatic conditions. Review of the BoM Climate Data (2023) at the nearest station (Eudunda Station No. 024511) identifies the predominate wind direction for the morning is westerly and the afternoon predominate wind direction		

	<p>is westerly and south westerly. The wind direction will aid in the reduction of impact from dust emissions to the nearest sensitive residential receptors which are located 3.5 km south west and 4.5 km south west.</p> <p>The surrounding landscape is predominantly agricultural with general activities of cropping and grazing that generates dust. A council borrow pit is located approximately 1.6 km west of the Site that at times generates dust. Satchell Road is utilised by multiple contractors installing commercial infrastructure within the region.</p> <p>Based on the proposed extraction volumes per annum and exposure timeframes to the source, exposure limits are considered to be of low risk to receptors. The free silica content is one of many constituents of dust, including pollen, sand, and other plant material. In addition to extraction, other quarrying activities including haulage and movement of vehicles may generate dust. Due to the proximity of the residences and aided by the local topography and prevailing wind direction the exposure to potential free silica is considered to be low.</p> <p>An assessment of the source material has been undertaken which has confirmed that the material does not contain any asbestos, refer to Attachment 4 – Asbestos Testing Results.</p>
Sensitivity to Change	<p>The level of dust within the ambient environment may influenced by climatic conditions. It is common for drier seasons to contain higher levels of dust due to the extent of exposed soils, unsealed roads and cropped land.</p> <p>Changes to the operational activities and duration could result in changes to dust emissions generated onsite. This may result in a low degree of change to dust emissions reflecting potential additional HME and haulage trucks utilised onsite.</p>
Justification for the Confirmation / Non-confirmation of Source, Pathway and Receptor	<p>The location of the residential receptors justifies that no receptors are affected by an increase of risk and therefore there is no Receptor.</p>

5.3.2. Control and Management Strategies

A review of control of management strategies has included previously approved control and management strategies **and the inclusion of additional strategies in line with S.C Heinrich's operational strategies.**

Control and Management Strategies
<p>Existing Controls:</p> <ul style="list-style-type: none"> • Rehabilitation will occur progressively in accordance with the Mining Plan. • Haul roads will be watered when required to control dust. • Mining will not occur during extreme wind days (i.e. dry conditions and wind speeds over 50 km/hr). • If required water will be carted to Site via portable water tankers.

<p>Additional Controls:</p> <ul style="list-style-type: none"> • Dampen down cleared areas, extraction working areas, haul roads, stockpiles and other hardstand areas by water spraying. • Sprayers on plant and equipment for crushing if required. • Stripping topsoil conducted in suitable wind and weather conditions to minimise generation of fugitive dust (i.e., where wind speed and direction will not impact on nearby residents). • Trucks to adhere to road permit conditions along Satchell Road (i.e. speed limits).
<p>Uncertainty and Assumptions of Control Strategies</p> <p>Potential impacts associated with air quality are reduced through the implementation of the control and management strategies, which are considered reasonable and industry standard practice to mitigate potential impacts.</p>
<p>Sensitivity to Change of Assumptions</p> <p>The sensitivity to change of assumptions is low based upon current separation distances to sensitive receptors.</p>

5.3.3. Environmental Outcome and Measurement Criteria

Based upon the outcomes of the Environmental Impact Assessment the existing Outcome and Measurement Criteria is considered appropriate for the ongoing management of Air Quality for the Site. No further amendments have been identified.

Operational	
Outcome	Outcome Measurement Criteria
<p>The Tenement Holder must, during construction and operation, ensure there are no public health and/or nuisance impacts from dust generated by mining operations.</p>	<p>Records from Mine Logbook will demonstrate that any dust complaints received were acknowledged within 48 hours and resolved with the complainant within seven (7) days (or other time as agreed with Mining Regulator).</p> <p>If complaints are not resolved to the satisfaction of the Mining Regulation, air quality monitoring is to occur at locations, and using methods, as agreed with the Mining Regulator, to demonstrate:</p> <ul style="list-style-type: none"> • PM10* concentrations leaving the Tenement are less than 50 µg/m³, when measured over a 24-hour period (midnight to midnight) as specified in the Environment Protection (Air Quality) Policy 2016, and / or • dust deposition leaving the Tenement does not exceed 4 grams per square metre per month (g/m²/m), when monitored in accordance with Australian Standard AS 3580.10.1 Methods for sampling and analysis of ambient air – Determination of particulates – Deposited matter – Gravimetric method <p>*Particulate matter with an aerodynamic diameter of ten micrometres or less.</p>

5.4. Groundwater

A search of the Department for Environment and Water (DEW) application 'NatureMaps' (2023) (Nature Maps) confirmed the Site is not located within an area prescribed under the *Landscape South Australia Act 2019*.

A search of the BoM Groundwater Dependent Ecosystems Atlas (GDE Atlas) (2023) did not identify any Aquatic Groundwater Dependent Ecosystems (GDE) within the Site, however one (1) Terrestrial GDE is located within the eastern and north eastern portion of the Site comprising of *Eucalyptus brachycalyx mallee woodland*. The Terrestrial GDE has been mapped as 'low potential' (from national assessment). Refer to Attachment 6 – Implications of mineral extraction for Vegetation Identified as a Terrestrial GDE (Low Potential) Summary for an analysis by Groundwork Plus Native Vegetation Consultant of the vegetation association and groundwater dependency. In summary the analysis reports '*Field validation of the Site has found the vegetation to be a mix of shrubs, low chenopods, native grasses and some scattered Eucalyptus oleosa mallee. Water table depths have been found to be in excess of 20 m. Annual rainfall provided by the Bureau of Meteorology is an average of 333 mm. Given the validated depth of groundwater on Site and the type of vegetation found, it is unlikely that groundwater is being utilised by the majority of the vegetation. Further to this, given the depth to groundwater, operations are not proposed to impact the depth of groundwater or the ability for recharge of groundwater from surface water infiltration. This would indicate that should some of the vegetation, particularly the mallee trees, be periodically utilising groundwater, proposed quarry operations will not inhibit this ability.*'

Groundwork Plus undertook a Native Vegetation assessment 30 May 2023 and is presented as Attachment 2 – Native Vegetation Management Plan. The report identifies the vegetation as *Eucalyptus oleosa ssp. oleosa* open Mallee with *Geijera linearifolia* and *Alectryon oleifolius* open shrubland over *Roepera apiculata* and *Maireana brevifolia* low shrubland over *Austrostipa sp.* Approval will be obtained prior to clearing the native vegetation within the Site.

Well data within the area is limited, with the majority of bores containing no water levels, old data or the well status and aquifer unknown, refer to Table 8 – Water Well Data for an overview of the wells within a four (4) km radius of the Site.

Table 8 – Water Well Data

Well No.	Direction from Site	Distance from Site (km)	Standing Water Level (SWL) m BGL	Elevation of Well (m AHD)	Status	Aquifer	Last record date
6730-480	North west	2.67	12	Unknown	Unknown	Unknown	05/02/2014
6730-100	South west	1.77	4.57	Unknown	Unknown	Unknown	06/02/1924
6730-363	South west	3.9	15.2	Unknown	Unknown	Unknown	27/10/1998
6730-316	South	1.25	Unknown	Unknown	OPR	Nya	23/09/1992
6730-156	South	1.88	Unknown	Unknown	OPR	Nya	27/06/1980
6730-157	South east	1.89	Unknown	Unknown	OPR	Ndw	27/06/1979
6730-158	South east	1.82	49	Unknown	ABD	Nds	27/06/1980
6730-151	North east	1.68	Unknown	Unknown	OPR	Unknown	27/06/1980

(Source: WaterConnect, 2023)

6730-100 1.77 km south west of the Site records a SWL of 4.57 m BGL dated 1924. There is no evidence of it being used with it now being located within a cropped field as per aerial imagery and as per Site visit undertaken by Groundwork Plus 06 February 2024.

Water wells located to the south east of the Site are located on the eastern side of ranges and are not topographically representative of the Site and therefore are not considered for inclusion in this assessment.

Well No 6730-316 located approximately 1.25 km south of the Site contained records within from the driller well construction report dated 22 September 1992 indicating a water cut occurred between 29 – 30 m BGL refer to Figure 3 – Driller Well Construction Report.

DMC-17

SCHEDULE EIGHT—FORM FOUR
GOVERNMENT OF SOUTH AUSTRALIA
Water Resources Act, 1976
DRILLERS WELL CONSTRUCTION REPORT

As the person responsible for the work carried out on this well I advise that it has been completed as described below.

1. PERMIT No. **28281** Official Well No. _____

2. LOCATION OF WELL:
Hundred or Pastoral Lease No. **0right**
Section **258** Lot No. _____ Site No. _____
Name of Property _____

Name of Driller: **Darryl Thomas** Licence No. **2/27** Permit holder or land occupier: **D.L. Gauer**
Name of plant operator if under supervision: _____ Postal Address: **World's End Creek 57n**
via ROBERTSTOWN Postcode: **5381**

3. SUMMARY
Date work commenced: **22/9/92** Date completed: **22/9/92**
Work carried out: New well Existing well, deepen enlarge rehabilitate backfill (tick appropriate boxes)
Final Depth: **23.5** m Final standing water level: **23.4** m Final yield: **0.6** l/sec
Was well abandoned? _____ If yes, state method _____

6. DRILLING DETAILS If not a drilled well please complete paragraphs 6.2, 9, 10, 11, 12 and 13 as necessary

6.1 CONSTRUCTION DETAILS (measurements from natural surface to nearest 0.1 m)

From (m)	To (m)	Drilling Method Cable Tool Rotary Auger, Etc.	Fluid Used (Air, Water, Mud Type)	Date	Water Cut From (m) To (m)	Standing Level (m)	Estimated Yield (l/sec)	Hole Depth at Test (m)	Casing at Test (m)	Test Method	Salinity mg/l or Tare	
0	33.5	rotary	air	22/9	29	30	23.4	0.6	33.5	-	air	good

7. CASING LEFT IN WELL

7.1 DIMENSION

From (m)	To (m)	Internal Diam.	7.2 TYPE Swell Joint, Welded Collar, Steel, Plastic, Etc.	7.3 CASING SHOE Yes No	7.4 CASING PRESSURE RATED Cemented Yes No	From (m)	To (m)	Cement (bags)	Water (litres)	Other Additives
0	13	152	steel	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					

8. CONSTRUCTION AT PRODUCTION LEVEL

8.1 METHOD
 Open Hole
 Screens(s)
 Slotted Casing

8.2 SCREEN ON SLOTTED CASING (if variable aperture screen used give limits)

Type	From (m)	To (m)	Aperture* (mm)	Inner Diam. (mm)	Outer Diam. (mm)	Material	Trade Name	Completion of Rise

9. OTHER GIVE DETAILS

9.1 LINER SEAL (gaskets)

Material	Depth (m)	Diam. (mm)	Method of Placement	Gravel Filling Mesh Size	From (m)	To (m)

9.2 GRAVEL PACKING

9.3 IF NOT A DRILLED WELL (i.e. hand dig, etc.)

Method	Depth (m)	Length (m)	Width (m)	Diam. (m)	Lining Material	From (m)	To (m)

9.4 DEVELOPMENT State methods and times taken
1 hour air lift

10. PUMP TEST (measurements from natural surface to nearest 0.1 m)

Interval Tested From (m)	To (m)	Water Level Stabilised at End?	Test Method	Depth of Pump (m)	Discharge Rate (l/sec)	Method of Measuring Discharge	No. of Hours Pumped	Draw Down (m)

12. SAMPLES
The provisions of the Water Resources Act and Regulations thereto require that strata and water samples must be obtained. If any samples have not been obtained state reasons:—

Signature of Licensed Driller: **D.D. Thomas** Date: **14/10/92**

Driller to forward this Copy, within 14 days of completion to:
The Director-General
Department of Mines and Energy
191 Greenhill Road
Parkside, S.A. 5063

6730003 W.N.00316
FORM 1207

Figure 3 – Driller Well Construction Report

In absence of any relevant and reliable regional data, resource drilling was undertaken in June 2023 via percussion drilling of four (4) holes (refer Drawing No. 2377.DRG.022 – Drillhole Location Plan) in the unexcavated areas of the quarry to identify the availability of resource.

The drilling was undertaken to a depth of 25 m from ground level of which groundwater was not intercepted at any of the four (4) holes.

This substantiates the consultation with the landowner confirming there are a lack of groundwater users in the area due to groundwater being inaccessible within the area and is consistent with the lack of active groundwater wells within three (3) km of the Site when searched on WaterConnect and reviewed onsite.

Plans to extract have been developed to a maximum depth of 23 m BGL at the lowest point of the quarry (refer to Drawing No. 2377.DRG.021AR1 – Conceptual Final Landform Plan and Drawing No. Conceptual Final Landform Plan Cross Sections A-A' to C-C'). Further percussion drilling extending two (2) m below the proposed Stage 2 floor level will be undertaken prior to completion of Stage 1B development in order to confirm that groundwater is not present within two (2) m of the final floor level.

There were no concerns regarding groundwater raised during consultation.

5.4.1. Impact Assessment

Quarry Phase	Potential Impact Event			
Operational	Potential to intersect groundwater due to the increase in depth of the pit floor.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
GW1	Quarry excavation during stage 2	Groundwater interception	Groundwater users and or GDE's	Yes
Uncertainty and Assumptions		<p>Review of desktop searches and consultation confirm there are a lack of groundwater users in the area due to depth of groundwater making it inaccessible to establish wells. Therefore, there are no known commercial or residential users of groundwater in proximity to the Site.</p> <p>Resource drilling identified no groundwater to 25 m below ground level from undisturbed areas of the quarry. It is assumed groundwater will remain lower than 25 m BGL. Further percussion drilling extending two (2) m below the proposed Stage 2 floor level will be undertaken prior to completion of Stage 1B development in order to confirm that groundwater is not present within two (2) m of the final floor level.</p> <p>Due to the depth of groundwater beneath the Site, it is unlikely that the terrestrial vegetation mapped as a low potential GDE is dependent on groundwater as per Attachment 6 – Implications of mineral extraction for Vegetation Identified as a Terrestrial GDE (Low Potential) Summary.</p> <p>The drill hole depth and lack of groundwater interception to 25 m BGL has been included on the Conceptual Final Landform Plan and Cross Sections (refer to Drawing No. 2377.DRG.021AR1 – Conceptual Final Landform Plan and Drawing No. Conceptual Final Landform Plan Cross Sections A-A' to C-C') to visually identify a two (2) m gap from pit floor depth to drill hole depth where it has been proven groundwater is not present.</p>		
Sensitivity to Change		<p>Due to the availability of groundwater data for the Site and the depth of resource drilling undertaken the sensitivity to change is considered medium. Additional drilling proposed during Stage 1B, prior to commencing Stage 2 will further inform ongoing sensitivity to change.</p>		
Justification for the Confirmation / Non-confirmation of Source, Pathway and Receptor		<p>Whilst there is an absence of sensitive receptors associated with this impact, a groundwater source, pathway and receptor has been established to be consistent with the Mining Lease conditions previously established for the Site through the Department for Energy and Mining (DEM) Defined Impact Assessment Model.</p>		

5.4.2. Control and Management Strategies

A review of control of management strategies has included previously approved control and management strategies and the inclusion of additional strategies in line with S.C Heinrich's operational strategies.

Control and Management Strategies
<p>Existing Controls</p> <ul style="list-style-type: none"> No mining is undertaken within two (2) m of the estimated highest seasonal groundwater level. <p>Additional Controls</p> <ul style="list-style-type: none"> Adherence to pit floor levels as per Drawing No. 2377.030A – Quarry Development Plan Stage 1A, Drawing No. 2377.031A – Quarry Development Plan Stage 1B and Drawing No. 2377.DRG.032A – Quarry Development Stage 2. Additional drilling within pit floor prior to completion of Stage 1B to confirm the absence of groundwater two (2) m below the proposed quarry floor. Undertake a groundwater assessment and review of QDP's if groundwater is detected within two (2) m of the planned quarry floor level for Stage 2. Periodic review of extraction area to ensure no seepage is occurring. If seepage observed, stop work and undertake a risk assessment and management plan to be developed (inclusive of new floor levels).
Uncertainty and Assumptions of Control Strategies
Control and management strategies are considered reasonable and commensurate with potential impacts of groundwater interception which are low.
Sensitivity to Change of Assumptions
Unlikely to change.

5.4.3. Environmental Outcome and Measurement Criteria

Based upon the outcomes of the Environmental Impact Assessment the existing Outcome and Measurement Criteria is considered appropriate for the ongoing management of groundwater within the Site. No further amendments have been identified.

Existing Groundwater Outcome and Measurement Criteria to be applied as outlined below.

Operational	
Outcome	Outcome Measurement Criteria
No adverse impact to groundwater caused by mining operations.	Annual inspection or survey (as agreed with Mining Regulator) of the pit floor recorded in the Mine Logbook will demonstrate that mining operations do not exceed the mine depth levels stated in the Mining Plan.

5.4.4. Proposed Measurement Criteria

Changes are required to the Proposed Measurement Criteria.

Groundwater	
Quarry Phase	Operational
Outcome Measurement	
<p>1. Outcome Achievement</p> <p>Annual inspection or survey (as agreed with Mining Regulator) of the pit floor levels recorded in the Mine Logbook will demonstrate that mining operations do not exceed the mine depth levels stated in Drawing No. 2377.030A – Quarry Development Plan Stage 1A, Drawing No. 2377.031A – Quarry Development Plan Stage 1B and Drawing No. 2377.DRG.032A – Quarry Development Stage 2.</p>	

<p>Additional resource drilling undertaken prior to the completion of Stage 1B to confirm that groundwater is not present within two (2) m of the Stage 2 final pit floor levels.</p> <p>Monthly inspection records during operations of the extraction area confirms that there are no signs of seepage during operation of the Site.</p> <p>2. What will be measured and the form of measurement Quarry Pit floor levels. Records of drilling investigations undertaken within pit floor level of Stage 1B. Inspection records for visual assessment of seepage.</p> <p>3. Location of measurement Within EML 6507 Drill locations outlined within Drawing No. 2377.DRG.021AR1 – Conceptual Final Landform Plan.</p> <p>4. Frequency Survey Pit floor levels annually. Seepage inspections monthly during operations. Drilling investigation undertaken prior to completion of Stage 1B.</p> <p>5. Control / Baseline Data Not applicable.</p> <p>6. Leading Indicator Criteria Not applicable.</p>

5.5. Visual Amenity

The Site is located in an agricultural area surrounded by grazing and cropping land. The nearest residential sensitive receptor is located 3.5 km south west with natural topography and vegetation providing screening of the quarry. Vegetation to the west of the Site provides natural screening with no views experienced by road users. The Site is bordered by ranges to the east.

The Site was originally approved under Defined Impact Assessment Model restricting disturbance area to three (3) ha at one (1) time including extraction areas and active rehabilitation activities. It is proposed that this restriction is removed and the Site to be managed as Section 3.2.4 Sequence of Quarrying and Progressive Rehabilitation and quarry development and progressive rehabilitation outlined in Drawing No. 2377.DRG.030A – Quarry Development Plan - Stage 1A, Drawing No. 2377.DRG.0031A – Quarry Development Plan - Stage 1B and Drawing No. 2377.DRG.032A – Quarry Development Plan - Stage 2.

There were no concerns raised regarding visual amenity during consultation.

5.5.1. Impact Assessment

Quarry Phase	Potential Impact Event			
Operational	Potential for negative visual impact of quarrying activities upon sensitive receptors situated within proximity to the Site due to an increase of open extraction area.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)

VA1	Quarry development, disturbed land	External viewpoints	Nearest sensitive residential receptors as per Drawing No.2377.DRG.017 – Land Access Map.	No
Uncertainty and Assumptions		<p>Assessment of the potential visual amenity impacts from the Site are well understood and informed by the visual impact assessment undertaken on 06 February 2024.</p> <p>Consultation with the landowner and visual inspection has confirmed the lack of residential receptors within three (3) km of the Site, confirming structures along Satchell Road are uninhabitable with adjoining land use of grazing or cropping.</p> <p>The Site is located at the end of the one-way road (Satchell Road) accessed for quarry operations, powerline construction and windfarm development.</p>		
Sensitivity to Change		<p>Development occurring closer to the Site or removal of natural screening located offsite could result in additional visual aspects increasing in some locations, however the sensitivity to change is considered low based upon the current land use for the area. The topography and vegetation adjacent to the Site provides natural screening of the Site.</p>		
Justification for the Confirmation / Non-confirmation of Source, Pathway and Receptor		<p>Site inspection and terrain mapping have confirmed the undulating surfaces and vegetation adjacent to the Site will continue to provide visual relief. The nearest residential receptor is located 3.5 km south west and experiences no views of the quarry, therefore there is no pathway or receptor.</p> <p>Notwithstanding the lease conditions for the Site have contained a predetermined visual amenity outcome which has been used to inform the development control and management strategies and outcome measurement criteria.</p>		

5.5.2. Control and Management Strategies

Changes to Control and Management Strategies have been updated to reflect new plan references.

Control and Management Strategies
<p>Construction and Operation:</p> <ul style="list-style-type: none"> • Mining operations will be developed and progressively rehabilitated as per Drawing No. 2377.DRG.030A – Quarry Development Plan - Stage 1A, Drawing No. 2377.DRG.031A – Quarry Development Plan - Stage 1B and Drawing No. 2377.DRG.032A – Quarry Development Plan - Stage 2. • Topsoil stockpiles to be utilised as earthen bunds to assist screening of the operations. <p>Post Completion:</p> <ul style="list-style-type: none"> • Shaping of the final landform with 1V:3H batters, respread of topsoil, stabilisation with grasses if required additional to natural revegetation in accordance with Drawing No. 2377.DRG.021AR1 – Conceptual Final Landform Plan.

Uncertainty and Assumptions of Control Strategies
No additional residential developments will occur within proximity to the Site. No known future residential development or intensification of land use is known within the adjacent land parcels.
Sensitivity to Change of Assumptions
The sensitivity to change of assumptions is low based upon current separation distances to sensitive receptors and land use of the area.

5.5.3. Environmental Outcome and Measurement Criteria

Based upon the outcomes of the Environmental Impact Assessment the Existing Outcome is considered appropriate for the ongoing management for visual amenity within the Site.

Due to the increase of disturbance area an amended Outcome Measurement Criteria is proposed as follows:

Operational	
Existing Outcome	Proposed Outcome Measurement Criteria
The form, contrasting aspects and reflective aspects of mining operations are visually softened to blend in with the surrounding landscape.	Annual site inspection records demonstrate that progressive and final rehabilitation has been completed in accordance with the approved Mining Plan.

5.5.4. Proposed Measurement Criteria

Visual Amenity	
Quarry Phase	Operational
Outcome Measurement	
<ol style="list-style-type: none"> 1. Outcome Achievement Annual site inspection records demonstrate that progressive and final rehabilitation has been completed in accordance with the approved Mining Plan. 2. What will be Measured and the Form of Measurement Visual assessment and photographic records of progressive rehabilitation as per Staged Quarry Development Plans. 3. Location of Measurement Within EML 6507. 4. Frequency Annually and at the completion of each Stage of quarry development. 5. Control / Baseline Data Not applicable. 6. Leading Indicator Criteria Not applicable. 	

5.6. Traffic

As per Section 3.2.13 Access Roads, there has an increase of traffic movements anticipated from 20 loads per day to approximately 50 loads per day during the height of campaigns, however, this will continue to vary depending upon market demand / campaign demand with some periods of the quarry to be unoperated and therefore reduced traffic.

The Site is accessed from Worlds End Highway onto the unsealed Satchell Road a no through road of which no residential receptors are located, with adjoining land use consisting of cropping or grazing. Windfarm trucks and personnel also utilise Satchell Road to access water storage tanks. Powerline construction contractors also utilise Satchell Road for development of powerline infrastructure and access gates located along Satchell Road to powerlines. A hardstand area previously used for a mobile concrete batching plant and now used as a product stockpile area is located on the property at the intersection of Worlds End Highway and Satchell Road refer to Photo Location 5 and 6 within Attachment 3 – Visual Assessment February 2024.

Satchell Road upgrades and maintenance requirements were agreed to between S.C. Heinrich and the Goyder Regional Council during the original MLP application, with the agreed road works occurring prior to the development of the Site. Ongoing maintenance will continue to occur as per a road maintenance agreement to be finalised. Visual assessment undertaken 06 February 2024 identified the road is in good condition and well maintained refer to Photo Location 10 within Attachment 3 – Visual Assessment February 2024.

No traffic incidents have been reported since the commencement of the quarry.

Stakeholder feedback raised concerns regarding dust generated from truck use along Satchell Road. Satchell Road is a local government owned road under the care and maintenance of Goyder Regional Council. S.C. Heinrich has the appropriate permits for truck use along Satchell Road.

5.6.1. Impact Assessment

Quarry Phase	Potential Impact Event			
Operational	Public safety risks such as collision between trucks and vehicles resulting from increased volume of quarry vehicles entering and exiting the Site at the access point.			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
T1	Quarry related traffic	Across Land	Public traffic	Yes
Uncertainty and Assumptions		<p>The Site entry and exit point is located at the end of no through road Satchell Road accessed predominately by quarry related traffic with direct access from and to the bituminised Worlds End Highway (approximately 2.3 km from Site). Other regular users include contractors to install and maintain powerline infrastructure and access water tanks within the region and windfarm infrastructure.</p> <p>No residential receptors are located along the proposed traffic route or within three (3) km of the Site (nearest 3.5 km south west).</p> <p>A road maintenance agreement is in the process of finalisation to maintain an agreed level of condition of Satchell Road with local government. Road use permits have been approved.</p> <p>Increased traffic will only occur in order to meet campaigns with some periods of the year with no traffic accessing the Site.</p>		

Sensitivity to Change	Unlikely to change.
Justification for the Confirmation / Non-confirmation of Source, Pathway and Receptor	Access point is not changing, approved access route is not changing, however traffic volumes are likely to increase along Satchell Road. On this basis it is likely that a source, pathway and receptor will be realised.

5.6.2. Control and Management Strategies

A review of control of management strategies has included previously approved control and management strategies **and the inclusion of additional strategies in line with S.C Heinrich's operational strategies.**

Control and Management Strategies
<p>Current Controls:</p> <ul style="list-style-type: none"> All operators will be made aware of the dangers of mine machinery and mine vehicles entering public roads during the Site induction. Vehicles and machinery will be parked inside the Tenement, not along road verges. <p>Additional Controls:</p> <ul style="list-style-type: none"> All personnel are to comply with the Site traffic management policies / procedures. Site management must ensure that all employees operating vehicles are licenced to do so. Two-way radios must be readily accessible in all Site vehicles. Vehicles must be in a roadworthy condition and fit for purpose. Road maintenance to be undertaken as per Council agreement and Work Authorisations under Sec 221 <i>Local Government Act (1999)</i>. Trucks to adhere to the speed limit approved within the road permit both directions along Satchell Road.
Uncertainty and Assumptions of Control Strategies
Control and management strategies adopted are standard industry practices and are proven to be effective (low uncertainty).
Sensitivity to Change of Assumptions
The sensitivity of the control measures to a change of assumptions is low.

5.6.3. Environmental Outcome and Measurement Criteria – No Change

Based upon the outcomes of the Environmental Impact Assessment the existing Outcome and Measurement Criteria is considered appropriate for the ongoing management of traffic within the Site. No further amendments have been identified.

Operational	
Outcome	Outcome Measurement Criteria
No traffic accidents involving members of the public at mine access points that could have been reasonably prevented by the Tenement Holder	All traffic accidents involving the public at mine access points are recorded in Mine Logbook. All accidents will be investigated by a suitably qualified independent third party within one calendar month (or other time as agreed with Mining Regulator) and the results of the investigation show that the accident could not have been reasonably prevented by the Tenement Holder.

5.6.4. Proposed Measurement Criteria

Traffic	
Quarry Phase	Operational
Outcome Measurement	
<ol style="list-style-type: none"> 1. Outcome Achievement All traffic accidents involving the public at mine access points are recorded in Mine Logbook. All accidents will be investigated by a suitably qualified independent third party within one (1) calendar month (or other time as agreed with Mining Regulator) and the results of the investigation show that the accident could not have been reasonably prevented by the Tenement Holder. 2. What will be Measured and the Form of Measurement Quarry logbook records detailing the results of the traffic incident investigation. 3. Location of Measurement Quarry Site entry / exit points. 4. Frequency Within one (1) month (or other time as agreed with Mining Regulation) after each incident. 5. Control / Baseline Data Not applicable. 6. Leading Indicator Criteria Not applicable. 	

5.7. Native Vegetation

As per Section 3.2.18 Vegetation Clearance the DIMLP Site inspection May 2019, confirmed that the majority of the Site was historically cleared and subject to heavy grazing, however noted scattered trees and shrubs increasing in numbers towards the north east corner were located within the Site and quarry development plans were designed to avoid scattered Native Vegetation through the establishment of a minimum five (5) m battered buffer around the dripline of the vegetation and no quarrying activities proposed within the north eastern corner.

For future operations it is now planned to remove the scattered trees and the vegetation within the Site to allow for extraction profile to be developed as per Drawing No. 2377.DRG.030A – Quarry Development Plan - Stage 1A, Drawing No. 2377.DRG.031A – Quarry Development Plan - Stage 1B and Drawing No. 2377.DRG.032A – Quarry Development - Stage 2. However, due to the amendments to the size and depth of extraction areas it is not practicable to retain these measures and hence an assessment to remove the scattered trees previously identified to be extracted around and retained has been undertaken.

An assessment of native vegetation within the Site was undertaken in May 2023 by Groundwork Plus Native Vegetation Accredited Consultant to assess the native vegetation present onsite and determine the SEB payment required to clear vegetation to allow for extraction to occur to the full extent of the EML. A Native Vegetation Clearance Data Report is attached as Attachment 2 – Native Vegetation Management Plan identifying the vegetation to be cleared (1.44 ha) and offsets to be paid to the NVF prior to clearance. The expansion of the quarry development has considered the health and condition of vegetation within the Site. The majority of the quality of vegetation is degraded due to historical disturbance from vehicles, earthworks and grazing at the Site of which the extent of native vegetation clearance has been reduced as much as possible historically. The proposed quarry plans are to extract to a depth of 25 m and a 1V:3H batter of which is not safe or practical to retain islands of vegetation within the pit therefore removal of vegetation is the recommended option to facilitate plans.

Attachment 2 – Native Vegetation Management Plan outlines 'A search of *NatureMaps* report identified four (4) threatened fauna species and zero (0) threatened flora species recorded within the preceding 20 years and within a five (5) km radius of the Site.

5.7.1. Impact Assessment

Quarry Phase	Potential Impact Event			
Operational	Unauthorised clearance or damage of native vegetation as a result of quarry operations			
Impact (ID)	Source	Pathway	Receptor	Confirmation of the source pathway and receptor (Y/N)
NV1	HME	Land	Native vegetation	Yes
Uncertainty and Assumptions		<p>The location of native vegetation has been well defined through vegetation surveys.</p> <p>Given the shape, size and landscape context of the vegetation under application, it is unlikely that clearance will lead to a long-term decrease in the size of any fauna populations. Likewise, clearance will not significantly reduce the area of occupancy of any fauna species.</p> <p>Clearance of the application area will not result in an increase in invasive species that are harmful to a threatened species habitat.</p>		

	<p>Clearance is unlikely to interfere with the recovery of any threatened fauna species.</p> <p>Following the closure of the quarry, the Site will be rehabilitated and is likely to be used for agricultural and grazing purposes to align with adjacent and existing use of the land. Given the previous rehabilitation of cleared areas for grazing, it is likely that native vegetation will colonise the rehabilitated landform, particularly native grasses, and early colonising shrub species.</p>
Sensitivity to Change	<p>The area requiring vegetation removal is well defined within the QDP.</p> <p>If the removal of native vegetation that has not been foreseen within the development of the MLP arises, appropriate approvals will need to be obtained under the <i>Native Vegetation Act 1991</i>.</p>
Justification for the Confirmation / Non-confirmation of Source, Pathway and Receptor	<p>Based on the proximity of the native vegetation to the operational areas of the Site it is reasonable to expect that a potential impact could occur.</p>

5.7.2. Control and Management Strategies

Control and Management Strategies
<p>New Controls:</p> <ul style="list-style-type: none"> • Topsoil stripping and associated vegetation clearance in accordance with Drawing No. 2377.DRG.030A – Quarry Development Plan - Stage 1A, Drawing No. 2377.DRG.031A – Quarry Development Plan - Stage 1B and Drawing No. 2377.DRG.032A – Quarry Development - Stage 2. • Training for mobile plant operators to ensure native vegetation is not cleared without authorisation. • Vegetation clearance area / extent of quarrying activity to be demarcated prior to commencement of vegetation clearance to prevent unauthorised clearance of native vegetation. • Ensure SEB payment for native vegetation areas within EML 6507 has been undertaken prior to earthworks commencing within each of the quarry development Stages as outlined within Drawing No. 2377.DRG.018 – Vegetation Associations.
Uncertainty and Assumptions of Control Strategies
<p>The mitigation measures proposed are considered reasonable and align with industry practice.</p>
Sensitivity to Change of Assumptions
<p>The area requiring vegetation removal is well defined within the QDP.</p> <p>If the removal of native vegetation that has not been foreseen within the development of the PEPR arises, appropriate approvals will need to be obtained under the <i>Native Vegetation Act 1991</i>.</p>

5.7.3. Proposed Environmental Outcome and Measurement Criteria

Based upon the outcomes of the Environmental Impact Assessment the existing Outcome and Measurement Criteria was not considered appropriate for the ongoing management of native vegetation within the Site. A new Outcome Measurement Criteria is proposed as follows:

Operational	
Outcome	Proposed Outcome Measurement Criteria
<p>The Tenement Holder must ensure that there is no loss of abundance or diversity of native vegetation on or off the Tenement through;</p> <ul style="list-style-type: none"> • clearance, • dust / contaminant deposition, • fire, • other damage, <p>unless a significant environmental benefit has been approved in accordance with the relevant legislation.</p>	<p>Visual inspection and photographic evidence undertaken annually and at the completion of each Stage of vegetation clearance by a suitably qualified person confirms that no clearance has occurred outside of the areas defined in the QDP (extraction footprint) as shown in Drawing No. 2377.DRG.030A – Quarry Development Plan - Stage 1A, Drawing No. 2377.DRG.031A – Quarry Development Plan - Stage 1B and Drawing No. 2377.DRG.032A – Quarry Development - Stage 2.</p>

5.7.4. Measurement Criteria

Native Vegetation	
Quarry Phase	Operational
Outcome Measurement	
<p>1. Outcome Achievement Visual inspection and photographic evidence undertaken annually and at the completion of each Stage of vegetation clearance by a suitably qualified person confirms that no clearance has occurred outside of the areas defined in the QDP (extraction footprint) as shown in Drawing No. 2377.DRG.030A – Quarry Development Plan - Stage 1A, Drawing No. 2377.DRG.031A – Quarry Development Plan - Stage 1B and Drawing No. 2377.DRG.032A – Quarry Development - Stage 2.</p> <p>2. What will be Measured and the Form of Measurement Vegetation clearance through records of Site inspections, photographic evidence and vegetation removal approval documentation.</p> <p>3. Location of Measurement Within EML 6507.</p> <p>4. Frequency Annually and at the completion of each stage of vegetation clearance.</p> <p>5. Control / Baseline Data Drawing No. 2377.DRG.018 – Vegetation Clearance Map. Attachment 3 – Native Vegetation Management Plan</p> <p>6. Leading Indicator Criteria Not applicable.</p>	

6. Effective and Efficient Mining

As a result of this Change of Operations Application, the changes mentioned within this document will not adversely **affect S.C. Heinrich's ability to effectively and efficiently quarry the** Tenement land, that appropriate environmental outcomes can still be achieved and that the changes in operations do not prevent S.C. Heinrich from being able to comply with any other Mining Act requirements.

6.1. Reasonable Prospect of Access to Land

No additional Waivers of Exemption are required for the extended operating areas as the current waivers and buffer requested of 50 m from infrastructure will continue to be maintained extracting to the full EML extents.

7. Assessment of Lease and / or Licence Terms / Conditions and The Act

Table 9 – Lease / Licence Conditions summarises the lease / licence conditions that apply to the **World's End Pit** and an assessment of whether the proposed change to operations would be compliant with each of the lease conditions, required amended control and management strategies, proposed outcomes or measurement criteria.

Table 9 – Lease / Licence Conditions

Condition No.	Condition	Assessment of whether proposed change in operations is compliant with condition
Sixth Schedule		
1.	The Tenement Holder must, during construction and operation, ensure no public nuisance impacts from dust as a result of mining operations.	<p>Refer to Section 5.3 Air Quality for a summary of the environment and operations.</p> <p>Additional control and measurement strategies have been included to align with S.C. Heinrich standard dust mitigation practices.</p> <p>Considered compliant with no change to outcome or measurement criteria proposed.</p> <p>The Proposed change to operations will not adversely affect the ability of the Tenement Holder to comply with this condition.</p>
2.	The Tenement Holder must, during construction and operation, ensure no public nuisance impacts from noise as a result of mining operations.	<p>Refer to Section 5.2 Noise for a summary of the environment and operations.</p> <p>Additional control and measurement strategies have been included to align with S.C. Heinrich standard noise mitigation practices.</p> <p>Considered compliant with no change to outcome or measurement criteria proposed.</p> <p>The Proposed change to operations will not adversely affect the ability of the Tenement Holder to comply with this condition.</p>
3.	The Tenement Holder must ensure that the form, contrasting aspects and reflective aspects of mining operations are visually softened to blend in with the surrounding landscape.	<p>Refer to Section 5.5 Visual Amenity for a summary of the environment and operations.</p> <p>No change to outcome.</p> <p>Additional control and measurement strategies have been included.</p> <p>A change is proposed to the Measurement Criteria due to a larger disturbance area.</p> <p>The Proposed change to operations will not adversely affect the ability of the Tenement Holder to comply with this condition.</p>

4.	The Tenement Holder must, during construction and operation, ensure the existing (pre-mining) soil quality of maintained.	The Proposed change to operations will not adversely affect the ability of the Tenement Holder to comply with this condition.
	The Tenement Holder must, during construction and operation, ensure that there are no public injuries or deaths resulting from unauthorised entry to the Site that could have been reasonably prevented.	The Proposed change to operations will not adversely affect the ability of the Tenement Holder to comply with this condition.
	The Tenement Holder must ensure that there are no public injuries or deaths as a result of the final landform post mine completion.	The Proposed change to operations will not adversely affect the ability of the Tenement Holder to comply with this condition.
	The Tenement Holder must, during construction and operation, ensure that there are no traffic accidents involving the public at min access points that could have been reasonably prevented by the Tenement Holder.	<p>Refer to Section 5.6 Traffic.</p> <p>Additional control and measurement strategies have been included to align with S.C. Heinrich standard traffic management practices.</p> <p>Considered compliant with no change to outcome or measurement criteria proposed.</p> <p>The Proposed change to operations will not adversely affect the ability of the Tenement Holder to comply with this condition.</p>
	The Tenement Holder must ensure that there is no unauthorised damage (including that caused by fire) to adjacent public or private property and infrastructure.	The Proposed change to operations will not adversely affect the ability of the Tenement Holder to comply with this condition.
	The Tenement Holder must, during construction and operation, ensure that there is no disturbance to Aboriginal or European heritage sites, objects or remains unless prior approval under the relevant legislation is obtained.	The Proposed change to operations will not adversely affect the ability of the Tenement Holder to comply with this condition.
	The Tenement Holder must ensure no loss of abundance of diversity of native vegetation on or off the Land through: 10.1 clearance, 10.2 dust / contaminate deposition, 10.3 fire, 10.4 other damage, unless a SEB has been approved in accordance with the relevant legislation.	<p>Refer to Section 3.2.18 Vegetation Clearance and Section 5.7 Native Vegetation.</p> <p>The Proposed change to operations will not adversely affect the ability of the Tenement Holder to comply with this condition.</p>
	The Tenement Holder must, during construction and operation, ensure no introduction of new species of weeds, or pests (including feral animals), nor increase	The Proposed change to operations will not adversely affect the ability of the Tenement Holder to comply with this condition.

	in abundance of existing weed or pest species in the Tenement.	
	The Tenement Holder must during construction and operation, ensure that there is no adverse impact to groundwater caused by mining operations.	Refer to Section 5.4 Groundwater. The Proposed change to operations will not adversely affect the ability of the Tenement Holder to comply with this condition.
	The Tenement Holder must, during construction and operation, ensure no adverse impact to surface water quality and water dependent ecosystems on or off the Land as a result of contamination and sedimentation caused by mining operations.	The Proposed change to operations will not adversely affect the ability of the Tenement Holder to comply with this condition.
	The Tenement Holder must, during construction and operation, ensure that all commercial or industrial waste is disposed of in accordance with relevant legislation.	The Proposed change to operations will not adversely affect the ability of the Tenement Holder to comply with this condition.
	The Tenement Holder must ensure that all disturbed land is progressively rehabilitated to achieve the agreed post mining land use.	The Proposed change to operations will not adversely affect the ability of the Tenement Holder to comply with this condition.

References

Australian Government Geoscience Australia, Elvis - Elevation and Depth - Foundation Spatial Data, <https://elevation.fsdg.org.au/> viewed 27 September 2023

Bureau of Meteorology (2022), viewed January 2022
http://www.bom.gov.au/climate/averages/tables/cw_021133.shtml

Nature Maps, viewed February 2022
<http://spatialwebapps.environment.sa.gov.au/naturemaps/?locale=en-us&viewer=naturemaps>

South Australian Resources Information Gateway (2022), *Department for Energy and Mining*, South Australian Government, viewed January 2022, <<https://map.sarig.sa.gov.au/>>.


WaterConnect *Department for Environment and Water*, South Australian Government, viewed December 2023, <https://www.waterconnect.sa.gov.au/Systems/GD/Pages/Default.aspx>,

drawings




REV	DESCRIPTION	DATE	BY

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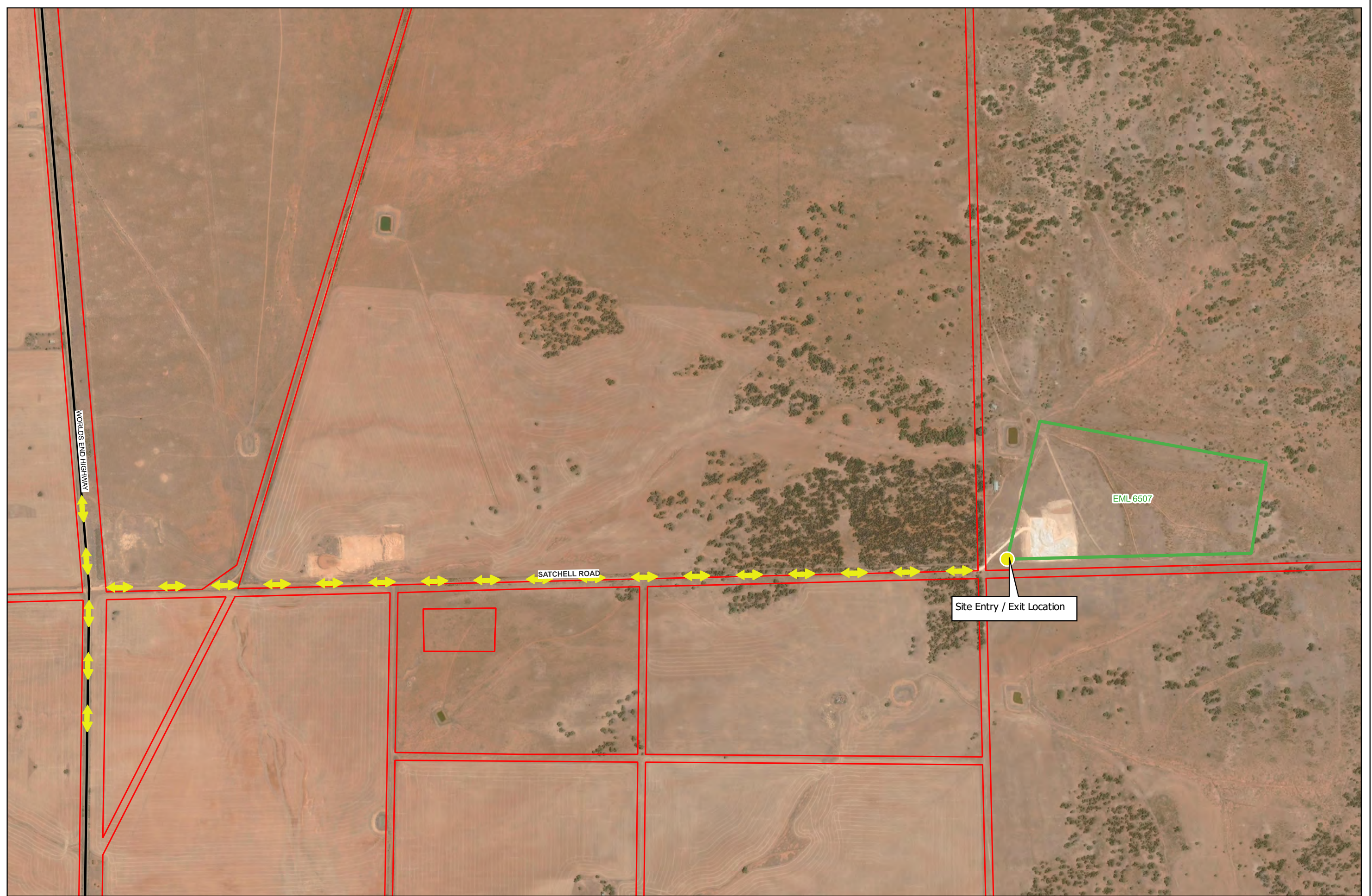
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 CLIENT: S.C. Heinrich & Co Pty Ltd

TITLE: Site Location Plan
 SCALE: 1:1,030,000
 DATE: 06-April-2023
 PRINTED: 06-April-2023


 DRAWING NUMBER: 2377.DRG.001
 DATE: 06-April-2023
 CHECKED: JR

Data Sources:
 Photography: Google Maps 2023 accessed: 06-April-2023
 Topography: Cadastre: DATA.SA.GOV.AU/Boundaries are Indicative only, not all boundaries shown
 Ecosystem: Other: SARIG 2023

REVISION:
 DATUM: HORIZONTAL / VERTICAL / ZONE
 EPSG: 28354
 MGA / AHD / 54



REV	DESCRIPTION	DATE	BY

Legend:

- Extractive Mineral Leases
- Cadastral
- Site Entry / Exit Point
- ↔ Access Road

Data Sources:
 Photography: DATA.SA.GOV.AU; Boundaries are Indicative only, not all boundaries shown
 Cadastral: DATA.SA.GOV.AU; Boundaries are Indicative only, not all boundaries shown
 Ecosystem: SARIG 2023



PROJECT: **Worlds End Pit**

CLIENT: **S.C. Heinrich & Co Pty Ltd**

TITLE: **Site Access Map**

SCALE: 1:9,000
(When Printed On A3)

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DRAWING NUMBER: **2377.DRG.015**

REVISION: **EP**

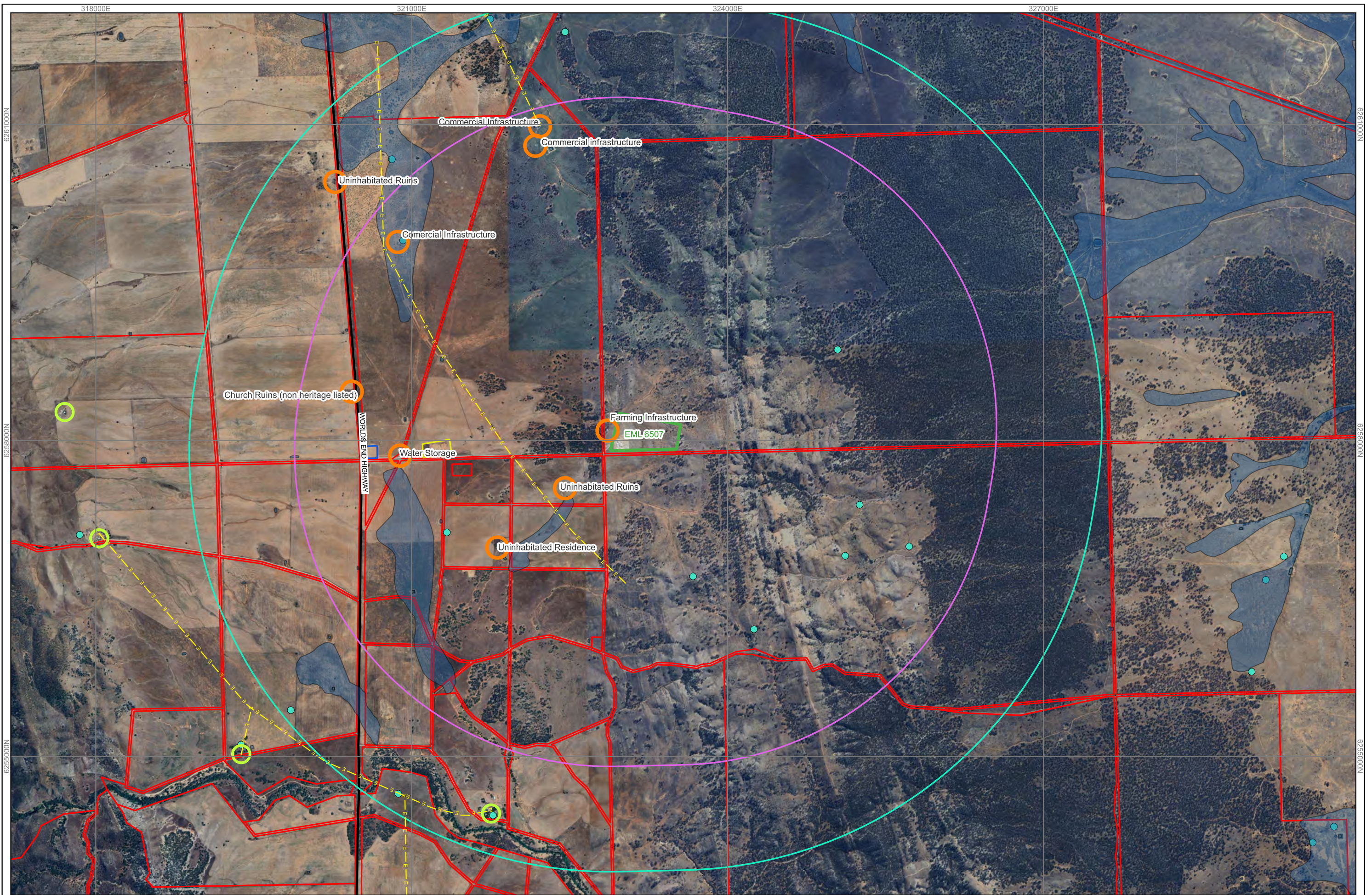
DATE: 13-April-2023 DRAWN: JR

PRINTED: 12-April-2023 CHECKED: JR

DATUM: HORIZONTAL / VERTICAL / ZONE: MGA / AHD / 54

EP90-28354





REV	DESCRIPTION	DATE	BY

Legend:

- EML 6507
- 4 km buffer
- Residence
- Waterbodies
- Cadastral
- Non Residential Receptors
- Powerlines
- Hardstand Area
- 3 km Buffer
- Water Wells
- Council borrow pit

PROJECT: **Worlds End Pit**

CLIENT: **S.C. Heinrich & Co Pty Ltd**

TITLE: **Land Access Map**

SCALE: 1:33,000
(When Printed On A3)

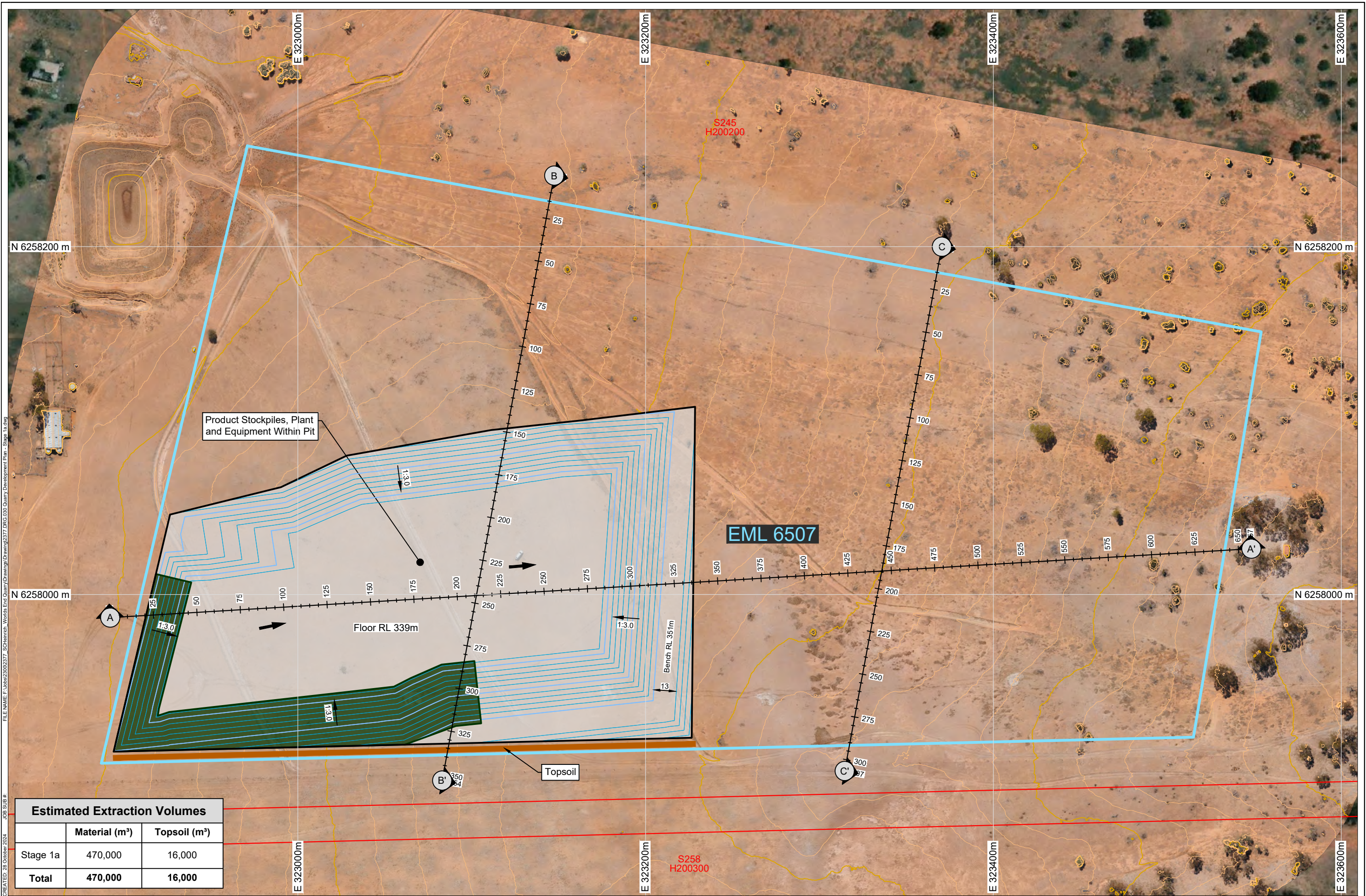
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DRAWN: EP
 CHECKED: JR

DRAWING NUMBER: **2377.DRG.017**

DATUM: HORIZONTAL / VERTICAL / ZONE
 MGA / AHD / 54

REVISION: EP90-28354



FILE NAME: F:\Jobs\202302317_SCH\Heinrich_Worlds End Quarry\Drawings\2377_DRG_030 Quarry Development Plan - Stage 1a.dwg
 CREATED: 28 October 2024
 JOB SUB #

Estimated Extraction Volumes		
	Material (m ³)	Topsoil (m ³)
Stage 1a	470,000	16,000
Total	470,000	16,000

REV	DESCRIPTION	DATE	BY

Data Sources:
 Photography: Groundwork Plus Pty Ltd, UAV Survey, 2019/04/10
 Topography: Groundwork Plus Pty Ltd, UAV Survey, 2019/04/10, DSM 75cm
 Cadastre: © The Government of South Australia (G11) 2021
 Ecosystem:
 LIDAR/Other: © 2023 Microsoft Corporation; © 2023 Maxar; © CNES (2023) Distribution Airbus DS
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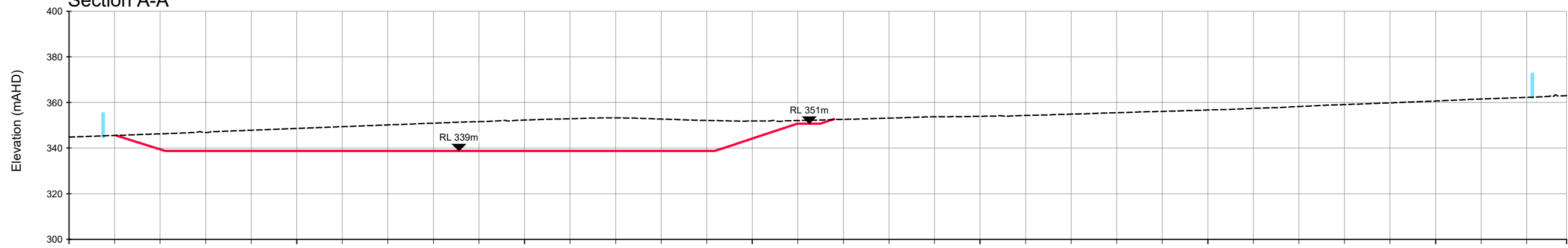
- Cadastral Boundary
- Extractive Minerals Lease
- Topsoil Stockpile
- Extraction Boundary (4.56ha)
- Progressive Rehabilitation (0.76ha)
- Direction of Extraction

PROJECT: **Worlds End Quarry**
 CLIENT: **S.C. Heinrich & Co Pty Ltd**

TITLE: **Quarry Development Plan - Stage 1A**
 SCALE: 1:2,000
 DRAWING NUMBER: **2377.DRG.030A**
 REVISION:
 CREATE DATE: 28 October 2024
 DRAWN: GL
 CHECKED: EP
 COORDINATE SYSTEM: GDA94 / MGA / AHD / 54

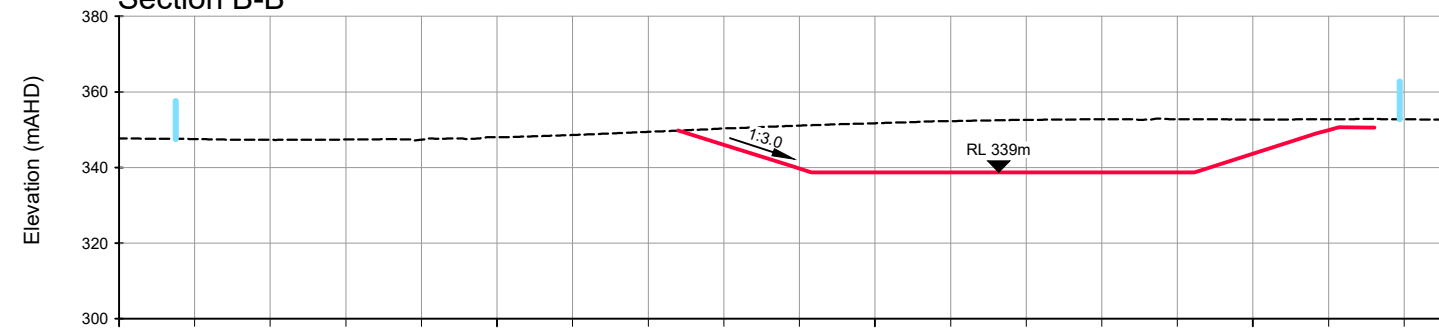
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 .JOB SUB #
 CREATED: 28 October 2024

Section A-A'



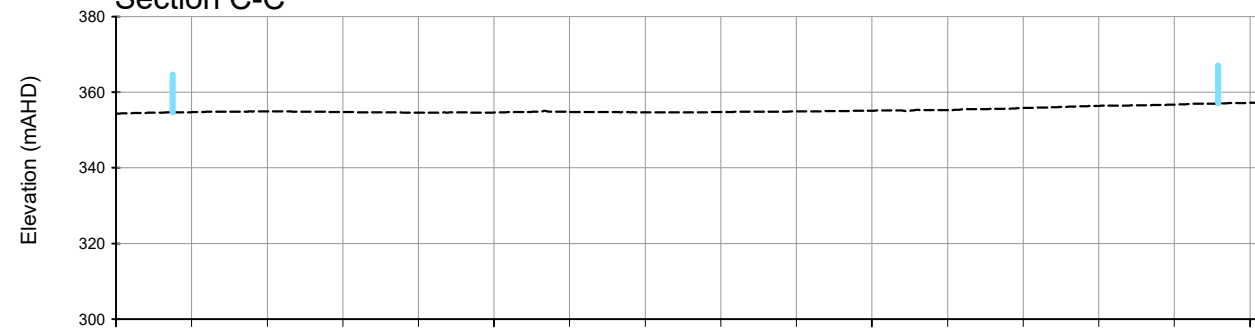
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Pit Depth (m)		6.8	8.1	9.1	9.9	10.6	11.4	12.2	12.9	13.6	14.1	14.5	14.0	13.4	7.7	1.3																			

Section B-B'



Chainage (m)	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	354
Pit Depth (m)								4.3	11.4	13.0	13.5	13.9	14.0	14.0	9.0	2.8		

Section C-C'



Chainage (m)	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	307
Pit Depth (m)																

REV	DESCRIPTION	DATE	BY

Data Sources:
 Photography: Groundwork Plus Pty Ltd, UAV Survey, 2019/04/10, DSM 75cm
 Cadastre:
 Ecosystem:
 LILIAN/Other:

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Legend:
 - - - - Existing Ground Surface
 — Pit Design Surface
 — Extractive Minerals Lease

PROJECT: **Worlds End Quarry**
 CLIENT: **S.C. Heinrich & Co Pty Ltd**

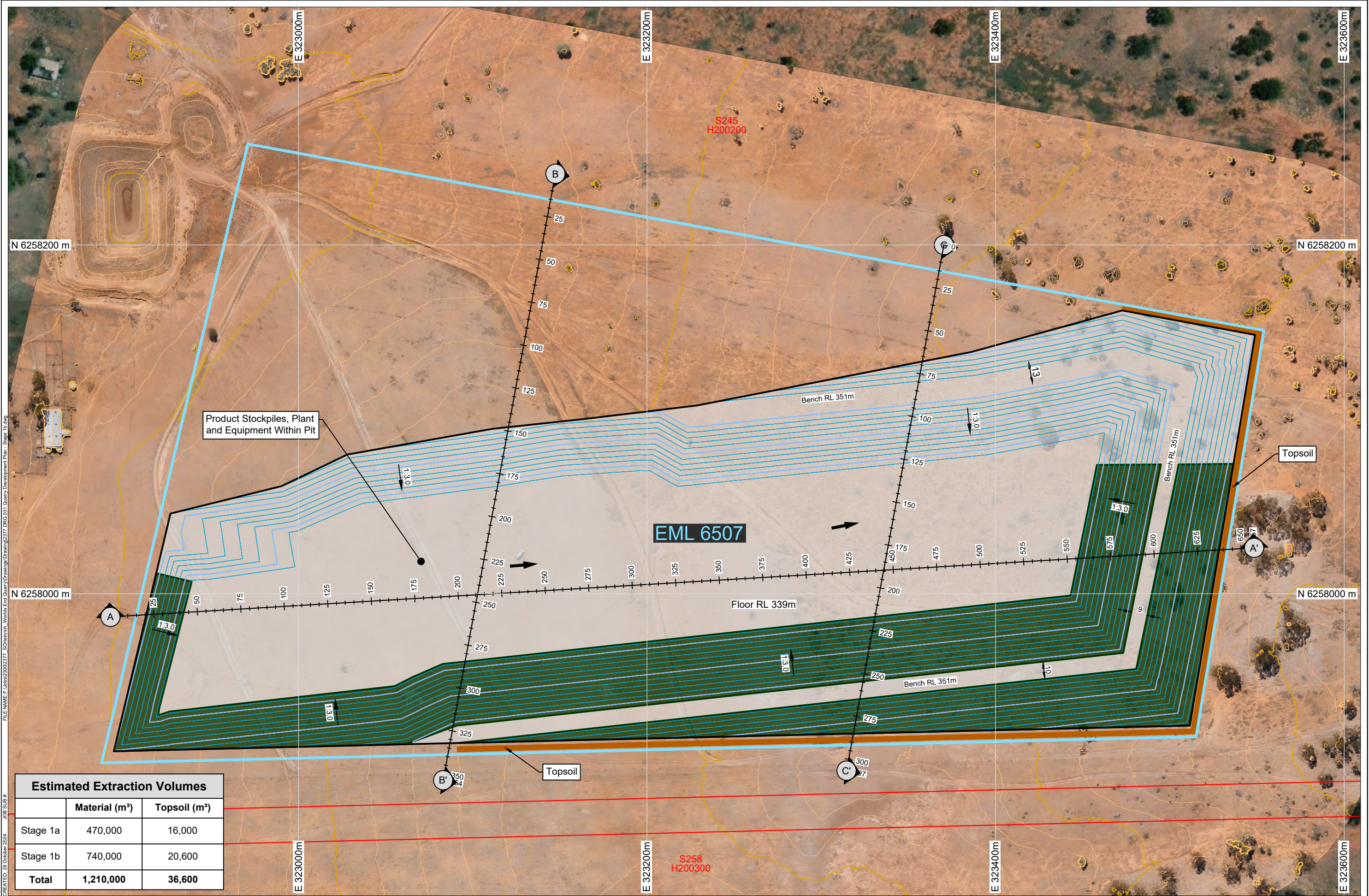
TITLE: **Quarry Development Plan - Stage 1A
 Cross Sections A-A' to C-C'**

SCALE: 1:2,000
 WHEN PRINTED ON A3

0m 40m

GROUNDWORK PART OF SLR
 PH: +61 7 3871 0411
 WWW.GROUNDWORK.COM.AU

DRAWING NUMBER: **2377.DRG.030B**
 REVISION:
 CREATE DATE: 28 October 2024
 DRAWN: GL
 COORDINATE SYSTEM:
 LAST SAVED BY: CODY.PARHAM
 CHECKED: EM
 GDA94 / MGA / AHD / 54



FILE NAME: F:\Jobs\23002377_SCH\Heinrich_Worlds End Quarry\Drawings\2377_DRG_031 Quarry Development Plan - Stage 1b.dwg
 CREATED: 28 October 2024
 JOB SUB #

Estimated Extraction Volumes		
	Material (m ³)	Topsoil (m ³)
Stage 1a	470,000	16,000
Stage 1b	740,000	20,600
Total	1,210,000	36,600

REV	DESCRIPTION	DATE	BY

Data Sources:
 Photography: Groundwork Plus Pty Ltd, UAV Survey, 2019/04/10
 Topography: Groundwork Plus Pty Ltd, UAV Survey, 2019/04/10, DSM 75cm
 Cadastre: © The Government of South Australia (G11) 2021
 Ecosystem:
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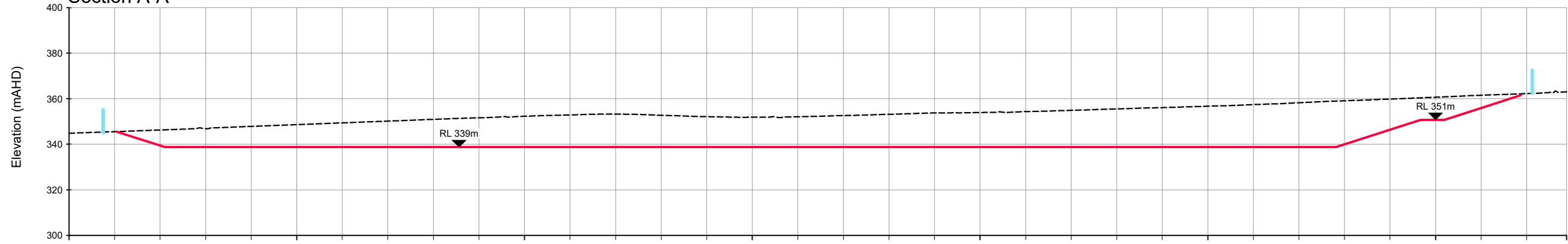
- Cadastral Boundary
- Extraction Boundary (8.33ha)
- Progressive Rehabilitation (3.53ha)
- Topsoil Stockpile
- Direction of Extraction

PROJECT: **Worlds End Quarry**
 CLIENT: **S.C. Heinrich & Co Pty Ltd**

TITLE: **Quarry Development Plan - Stage 1B**
 SCALE: 1:2,000
 DRAWING NUMBER: **2377.DRG.031A**
 REVISION:
 CREATE DATE: 28 October 2024
 DRAWN:
 CHECKED: EM
 COORDINATE SYSTEM: GDA84 / MGA / AHD / 54

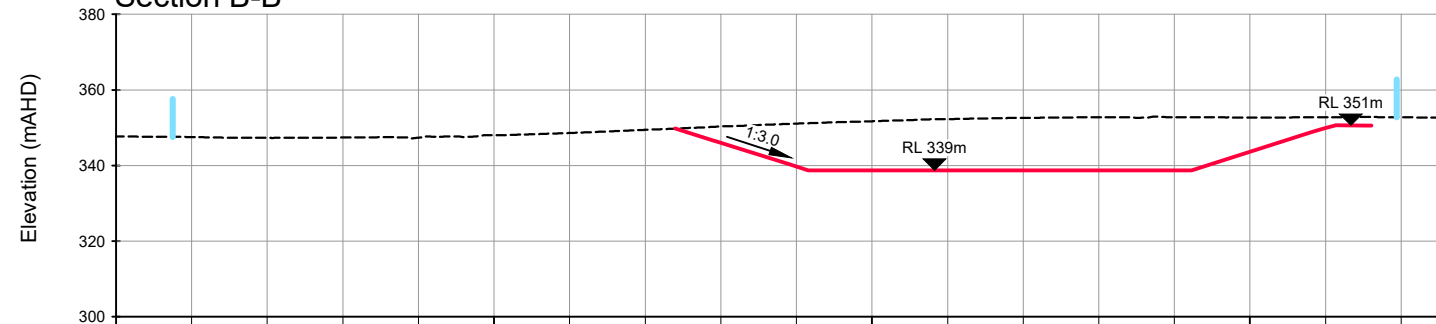
FILE NAME: F:\Jobs\23002377_SCH\enrich\Worlds End Quarry\Drawings\2377_DRG.031 Quarry Development Plan - Stage 1b.dwg
 .JOB SUB #
 CREATED: 28 October 2024

Section A-A'



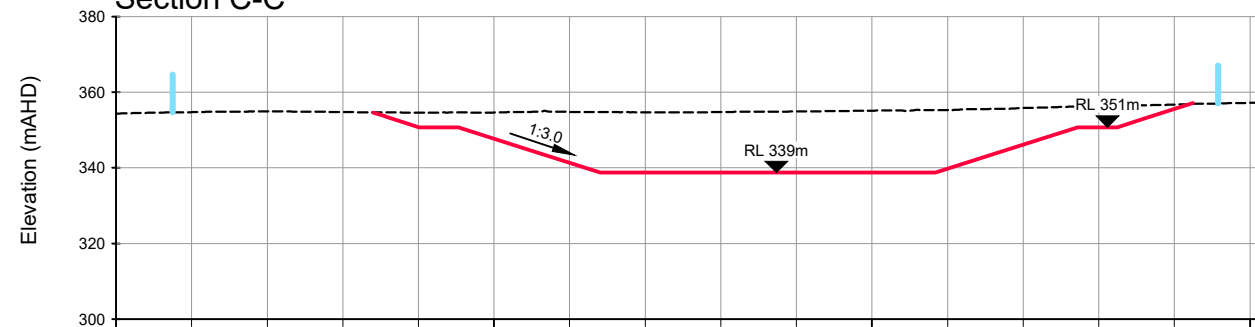
Chainage (m)	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	560	580	600	620	640	657
Pit Depth (m)		6.8	8.1	9.1	9.9	10.6	11.4	12.2	12.9	13.6	14.1	14.5	14.0	13.4	13.1	13.3	13.8	14.4	15.0	15.2	15.6	16.2	16.8	17.3	18.0	18.7	19.5	19.2	13.5	9.9	5.6		

Section B-B'



Chainage (m)	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	354
Pit Depth (m)								4.3	11.4	13.0	13.5	13.9	14.0	14.0	9.0	2.9		

Section C-C'



Chainage (m)	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	307
Pit Depth (m)				3.8	6.9	13.5	15.9	16.0	16.2	16.4	15.5	9.7	5.7	1.1		

REV	DESCRIPTION	DATE	BY

Data Sources:
 Photography: Groundwork Plus Pty Ltd, UAV Survey, 2019/04/10, DSM 75cm
 Cadastre:
 Ecosystem:
 LILIAN/Other:

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Legend:
 - - - - Existing Ground Surface
 — Pit Design Surface
 — Extractive Minerals Lease

PROJECT: **Worlds End Quarry**
 CLIENT: **S.C. Heinrich & Co Pty Ltd**

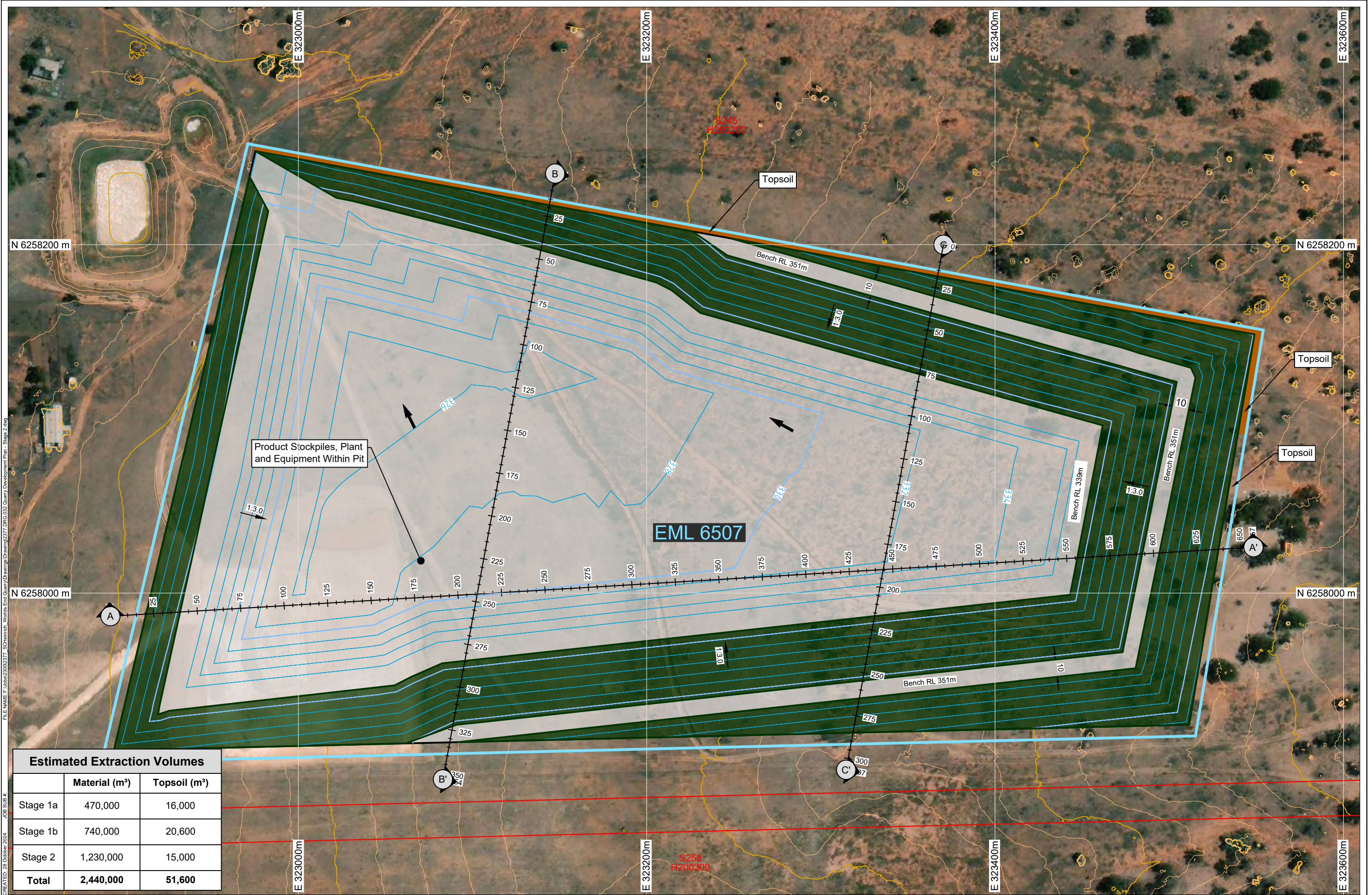
TITLE: **Quarry Development Plan - Stage 1B
 Cross Sections A-A' to C-C'**

SCALE: 1:2,000
 WHEN PRINTED ON A3

GROUNDWORK PART OF SLR
 PH: +61 7 3871 0411
 WWW.GROUNDWORK.COM.AU

DRAWING NUMBER: **2377.DRG.031B**
 REVISION:
 COORDINATE SYSTEM:
 GDA94 / MGA / AHD / 54

CREATE DATE: 28 October 2024
 DRAWN: GL
 LAST SAVED BY: CODY.PARHAM
 CHECKED: EM



FILE NAME: F:\Jobs\23002317 - Schematic - Worlds End Quarry\Drawings\2317_DRG_032 Quarry Development Plan - Stage 2.dwg
 CREATED: 28 October 2024
 JOB SUB #

Estimated Extraction Volumes		
	Material (m ³)	Topsoil (m ³)
Stage 1a	470,000	16,000
Stage 1b	740,000	20,600
Stage 2	1,230,000	15,000
Total	2,440,000	51,600

REV	DESCRIPTION	DATE	BY

Data Sources:
 Photography: Groundwork Plus Pty Ltd, UAV Survey, 2019/04/10
 Topography: Groundwork Plus Pty Ltd, UAV Survey, 2019/04/10, DSM 75cm
 Cadastre: © The Government of South Australia (G1) 2021
 Ecosystem:
 LIDAR/Other: © 2023 Microsoft Corporation; © 2023 Maxar; © CNES (2023) Distribution Airbus DS
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Legend:

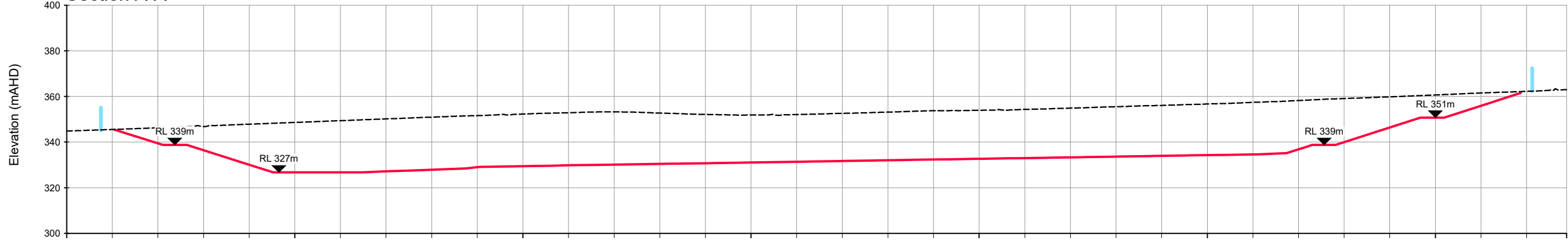
- Cadastral Boundary
- Extractive Minerals Lease
- Topsoil Stockpile
- Extraction Boundary (11.02ha)
- Progressive Rehabilitation (6.16ha)
- Direction of Extraction

PROJECT: **Worlds End Quarry**
 CLIENT: **S.C. Heinrich & Co Pty Ltd**

TITLE: **Quarry Development Plan - Stage 2**
 SCALE: 1:2,000
 DRAWING NUMBER: **2377.DRG.032A**
 REVISION:
 GROUNDWORK PART OF SLR
 PH: +61 7 3871 0411
 WWW.GROUNDWORK.COM.AU
 CREATE DATE: 28 October 2024
 DRAWN: GL
 CHECKED: EM
 COORDINATE SYSTEM: GDA84 / MGA / AHD / 54

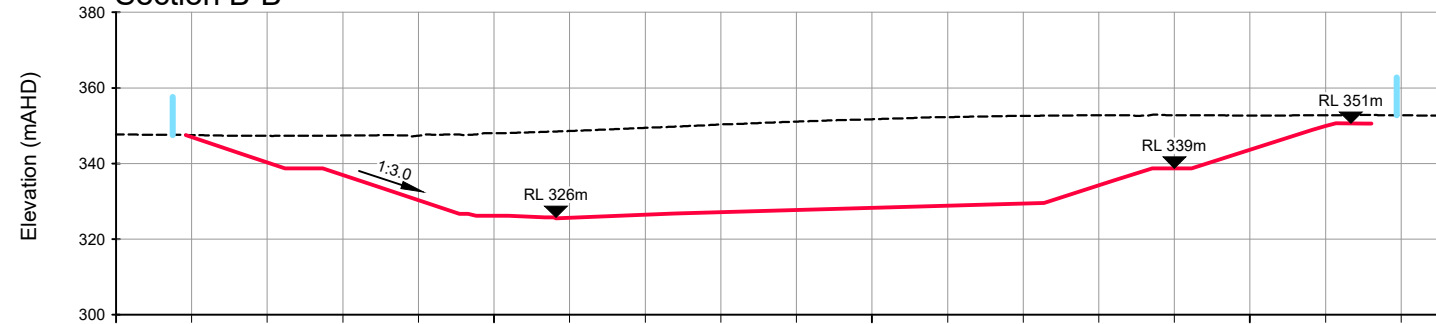
FILE NAME: F:\Jobs\23002377_SCH\enrich\Worlds End Quarry\Drawings\2377_DRG.032 Quarry Development Plan - Stage 2.dwg
 CREATED: 28 October 2024
 JOB SUB #

Section A-A'



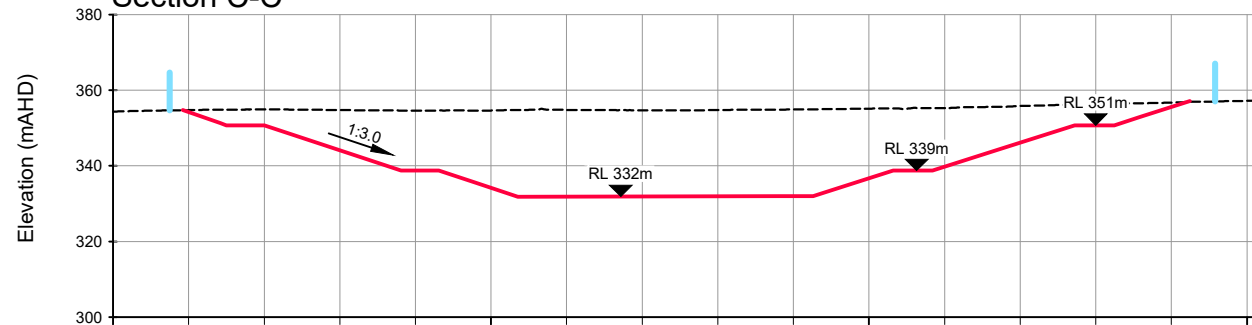
Chainage (m)	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	560	580	600	620	640	657	
Pit Depth (m)		6.8	10.4	17.8	21.9	22.6	23.0	23.0	22.6	22.8	23.0	23.2	22.3	21.4	20.8	20.7	20.9	21.1	21.4	21.3	21.3	21.6	21.9	22.1	22.4	22.8	21.4	19.2	13.5	9.9	5.6			

Section B-B'



Chainage (m)	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	354
Pit Depth (m)	0.6	7.0	10.4	17.0	21.8	22.9	23.0	23.2	23.4	23.4	23.4	23.1	18.5	14.0	9.0	2.9		

Section C-C'



Chainage (m)	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	307
Pit Depth (m)	0.5	4.2	10.7	15.9	20.5	23.0	22.8	22.8	23.0	18.4	15.5	9.7	5.7	1.1		

REV	DESCRIPTION	DATE	BY

- Legend:**
- - - - - Existing Ground Surface
 - Pit Design Surface
 - | Extractive Minerals Lease

Data Sources:
 Photography: Groundwork Plus Pty Ltd, UAV Survey, 2019/04/10, DSM 75cm
 Cadastre:
 Ecosystem:
 LILJAK/Other:

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PROJECT: **Worlds End Quarry**
 CLIENT: **S.C. Heinrich & Co Pty Ltd**

TITLE: **Quarry Development Plan - Stage 2
 Cross Sections A-A' to C-C'**

SCALE: 1:2,000
 WHEN PRINTED ON A3

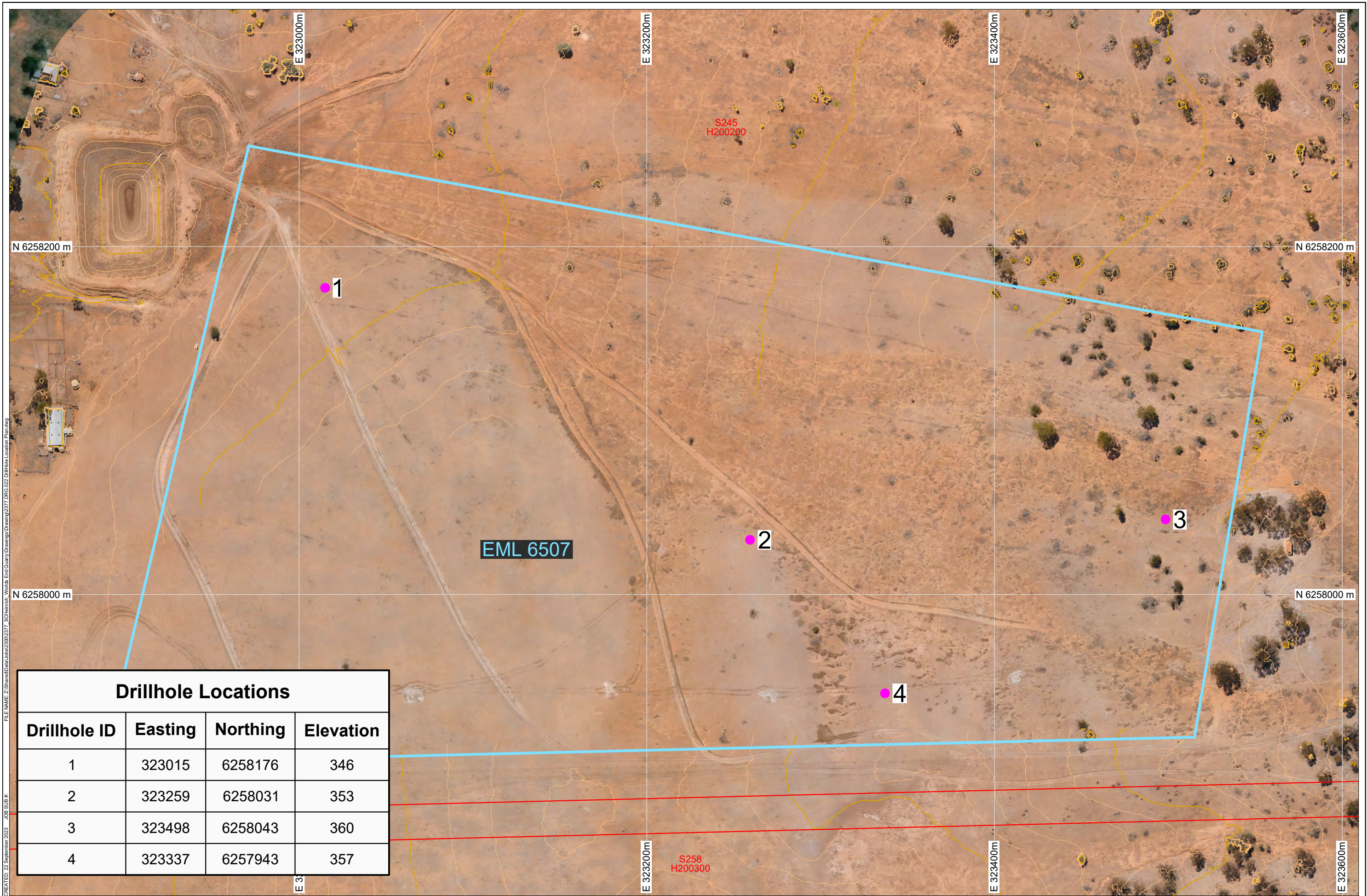
PH: +61 7 3871 0411
 WWW.GROUNDWORK.COM.AU

DRAWING NUMBER: **2377.DRG.032B**

REVISION:

COORDINATE SYSTEM: GDA94 / MGA / AHD / 54

CREATE DATE: 28 October 2024
 DRAWN: GL
 LAST SAVED BY: CODY.PARHAM
 CHECKED: EM



Drillhole Locations

Drillhole ID	Easting	Northing	Elevation
1	323015	6258176	346
2	323259	6258031	353
3	323498	6258043	360
4	323337	6257943	357

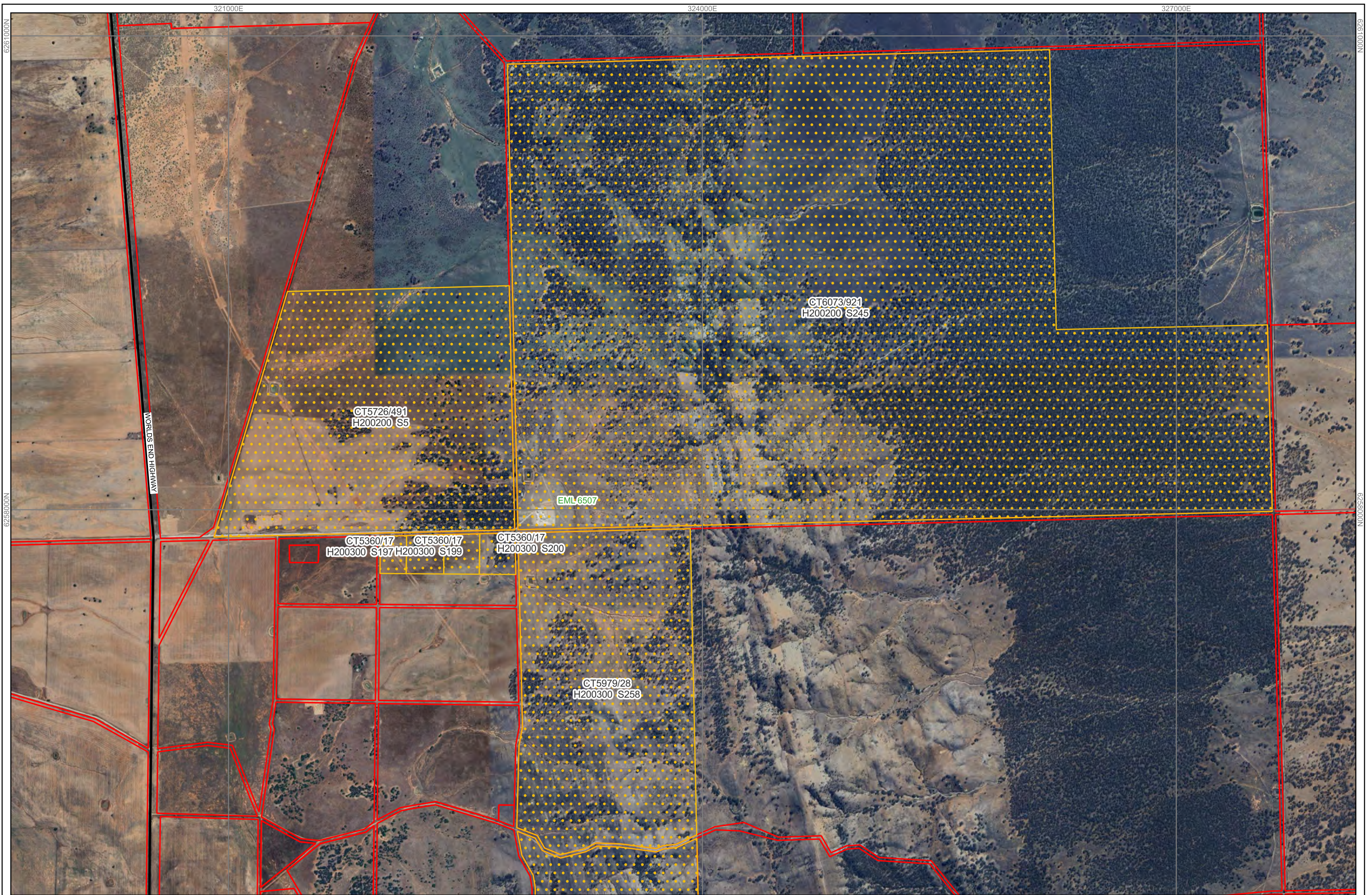
FILE NAME: Z:\SharedData\Jobs\23002377_Schennich_Worlds_End_Quarry\Drawings\2377_DRG_022_DrillHole_Location_Plan.dwg
 CREATED: 22 September 2023
 JOB SUB #

REV	DESCRIPTION	DATE	BY

Data Sources:
 Photography: Groundwork Plus Pty Ltd, UAV Survey, 2019/04/10
 Topography: Groundwork Plus Pty Ltd, UAV Survey, 2019/04/10, DSM 75cm
 Cadastre: © The Government of South Australia (G11) 2021
 Ecosystem:
 LIDAR/Other: © 2023 Microsoft Corporation; © 2023 Maxar; © CNES (2023) Distribution Airbus DS
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Legend:
— Cadastral Boundary
— Extractive Minerals Lease
● Drillhole Point

 PROJECT:	Worlds End Quarry CLIENT: S.C. Heinrich & Co Pty Ltd	TITLE: Drillhole Location Plan	SCALE: 1:2,000 WHEN PRINTED ON A3 	DRAWING NUMBER: 2377.DRG.022	REVISION: COORDINATE SYSTEM: GDA84 / MGA / AHD / 54
PH: +61 7 3871 0411 WWW.GROUNDWORK.COM.AU		CREATE DATE: 22 September 2023 LAST SAVED BY: KB00TH		DRAWN: KB CHECKED: TT	



REV	DESCRIPTION	DATE	BY

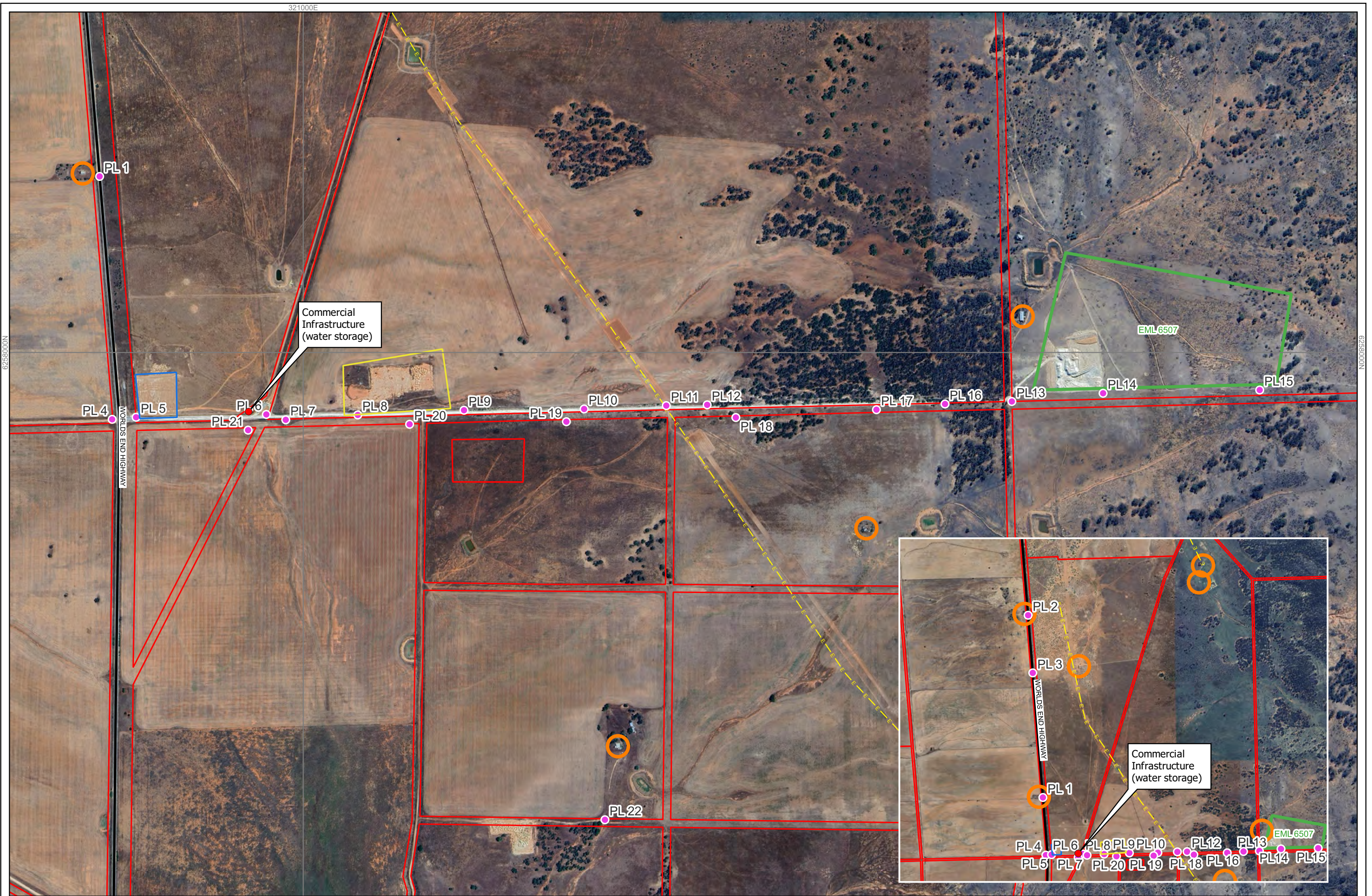
Legend:
 EML 6507
 Cadastral
 Adjacent Landowners

Data Sources:
Photography: Google Maps 2023 accessed: 01-November-2023
Topography: Cadastre: DATA.SA.GOV.AU; Boundaries are Indicative only, not all boundaries shown
Ecosystem: Other: SARIG 2023



PROJECT: Worlds End Pit
CLIENT: S.C. Heinrich & Co Pty Ltd

 <small>WWW.GROUNDWORKPLUS.COM.AU</small>	SCALE: 1:22,000 <small>(When Printed On A3)</small>	 <small>0 100 200 300 400 m</small>	DRAWING NUMBER: 2377.DRG.026	REVISION:
	DATE: 01-November-2023 PRINTED: 01-November-2023		DRAWN: EP CHECKED: JR	DATUM: HORIZONTAL / VERTICAL / ZONE: MGA / AHD / 54



REV	DESCRIPTION	DATE	BY

321000E

Legend:

- EML 6507
- Cadastral
- Hardstand Area
- Non Residential Receptors
- Photo Location Point
- Powerlines
- Council borrow pit

N

PROJECT: **Worlds End Pit**

CLIENT: **S.C. Heinrich & Co Pty Ltd**

TITLE: **Visual Assessment Map**

GROUNDWORK plus

SCALE: 1:9,000
(When Printed On A3)

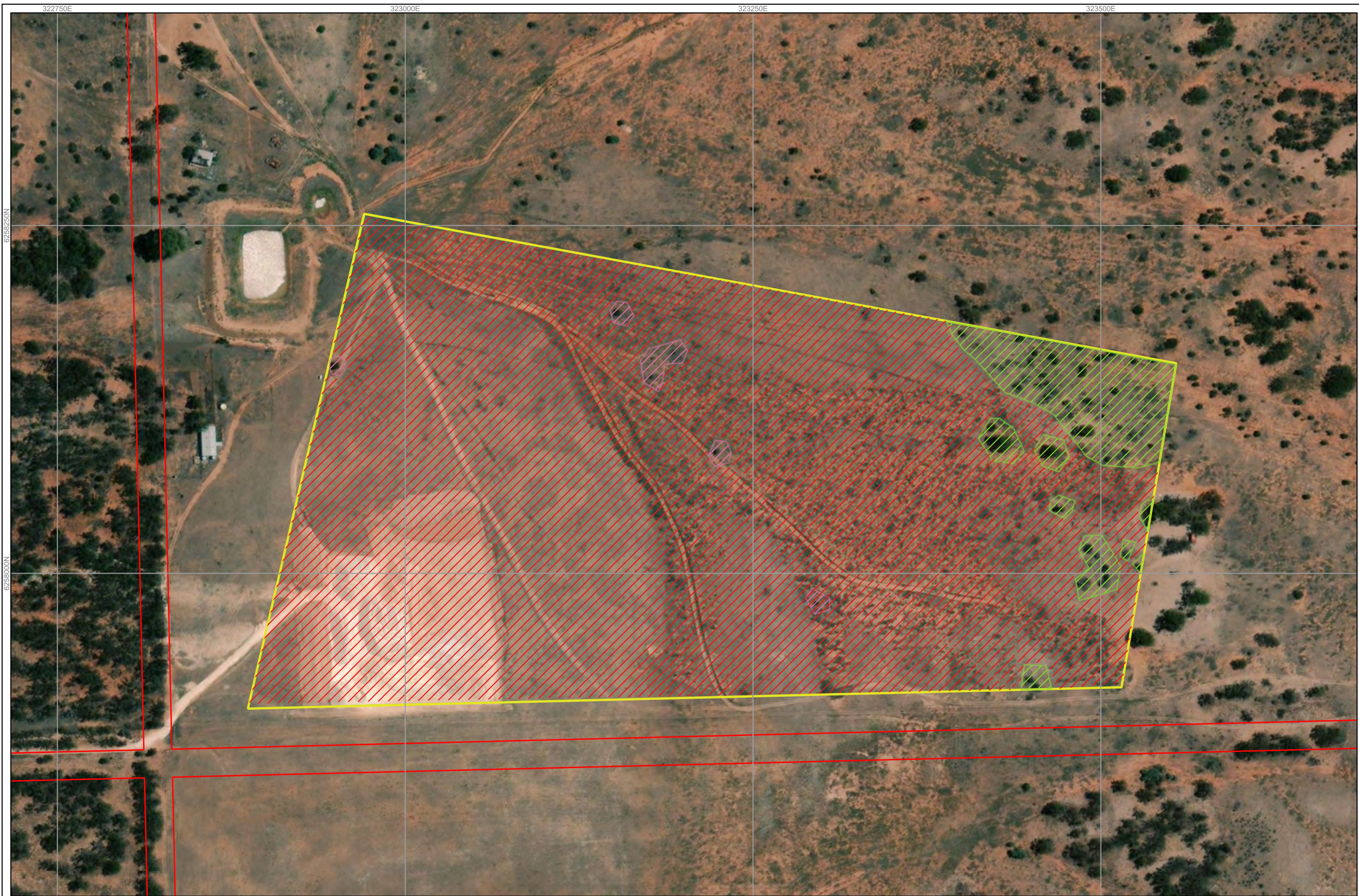
DATE: 08-February-2024
 PRINTED: 08-February-2024

DRAWN: EP
 CHECKED: JR

DRAWING NUMBER: **2377.DRG.029**

DATUM: HORIZONTAL / VERTICAL / ZONE
 MGA / AHD / 54

REVISION: EPGS 28354



REV	DESCRIPTION	DATE	BY

Legend:

- Cadastral
- Site
- A1
- A2
- Previously disturbed area

Vegetation association

PROJECT: Worlds End

CLIENT: SC Heinrich

TITLE: Vegetation associations

SCALE: 1:2,500
(When Printed On A3)

DATE: 30-June-2023
PRINTED: 30-June-2023

DRAWN: GW
CHECKED:

DRAWING NUMBER: 2377.DRG.018

DATUM: HORIZONTAL / VERTICAL / ZONE
MGA / AHD / 54

REVISION: EPG9.28354

Data Sources:
 Photography:
 Cadastral: Data.sa.gov.au (boundaries are indicative only, not all boundaries shown)
 Ecosystem:
 Other:





Uninhabited Ruins

EML 6507

REV	DESCRIPTION	DATE	BY

- Legend:**
- EML 6507
 - Cadastral
 - Site Storage
 - Non Residential Receptors
 - Site Entry Point

Data Sources:
 Photography: Google Maps 2023 accessed: 11-January-2024
 Topography: Cadastral: DATA.SA.GOV.AU; Boundaries are indicative only, not all boundaries shown
 Ecosystem: Other: SARIG 2023



PROJECT: **Worlds End Pit**

CLIENT: **S.C. Heinrich & Co Pty Ltd**

	SCALE: 1:3,000 <small>(When Printed On A3)</small>	0 10 20 30 40 m	DRAWING NUMBER: 2377.DRG.028	REVISION:
	<small>DATE: 11-January-2024</small> <small>PRINTED: 11-January-2024</small>	<small>DRAWN: EP</small> <small>CHECKED: JR</small>	<small>DATUM: HORIZONTAL / VERTICAL / ZONE</small> <small>EP</small> <small>MGA / AHD / 54</small>	

62560000N

62560000N



FILE NAME: F:\Jobs\2024\2377_SCH\Heinrich_Worlds End Quarry\Drawings\2377_DRG_021R1_Conceptual Final Landform Plan.dwg
 CREATED: 6 November 2024
 JOB SUB #

REV	DESCRIPTION	DATE	BY
1	Updated Pit Design	2024/10/28	CP

Data Sources:
 Photography: Groundwork Plus Pty Ltd, UAV Survey, 2019/04/10
 Topography: Groundwork Plus Pty Ltd, UAV Survey, 2019/04/10, DSM 75cm
 Cadastre: © The Government of South Australia (G1T) 2021
 Ecosystem:
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Legend:

- Cadastral Boundary
- Extractive Minerals Lease
- ▾ Grassed Area
- Drillhole Location

PROJECT: **Worlds End Quarry**
 CLIENT: **S.C. Heinrich & Co Pty Ltd**

TITLE: **Conceptual Final Landform Plan**

SCALE: 1:2,000
 0m 40m
 WHEN PRINTED ON A3

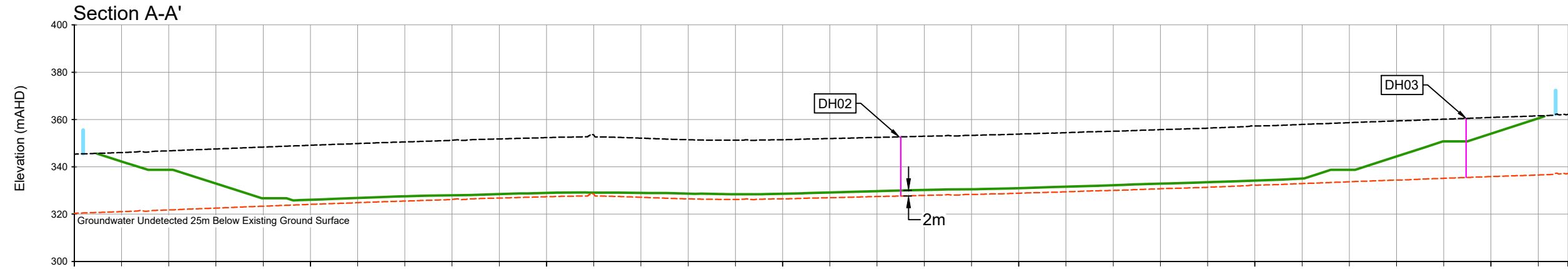
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 REVISION: **1**

CREATE DATE: 6 November 2024
 DRAWN: CP
 COORDINATE SYSTEM: GDA94 / MGA / AHD / 54

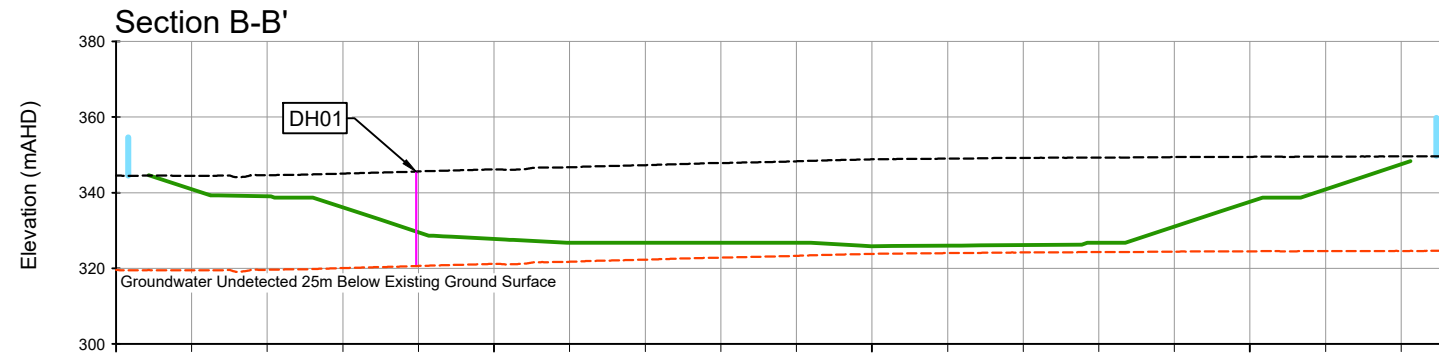
PH: +61 7 3871 0411
 WWW.GROUNDWORK.COM.AU
 LAST SAVED BY: CODY.PARHAM
 CHECKED: EP

GROUNDWORK
 PART OF SLR

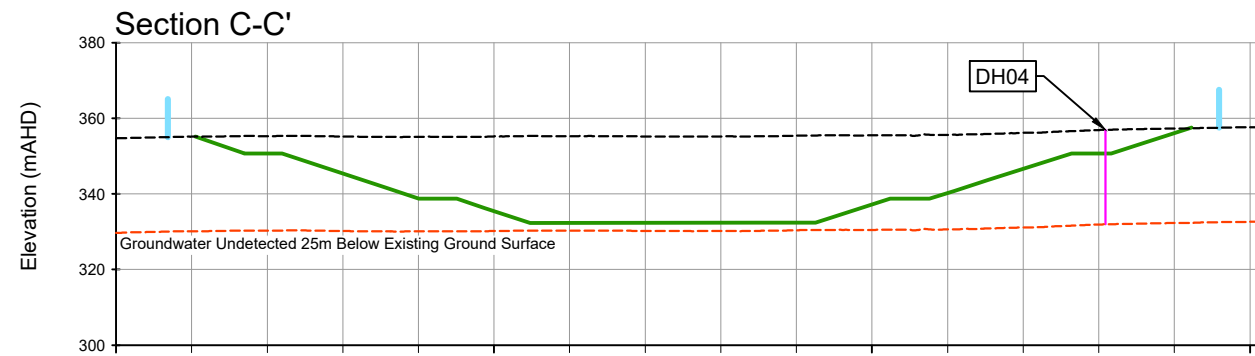
FILE NAME: F:\Jobs\23002377_Schematic\Worlds End Quarry\Drawings\2377_DRG.021B1 Conceptual Final Landform Plan.dwg
 CREATED: 6 November 2024
 JOB SUB #



Chainage (m)	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	560	580	600	620	633
Final RL (m)	342.3	338.7	332.9	326.7	326.1	326.8	327.6	328.0	328.5	329.0	329.1	328.9	328.7	328.4	328.6	329.1	329.7	330.2	330.5	331.0	331.6	332.2	332.9	333.5	334.2	335.0	338.7	344.4	350.7	354.0	360.5	362.2
Buffer Depth (m)	21	17	10	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	5	10	16	18	24	



Chainage (m)	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	354
Final RL (m)	340.9	339.1	336.1	329.6	327.8	326.7	326.7	326.7	326.7	325.8	326.0	326.2	326.7	331.0	337.6	340.9	347.5	349.6
Buffer Depth (m)	21	19	16	9	7	5	4	4	3	2	2	2	2	7	13	16	23	



Chainage (m)	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	307
Final RL (m)	355.1	350.7	345.4	338.8	335.5	332.3	332.4	332.4	332.4	337.2	340.3	346.6	350.7	356.1	357.6	357.6
Buffer Depth (m)		20	15	9	5	2	2	2	2	7	10	15	19	24		

REV	DESCRIPTION	DATE	BY
1	Updated Pit Design	2024/10/28	CP

Data Sources:
 Photography: Groundwork Plus Pty Ltd, UAV Survey, 2019/04/10, DSM 75cm
 Cadastre:
 Ecosystem:
 LIDAR/Other:

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Legend:

- - - - - Existing Ground Surface
- Rehabilitated Surface
- Extractive Minerals Lease
- - - - - Depth of Exploration Drilling

PROJECT: **Worlds End Quarry**

CLIENT: **S.C. Heinrich & Co Pty Ltd**

TITLE: **Conceptual Final Landform Plan Cross Sections A-A' to C-C'**

SCALE: 1:2,000

WHEN PRINTED ON A3

0m 40m

DRAWING NUMBER: **2377.DRG.021B**

REVISION: **1**

COORDINATE SYSTEM: GDA94 / MGA / AHD / 54

CREATE DATE: 6 November 2024

DRAWN: CP

CHECKED: EP

LAST SAVED BY: CODY.PARHAM

PH: +61 7 3871 0411

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attachments

Attachment 1

Drillhole Logs May 2023

Client: S.C. Heinrich

Drill Type: Percussion

Project: Worlds End

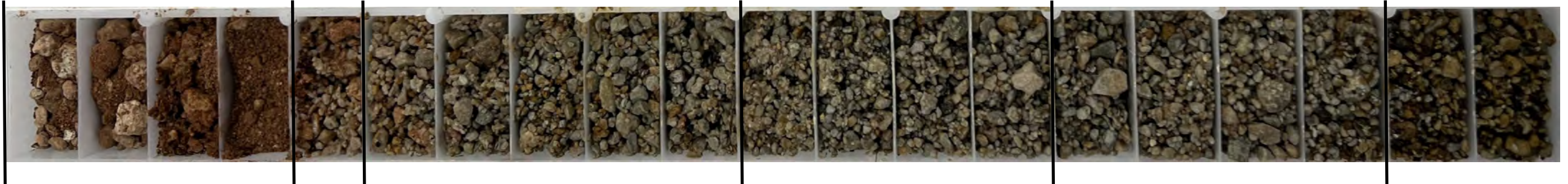
Date: June 2023

Logged by: Tristan Throup

Job: 2377

Hole Numbers:

DH-01



0.0 - 4.0m

Brown, residual soil.

4.0 - 5.0m

Off white, extremely weathered, Sandstone.

5.0 - 10.0m

Off white, moderately weathered, Sandstone.

10.0 - 14.0m

Off white, extremely weathered, Sandstone.

14.0 - 18.0m

Off white, moderately weathered, Sandstone.

18.0 - 25.0m

Off white, extremely weathered, Sandstone.



Client: S.C. Heinrich

Drill Type: Percussion

Project: Worlds End

Date: June 2023

Logged by: Tristan Throup

Job: 2377

Hole Numbers:

DH-02



0.0 - 1.0m

Orange, residual soil.

1.0 - 9.0m

Orange, extremely weathered, Sandstone/Clay.

9.0 - 10.0m

Off white, extremely weathered, Sandstone.

10.0 - 14.0m

Off white, highly weathered, Sandstone.

14.0 - 19.0m

Off white, moderately weathered, Sandstone.

19.0 - 20.0m

Brown, highly weathered, Sandstone.

20.0 - 25.0m

Brown, highly weathered, Quartz/Sandstone.



Client: S.C. Heinrich

Drill Type: Percussion

Project: Worlds End

Date: June 2023

Logged by: Tristan Throup

Job: 2377

Hole Numbers:

DH-03



0.0 - 1.0m

Brown, residual soil.

1.0 - 2.0m

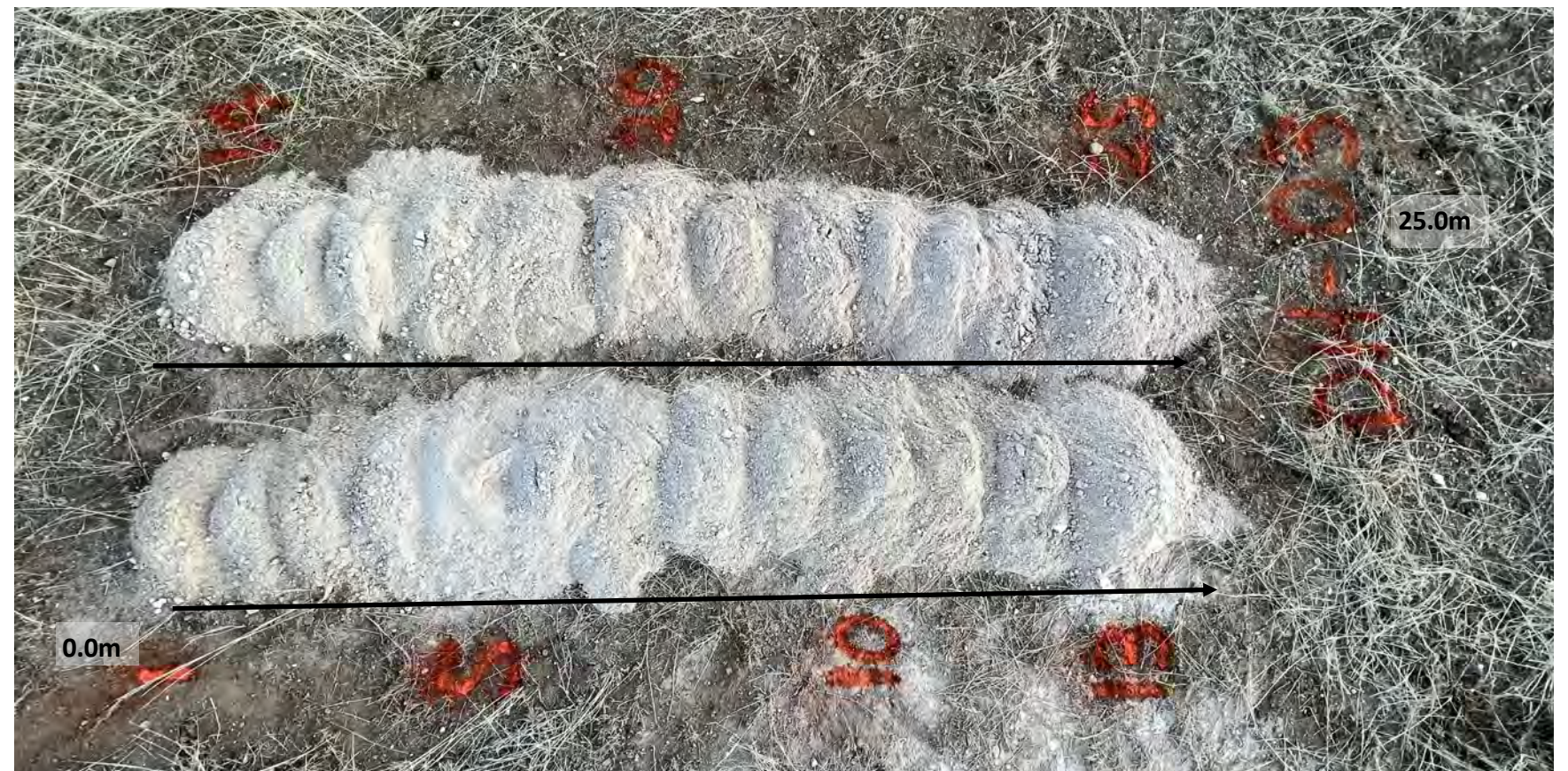
Brown, moderately weathered, Quartz/Sandstone.

2.0 - 14.0m

Brown, slightly weathered, Quartz/Sandstone.

14.0 - 25.0m

Brown, moderately weathered, Sandstone.



Client: S.C. Heinrich

Drill Type: Percussion

Project: Worlds End

Date: June 2023

Logged by: Tristan Throup

Job: 2377

Hole Numbers:

DH-04



0.0 - 1.0m

Brown, residual soil.

1.0 - 4.0m

Brown, extremely weathered, Quartz/Sandstone.

4.0 - 25.0m

Brown, moderately weathered, Quartz/Sandstone.



Attachment 2

Native Vegetation Management Report

Groundwork Plus (SA) Pty Ltd

Native Vegetation Management Plan

Worlds End Quarry

Clearance under the *Native Vegetation Regulations 2017*

Prepared for: S.C. Heinrich & Co. Pty Ltd

Date: February 2024

File Reference: 2377.610.012V1



DOCUMENT CONTROL

PROJECT / DETAILS REPORT

Document Title:	Native Vegetation Management Plan Worlds End Quarry
Principal Author:	Georgia Wilson
Client:	S.C. Heinrich & Co. Pty Ltd
Reference Number:	2377.610.012

DOCUMENT STATUS

Issue	Description	Date	Author	Reviewer
0	Draft for Comment	January 2024	Georgia Wilson	Louise Jaunay
1	Final	February 2024	Georgia Wilson	Louise Jaunay

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Site Location Plan (Drawing No. 2377.DRG.001)
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ATTACHMENTS

Attachment 1 Fauna Species List
Attachment 2 *Environmental Protection and Biodiversity Conservation Act 1999* Protected Matters Report
Attachment 3 Bushland Assessment Scoresheet
Attachment 4 Threatened Species Summary

1 Applicant Information

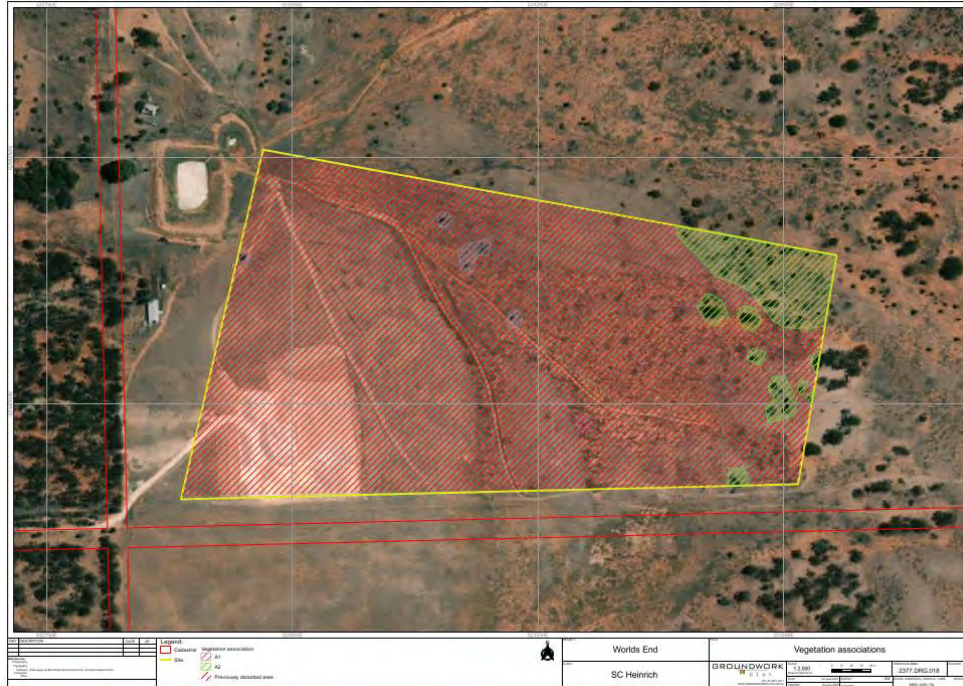
1.1. Application Details

Applicant:	S.C. Heinrich & Co. Pty Ltd		
Key contact:	Name:	Malcolm Heinrich	
	Contact details:	moose@scheinrich.com.au Satchell Road, Worlds End, South Australia	
Landowner:	Name:	Malcolm Heinrich	
	Contact details:	As above	
Site address:	Satchell Road, Worlds End, South Australia 5381		
Local Government Area:	Regional Council of Goyder	Hundred:	Baldina
Title ID:	CT 6073 / 921	Parcel ID:	H200200 S245

1.2. Summary of Proposed Clearance

Purpose of clearance	Clearance is required for quarry extraction
Native Vegetation Regulation	Part 5, Division 1, Regulation 12 (28) - Operations
Description of the vegetation under application	0.32 hectares (ha) of <i>Geijera linearifolia</i> open shrubland over <i>Roepera apiculata</i> and <i>Maireana brevifolia</i> low shrubland in good condition. 1.12 ha of <i>Eucalyptus oleosa ssp. oleosa</i> open Mallee with <i>Geijera linearifolia</i> and <i>Alectryon oleoifolius</i> open shrubland over <i>Roepera apiculata</i> and <i>Maireana brevifolia</i> low shrubland over <i>Austrostipa sp.</i> in good condition.
Total proposed clearance - area (ha) and number of trees	1.44 ha are proposed to be cleared
Level of clearance	Level 3
Overlay (Planning and Design Code)	Hazards (Flooding – Evidence Required), Hazards (Bushfire – Regional), Key Outback and Rural Routes, Murray - Darling Basin, Native Vegetation, Water Resources

Map of proposed clearance area



Mitigation hierarchy

Native vegetation has been avoided as much as practical when considering the extraction area, with quarry activities focused within previous disturbance areas of the Site. The majority of the Extractive Minerals Lease (EML) has been situated over an area of previous disturbance to minimise the extent of native vegetation that is required for removal. Consideration to retaining native vegetation within the Program for Environmental Protection and Rehabilitation (PEPR) will be given, and where possible, high quality native vegetation will be avoided with buffer zones to ensure the native vegetation is not impacted by quarry activities.

Vegetation clearance will be minimised to the extent that will allow viable quarry operations.

Following the closure of the quarry, the Site will be rehabilitated and is likely to be used for agricultural and grazing purposes to align with adjacent and existing use of the land. Given the previous rehabilitation of the historical quarry operations, it is likely that native vegetation will colonise the rehabilitated landform, particularly native grasses, and early colonising shrub species.

To offset the proposed clearance, the Client intends to pay into the Native Vegetation Fund (NVF), the amount required for the Significant Environmental Benefit (SEB)

SEB Offset proposal

The client intends to make a single payment (including admin fee of \$665.23) of \$12,760.34 into the NVF.

2 Purpose of Clearance

2.1 Description

Groundwork Plus (SA) Pty Ltd (Groundwater Plus) have been engaged by S.C. Heinrich & Co. Pty Ltd (the Client), to undertake a Native Vegetation Assessment within a quarry extraction area within EML 5607, on land parcel Certificate of Title (CT) 6073 / 921 (the Site). This Native Vegetation Management Plan is to form a component of the PEPR and may influence the extraction areas within the Site.

The Site is located in the Northern and Yorke Landscape Management Region, approximately 130 kilometres (km) north east of Adelaide, South Australia. The nearest town, Burra, is located approximately 19 km north west of the EML, refer to **Drawing No. 2377.DRG.001 – Site Location Plan**.

2.2 Background

The Site has been operating as a quarry extraction area since it was granted the EML on 10 February 2020, where the extraction activity has been predominantly focused in the south west corner of the Site. It has also been used for agriculture (grazing) in parts surrounding small patches of native remnant vegetation in the project area. Due to the increasing demand for limestone for road base and construction materials within the Northern and Yorke area, clearance is required to enable the ongoing delivery of materials to the broader market.

Quarry Development Plans (QDP's) (Stage 1 and Stage 2) of clearance have been developed, this will form part of the PEPR.

2.2.1 Interim Biogeographical Regionalisation of Australia (IBRA)

A search of the Government of South Australia Enviro Data (2023) application *NatureMaps*, confirmed the Site is located within the Flinders Lofty Block (FLB) Interim Biogeographic Regionalisation for Australia (IBRA) Region, and the Broughton IBRA Subregion. Ten percent of the subregion has been mapped as remnant vegetation, of which three (3) percent is formally conserved within Department for Environment and Water (DEW) reserves and Heritage Agreements (HA) under the *Native Vegetation Act 1991*. The Flinders Lofty IBRA Region is described as "Ranges and hills with extensive rock outcrop and shallow soils; stony pediments and small bason plains; some remnant of stony downs; narrow valleys, some with gorges. Ranges and hills in form of hogback ridges in quartzite" (*NatureMaps*, 2023).

2.2.2 Climate

Climate data has been sourced from the Eudunda Bureau of Meteorology (BoM) (Site No. 024511) located approximately 40 km south of the EML. Climate is described as Mediterranean with majority of rainfall between the months of May and September. Mean daily maximum temperatures range from 29.4 degrees Celsius in January and 13.1 degrees Celsius for July, with mean minimum temperatures ranging from 14.3 degrees Celsius in February to 5.1 degrees Celsius in July. Review of the Government of South Australia Enviro Data (2023), application *NatureMaps* climate data references a mean annual rainfall of 333 millimetres (mm) for the site.

2.3 General Location Map

The Site is located approximately 130 kilometres km north east of the Adelaide CBD, South Australia, refer to **Drawing No. 2377.DRG.001 – Site Location Plan** for a visual representation of the project location.

2.4 Details of the Proposal

The Site is confined within alluvial plains and outwash fans inside an agricultural area with patches of remnant native vegetation which has undergone periods of historical grazing. An inspection of the Site undertaken 30 May 2023 by Groundwork Plus Native Vegetation Accredited Consultant confirmed that the Site contains Native Vegetation as defined by the Native Vegetation Act 1991. Vegetation within the Site comprised of previously disturbed native vegetation from grazing in small, isolated patches as well as a larger patch of mature remnant native vegetation in the Site.

2.5 Approvals Required or Obtained

This Vegetation Management Plan has been prepared for inclusion within the PEPR for the Site in accordance with the provisions of the *Mining Act 1971*.

A review of the Government of *NatureMaps* (2023) indicated that there have not been any previous native vegetation clearance applications for the Site, with the closest application existing approximately 0.25 km to the north east of the Site (application No. 2022_3193).

2.6 Native Vegetation Regulation

Provisions for clearance of native vegetation associated with the approved mining operations are provided under the *Native Vegetation Regulations 2017*, Part 5, Regulation 12, Division 1, Subclause 28 – Operations – Clearance of vegetation incidental to operations authorised under the *Mining Act 1971* or the *Geothermal Energy Act 2000*.

3 Method

3.1 Flora assessment

An online search was undertaken for *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) Matters of National Environmental Significance (MNES) along with a review of the Government of South Australia Enviro Data (2023), application *NatureMaps* for historical records of any rare or endangered flora species five (5) km of the Site.

Following a review of the background information and literature, an assessment of the site was undertaken on 30 May June 2023 by Groundwork Plus Accredited Consultant involving a general assessment of the site and identification of habitat for species of conservation significance utilising the Native Vegetation Council's (NVC) Bushland Assessment Methodology.

The proposed works areas were surveyed for:

- Remnant and regrowth native vegetation
- Introduced plant species
- Site disturbance
- Vegetation composition

The vegetation survey was conducted within the proposed extraction area.

Representative photographs of the vegetation within the Site are provided within **Section 4.1 Vegetation Assessment**.

3.2 Fauna assessment

An online search was undertaken for EPBC Act MNES, as well as a review of the Government of South Australia Enviro Data (2023), application *NatureMaps* to determine the presence of any rare or endangered fauna species recorded within a five (5) km radius of the Site, refer to **Attachment 1 – Fauna Species List**. A summary of the key EPBC Act listed species potentially present within the area is found in **Attachment 2 – Environmental Protection and Biodiversity Conservation Act 1999 Protected Matters Report**. An assessment of the Site was undertaken on 30 May 2023 by Groundwork Plus recording opportunistic sightings or signs of fauna species present within the Site.

4 Assessment Outcomes

4.1 Vegetation Assessment

The landforms of the Site are characterised as alluvial plains with outwash fans with hard setting loam to clay loam overlaying strongly structured red clay. Historical vegetation clearance has resulted in the majority of vegetation being removed from the Site. Elevation is between 347 m and 358 m Australian Height Datum (mAHD). Remaining native vegetation is comprised of two patches of remnant native vegetation, one of which has been previously cleared and grazed, leaving small, isolated patches within the middle of the Site and a larger patch in the north eastern corner. The remaining vegetation is required to be removed for the proposed future quarry development.

Inspection of the Site confirmed that two (2) native vegetation associations were present within the Site comprising of:


- *Geijera linearifolia* open shrubland over *Roepora apiculata* and *Maireana brevifolia* low shrubland.
- *Eucalyptus oleosa ssp. oleosa* open Mallee with *Geijera linearifolia* open shrubland over *Roepora apiculata* and *Maireana brevifolia* low shrubland over *Austrostipa sp.*

Topography and vegetation association were found to be relatively consistent across the area under application. The closest Heritage Agreement (HA) to the Site is located approximately 6.64 km south west of the Site (HA 1520).

Full assessment of the vegetation attributes, condition scores and a list of flora species recorded onsite are provided within **Attachment 3 – Bushland Assessment Scoresheets**.

Further details of the vegetation associations are provided in **Table 1** and **Table 2** below.

Table 1 - Details of Vegetation Association 1

<p>Vegetation Association</p>	<p><i>Geijera linearifolia</i> open shrubland over <i>Roepera apiculata</i> and <i>Maireana brevifolia</i> low shrubland.</p>
	
<p>Vegetation Association 1, looking east Drawing No. 2377.DRG.018 – Vegetation Association A1 (MGA Zone 54 323175, 6258162.83)</p>	
<p>General description</p>	<p>Vegetation Association 1 is located within the middle of the Site. This area has been historically cleared with large mature shrubs of <i>Geijera linearifolia</i> and Bullock Bush previously retained. The understorey has since been periodically grazed which has led to the regrowth of native understorey species of <i>Austrostipa sp.</i>, <i>Roepera apiculata</i> and <i>Maireana brevifolia</i>. Vegetation is in close proximity to tracks linking the external roads to the extraction area with evidence of edge effect on vegetation condition in the form of higher weed density than vegetation further into the undisturbed remnant vegetation in the north east corner of the Site.</p> <p>Vegetation Association 1 is in fair condition, with reduced overstorey species and few ground cover natives with weed invasion, with the exception of <i>Austrostipa sp.</i> regrowth since grazing has occurred. Historical clearance has likely reduced the overstorey tree density.</p>
<p>Threatened species or community</p>	<p>A search of the Government of South Australia Enviro Data (2022), application <i>NatureMaps</i> report identified seven (7) threatened fauna species and four (4) threatened flora species recorded within the preceding 20 year and within a five (5) km radius of the Site.</p>

	Of the seven (7) threatened fauna species identified within the desktop assessment, four (4) may be considered 'likely', and two (2) may be considered 'possible' to use the application area. However, given the size of the better quality habitat under application, and the location of the vegetation on the perimeter of cleared and more degraded vegetation it is unlikely the clearance of native vegetation under application would significantly impact any of the threatened species. Furthermore, no threatened species were recorded at the time of the Site inspections.				
Landscape context score	1.16	Vegetation Condition Score	9.56	Conservation significance score	1.04
Unit biodiversity Score	11.54	Area (ha)	0.32	Total biodiversity Score	3.69

Table 2 - Details of Vegetation Association 2

Vegetation Association	<i>Eucalyptus oleosa ssp. oleosa</i> open Mallee with <i>Geijera linearifolia</i> and <i>Alectryon oleifolius</i> open shrubland over <i>Roepera apiculata</i> and <i>Maireana brevifolia</i> low shrubland over <i>Austrostipa sp.</i>
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Vegetation Association 2, looking north

Drawing No. 2377.DRG.018 – Vegetation Association 2

(MGA Zone 54 323429.03, 6258199.52)

General description	<p>Similar to Vegetation Association 1, however, overstorey tree species of <i>Eucalyptus oleosa ssp. oleosa</i> is present with little to no historical clearance as denser shrub layer of <i>Geijera linearifolia</i> and <i>Alectryon oleifolius</i> is present. Evidence of grazing present, with patches of <i>Roepera apiculata</i> and <i>Austrostipa sp.</i> present.</p> <p>Vegetation is in fair condition, with overstorey species present as well as a denser shrub layer and a native ground cover presence with less weed invasion compared to previously cleared areas of the Site.</p> <p>Vegetation Association 2 is connected to remnant vegetation adjacent to the Site.</p>				
Threatened species or community	<p>A search of the Government of South Australia Enviro Data (2022), application <i>NatureMaps</i> report identified seven (7) threatened fauna species and four (4) threatened flora species recorded within the preceding 20 year and within a five (5) km radius of the Site.</p> <p>Of the seven (7) threatened fauna species identified within the desktop assessment, four (4) may be considered 'likely', and two (2) may be considered 'possible' to use the application area. However, given the size of the better quality habitat under application, and the location of the vegetation on the perimeter of cleared and more degraded vegetation it is unlikely the clearance of native vegetation under application would significantly impact any of the threatened species. Furthermore, no threatened species were recorded at the time of the Site inspections.</p>				
Landscape context score	1.16	Vegetation Condition Score	15.62	Conservation significance score	1.04
Unit biodiversity Score	18.84	Area (ha)	1.12	Total biodiversity Score	21.10

4.2 Threatened Species Assessment

A search of the Government of South Australia Enviro Data (2023), application *NatureMaps* report recorded four (4) threatened fauna species and zero (0) threatened flora species recorded within the preceding 20 years and within a five (5) km radius of the Site, refer to **Attachment 4 – Threatened Species Summary**. An EPBC Act Protected Matters Search Report listed 16 threatened fauna species and eight (8) threatened flora species additional to those identified through *NatureMaps*, refer to **Attachment 2 – Environmental Protection and Biodiversity Conservation Act 1999 Protected Matters Report**. Only species identified through *NatureMaps* where location and record date are known have been included in the summary.

Of the fauna species identified through *NatureMaps*, two (2) species may be considered 'possible' to use the proposed Site with all other species considered 'unlikely'. Given the size of the impact areas and the native vegetation nearby that will remain undisturbed it is unlikely any of the possible threatened species would be significantly impacted by the proposed clearance.

4.3 Cumulative Impact

The current clearance application encompasses a significant portion of the MC, which will allow for staged extraction and operational areas. Portions of native vegetation have been excluded from the extraction and operational area, refer to **Drawing No. 2377.DRG.018 – Vegetation Associations**. Access to the Site is already established, with no new tracks required to be constructed through surrounding native vegetation. No further clearance is expected at this stage of the quarry development.

Indirect impacts to surrounding vegetation may include dust deposition, increase in weed abundance and diversity, and general rubbish incursions from operational activities. These will be mitigated through control measures outlined within the PEPR.

The clearance of native vegetation will add to the cumulative cleared area of the surrounding landscape, however, this will be minimised to the available resource and largely restricted to areas that have been subject to previous historical clearance.

4.4 Address the Mitigation Hierarchy

a) **Avoidance – outline measures taken to avoid clearance of native vegetation**

Native vegetation has been avoided as much as practical when considering the extraction area, with quarry activities focused within previous disturbance areas of the Site. The majority of the EML has been situated over an area of previous disturbance to minimise the extent of native vegetation that is required for removal. Consideration to retaining native vegetation within the PEPR will be given, and where possible, high quality native vegetation will be avoided with buffer zones to ensure the native vegetation is not impacted by quarry activities, as outlined in **Drawing No. 2377.DRG.018 – Vegetation Associations**.

b) **Minimization – if clearance cannot be avoided, outline measures taken to minimize the extent, duration and intensity of impacts of the clearance on biodiversity to the fullest possible extent (whether the impact is direct, indirect or cumulative).**

Vegetation clearance will be minimised to the extent that will allow viable quarry operations.

c) **Rehabilitation or restoration – outline measures taken to rehabilitate ecosystems that have been degraded, and to restore ecosystems that have been degraded, or destroyed by the impact of clearance that cannot be avoided or further minimized, such as allowing for the re-establishment of the vegetation.**

Following the closure of the quarry, the Site will be rehabilitated and is likely to be used for agricultural and grazing purposes to align with adjacent and existing use of the land. Given the previous rehabilitation of the historical quarry operations, it is likely that native vegetation will colonise the rehabilitated landform, particularly native grasses, and early colonising shrub species.

d) **Offset – any adverse impact on native vegetation that cannot be avoided or further minimized should be offset by the achievement of a significant environmental benefit that outweighs that impact.**

To offset the proposed clearance, the Client intends to pay into the NVF, the amount required for the SEB, as calculated in **Table 6 - Totals Summary Table**.

4.5 Principles of Clearance (Schedule 1, Native Vegetation Act 1991)

The Native Vegetation Council will consider Principles 1(b), 1(c) and 1(d) when assigning a level of Risk under Regulation 16 of the Native Vegetation Regulations. The Native Vegetation Council will consider all the Principles of clearance of the Act as relevant, when considering an application referred under the *Planning, Development and Infrastructure Act 2016*.

Table 3 - Principles of Clearance

Principle of clearance	Relevant information	Assessment against the principles	Moderating factors that may be considered by the NVC
Principle 1b - significance as a habitat for wildlife	<p>The vegetation under application may provide habitat for fauna species, particularly birds. The vegetation is connected with surrounding vegetation. The desktop assessment for threatened fauna species identified four (4) species that may be considered 'possible' to utilise the application area, based on previous records and habitat experiences. Refer to Section 4.2 Threatened Species Assessment for further details.</p> <p>Patches: Threatened Fauna Score – 0.1 (all native vegetation associations)</p>	<p><u>Seriously at Variance</u> No</p> <p><u>At Variance</u> – Yes</p>	<p>Given the shape, size and landscape context of the vegetation under application, it is unlikely that clearance will lead to a long-term decrease in the size of any fauna populations. Likewise, clearance will not significantly reduce the area of occupancy of any fauna species.</p> <p>Clearance of the application area will not result in an increase in invasive species that are harmful to a threatened species habitat.</p> <p>Clearance is unlikely to interfere with the recovery of any threatened fauna species.</p>
Principle 1c - plants of a rare, vulnerable or endangered species	<p>No threatened flora species were recorded during the Site inspection.</p> <p>Threatened Flora Score(s) – 0 (all native vegetation associations)</p>	<p><u>Seriously at Variance</u> No</p> <p><u>At Variance</u> – No</p>	N/A
Principle 1d - the vegetation comprises the whole or	<p>No threatened communities were recorded during the Site inspection.</p>	<p><u>Seriously at Variance</u> No</p>	N/A

Principle of clearance	Relevant information	Assessment against the principles	Moderating factors that may be considered by the NVC
<i>part of a plant community that is Rare, Vulnerable or endangered:</i>			

[Principles of Clearance](#) (h-m) will be considered by comments provided by the local NRM Board or relevant Minister. The Data Report should contain information on these principles where relevant and where sufficient information or expertise is available.

4.6 Risk Assessment

Table 4 - Risk Assessment

Total clearance	No. of trees	-
	Area (ha)	1.44
	Total biodiversity Score	27.32
Seriously at variance with principle 1(b), 1(c) or 1 (d)		-
Risk assessment outcome		Level 3

5 Clearance Summary

Table 5 - Clearance Areas Summary Table

Block	Site	Species diversity score	Threatened Ecological community Score	Threatened plant score	Threatened fauna score	UBS	Area (ha)	Total Biodiversity score	Loss factor	SEB Points required	SEB payment	Admin Fee
A	1	9	1	0	0.04	11.54	0.32	3.69	1	3.88	\$1,800.76	\$99.04
A	2	10	1	0	0.04	21.1	1.12	23.63	1	24.81	\$10,294.35	\$566.19
						Total	1.44	27.32		28.69	\$12,095.11	\$665.23

Table 6 - Totals Summary Table

	Total Biodiversity score	Total SEB points required	SEB Payment	Admin Fee	Total Payment
Application	27.32	28.69	\$12,095.11	\$665.23	\$12,760.34

Economies of Scale Factor	0.5
Rainfall (mm)	334

6 Significant Environmental Benefit

A Significant Environmental Benefit (SEB) is required for approval to clear under Division 5 of the *Native Vegetation Regulations 2017*. The NVC must be satisfied that as a result of the loss of vegetation from the clearance that an SEB will result in a positive impact on the environment that is over and above the negative impact of the clearance.

ACHIEVING AN SEB

Indicate how the SEB will be achieved by ticking the appropriate box and providing the associated information:

- Establish a new SEB Area on land owned by the proponent.
- Use SEB Credit that the proponent has established. Provide the SEB Credit Ref. No. _____
- Apply to have SEB Credit assigned from another person or body. The [application form](#) needs to be submitted with this Data Report.
- Apply to have an SEB to be delivered by a Third Party. The [application form](#) needs to be submitted with this Data Report.
- Pay into the Native Vegetation Fund.

PAYMENT SEB

The client intends to make a single payment (including admin fee of \$665.23) of \$12,760.34 into the NVF.

DRAWINGS



REV	DESCRIPTION	DATE	BY

Legend:

PROJECT: Worlds End Pit

CLIENT: S.C. Heinrich & Co Pty Ltd

TITLE: Site Location Plan

SCALE: 1:1,030,000

DATE: 06-April-2023

PRINTED: 06-April-2023

DRAWN: EP

CHECKED: JR

DATUM: HORIZONTAL / VERTICAL / ZONE

EP

MGA / AHD / 54

GROUNDWORK plus

PH 481 3871 0411

WWW.GROUNDWORKPLUS.COM.AU

DRAWING NUMBER: 2377.DRG.001

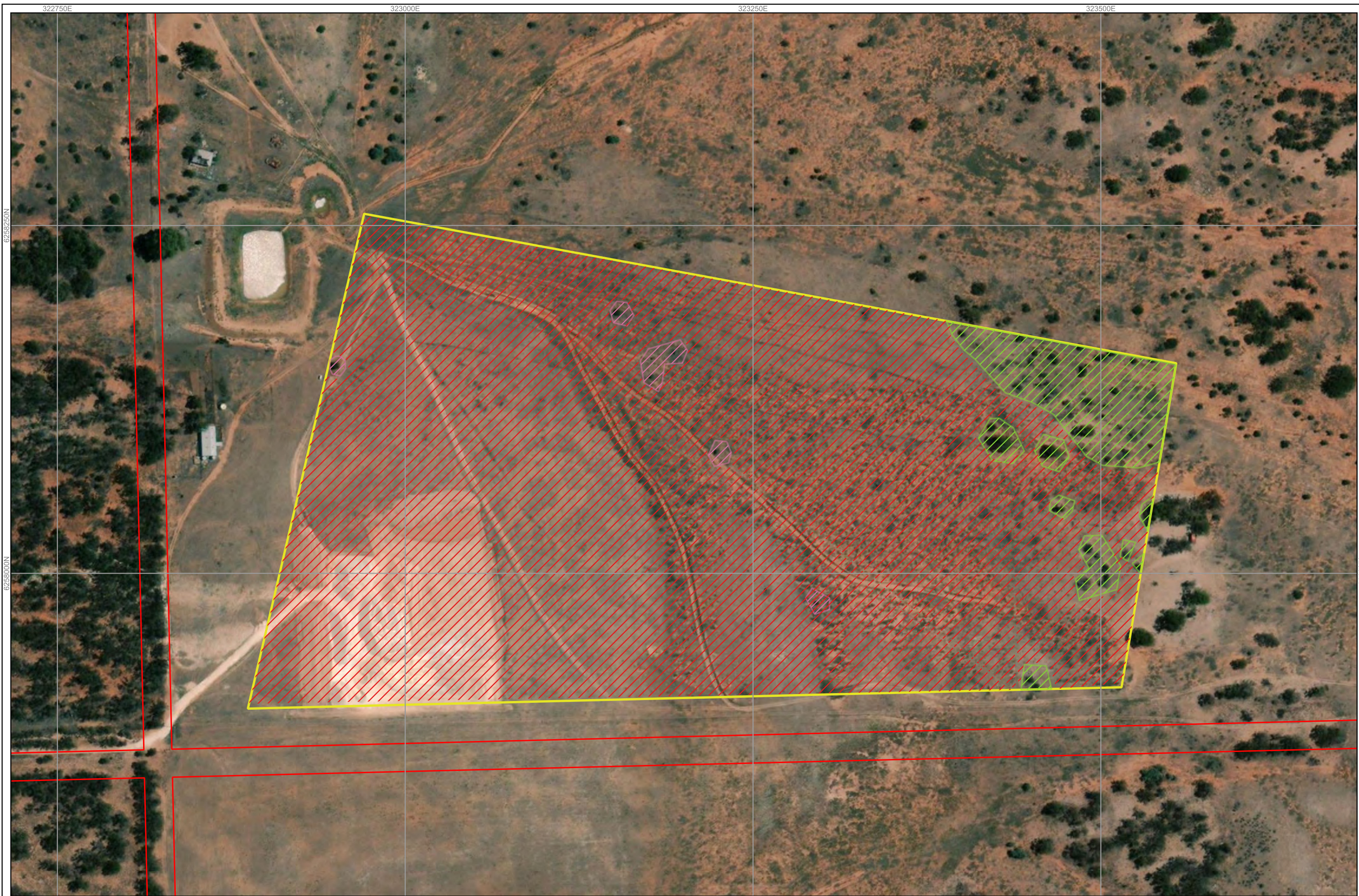
REVISION:

EP

MGA / AHD / 54

Data Sources:

- Photography: Google Maps 2023 accessed: 06-April-2023
- Topography: Cadastre: DATA.SA.GOV.AU/Boundaries are Indicative only, not all boundaries shown
- Ecosystem: Other: SARIG 2023



REV	DESCRIPTION	DATE	BY

Data Sources:
 Photography:
 Topography:
 Cadastral: Data.sa.gov.au (boundaries are indicative only, not all boundaries shown)
 Ecosystem:
 Other:

Legend:

- Cadastral
- Site
- A1
- A2
- Previously Disturbed Area

PROJECT: Worlds End
 CLIENT: SC Heinrich

TITLE: Vegetation Associations

SCALE: 1:2,500
 (When Printed On A3)

	DRAWING NUMBER: 2377.DRG.018 DATE: 05-July-2023 PRINTED: 05-July-2023
PH: +61 3871 0411 WWW.GROUNDWORKPLUS.COM.AU	REVISION: DATE: 05-July-2023 CHECKED:

DATUM: HORIZONTAL / VERTICAL / ZONE
 MGA / AHD / 54

ATTACHMENTS

Attachment 1

Fauna Species List

Attachment 2

Environmental Protection Biodiversity Conservation Act
1999 Protected Matters Report



Australian Government

Department of Climate Change, Energy,
the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 30-Jun-2023

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar)	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	25
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <https://www.dcceew.gov.au/parks-heritage/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	16
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	1
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	5
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [\[Resource Information \]](#)

Ramsar Site Name	Proximity	Buffer Status
The coorong, and lakes alexandrina and albert wetland	150 - 200km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities [\[Resource Information \]](#)

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	Community may occur within area	In feature area
Iron-grass Natural Temperate Grassland of South Australia	Critically Endangered	Community may occur within area	In feature area
Mallee Bird Community of the Murray Darling Depression Bioregion	Endangered	Community likely to occur within area	In feature area
Peppermint Box (Eucalyptus odorata) Grassy Woodland of South Australia	Critically Endangered	Community may occur within area	In feature area

Listed Threatened Species [\[Resource Information \]](#)

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.

Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Lophochroa leadbeateri leadbeateri Major Mitchell's Cockatoo (eastern), Eastern Major Mitchell's Cockatoo [82926]	Endangered	Species or species habitat may occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat likely to occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat likely to occur within area	In feature area
FISH			
Galaxias rostratus Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat may occur within area	In feature area

MAMMAL

Scientific Name	Threatened Category	Presence Text	Buffer Status
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area	In feature area
PLANT			
Acacia glandulicarpa Hairy-pod Wattle [8838]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Acacia menzeli Menzel's Wattle [9218]	Vulnerable	Species or species habitat may occur within area	In feature area
Acacia spilleriana Spiller's Wattle [34123]	Endangered	Species or species habitat likely to occur within area	In feature area
Caladenia tensa Greencomb Spider-orchid, Rigid Spider-orchid [24390]	Endangered	Species or species habitat likely to occur within area	In feature area
Codonocarpus pyramidalis Slender Bell-fruit, Camel Poison [19507]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Dodonaea subglandulifera Peep Hill Hop-bush [11956]	Endangered	Species or species habitat likely to occur within area	In feature area
Pterostylis xerophila Desert Greenhood [7997]	Vulnerable	Species or species habitat may occur within area	In feature area
Swainsona pyrophila Yellow Swainson-pea [56344]	Vulnerable	Species or species habitat may occur within area	In feature area
REPTILE			
Aprasia pseudopulchella Flinders Ranges Worm-lizard [1666]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Tiliqua adelaidensis Pygmy Blue-tongue Lizard, Adelaide Blue-tongue Lizard [1270]	Endangered	Species or species habitat may occur within area	In feature area

Listed Migratory Species [[Resource Information](#)]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]	
Protected Area Name	Reserve Type	State	Buffer Status	
Mimbara	Conservation Park	SA	In buffer area only	

EPBC Act Referrals					[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status	
Goyder South Hybrid Renewable Energy Facility - OTL and Substation, Worlds End	2021/8959		Post-Approval	In feature area	

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
wind farm and associated infrastructure	2006/2764	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact us](#) page.

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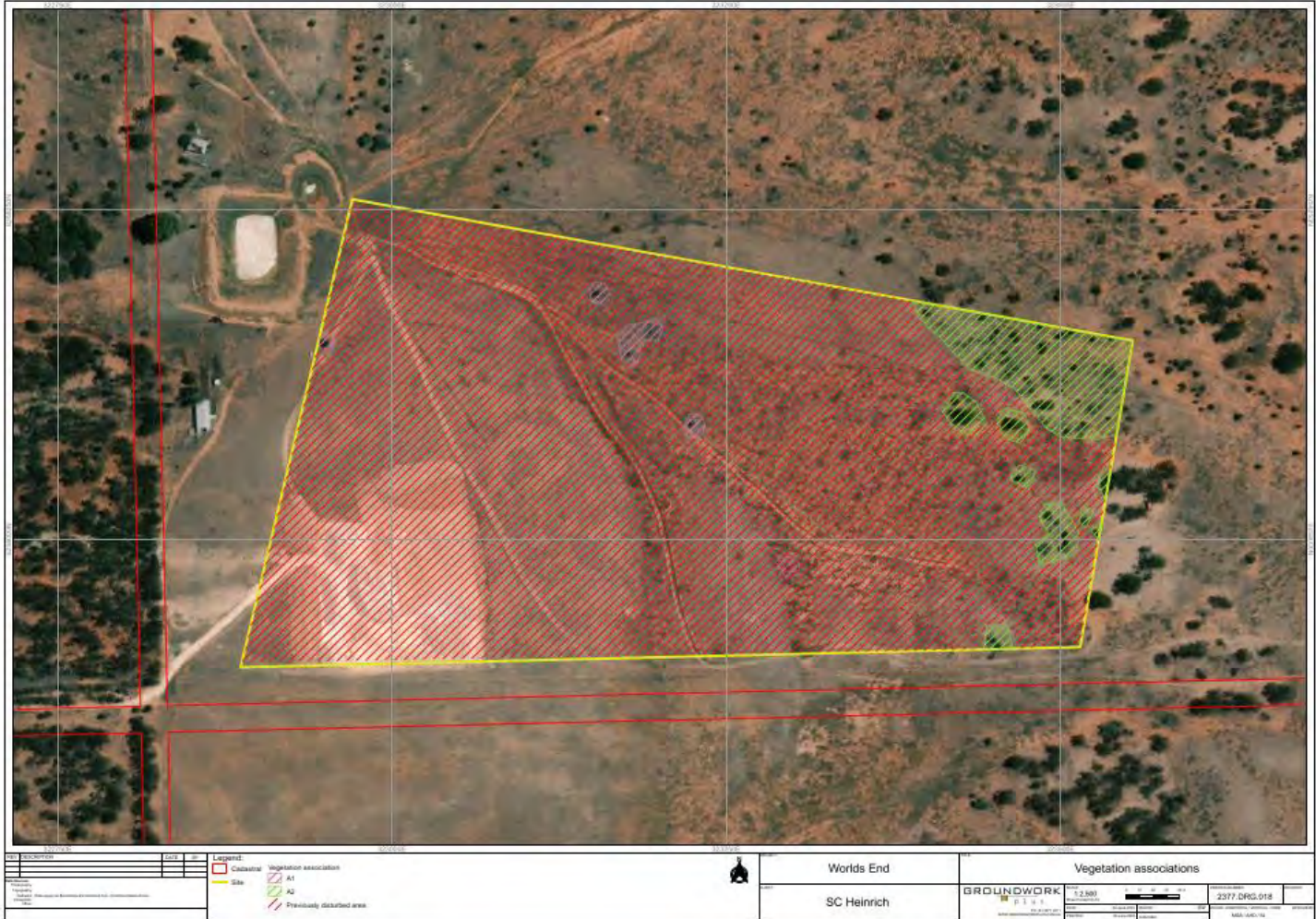
Attachment 3

Bushland Assessment Scoresheet

Block	A
Size of Block (Ha)	0.32
Landscapes Region	Northern & Yorke
IBRA Association	Burra Hill
IBRA Subregion	Broughton

ASSESSOR(S)	G. Wilson
DATE OF ASSESSMENT	30/05/2023

Map of the Block (Including the Sites)



Landscape Context Scores

Percent Vegetation Cover (5km radius) (%)	45
0-5% = 0 pts; >5-10% = 0.02 pts; >10-25% = 0.04 pts; >25-50% = 0.06 pts; >50-75% = 0.03 pt; >75-100% = 0 pts	
Score	0.06
Block Shape Cleared perimeter:Area (km/km2)	
Cleared Perimeter (m) =	412
Cleared Perimeter to area ratio	128.75
<6 = 0.03 pts; 6 to <12 = 0.02 pts; 12 to <18 = 0.01 pt	
Score	0

% native veg. remaining in IBRA Assoc.	45
% native veg. remaining in IBRA subregion	10
0 - 10% = 0.05 pts; >10-20% = 0.04 pts; >20-30% = 0.03 pts; >30-60% = 0.02 pts; > 60 = 0 pts	
Score	0.07
Score received for both IBRA assoc. and subregion and summed	

% native veg. protected IBRA Assoc.	5
0-5% = 0.03 pts; >5-10% = 0.02 pts; >10-25% = 0.01 pt; >25% = 0	
Score	0.03

Wetland or Riparian Habitat present	
Riparian zone present (Yes/No) = 0.02 pt	No
Swamp/wetland present (Yes/No) = 0.03 pts (Swamp/wetland may be +/- riparian zone)	No
Score	0

Note; Blocks will score a minimum Landscape Context Score of 1

LANDSCAPE CONTEXT SCORE (max 1.25)	1.16
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Vegetation Condition Scores

SITE:	A1
VEGETATION ASSOCIATION DESCRIPTION	Geijera linearifolia open shrubland over <i>Roepera apiculata</i> and <i>Maireana</i>
SIZE OF SITE (Ha)	0.32

Native Plant species diversity	
Score the diversity of species present in the site as a proportion to what would be expected in a vegetation of that community in very good condition (approaching a pre-European state)	
<5% (3 Points)	<input type="checkbox"/>
5-10% (6 Points)	<input type="checkbox"/>
11 - 20% (9 Points)	<input checked="" type="checkbox"/>
21 - 30% (12 Points)	<input type="checkbox"/>
31 - 40 % (15 Points)	<input type="checkbox"/>
41 - 50% (18 Points)	<input type="checkbox"/>
51 - 60% (21 Points)	<input type="checkbox"/>
61 - 70% (24 Points)	<input type="checkbox"/>
71 - 80% (27 Points)	<input type="checkbox"/>
>80% (30 Points)	<input type="checkbox"/>
Native Plant species diversity score (max score of 30)	9

Weed Scores	
Does the site contain plant species declared under the <i>NRM Act 2004</i> (1.5 points)	<input type="checkbox"/>
Cover rating for all declared weeds (max of 6)	
Does the site contain environmental weeds (introduced plants with the capacity to invade and exclude native species from bushland. This typically includes species with a BCM weed threat rating of 3, 4 or 5). (1 Point)	<input checked="" type="checkbox"/>
Cover rating for all environmental weeds (max of 6)	3
Weed Score (max score of 15)	12

<i>Is the community naturally treeless?</i>	<input type="checkbox"/>
Mature Tree Score (max 8)	0
Fallen timber/debris (max 5)	0
Hollow-bearing trees Score (max 5)	0
Tree Canopy Cover Score (max 5)	0

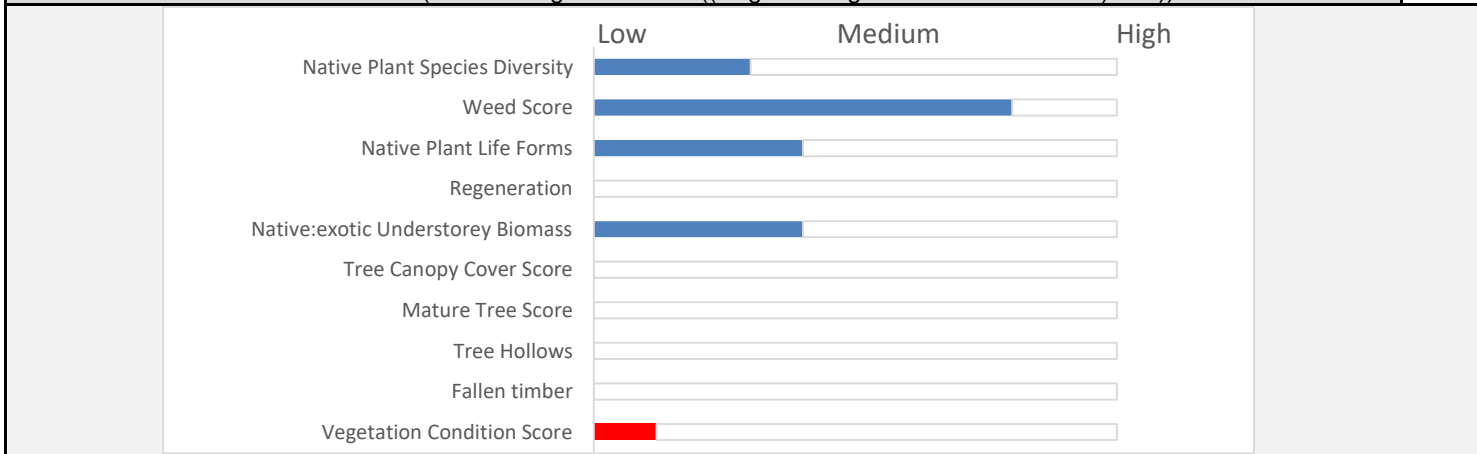
Native:exotic Understorey biomass score (max 5)	2
--	---

Regeneration	
No regeneration present (0 Points)	<input checked="" type="checkbox"/>
Very low regeneration, consisting of highly scattered juvenile plants of a limited number of species (3 points)	<input type="checkbox"/>
Regeneration present, consisting of multiple individual juvenile plants but a limited number of species (6 points)	<input type="checkbox"/>
Multiple species regenerating, but low numbers of juvenile plants (9 points)	<input type="checkbox"/>
Multiple species regenerating with multiple individual juveniles present with varying age classes (12 points)	<input type="checkbox"/>
Regeneration Score (Max 12)	0

Native Plant life form	
All strata of vegetation heavily impacted and native vegetation represented by only scattered plants (4 points)	<input type="checkbox"/>
All strata of vegetation impacted with limited structural diversity, largely uniform age classes and reduced vegetation cover (8 points)	<input checked="" type="checkbox"/>
At least one strata of vegetation has been impacted, with reduced structural diversity, elements may be missing (such as plant species that provide specific structural features e.g. sedges or mid layer shrubs) and reduce vegetation cover (12 points)	<input type="checkbox"/>
Limited impacts on native vegetation, with a diversity of structural features and a varied age class, with only a minor loss in structural diversity, vegetation cover or structural elements (16 points)	<input type="checkbox"/>
All strata of vegetation present, little or no sign of disturbance. A variety of life forms and associated age classes present. Vegetation cover near complete (20 points)	<input type="checkbox"/>
Native Plant life form score (max 20)	8

Vegetation Condition Score calculation

Positive Vegetation Attributes Score = Native species diversity + Regeneration + Native Plant Life Forms + Mature Trees + Fallen timber/debris + Hollow-bearing trees	
<i>If the community is naturally treeless this score is multiplied by 1.24</i>	17.00
Negative Vegetation Attributes Score = (15 - Weeds) + ((10 - Biomass score - Tree Canopy Cover Score)exp2/2)	35.00
VEGETATION CONDITION SCORE (Positive veg attributes x ((Negative vegetation attributes + 60) / 80))	9.56



Conservation Significance Score

Is the vegetation association considered a Threatened Ecological community or Ecosystem?	Yes/No
State (Provisional List of Threatened Ecosystems of SA) Rare community (0.1 pt)	<input type="checkbox"/>
State (Provisional List of Threatened Ecosystems of SA) Vulnerable community (0.2 pts)	<input type="checkbox"/>
State (Provisional List of Threatened Ecosystems of SA) Endangered community (0.3 pts)	<input type="checkbox"/>
Nationally (EPBC Act) Vulnerable community (0.35 pts)	<input type="checkbox"/>
Contains a Nationally (EPBC Act) Endangered or Critically Endangered community (0.4 pts)	<input type="checkbox"/>
<i>Note; all sites will score a minimum Conservation Significance Score of 1</i>	
Threatened Community Score	1

Number of Threatened Flora Species recorded for the site (within the site)	Number
<i>*If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.</i>	
State Rare species recorded (1 pt each)	0
State Vulnerable species recorded (2.5 pt each)	0
State Endangered recorded (5 pts each)	0
Nationally Vulnerable species recorded (10 pts each)	0
Nationally Endangered or Critically endangered species recorded (20 pts each)	0
0 = 0 pts; <2 = 0.04 pts; 2 - <5 = 0.08 pts; 5 - <10 = 0.12 pts; 10 - <20 = 0.16pts; 20 or > = 0.2 pts	0
Threatened Flora Score	0

Potential habitat for Threatened Fauna Species (number observed or previously recorded)	Number
<i>*If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.</i>	
State Rare species observed or locally recorded (1 pt each)	4
State Vulnerable species observed or locally recorded (2.5 pt each)	0
State Endangered species observed or locally recorded (5 pt each)	0
Nationally Vulnerable species observed or locally recorded (10 pts each)	0
Nationally Endangered or Critically endangered species observed or locally recorded (20 pts each)	0
0 = 0 pts; <2 = 0.02 pts; 2 - <5 = 0.04 pts; 5 - <10 = 0.06 pts; 10 - <20 = 0.08pts; 20 or > = 0.1 pts	4
Threatened Fauna Score	0.04

CONSERVATION SIGNIFICANCE SCORE	1.04
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Total Scores for the Site		Vegetation Condition x Landscape Context x Conservation Significance =	
LANDSCAPE CONTEXT SCORE	1.16	UNIT BIODIVERSITY SCORE	11.54
VEGETATION CONDITION SCORE	9.56	Total Biodiversity Score	
CONSERVATION SIGNIFICANCE SCORE	1.04	(Biodiversity Score x hectares)	3.69

Photo Point and Vegetation Survey Location	Direction of the Photo	
	East	
	GPS Reference	
	Datum	
	Zone (52, 53 or 54)	54
	Easting (6 digits)	323305
	Northing (7 digits)	6258008
Description		

Assessment for Clearance		Approximate hectares required	
Loss Factor	1.0		0.48
Loadings for clearance of protected areas		Economies of Scale factor	0.50
Reductions for rehabilitation of impact site		Mean Annual rainfall for the site (mm)	334
SEB Points required	3.88	Payment into the fund (GST Exclusive)	\$1,800.76
		Administration fee (GST Inclusive)	\$99.04

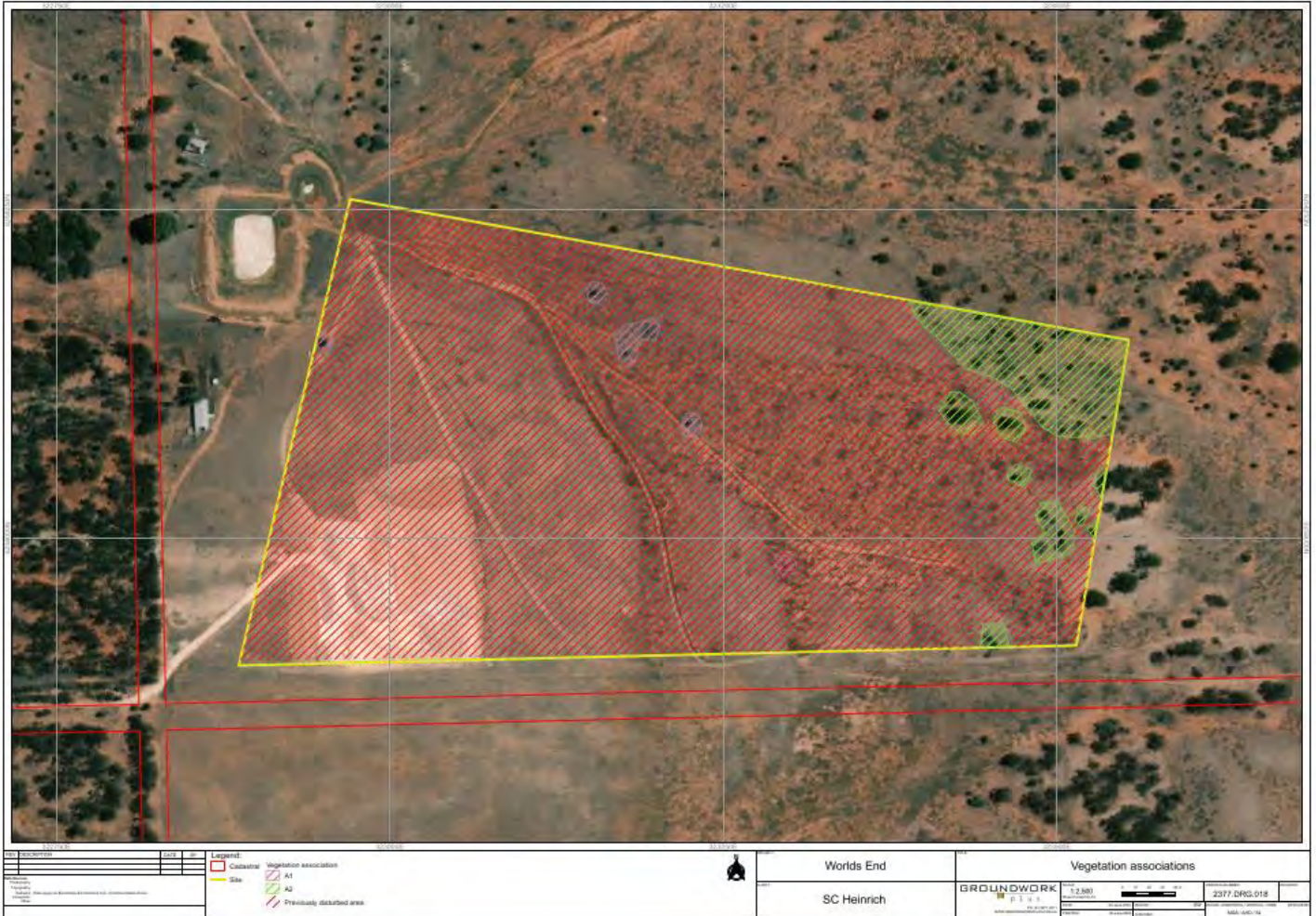
Bushland Assessment Scoresheets

(Version - 20 July 2022)

Block	A
Size of Block (Ha)	1.370
Landscapes Region	Northern & Yorke
BCM Region	Northern Agricultural & Yorke Peninsula
IBRA Association	Burra Hill
IBRA Subregion	Broughton

ASSESSOR(S)	G.Wilson
DATE OF ASSESSMENT	30/05/2023

Map of the Block (Including the Sites)



Landscape Context Scores

% native veg. remaining in IBRA Assoc.	45
% native veg. remaining in IBRA subregion	10
0 - 10% = 0.05 pts; >10-20% = 0.04 pts; >20-30% = 0.03 pts; >30-60% = 0.02 pts; > 60 = 0 pts	
Score	0.07

Score received for both IBRA assoc. and subregion then summed

Percent Vegetation Cover (5km radius) (%)	45
0-5% = 0 pts; >5-10% = 0.02 pts; >10-25% = 0.04 pts; >25-50% = 0.06 pts; >50-75% = 0.03 pt; >75-100% = 0 pts	
Score	0.06

% native veg. protected IBRA Assoc.	5
0-10% = 0.03 pts; >10-20% = 0.02 pts; >20-40% = 0.01 pt; >40% = 0	
Score	0.03

Block Shape Cleared perimeter:Area (km/km2)	
Cleared Perimeter (m) =	769
Cleared Perimeter to area ratio	56.13
<6 = 0.03 pts; 6 to <12 = 0.02 pts; 12 to <18 = 0.01 pt	
Score	0

Wetland or Riparian Habitat present	
Riparian zone present (Yes/No) = 0.02 pt	No
Swamp/wetland present (Yes/No) = 0.03 pts (Swamp/wetland may be +/- riparian zone)	No
Score	0

Note; Blocks will score a minimum Landscape Context Score of 1

LANDSCAPE CONTEXT SCORE (max 1.25)	1.16
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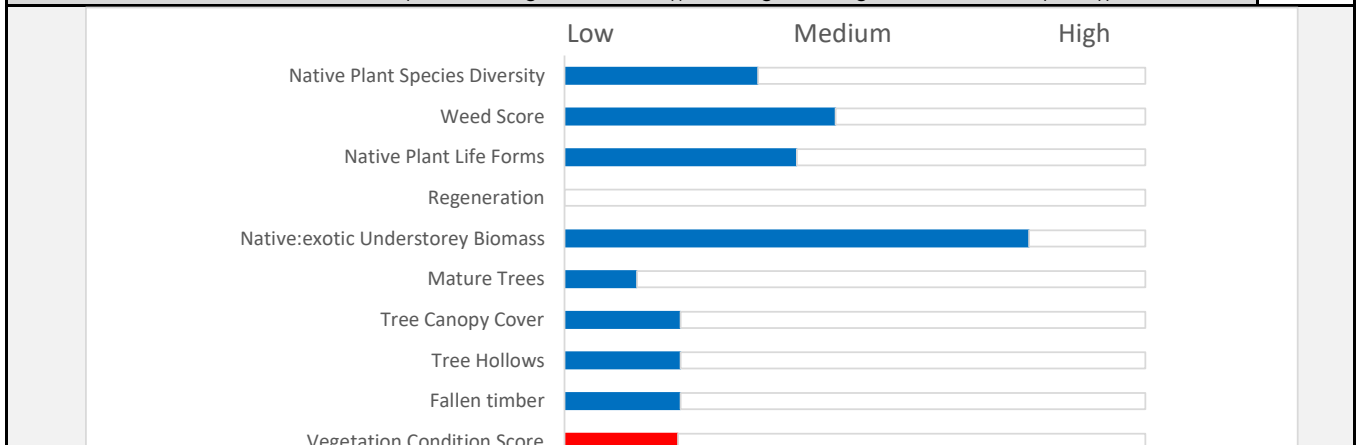
Vegetation Condition Scores

SITE:	A2
BCM COMMUNITY	NA 5 Mallee & Woodlands with Open Chenopod & Sclerophyll Shrub Understorey
VEGETATION ASSOCIATION DESCRIPTION	<i>Eucalyptus oleosa ssp. oleosa</i> open Mallee with <i>Geijera linearifolia</i> op
SIZE OF SITE (Ha)	1.12

Benchmarked attributes (Scores determined by comparing to a Benchmark community)				Native Plant Life Forms	Cover rating
Number of Native Species (Minus herbaceous annuals for spring Surveys)			8	Trees > 15m	
Native Plant Species Diversity Score (max 30) from benchmark score <i>weighted by a factor of 2</i>			10.0	Trees 5 - 15 m	
Number of regenerating native species			0	Trees < 5m	
Regeneration Score (max 12) from benchmark community weighted by a factor of 1.5			0	Mallee > 5m	1
				Mallee < 5m	
Weed species (Top 5 Cover x Invasiveness)	Cover (max 6)	Weed Threat Rating (max 5)	C x I	Shrubs > 2m	3
Avena spp.	2	2	4	Shrubs 0.5 - 2m	1
Asphodelus fistulosus	3	2	6	Shrubs < 0.5	1
Carthamus lanatus	2	2	4	Forbs	
			0	Mat Plants	
			0	Grasses > 0.2m	2
				Grasses < 0.2m	
				Sedges > 1m	
				Sedges < 1m	
				Hummock grasses	
				Vines, scramblers	
				Mistletoe	
				Ferns	
				Grass-tree	
				Total	8
Weed Score (max 15) from benchmark community			7		
Native Plant Life Forms (max 20) from benchmark score <i>weighted by a factor of 2</i>					8.0

Non-Benchmarked Attributes (Scores determined from direct field observations)		<i>Is the community naturally treeless?</i>	<input type="checkbox"/>
Native:exotic Understorey biomass Score (max 5)	4	Fallen Timber/Debris (max 5)	1
		Hollow-bearing trees Score (max 5)	1
		Mature Tree Score (max 8)	1
		Tree Canopy Cover Score (max 5)	1

Vegetation Condition Score calculation	
Positive Vegetation Attributes Score = Native species diversity + Regeneration + Native Plant Life Forms Fallen timber/debris + Hollow-bearing trees <i>- If the community Score is Not Benchmarkd (SNB) for regeneration this score is multiplied 1.24</i> <i>- If the community is naturally treeless this score is multiplied by 1.29</i>	21.00
Negative Vegetation Attributes Score = (15 - Weeds) + ((10 - Biomass score - Tree Canopy Cover Score)exp2/2)	20.50
VEGETATION CONDITION SCORE (Positive veg attributes x ((80 - Negative vegetation attributes) / 80))	15.62



Conservation Significance Score

Is the vegetation association considered a Threatened Ecological community or Ecosystem?	Yes/No
State (Provisional List of Threatened Ecosystems of SA) Rare community (0.1 pt)	<input type="checkbox"/>
State (Provisional List of Threatened Ecosystems of SA) Vulnerable community (0.2 pts)	<input type="checkbox"/>
State (Provisional List of Threatened Ecosystems of SA) Endangered community (0.3 pts)	<input type="checkbox"/>
Nationally (EPBC Act) Vulnerable community (0.35 pts)	<input type="checkbox"/>
Nationally (EPBC Act) Endangered or Critically Endangered community (0.4 pts)	<input type="checkbox"/>
<i>Note; all sites will score a minimum Conservation Significance Score of 1</i>	
Threatened Community Score	1
Number of Threatened Flora Species recorded for the site (within the site)	Number
<i>*If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.</i>	
State Rare species recorded (1 pt each)	0
State Vulnerable species recorded (2.5 pt each)	0
State Endangered recorded (5 pts each)	0
Nationally Vulnerable species recorded (10 pts each)	0
Nationally Endangered or Critically endangered species recorded (20 pts each)	0
0 = 0 pts; <2 = 0.04 pts; 2 - <5 = 0.08 pts; 5 - <10 = 0.12 pts; 10 - <20 = 0.16 pts; 20 or > = 0.2 pts	0
Threatened Flora Score	0
Potential habitat for Threatened Fauna Species (number observed or previously recorded)	Number
<i>*If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.</i>	
State Rare species observed or locally recorded (1 pt each)	4
State Vulnerable species observed or locally recorded (2.5 pt each)	0
State Endangered species observed or locally recorded (5 pt each)	0
Nationally Vulnerable species observed or locally recorded (10 pts each)	0
Nationally Endangered or Critically endangered species observed or locally recorded (20 pts each)	0
0 = 0 pts; <2 = 0.02 pts; 2 - <5 = 0.04 pts; 5 - <10 = 0.06 pts; 10 - <20 = 0.08pts; 20 or > = 0.1 pts	4
Threatened Fauna Score	0.04
CONSERVATION SIGNIFICANCE SCORE	1.04

Total Scores for the Site		Vegetation Condition x Landscape Context x Conservation Significance =	
LANDSCAPE CONTEXT SCORE	Score 1.16	UNIT BIODIVERSITY SCORE	18.84
VEGETATION CONDITION SCORE	15.62	Total Biodiversity Score	
CONSERVATION SIGNIFICANCE SCORE	1.04	(Biodiversity Score x hectares)	21.10

Photo Point and Vegetation Survey Location	Direction of the Photo	
		
	GPS Reference	
	Datum	
	Zone (52, 53 or 54)	54
	Easting (6 digits)	323474
	Northing (7 digits)	6258125
Description		

What is the purpose of Assessment?

Clearance

SEB Area

Other

Assessment for Clearance		Approximate hectares required	2.77
Loss Factor	1.0	Economies of Scale Factor	0.5
Loadings for clearance of protected areas		Mean Annual rainfall for the site (mm)	334
Reductions for rehabilitation of impact site		Payment into the fund (GST Exclusive)	\$10,294.35

SEB Points required	22.16	Administration fee (GST Inclusive)	\$566.19
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Attachment 4

Threatened Species Summary

Threatened Species Summary

Species (common name)	NP&W Act	EPBC Act	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Fauna Species					
<i>Corcorax melanorhamphos</i> (White-winged Cough)	R		2022	White-winged Choughs are found in open forests and woodlands. They tend to prefer the wetter areas, with lots of leaf-litter, for feeding, and available mud for nest building.	Unlikely. Species habitat not present within Site as little leaf litter is present.
<i>Melanodryas cucullata cucullata</i> (Hooded Robin – south eastern)	R	EN	2012	The south eastern Hooded Robin is found in Eucalypt woodland, mallee and Acacia shrubland. They tend to prefer relatively open areas, patches of young Eucalypts or shrubs and are often found near clearings, such as paddocks.	Possible. While species habitat is present. The size of the impact areas and the native vegetation nearby that will remain undisturbed, it is unlikely the species would be impacted.
<i>Myiagra inquieta</i> (Restless Flycatcher)	R		2012	The Restless Flycatcher is often found in open forests and woodland and is frequently seen in farmland.	Possible. While species habitat is present. The size of the impact areas and the native vegetation nearby that will remain undisturbed, it is unlikely the species would be impacted.
<i>Plectorhyncha lanceolata</i> (Striped Honeyeater)	R		2012	Striped honeyeaters are found in forests and woodlands, often along rivers, as well as mangroves and in urban gardens.	Unlikely. Species habitat not present within Site as no water source or forest / woodland present.

Likelihood	Criteria
Highly Likely/Known	Recorded in the last 10 years, the species does not have highly specific niche requirements, the habitat is present and falls within the known range of the species distribution or; The species was recorded as part of field surveys.
Likely	Recorded within the previous 20 years, the area falls within the known distribution of the species and the area provides habitat or feeding resources for the species.
Possible	Recorded within the previous 20 years, the area falls inside the known distribution of the species, but the area provide limited habitat or feeding resources for the species. Recorded within 20 -40 years, survey effort is considered adequate, habitat and feeding resources present, and species of similar habitat needs have been recorded in the area.
Unlikely	Recorded within the previous 20 years, but the area provide no habitat or feeding resources for the species, including perching, roosting or nesting opportunities, corridor for movement or shelter. Recorded within 20 -40 years; however, suitable habitat does not occur, and species of similar habitat requirements have not been recorded in the area. No records despite adequate survey effort.

Attachment 3

Visual Assessment February 2024

Job No.: 2377
Site Name: Worlds End Quarry EML 6507
Site Address: Worlds End SA
Monitoring Date: 6 February 2024
Report Requested by: Emma Manuel

Category: Visual Amenity
Client: S.C. Heinrich & Co. Pty Ltd
Approvals:
Monitored by: E Manuel

Photographs Points



06/02/2024

Photo Location 1: View of disused non-heritage listed Church ruins



06/02/2024

Photo Location 2: View of residential ruins



06/02/2024

Photo Location 3: View from Worlds End Highway looking east identifies farming infrastructure



06/02/2024

Photo Location 4: View of Satchell Road and Worlds Highway Intersection, noted there is no deterioration of the bitumen in good condition. It is noted drag out present due to road use by Wind Farm trucks, powerlines contractors and quarry trucks.



06/02/2024

Photo Location 4: View of Satchell Road looking towards the quarry. Shows Site is well shielded by vegetation.



06/02/2024

Photo Location 5: Previous hard stand concrete area for power infrastructure construction, remains a stockpile area for infrastructure works.



06/02/2024

Photo Location 5: Previous hard stand concrete area for power infrastructure construction, remains a stockpile area for infrastructure works.



06/02/2024

Photo Location 5: Inspection of roadside condition.



06/02/2024

Photo Location 6: View of adjacent landowner land shows an abandoned windmill and condition of sheep trough.



06/02/2024

Photo Location 6: View along fence line of sheep trough area on the north side of Satchell Road displays dry conditions, and heavily grazed grass



06/02/2024

Photo Location 6: View of sheep water trough conditions.



06/02/2024

Photo Location 7: View of sheep water trough south side of Satchell Road, shows some troughs in broken condition. and general grazing conditions.



06/02/2024

Photo Location 7: Functional water trough display no dust cover.



06/02/2024

Photo Location 7: Ground cover at trough area identified as a hard rock surface.



06/02/2024

Photo Location 8: View of the entrance to Council borrow pit located on adjacent holdings.



06/02/2024

Photo Location 8: View along fence line from Council borrow pit entrance looking east.



06/02/2024

Photo Location 9: View along fence line at Council borrow pit stockpile area.



06/02/2024

Photo Location 9: View of Council borrow pit stockpile area and general land conditions.



06/02/2024

Photo Location10: View of Satchell Road and roadside vegetation, road well maintained.



06/02/2024

Photo Location10: View of Satchell Road and roadside vegetation, road well maintained.



06/02/2024

Photo Location 11: Photo of land parcel northern side of Satchell Road with access point for power infrastructure.



06/02/2024

Photo Location 11: View of fence / boundary line showing general conditions of land.



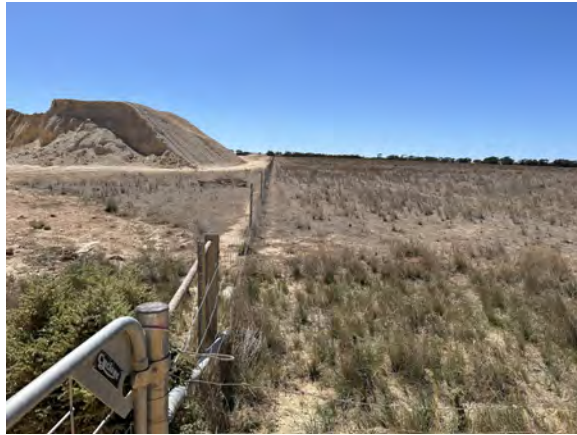
06/02/2024

Photo Location 12: View of general land conditions of the cropped area.



06/02/2024

Photo Location 12: View towards quarry shows presence of native vegetation providing screening and relief from views of the quarry.



06/02/2024

Photo Location 13: View from Quarry entrance looking east along fence line.



06/02/2024

Photo Location 13: View of adjoining paddock showing general conditions of the land.



06/02/2024

Photo Location 13: View of adjoining paddock showing general conditions looking south.



06/02/2024

Photo Location 14: View from EML 6507 southern boundary along fence line.



06/02/2024

Photo Location 14: View from EML 6507 southern boundary into adjoining land.



06/02/2024

Photo Location 14: View from EML 6507 southern boundary into adjoining land.



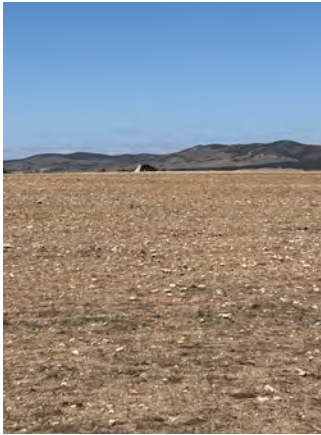
06/02/2024

Photo Location 15: View from southern boundary into adjoining paddock showing general condition.



06/02/2024

Photo Location 16: View of land parcel and general conditions south side of Satchell Road.



06/02/2024

Photo Location 17: View of residential ruins located within paddock. Confirmed with landowner it is ruins.



06/02/2024

Photo Location 18: View of paddock south side of Satchell Road demonstrating general conditions.



06/02/2024

Photo Location 18:



06/02/2024

Photo Location 21: View of paddock at intersection of Worlds End Highway and Satchell Road demonstrating general conditions.



06/02/2024

Photo Location 19: View of paddock south side of Satchell Road demonstrating general conditions.



06/02/2024

Photo Location 20: View of paddock south side of Satchell Road demonstrating general conditions.



06/02/2024

Photo Location 22: View of uninhabitable house. Condition of old farm house shows it has been uninhabited for a period of time.



06/02/2024

Photo Location 22: View of uninhabitable house. Condition of old farm house shows it has been uninhabited for a period of time.

Attachment 4

Asbestos Testing Results



WSP Australia Pty Limited

12 Greenhill Road Wayville
Telephone +61 2 4925 8452
Email idadelaide@wsp.com

Certificate of Analysis



ABN 80 078 004 798

Accredited for compliance with ISO/IEC:
17025 - Testing (No. 17199)

LOCATION: S.C Heinrich - LF 9 Worlds's End Quarry

CERTIFICATE NO: ADE-PS208385-0011-172688

CLIENT: Lab+Field Construction Material Testing

DATE\S SAMPLED: 1/12/2023

CLIENT ADDRESS: 30 Hudson Road, Mawson Lakes SA 5095

DATE RECEIVED: 15/12/2023

TELEPHONE: 08 8258 5594

DATE ANALYSED: 18/12/2023

EMAIL: jade.wilkinson@labfield.com.au

ORDER NUMBER: NA

CONTACT: Jade Wilkinson

SAMPLED BY: As Received

TEST METHOD: Qualitative identification of asbestos fibres in bulk and soil samples at WSP Corporate Laboratories by polarised light microscopy, including dispersion staining, in accordance with AS4964 (2004) Method for the qualitative identification of asbestos in bulk samples and WSP's Laboratory Procedure (LP3 - Identification of Asbestos Fibres). Trace analysis carried out on all non-homogenous samples.

Lab No	Sample ID	Location	Description	Approximate Dimensions	Identification Type
001	PR-23/0394-10	40mm Rubble	Sand	243.6 g	OF, NAD ¹

LEGEND:

- NAD - No Asbestos Detected
- CH - Chrysotile Asbestos Detected
- A - Amosite Asbestos Detected
- C - Crocidolite Asbestos Detected
- OF - Organic Fibres Detected
- ¹ - No asbestos detected at reporting limit of 0.1 g/kg

Approved Identifier

Name: Emily Grayson

Approved Signatory

Name: Mostaq Bayazid

Notes:

If no asbestos is detected in vinyl tiles, mastics, sealants, epoxy resins and ore samples, then confirmation by another independent analytical technique is advised due to the nature of the samples. UMF may or may not be asbestos, confirmation by another independent analytical technique is advised.

The results contained within this report relate only to the sample(s) analysed.

Sampling is not covered by the scope of accreditation.

WSP accepts no responsibility for the initial collection, packaging or transportation of samples submitted by external persons, or data supplied by external persons.

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AUTHORISATION DATE

Monday, 18 December 2023

Attachment 5

Wind Rose Data

Rose of Wind direction versus Wind speed in km/h (26 Jan 1965 to 10 Aug 2023)

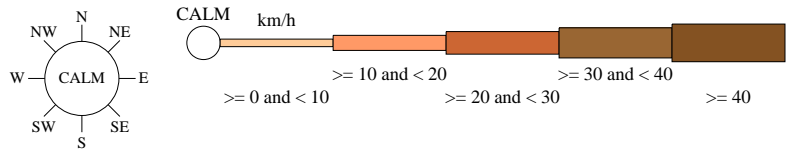
Custom times selected, refer to attached note for details

EUDUNDA

Site No: 024511 • Opened Nov 1880 • Still Open • Latitude: -34.1773° • Longitude: 139.0903° • Elevation 420m

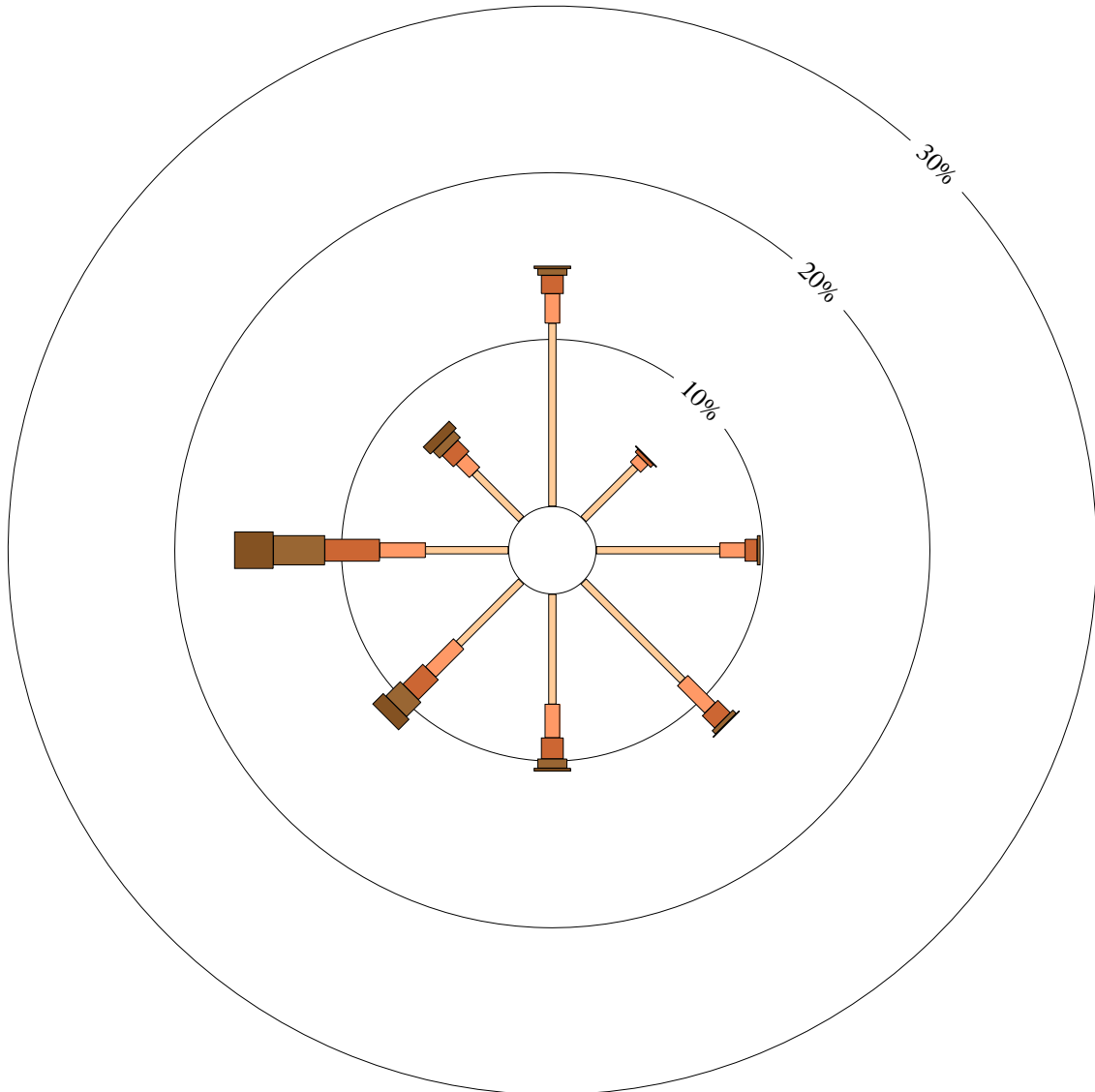
An asterisk (*) indicates that calm is less than 0.5%.

Other important info about this analysis is available in the accompanying notes.



9 am
21096 Total Observations

Calm 13%



Rose of Wind direction versus Wind speed in km/h (26 Jan 1965 to 10 Aug 2023)

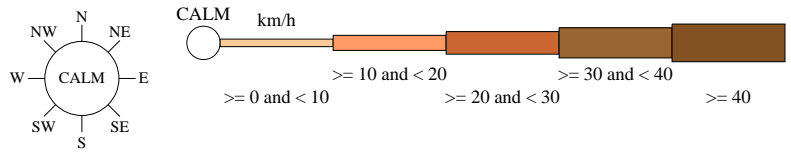
Custom times selected, refer to attached note for details

EUDUNDA

Site No: 024511 • Opened Nov 1880 • Still Open • Latitude: -34.1773° • Longitude: 139.0903° • Elevation 420m

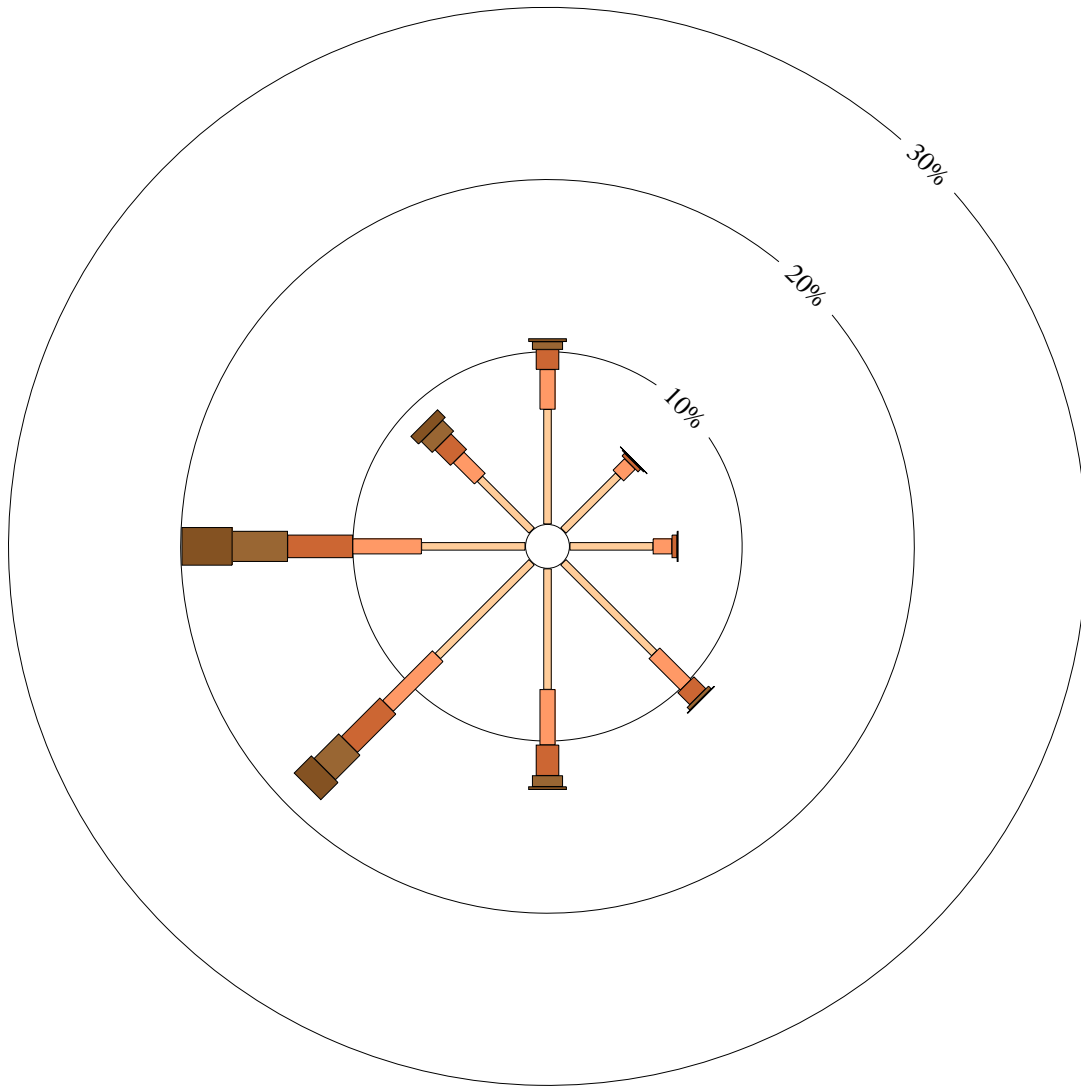
An asterisk (*) indicates that calm is less than 0.5%.

Other important info about this analysis is available in the accompanying notes.



3 pm
17179 Total Observations

Calm 6%



Attachment 6

Implications of mineral extraction for Vegetation Identified as a Terrestrial GDE (Low Potential) Summary

Implications of mineral extraction for Vegetation Identified as a Terrestrial GDE (Low Potential) Summary

Terrestrial GDEs fall into a category of groundwater dependent ecosystems that are characterised by a dependency on the subsurface presence of groundwater, often accessed via the non-saturated zone above the saturated zone of the water table, when roots penetrate this zone. It does not require the surface expression of groundwater (such as springs or wetlands). According to the methodology developed for the national GDE mapping, Groundwater at a depth of less than 10 m may be an indication of **vegetation's** ability to access the water table if the soil conditions are conducive to tree root penetration to that depth. Some tree species may have roots much deeper than 10 m, but most species root depths would fall within the 10 m depth. This would suggest a very low use of ground water by terrestrial vegetation where the groundwater depth is in excess of 10 m depth.

Mapping for Terrestrial GDEs has been completed at a national level, with methodology based on factors such as evapotranspiration compared to rainfall; depth to water table or topography; soil characteristics, such as water **holding capacity; vegetation type, including constant 'greenness' all year round; and presence of surface water.** Data for the mapping was obtained from literature reviews, expert consultation and review, remote sensing and GIS analysis with the final map reliant of the availability of existing data, with field validation for all potential GDEs not possible on a national scale.

Investigations of the GDE Atlas found **a low potential Terrestrial GDE may exists within the World's End EML. This has been mapped as a 'Eucalyptus brachycalxy mallee woodland'. The mapping as a low potential GDE has been** primarily based on a high Inflow Dependent Ecosystem (IDE) score, which quantifies the likelihood of vegetation water use being in excess of rainfall, suggesting supplementary groundwater use; as well as type of vegetation present (based on national mapping, not field validated). No data regarding water table depth, aquifers, or aquifer geology has been included in the attribute table of the mapping for this location.

Field validation of the Site has found the vegetation to be a mix of shrubs, low chenopods, native grasses and some scattered *Eucalyptus oleosa* mallee. Water table depths have been found to be in excess of 20 m. Annual rainfall provided by the Bureau of Meteorology is an average of 333 mm. Given the validated depth of groundwater on Site and the type of vegetation found, it is unlikely that groundwater is being utilised by the majority of the vegetation. Further to this, given the depth to groundwater, operations are not proposed to impact the depth of groundwater or the ability for recharge of groundwater from surface water infiltration. This would indicate that should some of the vegetation, particularly the mallee trees, be periodically utilising groundwater, proposed quarry operations will not inhibit this ability.

References:

Groundwater Dependent Ecosystems Atlas, Australian Government Bureau of Meteorology, URL: <http://www.bom.gov.au/water/groundwater/gde/>

Doody, T., Barron, O., Dowsley, K., Emelyanova, I., Fawcett, J., Overtona, I. C., Pritchard, J. L., Van Dijk, A. I.J.M., and Warren, G. 9 (2017), Continental mapping of groundwater dependent ecosystems: A methodological framework to integrate diverse data and expert opinion, Journal of Hydrology: Regional Studies, URL: <https://doi.org/10.1016/j.ejrh.2017.01.003>

Eamus, D., Froend, R., Loomes, R., Hose, G., & Murray, B. (2006), *A functional methodology for determining the groundwater regime needed to maintain the health of groundwater-dependent vegetation*, Australian Journal of Botany, URL: https://www.researchgate.net/publication/49278037_A_Functional_methodology_for_determining_the_groundwater_regime_needed_to_maintain_the_health_of_groundwater-dependent_vegetation/link/00463515e730b1ea6a000000/download?tp=eyJjb250ZXh0Ijp7ImZpcnN0UGFnZSI6InB1YmxpY2F0aW9uIiwicGFnZSI6InB1YmxpY2F0aW9uIn19

Stygoecologia (2013), *A Review of Groundwater Dependent Terrestrial Vegetation and Groundwater Depth for the Namoi Catchment* Management Authority, NSW, URL: <https://frackinginquiry.nt.gov.au/submission-library?a=446549>

Attachment 7

Worlds End PEPR March 2024