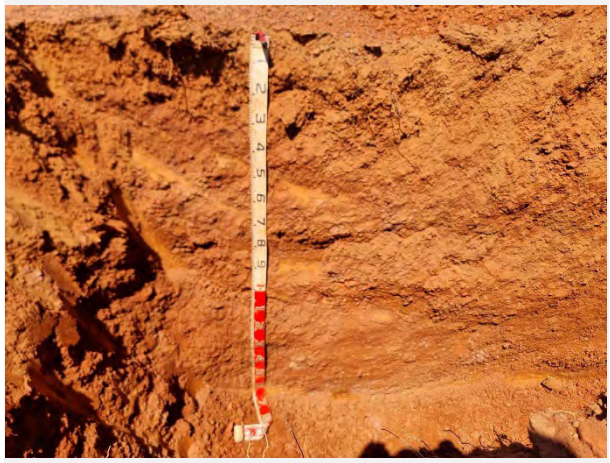
Landloch

WINU PROJECT:
SOIL CHARACTERISATION



Rio Tinto Winu Pty Ltd

May 2025

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1 INTRODUCTION

Rio Tinto Winu Pty Ltd (RTW) plans to develop a new copper-gold mine, referred to as the Project. The Project is located approximately 320km east of Port Hedland in the Pilbara region of Western Australia, within both the Nyangumarta and Martu Peoples' Native Title Determination Areas. Landloch Pty Ltd (Landloch) completed an initial baseline soil characterisation within the Project development footprint in 2020. Since that time the size of the development envelope for the Project has increased, and now includes an access road and bore field. RTW engaged Landloch to complete soil characterisation for the revised Project envelope.

This report presents the results of the soil characterisation, and includes:

- Summary of the desktop review
- Methodology for the field-based survey and collection of samples;
- Methodology for the testing of samples, interpretation and classification of soils;
- Classification of soils in line with the Australian Soil Classification (ASC) scheme;
- Allocation of Soil Mapping Units (SMUs);
- Soil management strategies;
- Estimated soil stripping depth and soil volumes; and
- Soil handling recommendations.

1.1 Background

The Project is a planned copper and gold mine located approximately 320km east of Port Hedland, in the Pilbara region of Western Australia. The Project resides within both the Nyangumarta and Martu People Title Determination areas. The combined Project Development Envelope is ~23,649ha in size and is comprised of three development envelopes:

- Mine infrastructure area (10,182ha);
- Rimfire bore field (6,820ha); and
- Road access corridor (6,647ha and ~170km in length).

The location of the Project, including the three development envelopes, within the regional setting, is shown in Figure 1.

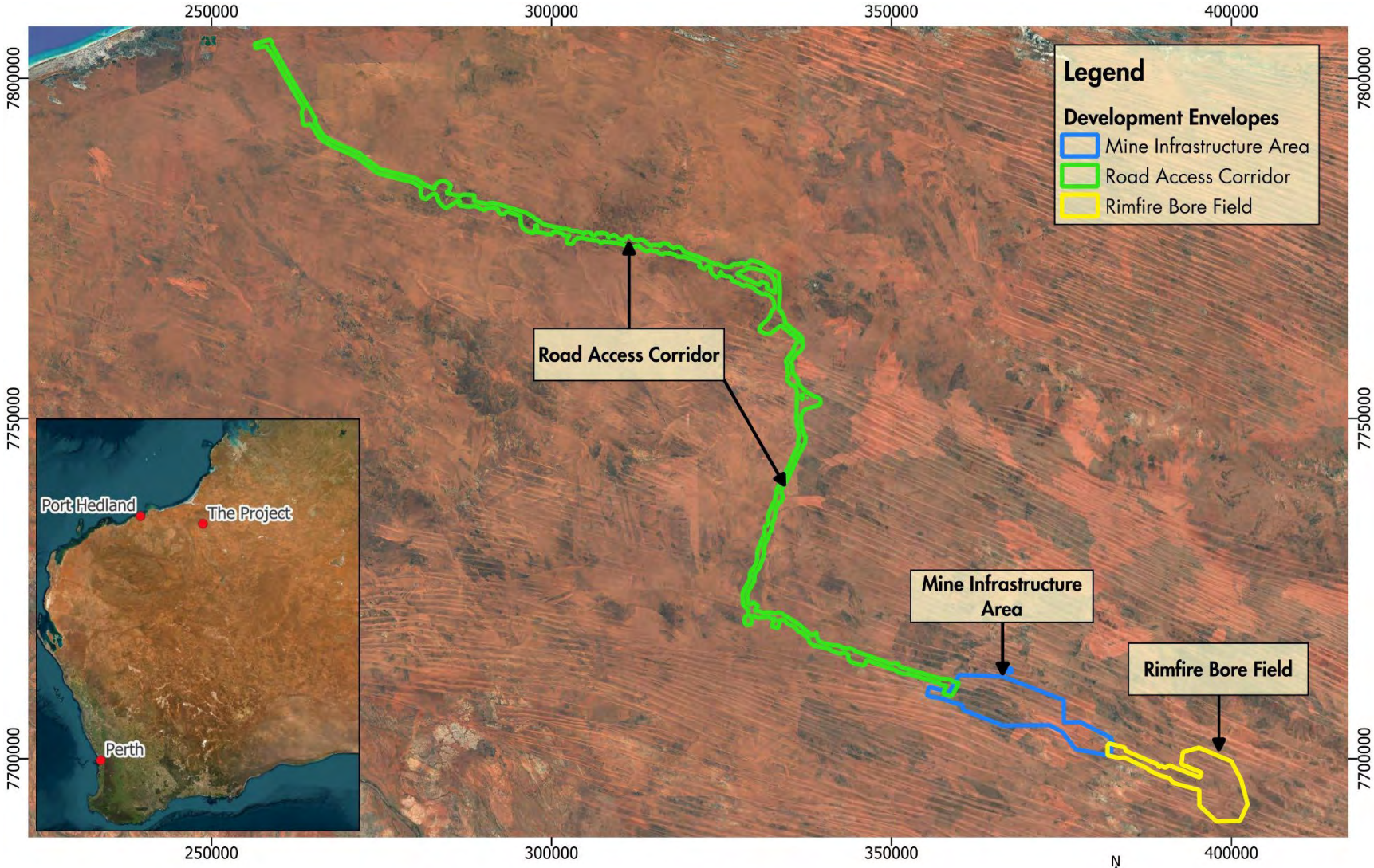


Figure 1: Location of the Project, including the three development envelopes, within the region setting.

1.2 Regulatory requirements

In December 2024 and March 2025, The Department of Mines, Industry, Regulation and Safety (DEMIRS) released the latest guidelines for preparing Mining Development and Closure Proposals (MDCP) and Mine Closure Plans (MCP). The MDCP and MCP guidelines are not yet in effect, with DEMIRS estimating that they will become active in August 2025. Once in effect, these guidelines will supersede the existing Mining Proposal Guidance (DMIRS 2020a), and Mine Closure Plan Guidance (DMIRS 2020b).

Within the MDCP guidelines it is stated that:

"The level of detail required for soils will depend on the scale, nature and location of the mining activities proposed. Aspects to be considered when developing a MDCP include but are not limited to:

- *A description of the major soils occurring in the activity envelope including the indicative volume of topsoil and subsoil available for rehabilitation. Reference to the characterisation methodology used should be included in the MDCP. Where appropriate soils may be classified according to the Australian Soil Classification (Isbell and NCST 2021).*
- *Where there are multiple soil types identified, a map showing the spatial extent of each individual soil type in the activity envelope. The map should include a scale bar, latitude and longitude coordinates, date of field survey, and regional map location.*
- *Physical and chemical characteristics of soils to identify baseline characteristics and potential for use as a rehabilitation medium, including susceptibility to erosion and ability to support growth of native vegetation. Key parameters include:*
    - *Soil salinity and pH.*
    - *Exchangeable cations and sodicity.*
    - *Soil texture.*
    - *Particle size distribution.*
    - *Soil structural stability (Emerson Test and potential for clay dispersion).*
    - *Hydraulic conductivity.*
    - *Propensity for hard-setting.*
    - *Total metal concentration.*
    - *Water repellence.*
- *Volumes of soils required to complete rehabilitation, identification of any shortfall of available material, and where relevant, mitigation measures to address the deficiency."*

The infield soil survey and associated laboratory analysis was completed to provide sufficient *in situ* soils data as to facilitate soils mapping, classification and characterisation. Details on the regulatory requirements stated above, and the relevant section of the report where each requirement is addressed is provided in Table 1.

Table 1: Regulatory requirements and corresponding section within this report.

Requirement	Section
Description of major soils	4.2 Soil Mapping units
Indicative volume of topsoil and subsoil available for rehabilitation	5.3 Soil volumes
Reference to the characterisation methodology	2.2 Field-based survey 3.2 Data interpretation scheme
Classified according to the Australian Soil Classification	4.1 Australian Soil Classification
Map showing spatial extent of each individual soil type	4.1 Australian Soil Classification (Figures 11-16) 4.2.4 Soil Distribution (Figures 17-22)
Physical and chemical characteristics of soils	4.2 Soil Mapping Units 4.3 Deep Sands 4.4 Gradational Sands 4.5 Shallow Sands
Potential for use as a rehabilitation medium	5.1 Soil Suitability
Susceptibility to erosion	5.5 Wind erosion 5.6 Water erosion
Ability to support growth of native vegetation	5.1 Soil Suitability
Key parameters include: • Soil salinity and pH • Exchangeable cations and sodicity • Soil structural stability • Hydraulic conductivity • Propensity for hard setting • Total metal concentration • Water repellence	3.1 Soil testing
Volumes of soil required to complete rehabilitation, identification of available material, and where relevant, mitigation measures to address the deficiency.	Outside of scope – To be covered within the MCP

2 OUTLINE OF APPROACH

Broadly, the approach taken to complete the soil characterisation included:

- A desktop review of soil and land information and development of Sampling and Analysis Plan;
- Field survey to ground truth the soil types and sample the soils;
- Classification of soils into soil types;
- Grouping of soils types based on similarities in characteristics
- Analysis of geotechnical survey data to aid in extrapolation of soils data;
- Mapping of soil type extents;
- Determination of potential topsoil and subsoil stripping depths and volumes.

This section outlines the review of existing information, the approach to the field-based survey, and the process for the soil classification and mapping.

2.1 Desktop review

A desktop review of existing soil and landscape data was undertaken to gain an appreciation of the types and variability of the soils and landscapes within the Project area. Soil inspection sites were selected to ground-truth this pre-existing soil and landscape data. A summary of the desktop review is provided in this section.

2.1.1 Land resource mapping

Land resources mapping has been conducted across Western Australia at varying levels of intensity. The collation of this information has resulted in the development of soil-landscape mapping for the whole of Western Australia. The scale of mapping varies across the state, with areas split into regions dependent upon the level of data available at the time of compilation. Mapping is compiled of differing levels of intensity depending on the region.

The soil-landscape mapping is based on a nested hierarchy of mapping units comprised of six levels. Each unit in the mapping hierarchy is a subdivision of the preceding level. This hierarchy is outlined below:

1. Regions: broad subdivisions of the Australian Continent.
2. Provinces: broad overview of the whole state.
3. Zones: regions defined in geomorphic or geological criteria.
4. Systems: areas with reoccurring patterns of landforms, soils and vegetation.
5. Subsystems: areas of characteristic landforms containing definite suits of soils.
6. Phases: division of subsystems based on land use requirements.

For the Project area, land resource mapping is available at the land systems level (Level 4) (van Vreeswyk *et al.* 2004, Catching 2006). A total of six land systems are present illustrated in Figures 2 to 4 and summarised in Table 2:

- Little Sandy system;
- Callawa system;
- Buckshot system;
- Nita system;
- AB40 atlas system; and
- B30 atlas system.

The most prominent system within the Project area is the Little Sandy system, comprising 93% of the Mine infrastructure area (MIA) and much of the south-eastern portion of the access the road (~34%), with a minor presence within the Rimfire envelope (<1%). With depositional surfaces comprised of sandplains and dune fields, the primary driver of soils and landforms across the Little Sandy system is wind. Linear and reticulate dunes run parallel to sand plains, and isolated low hills of gravel and calcrete exist in areas of

increased elevation. Soils are predominantly red deep sands formed on sandplains and swales, with sandy earths associated with the dunes. Shallow gravels can be found on the gravelly plains.

The Nita system is present across ~33% of the Access Road but does not occur within any other footprint. Sandplains and linear dunes formed from deposition are the defining feature of the Nita land system, interspersed with low hills and stony/gravelly rises. Soils are predominantly red deep sands associated with the sandplains and dunes, with red shallow sands and shallow gravelly soils occurring on the low hills and gravelly plains.

The Callawa system covers ~32% of the Access Road. An erosional system, landforms include highly dissected low hills, low mesas and gravelly plains, with lower slopes lead into sand sheets and drainage lines. This land system occurs as discreet elevated areas within the Nita land system. Stony soils and shallow loams are commonly associated with the hills, mesas and plateaux. Red shallow loams are present on the gravely plains, with red deep sands and red sandy earths on lower gradient sand sheets.

A relatively minor unit, the Buckshot system comprises <2% of the Access Road footprint, occurring at two discrete locations. With depositional surfaces of gravelly sandplains and occasional sand dunes, the Buckshot system has similar characteristics to other systems within the area. The gravelly sandplains and stony/sandy plains are associated with red deep sands or red loamy earths, with shallow gravelly soils present in areas of increase elevation and slope.

The AB40 atlas system is comprises a small portion of the MIA (7%), and dominants the Rimfire bore field (97%). Gently undulating plains and dunes are most common, although ironstone and laterite gravel plains occur frequently. No soils data are available for this system within the publish land resource mapping.

The B30 atlas system occurs solely in the Rimfire bore field area and is associated with <3% of the area. Landforms include linear dune fields with swales and sand plains, and considerable areas of clay and salt pans. No soils data are available for this system within the published land resource mapping.

Table 2: Land systems occurring within the Project area.

Land system	Percentage of total survey area (%)	Associated soils	Description
Little Sandy	50	Red deep sands Shallow gravels Sandy earths	Depositional sand plains and dune fields. Linear and reticulate dunes run parallel to the sand plains. Hills of gravel and calcrete.
Nita	9	Red deep sands Red shallow sands Shallow gravels	Depositional surfaces. Sandplains and linear dunes. Low hills and stony rises.
Callawa	9	Stony soils Shallow loams Red deep sands Red sandy earths	Erosional surfaces. Low mesas and gravelly plains with low slopes that lead into sand sheets and drainage lines.
Buckshot	<1	Red deep sands Red loamy earths Shallow gravels	Depositional surfaces. Gravelly sandplains and dunes. Low hills and rises atop laterite and abundant ironstone.
AB40	30	Stony soils Sandy soils	Gently undulating plains and dunes. Areas of gravel from ironstone and exposed laterite.
B30	<1	Sandy soils Clays	Linear dune fields with swales and sand plains. Occurrences of clay pans and salt pans.

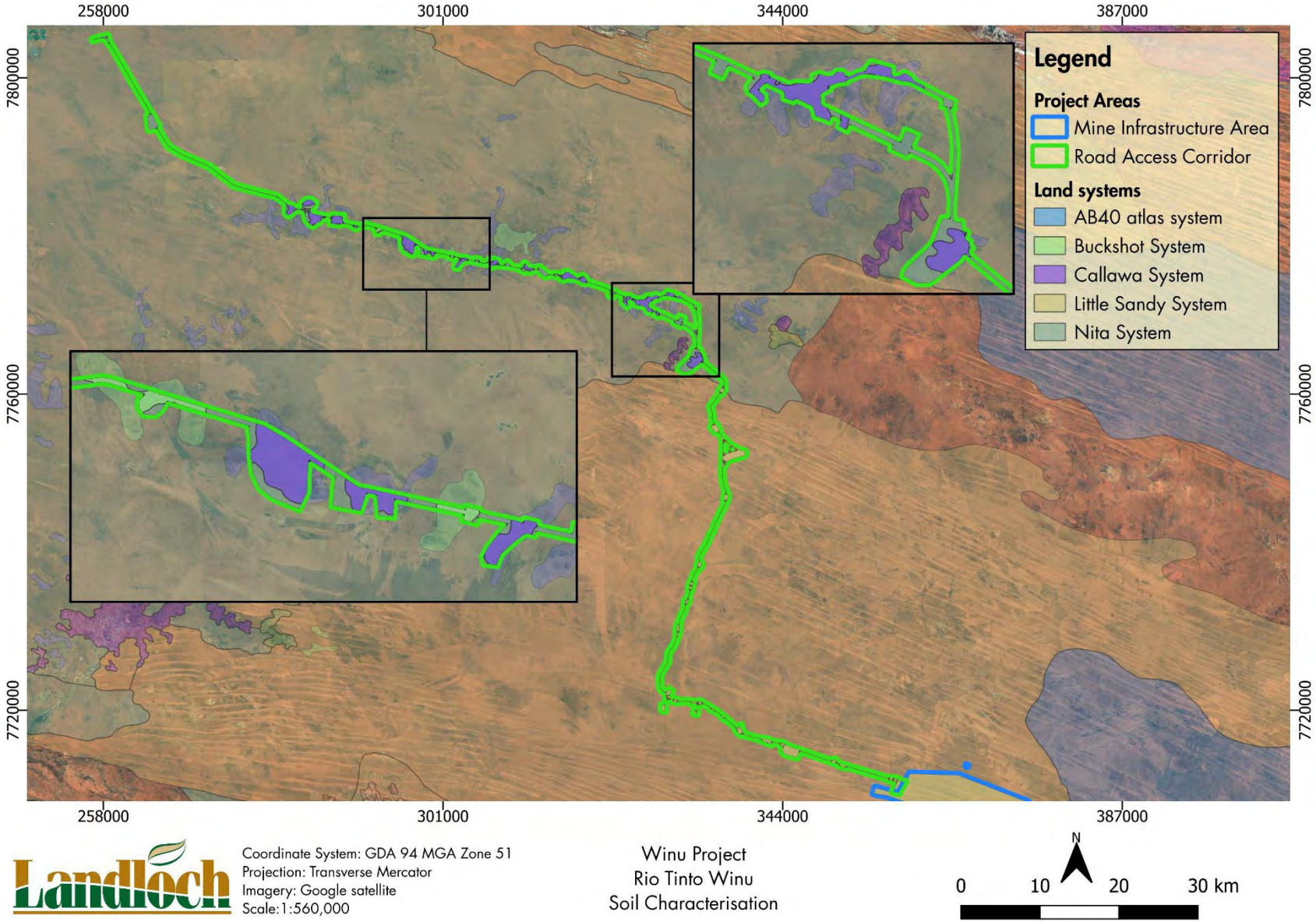


Figure 2: Land systems mapping along the Road Access Corridor.

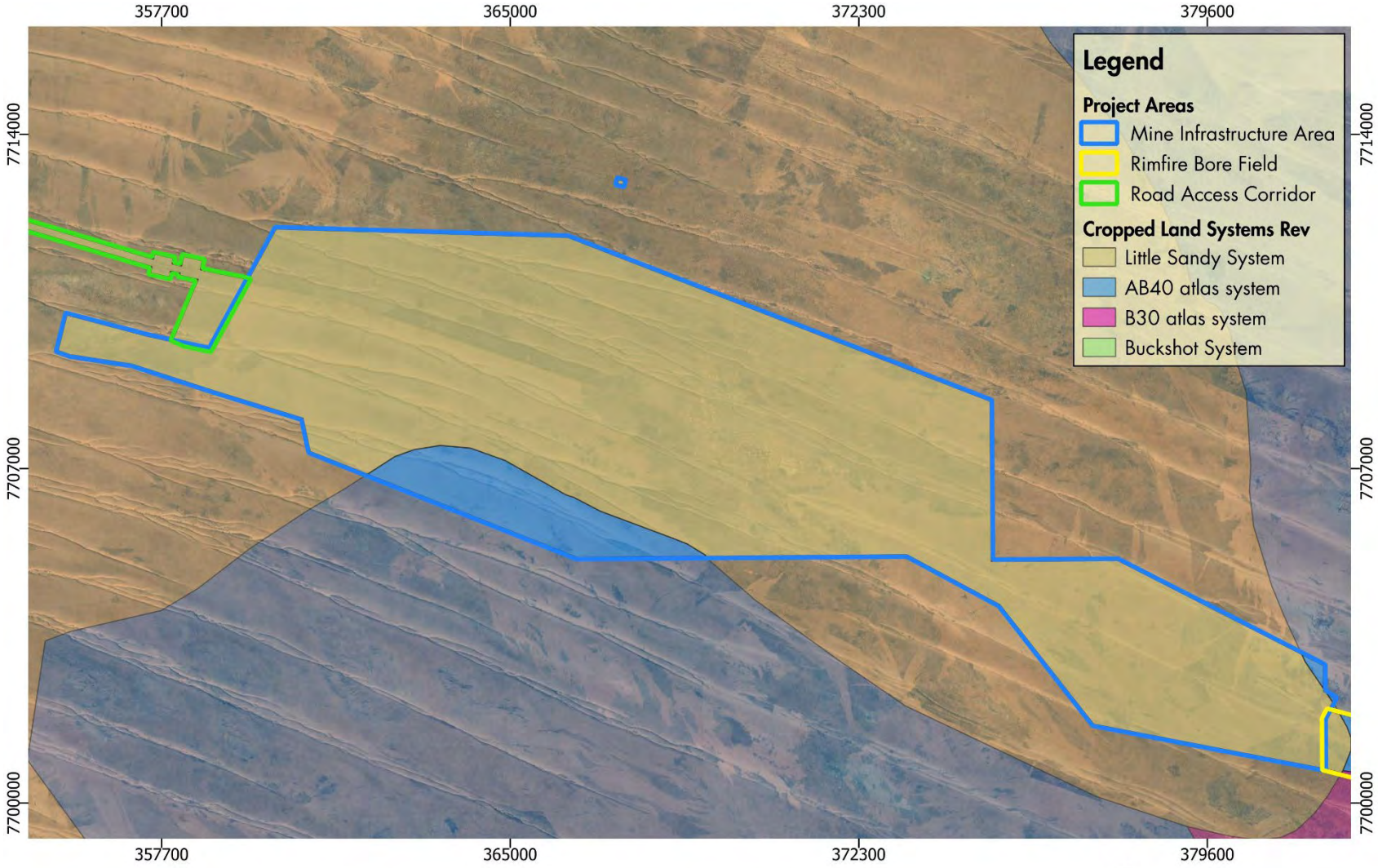


Figure 3: Land systems mapping within the Mining Infrastructure Area.

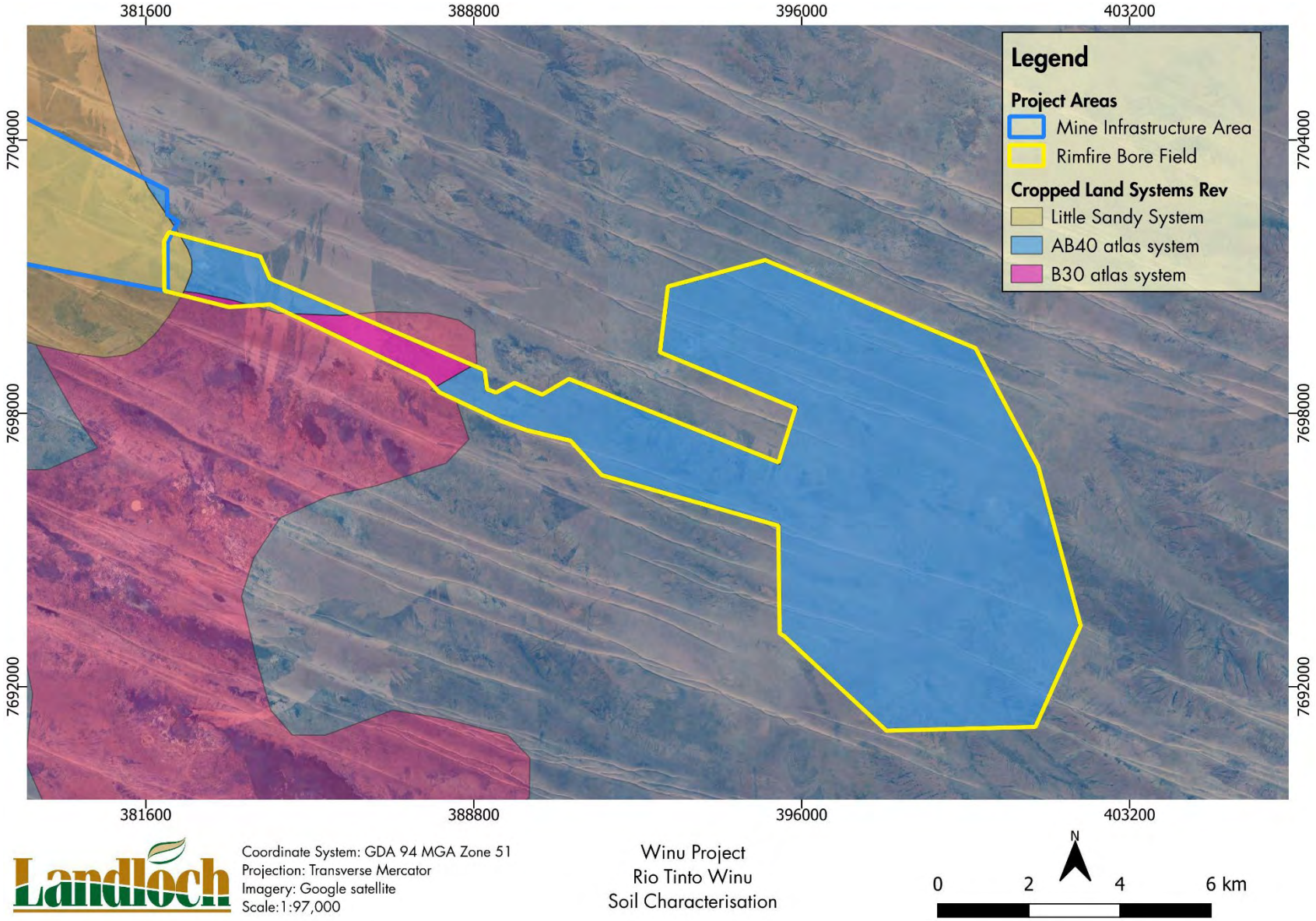


Figure 4: Land systems mapping for the Rimfire Bore Field.

2.1.2 Atlas of Australian Soils

The Atlas of Australian Soils (Northcote *et al.* 1960-1968) was compiled by CSIRO in the 1960s to provide a consistent national description of Australia's soils. It comprises a series of ten maps and associated explanatory notes. The maps are published at a scale of 1:2,000,000, but the original compilation was at scales ranging from 1:250,000 to 1:500,000. Mapped units within the Atlas are soil landscapes usually comprising several soil types. The explanatory notes include descriptions of soil landscape and component soils. Additionally, the soils have further been classified using the Australian Soil Classification scheme (ASC).

A total of five soil landscapes have been described across the extent of the Project area:

- AB21;
- AB22;
- AB39:
- AB40; and
- B30.

The distribution of the five soil landscapes are mapped in Figures 5 to 7.

The dominant soil of the AB39, AB40, AB21 and AB22 soil landscapes are classified as Tenosols. Tenosols are soils with weak pedological organisation or structure, aside from the topsoil horizon. Tenosols encompasses a diverse range of soils across Australia.

The dominant ASC order within the B30 soil landscape are Rudosols. The Rudosol order covers soils that have little to no pedological organisation. These soils are typically young soils, having relatively little time to pedologically modify the parent rock or sediment. Rudosols are typically shallow soils with low clay content laying above a cemented or hard rock layer.

Additional ASC orders described as secondary soils in the Atlas include Calcarosols (AB39, AB21 and AB22). Calcarosols are soils that are calcareous throughout the majority of the soil profile and do not have sandy soil textures. Sodosols are present within a single soil landscape (B30). Sodosols are soils that have a clear texture contrast between soil horizons and the majority of the soil profile is sodic and not strongly acid.

Overall, the dominant soil types expected across the Project area are Tenosols and Rudosols. Both soils refer to poorly developed soil profiles, and commonly include sandy soils derived from dune sands. It is noted that the updated ASC includes a new soil order called Arenosols. These are soils with a sandy texture to a depth of 0.8m, with no layer with clay content that exceeds 15%, and no hard layers. As the update to the ASC occurred after the soil landscapes were classified to the ASC, this order is absent. It can be assumed that the majority of Tenosols and Rudosols present within the soil landscapes are likely to be Arenosols. This matches the land systems mapping which indicates the majority of land systems are comprised of dunes and swales with deep sandy soils.

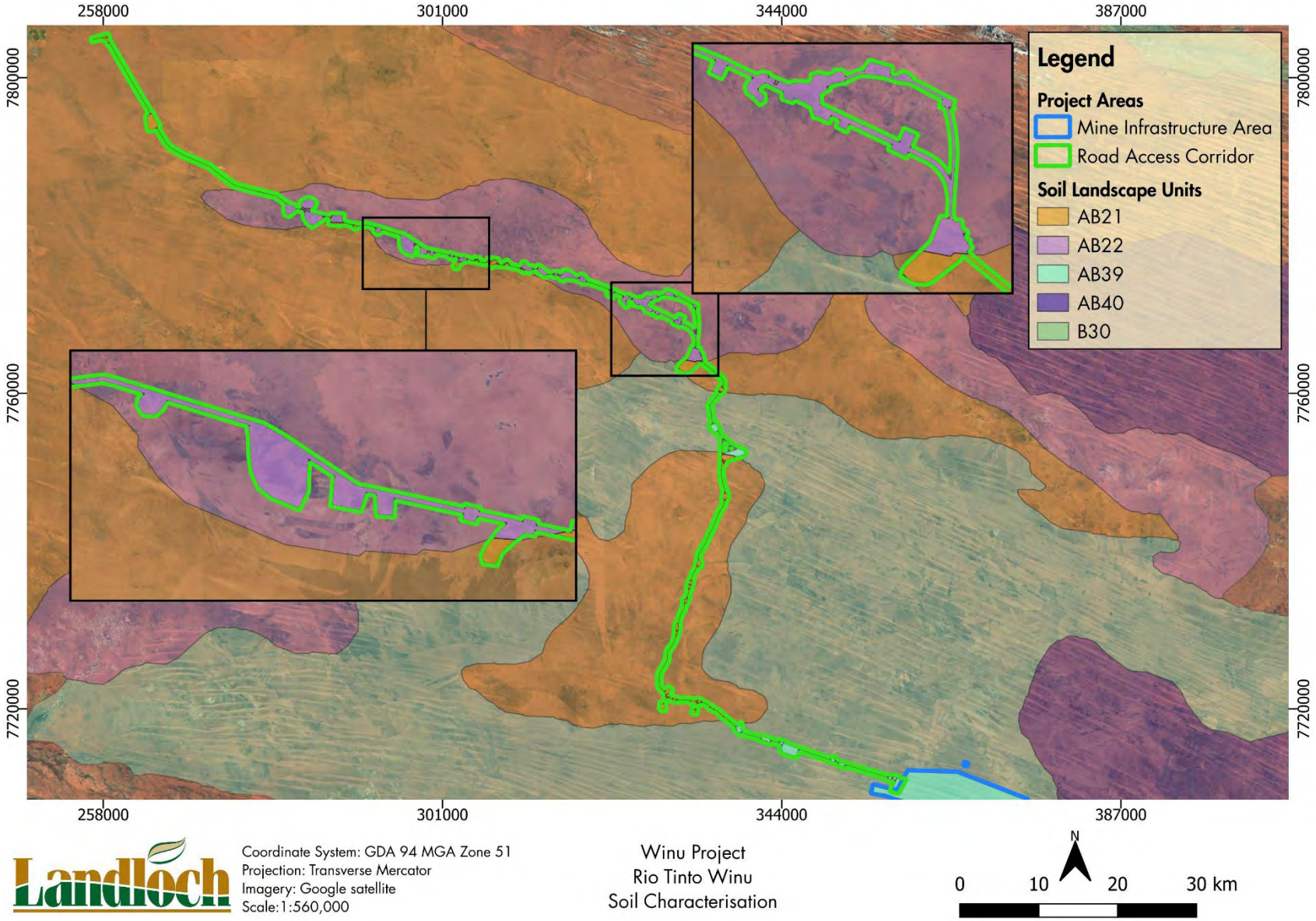


Figure 5: ASRIS soil landscapes across the Road Access Corridor.

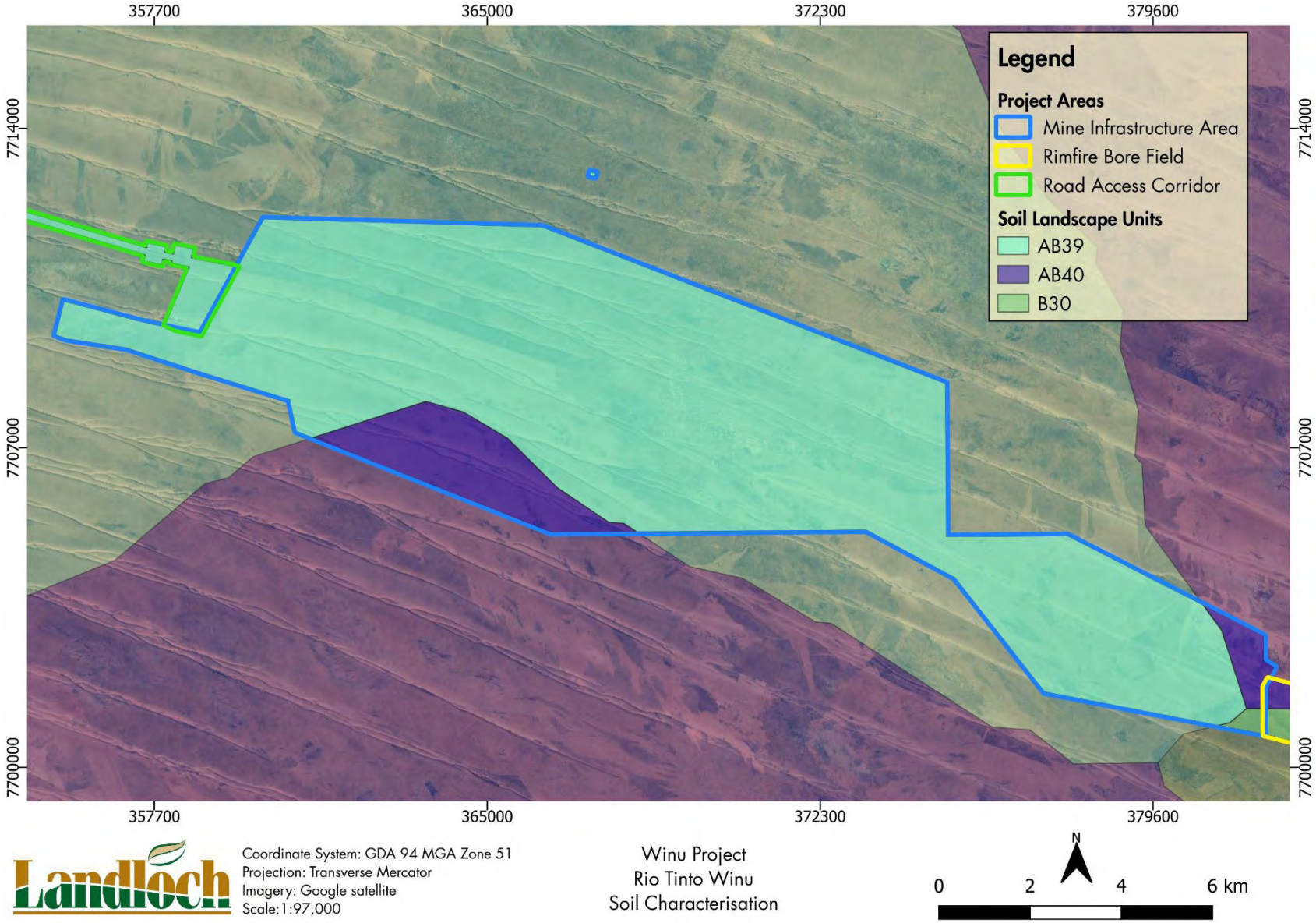


Figure 6: ASRIS soil landscapes within the Mining Infrastructure Area.

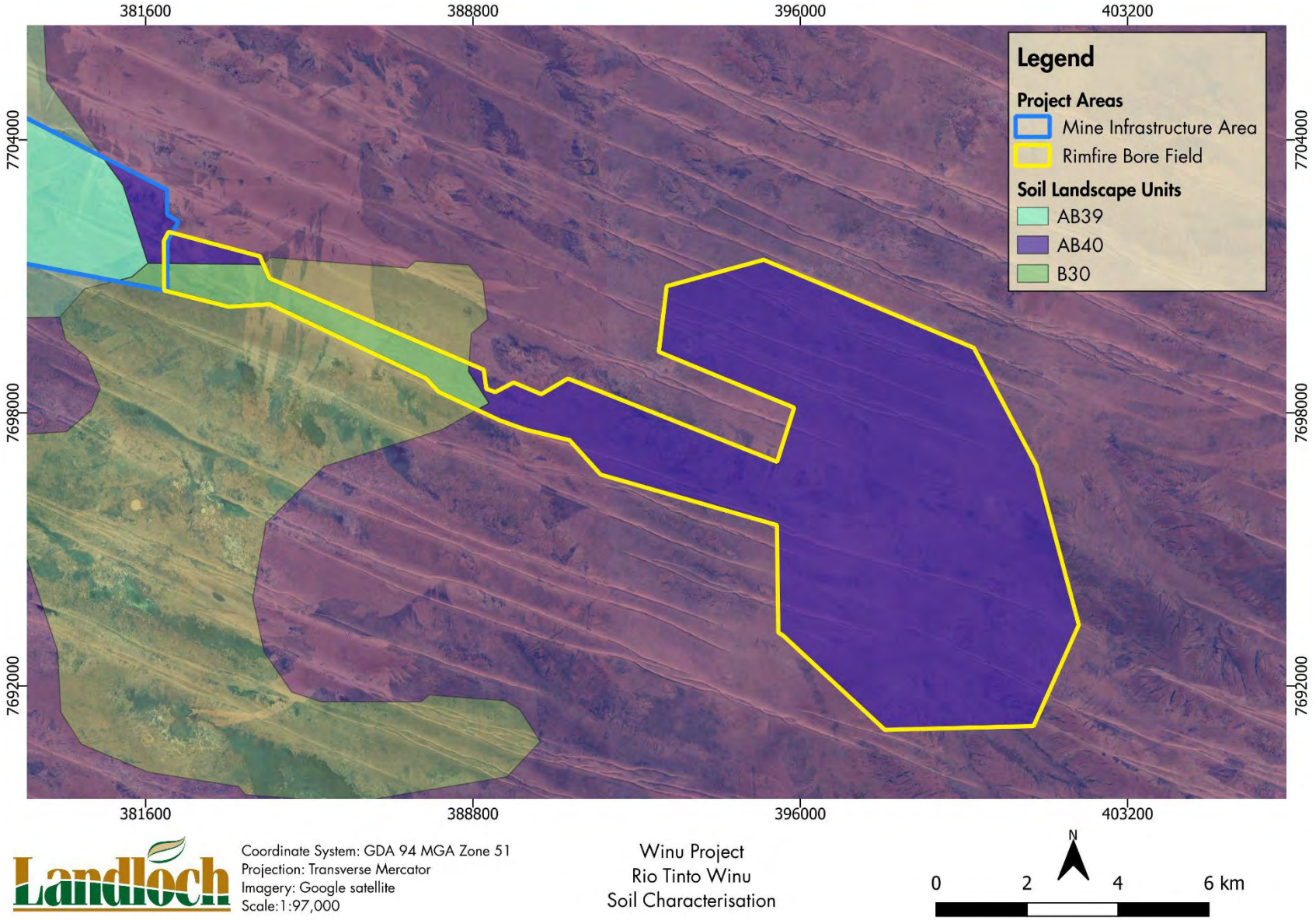


Figure 7: ASRIS soil landscapes within the Rimfire Bore Field.

2.1.3 Winu Project Soil Characterisation Report

Landloch has previously completed a characterisation of the soils at Winu (Landloch 2020). The total survey area assessed was ~1,220ha and resides entirely within the current MIA. The survey area included the, at the time, planned mining infrastructure and airstrip.

A total of 19 soil inspection sites were investigated, with 13 described in detail and 6 check sites. 63 soil samples were collected and underwent the following initial laboratory assessment:

- pH_w (1:5 solids: deionised water solution);
- $EC_{1:5}$ (1:5 soil: deionised water solution);
- Emerson dispersion class; and
- Fine/coarse fraction percentage.

In addition to this, 24 of the 63 samples were submitted for more detailed laboratory analysis. The laboratory analyses were divided in a topsoil characterisation suite and a subsoil characterisation suite (Table 3).

Table 3: Laboratory analysis suites performed on 24 soil samples (Landloch 2020).

Laboratory Suite	Target samples	Analysis
Topsoil Suite	A horizon (topsoil fertility) generally between 0-100mm depth. Analyses include soil fertility as this is the 'growth media' depth of the soil profile and is a major factor in determining a soil's nutrient status. This will also include one sample from the subsoil for baseline comparison.	• $pH_{1:5}$ (water) • $EC_{1:5}$ • Total Cl • Exchangeable cations (K^+, Ca^{2+}, Mg^{2+}, Na^+ & Al^{3+}) • Effective cation exchange capacity (ECEC) • Exchangeable sodium percentage (ESP) • Particle size distribution of the fine fraction (coarse sand, fine sand, silt, clay) • Organic C • Total N & Total P • Available P and K (Colwell) • Available S (KCl) • Trace elements (Cu, Zn, Mn & Fe)
Subsoil Suite	All other horizons below the topsoil (>100mm). Analyses focus on chemical and physical properties of the soil.	• $pH_{1:5}$ (water) • $EC_{1:5}$ • Total Cl • Exchangeable cations (K^+, Ca^{2+}, Mg^{2+}, Na^+ & Al^{3+}) • Effective cation exchange capacity (ECEC) • Exchangeable sodium percentage (ESP) • Particle size distribution of the fine fraction (coarse sand, fine sand, silt, clay)

Following analysis of the baseline soils data, the soils of the survey area were classified using two classification schemes:

- Australian Soil Classification (ASC); and
- Soil Groups of Western Australia (SGWA).

A total of two ASC orders were identified within the survey area, Tenosols and Kandosols. Tenosols are soils with weak pedological organisation apart from the topsoil horizon. Kandosols are soils with massive or weakly structured subsoils that have a clay content that exceeds 15% and are not calcareous. The portion of the survey area associated with the airstrip were mapped as Kandosols, with the remainder of the survey area mapped as Tenosols.

The two SGWA soil orders identified within the survey area were Red Deep Sands and Brown Sandy Earths. Red Deep Sands encompass sandy soils with a depth greater than 0.8m where the surface soils are red. The Red Deep Sands were mapped to the same extents as the Tenosols. The Brown Sandy Earths encompassed soils with brown sandy topsoils that increased in clay content with depth, this SGWA order was present within the airstrip.

The soils of the survey area were grouped into Soil Mapping Units (SMUs). SMUs are developed based on recurring landscape and soil attributes, with minor variations in soil properties allowable within each SMU. The purpose of the SMUs is to group soils by their management requirements, such as depth, salinity, sodicity and coarse fragments. A total of two SMUs were defined:

- Deep Sands; and
- Gradational Sands.

The Deep Sands were mapped across the MIA, and the Gradational Sands across the airstrip. Deep Sands were defined by their deep sandy soil profiles, with no appreciable clay content or pedological development. The Gradational Sands consisted of deep sandy profiles that graded from loamy sand textures to sandy loams at depths greater than 0.5m.

Both SMUs have similar physical and chemical properties, aside from the difference in subsoil texture. Both SMUs contain negligible levels of coarse material and have weak to no structure. Both units are non-saline and moderately acidic. Sodicity typically increases with depths in both SMUs. Both SMUs were considered to be suitable growth media for use during rehabilitation.

A map of the SMU distributions within the current Mining Infrastructure envelope is provided in Figure 8. Summaries of the material characterisation data of the SMUs is provided in Appendix A.

Similar to the Atlas of Australian soils, the Tenosols identified by Landloch are likely to correspond to Arenosols. The survey was completed prior to the update to the ASC, and as such deep sandy soils were identified as Tenosols. Since this update, the soils classified as Tenosols would likely better fit the classification of Arenosols.

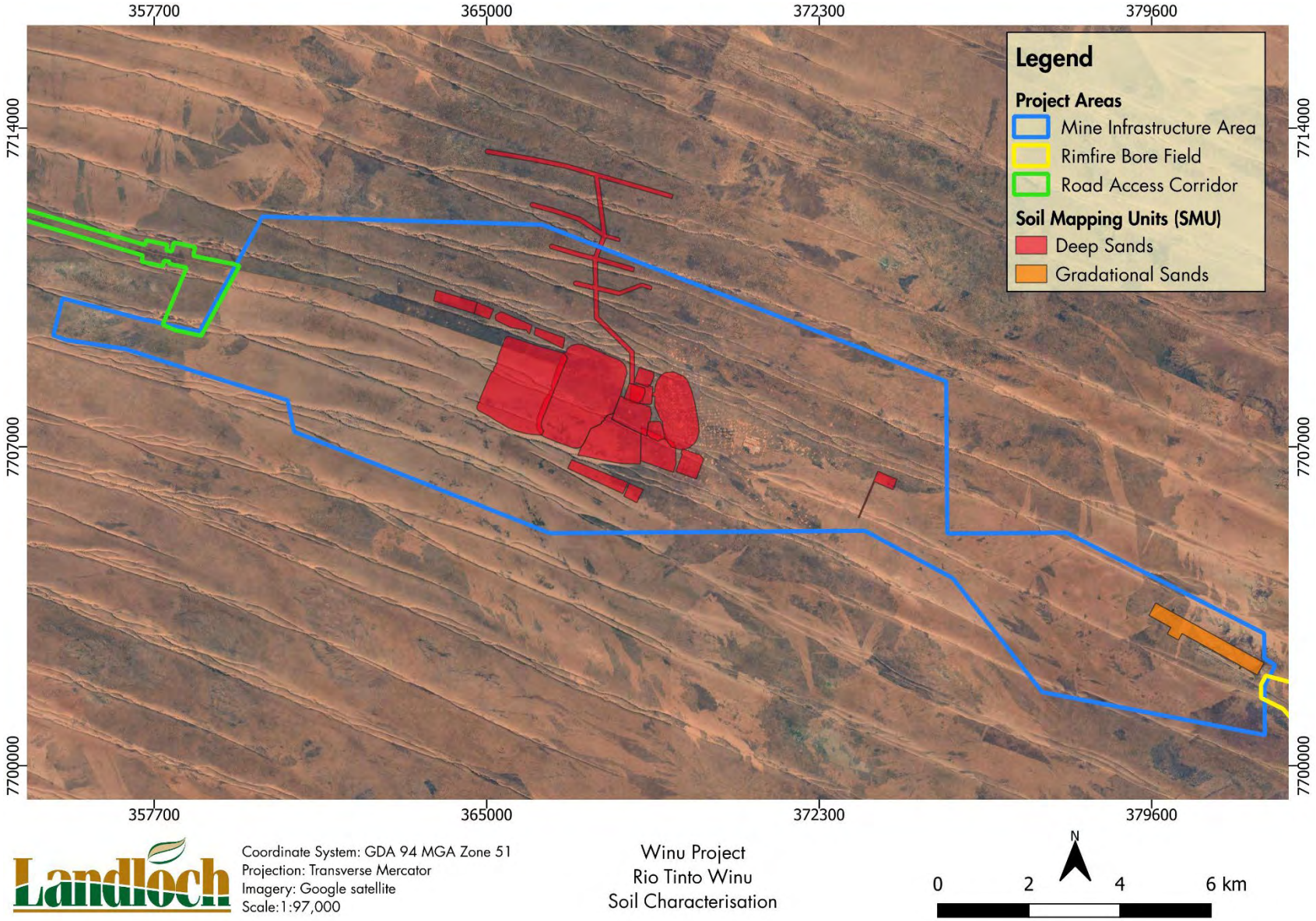


Figure 8: Initial SMU mapping within the Mining Infrastructure Area (Landloch 2020).

2.1.4 Geotechnical repots

Geotechnical and Geological Consultants (GGC) and Knight Piesold Consulting (KPC) completed a number of geotechnical investigations over the Access Road and Mining Infrastructure areas (GGC 2021–2022, KPC 2025). As part of the geotechnical investigations, a total of 495 test pits were excavated and assessed. Of the 495 test pits, 123 were within the MIA, with the remaining 372 occurring within the Road Access Corridor (RAC) area.

For each geotechnical test pit the following was recorded:

- Excavation method;
- Test pit depth;
- Soil/rock material description;
- Moisture condition;
- Consistency/density;
- Structure; and
- Test pit photographs.

While the data collected is different to that collected during a soil assessment, clear changes in soil type and depth, presence and abundance of coarse material, and notes on consistence and structure can be correlated with baseline soils data. A number of samples were collected during the test pitting and were sent for geotechnical laboratory analysis. This laboratory analysis provided little chemical and physical data relevant to the soils of the Project area in relation to their use in rehabilitation.

Where existing baseline soils data exists (Landloch 2020) geotechnical test pit data was compared with soil test pit data to determine correlation between the two assessments. Three geotechnical test pits (PSTP16, PSTP26 and OITP097) align closely with in close three soil test pits (S09, S10 and S08).

The three soil test pits were classified as Deep Sands SMU. Gravel was encountered at a depth of 0.4m at soil test pit S09. Ferricrete gravel was identified at the nearby geotechnical test pit (PTSP16), indicating a consistency in data. The soil texture for all three soil test pits were loamy sands, with the three geotechnical pits having an initial surface texture of sand and sub-surface textures (typically at depths >1.5m) of ferricrete, indicating further alignment in the data.

12 geotechnical test pits were assessed within the area mapped as the Gradational Sands SMU. The observations made by GGC show that the sands of this area contain a higher level of clay with many textures being classed as clayey sand. This correlates to the increased clay content observed by Landloch where soil textures graded from loamy sand to sandy loams.

The correlated data between the soils characterisation and geotechnical investigation suggests that data collected during geotechnical surveys can be used as lower detailed surrogate for soils data.

Figures showing the location of the completed (2020–2021 and 2025) geotechnical test pit locations are provided in Appendix B.

2.1.5 Winu vegetation mapping

Vegetation mapping covering the entirety of the project area was provided to Landloch by RTW. The mapping includes the spatial distribution of vegetation units within the MIA, Rimfire bore field (Rimfire) and RAC areas. Additionally, brief vegetation association and landform descriptions are provided.

A total of 42 vegetation units, including one defined as Disturbed, were mapped across the Project area. Distribution of the vegetation units across each distinct project area are provided in Appendix C. Associations between vegetation mapping units and SMUs were used to refine soil unit boundaries during the mapping stage of soil characterisation, but did not inform the selection of soil inspection sites.

2.2 Field-based survey

2.2.1 Mapping scale and sampling density

The required scale of soil mapping and the size of the proposed survey area dictates the density and number of soil inspection sites required. Additionally, the quality of existing baseline soils data and geotechnical test pit data is to be considered. The required soil inspection density for a range of assessment types is defined in the Australian *Guidelines for Surveying Soil and Land Resources* (McKenzie, *et al* 2008), part of the Australian soil and land survey handbook series.

The MIA was excluded from soil sampling as the soils of this area are to be characterised and mapped through extrapolation using a combination of existing soils data, geotechnical data and vegetation unit mapping. A total of 13 soil inspection locations were previously investigated within the MIA. There are 123 geotechnical test pits which have been assessed within the MIA footprint. Based on this, there are 136 inspection locations that can be used for the extrapolation of soil boundaries. This is equal to 1 inspection site every ~82ha, equivalent to a medium semi-detailed scale of mapping. This is adequate for the objective of assessing a project's feasibility or for intensive land use planning and will produce mapping with a scale of 1:50,000.

Due to the low levels of disturbance planned, a lower scale of mapping was used for the RAC and Rimfire areas. For the objective of assessing extensive land use and project feasibility at the low semi-detailed project planning level (1:100,000 scale), an inspection site every 100–400ha is required. This scale of mapping will delineate areas of approximately 40ha in size and will detail groups of soils with similar properties.

The total size of the Rimfire envelope is ~6,820ha. Considering the semi-detailed intensity level required, a total of 18 soil inspection sites were investigated, equivalent to 1 site per 378ha.

The *Guidelines for Soil Survey Along Linear Features* (Soil Science Australia QLD 2013) provides a framework for determining the appropriate scale for soil survey for linear infrastructure. For this survey, a scale of 1:100,000 was deemed appropriate, which will provide high level guidance for planning. This corresponds to an inspection density of one site every 1,000–2,000m, with a maximum distance without direct site data of 5,000m. This is considered an appropriate scale for the RAC.

Geotechnical data from 418 test pits is available across the RAC. The access road is approximately 171km in length (171,000m). The current number of geotechnical test pits provides an inspection site approximately every 410m.

To correlate geotechnical test pit data to soils data baseline soils data is required. Three land systems occurring within the RAC (Section 2.1.1) were not included within the survey area investigated by Landloch (2020). These land systems (Nita, Callawa and Buckshot) require baseline soils data to be collected prior to the use of geotechnical data as surrogate soils data. For this purpose, six soil inspection sites were investigated within the RAC, and alongside geotechnical test pits.

Essentially, each area has a specific methodology for the classification of soils. The MIA will rely on previous soil inspection sites completed by Landloch, with that data to be extrapolated based on geotechnical test pitting. The RAC has many geotechnical test pits, with a handful of soil inspection sites proposed for the purpose of building relationships between geotechnical and soils data. Rimfire has no geotechnical test pitting and will rely purely on soil inspection sites to be investigated as part of this project.

In summary, the number of inspection sites for each area are:

- MIA
    - 123 geotechnical test pits (previously investigated)
    - 13 soil inspection sites (previously investigated)
- RAC
    - 418 geotechnical test pits (previously investigated)
    - 6 soil inspection sites (this survey)
- Rimfire
    - 18 soil inspection sites (this survey)

2.2.2 Inspection site selection

Soil inspection sites were selected based on land systems mapping, vegetation mapping, geotechnical test pit locations, aerial imagery and the location of exposed drill sumps.

For Rimfire, soil inspection locations were selected at existing drill pad locations where sufficient exposure of the soil profile is available. Observation of the exposed soil profiles were accomplished without the requirement for additional excavation.

For the RAC, soil inspection sites were constructed at the same location as pre-selected geotechnical test pits. Two test pits were constructed in each of the three land systems (Nita, Callawa and Buckshot) to ground truth the existing soils data.

Soil inspection site coordinated for the Project area are tabulated in Table 4 and their locations are shown in Figure 9 and 10.

Table 4: Soil inspection site coordinates within each survey area (GDA 94, Zone 51).

Site ID	Easting (m)	Northing (m)	Site ID	Easting (m)	Northing (m)
Rimfire Bore Field (drill sumps)					
RF01	397,061	7,695,463	RF10	399,959	7,697,884
RF02	397,552	7,695,453	RF11	399,776	7,698,409
RF03	397,151	7,696,127	RF12	399,180	7,698,872
RF04	397,360	7,696,657	RF13	397,425	7,699,452
RF05	396,756	7,698,040	RF14	396,333	7,699,858
RF06	398,757	7,696,114	RF15	393,954	7,700,017
RF07	399,431	7,695,965	RF16	401,740	7,694,072
RF08	400,971	7,695,915	RF17	400,505	7,693,547
RF09	400,318	7,697,095	RF18	399,752	7,693,548
Road Access Area (Excavated soil test pits)					
HR01	327,214	7,770,793	HR04	291,647	7,781,269
HR02	321,505	7,773,441	HR05	305,787	7,776,637
HR03	301,474	7,777,559	HR06	277,171	7,785,642

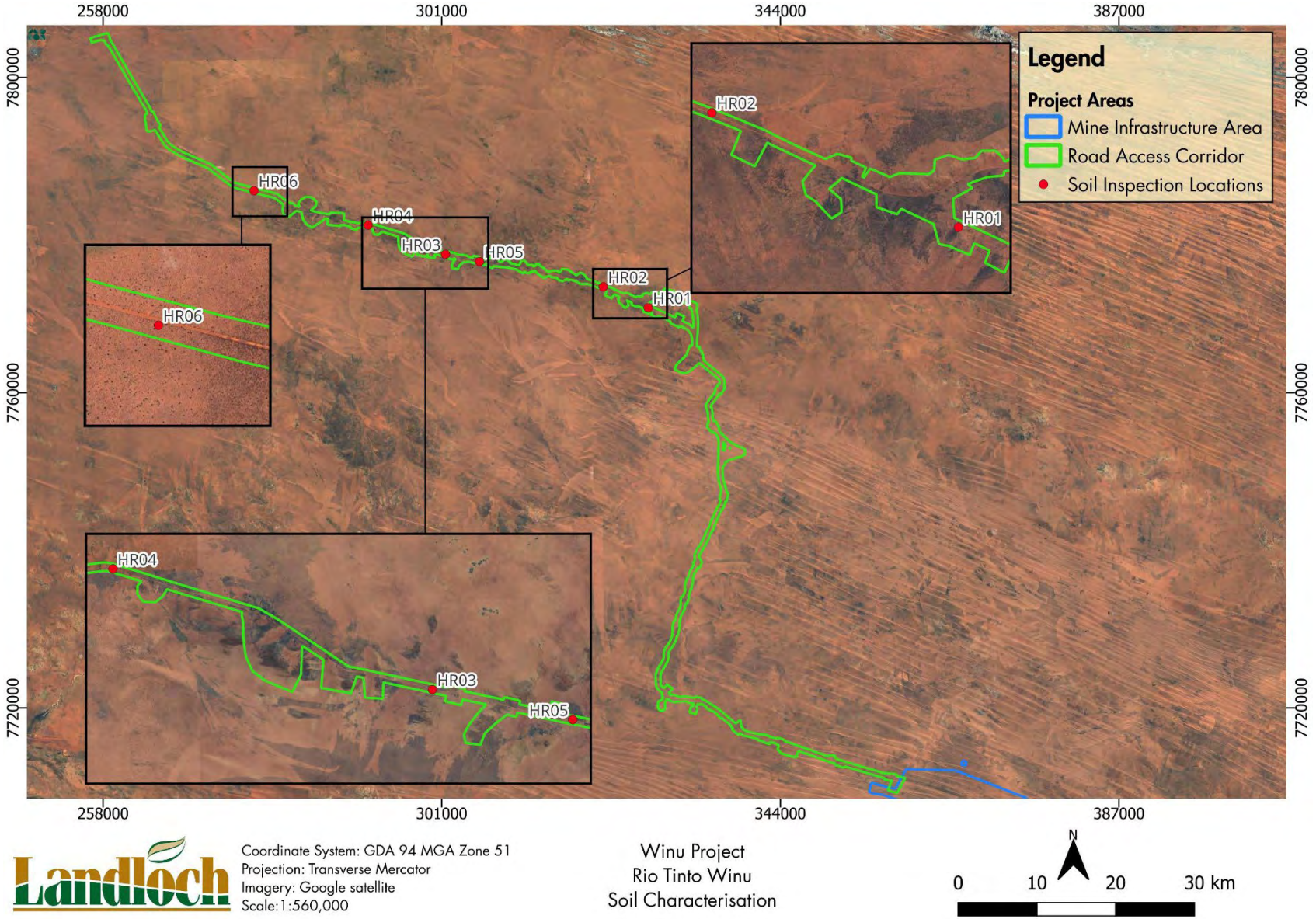


Figure 9: Soil inspection site locations across the Road Access Corridor.

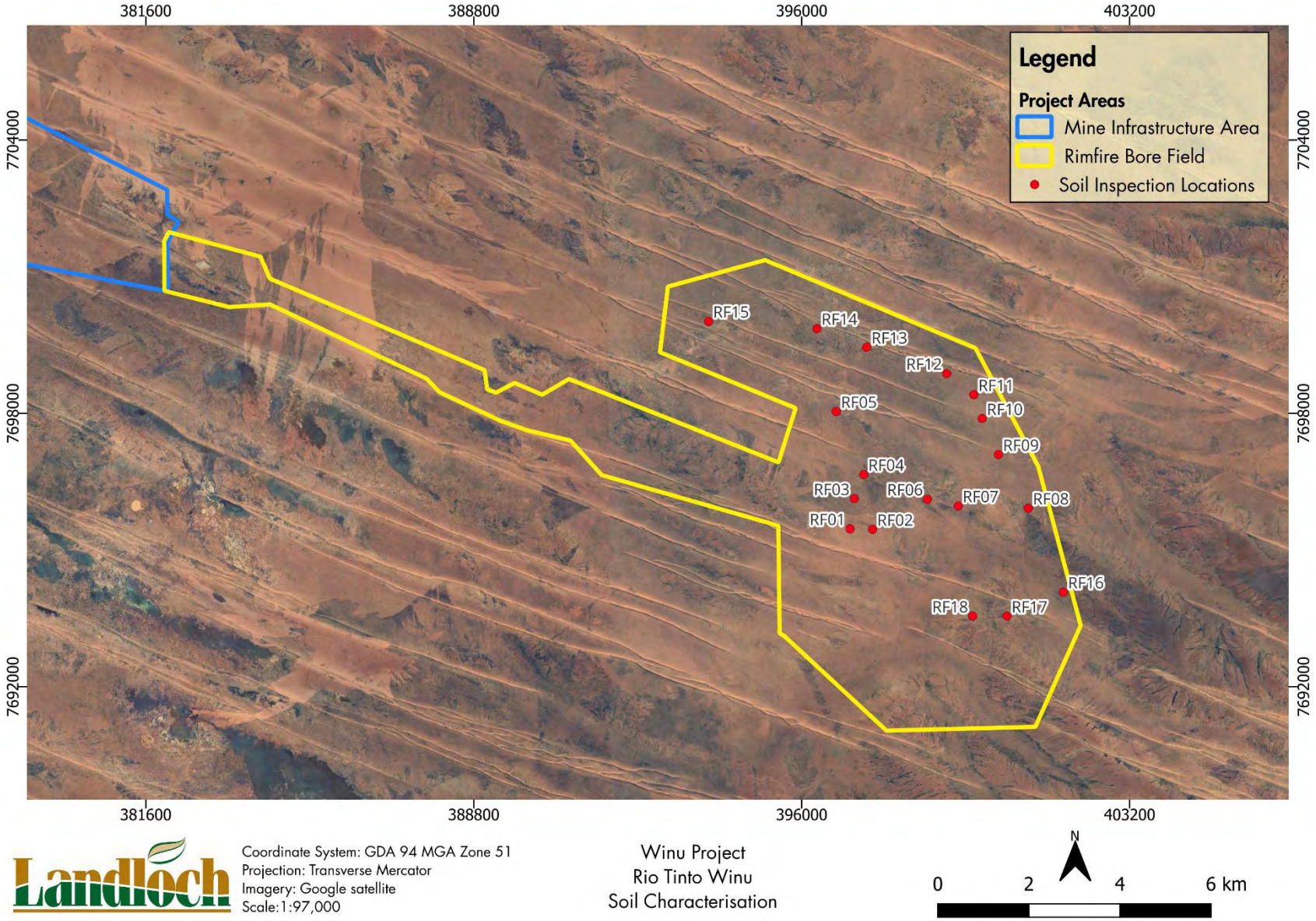


Figure 10: Soil inspection site locations within the Rimfire Bore Field.

2.2.3 Soil inspection site description

Site information, soil profile descriptions, and baseline soil data were recorded at each of the soil inspection sites in line with the *Australian Soil and Landscape Survey Handbook* (NCST 2024).

For five of the six RAC inspection sites, a soil pit was dug using an excavator to a depth of ~1.5m. At inspection site HR01 a soil pit was excavated using had tools to a depth of ~0.5m. For the Rimfire inspection sites, an intact soil profile was freshly exposed using hand tools.

At all inspection sites images of the landscape, vegetation, soil surface and soil profile were taken. Observations of the location, landform type, vegetation, land surface, and soil profiles were recorded at each site.

Location, landform, vegetation, and land surface observations included:

- Assessment date;
- GPS coordinates;
- Current land use;
- Dominant vegetation forms;
- Vegetation cover percentage;
- Land surface aspect and microrelief;
- Surface coarse fragments (abundance and size);
- Rock outcrop and abundance; and
- Erosion state, type and extent.

The following information was recorded for each soil horizon observed within an assessed soil profile:

- Horizons (including depth and boundary type);
- Filed texture;
- Colour (Munsell);
- Coarse fragment abundance and size;
- Soil structure type and grade;
- Soil consistency;
- Root abundance and size; and
- Presence of mottling and segregations.

The information recorded for each soil inspection site is provided in the soil log data sheets (Appendix D).

2.2.4 Soil sampling

Soil samples from a range of depths were collected from all soil inspections sites. The number of samples taken at each site varied based on the depth of the soil pit/exposed profile and/or the homogeneity of the soils within the soil profile. Generally, one sample was taken from the topsoils (A) horizon and 3 samples from the diagnostic (B) horizons, subsoil. A total of 71 samples were collected from 24 soil inspection sites.

3 SOIL CHARACTERISATION

3.1 Soil testing

All soil samples collected were transported to Landloch's facility in Perth and assessed for the following parameters:

- pH_w;
- Salinity, $EC_{1:5}$;
- Emerson dispersion test;
- Coarse fragment percentage (>2mm diameter); and
- Presence/absence of carbonates.

In addition to this, 54 samples from 18 sites were submitted for more detailed laboratory analysis (Table 5). The laboratory analyses were split into a topsoil and subsoil characterisation suite in line with the MDCP. Of the 54 samples, 27 were tested for the topsoil suite, with the remaining 27 undergoing the subsoil characterisation suite.

Table 5: Detailed laboratory analysis (54 samples).

Test suite	Target samples	Analysis
Topsoil	Topsoil (A) horizon, generally the surface 100-200 mm. Analyses include chemical and physical properties of the soil, and soil fertility. This is the soil depth that contains the majority of fertility and is supporting existing vegetation.	• pH_w • Salinity, $EC_{1:5}$ • Soluble Cl • Exchangeable cations (Ca^{2+}, Mg^{2+}, Na^{+}, K^{+}, Al^{3+}) • Effective cation exchange capacity (ECEC) • Exchangeable sodium percentage (ESP) • Particle size distribution of the fine fraction (<2mm) • Organic C • Total N and Total P • Available P and K (Colwell) • Available S (KCl) • Trace Cu, Zn, Mn, Fe (DTPA)
Subsoil	Subsoil (B) and substrate (C) horizons, below the topsoil. Analyses include chemical and physical properties of the soil, excluding fertility.	• pH_w • Salinity, $EC_{1:5}$ • Soluble Cl • Exchangeable cations (Ca^{2+}, Mg^{2+}, Na^{+}, K^{+}, Al^{3+}) • Effective cation exchange capacity (ECEC) • Exchangeable sodium percentage (ESP) • Particle size distribution of the fine fraction (<2mm)

3.2 Data interpretation scheme

As part of this project, a scheme was developed to assist with the interpretation of soils data to define the growth media suitability and structural stability of the soils. The scheme establishes a baseline of the existing properties of soils depending on whether they support vegetation (to varying degrees). Parameters considered include pH_2, $EC_{1:5}$, fertility, structural stability and coarse fraction percentage. The interpretation scheme utilises baseline data from the previous Winu soil characterisation report (Landloch

2020) and can continue to be validated and further refined by future growth media/vegetation trials.

3.2.1 Soil pH_w

A general classification of soil pH_w values is given in Table 6 (Hazelton and Murphy 2016). This classification allows for pH values to be expressed in qualitative terms but does not provide guidance on the suitability of a given pH values for vegetation establishment. A reasonable approach for assessing the suitability for soil pH is to consider the pH_w levels of the topsoils that currently support vegetation. This approach acknowledges vegetation presence but does not identify potential differences in vegetation type that may establish at varying pH values.

Vegetation cover across the entire Project is consistently mid-dense (30–70% ground cover). The range of pH_w values of the topsoils from all inspection sites (including the 2020 data) ranges from 5.4 – 7.0 (strongly acid to slightly acid). As vegetation density did not drastically differ between sites, this topsoil pH_w range was used in this assessment to define pH_w values that will no adversely affect vegetation growth or establishment. Soils with pH_w values greater than 7.0 and less that 5.5 will be defined as soils that may potentially be limited in their potential for vegetation growth or establishment.

Table 6: General soil pH_w classifications.

pH_w (pH units)	Classification
<4.0	Very strongly acid
4.0–5.5	Strongly acid
5.5–6.0	Moderately acid
6.0–7.0	Slightly acid
7.0–8.0	Slightly alkaline
8.0–9.0	Moderately alkaline
9.0–10.0	Strongly alkaline
>10.0	Very strongly alkaline

3.2.2 Soil salinity ($EC_{1:5}$)

Salinity is often measured using the electrical conductivity (EC) of a solution containing 1-part solids to 5 parts deionised water ($EC_{1:5}$). Most published salinity suitability ranking systems assume agricultural vegetation, and the application of these ranking systems has little relevance for plant species that occur within the Project area.

In a similar manner to soil pH_w, $EC_{1:5}$ values from topsoils that supported mid-dense (30-70%) vegetation ground cover were used to define a baseline range. The range of $EC_{1:5}$ values of the topsoils from all inspection site (including the 2020 data) ranges from 0.01–0.02dS/m. Therefore, salinity values greater that 0.02dS/m was used to indicate soils that are sufficiently saline to potentially impact vegetation growth.

3.2.3 Fertility

Similar to the pH_w and $EC_{1:5}$ values, the determination of generalised guidelines for suitable fertility values for a wide range of soils and sites is very difficult. A reasonable approach for defining suitable soil fertility is to consider the fertility values of topsoils that are currently supporting vegetation, in a similar manner to Sections 3.2.1 and 3.2.2. The resulting fertility parameter values are summarised in Table 7 and represent values that are not expected to limit vegetation growth or establishment.

These parameters could be used in future to determine whether soil handling during operations (stripping, stockpiling, mixing with subsoils etc.) has caused a reduction in fertility. They could be used in the future to determine fertiliser requirements in stockpiled soils, and fertiliser requirements for subsoils if they are to be used as alternative growth media.

Table 7: Suitable nutrient values based on measured values from the topsoils.

Nutrient	Unit	Value
Total Nitrogen	mg/kg	>45
Total Phosphorus	mg/kg	>40
Organic Carbon	%	>0.2
Available Phosphorus (Colwell)	mg/kg	>5
Available Potassium (Colwell)	mg/kg	>35
Available Sulphur (KCl)	mg/kg	>3

3.2.4 Structural stability

Structure is the arrangement of primary particles into secondary units or peds. The secondary units are characterised on the basis of size, shape, and grade. A structurally unstable soil is one that tends to have minor or reduced particle arrangement.

It is important to note that structural stability as used in this report is different to geotechnical stability.

Structurally unstable soils may be prone to:

- Tunnel erosion;
- Increased bulk density and hardsetting surfaces;
- Increased runoff and erosion potential;
- Reduced water holding capacity and infiltration capacity; and
- Reduced root penetrability.

A soil's potential to have an unstable structure is dependent on both its chemical and physical properties. These are considered in a number of ways.

The proportion of exchangeable Na held on a soil's exchange complex in relation to other exchangeable cations is important. This is referred to as the Exchangeable Sodium Percentage (ESP). McKenzie *et al* (2004) considered the measurement of ESP as suitable for assessing the potential for clay dispersion when a soil's Effective Cation Exchange

Capacity (ECEC) is >3meq/100g and exchangeable Na is <0.3meq/100g. Further, clay dispersion risk is greatest in soils with loam or clay textures (clay fraction >10%). Sand dominated soils are not prone to structural instability even if they have high ESP.

Clay dispersion potential for a soil is also influenced by interactions between clay content, ESP, and $EC_{1:5}$. The Electrochemical Stability Index (ESI) is a way of considering the relationship between ESP and $EC_{1:5}$ for loam and clay textured soils (clay fraction >10%). A tentative ESI value is 0.05 (McKenzi *et al* 2004), with ESI <0.05 and clay content >10% indicating a soil that is prone to structural instability due to clay dispersion.

Magnesic soils can also be prone to clay dispersion. This is assessed using a combination of the Exchangeable Magnesium Percentage (EMP), exchangeable Ca:Mg ratio, ESP, and clay content. Clay dispersion may occur if the following conditions are met:

- EMP >30% Ca:Mg ratio <1 and ESP >4%. Clay dispersion has been recorded when (ESP + EMP/10) is >6%, assuming the soil also has <10% clay (Fenton and Conyers 2022).

Soils with a high combined proportion of fine sand, silt and clay (particles ≤0.2mm) are prone to structural instability, even if their clay fractions are not chemically dispersive. This is because the smaller particles can mobilise within the coarse sand matrix. For this reason, soils with a combined fine sand, silt, and clay fraction >70% are considered to be at an increased risk of structural instability (Vacher *et al.* 2004).

It is noted that a soil can have a fine fraction that is prone to structural instability, but if the proportion of unstable fines is small, the soil as a whole may be structurally stable. Typically, a binary mixture with >30 – 40% fines and <60 – 70% coarse fraction could be considered a fines-dominated material with some coarse fraction. A binary mixture with <30–40% fines and >60–70% coarse fraction could be considered a coarse dominated material with some fines. Based on this, a fines fraction cut-off of >40% seems reasonable, with soils that contain >40% fines being at risk of structural instability if the fine fraction meets one or more of the other criteria outlined above. A soil with <40% fines is classified as not being prone to instability, even if the fine fraction is prone to instability.

To capture the interactions between physical and chemical properties and their effect on structural stability, the samples were assessed against these four criteria. If any of these criteria are met, that soil was classified as being prone to structural instability. The criteria are detailed in Table 8.

Table 8: Structural stability criteria.

ESP criteria	EMP criteria
• Clay content >10% of fines, and • Fines >40%, and • ECEC >3meq/100g, and • Ex. Na >0.3meq/100g, and • ESP >6%.	• Clay content >10% of fines, and • Fines >40%, and • ECEC >3meq/100g, and • EMP >30%, Ca:Mg <1, & ESP >4%, or • EMP >30%, Ca:Mg <1, & (ESP + (EMP/10) >6%
ESI criteria	**PSD criteria**
• Clay content >10% of fines, and • Fines >40%, and • ESI <0.05.	• Fines >40%, and • Fine sand + silt + clay >70% of fine fraction.

3.2.5 Coarse fraction

In addition to its influence on structural stability, the abundance and size of the coarse fraction also has a significant bearing on a soil's erosion potential. Surfaces with more abundance of durable coarse fragments are more likely to be erosion resistant than surfaces with a lower abundance of durable coarse fragments.

For the purpose of this report, soils with a coarse fragment abundance >50% and coarse fragment size >20mm in diameter will be considered to potentially have a high resistance to erosion.

3.3 Soil classification

3.3.1 Australian Soil Classification (ASC)

The Australian Soil classification (ASC) (Isbell and NCST 2021) is the national system for soil classification. The scheme defines soil classes on real soil bodies using a key. The ASC uses a set of defined attributes, horizons, and materials to assign a soil profile to a class. Collectively, these concepts are called diagnostic features. Classes are allocated based on a vertical soil profile as seen in an exposed soil pit, and account for geographic attributes of the landform.

3.3.2 Soil mapping units

In addition to the ASC, the soils of the survey area were grouped into Soi Mapping Units (SMUs). SMUs are the basic geographic component of a soils map and can be associated with a single or multiple soil types with definable characteristics. SMUs are developed based on recurring landscape and soil attributes, with minor variations in soil properties allowable within each SMU. The purpose of SMUs is to group soils by their management requirements, such as depth, salinity, sodicity, and coarse fragments. For this project, SMUs were used as the basis for defining the viability of the potential topsoil and subsoil resource.

4 SOIL CLASSIFICATION

4.1 Australian Soil Classification

The ASC uses a set of defined attributes, horizons, and materials to assign a soil profile to a class. Collectively, these concepts are called diagnostic features. These features are ranked based on their likely importance to the use of a soil. However, this ranking is subjective and arbitrary to some extent. In this way, the ASC provides an indication of a soil's potential for use, generally from an agricultural perspective. Classification of soils to the ASC relies on observations made of the soil profile, and interpretation of physical and chemical soils data.

Within the survey area, soil inspection sites were classified to the ASC, with three classes identified:

1. Arenosol;
2. Kandosol; and
3. Rudosol.

Arenosols are soils with predominantly sandy textures, where no soil horizon has a clay content greater than 15%. The Arenosols of the Project area consist of deep (~1.5m) soil profiles with little to no pedological organisation and have soil textures ranging from sand to clayey sand. The Arenosols dominate the Project area, covering ~19,021ha (81%) and are associated with 13 soil inspection sites. This ASC class typically occurs on the inter-dunal sand plains, sand dunes and swales of the landscape.

Kandosols are soils that lack a strong texture contrast between the A and B soil horizons (topsoil and subsoil) and have massive or only weakly structured B horizons. The Kandosols of the Project area are typically deep sandy soils that have an increased clay content in their subsoils. Topsoils range from loamy sands to sandy loams with the subsoils grading to clay loams. Kandosols occur across ~18% of the Project area and are associated with the stony rises of the landscape.

Rudosols are are soils that have little to no pedological development. Rudosols are considered to be relatively young soils. The Rudosols of the Project area are exclusively found within the Rimfire bore field. They are associated with 3 soil inspection sites, occurring across ~1% of the Project area. The Rudosols of encountered in the Project area are shallow (<0.3m) sands that lay atop a hardpan.

A summary of each ASC order and associated soil inspection site is provided in Table 9. A spatial representation of each ASC order is illustrated in Figures 11–16.

Table 9: Australian Soil Classification of the soils within the Project area.

ASC	Description	Associated sites	Percentage of survey area (%)
Arenosol	Deep sandy soils with generally weak to no pedological development. Associated with the inter-dunal sand plains and sand dunes of the Project.	HR01, HR03, HR06, RF01, RF02, RF03, RF04, RF07, RF09, RF10, RF11, RF12, RF14	81
Kandosol	Soils that lack a texture contrast between the A and B horizons. B horizons have weak or no structure. Associated with stony rises.	HR02, HR04, HR05, RF05, RF13, RF15, RF16, RF18	18
Rudosol	Shallow sandy soils with weak to no pedological development laying atop a concreted hardpan.	RF06, RF08, RF17	1

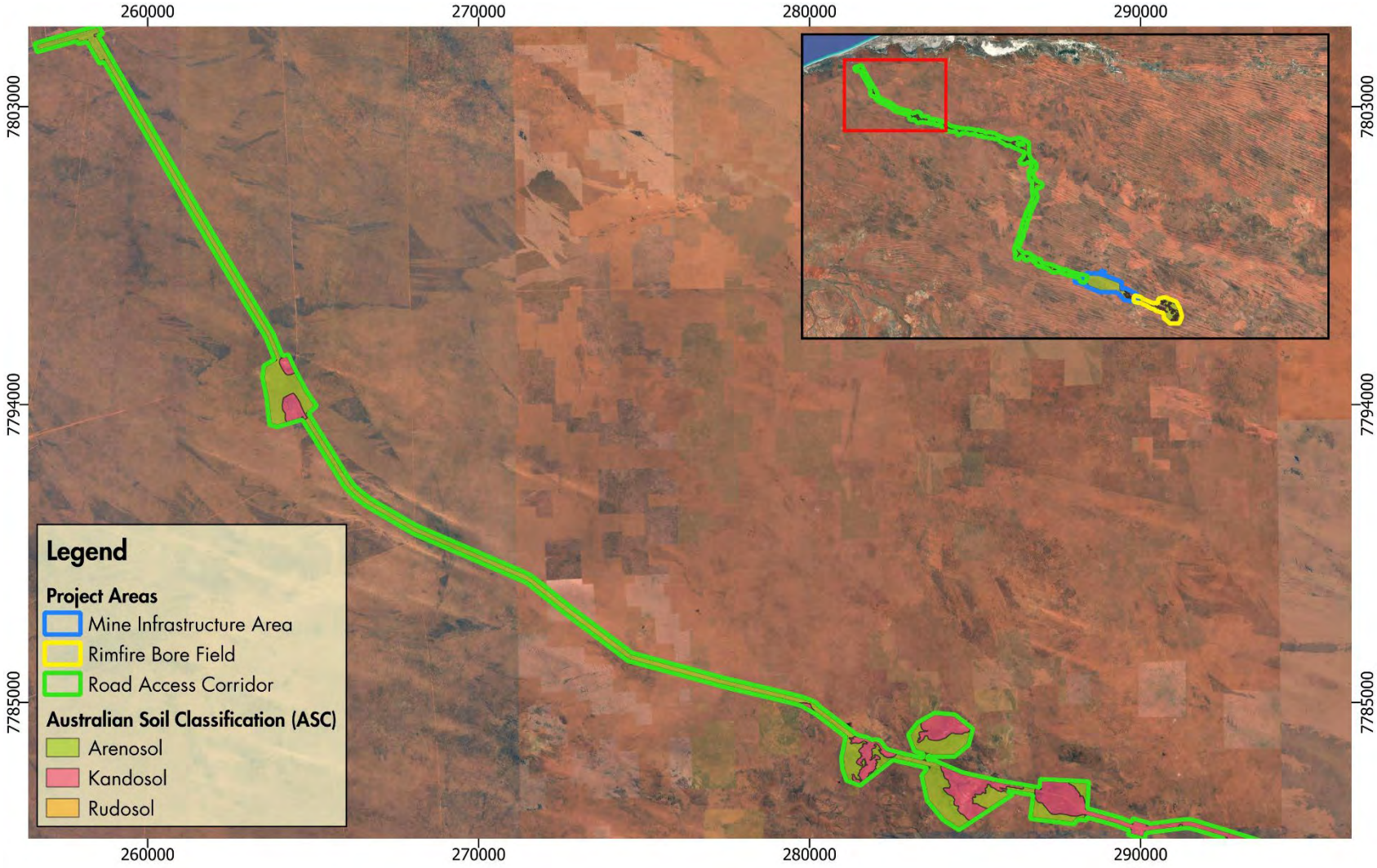


Figure 11: ASC mapping for the Project area.

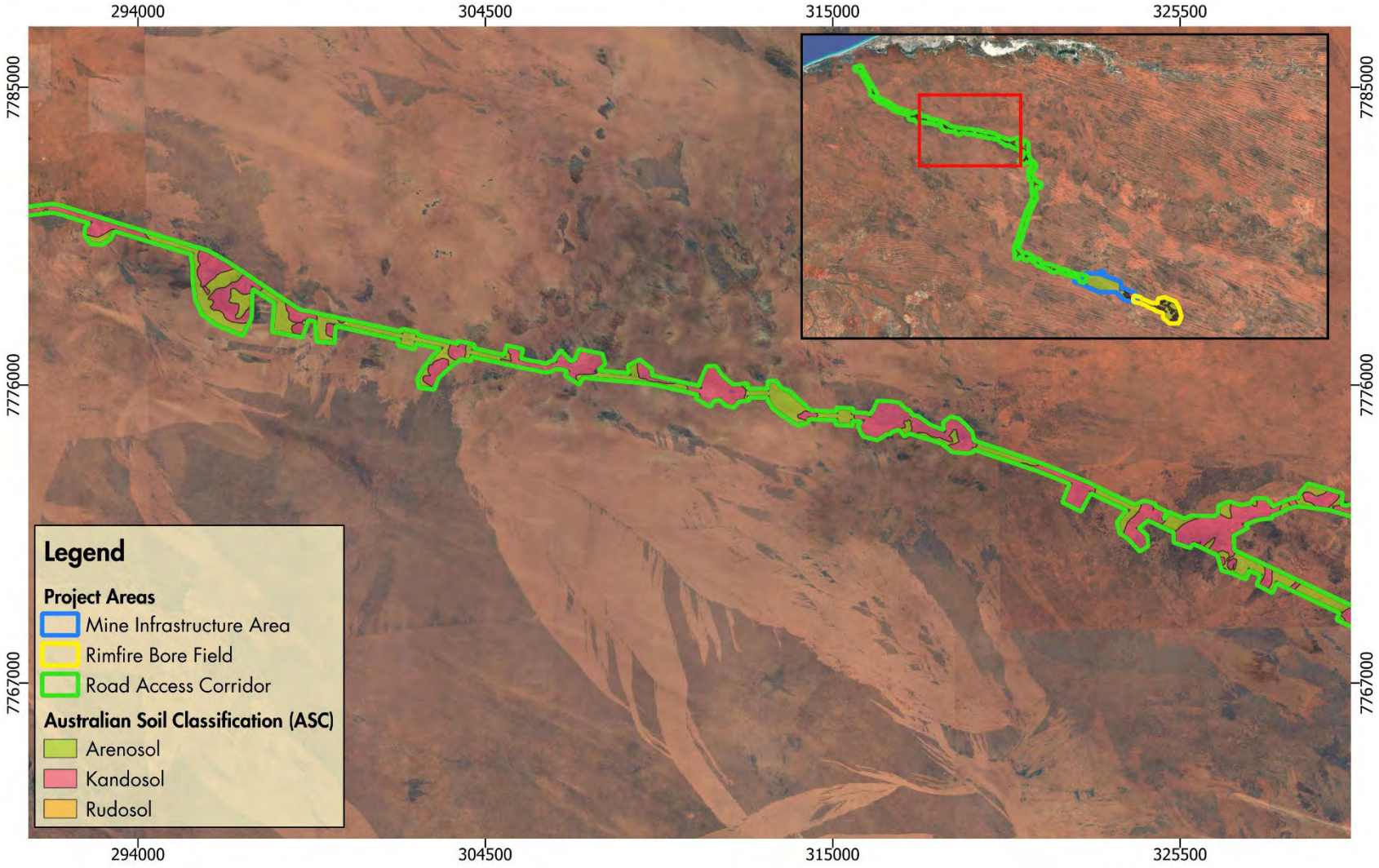


Figure 12: ASC mapping for the Project area.

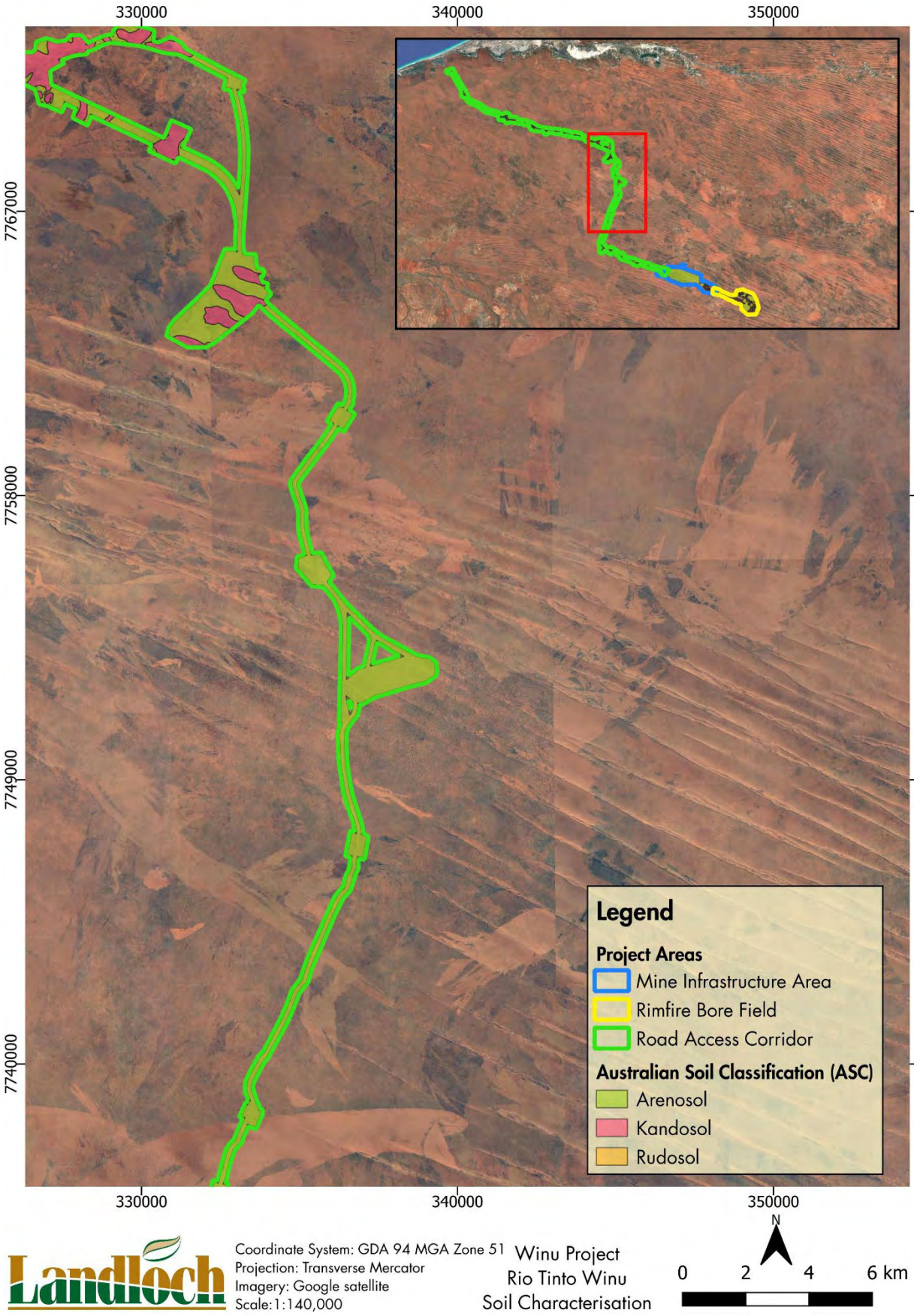


Figure 13: ASC mapping for the Project area.

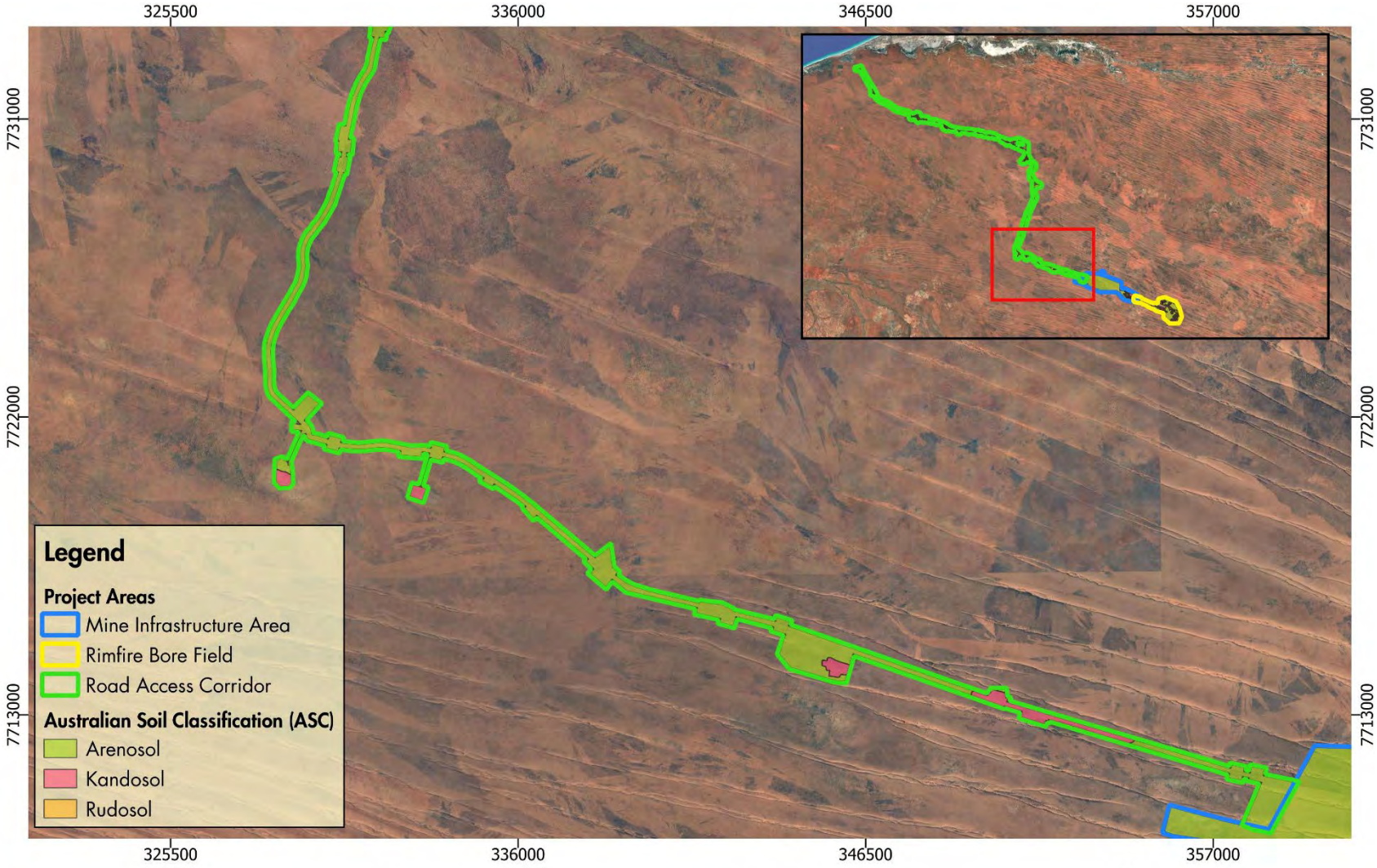


Figure 14: ASC mapping for the Project area

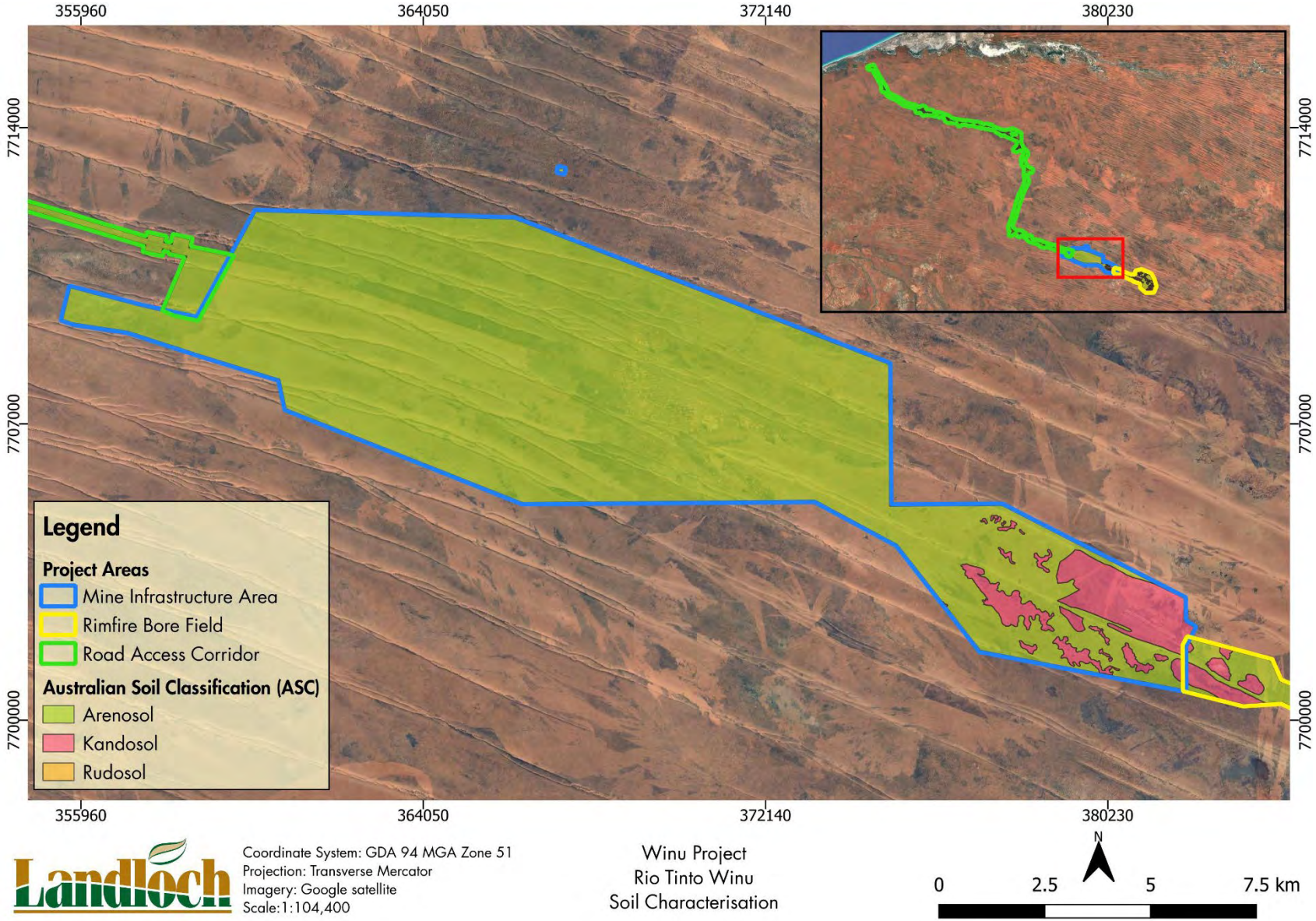


Figure 15: ASC mapping for the Project area.

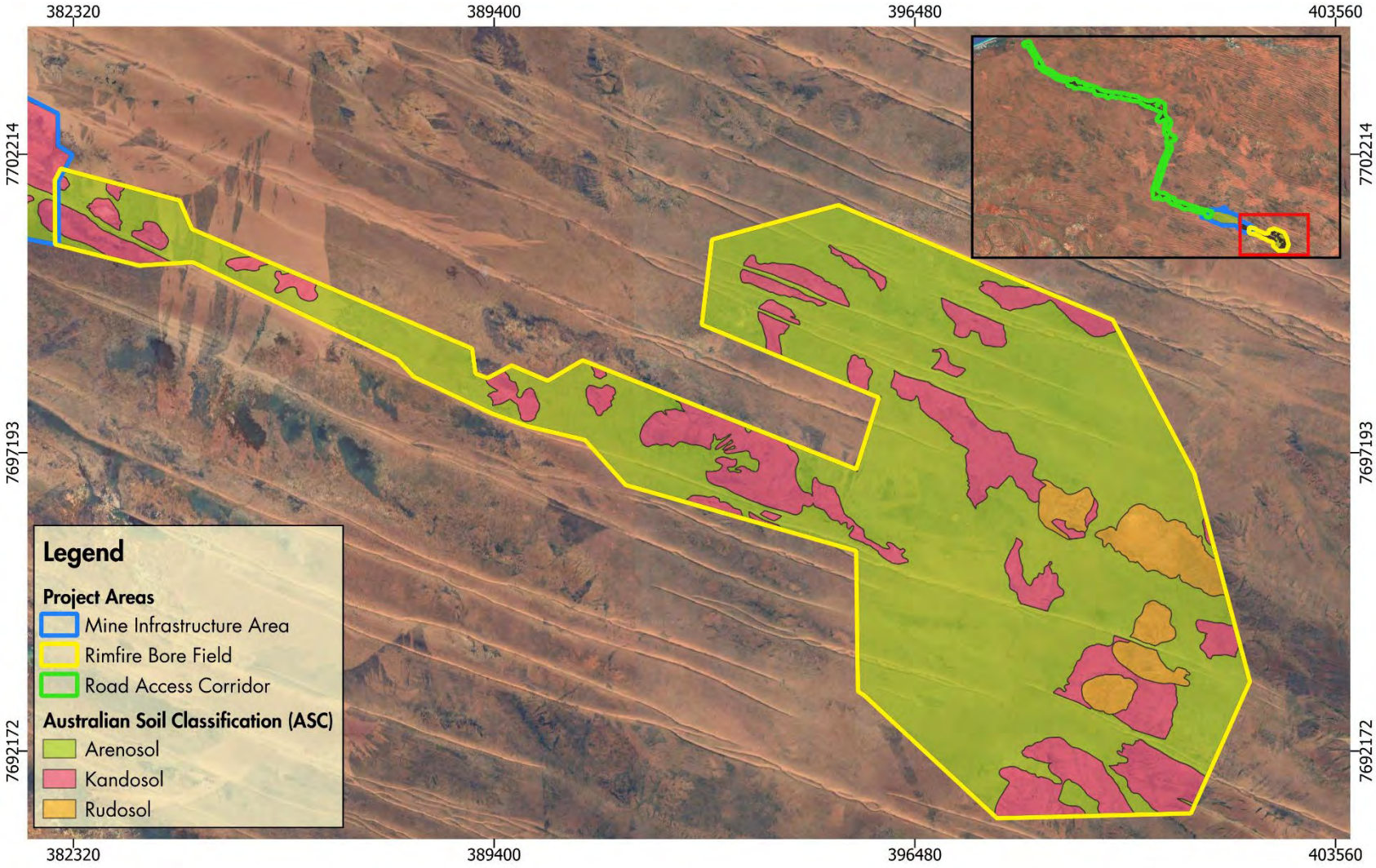


Figure 16: ASC mapping for the Project area.

4.2 Soil Mapping Units

The ASC classification system provides a high-level understanding of the soils for a given area. However, this classification system was developed to understand the *in situ* soils. The ASC classification scheme does not consider land uses that actively strip, invert, and/or stockpile soils (e.g. mining). Development of SMUs allows for consideration of the soil-disturbing actions in light of the end use of the soils. It allows for soils to be grouped together based on their defining characteristics for a given end use.

The soil inspection sites were grouped into SMUs based on their ASC classification, along with management requirements, morphological properties, chemical characteristics, particle size distributions and coarse fragment abundances. Three SMUs were defined:

- Deep Sands: Deep wind-blown aeolian sands associated with the inter-dunal sand plains and sand dunes that dominate the Project area. This is the most abundant SMU. These soils are dominated by sands with no appreciable clay content and no pedological development beyond the topsoils.
- Gradational Sands: Deep aeolian sands similar to the Deep Sands SMU, except for an increase in clay within the deeper subsoils. These soils have a variable abundance of coarse material throughout their profiles. Associated with the inter-dunal sand plains and stony rises.
- Shallow Sands: Shallow sandy soils with little to no pedological development laying atop a concreted hardpan at depths <0.3m. This SMU exclusively occurs within the Rimfire footprint.

A summary of the SMUs and the soil inspection sites associated with each is provided in Table 10.

Table 10: Soil Mapping Units within the Project area.

SMU	Description	Associated sites
Deep Sands	Deep wind blown aeolian sands with no pedological development and no appreciable clay content.	HR01, HR03, HR07, RF01, RF02, RF03, RF04, RF07, RF09, RF10, RF11, RF12, RF14
Gradational Sands	Deep wind blown aeolian sands with loamy subsoils.	HR02, HR04, HR05, RF05, RF13, RF17, RF18
Shallow Sands	Shallow sands with no pedological development overlaying concreted hardpan.	RF06, RF08, RF15, RF17

An overview of the key soil attributes that are common across all SMUs, and those which differentiate the SMUs are given below.

4.2.1 Common attributes of the SMUs

Attributes of the soils that are consistent across the Project area and as such, are not a differentiating factor for the development of SMUs as outlined as follows:

- Soil pH_w values range from 5.4–7.0 (strongly acid to slightly acid) with median pH_w of topsoils and subsoils ranging from 5.8–6.0 (moderately acid).
- Soil salinity is very low, with $EC_{1:5}$ values range from 0.01–0.02dS/m.
- Coarse fragment size and abundance is variable. Topsoil coarse fragment abundances range from 0–20% in the Deep Sands to 0–60% in the Gradational Sands. Subsoils coarse fragment abundance range from 0–80%. The size of the coarse fragments ranges from 2–20mm.
- Vegetation density is mid-dense (30–70% ground cover), associated with *Triodia* dominated vegetation communities.
- Topsoils have fertility values that are deemed to be sufficient for the establishment and growth of vegetation.
- Although no SMU as a whole is considered to be prone to structural instability, some soil horizons can be prone to structural instability based on ESI.

4.2.2 Differentiating attributes of SMUs

The key differentiating attributes of the three SMUs are:

- Subsoil clay content; and
- Soil depth.

4.2.2.1 Subsoil clay content

The key differentiating attribute of the Gradational Sands is the difference in clay content within the subsoil. The Shallow Sand and Deep Sand have subsoils with a sand to clayey sand texture, and the Gradational Sands have subsoils with loamy sand through to clay loam. This increase in clay content has implications on the physical and chemical characteristics of the Gradational Sands.

4.2.2.2 Soil depth

The Shallow Sand is unique due to the presence of a concreted hardpan at a depth ranging from 0.25–0.30m. Both the Deep Sands and Gradational Sands were not limited in soil depth.

4.2.3 Soil distribution

The size and proportion of each SMU within the Project area is given in Table 11, with Tables 12–14 presenting for each of the three survey areas. Figures 17–22 show the distribution of the SMUs within each of the three survey areas. SMU boundaries for the RAC and MIA have been extrapolated using the geotechnical data as per Section 4.2.3.

Table 11: Size and proportion of each SMU within the Project area.

SMU	Size and Proportion Within Survey Area	
	Size (ha)	Proportion (%)
Deep Sands	19,174	81
Gradational Sands	4,055	17
Shallow Sands	418	2

Table 12: Size and proportion of each SMU within the Road Access Corridor.

SMU	Size and Proportion Within Survey Area	
	Size (ha)	Proportion (%)
Deep Sands	4,532	68
Gradational Sands	2,114	32
Shallow Sands	-	-

Table 13: Size and proportion of each SMU within the Mining Infrastructure Area.

SMU	Size and Proportion Within Survey Area	
	Size (ha)	Proportion (%)
Deep Sands	9,571	94
Gradational Sands	611	6
Shallow Sands	-	-

Table 14: Size and proportion of each SMU within the Rimfire Bore Field.

SMU	Size and Proportion Within Survey Area	
	Size (ha)	Proportion (%)
Deep Sands	5,039	74
Gradational Sands	1,331	20
Shallow Sands	418	6

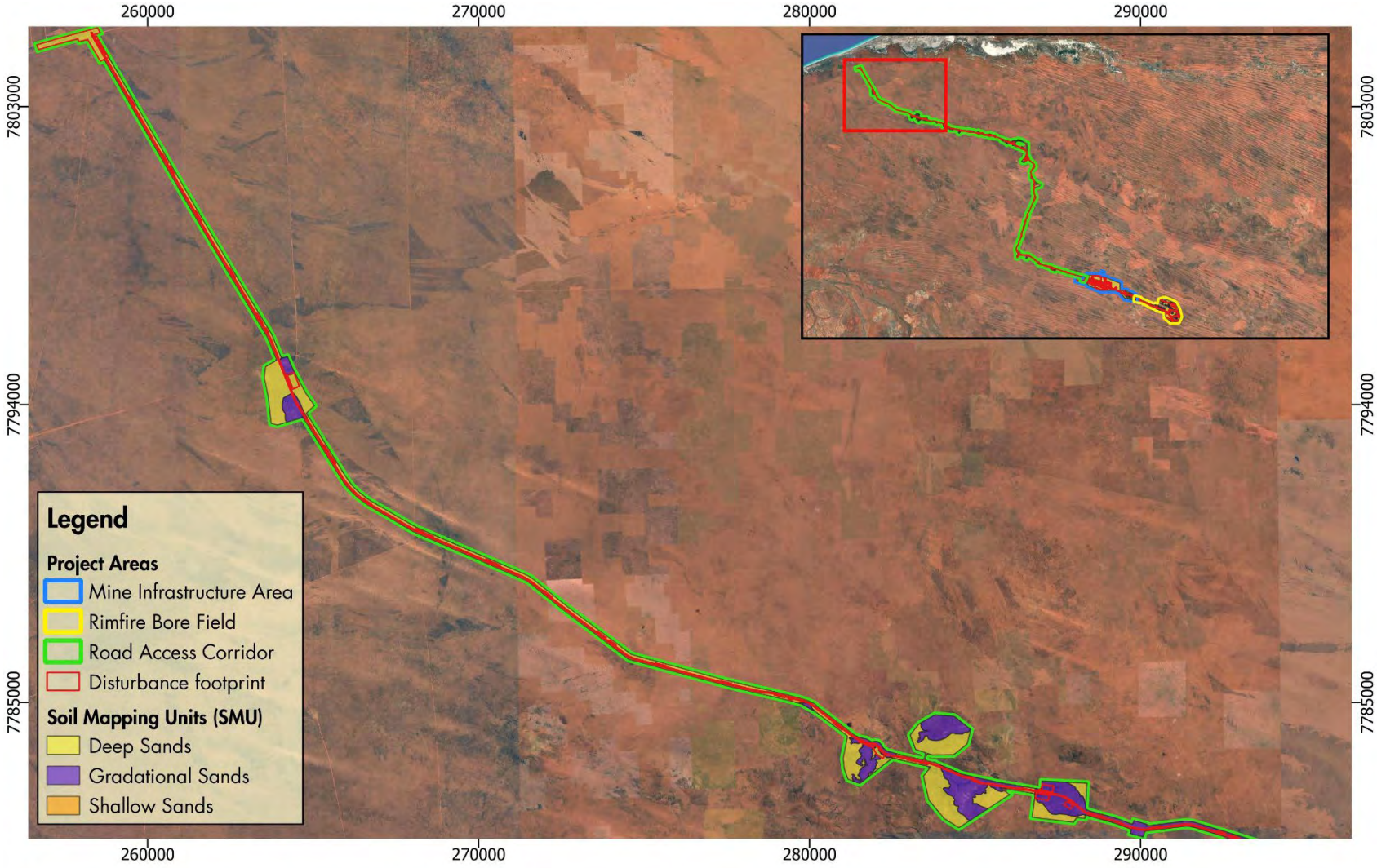


Figure 17: SMU mapping for the Project area.

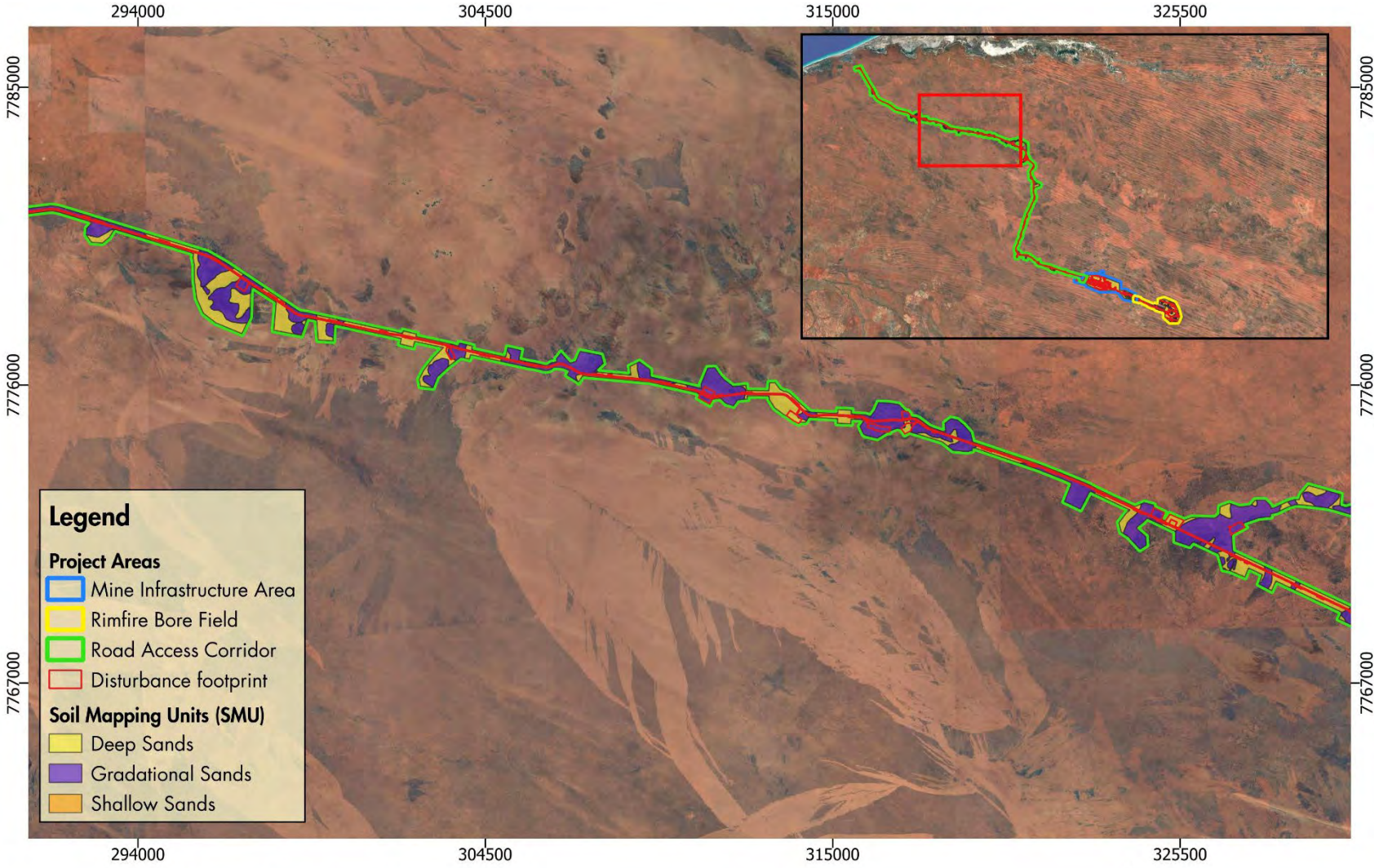


Figure 18: SMU mapping for the Project area.

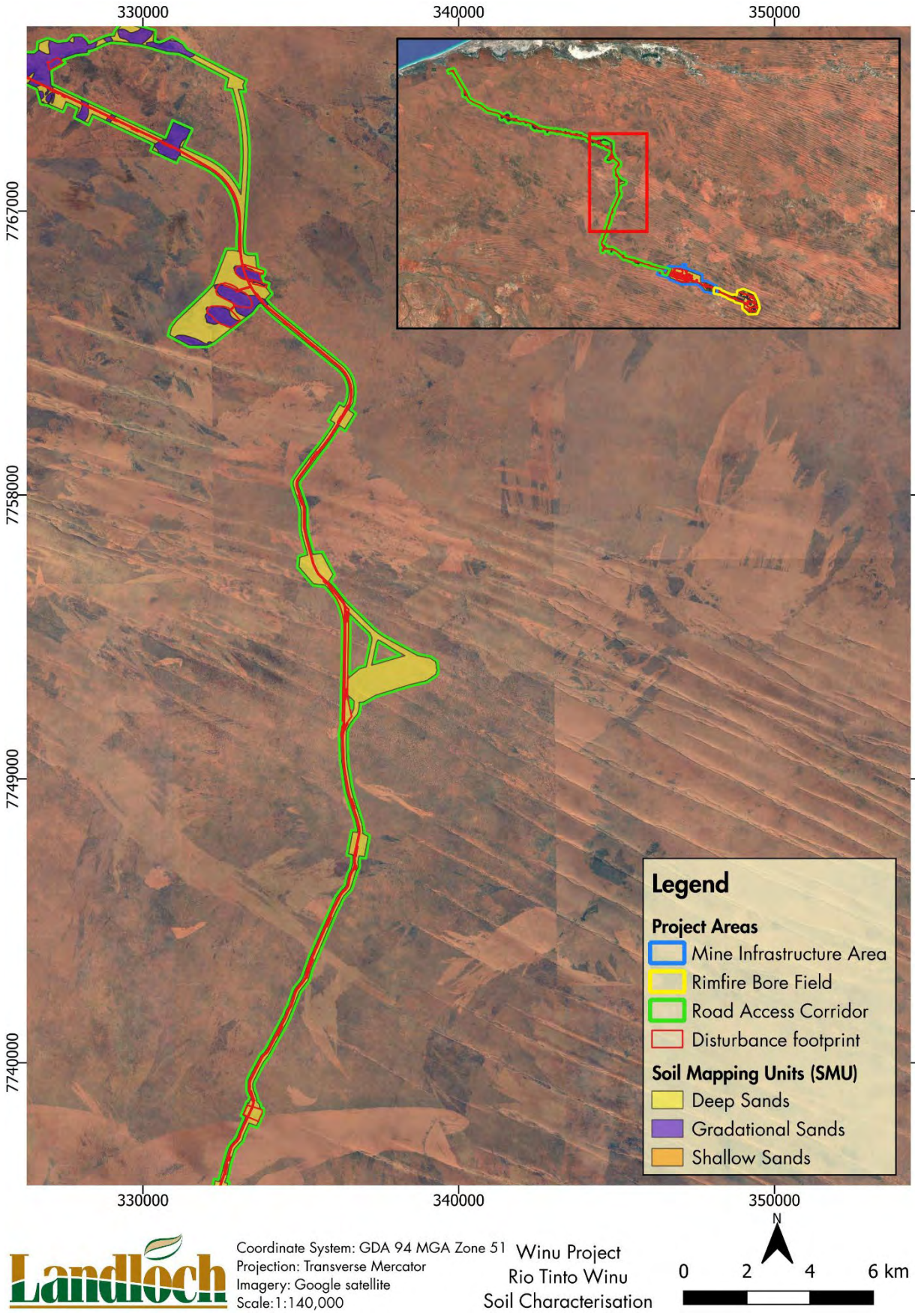


Figure 19: SMU mapping for the Project area.

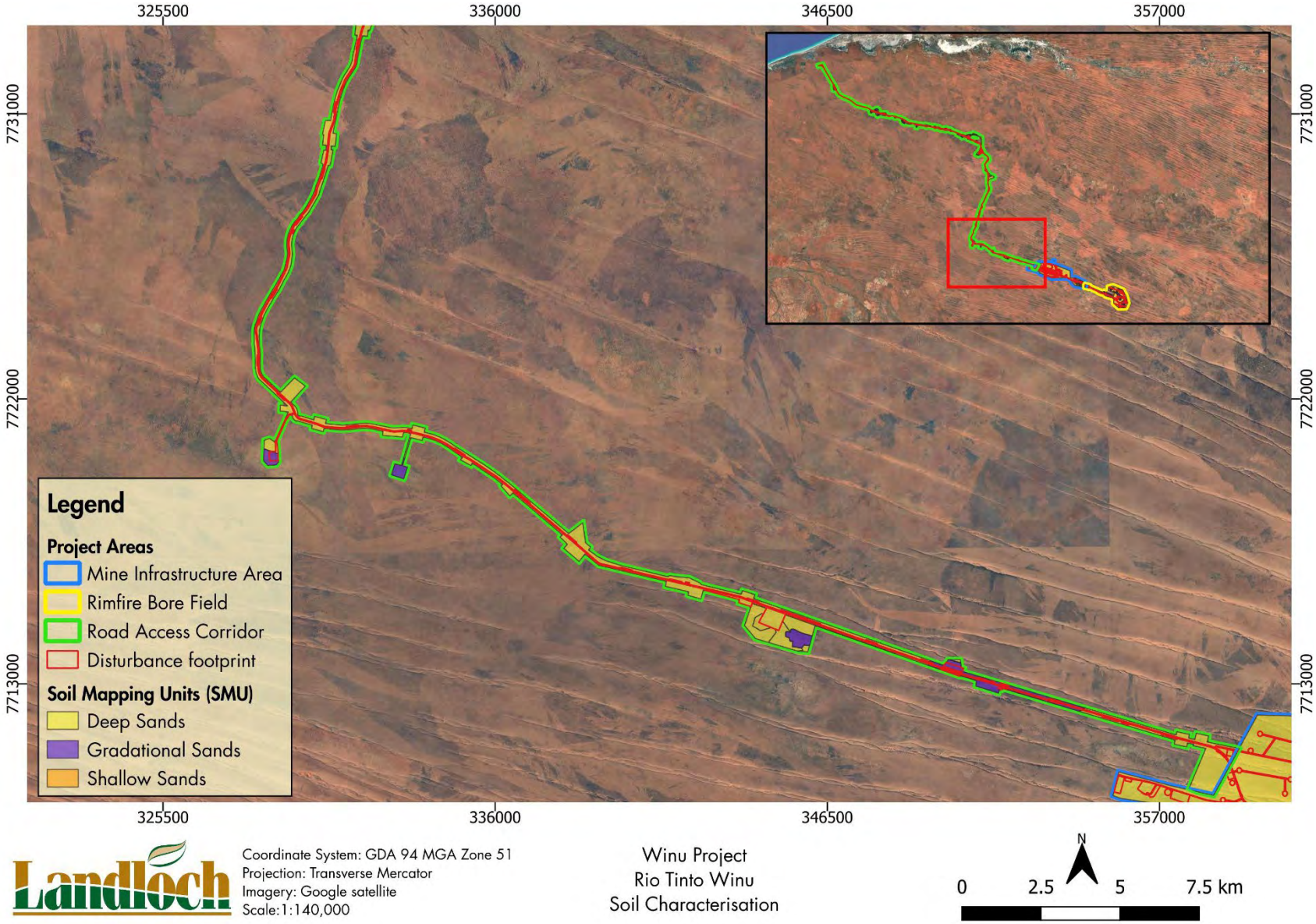


Figure 20: SMU mapping for the Project area.

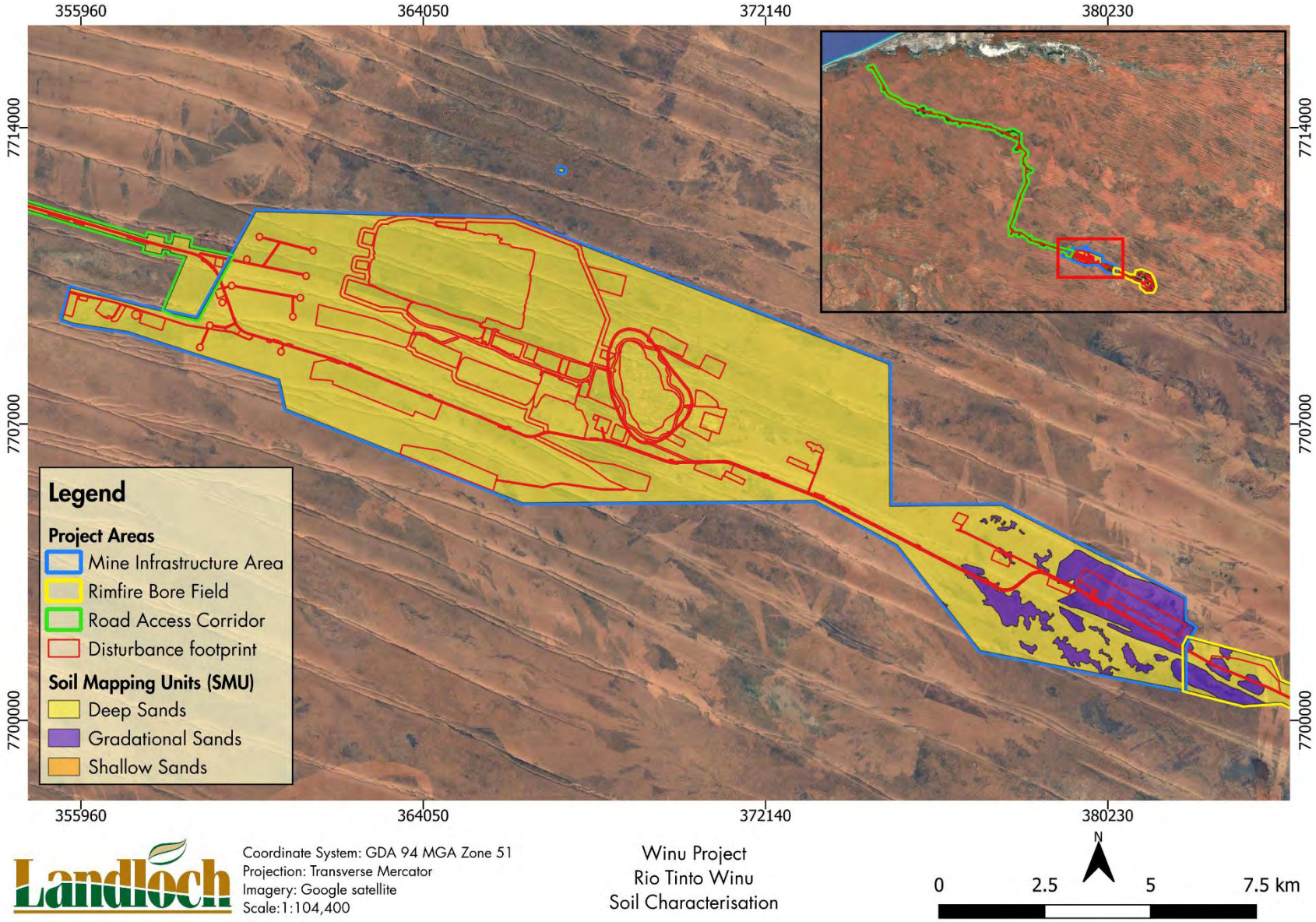


Figure 21: SMU mapping for the Project area.

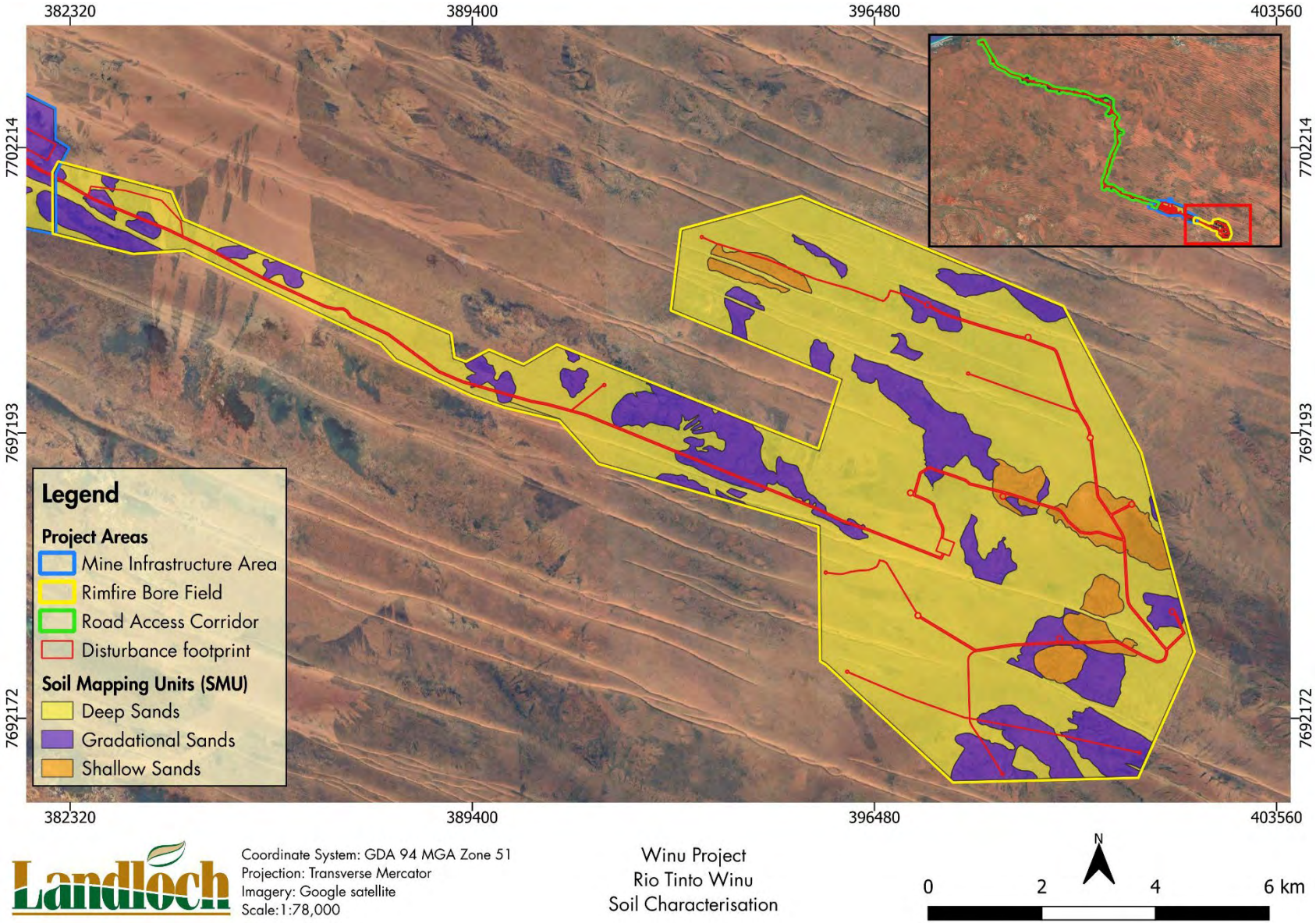


Figure 22: SMU mapping for the Project area.

4.2.4 Geotechnical data interpretation

The geotechnical surveys completed across the Project provided data and field observations that can be used in lieu of *in situ* soils data. The following geotechnical data was used by Landloch to assist in the determination of soil types and boundaries:

- Soil/rock material description;
- Consistency and density;
- Structure;
- Test pit photos; and
- Test pit termination depths.

The geotechnical data was re-interpreted by Landloch to align with the data contained in Landloch's soil survey profile descriptions. This included depth, texture, coarse fragment type and material source. The data was used to assess similarities between the previously sampled soils (Landloch 2020), newly sampled soils and those encountered during the geotechnical investigations. Landloch's interpretation of the available data can be found in Appendix E. Note that the data is restricted to physical soil characteristics only.

Using the geotechnical and soil inspection sites, relationships between the two data types were established. Based on similarities between the soils data and geotechnical data, it was possible to determine the soil type likely to be present for a given geotechnical pit. Based on this, the following associations between SMU and geotechnical data was determined:

- Deep Sands: Geotechnical test pits where sand or silty sand is present to an approximate depth of 1.5m. Gravel recorded as ferricrete occasionally encountered at depths greater than 1.0m.
- Gradational Sands: Geotechnical test pits that contain clayey sand and clayey gravelly sand. Sandy gravels recorded as ferricrete occasionally occur at depths greater than 1.0m.
- Shallow Sands: As no geotechnical investigation was completed for the Rimfire bore field, no relationship between the Shallow Sands and geotechnical data can be made. Additionally, no geotechnical test pits encountered hardpans at depths below 1.5m.

4.3 Deep Sands

The Deep Sands comprise ~81% of the total Project area. This SMU is associated with the inter-dunal sandplains and sand dunes and swales of the landscape. The Deep Sands are comprised of deep sandy profiles and have soil textures ranging from sand to clayey sand. The soil profile has little to no structure outside of the A horizon (topsoil). Coarse fragment abundance is variable throughout this SMU. There are no notable differences between the Deep Sands encountered in the initial 2020 soils investigation, and the 2025 investigation.

Median salinity values ($EC_{1:5}$) for both the topsoils and subsoils were 0.01dS/m, indicating that both the topsoils and subsoils are non-saline. Median topsoil pH_w is 6.0

and median subsoil pH_w is 5.9 (moderately acid). The Deep Sands are not typically prone to structural instability, with the exception of two subsoil samples from one site (RF14), which are prone based on ESI. The chemical properties of the Deep Sand topsoils and subsoils are considered adequate for supporting vegetation.

The fertility values of the Deep Sand topsoils and subsoils are in line with the baseline fertility values. While fertility is low, they are typical for the region. Both the topsoils and the subsoils are suitable for use as a growth media based on their fertility values, however it is noted that topsoil is likely to contain an active seedbank which will not be present in the subsoil.

Table 15 summarises the typical characteristics of the Deep Sands with median values shown in brackets. Table 16 summarises the median properties of the Deep Sands against the threshold values presented in Section 3.2. Material characterisation data of all Deep Sands samples (including those from the 2020 investigation) is given in Table 17. The physical and morphological attributes of the soil horizons of a representative soil profile for the Deep Sands is given in Table 18.

Table 15: Typical material characteristics of the Deep Sands.

Characteristics	Topsoil	Subsoil	Subsoil
Horizon	A	B1	B2
Depth (mm)	0 – 150	150 – 500	500 – 1800
Texture (class)	Sand – clayey sand	Sand – clayey sand	Loamy sand – clayey sand
Structure (grade)	Single grain – weak	Single grain	Single grain – massive
Consistency	Loose – weak (dry)	Loose – firm (dry)	Loose – firm (dry)
Coarse fragments	0 – 22% (0%) 2 – 20mm^	0 – 73% (0%) 2 – 20mm^	0 – 69% (0%) 2 – 60mm^
pH	6.0 – 6.3 (6.0)	5.5 – 6.2 (5.9)	5.5 – 6.6 (6.0)
Salinity (dS/m)	0.01 – 0.02 (0.01)	0.01 – 0.02 (0.01)	0.01 – 0.03 (0.01)
Sodicity, ESP (%)	2.8 – 4.2 (3.5)	2.9 – 7.9 (3.8)	1.4 – 7.1 (3.2)
ESI	0.002 – 0.007 (0.003)	0.003 – 0.004 (0.003)	<0.001
Ca:Mg	2.5 – 5.3 (3.5)	2.3 – 3.8 (3.0)	1.9 – 3.7 (2.7)
Emerson Class	3 – 5 (5*)	3 – 5 (5*)	3 – 5 (5*)
Fertility Class	Moderate/high	Moderate/high	Moderate/high

*Signifies the mode value rather than the median value. ^Values estimated from visual observations.

Table 16: Summary of the Deep Sands properties (median values) against data interpretation scheme thresholds.

Parameter	Unit	Threshold	Topsoil	Subsoil
Soil chemical properties				
Soil pH	-	5.5 – 7.0	6.0	5.9
Soil salinity	dS/m	<0.02	0.01	0.01
Soil fertility				
Total Nitrogen	mg/kg	>45	61	50
Total Phosphorus	mg/kg	>40	40	40
Organic Carbon	%	>0.2	0.2	0.2
Avail. Phosphorus	mg/kg	>5.0	5	5.0
Avail. Potassium	mg/kg	>35	50	53
Avail. Sulphur	mg/kg	>3.0	3.0	4.1
Structural stability				
Structural stability	-		-	-
Soil physical properties				
Coarse fraction	%	>50% >20mm	0% 2 – 6mm	0% 2 – 6mm

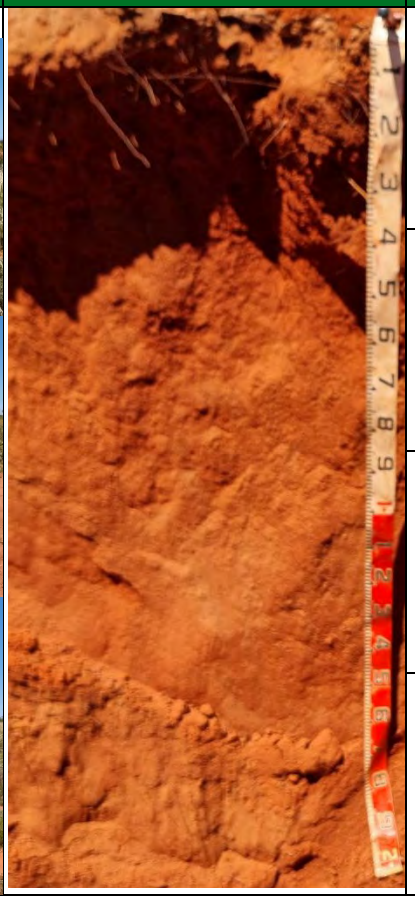
Table 17: Material characterisation data for the Deep Sands samples sent for laboratory analysis.

Analysis		Unit	HR-01		HR03				HR06			RF02		
Depth		mm	0-50	150-250	0-100	300-400	800-900	1200-1300	0-100	300-400	1200-1300	0-100	300-400	600-700
pH - Water		pH units	5.7	5.9	6.2	5.9	5.8	5.8	6.1	6.1	6.2	5.6	5.9	5.5
Electrical Conductivity		dS/m	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01
Chloride		mg/kg	<5	9	<5	7	10	6	8	26	11	7	13	5
Total Nitrogen		mg/kg	90	-	<50	<50	-	-	134	-	-	67	-	-
Total Phosphorus		mg/kg	42	-	<40	43	-	-	62	-	-	<40	-	-
Available Phosphorus (Colwell)		mg/kg	<5.0	-	<5.0	6.8	-	-	<5.0	-	-	<5.0	-	-
Potassium (Colwell)		mg/kg	61	-	35	45	-	-	60	-	-	47	-	-
Sulphur (KCl)		mg/kg	<3.00	-	<3.0	<3.0	-	-	<3.0	-	-	<3.0	-	-
Organic Carbon		%	<0.20	-	<0.2	<0.2	-	-	0.4	-	-	<0.2	-	-
Trace Elements	Copper	mg/kg	<0.20	-	<0.2	<0.2	-	-	<0.2	-	-	<0.2	-	-
	Iron	mg/kg	3.3	-	1.4	1.8	-	-	3.2	-	-	1.2	-	-
	Manganese	mg/kg	1.5	-	5.7	3.4	-	-	7.2	-	-	3.2	-	-
	Zinc	mg/kg	<0.2	-	<0.2	<0.2	-	-	<0.2	-	-	<0.2	-	-
	Boron	mg/kg	<0.2	-	<0.2	<0.2	-	-	0.2	-	-	0.2	-	-
Exchangeable Cations	ECEC	meq/100g	1.2	1.2	1.1	1.1	1.5	3.1	1.5	1.5	1.4	1.0	1.1	1.3
	Ex Sodium Percent	%	3.5	3.7	4.0	3.8	3.0	1.4	2.8	2.9	3.2	4.2	3.9	3.3
	Ex Magnesium Percent	%	16.0	19.2	15.5	22.0	24.6	29.4	18.9	18.9	20.0	13.6	13.4	14.0
	Exchangeable Calcium	meq/100g	0.78	0.69	0.58	0.57	0.88	1.73	1.02	0.93	0.78	0.61	0.57	0.70
	Exchangeable Magnesium	meq/100g	0.20	0.23	0.17	0.25	0.36	0.92	0.29	0.29	0.27	0.14	0.15	0.19
	Exchangeable Potassium	meq/100g	0.15	0.14	0.07	0.11	0.13	0.13	0.14	0.15	0.11	0.10	0.12	0.14
	Exchangeable Sodium	meq/100g	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	Ca:Mg Ratio	-	3.9	3.1	3.4	2.3	2.4	1.9	3.5	3.3	2.9	4.3	3.8	3.7
ESI		-	0.003	0.003	0.003	0.003	0.003	0.007	0.007	0.003	0.003	0.002	0.003	0.003
Average coarse fragment size (range)		mm	6-20	20-60	2-6	2-6	6-20	20-60	-	-	-	2-6	2-6	2-6
Coarse Fraction >2mm		%	21.7	72.6	2.9	1.3	65.4	69.0	0.0	0.0	0.0	0.0	0.0	0.0
Particle Size Distribution of Fine Fraction	Coarse Sand (0.2-2.0mm)	%	56.2	56.9	79.2	66.1	55.6	53.6	65.5	74.2	59.4	56.2	53.5	52.0
	Fine Sand (0.02—0.2mm)	%	35.9	34.7	14.5	23.7	27.4	23.0	24.7	17.9	30.8	36.0	38.6	38.0
	Silt (0.002-0.02mm)	%	0.8	0.8	0.8	0.8	2.7	4.8	0.8	0.8	0.8	0.8	2.8	0.8
	Clay (<0.002mm)	%	7.1	7.1	5.0	9.0	10.7	17.0	9.1	7.1	9.0	7.1	5.1	9.1

Table 17 continued: Material characterisation data for the Deep Sands samples sent for laboratory analysis.

Analysis		Unit	RF03			RF04			RF09			RF14		
Depth		mm	0-100	200-300	300-400	0-100	200-300	400-500	0-100	300-400	700-800	0-100	300-400	500-600
pH - Water		pH units	6.3	6.2	6.6	5.8	5.7	5.9	5.4	5.6	5.5	6.1	5.8	6.0
Electrical Conductivity		dS/m	0.01	0.03	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Chloride		mg/kg	19	11	17	<5	25	9	6	14	5	<5.00	11	13
Total Nitrogen		mg/kg	<50	<50	-	<50	<50	-	55	<50	-	90	89	-
Total Phosphorus		mg/kg	<40	<40	-	<40	<40	-	<40	<40	-	54	<40	-
Available Phosphorus (Colwell)		mg/kg	<5.0	<5.0	-	5.7	<5.0	-	<5.0	<5.0	-	<5.0	<5.0	-
Potassium (Colwell)		mg/kg	45	53	-	52	56	-	38	41	-	73	62	-
Sulphur (KCl)		mg/kg	3.2	4.31	-	3.2	4.1	-	<3.0	4.3	-	<3.0	3.2	-
Organic Carbon		%	0.3	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-
Trace Elements	Copper	mg/kg	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-
	Iron	mg/kg	2.3	2.3	-	<1.0	<1.0	-	1.5	<1.0	-	1.9	<1.0	-
	Manganese	mg/kg	1.2	1.6	-	1.7	<1.0	-	1.4	1.2	-	3.7	1.4	-
	Zinc	mg/kg	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	-
	Boron	mg/kg	0.3	0.3	-	0.2	0.2	-	<0.2	0.2	-	<0.2	0.2	-
Exchangeable Cations	ECEC	meq/100g	1.5	1.2	1.2	1.1	1.2	1.4	1.2	1.1	1.1	1.4	1.2	1.2
	Ex Sodium Percent	%	2.9	7.9	7.1	3.9	3.6	3.2	3.5	3.8	4.0	3.2	3.8	3.7
	Ex Magnesium Percent	%	17.1	21.0	25.4	17.9	16.3	19.8	11.2	16.3	17.1	18.6	19.6	21.9
	Exchangeable Calcium	meq/100g	0.65	0.62	0.65	0.56	0.67	0.77	0.75	0.56	0.51	0.71	0.62	0.63
	Exchangeable Magnesium	meq/100g	0.26	0.25	0.30	0.20	0.20	0.27	0.14	0.18	0.19	0.26	0.23	0.26
	Exchangeable Potassium	meq/100g	0.10	0.12	0.13	0.13	0.13	0.15	0.08	0.09	0.12	0.16	0.14	0.15
	Exchangeable Sodium	meq/100g	0.04	0.09	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	Ca:Mg Ratio	-	2.5	2.5	2.2	2.8	3.4	2.8	5.3	3.0	2.7	2.8	2.7	2.4
ESI		-	0.003	0.004	0.004	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Average coarse fragment size (range)		mm	2-6	2-6	2-6	6-20	6-20	6-20	2-6	2-6	2-6	2-6	2-6	2-6
Coarse Fraction >2mm		%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Particle Size Distribution of Fine Fraction	Coarse Sand (0.2-2.0mm)	%	56.5	53.8	49.9	46.9	44.9	45.3	54.5	54.9	51.4	56.1	52.2	49.6
	Fine Sand (0.02—0.2mm)	%	35.6	40.4	40.1	42.8	43.4	46.2	37.7	37.3	40.7	32.0	33.9	38.5
	Silt (0.002-0.02mm)	%	0.8	0.8	2.8	0.8	2.7	2.8	2.8	0.8	2.8	2.8	2.8	0.8
	Clay (<0.002mm)	%	7.1	5.1	7.1	9.1	7.0	5.1	5.1	7.0	5.1	9.1	11.1	11.0

Table 18: Representative inspection site of the Deep Sands.

Representative Site No: HR–06 **Landform:** Flat **Micro-relief:** N/A **Surface condition**: Soft	**Dominant Vegetation:** Non-woody **Surface cover:** Mid-dense (30-70%) **Site Drainage:** Moderately well-drained	**Australian Soil Classification:** Arenosol					**General comments:** Negligible surface rock cover. Comparatively increased tree density.	
Landscape Photos	**Profile Photo**	**Horizon (mm)**	**Moist Colour**	**Texture**	**Structure**	**Consistence**	**Roots**	**pH_w & $EC_{1:5}$**
		A 0 – 150	10R 3/6 Dark red	Loamy sand	Polyhedral (weak)	Weak (dry)	Many (25-100) Fine (1-2mm)	pH: 6.1 EC: 0.02dS/m
		B1 150 – 500	10R 2.5/2 Very dusky red	Loamy sand	Apedal (single grain)	Loose (dry)	Few (1-10) Medium (2-5mm)	pH: 6.1 EC: 0.01dS/m
		B2 500 – 1800	10R 2.5/2 Very dusky red	Clayey sand	Apedal (single grain)	Loose (dry)	No roots (0)	pH: 6.2 EC: 0.01dS/m

4.4 Gradational Sands

The Gradational Sands are present across 17% of the total Project area. This SMU is similar to the Deep Sands with the exception of having subsoils that grade to loams with depth. This SMU consists of deep profiles that grade from sandy topsoils to loamy subsoils.

Median salinity values ($EC_{1:5}$) for both the topsoils and subsoils are 0.01dS/m (non-saline). Both the topsoils and subsoils are moderately acid with pH_w values of 5.8 and 5.9, respectively. The chemical properties of the Gradational Sands topsoils and subsoils are adequate for supporting vegetation. Similarly to the Deep Sands, subsoils can be prone to structural instability based on ESI, but overall the Gradational Sands are not considered to be prone to structural instability.

Gradational Sands have fertility values in line with the baseline values as described in Section 3.2.3. Similar to the Deep Sands, many of the reported values are at the lowest detectable level.

Table 19 summarises the typical characteristics of the Gradational Sands with median values shown in brackets. Table 20 summarises the median properties of the SMU against the threshold values presented in Section 3.2. Material characterisation data of the soil samples that underwent laboratory analysis are given in Table 21. The physical and morphological attributes of the soil horizons of a representative soil profile for the Gradational Sands is given in Table 22.

Table 19: Typical material characteristics of the Gradational Sands.

Characteristics	Topsoil	Subsoil	Subsoil
Horizon	A	B1	B2
Depth (mm)	0 – 150	150 – 400	400 – 1700
Texture (class)	Loamy sand – sandy loam	Loamy sand – sandy loam	Clayey sand – clay loam
Structure (grade)	Single grain – weak	Single grain – weak	Single grain – moderate
Consistency	Loose – weak (dry)	Loose – firm (dry)	Weak – very firm (dry)
Coarse fragments	0 – 58% (1%) 2 – 20mm^	0 – 81% (5%) 2 – 60mm^	0 – 77% (60%) 2 – 60mm^
pH	5.5 – 6.6 (5.8)	5.7 – 6.4 (6.1)	5.7 – 6.6 (5.9)
Salinity (dS/m)	0.01	0.01	0.01 – 0.02 (0.01)
Sodicity, ESP (%)	2.0 – 3.9 (2.9)	1.9 – 3.4 (3.0)	1.2 – 5.1 (2.4)
ESI	0.003 – 0.005 (0.003)	0.003 – 0.005 (0.003)	0.003 – 0.013 (0.004)
Ca:Mg	2.5 – 5.3 (3.5)	2.3 – 3.8 (3.0)	1.9 – 3.7 (2.7)
Emerson Class	3 – 5 (5*)	3 – 5 (5*)	3 – 5 (5*)
Fertility Class	Moderate/high	Moderate/high	Moderate/high

*Signifies the mode value rather than the median value. ^Values estimated from visual observations.

Table 20: Summary of the Gradational Sands properties (median values) against data interpretation scheme thresholds.

Parameter	Unit	Threshold	Topsoil	Subsoil
Soil chemical properties				
Soil pH	-	5.5 – 7.0	5.8	5.9
Soil salinity	dS/m	<0.02	0.01	0.01
Soil fertility				
Total Nitrogen	mg/kg	>45	78	80
Total Phosphorus	mg/kg	>40	65	56
Organic Carbon	%	>0.2	0.3	0.2
Avail. Phosphorus	mg/kg	>5.0	5.0	5.0
Avail. Potassium	mg/kg	>35	55	72
Avail. Sulphur	mg/kg	>3.0	3.0	3.0
Structural stability				
Structural stability	-		-	-
Soil physical properties				
Coarse fraction	%	>50% >20mm	0% 2 – 6mm	20% 6 – 20mm

Table 21: Material characterisation data for the Gradational Sands samples sent for laboratory analysis.

Analysis		Unit	HR02				HR04				HR05			
Depth		mm	0-100	300-400	700-800	1200-1300	0-100	200-300	700-800	1200-1300	0-100	300-400	700-800	1200-1300
pH - Water		pH units	5.5	6.2	5.8	6.4	5.8	5.7	5.9	5.7	5.9	6.2	6.2	6.1
Electrical Conductivity		dS/m	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Chloride		mg/kg	5	6	<5	5	12	7	10	8	30	<5	<5	5
Total Nitrogen		mg/kg	159	89	-	-	61	71	-	-	194	105	-	-
Total Phosphorus		mg/kg	67	41	-	-	65	72	-	-	83	81	-	-
Available Phosphorus (Colwell)		mg/kg	<5.0	<5.0	-	-	<5.0	<5.0	-	-	<5.0	<5.0	-	-
Potassium (Colwell)		mg/kg	53	155	-	-	51	59	-	-	57	79	-	-
Sulphur (KCl)		mg/kg	3.1	<3.0	-	-	<3.0	<3.0	-	-	<3.0	<3.0	-	-
Organic Carbon		%	0.3	0.3	-	-	0.4	0.2	-	-	0.2	0.2	-	-
Trace Elements	Copper	mg/kg	<0.2	<0.2	-	-	0.2	<0.20	-	-	<0.20	<0.20	-	-
	Iron	mg/kg	6.1	2.9	-	-	2.9	1.8	-	-	5.0	1.2	-	-
	Manganese	mg/kg	9.7	2.5	-	-	8.7	1.9	-	-	2.8	1.6	-	-
	Zinc	mg/kg	0.2	<0.2	-	-	0.3	<0.2	-	-	<0.2	<0.2	-	-
	Boron	mg/kg	<0.2	0.3	-	-	<0.2	0.2	-	-	<0.2	0.3	-	-
Exchangeable Cations	ECEC	meq/100g	1.5	1.5	1.6	2.8	1.3	1.4	3.8	2.9	1.6	2.3	2.0	2.8
	Ex Sodium Percent	%	3.0	3.0	2.7	1.6	3.3	3.2	1.2	1.5	2.8	1.9	2.1	1.6
	Ex Magnesium Percent	%	17.7	23.5	22.1	27.7	19.2	21.9	20.6	28.0	17.9	19.8	27.6	30.9
	Exchangeable Calcium	meq/100g	0.83	0.81	0.94	1.64	0.79	0.79	1.92	1.79	0.92	1.01	1.15	1.64
	Exchangeable Magnesium	meq/100g	0.26	0.35	0.36	0.76	0.26	0.30	0.79	0.81	0.28	0.45	0.56	0.86
	Exchangeable Potassium	meq/100g	0.13	0.22	0.18	0.22	0.11	0.13	0.22	0.19	0.14	0.18	0.18	0.20
	Exchangeable Sodium	meq/100g	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	Ca:Mg Ratio	-	3.2	2.3	2.6	2.2	3.1	2.6	2.4	2.2	3.3	2.2	2.0	1.9
ESI		-	0.003	0.003	0.004	0.013	0.003	0.003	0.009	0.007	0.004	0.005	0.005	0.006
Average coarse fragment size (range)		mm	2-6	2-6	2-6	20-60	2-6	2-6	20-60	6-20	6-20	20-60	20-60	20-60
Coarse Fraction >2mm		%	0.5	6.3	19.9	56.4	0.9	5.0	62.6	66.9	57.9	80.5	74.8	76.7
Particle Size Distribution of Fine Fraction	Coarse Sand (0.2-2.0mm)	%	64.2	70.9	70.7	47.8	68.7	74.6	43.6	48.5	49.7	56.3	54.5	57.4
	Fine Sand (0.02—0.2mm)	%	23.9	17.1	13.3	19.3	19.3	18.5	17.1	12.0	39.8	29.5	24.0	19.9
	Silt (0.002-0.02mm)	%	2.7	0.8	2.8	4.6	2.8	0.8	0.8	3.0	2.8	4.7	2.8	0.8
	Clay (<0.002mm)	%	9.0	11.1	13.2	24.2	9.1	5.6	36.8	35.5	7.1	7.0	17.5	19.8

Table 21 continued: Material characterisation data for the Gradational Sands samples sent for laboratory analysis.

Analysis		Unit	RF05			RF13			RF16			RF18		
Depth		mm	0-100	300-400	800-900	0-100	200-300	500-600	0-100	400-500	900-1000	0-100	300-400	700-800
pH - Water		pH units	6.6	6.4	6.6	5.8	6.1	5.9	5.9	5.8	5.9	5.5	5.8	5.8
Electrical Conductivity		dS/m	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Chloride		mg/kg	<5	8	8	9	8	12	12	9	5	6	5	8
Total Nitrogen		mg/kg	67	-	-	50	<50	-	88	-	-	62	-	-
Total Phosphorus		mg/kg	<40	-	-	<40	41	-	65	-	-	50	-	-
Available Phosphorus (Colwell)		mg/kg	<5.0	-	-	<5.0	<5.0	-	<5.0	-	-	<5.0	-	-
Potassium (Colwell)		mg/kg	77	-	-	50	65	-	88	-	-	57	-	-
Sulphur (KCl)		mg/kg	<3.0	-	-	<3.0	<3.0	-	<3.0	-	-	<3.0	-	-
Organic Carbon		%	0.4	-	-	<0.2	<0.2	-	<0.2	-	-	<0.2	-	-
Trace Elements	Copper	mg/kg	<0.2	-	-	<0.20	<0.20	-	0.2	-	-	<0.20	-	-
	Iron	mg/kg	<1.0	-	-	1.4	<1.00	-	2.6	-	-	1.4	-	-
	Manganese	mg/kg	3.3	-	-	3.5	1.6	-	2.6	-	-	1.7	-	-
	Zinc	mg/kg	<0.2	-	-	<0.2	<0.2	-	<0.2	-	-	<0.2	-	-
	Boron	mg/kg	0.3	-	-	0.2	0.2	-	0.2	-	-	<0.2	-	-
Exchangeable Cations	ECEC	meq/100g	1.5	1.4	1.7	2.2	1.9	1.4	1.6	1.5	1.5	1.1	1.3	1.3
	Ex Sodium Percent	%	2.9	3.2	5.1	2.0	2.3	3.1	2.7	3.0	2.9	3.9	3.4	3.3
	Ex Magnesium Percent	%	19.5	23.3	26.0	8.4	12.2	13.5	18.6	17.3	17.9	14.1	17.4	14.8
	Exchangeable Calcium	meq/100g	0.87	0.74	0.91	0.72	0.71	0.70	0.88	0.72	0.90	0.57	0.59	0.62
	Exchangeable Magnesium	meq/100g	0.29	0.32	0.45	0.18	0.23	0.19	0.30	0.25	0.27	0.16	0.22	0.20
	Exchangeable Potassium	meq/100g	0.17	0.19	0.21	0.12	0.14	0.23	0.17	0.20	0.18	0.14	0.15	0.15
	Exchangeable Sodium	meq/100g	0.04	0.04	0.09	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	Ca:Mg Ratio	-	3.0	2.3	2.0	4.0	3.0	3.8	2.9	2.9	3.3	3.6	2.7	3.1
ESI		-	0.003	0.003	0.004	0.005	0.004	0.003	0.004	0.003	0.003	0.003	0.003	0.003
Average coarse fragment size (range)		mm	6-20	6-20	6-20	6-20	6-20	6-20	2-6	2-6	2-6	2-6	2-6	2-6
Coarse Fraction >2mm		%	0.0	0.0	0.0	14.1	36.6	76.5	0.0	0.0	0.0	1.1	2.0	2.2
Particle Size Distribution of Fine Fraction	Coarse Sand (0.2-2.0mm)	%	39.5	45.0	41.7	46.4	41.5	42.7	58.2	55.5	52.0	60.3	57.2	54.8
	Fine Sand (0.02—0.2mm)	%	48.3	40.3	40.8	45.9	50.6	45.2	31.8	30.4	34.0	31.5	32.5	32.1
	Silt (0.002-0.02mm)	%	2.8	0.8	4.6	0.8	0.8	2.7	2.7	4.7	2.8	2.8	0.8	2.7
	Clay (<0.002mm)	%	9.0	10.7	8.7	7.0	7.1	9.0	7.0	9.1	11.1	5.1	9.1	9.0

Table 22: Representative inspection site of the Gradational Sands.

Representative Site No: HR–02 **Landform:** Flat **Micro-relief:** N/A **Surface condition**: Firm	**Dominant Vegetation:** Non-woody **Surface cover:** Mid-dense (30-70%) **Site Drainage:** Moderately well-drained	**Australian Soil Classification:** Kandosol					**General comments:** Negligible surface rock cover. Sand atop firm surface.	
Landscape Photos	**Profile Photo**	**Horizon (mm)**	**Moist Colour**	**Texture**	**Structure**	**Consistence**	**Roots**	**pH_w & $EC_{1:5}$**
		A 0 – 150	2.5YR 2/4 Dark reddish brown	Loamy sand	Polyhedral (weak)	Very weak (dry)	Common (10-25) Fine (1-2mm)	pH: 5.5 EC: 0.01dS/m
		B1 150 – 400	2.5YR 4/6 Red	Loamy sand	Angular blocky (weak)	Weak (moderate moist)	Few (1-10) Fine (1-2mm)	pH: 6.2 EC: 0.01dS/m
		B21 400 – 1000	2.5YR 3/6 Dark red	Clayey sand	Apedal (single grain)	Weak (moderate moist)	No roots (0)	pH: 5.8 EC: 0.01dS/m
		B22 1000 – 1600	2.5YR 3/6 Dark red	Sandy clay loam	Subangular blocky (weak)	Weak (moderate moist)	No roots (0)	pH: 6.4 EC: 0.02dS/m

4.5 Shallow Sands

The Shallow Sands have physical and chemical properties like the Deep Sands, and are differentiated by a cemented hardpan occurring at depths of ~0.3m. The Deep Sands consist of a moderately acid shallow sandy profile. The texture of the Shallow sands does not exceed clayey sand. The Shallow Sands are exclusively found within the Rimfire bore field area.

Both the topsoils and subsoils are classes as non-saline with $EC_{1:5}$ values of 0.01dS/m. Median pH_w values for the topsoils and subsoils are 6.0, classing them as moderately acid. The chemical properties of the Shallow Sands indicate that both the topsoils and subsoils are adequate for supporting vegetation.

The fertility values of the Shallow Sands are in line with the baseline values as described in Section 3.2.3.

Table 23 summarises the typical characteristics of the Shallow Sands with median values shown in brackets. Table 24 summarises the median properties of the SMU against the threshold values presented in Section 3.2. Material characterisation data of the soil samples is given in Table 25. The physical and morphological attributes of the soil horizons of a representative soil profile for the Shallow Sands is given in Table 26.

Table 23: Typical material characteristics of the Shallow Sands.

Characteristics	Topsoil	Subsoil
Horizon	A	B
Depth (mm)	0 – 150	150 – 350
Texture (class)	Loamy sand – clayey sand	Loamy sand – clayey sand
Structure (grade)	Single grain	Single grain – weak
Consistency	Loose (dry)	Loose (dry)
Coarse fragments	0 – 38% (6%) 2 – 20mm^	0 – 70% (35%) 6 – 20mm^
pH	5.5 – 6.2 (6.0)	5.7 – 6.2 (6.0)
Salinity (dS/m)	0.01 – 0.02 (0.01)	0.01 – 0.02 (0.01)
Sodicity, ESP (%)	3.5 – 4.0 (3.9)	2.0 – 4.1 (3.2)
ESI	0.002 – 0.003 (0.003)	0.002 – 0.005 (0.003)
Ca:Mg	2.1 – 3.4 (3.0)	2.2 – 3.0 (2.9)
Emerson Class	3 – 5 (5*)	3 – 5 (5*)
Fertility Class	Moderate/high	-

*Signifies the mode value rather than the median value. ^Values estimated from visual observations.

Table 24: Summary of the Shallow Sands properties (median values) against data interpretation scheme thresholds.

Parameter	Unit	Threshold	Topsoil	Subsoil
Soil chemical properties				
Soil pH	-	5.5 – 7.0	6.0	6.0
Soil salinity	dS/m	<0.02	0.01	0.01
Soil fertility				
Total Nitrogen	mg/kg	>45	68	-
Total Phosphorus	mg/kg	>40	40	-
Organic Carbon	%	>0.2	0.2	-
Avail. Phosphorus	mg/kg	>5.0	5.0	-
Avail. Potassium	mg/kg	>35	48	-
Avail. Sulphur	mg/kg	>3.0	3.0	-
Structural stability				
Structural stability	-		-	-
Soil physical properties				
Coarse fraction	%	>50% >20mm	0% 2 – 6mm	20% 6 – 20mm

Table 25: Material characterisation data for the Shallow Sands samples sent for laboratory analysis.

Analysis		Unit	RF06		RF08		RF15	
Depth		mm	0-50	100-200	0-100	200-300	0-100	200-300
pH - Water		pH units	6.2	6.2	5.4	5.9	6.0	5.7
Electrical Conductivity		dS/m	0.01	0.01	0.01	0.01	0.01	0.01
Chloride		mg/kg	<5.0	<5.0	19	<5.0	35	8
Total Nitrogen		mg/kg	<50	-	69	-	68	-
Total Phosphorus		mg/kg	<40	-	<40	-	61	-
Available Phosphorus (Colwell)		mg/kg	<5.0	-	<5.0	-	<5.0	-
Potassium (Colwell)		mg/kg	55	-	48	-	39	-
Sulphur (KCl)		mg/kg	<3.0	-	<3.0	-	3.2	-
Organic Carbon		%	<0.2	-	0.3	-	<0.2	-
Trace Elements	Copper	mg/kg	<0.2	-	<0.20	-	<0.2	-
	Iron	mg/kg	1.2	-	2.9	-	<1.0	-
	Manganese	mg/kg	2.7	-	2.7	-	3.1	-
	Zinc	mg/kg	<0.2	-	<0.2	-	<0.2	-
	Boron	mg/kg	0.2	-	<0.2	-	<0.2	-
Exchangeable Cations	ECEC	meq/100g	1.1	1.1	1.1	1.4	1.2	2.2
	Ex Sodium Percent	%	3.9	4.1	4.0	3.2	3.5	2.0
	Ex Magnesium Percent	%	15.6	16.2	14.8	19.7	26.4	16.6
	Exchangeable Calcium	meq/100g	0.53	0.52	0.55	0.79	0.70	0.81
	Exchangeable Magnesium	meq/100g	0.17	0.17	0.16	0.27	0.33	0.37
	Exchangeable Potassium	meq/100g	0.12	0.14	0.10	0.14	0.08	0.89
	Exchangeable Sodium	meq/100g	0.04	0.04	0.04	0.04	0.04	0.04
	Ca:Mg Ratio	-	3.0	3.0	3.4	2.9	2.1	2.2
ESI		-	0.003	0.002	0.002	0.003	0.003	0.005
Average coarse fragment size (range)		mm	2-6	6-20	2-6	6-20	2-6	6-20
Coarse Fraction >2mm		%	0.0	0.0	11.4	70.7	0.8	3.8
Particle Size Distribution of Fine Fraction	Coarse Sand (0.2-2.0mm)	%	49.5	46.0	48.7	48.6	51.7	48.4
	Fine Sand (0.02—0.2mm)	%	42.6	48.2	40.7	38.8	34.3	37.5
	Silt (0.002-0.02mm)	%	2.8	0.8	0.8	4.7	2.8	2.8
	Clay (<0.002mm)	%	5.1	5.1	9.0	7.0	11.0	11.1

Table 26: Representative inspection site of the Shallow Sands.

Representative Site No: RF–12 **Landform:** Simple slope **Micro-relief:** N/A **Surface condition**: Firm	**Dominant Vegetation:** Non-woody **Surface cover:** Mid-dense (30-70%) **Site Drainage:** Imperfectly drained	**Australian Soil Classification:** Kandosol					**General comments:** Surface rock cover 5%, 2mm in diameter.	
Landscape Photos	**Profile Photo**	**Horizon (mm)**	**Moist Colour**	**Texture**	**Structure**	**Consistence**	**Roots**	**pH_w & $EC_{1:5}$**
		A 0 – 150	2.5YR 4/8 Red	clayey sand	Apedal (single grain)	Loose (dry)	Common (10-25) Fine (1-2mm)	pH: 6.0 EC: 0.01dS/m
		B 150 – 350	2.5YR 5/8 Red	Sandy loam	Polyhedral (weak)	Weak (dry)	Few (1-10) Fine (1-2mm)	pH: 5.7 EC: 0.01dS/m
		C 350 – 700+	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded

5 SOIL MANAGEMENT

5.1 Soil suitability

The topsoils of all three SMUs have properties that are suitable for vegetation establishment and growth. The topsoils have fertility, pH_w and $EC_{1:5}$ values that support plant growth.

Similarly to the topsoils, the subsoils of all three SMUs have properties that are suitable for vegetation establishment and growth. No subsoils had fertility, pH_w or $EC_{1:5}$ values that would restrict plant growth.

The soils from all SMUs (topsoils and subsoils) are considered to be good potential rehabilitation resources for use as growth media.

5.2 Soil stripping

The purpose of determining suitable soil stripping depths is to provide an estimate of the maximum volume of soil available for rehabilitation. To determine the maximum available soil volume, both the suitable stripping depth and the area to be stripped must be known.

Suitable stripping depths are based on the attributes of the soils and are determined separately for each SMU. The key attribute determining the suitable stripping depths is soil depth.

The area that is likely to be stripped (within the Project area) is separated into the three discreet development envelopes (Section 1). Within each of the development envelopes disturbance footprints associated with future mining and infrastructure have been demarcated. Soil stripping will be limited to the following disturbance footprints:

- Mine Infrastructure Area (MIA) – 3,536ha;
- Road Access Corridor (RAC) – 1,095ha; and
- Rimfire Bore Field – 188ha.

Of the three disturbance footprints, only the MIA is associated with a high degree of planned disturbance. For this reason, it is assumed that the subsoils of the RAC and Rimfire bore field will not be stripped.

Topsoils should be stripped and stockpiled separately from subsoils if stockpiled, as they contain higher levels of organic matter, soil biology, and seed. Any vegetation debris should also be retained as it will likely be useful in maintaining the nutrient store, and if sufficiently large in size (i.e., branches, trunks), may provide additional erosion resistance.

5.2.1 Deep Sands

Topsoils and subsoils of the Deep Sands should be stripped for use as a rehabilitation resource where required. There are no observed limitations to the stripping depth of the

Deep Sands, with no limiting sublayer being encountered within ~1.5m of the surface in any of the soil inspections sites surveyed.

This means that the Deep Sands can be stripped to as deep as 1.5m. In practice, adoption of this stripping depth would yield a very large volume of soil that would need to be managed. If direct replacement of soils is not undertaken, this would require large stockpile footprints to be included in the mine layout. In acknowledgement of this, two sets of volumes have been provided for the MIA:

1. For the purpose of stripping the maximum volume of soil, it is assumed that the topsoils of the Deep Sands will be stripped to 0.15m and the subsoils to 1.5m (1.35m of subsoil); and
2. For the purpose of limiting the maximum stripping depth of subsoils, it is assumed that the topsoils of the Deep Sands will be stripped to 0.15m and the subsoils to 0.3m (0.15m of subsoil).

5.2.2 Gradational Sands

Topsoils and subsoils of the Gradational Sands should be stripped for use as a rehabilitation resource where required. There are no observed limitations to the stripping depth of the Gradational Sands, with no limiting sublayer being encountered within ~1.5m of the surface in any of the soil inspections sites surveyed.

This means that the Gradational Sands can be stripped to as deep as 1.5m. In practice, adoption of this stripping depth would yield a very large volume of soil that would need to be managed. If direct replacement of soils is not undertaken, this would require large stockpile footprints to be included in the mine layout. In acknowledgement of this, two sets of volumes have been provided for the MIA:

1. For the purpose of stripping the maximum volume of soil, it is assumed that the topsoils of the Gradational Sands will be stripped to 0.15m and the subsoils to 1.5m (1.35m of subsoil); and
2. For the purpose of limiting the maximum stripping depth of subsoils, it is assumed that the topsoils of the Gradational Sands will be stripped to 0.15m and the subsoils to 0.3m (0.15m of subsoil).

5.2.3 Shallow Sands

Topsoils of the Shallow Sands should be stripped for use as a rehabilitation resource where required. The Shallow Sands occur exclusively in the Rimfire bore field and as such, the shallow subsoils are not expected to be stripped.

For the purpose of stripping the maximum volume of topsoils, it is assumed that the Shallow Sands will be stripped to a depth of 0.15m.

5.3 Soil volumes

Estimated total volumes of all soils classified as potential rehabilitation resources have been separated based on each of the three development envelopes.

5.3.1 Mining Infrastructure Area

Estimated total volumes of all soils classified as potential rehabilitation resources within the MIA disturbance footprint, assuming a maximum stripping depth of 0.3m, is provided in Table 27. If all soils are to be stripped to their maximum depths, the total amount of recoverable soil is outlined in Table 28.

Table 27: Volumes of soils to be recovered by SMU from the MIA disturbance footprint considering a stripping depth of 0.3m.

SMU	Soil Volume (m^3)		
	Topsoil	Subsoil	Total volume (m^3)
Deep Sands	5,108,100	5,108,100	10,216,200
Gradational Sands	196,125	196,125	392,250
Shallow Sands	-	-	-
Total	5,304,225	5,304,225	10,608,450

Table 28: Volumes of soils to be recovered by SMU from the MIA disturbance footprint considering a maximum stripping depth.

SMU	Soil Volume (m^3)		
	Topsoil	Subsoil	Total volume (m^3)
Deep Sands	5,108,100	45,972,900	51,081,000
Gradational Sands	196,125	1,765,125	1,961,250
Shallow Sands	-	-	-
Total	5,304,225	47,738,025	53,042,250

5.3.2 Road Access Corridor

Estimated total volumes of all soils classified as potential rehabilitation resources within the RAC disturbance footprint, assuming only the topsoils are to be stripped to a maximum depth of 0.15m is provided in Table 29.

Table 29: Volumes of soils to be recovered by SMU from the RAC disturbance footprint considering a stripping depth of 0.15m.

SMU	Soil Volume (m^3)		
	Topsoil	Subsoil	Total volume (m^3)
Deep Sands	1,135,680	-	1,135,680
Gradational Sands	507,390	-	507,390
Shallow Sands	-	-	-
Total	1,643,070	-	1,643,070

5.3.2.1 Rimfire bore field

Estimated total volumes of all soils classified as potential rehabilitation resources within the Rimfire bore field disturbance footprint, assuming only the topsoils are to be stripped to a maximum depth of 0.15m is provided in Table 30.

Table 30: Volumes of soils to be recovered by SMU from the Rimfire bore field disturbance footprint considering a stripping depth of 0.15m.

SMU	Soil Volume (m^3)		
	Topsoil	Subsoil	Total volume (m^3)
Deep Sands	204,990	-	204,990
Gradational Sands	51,330	-	51,330
Shallow Sands	25,406	-	25,406
Total	281,726	-	281,726

5.4 Soil stockpiling

Soils from all three SMUs have similar physical and chemical properties, with some slight differences. The differences in soil texture do not lead to different stockpiling recommendations of the three SMUs.

Stockpiling of soils for extended periods of time can lead to changes in soil quality that could pose a risk to rehabilitation success. Ideally, soils (particularly topsoils) should not be stockpiled, but rather stripped and directly replaced on prepared rehabilitation areas. Direct return of soils avoids double handling and reduces the need to create stockpile areas. Stockpiling of soils will increase the loss of organic matter, nutrients, viable seeds, and soil biology, particularly if stockpiled for longer than 12 months. Keipert (2005), for soils in the Hunter Valley, concluded that most topsoil deterioration occurred in the first 12 months of stockpiling. Soil quality decline caused by compaction is likely to be of less concern given the sandy textures of the soils at the Project.

In many cases, stockpiling of at least some of the soil resource is usually unavoidable. If soils are stockpiled, topsoils from the three SMUs can be stockpiled together due to their similar physical and chemical properties.

Any subsoils that are stockpiled should be done so separately from the topsoils. Mixing subsoils with topsoils will reduce the organic matter, nutrients, viable seeds, and soil biology of the resultant mixed soil resource; stockpiling separately avoids these deleterious outcomes.

It is recommended that topsoil stockpiles be kept as low as possible. A maximum height of 2m is often suggested, though Keipert (2005) concluded that most topsoil quality deterioration occurs in the first 12 months regardless of the height of stockpile. Subsoils stockpiles can be higher at Winu because the organic matter, nutrients, viable seed, and soil biology is naturally low (subsoils are low in these attributes naturally). Further, the soils contain very little structure, and will be less impacted by deep stockpiling.

If the available soil stockpile footprint is limited, precedence could be given to keeping topsoil stockpile heights low by increasing subsoil stockpile heights. A maximum subsoil

stockpile of 4m is recommended because stockpiles higher than this would be very prone to erosion (both wind and water). Placement of vegetation debris over the stockpiles should be considered as a mitigation measure for wind erosion.

Stockpiles should be shaped such that they are free to drain. They should not be placed in low-lying areas that could potentially be inundated. Although the soils are predominantly sandy, if inundation occurs waterlogging of stockpiled soils will potentially further reduce soil quality.

If stockpiling for longer than 12 months is planned, consideration should be given to fertilising and seeding both the topsoil and subsoil stockpiles. Soil testing prior to reuse of stockpiled soils is strongly recommended. Testing should seek to establish any fertiliser and amendment requirements at the point of soil respreading. Seed germination trials could also be conducted to guide reseeding plans.

5.5 Wind erosion

The susceptibility of a soil to wind erosion is related to the material's aggregated PSD. Other factors such as coarse fraction abundance and size and soil moisture also strongly influence wind erosion potential (Hazelton and Murphy 2016). Sandy soils (>90% sand by weight), particularly those containing fine sand, tend to have high wind erosion potential while sandy loams to clay loams have moderate wind erosion potential, and clays have low wind erosion potential. Rocky or gravelly soils also have a low wind erosion potential.

The Deep Sands, Gradational Sands and Shallow Sands all have sandy textures throughout the profile. Additionally, these soils typically have low coarse fragment abundances, meaning that they should be considered highly susceptible to wind erosion. This risk could be mitigated by covering the stockpiles in vegetation debris (branches, trunks) created while clearing. This would also ensure any seed and organic matter associated with the clear vegetation is returned to the soil (and not lost) and made available for future rehabilitation campaigns.

Wind erosion would be a risk not only when soils are stockpiled, but also when soils are respread. Mitigation of wind erosion risk for rehabilitation could be achieved the same way that wind erosion risk is mitigated for stockpiles (i.e. spreading of vegetation debris). Alternatively, soil binders or similar spray-on surface treatments could be considered as a means of managing wind erosion risk until such time as the vegetation establishes and offers protection in the medium to long term.

5.6 Water erosion

The soils within the Project area are sandy and have a low coarse fragment abundance. This makes them prone to water erosion. When stockpiled, water erosion risk could be mitigated (along with wind erosion risk) by the placement of vegetation debris on the stockpile surfaces.

When respreading these soils as part of rehabilitation works, risks associated with water erosion must be considered, particularly if the slope lengths and gradients planned for

the rehabilitation areas are longer and/or steeper than the landform currently at the Project. Soils from all SMUs could be placed on surfaces with similar slope lengths and gradients without increasing water erosion risk. Significant water erosion will likely occur if soils are to be placed on rehabilitation surfaces that are longer and/or steeper than the existing land. If this is required, additional armouring elements may be required, particularly in the early rehabilitation stages when groundcover levels are lowest. One option for armouring steeper rehabilitation areas is the placement of vegetation debris (branches, trunks) created while clearing. The level of cover and the placement of the cover would need to be informed via future water erosion studies.

5.7 Soil amendments

Total N and P, and available P and K values for soils are variable across the survey area but are considered sufficient for vegetation growth.

For rehabilitation, it is recommended to replace or supplement nutrients lost through disturbance to encourage rapid establishment of vegetation. Application of fertiliser to the topsoil and subsoil is recommended based on the loss of nutrients caused by the removal of vegetation (mostly topsoil), disturbance of the soil, and the likely respreading of topsoil in a thin layer over less fertile subsoil.

The degree to which low fertility impacts plant growth could be considered as part of greenhouse or field trials conducted once the soils are disturbed. Such trials would be beneficial in defining the required types of fertilisers and their mode of application, and in optimising the rates and timing of application.

Rates of fertilisation should be assessed once the soils are stripped and stockpiled. Once collected, data for these disturbed soils could be usefully compared against the fertility values found in this report.

5.8 Summary

The limitations, opportunities, growth media potential, erosion potential, and recommendations for use as rehabilitation materials for the soils found within each SMU are summarised in Table 31.

Table 31: Summary of the key limitations, opportunities, and suitability for rehabilitation of the soils within each SMU.

Material	Material	Limitation	Opportunities	Suitability for Rehabilitation
Deep Sands	Topsoil and subsoil	• Low abundance of coarse fragments. • High risk of wind erosion. • Risk of water erosion.	• Non-sodic • Non-saline. • pH values that support vegetation. • Fertility that typically supports vegetation.	• Stripping of the topsoils is recommended to a depth of 0.15m. • Stripping of the subsoils is recommended to a depth of either 0.3m or 1.5m within the MIA. • The topsoils and subsoils are considered to have good potential for use as a growth media in rehabilitation.
Gradational Sands	Topsoil and subsoil	• Low abundance of coarse fragments. • High risk of wind erosion. • Risk of water erosion.	• Non-sodic • Non-saline. • pH values that support vegetation. • Fertility that typically supports vegetation.	• Stripping of the topsoils is recommended to a depth of 0.15m. • Stripping of the subsoils is recommended to a depth of either 0.3m or 1.5m. • The topsoils and subsoils are considered to have good potential for use as a growth media in rehabilitation.
Shallow Sands	Topsoil and subsoil	• Stripping depth limited within the Shallow Sands. • Low abundance of coarse fragments • High risk of wind erosion. • Risk of water erosion.	• Non-saline. • Non-sodic • pH values that support vegetation. • Fertility that typically supports vegetation.	• Stripping of the topsoils is recommended to a depth of 0.15m. • The topsoils are considered to have good potential for use as a growth media in rehabilitation. • Potential for subsoil resource to be opportunistically stripped if greater volume is required.

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APPENDIX A: MATERIAL CHARACTERISATION DATA OF THE DEEP SANDS AND GRADATIONAL SANDS SMU (2020)

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Table A-1: Material Characterisation data for SMU samples sent for laboratory analysis (Landloch 2020).

Analysis		Unit	S03				S05				S09			
Depth		mm	0-100	100-400	600-800	900-1100	0-100	0400-600	800-1000	400-1800	0-50	100-300	500-700	900-1100
pH - Water		pH units	5.8	6.0	6.3	7.0	7.0	7.0	6.5	6.4	5.5	5.9	5.8	7.0
Electrical Conductivity		dS/m	0.01	0.01	0.26	0.12	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.03
Chloride		mg/kg	3	3	355	121	2	5	1	1	6	6	6	7
Total Nitrogen		mg/kg	100	<100	-	-	<100	<100	-	-	137	<100	-	-
Total Phosphorus		mg/kg	<40	<40	-	-	<40	<40	-	-	<40	<40	-	-
Available Phosphorus (Colwell)		mg/kg	30.0	31.9	-	-	23.3	28.6	-	-	29.6	35.2	-	-
Potassium (Colwell)		mg/kg	53	56	-	-	38	54	-	-	80	53	-	-
Sulphur (KCl)		mg/kg	11	7.06	-	-	7	7	-	-	8	7	-	-
Organic Carbon		%	0.3	0.2	-	-	0.1	<0.10	-	-	0.2	0.1	-	-
Trace Elements	Copper	mg/kg	0.3	<0.2	-	-	<0.2	<0.2	-	-	<0.2	<0.2	-	-
	Iron	mg/kg	2.7	1.4	-	-	1.7	1.3	-	-	4.3	2.0	-	-
	Manganese	mg/kg	4.3	1.5	-	-	3.7	1.0	-	-	7.4	3.9	-	-
	Zinc	mg/kg	<0.2	<0.2	-	-	<0.2	<0.2	-	-	<0.2	<0.2	-	-
Exchangeable Cations	ECEC	meq/100g	0.8	0.8	2.1	1.4	1.2	0.9	1.0	0.9	0.9	1.1	1.1	1.6
	Ex Sodium Percent	%	9.4	8.5	53.5	35.8	4.8	4.7	7.2	7.3	4.9	5.3	5.8	24.0
	Exchangeable Calcium	meq/100g	0.44	0.45	0.52	0.50	0.89	0.65	0.62	0.51	0.51	0.59	0.60	0.74
	Exchangeable Magnesium	meq/100g	0.19	0.23	0.37	0.33	0.18	0.15	0.24	0.25	0.21	0.32	0.31	0.41
	Exchangeable Potassium	meq/100g	0.08	0.08	0.09	0.09	0.06	0.07	0.07	0.07	0.11	0.10	0.11	0.07
	Exchangeable Sodium	meq/100g	0.07	0.07	1.14	0.52	0.06	0.04	0.07	0.07	0.04	0.06	0.06	0.39
Coarse Fraction >2mm		%	3.8	4.7	3.0	2.6	6.5	5.8	5.8	5.4	7.9	9.1	8.5	3.7
Particle Size Distribution of Fine Fraction	Coarse Sand (0.2-2.0mm)	%	63.6	59.8	51.3	46.4	60.6	55.3	53.7	50.4	57.4	55.4	57.8	60.5
	Fine Sand (0.02—0.2mm)	%	31.4	35.2	38.2	44.9	34.4	38.0	40.4	44.6	34.0	34.9	31.7	28.2
	Silt (0.002-0.02mm)	%	<0.1	<0.1	1.8	<0.1	<0.1	<0.1	<0.1	<0.1	1.8	1.8	1.9	<0.1
	Clay (<0.002mm)	%	5.0	5.0	8.7	8.7	5.0	6.7	5.9	5.0	6.7	7.9	8.7	11.4

Table A-1 continued: Material Characterisation data for SMU samples sent for laboratory analysis (Landloch 2020).

Analysis		Unit	S12				S18			
Depth		mm	0-200	200-400	400-600	600-1000	0-100	300-500	1000-1200	1700-1900
pH - Water		pH units	6.0	6.2	6.4	6.2	5.6	5.6	5.5	5.7
Electrical Conductivity		dS/m	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Chloride		mg/kg	6	6	6	6	6	6	6	6
Total Nitrogen		mg/kg	130	115	-	-	104	<100	-	-
Total Phosphorus		mg/kg	41	<40	-	-	<40	<40	-	-
Available Phosphorus (Colwell)		mg/kg	31.9	31.1	-	-	29.3	30.2	-	-
Potassium (Colwell)		mg/kg	60	69	-	-	43	48	-	-
Sulphur (KCl)		mg/kg	7	7.52	-	-	9	10	-	-
Organic Carbon		%	0.3	0.2	-	-	0.4	0.1	-	-
Trace Elements	Copper	mg/kg	<0.2	<0.2	-	-	<0.2	<0.2	-	-
	Iron	mg/kg	4.6	2.7	-	-	3.4	2.0	-	-
	Manganese	mg/kg	6.4	3.3	-	-	4.1	3.9	-	-
	Zinc	mg/kg	<0.2	<0.2	-	-	<0.2	<0.2	-	-
Exchangeable Cations	ECEC	meq/100g	1.4	1.9	1.6	2.3	0.9	0.8	0.8	0.8
	Ex Sodium Percent	%	4.0	2.4	4.3	10.1	11.0	5.3	5.6	5.8
	Exchangeable Calcium	meq/100g	0.94	0.92	1.06	1.36	0.51	0.46	0.42	0.45
	Exchangeable Magnesium	meq/100g	0.29	0.28	0.36	0.54	0.23	0.24	0.22	0.23
	Exchangeable Potassium	meq/100g	0.11	0.66	0.10	0.12	0.07	0.07	0.08	0.07
	Exchangeable Sodium	meq/100g	0.06	0.05	0.07	0.23	0.10	0.04	0.04	0.05
Coarse Fraction >2mm		%	11.5	42.1	12.5	9.0	3.9	6.9	6.4	6.2
Particle Size Distribution of Fine Fraction	Coarse Sand (0.2-2.0mm)	%	51.4	52.3	51.7	49.7	58.5	57.3	55.6	54.1
	Fine Sand (0.02—0.2mm)	%	38.4	35.7	31.7	31.8	32.8	32.4	34.9	35.4
	Silt (0.002-0.02mm)	%	<0.1	1.8	<0.1	<0.1	<0.1	<0.1	<0.1	1.8
	Clay (<0.002mm)	%	10.2	10.2	16.6	18.4	8.7	10.3	9.5	8.7

APPENDIX B: LOCATIONS OF ASSESSED GEOTECHNICAL TEST PITS

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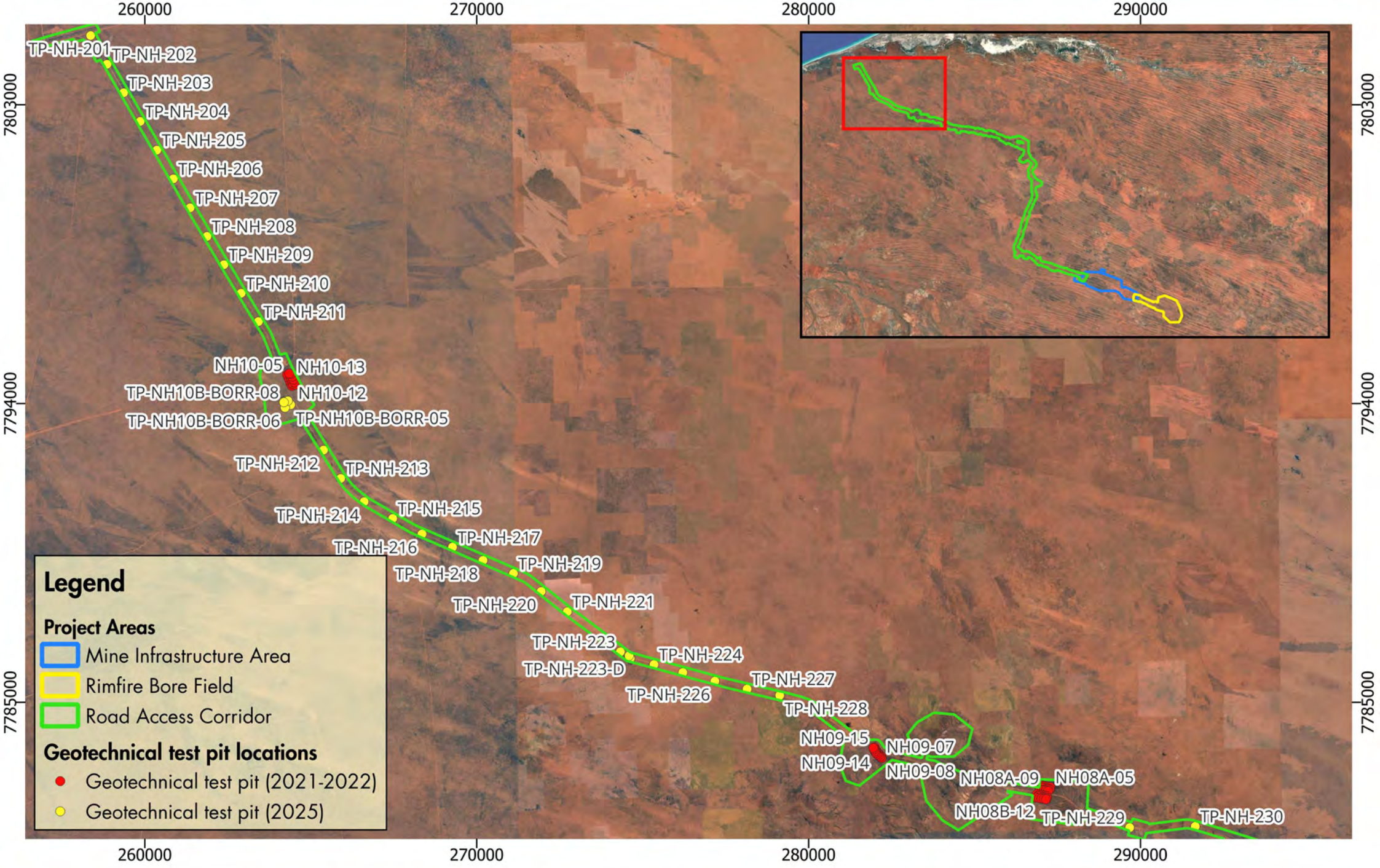


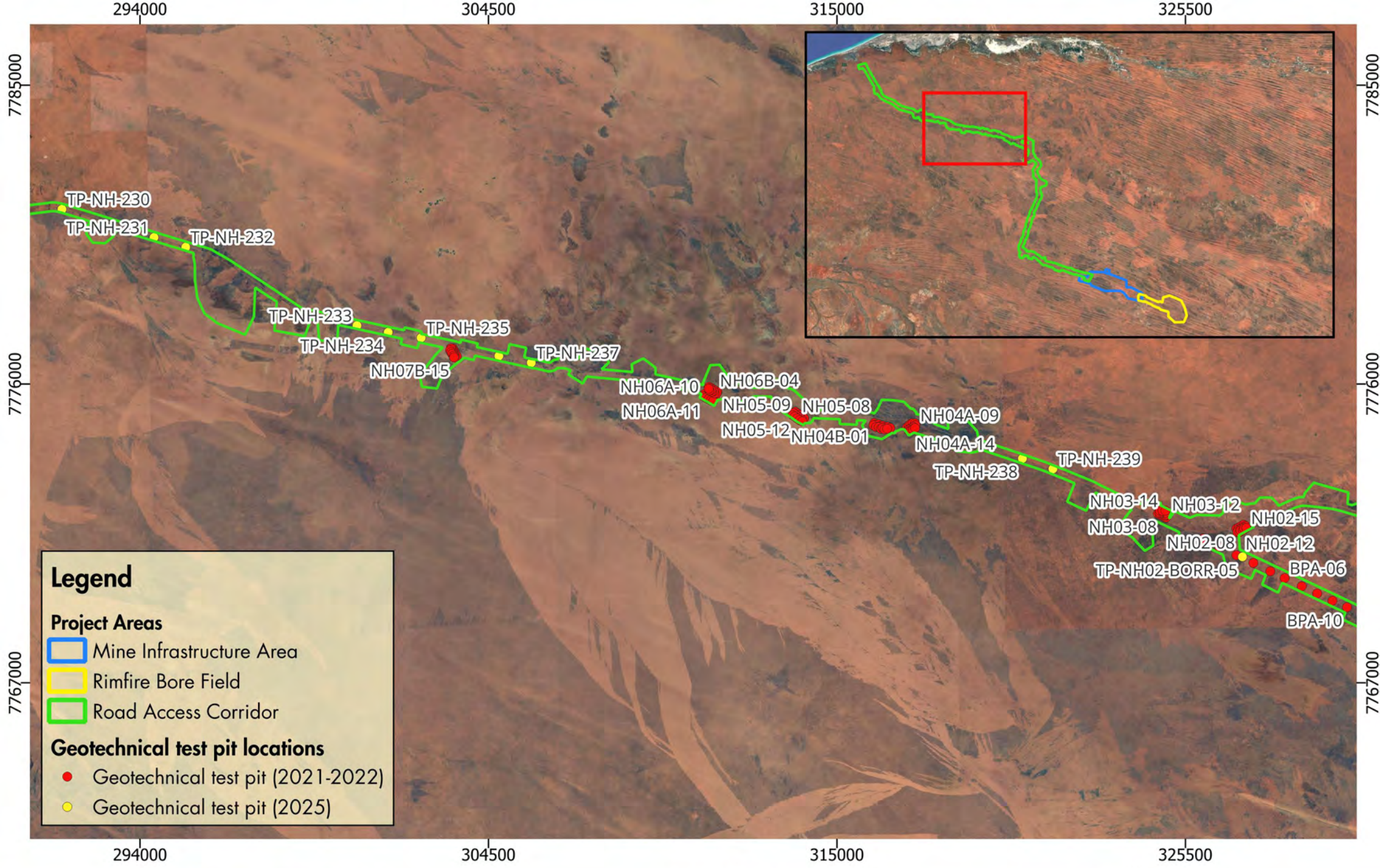
Landloch

Coordinate System: GDA 94 MGA Zone 51
Projection: Transverse Mercator
Imagery: Google satellite
Scale: 1:140,000

Winu Project
Rio Tinto Winu
Soil Characterisation

N

0 2.5 5 7.5 km



Landloch

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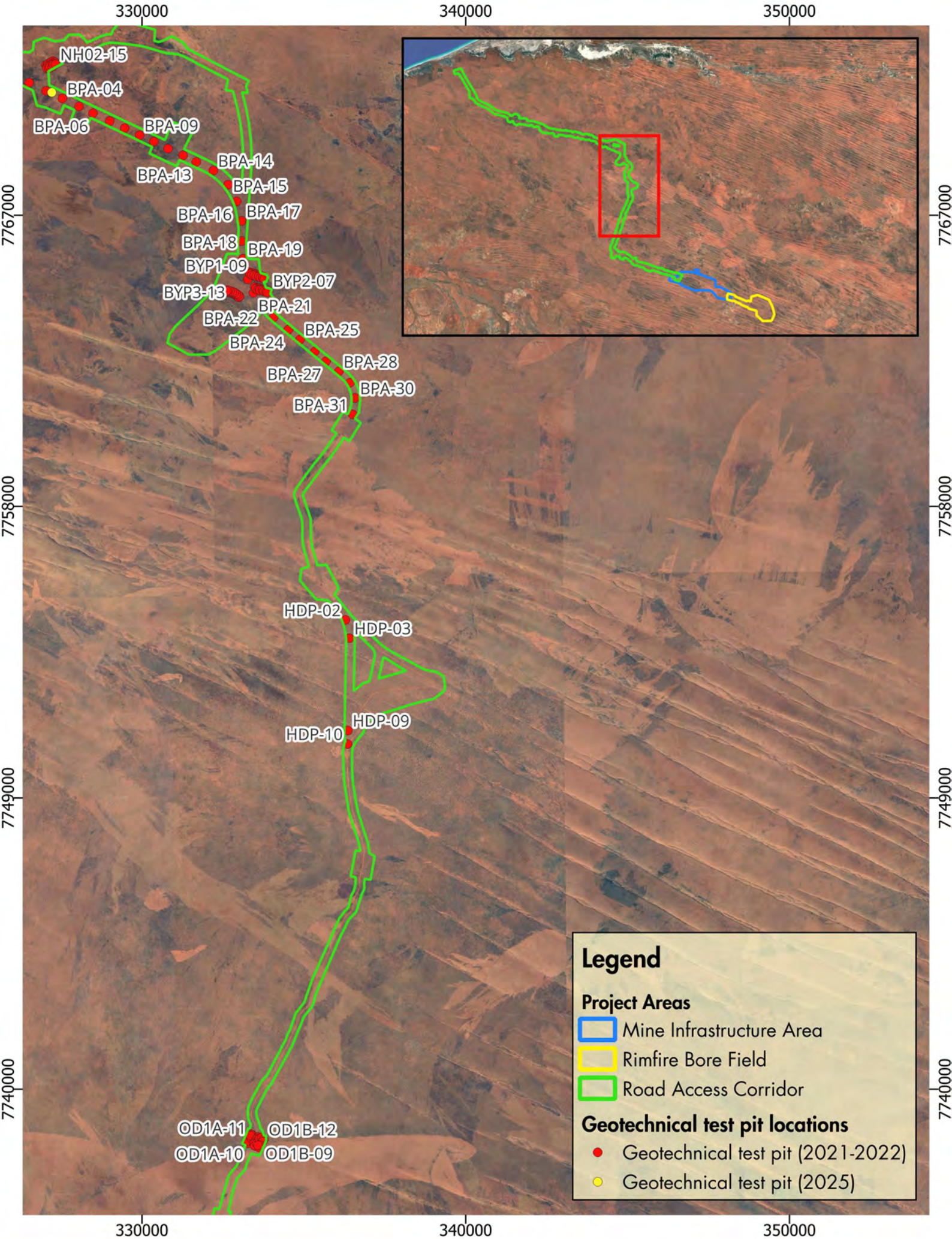
Winu Project
Rio Tinto Winu
Soil Characterisation

N

0 2.5 5 7.5 km



Landloch

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Winu Project
Rio Tinto Winu
Soil Characterisation

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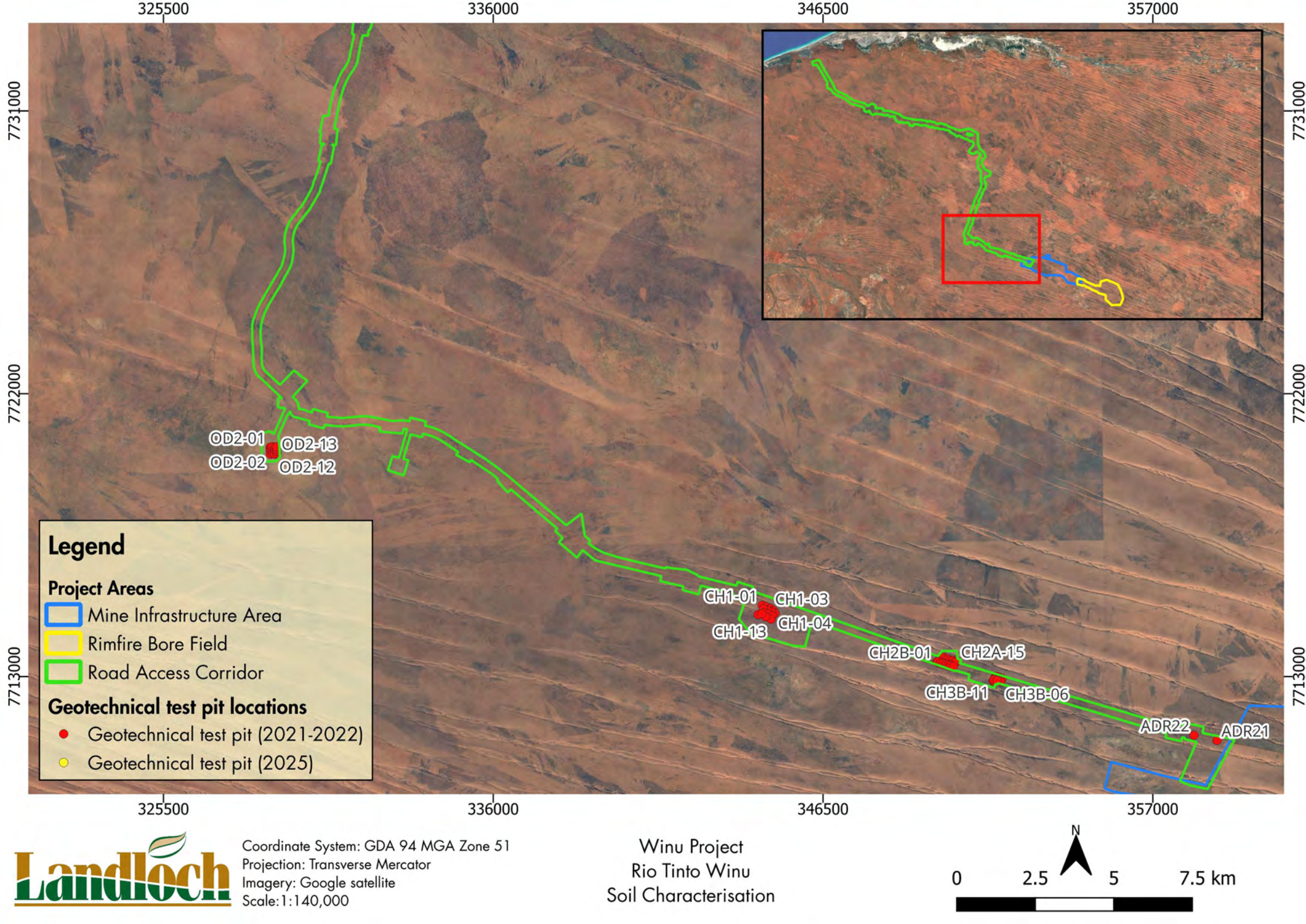
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336000
346500
357000
7731000
7722000
7713000
OD2-01
OD2-13
OD2-02
OD2-12
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CH1-03
CH1-04
CH1-13
CH2B-01
CH2A-15
CH3B-11
CH3B-06
ADR22
ADR21
Legend
Project Areas
Mine Infrastructure Area
Rimfire Bore Field
Road Access Corridor
Geotechnical test pit locations
Geotechnical test pit (2021-2022)
Geotechnical test pit (2025)
Landloch
Coordinate System: GDA 94 MGA Zone 51
Projection: Transverse Mercator
Imagery: Google satellite
Scale:1:140,000
Winu Project
Rio Tinto Winu
Soil Characterisation
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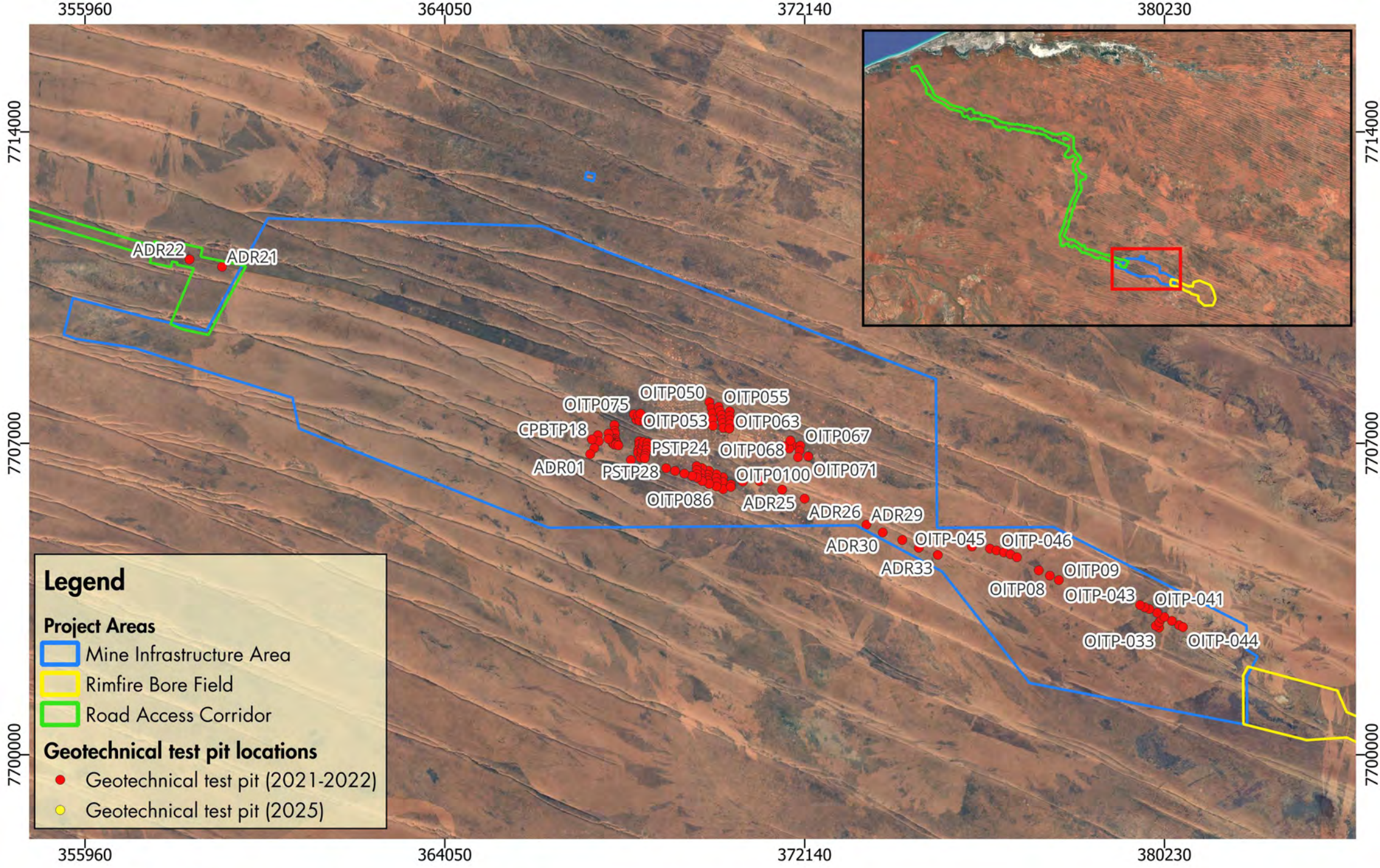
7.5 km



Landloch

Coordinate System: GDA 94 MGA Zone 51
Projection: Transverse Mercator
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Winu Project
Rio TintoWinu
Soil Characterisation

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APPENDIX C: WINU VEGETATION COMMUNITIES AND MAPPING

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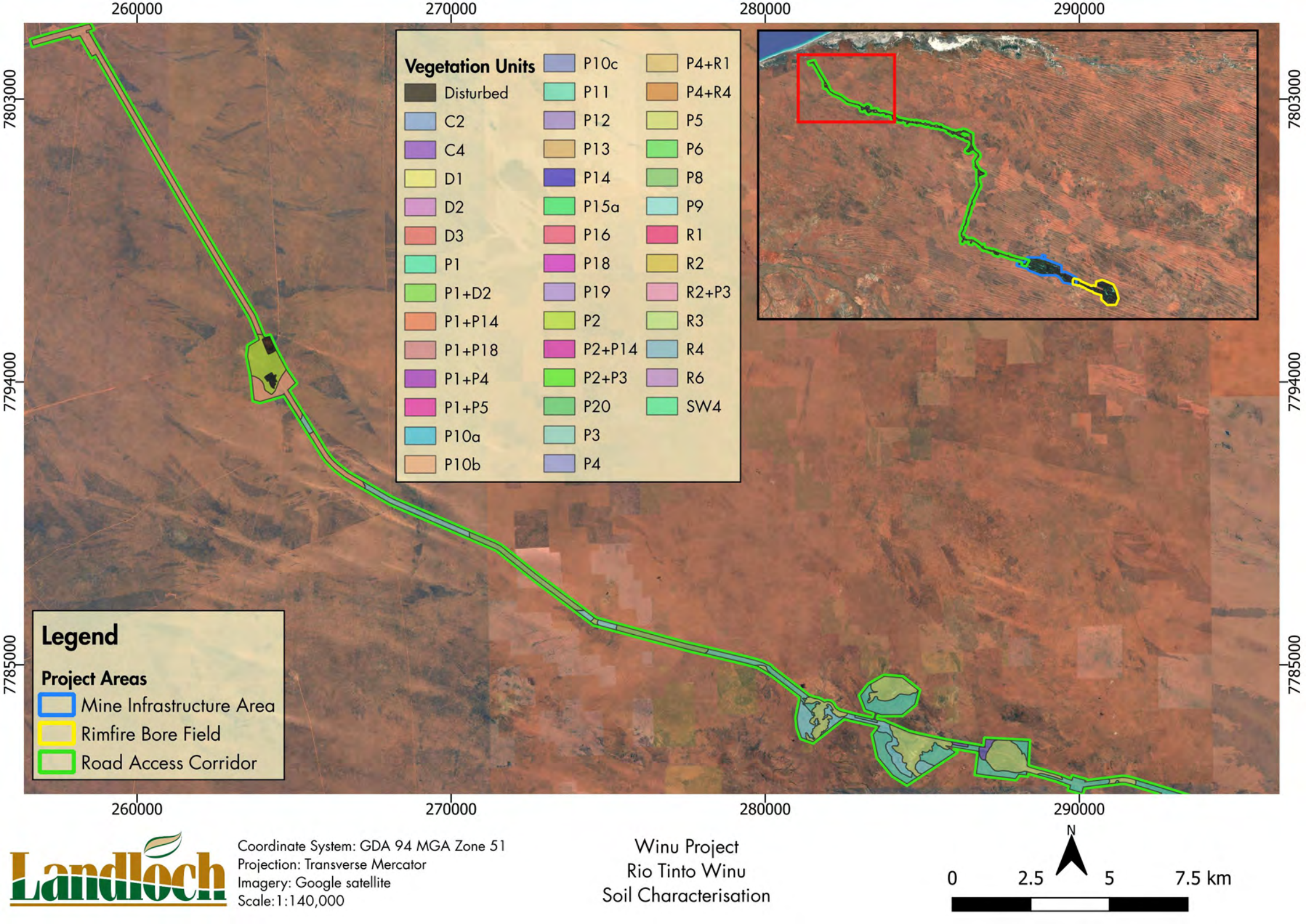
260000
270000
280000
290000
7803000
7794000
7785000
Vegetation Units
Disturbed
C2
C4
D1
D2
D3
P1
P1+D2
P1+P14
P1+P18
P1+P4
P1+P5
P10a
P10b
P10c
P11
P12
P13
P14
P15a
P16
P18
P19
P2
P2+P14
P2+P3
P20
P3
P4
P4+R1
P4+R4
P5
P6
P8
P9
R1
R2
R2+P3
R3
R4
R6
SW4
Legend
Project Areas
Mine Infrastructure Area
Rimfire Bore Field
Road Access Corridor
Landloch
Coordinate System: GDA 94 MGA Zone 51
Projection: Transverse Mercator
Imagery: Google satellite
Scale:1:140,000
Winu Project
Rio Tinto Winu
Soil Characterisation
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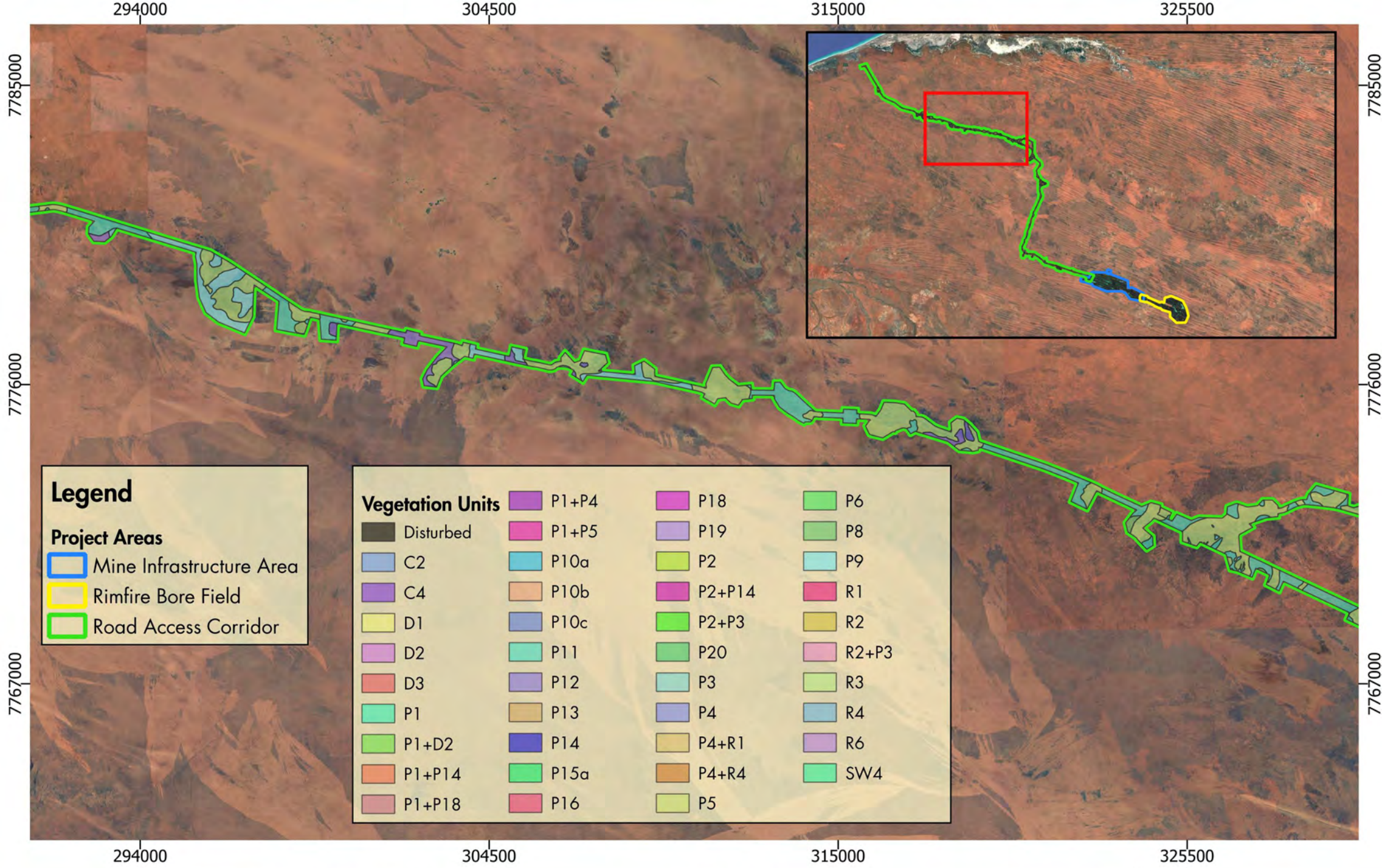
7.5 km



Landloch

Coordinate System: GDA 94 MGA Zone 51
Projection: Transverse Mercator
Imagery: Google satellite
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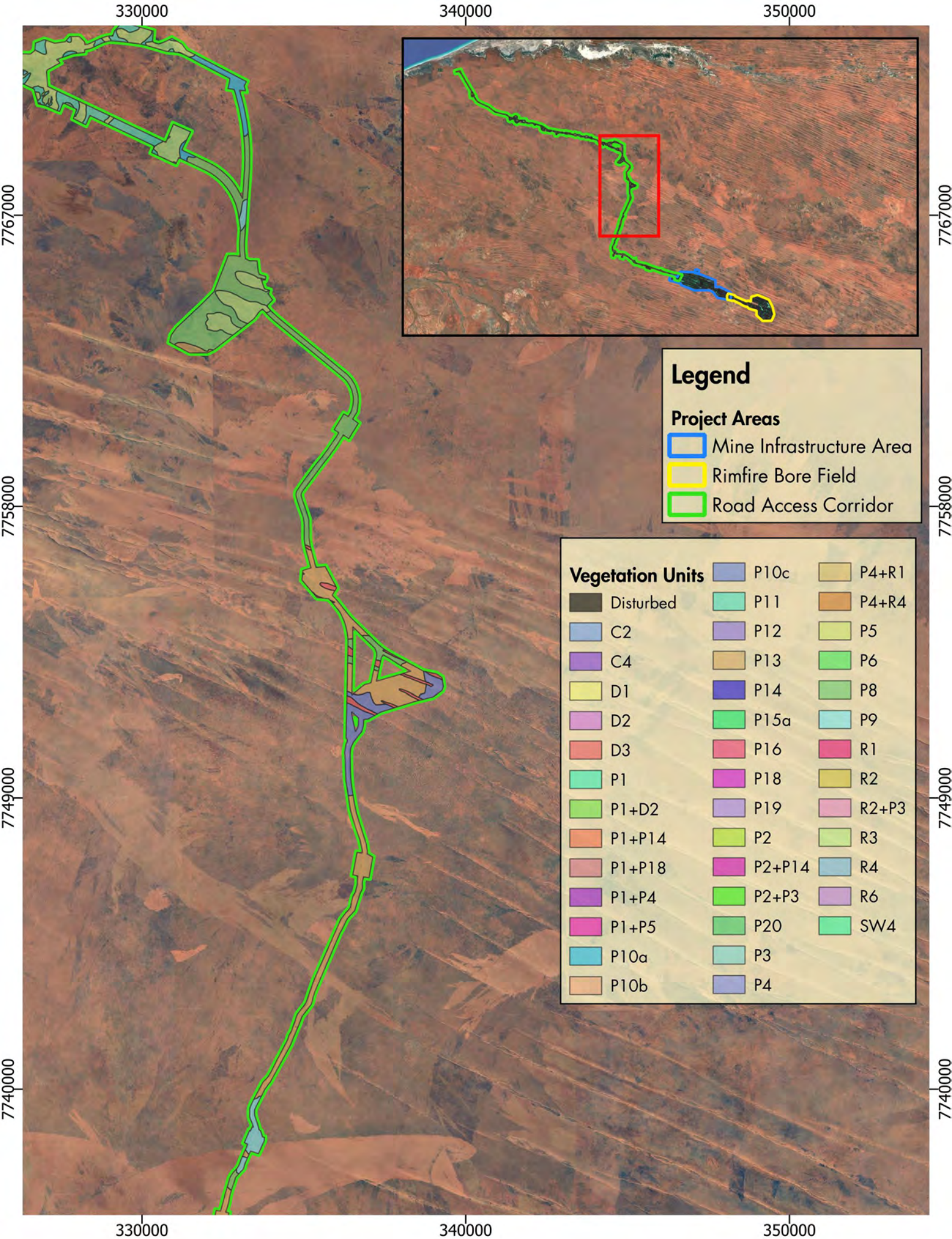
Winu Project
Rio Tinto Winu
Soil Characterisation

N

0 2.5 5 7.5 km



Landloch

Coordinate System: GDA 94 MGA Zone 51
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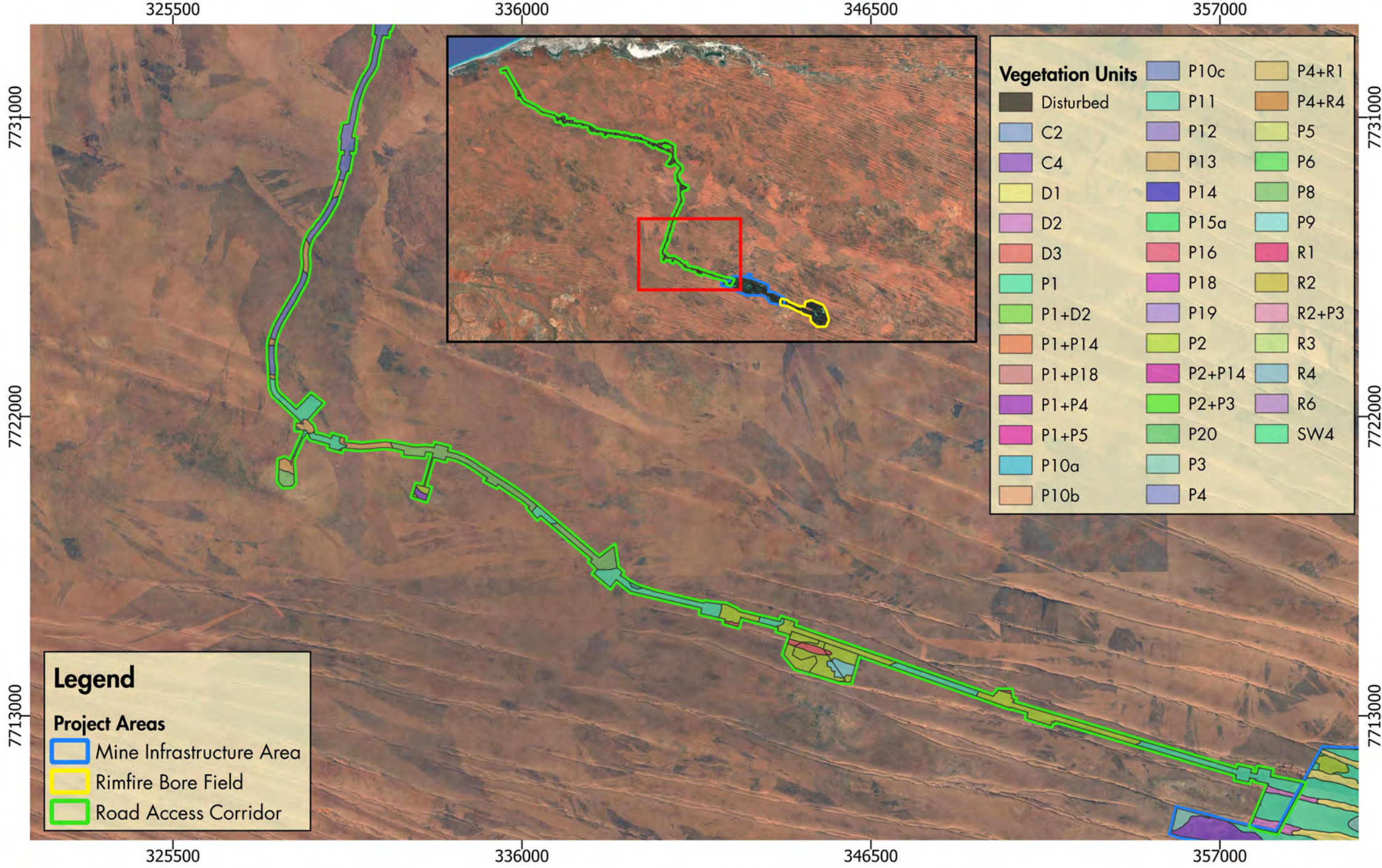
Imagery: Google satellite
Scale: 1:140,000

Winu Project
Rio Tinto Winu
Soil Characterisation

N

0 2 4 6 km



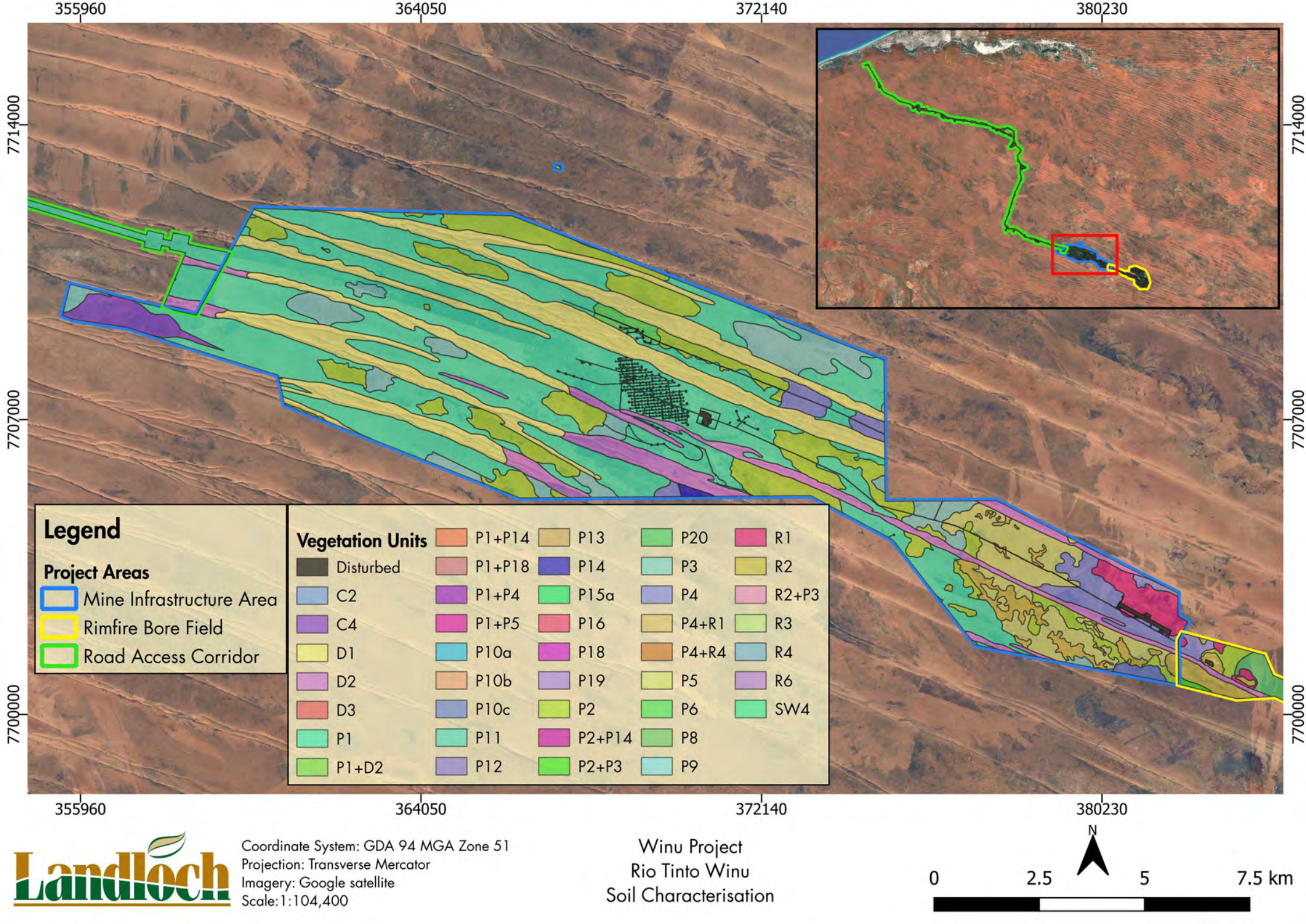
Landloch

Coordinate System: GDA 94 MGA Zone 51
Projection: Transverse Mercator
Imagery: Google satellite
Scale: 1:140,000

Winu Project
Rio Tinto Winu
Soil Characterisation

N

0 2.5 5 7.5 km



Landloch

Coordinate System: GDA 94 MGA Zone 51
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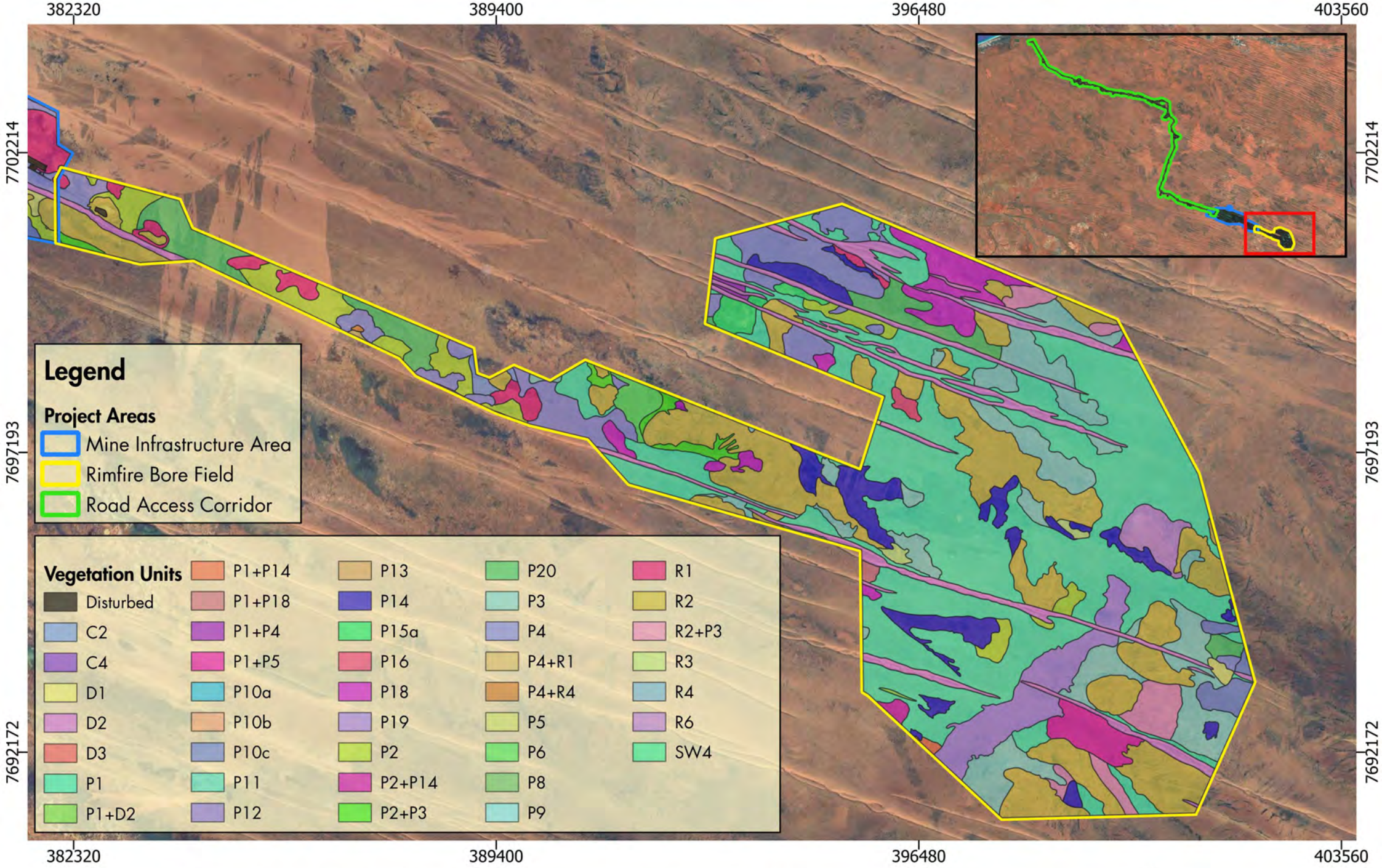
Winu Project
Rio Tinto Winu
Soil Characterisation

N

0 2.5 5 7.5 km



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Winu Project
Rio Tinto Winu
Soil Characterisation

N

0 2 4 6 km

APPENDIX D: FIELD SOIL LOG DATA SHEETS

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Site Information

Project	Date	Scribe	Location	Observation	Easting/ Latitude	Zone	ASC Mapped
2433.24b	07/03/2025	M.White	HR01	Soil pit			Tenosol

Dominant Vegetation Form	Ground Cover %	Aspect	Northing/ Longitude	Scale	ASC Ground Truth
Non-woody	Mid-dense (30-70%)				Tenosol

Secondary Vegetation Form	Ground Cover %	Slope %	Rock Outcrop	Erosion Type
Woody	Isolated Plants (<0.2%)		No rock outcrop	Wind

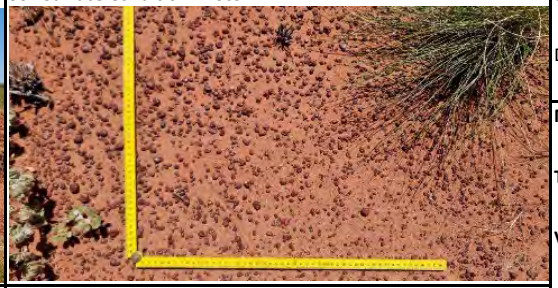
Vegetation (species)	Drainage (site)	Erosion Extent
Triodia sp.	Moderately well-drained	None evident

Landform	Soil Surface Condition (dry)	Land Use	Erosion State
Upper slope	Soft	Mining	None evident

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo



Site Type

Detailed + Sampled for Lab

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

Landscape Photo (South)

Landscape Photo (West)

Other Photo

Other Information: Surface rock cover 40% 20mm. Site dug by hand tools on a prepared pad.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-100		Clear	Clayey Sand	10R 3/4 Dusky red	Not recorded	Not recorded	10-20 % 6-20 mm	Apedal	Single grain	Loose (dry)	Many (25-200) Fine (1-2 mm)	5.7	5.9	0-50
B	100-250		Not recorded	Clayey Sand	10R 4/8 Red	Not recorded	Not recorded	50-90 % 20-60 mm	Platy	Single grain	Loose (dry)	Few (1-10) Fine (1-2 mm)	0.01	0.01	150-250

Other information: Dug by hand. Depth of refusal 250mm. 250MM+ appears more red in colour and has high levels of coarse fragments. No structure outside of surface crust.

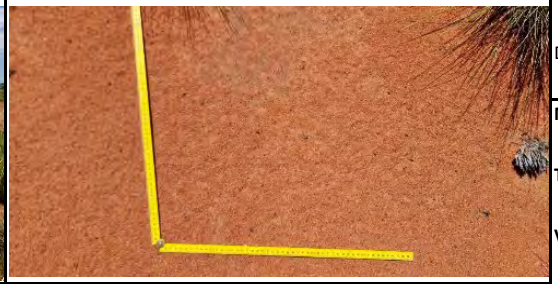
Soil Profile Description

Project 2433.24b	**Date** 06/03/2025	**Scribe** M.White	**Location** HR02	**Observation** Soil pit	**Easting/ Latitude**	**Zone**	**ASC Mapped** Tenosol
Dominant Vegetation Form Non-woody		**Ground Cover %** Mid-dense (30-70%)	**Aspect**		**Northing/ Longitude**	**Scale**	**ASC Ground Truth** Kandosol
Secondary Vegetation Form Woody		**Ground Cover %** Very sparse (0.2-10%)	**Slope %**		**Rock Outcrop** No rock outcrop	**Erosion Type** None evident	
Vegetation (species) Triodia sp.					**Drainage (site)** Moderately well-drained	**Erosion Extent** None evident	
Landform Flat		**Soil Surface Condition (dry)** Firm			**Land Use** Mining	**Erosion State** None evident	

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo



Site Type

Detailed + Sampled for Lab

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

Landscape Photo (South)

Landscape Photo (West)

Other Photo

Other Information: Negligible rock cover. Sand atop firm surface.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-150		Clear	Loamy Sand	2.5YR 2/4	Not recorded	Not recorded	<2 % 2-6 mm	Polyhedral	Weak	Very weak (dry)	Common (10-25) Fine (1-2 mm)	5.5	0.01	0-100
B1	150-400		Gradual	Loamy Sand	2.5YR 4/6	Not recorded	Not recorded	<2 % 2-6 mm	Angular blocky	Weak	Weak (moderately moist)	Few (1-10) Fine (1-2 mm)	6.2	0.01	300-400
B21	400-1000		Gradual	Clayey Sand (coarse)	2.5YR 3/6	Not recorded	Not recorded	2-10 % 2-6 mm	Apedal	Single grain	Weak (moderately moist)	No roots (0)	5.8	0.01	700-800
B22	1000-1600		Not recorded	Sandy Clay Loam	2.5YR 3/6	Not recorded	2-10 % Carbonates	10-20 % 20-60 mm	Subangular blocky	Weak	Weak (moderately moist)	No roots (0)	6.4	0.02	1200-1300

Other information:

Soil Profile Description

Project	Date	Scribe	Location	Observation	Easting/ Latitude	Zone	ASC Mapped
2433.24b	07/03/2025	M.White	HR03	Soil pit			Tenosol

Dominant Vegetation Form	Ground Cover %	Aspect	Northing/ Longitude	Scale	ASC Ground Truth
Non-woody	Mid-dense (30-70%)				Tenosol

Secondary Vegetation Form	Ground Cover %	Slope %	Rock Outcrop	Erosion Type
Woody	Sparse (10-30%)		No rock outcrop	Water

Vegetation (species)	Drainage (site)	Erosion Extent
Triodia sp.	Imperfectly drained	Moderate

Landform	Soil Surface Condition (dry)	Land Use	Erosion State
Simple slope	Firm	Mining	Partially stabilised

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo

Site Type

Detailed + Sampled for Lab

Microrelief

Type

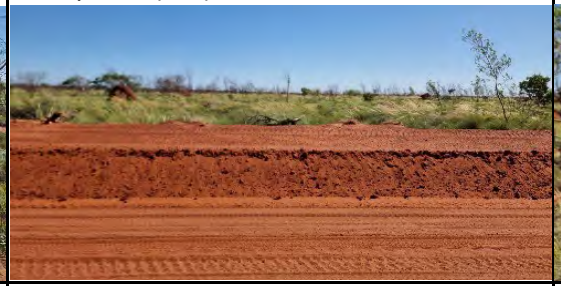
Vertical (m)

Horizontal (m)

Sampled

Landscape Photo (South)

Landscape Photo (West)



Other Photo

Other Information: Erosion from runoff caused around the constructed excavation pad. Surface rock cover negligible.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-200		Gradual	Sand	2.5YR 4/6	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	Common (10-25) Fine (1-2 mm)	6.2	0.01	0-100
B1	200-700		Clear	Sand	2.5YR 4/6	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (moderately moist)	Common (10-25) Fine (1-2 mm)	5.9	0.01	300-400
B21	700-1100		Gradual	Clayey Sand	2.5YR 3/6	Not recorded	Not recorded	50-90 % 6-20 mm	Apedal	Massive	Loose (moderately moist)	Few (1-10) Very fine (<1 mm)	5.8	0.01	800-900
B22	1100-1500		Not recorded	Clayey Sand	2.5YR 3/6	Not recorded	2-10 % Carbonates	50-90 % 20-60 mm	Apedal	Single grain	Firm (moderately moist)	No roots (0)	5.8	0.01	1200-1300

Other information: Cementing beginning at 1500mm. depth of refusal 1500mm.

Soil Profile Description

Project 2433.24b	**Date** 07/03/2025	**Scribe** M.White	**Location** HR04	**Observation** Soil pit	**Easting/ Latitude**	**Zone**	**ASC Mapped** Tenosol
Dominant Vegetation Form Non-woody			**Ground Cover %** Mid-dense (30-70%)	**Aspect**	**Northing/ Longitude**	**Scale**	**ASC Ground Truth** Kandosol
Secondary Vegetation Form Woody			**Ground Cover %** Isolated Plants (<0.2%)	**Slope %**	**Rock Outcrop** No rock outcrop	**Erosion Type** None evident	
Vegetation (species) Triodia sp.					**Drainage (site)** Moderately well-drained	**Erosion Extent** None evident	
Landform Upper slope			**Soil Surface Condition (dry)** Loose		**Land Use** Grazing	**Erosion State** None evident	

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo

Site Type

Detailed + Sampled for Lab

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

Landscape Photo (South)

Landscape Photo (West)

Other Photo

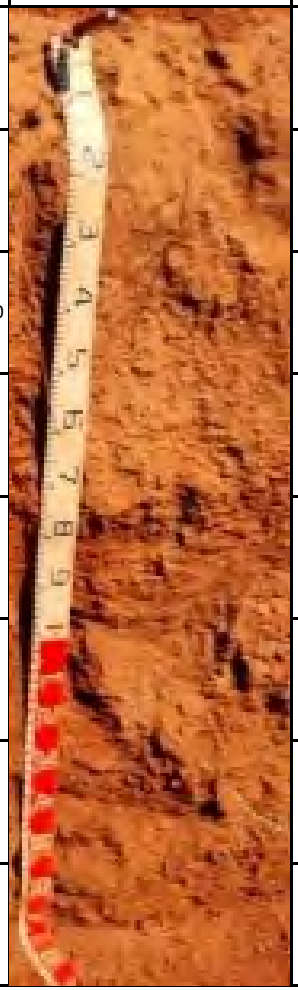
Other Information: Surface rock cover less than 10%, 2mm. Termite mounds in vecinity.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-150		Clear	Loamy Sand	2.5YR 3/6	Not recorded	Not recorded	2-10 % 2-6 mm	Apedal	Single grain	Loose (dry)	Many (25-200) Fine (1-2 mm)	5.8	0.01	0-100
B1	150-400		Clear	Loamy Sand	2.5YR 3/6	Not recorded	Not recorded	2-10 % 2-6 mm	Apedal	Single grain	Loose (moderately moist)	Common (10-25) Fine (1-2 mm)	5.7	0.01	200-300
B21	400-1000		Clear	Clay Loam, Sandy	10R 4/8	Not recorded	Not recorded	50-90 % 20-60 mm	Polyhedral	Moderate	Weak (dry)	Few (1-10) Very fine (<1 mm)	5.9	0.01	700-800
B22	1000-1700		Not recorded	Light Clay (sandy)	10R 4/6	Not recorded	Not recorded	20-50 % 6-20 mm	Polyhedral	Moderate	Weak (dry)	No roots (0)	5.7	0.01	1200-1300

Other information:

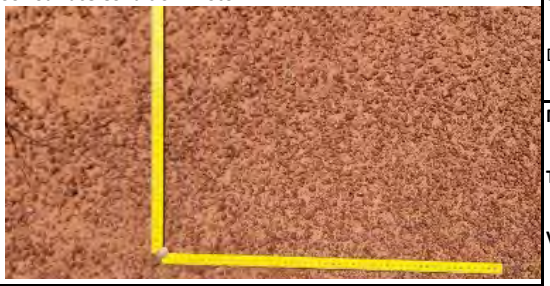
Soil Profile Description

Project 2433.24b	**Date** **06/03/2025**	**Scribe** M.White	**Location** **HR**05	**Observation** Soil pit	**Easting/ Latitude**	**Zone**	**ASC Mapped** Tenosol
Dominant Vegetation Form Non-woody			**Ground Cover %** Mid-dense (30-70%)	**Aspect**	**Northing/ Longitude**	**Scale**	**ASC Ground Truth** Kandosol
Secondary Vegetation Form Woody			**Ground Cover %** Very sparse (0.2-10%)	**Slope %**	**Rock Outcrop** No rock outcrop	**Erosion Type** Water (sheet)	
Vegetation (species) Tiodia sp.					**Drainage (site)** Moderately well-drained	**Erosion Extent** Minor or present	
Landform Mid-slope			**Soil Surface Condition (dry)** Soft		**Land Use** Pastures	**Erosion State** Partially stabilised	

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo



Site Type

Detailed + Sampled for Lab

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

Landscape Photo (South)

Landscape Photo (West)

Other Photo

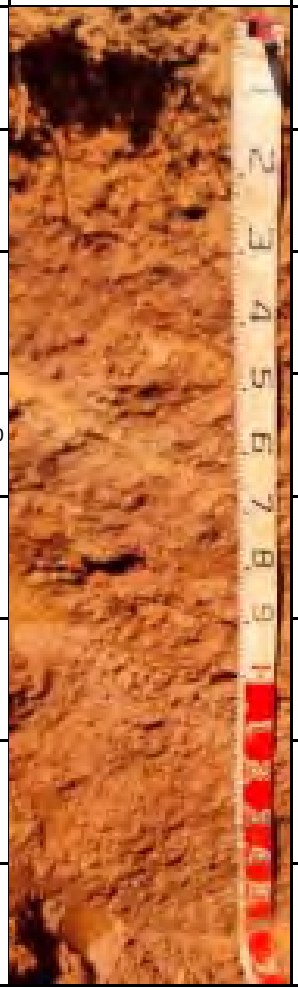
Other Information: Surface rock cover 60% 20mm. Minor water erosion present from overland flow.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-100		Clear	Sandy Loam	2.5YR 4/6	Not recorded	Not recorded	20-50 % 6-20 mm	Apedal	Single grain	Loose (dry)	Common (10-25) Fine (1-2 mm)	5.9	0.01	0-100
B1	100-400		Clear	Clayey Sand	2.5YR 5/6	Not recorded	Not recorded	50-90 % 20-60 mm	Polyhedral	Weak	Very weak (dry)	Few (1-10) Medium (2-5 mm)	6.2	0.01	300-400
B22	400-900		Clear	Clayey Sand (coarse)	2.5YR 3/6	Not recorded	Not recorded	20-50 % 20-60 mm	Polyhedral	Weak	Weak (dry)	No roots (0)	6.2	0.01	700-800
B22	900-1600		Not recorded	Sandy Clay Loam	2.5YR 4/8	10% yellow	Not recorded	50-90 % 20-60 mm	Polyhedral	Moderate	Very firm (dry)	No roots (0)	6.1	0.01	1200-1300

Other information:

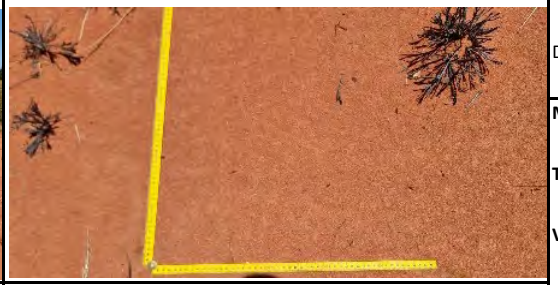
Soil Profile Description

Project 2433.24b	**Date** 07/03/2025	**Scribe** M.White	**Location** **HR**06	**Observation** Soil pit	**Easting/ Latitude**	**Zone**	**ASC Mapped** Tenosol
Dominant Vegetation Form Non-woody			**Ground Cover %** Mid-dense (30-70%)	**Aspect**	**Northing/ Longitude**	**Scale**	**ASC Ground Truth** Tenosol
Secondary Vegetation Form Woody			**Ground Cover %** Sparse (10-30%)	**Slope %**	**Rock Outcrop** No rock outcrop	**Erosion Type** None evident	
Vegetation (species) Triodia sp.					**Drainage (site)** Moderately well-drained	**Erosion Extent** None evident	
Landform Flat			**Soil Surface Condition (dry)** Soft		**Land Use** Mining	**Erosion State** None evident	

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo



Site Type

Detailed + Sampled for Lab

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

Landscape Photo (South)

Landscape Photo (West)

Other Photo

Other Information: Negligible rock cover. Increased tree density in comparison to other HR sites.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-150		Gradual	Loamy Sand	10R 3/6	Not recorded	Not recorded	0	Polyhedral	Weak	Weak (dry)	Many (25-200) Fine (1-2 mm)	6.1	0.01	0-100
B1	150-500		Diffuse	Loamy Sand	10R 1/2	Not recorded	Not recorded	0	Apedal	Single grain	Loose (dry)	Few (1-10) Medium (2-5 mm)	6.1	0.01	300-400
B2	500-1800		Not recorded	Clayey Sand	10R 1/2	Not recorded	Not recorded	0	Apedal	Single grain	Loose (dry)	No roots (0) Not recorded	6.2	0.02	1200-1300

Other information:

Soil Profile Description

Project 2433.24b	**Date** 08/03/2025	**Scribe** M.White	**Location** **RF01**	**Observation** Existing vertical exposure	**Easting/ Latitude**	**Zone**	**ASC Mapped** Tenosol
Dominant Vegetation Form Non-woody			**Ground Cover %** Mid-dense (30-70%)	**Aspect**	**Northing/ Longitude**	**Scale**	**ASC Ground Truth** Tenosol
Secondary Vegetation Form Woody			**Ground Cover %** Very sparse (0.2-10%)	**Slope %**	**Rock Outcrop** No rock outcrop	**Erosion Type** None evident	
Vegetation (species) Triodia sp.					**Drainage (site)** Well-drained	**Erosion Extent** None evident	
Landform Flat			**Soil Surface Condition (dry)** Loose		**Land Use** Mining	**Erosion State** None evident	

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo

Site Type

Detailed + Sampled for Lab

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

Landscape Photo (South)

Landscape Photo (West)

Other Photo

Other Information: Site of a drill pad. Side wall of sump inspected. Negligible surface rock cover.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-100		Clear	Clayey Sand	2.5YR 5/8	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	Few (1-10) Very fine (<1 mm)	6.0	0.01	0-100
B1	100-600		Gradual	Clayey Sand	2.5YR 6/8	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	Few (1-10) Very fine (<1 mm)	5.5	0.01	300-400
B2	600-1100		Not recorded	Clayey Sand	2.5YR 6/8	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	No roots (0)	5.5	0.01	800-900

Other information:

Soil Profile Description

Project	Date	Scribe	Location	Observation	Easting/ Latitude	Zone	ASC Mapped
2433.24b	08/30/2025	M.White	**RF02**	Existing vertical exposure			Tenosol
Dominant Vegetation Form	Non-woody	**Ground Cover %**	Mid-dense (30-70%)	**Aspect**	**Northing/ Longitude**	**Scale**	**ASC Ground Truth** Tenosol
Secondary Vegetation Form	Woody	**Ground Cover %**	Isolated Plants (<0.2%)	**Slope %**	**Rock Outcrop** No rock outcrop	**Erosion Type**	None evident
Vegetation (species)	Triodia sp.				**Drainage (site)** Well-drained	**Erosion Extent**	None evident
Landform	Flat	**Soil Surface Condition (dry)**			**Land Use** Mining	**Erosion State**	None evident

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo

Site Type

Detailed + Sampled for Lab

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

Landscape Photo (South)

Landscape Photo (West)

Other Photo

Other Information: Negligible rock cover.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-100		Clear	Clayey Sand	2.5YR 5/8	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Firm (dry)	Few (1-10) Very fine (<1 mm)	5.6	0.01	0-100
B	100-500		Diffuse	Clayey Sand	2.5YR 6/8	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Firm (dry)	No roots (0)	5.9	0.01	300-400
B2	500-1000		Not recorded	Clayey Sand	2.5YR 5/8	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Firm (dry)	No roots (0)	5.5	0.01	600-700

Other information: 0-1000mm investigated due to waterline of drill spoil present at 1000mm. Exposed sump wall asssessed.

Soil Profile Description

Project	Date	Scribe	Location	Observation	Easting/ Latitude	Zone	ASC Mapped
2433.24b	08/03/2025	M.White	**RF03**	Existing vertical exposure			Tenosol

Dominant Vegetation Form	Ground Cover %	Aspect	Northing/ Longitude	Scale	ASC Ground Truth
Non-woody	Mid-dense (30-70%)				Tenosol

Secondary Vegetation Form	Ground Cover %	Slope %	Rock Outcrop	Erosion Type
Woody	Sparse (10-30%)		No rock outcrop	None evident

Vegetation (species)	Drainage (site)	Erosion Extent
Triodia sp.	Moderately well-drained	None evident

Landform	Soil Surface Condition (dry)	Land Use	Erosion State
Flat	Loose	Mining	None evident

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo

Site Type

Detailed + Sampled for Lab

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

Landscape Photo (South)

Landscape Photo (West)

Other Photo

Other Information: Negligible rock cover.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-100		Gradual	Clayey Sand	2.5YR 5/6	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	Few (1-10) Very fine (<1 mm)	6.3	0.01	0-100
B	100-300		Gradual	Clayey Sand	2.5YR 5/6	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	No roots (0)	6.2	0.03	200-300
B2	300-600		Not recorded	Clayey Sand	10YR 4/8	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	No roots (0)	6.6	0.03	400-500

Other information: Exposed sump wall with no roots appearing in any horizon. Undisturbed area has semi-dense vegetation.

Soil Profile Description

Project	Date	Scribe	Location	Observation	Easting/ Latitude	Zone	ASC Mapped
2433.24b	08/03/2025	M.White	RF04	Existing vertical exposure			Tenosol

Dominant Vegetation Form	Ground Cover %	Aspect	Northing/ Longitude	Scale	ASC Ground Truth
Woody	Mid-dense (30-70%)				Tenosol

Secondary Vegetation Form	Ground Cover %	Slope %	Rock Outcrop	Erosion Type
Non-woody	Sparse (10-30%)		No rock outcrop	None evident

Vegetation (species)	Drainage (site)	Erosion Extent
	Imperfectly drained	None evident

Landform	Soil Surface Condition (dry)	Land Use	Erosion State
Lower slope	Surface crust	Mining	None evident

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo

Site Type

Detailed + Sampled for Lab

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

Landscape Photo (South)

Landscape Photo (West)

Other Photo

Other information: Surface rock cover 40% 20mm.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-100		Clear	Clayey Sand	2.5YR 5/6	Not recorded	Not recorded	20-50 % 6-20 mm	Apedal	Single grain	Loose (dry)	Common (10-25) Very fine (<1 mm)	5.8	0.01	0-100
B1	100-300		Gradual	Clayey Sand	2.5YR 5/8	Not recorded	Not recorded	50-90 % 6-20 mm	Apedal	Single grain	Loose (dry)	No roots (0)	5.7	0.01	200-300
B2	300-600		Not recorded	Clayey Sand	2.5YR 5/8	Not recorded	Not recorded	50-90 % 6-20 mm	Apedal	Single grain	Loose (dry)	No roots (0)	5.9	0.01	400-500

Other information: Exposed sump wall 600mm deep. Rocky sand. No appreciable clay.

Soil Profile Description

Project	Date	Scribe	Location	Observation	Easting/ Latitude	Zone	ASC Mapped
2433.24b	08/03/2025	M.White	RF05	Existing vertical exposure			Tenosol

Dominant Vegetation Form	Ground Cover %	Aspect	Northing/ Longitude	Scale	ASC Ground Truth
Non-woody	Mid-dense (30-70%)				Kandosol

Secondary Vegetation Form	Ground Cover %	Slope %	Rock Outcrop	Erosion Type
Woody	Sparse (10-30%)		No rock outcrop	None evident

Vegetation (species)	Drainage (site)	Erosion Extent
Triodia sp.	Moderately well-drained	None evident

Landform	Soil Surface Condition (dry)	Land Use	Erosion State
Flat	Loose	Mining	None evident

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo

Site Type

Detailed + Sampled for Lab

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

Landscape Photo (South)

Landscape Photo (West)

Other Photo

Other Information: Surface rock cover 10% 2mm.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-100		Clear	Clayey Sand	2.5YR 4/8	Not recorded	Not recorded	20-50 % 6-20 mm	Apedal	Single grain	Loose (dry)	Common (10-25) Very fine (<1 mm)	6.6	0.01	0-100
B1	100-600		Gradual	Clayey Sand	2.5YR 4/8	Not recorded	Not recorded	50-90 % 6-20 mm	Apedal	Single grain	Loose (dry)	No roots (0)	6.4	0.01	300-400
B2	600-1200		Not recorded	Sandy Loam	2.5YR 4/8	Not recorded	Not recorded	50-90 % 6-20 mm	Apedal	Single grain	Firm (dry)	No roots (0)	6.6	0.02	800-900

Other information: Potentially contaminated, waste staining evident and deep.

Soil Profile Description

Project 2433.24b	**Date** 08/03/2025	**Scribe** M.White	**Location** **RF06**	**Observation** Existing vertical exposure	**Easting/ Latitude**	**Zone**	**ASC Mapped** Tenosol
Dominant Vegetation Form Non-woody			**Ground Cover %** Mid-dense (30-70%)	**Aspect**	**Northing/ Longitude**	**Scale**	**ASC Ground Truth** Rudosol
Secondary Vegetation Form Woody			**Ground Cover %** Sparse (10-30%)	**Slope %**	**Rock Outcrop** No rock outcrop	**Erosion Type** None evident	
Vegetation (species) Triodia sp.					**Drainage (site)** Moderately well-drained	**Erosion Extent** None evident	
Landform Simple slope			**Soil Surface Condition (dry)** Loose		**Land Use** Mining	**Erosion State** None evident	

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo

Site Type

Detailed + Sampled for Lab

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

Landscape Photo (South)

Landscape Photo (West)

Other Photo

Other Information: Increased tree density similar to other rocky sites. Spinifex dominated . Suface rock cover 2% 2mm.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-100		Clear	Loamy Sand	5YR 5/8	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	Many (25-200) Fine (1-2 mm)	6.2	0.01	0-150
B	100-250		Sharp	Loamy Sand	5YR 5/6	Not recorded	Not recorded	2-10 % 6-20 mm	Apedal	Single grain	Weak (dry)	Common (10-25) Fine (1-2 mm)	6.2	0.01	100-200
C	250+		Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not sampled

Other information: Sand atop concreted ironstone or laterite. Pebbles of the C horizon present in B horizon.

Soil Profile Description

Project	Date	Scribe	Location	Observation	Easting/ Latitude	Zone	ASC Mapped
2433.24b	08/03/2025	M.White	RF07	Existing vertical exposure			Tenosol

Dominant Vegetation Form	Ground Cover %	Aspect	Northing/ Longitude	Scale	ASC Ground Truth
Non-woody	Mid-dense (30-70%)				Tenosol

Secondary Vegetation Form	Ground Cover %	Slope %	Rock Outcrop	Erosion Type
Woody	Sparse (10-30%)		No rock outcrop	None evident

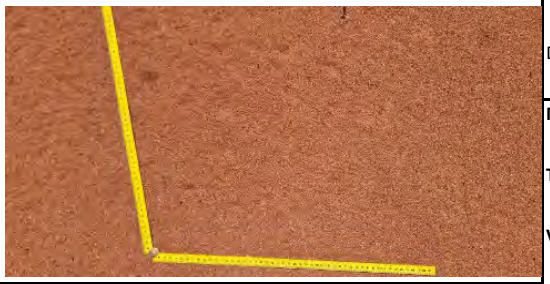
Vegetation (species)	Drainage (site)	Erosion Extent
Triodia sp.	Moderately well-drained	None evident

Landform	Soil Surface Condition (dry)	Land Use	Erosion State
Flat	Loose	Mining	None evident

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo



Site Type

Detailed + Sampled for Lab

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

Landscape Photo (South)

Landscape Photo (West)

Other Photo

Other Information: On a slope down from RF06. Negligible rock cover.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-100		Gradual	Clayey Sand	2.5YR 4/8	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Very weak (dry)	Common (10-25) Fine (1-2 mm)	6.0	0.02	0-100
B1	100-500		Gradual	Clayey Sand	2.5YR 4/8	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Very weak (dry)	Few (1-10) Fine (1-2 mm)	6.0	0.02	200-300
B2	400-800		Not recorded	Clayey Sand	2.5YR 4/8	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Very weak (dry)	No roots (0)	5.5	0.02	500-600

Other information: Exavated sump wall assessed. Clear contamination present from at 850mm. Consistent sand to 850mm.

Soil Profile Description

Project	Date	Scribe	Location	Observation	Easting/ Latitude	Zone	ASC Mapped
2433.24b	08/03/2025	M.White	RF08	Existing vertical exposure			Tenosol

Dominant Vegetation Form	Ground Cover %	Aspect	Northing/ Longitude	Scale	ASC Ground Truth
Non-woody	Mid-dense (30-70%)				Rudosol

Secondary Vegetation Form	Ground Cover %	Slope %	Rock Outcrop	Erosion Type
Woody	Sparse (10-30%)		No rock outcrop	None evident

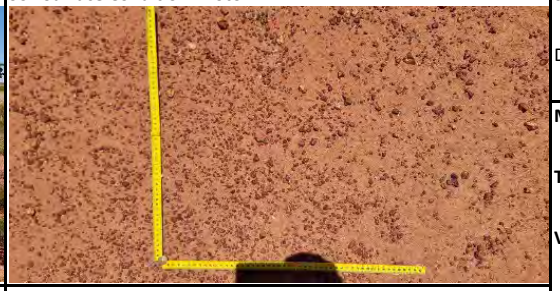
Vegetation (species)	Drainage (site)	Erosion Extent
Triodia sp.	Moderately well-drained	None evident

Landform	Soil Surface Condition (dry)	Land Use	Erosion State
Simple slope	Firm	Mining	None evident

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo



Site Type

Detailed + Sampled for Lab

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

Landscape Photo (South)

Landscape Photo (West)

Other Photo

Other Information: Surface rock cover 40% 20mm.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-100		Clear	Clayey Sand	2.5YR 4/8	Not recorded	Not recorded	2-10 % 2-6 mm	Apedal	Single grain	Loose (dry)	Many (25-200) Fine (1-2 mm)	5.4	0.01	0-100
BC	100-300		Clear	Clayey Sand	2.5YR 3/6	Not recorded	Not recorded	50-90 % 6-20 mm	Apedal	Single grain	Loose (dry)	Few (1-10) Fine (1-2 mm)	5.9	0.01	200-300
C	300-1000+		Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not sampled

Other information:

Soil Profile Description

Project 2433.24b	**Date** 08/03/2025	**Scribe** M.White	**Location** RF09	**Observation** Existing vertical exposure	**Easting/ Latitude**	**Zone**	**ASC Mapped** Tenosol
Dominant Vegetation Form Non-woody			**Ground Cover %** Mid-dense (30-70%)	**Aspect**	**Northing/ Longitude**	**Scale**	**ASC Ground Truth** Tenosol
Secondary Vegetation Form Woody			**Ground Cover %** Sparse (10-30%)	**Slope %**	**Rock Outcrop** No rock outcrop	**Erosion Type** None evident	
Vegetation (species) Triodia sp.					**Drainage (site)** Well-drained	**Erosion Extent** None evident	
Landform Flat			**Soil Surface Condition (dry)** Loose		**Land Use** Mining	**Erosion State** None evident	

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo

Site Type

Detailed + Sampled for Lab

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

Landscape Photo (South)

Landscape Photo (West)

Other Photo

Other Information: Negligible rock cover.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-100		Gradual	Clayey Sand	2.5YR 4/8	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	Common (10-25) Fine (1-2 mm)	5.4	0.01	0-100
B1	100-400		Gradual	Clayey Sand	2.5YR 4/6	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	Common (10-25) Fine (1-2 mm)	5.6	0.01	300-400
B2	400-1000		Not recorded	Clayey Sand	2.5YR 4/6	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	No roots (0)	5.5	0.01	700-800

Other information: Few coarse roots in A and B1.

Soil Profile Description

Project	Date	Scribe	Location	Observation	Easting/ Latitude	Zone	ASC Mapped
2433.24b	08/03/2025	M.White	RF10	Existing vertical exposure			Tenosol

Dominant Vegetation Form	Ground Cover %	Aspect	Northing/ Longitude	Scale	ASC Ground Truth
Non-woody	Mid-dense (30-70%)				Tenosol

Secondary Vegetation Form	Ground Cover %	Slope %	Rock Outcrop	Erosion Type
Woody	Sparse (10-30%)		No rock outcrop	None evident

Vegetation (species)	Drainage (site)	Erosion Extent
Triodia sp.	Well-drained	None evident

Landform	Soil Surface Condition (dry)	Land Use	Erosion State
Flat	Loose	Mining	None evident

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo

Site Type

Detailed + Sampled for Lab

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

Landscape Photo (South)

Landscape Photo (West)

Other Photo

Other Information: Negligible rock cover.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-100		Clear	Clayey Sand	2.5YR 4/8	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	Common (10-25) Fine (1-2 mm)	6.0	0.01	0-100
B1	100-500		Diffuse	Clayey Sand	2.5YR 4/6	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	Few (1-10) Fine (1-2 mm)	6.0	0.01	300-400
B2	500-1100		Not recorded	Clayey Sand	2.5YR 4/6	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	No roots (0)	6.0	0.01	800-900

Other information: Clear contamination present from 1m. Sump wall inspected.

Soil Profile Description

Project	Date	Scribe	Location	Observation	Easting/ Latitude	Zone	ASC Mapped
2433.24b	09/03/2025	M.White	RF11	Existing vertical exposure			Tenosol

Dominant Vegetation Form	Ground Cover %	Aspect	Northing/ Longitude	Scale	ASC Ground Truth
Non-woody	Mid-dense (30-70%)				Tenosol

Secondary Vegetation Form	Ground Cover %	Slope %	Rock Outcrop	Erosion Type
Woody	Sparse (10-30%)		No rock outcrop	None evident

Vegetation (species)	Drainage (site)	Erosion Extent
Triodia sp.	Well-drained	None evident

Landform	Soil Surface Condition (dry)	Land Use	Erosion State
Flat	Loose	Mining	None evident

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo

Site Type

Detailed + Sampled for Lab

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

Landscape Photo (South)

Landscape Photo (West)

Other Photo

Other information: Negligible rock cover.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-100		Clear	Clayey Sand	2.5YR 4/8	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	Common (10-25) Fine (1-2 mm)	6.0	0.0	0-100
B1	100-500		Gradual	Clayey Sand	2.5YR 5/8	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	Few (1-10) Medium (2-5 mm)	6.0	0.0	300-400
B2	500-850		Not recorded	Clayey Sand	2.5YR 5/8	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	No roots (0)	6.0	0.0	700-800

Other information: Sump wall inspected, potential contamination present.

Soil Profile Description

Project	Date	Scribe	Location	Observation	Easting/ Latitude	Zone	ASC Mapped
2433.24b	09/03/2025	M.White	RF12	Existing vertical exposure			Tenosol

Dominant Vegetation Form	Ground Cover %	Aspect	Northing/ Longitude	Scale	ASC Ground Truth
Non-woody	Mid-dense (30-70%)				Tenosol

Secondary Vegetation Form	Ground Cover %	Slope %	Rock Outcrop	Erosion Type
Woody	Sparse (10-30%)		No rock outcrop	None evident

Vegetation (species)	Drainage (site)	Erosion Extent
Triodia sp.	Well-drained	None evident

Landform	Soil Surface Condition (dry)	Land Use	Erosion State
Lower slope	Soft	Mining	None evident

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo

Site Type

Detailed + Sampled for Lab

Landscape Photo (South)

Landscape Photo (West)

Other Photo

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

Other Information: Negligible rock cover.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-100		Clear	Clayey Sand	2.5YR 5/8	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	Common (10-25) Fine (1-2 mm)	6.0	0.01	0-100
B1	100-500		Gradual	Clayey Sand	2.5YR 6/8	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	Few (1-10) Very fine (<1 mm)	6.0	0.01	300-400
B2	500-800		Not recorded	Clayey Sand	2.5YR 6/8	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	No roots (0)	6.0	0.01	600-700

Other information: Sump location, exposed side wall has degraded. Fairly uniform sand.

Soil Profile Description

Project	Date	Scribe	Location	Observation	Easting/ Latitude	Zone	ASC Mapped
2433.24b	09/03/2025	M.White	RF03	Existing vertical exposure			Tenosol

Dominant Vegetation Form	Ground Cover %	Aspect	Northing/ Longitude	Scale	ASC Ground Truth
Non-woody	Mid-dense (30-70%)				Kandosol

Secondary Vegetation Form	Ground Cover %	Slope %	Rock Outcrop	Erosion Type
Woody	Sparse (10-30%)		No rock outcrop	None evident

Vegetation (species)	Drainage (site)	Erosion Extent
Triodia sp.	Imperfectly drained	None evident

Landform	Soil Surface Condition (dry)	Land Use	Erosion State
Lower slope	Soft	Mining	None evident

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo

Site Type

Detailed + Sampled for Lab

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

Landscape Photo (South)

Landscape Photo (West)

Other Photo

Other Information: Surface rock cover 80% 20mm. Site downhill of large sand dune.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-100		Clear	Clayey Sand	2.5YR 4/8	Not recorded	Not recorded	2-10 % 6-20 mm	Apedal	Single grain	Loose (dry)	Common (10-25) Very fine (<1 mm)	5.8	0.01	0-100
B1	100-300		Clear	Clayey Sand	2.5YR 5/8	Not recorded	Not recorded	10-20 % 6-20 mm	Apedal	Single grain	Loose (dry)	Few (1-10) Fine (1-2 mm)	6.1	0.01	200-300
B2	300-700		Clear	Sandy Loam	2.5YR 5/8	Not recorded	Not recorded	50-90 % 6-20 mm	Apedal	Single grain	Loose (dry)	Few (1-10) Fine (1-2 mm)	5.9	0.01	500-600
BC	700+		Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not sampled

Other information:

Soil Profile Description

Project	Date	Scribe	Location	Observation	Easting/ Latitude	Zone	ASC Mapped
2433.24b	09/03/2025	M.White	RF14	Existing vertical exposure			Tenosol

Dominant Vegetation Form	Ground Cover %	Aspect	Northing/ Longitude	Scale	ASC Ground Truth
Non-woody	Mid-dense (30-70%)				Tenosol

Secondary Vegetation Form	Ground Cover %	Slope %	Rock Outcrop	Erosion Type
Woody	Sparse (10-30%)		No rock outcrop	None evident

Vegetation (species)	Drainage (site)	Erosion Extent
Triodia sp.	Well-drained	None evident

Landform	Soil Surface Condition (dry)	Land Use	Erosion State
Lower slope	Soft	Mining	None evident

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo

Site Type

Detailed + Sampled for Lab

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

Landscape Photo (South)

Landscape Photo (West)

Other Photo

Other Information: Negligible rock cover. Boulders have been excavated during sump construction.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-100		Clear	Clayey Sand	2.5YR 3/6	Not recorded	Not recorded	<2 % 2-6 mm	Polyhedral	Weak	Weak (dry)	Common (10-25) Fine (1-2 mm)	6.1	0.01	0-100
B1	100-500		Gradual	Clayey Sand	2.5YR 4/8	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	Few (1-10) Fine (1-2 mm)	5.8	0.01	300-400
B2	500-900		Not recorded	Clayey Sand	2.5YR 4/8	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	No roots (0)	6.0	0.01	500-600

Other information: Clear contamination from 700mm. Large boulders present within sump and excavated material.

Soil Profile Description

Project 2433.24b	**Date** 08/03/2025	**Scribe** M.White	**Location** **RF15**	**Observation** Existing vertical exposure	**Easting/ Latitude**	**Zone**	**ASC Mapped** Tenosol
Dominant Vegetation Form Non-woody			**Ground Cover %** Mid-dense (30-70%)	**Aspect**	**Northing/ Longitude**	**Scale**	**ASC Ground Truth** Kandosol
Secondary Vegetation Form Woody			**Ground Cover %** Sparse (10-30%)	**Slope %**	**Rock Outcrop** No rock outcrop	**Erosion Type** None evident	
Vegetation (species) Triodia sp.					**Drainage (site)** Imperfectly drained	**Erosion Extent** None evident	
Landform Simple slope			**Soil Surface Condition (dry)** Firm		**Land Use** Mining	**Erosion State** None evident	

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo

Site Type

Detailed + Sampled for Lab

Landscape Photo (South)

Landscape Photo (West)

Other Photo

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

Other Information: Surface rock cover 5% 2mm.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-150		Gradual	Clayey Sand	2.5YR 4/8	Not recorded	Not recorded	2-10 % 2-6 mm	Apedal	Single grain	Loose (dry)	Common (10-25) Fine (1-2 mm)	6.0	0.01	0-100
B	150-350		Sharp	Sandy Loam	2.5YR 5/8	Not recorded	Not recorded	10-20 % 6-20 mm	Polyhedral	Weak	Weak (dry)	Few (1-10) Fine (1-2 mm)	5.7	0.01	200-300
C	350-700+		Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not sampled

Other information:

Soil Profile Description

Project	Date	Scribe	Location	Observation	Easting/ Latitude	Zone	ASC Mapped
2433.24b	09/03/2025	M.White	RF16	Existing vertical exposure			Tenosol

Dominant Vegetation Form	Ground Cover %	Aspect	Northing/ Longitude	Scale	ASC Ground Truth
Non-woody	Mid-dense (30-70%)				Kandosol

Secondary Vegetation Form	Ground Cover %	Slope %	Rock Outcrop	Erosion Type
Woody	Sparse (10-30%)		No rock outcrop	Water (gully)

Vegetation (species)	Drainage (site)	Erosion Extent
Triodia sp.	Imperfectly drained	Moderate

Landform	Soil Surface Condition (dry)	Land Use	Erosion State
Flat	Firm	Mining	Active

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo

Site Type

Detailed + Sampled for Lab

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

Landscape Photo (South)

Landscape Photo (West)

Other Photo

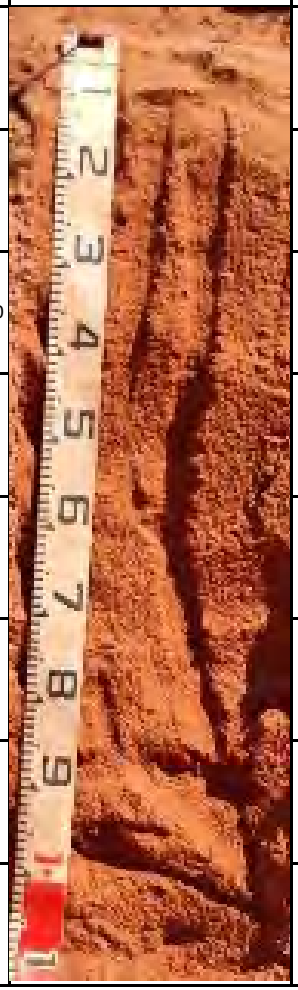
Other Information: Erosion present at sump. Signs of over overland flow draining into drill pad from undisturbed areas. No erosion in undisturbed area. Negligible rock cover.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-150		Gradual	Clayey Sand	2.5YR 3/6	Not recorded	Not recorded	<2 % 2-6 mm	Apedal	Single grain	Loose (dry)	Common (10-25) Very fine (<1 mm)	5.9	0.01	0-100
B21	150-800		Gradual	Sandy Loam	2.5YR 4/6	Not recorded	Not recorded	<2 % 2-6 mm	Polyhedral	Weak	Weak (dry)	Few (1-10) Very fine (<1 mm)	5.8	0.01	400-500
B22	800-1000		Not recorded	Sandy Loam (coarse)	2.5YR 4/8	Not recorded	Not recorded	<2 % 2-6 mm	Polyhedral	Weak	Weak (dry)	No roots (0)	5.9	0.01	900-1000

Other information: Clay content increases with depth. Beginning of A horizon ill defined.

Soil Profile Description

Project	Date	Scribe	Location	Observation	Easting/ Latitude	Zone	ASC Mapped
2433.24b	09/03/2025	M.White	RF17	Existing vertical exposure			Tenosol

Dominant Vegetation Form	Ground Cover %	Aspect	Northing/ Longitude	Scale	ASC Ground Truth
Non-woody	Mid-dense (30-70%)				Rudosol

Secondary Vegetation Form	Ground Cover %	Slope %	Rock Outcrop	Erosion Type
Woody	Sparse (10-30%)		No rock outcrop	None evident

Vegetation (species)	Drainage (site)	Erosion Extent
Triodia sp.	Moderately well-drained	None evident

Landform	Soil Surface Condition (dry)	Land Use	Erosion State
Flat	Soft	Mining	None evident

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo

Site Type

Detailed + Sampled for Lab

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

Landscape Photo (South)

Landscape Photo (West)

Other Photo

Other Information: Surface rock cover 30% 20mm.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-100		Clear	Clayey Sand	2.5YR 2.5/4	Not recorded	Not recorded	2-10 % 6-20 mm	Apedal	Single grain	Loose (dry)	Common (10-25) Fine (1-2 mm)	6.0	0.02	0-50
B1c	100-250		Gradual	Clayey Sand	2.5YR 4/6	Not recorded	Not recorded	50-90 % 6-20 mm	Apedal	Single grain	Loose (dry)	Few (1-10) Very fine (<1 mm)	6.0	0.02	200-300
C	250-1000+		Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not recorded	Not sampled

Other information: Exposed sump wall assessed.

Soil Profile Description

Project	Date	Scribe	Location	Observation	Easting/ Latitude	Zone	ASC Mapped
2433.24b	09/03/2025	M.White	RF18	Existing vertical exposure			Tenosol

Dominant Vegetation Form	Ground Cover %	Aspect	Northing/ Longitude	Scale	ASC Ground Truth
Non-woody	Mid-dense (30-70%)				Kandosol

Secondary Vegetation Form	Ground Cover %	Slope %	Rock Outcrop	Erosion Type
Woody	Sparse (10-30%)		No rock outcrop	None evident

Vegetation (species)	Drainage (site)	Erosion Extent
Triodia sp.	Well-drained	None evident

Landform	Soil Surface Condition (dry)	Land Use	Erosion State
Flat	Loose	Mining	None evident

Landscape Photo (North)

Landscape Photo (East)

Soil Surface Condition Photo

Site Type

Detailed + Sampled for Lab

Landscape Photo (South)

Landscape Photo (West)

Other Photo

Microrelief

Type

Vertical (m)

Horizontal (m)

Sampled

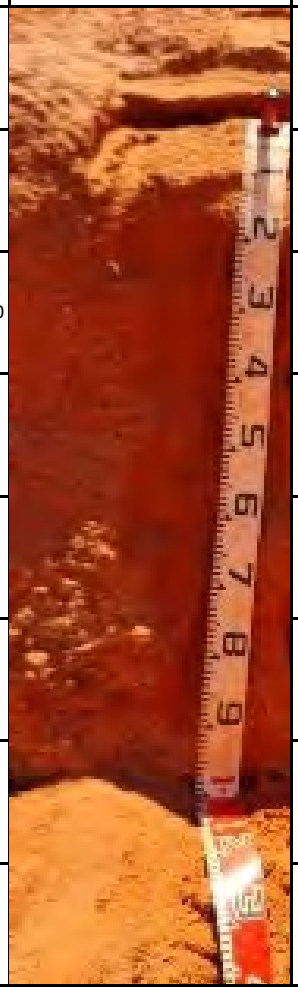
Other Information: Negligible rock cover. Similar erosion to RF16 present at sump.

Dominant Vegetation Photo 1

Dominant Vegetation Photo 2

Other Vegetation Photo

Soil Profile Description

Horizon	Depth (mm)	Profile Photo	Boundary	Texture	Moist Colour	Mottle (colour, abundance)	Segregations (abundance, nature)	Coarse fragments (abundance, size)	Structure (type)	Structure (grade)	Consistence (soil water status)	Roots (abundance, size)	pH	EC (dS/m)	Depth of Sample for Lab (mm)
A	0-100		Clear	Clayey Sand	2.5YR 3/6	Not recorded	Not recorded	<2 % 2-6 mm	Polyhedral	Weak	Weak (dry)	Many (25-200) Very fine (<1 mm)	5.5	0.01	0-100
B1	100-500		Gradual	Clayey Sand	2.5YR 4/6	Not recorded	Not recorded	<2 % 2-6 mm	Polyhedral	Weak	Weak (dry)	Few (1-10) Fine (1-2 mm)	5.8	0.01	300-400
B2	500-1000		Not recorded	Sandy Loam	2.5YR 4/8	Not recorded	Not recorded	<2 % 2-6 mm	Polyhedral	Weak	Weak (dry)	Few (1-10)	5.8	0.01	700-800

Other information:

APPENDIX E: GEOTECHNICAL TEST PIT DATA INTERPRETATION.

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Survey Sites	Geotech site	Land system	Depth	Texture	Particle size	Coarse fragments	Source
	CPBTP01	Little Sandy	0.0-2.8	Silty sand	fine to coarse	none	Aeolian
	CPBTP02	Little Sandy	0.0-2.6	Silty sand	fine to coarse	none	Aeolian
	CPBTP03	Little Sandy	0.0-2.1	Silty sand	fine to coarse	none	Aeolian
	CPBTP04	Little Sandy	0.0-2.6	Silty sand	fine to coarse	none	Aeolian
	CPBTP05	Little Sandy	0.0-2.0	Silty sand	fine to coarse	none	Aeolian
	CPBTP06	Little Sandy	0.0-2.1	Silty sand	fine to coarse	none	Aeolian
	CPBTP07	Little Sandy	0.0-2.9	Silty sand	fine to coarse	none	Aeolian
	CPBTP08	Little Sandy	0.0-2.8	Silty sand	fine to coarse	none	Aeolian
	CPBTP09	Little Sandy	0.0-2.7	Silty sand	fine to coarse	none	Aeolian
	CPBTP10	Little Sandy	0.0-2.8	Silty sand	fine to coarse	none	Aeolian
	CPBTP11	Little Sandy	0.0-3.0	Silty sand	fine to coarse	none	Aeolian
	CPBTP12	Little Sandy	0.0-2.8	Silty sand	fine to coarse	none	Aeolian
	CPBTP13	Little Sandy	0.0-2.7	Silty sand	fine to coarse	none	Aeolian
	CPBTP14	Little Sandy	0.0-2.4	Silty sand	fine to coarse	none	Aeolian
	CPBTP15	Little Sandy	0.0-1.9	Sand	fine to coarse	none	Aeolian
			1.9-2.2	Silty sand	fine to coarse	gravel	Aeolian
	CPBTP16	Little Sandy	0.0-2.6	Silty sand	fine to coarse	none	Aeolian
	CPBTP17	Little Sandy	0.0-2.6	Silty sand	fine to coarse	none	Aeolian
	CPBTP18	Little Sandy	0.0-2.6	Silty sand	fine to coarse	none	Aeolian
	PSTP14	Little Sandy	0.0-0.5	Sand	fine to coarse	none	Aeolian
			0.5-3.2	Silty sand	fine to coarse	none	Aeolian
	PSTP15	Little Sandy	0.0-0.7	Sand	fine to coarse	none	Aeolian
			0.7-2.2	Sandy gravel	fine to coarse	gravel	Aeolian
S09	PSTP16	Little Sandy	0.0-0.4	Sand	fine to coarse	none	Aeolian
			0.4-1.2	Ferricrete	fine to coarse	gravel	Ferricrete
	PSTP17	Little Sandy	0.0-0.5	Silty sand	fine to coarse	none	Aeolian
			0.5-1.9	Ferricrete	fine to coarse	gravel	Ferricrete
	PSTP18	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-2.3	Sandy gravel	fine to medium	gravel	Aeolian
			0.0-0.3	Sand	fine to coarse	none	Aeolian

Survey Sites	Geotech site	Land system	Depth	Texture	Particle size	Coarse fragments	Source
	PSTP19	Little Sandy	0.3-0.5	Silty sand	fine to coarse	none	Aeolian
			0.5-0.9	Sand	fine to coarse	trace gravel	Aeolian
			0.9-1.1	Silcrete	fine to coarse	gravel	Silcrete
	PSTP20	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-0.7	Silty sand	fine to coarse	none	Aeolian
			0.7-1.3	Ferricrete	fine to coarse	gravel	Ferricrete
			1.3-1.4	Silcrete	fine to coarse	gravel	Silcrete
	PSTP21	Little Sandy	0.0-0.4	Sand	fine to coarse	none	Aeolian
			0.4-1.2	Ferricrete	fine to coarse	gravel	Ferricrete
	PSTP22	Little Sandy	0.0-0.4	Sand	fine to coarse	none	Aeolian
			0.4-0.9	Silty sand	fine to coarse	none	Aeolian
			0.9-1.6	Ferricrete	fine to coarse	gravel	Ferricrete
	PSTP23	Little Sandy	0.0-0.4	Sand	fine to coarse	none	Aeolian
			0.4-1.2	Silty sand	fine to coarse	none	Aeolian
			1.2-1.7	Ferricrete	fine to coarse	gravel	Ferricrete
	PSTP24	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-1.0	Silty sand	fine to coarse	none	Aeolian
			1.0-1.8	Ferricrete	fine to coarse	gravel	Ferricrete
	PSTP25	Little Sandy	0.0-0.4	Sand	fine to coarse	none	Aeolian
			0.4-1.2	silty sand	fine to coarse	none	Aeolian
			1.2-2.3	Ferricrete	fine to coarse	gravel	Ferricrete
S10	PSTP26	Little Sandy	0.0-0.4	Sand	fine to coarse	none	Aeolian
			0.4-1.5	Silty sand	fine to coarse	gravel	Aeolian
			1.5-2.1	Silcrete	fine to coarse	gravel	Ferricrete
	PSTP27	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-1.5	Silty sand	fine to coarse	none	Aeolian
			1.5-2.1	Ferricrete	fine to coarse	gravel	Ferricrete
	PSTP28	Little Sandy	0.0-0.4	Sand	fine to coarse	none	Aeolian
			0.4-1.1	Silty sand	fine to coarse	none	Aeolian
			1.1-1.9	Ferricrete	fine to coarse	gravel	Ferricrete

Survey Sites	Geotech site	Land system	Depth	Texture	Particle size	Coarse fragments	Source
	OITP033	Little Sandy	0.0-1.4	Silty sand	fine to coarse	none	Aeolian
			1.4-1.8	Clayey gravelly sand	fine to coarse	gravel	Aeolian
			1.8-2.4	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP034	Little Sandy	0.0-2.3	Clayey sand	fine to coarse	none	Aeolian
	OITP035	Little Sandy	0.0-2.1	Sand	fine to coarse	none	Aeolian
	OITP036	Little Sandy	0.0-1.8	Clayey sand	fine to coarse	trace gravel	Aeolian
			1.8-2.0	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP037	Little Sandy	0.0-0.4	Silty sand	fine to coarse	none	Aeolian
			0.4-1.7	Clayey gravelly sand	fine to coarse	gravel	Aeolian
			1.7-1.8	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP038	Little Sandy	0.0-0.8	Silty sand	fine to coarse	none	Aeolian
			0.8-1.1	gravelly sand	fine to coarse	gravel	Aeolian
			1.1-1.7	Clayey gravelly sand	fine to coarse	gravel	Aeolian
	OITP039	Little Sandy	0.0-0.2	Sand	fine to coarse	none	Aeolian
			0.2-2.1	Clayey sand	fine to coarse	gravel	Aeolian
	OITP040	Little Sandy	0.0-1.0	Silty sand	fine to coarse	none	Aeolian
			1.0-1.2	Sandy gravel	fine to coarse	gravel	Aeolian
			1.2-1.8	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP041	Little Sandy	0.0-0.9	Clayey sand	fine to coarse	none	Aeolian
			0.9-2.3	Sandy gravel	fine to coarse	gravel	Aeolian
	OITP042	Little Sandy	0.0-0.4	Silty sand	fine to coarse	trace gravel	Aeolian
			0.4-0.8	Sandy gravel	fine to coarse	gravel	Aeolian
			0.8-1.2	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP043	Little Sandy	0.0-1.7	Silty sand	fine to coarse	none	Aeolian
			1.7-2.2	Sandy gravel	fine to coarse	gravel	Aeolian
	OITP044	Little Sandy	0.0-0.3	Clayey sand	fine to coarse	none	Aeolian
			0.3-1.0	Clayey sand	fine to coarse	gravel	Aeolian
			1.0-1.7	Clayey gravelly sand	fine to coarse	gravel	Aeolian
	OITP045	Little Sandy	0.0-1.0	Silty sand	fine to coarse	none	Aeolian
			1.0-2.1	Sandy gravel	fine to coarse	gravel	Aeolian

Survey Sites	Geotech site	Land system	Depth	Texture	Particle size	Coarse fragments	Source
	OITP046	Little Sandy	0.0-1.0	Silty sand	fine to coarse	none	Aeolian
			1.0-1.8	Gravelly sand	fine to coarse	gravel	Aeolian
			1.8-2.2	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP047	Little Sandy	0.0-0.5	Silty sand	fine to coarse	none	Aeolian
			0.5-0.8	Gravelly sand	fine to coarse	gravel	Aeolian
			0.8-1.8	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP048	Little Sandy	0.0-0.5	Silty sand	fine to coarse	trace gravel	Aeolian
			0.5-0.7	Sandy gravel	fine to coarse	gravel	Aeolian
			0.7-1.7	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP049	Little Sandy	0.0-1.3	Silty sand	fine to coarse	none	Aeolian
			1.3-1.9	Sandy gravel	fine to medium	gravel	Aeolian
	ADR01	Little Sandy	0.0-3.0	Sand	fine to coarse	none	Aeolian
	ADR21	Little Sandy	0.0-3.0	Sand	fine to coarse	none	Aeolian
	ADR22	Little Sandy	0.0-3.0	Silty sand	fine to coarse	none	Aeolian
	ADR23	Little Sandy	0.0-2.1	Silty sand	fine to coarse	none	Aeolian
	ADR24	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-3.2	Silty sand	fine to coarse	none	Aeolian
	ADR25	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-0.7	silty sand	fine to coarse	none	Aeolian
			0.3-2.9	Ferricrete	fine to coarse	gravel	Ferricrete
	ADR26	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-0.5	Silty sand	fine to coarse	none	Aeolian
			0.5-3.0	Ferricrete	fine to coarse	gravel	Ferricrete
	ADR29	Little Sandy	0.0-2.6	Silty sand	fine to coarse	none	Aeolian
	ADR30	Little Sandy	0.0-0.7	Sand	fine to coarse	none	Aeolian
			0.7-1.4	Silty sand	fine to coarse	none	Aeolian
			1.4-1.7	Sandy gravel	fine to medium	gravel	Aeolian
			1.7-2.5	Ferricrete	fine to coarse	gravel	Ferricrete
	ADR31	Little Sandy	0.0-2.7	Silty sand	fine to coarse	none	Aeolian
	ADR32	Little Sandy	0.0-2.9	Silty sand	fine to coarse	none	Aeolian

Survey Sites	Geotech site	Land system	Depth	Texture	Particle size	Coarse fragments	Source
	ADR33	Little Sandy	0.0-2.3	Silty sand	fine to coarse	none	Aeolian
	ADR35	Little Sandy	0.0-1.5	Silty sand	fine to coarse	none	Aeolian
			1.5-2.1	Sandy gravel	fine to medium	gravel	Aeolian
	OITP050	Little Sandy	0.0-0.5	Sand	fine to coarse	none	Aeolian
			0.5-1.8	Sandy gravel	fine to coarse	gravel	
			1.8-2.6	Silcrete	fine to coarse	gravel	Ferricrete
	OITP051	Little Sandy	0.0-0.7	Sand	fine to coarse	none	Aeolian
			0.7-3.0	Sandy gravel	fine to coarse	gravel	
	OITP052	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-3.0	Silty sand	fine to coarse	none	Aeolian
	OITP053	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-3.0	Silty sand	fine to coarse	none	Aeolian
	OITP054	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-3.2	Silty sand	fine to coarse	none	Aeolian
	OITP055	Little Sandy	0.0-0.5	Sand	fine to coarse	none	Aeolian
			0.5-1.0	Clayey sandy gravel	fine to coarse	gravel	Aeolian
			1.0-3.0	Clayey gravelly sand	fine to coarse	gravel	Aeolian
	OITP056	Little Sandy	0.0-0.2	Sand	fine to coarse	none	Aeolian
			0.2-0.6	Silty sand	fine to coarse	none	Aeolian
			0.6-1.1	Silty gravelly sand	fine to coarse	gravel	Aeolian
			1.1-1.8	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP057	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-1.5	Silty sand	fine to coarse	none	Aeolian
			1.5-2.0	Silty gravelly sand	fine to coarse	gravel	Aeolian
	OITP058	Little Sandy	0.0-2.4	Sand	fine to coarse	none	Aeolian
	OITP059	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-3.2	Silty sand	fine to coarse	none	Aeolian
	OITP060	Little Sandy	0.0-0.2	Sand	fine to coarse	none	Aeolian
			0.2-3.2	Silty sand	fine to coarse	none	Aeolian
	OITP061	Little Sandy	0.0-0.4	Silty sand	fine to coarse	none	Aeolian

Survey Sites	Geotech site	Land system	Depth	Texture	Particle size	Coarse fragments	Source
	OITP061	Little Sandy	0.4-1.5	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP062	Little Sandy	0.0-0.6	Sand	fine to coarse	none	Aeolian
			0.6-1.2	Silty gravelly sand	fine to coarse	gravel	Aeolian
			1.2-2.2	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP063	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-0.6	Silty sand	fine to coarse	none	Aeolian
			0.6-1.4	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP064	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-1.5	Silty sand	fine to coarse	none	Aeolian
			1.5-2.7	Silcrete	fine to coarse	gravel	Ferricrete
	OITP065	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-2.5	Silty sand	fine to coarse	none	Aeolian
	OITP066	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-3.0	Silty sand	fine to coarse	none	Aeolian
	OITP067	Little Sandy	0.0-0.2	Sand	fine to coarse	none	Aeolian
			0.2-3.0	Silty sand	fine to coarse	none	Aeolian
	OITP068	Little Sandy	0.0-0.2	Sand	fine to coarse	none	Aeolian
			0.2-3.0	Silty sand	fine to coarse	none	Aeolian
	OITP069	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-3.2	Silty sand	fine to coarse	none	Aeolian
	OITP070	Little Sandy	0.0-0.2	Sand	fine to coarse	none	Aeolian
			0.2-3.2	Silty Sand	fine to coarse	none	Aeolian
	OITP071	Little Sandy	0.0-0.2	Sand	fine to coarse	none	Aeolian
			0.2-3.2	Silty Sand	fine to coarse	none	Aeolian
	OITP072	Little Sandy	0.0-0.2	Sand	fine to coarse	none	Aeolian
			0.2-3.2	Silty Sand	fine to coarse	none	Aeolian
	OITP073	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-3.0	Silty sand	fine to coarse	none	Aeolian
	OITP074	Little Sandy	0.0-0.4	Sand	fine to coarse	none	Aeolian
			0.4-3.0	Silty sand	fine to coarse	none	Aeolian

Survey Sites	Geotech site	Land system	Depth	Texture	Particle size	Coarse fragments	Source
	OITP075	Little Sandy	0.0-0.2	Sand	fine to coarse	none	Aeolian
			0.2-0.5	silty sand	fine to coarse	none	Aeolian
			0.5-2.5	Gravelly sand	fine to coarse	gravel	
	OITP076	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-0.9	Silty Sand	fine to coarse	none	Aeolian
			0.9-1.8	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP077	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-3.0	Gravelly sand	fine to coarse	gravel	
	OITP078	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-0.5	Silty sand	fine to coarse	none	Aeolian
			0.5-1.4	Sandy gravel	fine to coarse	gravel	
	OITP079	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-0.8	Silty sand	fine to coarse	none	Aeolian
			0.8-2.8	Gravelly sand	fine to coarse	gravel	
	OITP080	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-3.2	Silty sand	fine to coarse	none	Aeolian
	OITP081	Little Sandy	0.0-0.2	Sand	fine to coarse	none	Aeolian
			0.2-0.5	Sandy gravel	fine to coarse	gravel	
			0.5-2.8	Ferricrete	fine to coarse	gravel	
	OITP082	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-0.8	Sandy gravel	fine to coarse	gravel	Aeolian
			0.8-3.2	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP083	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-2.3	Silty sand	fine to coarse	none	Aeolian
	OITP084	Little Sandy	0.0-1.0	Sand	fine to coarse	none	Aeolian
			1.0-3.0	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP085	Little Sandy	0.0-0.1	Sand	fine to coarse	none	Aeolian
			0.1-0.4	Sandy gravel	fine to coarse	gravel	Aeolian
			0.4-2.1	Ferricrete	fine to coarse	gravel	Ferricrete
			0.0-0.3	Sand	fine to coarse	none	Aeolian

Survey Sites	Geotech site	Land system	Depth	Texture	Particle size	Coarse fragments	Source
	OITP086	Little Sandy	0.3-0.5	Sandy gravel	fine to coarse	gravel	Aeolian
			0.5-2.2	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP087	Little Sandy	0.0-1.3	sand	fine to coarse	trace gravel	Aeolian
			1.3-2.3	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP088	Little Sandy	0.0-0.6	Sand	fine to coarse	trace gravel	Aeolian
			0.6-2.5	Sandy gravel	fine to coarse	gravel	Aeolian
	OITP089	Little Sandy	0.0-0.2	Sand	fine to coarse	trace gravel	Aeolian
			0.2-0.8	Sandy gravel	fine to coarse	gravel	Aeolian
			0.8-2.5	Silty sandy gravel	fine to coarse	gravel	Aeolian
	OITP090	Little Sandy	0.0-0.2	Sand	fine to coarse	none	Aeolian
			0.2-0.5	Sandy gravel	fine to coarse	gravel	Aeolian
			0.5-2.7	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP091	Little Sandy	0.0-0.2	Sand	fine to coarse	none	Aeolian
			0.2-0.5	Sandy gravel	fine to coarse	gravel	Aeolian
			0.5-2.5	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP092	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-2.3	Silty sand	fine to coarse	none	Aeolian
	OITP093	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-1.8	Sandy gravel	fine to coarse	gravel	Aeolian
			1.8-2.8	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP094	Little Sandy	0.0-0.7	Sand	fine to coarse	none	Aeolian
			0.7-1.7	Clayey sandy gravel	fine to coarse	gravel	Aeolian
			1.7-2.9	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP095	Little Sandy	0.0-0.8	Sand	fine to coarse	none	Aeolian
			0.8-2.5	Sandy gravel	fine to coarse	gravel	Aeolian
	OITP096	Little Sandy	0.0-0.4	Sand	fine to coarse	none	Aeolian
			0.4-2.4	Silty sand	fine to coarse	none	Aeolian
S08	OITP097	Little Sandy	0.0-0.7	Sand	fine to coarse	none	Aeolian
			0.7-1.1	Sandy gravel	fine to coarse	gravel	Aeolian
			1.1-2.9	Ferricrete	fine to coarse	gravel	Ferricrete

Survey Sites	Geotech site	Land system	Depth	Texture	Particle size	Coarse fragments	Source
	OITP098	Little Sandy	0.0-0.4	Sand	fine to coarse	none	Aeolian
			0.4-1.7	Sandy gravel	fine to coarse	gravel	Aeolian
			1.7-2.5	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP099	Little Sandy	0.0-0.8	Sand	fine to coarse	none	Aeolian
			0.8-3.0	Ferricrete	fine to coarse	gravel	Ferricrete
	OITP100	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-1.0	Silty sand	fine to coarse	none	Aeolian
			1.0-2.0	Silty sandy gravel	fine to coarse	gravel	Colluvial
	OITP101	Little Sandy	0.0-0.7	Sand	fine to coarse	none	Aeolian
			0.7-2.0	Silty sandy gravel	fine to coarse	gravel	
	OITP102	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-3.2	Silty sand	fine to coarse	none	Aeolian
	OITP103	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-2.0	Silty sand	fine to coarse	none	Aeolian
	OITP104	Little Sandy	0.0-0.4	Sand	fine to coarse	none	Aeolian
			0.4-3.2	Silty sand	fine to coarse	none	Aeolian
	OITP105	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-3.1	Silty sand	fine to coarse	none	Aeolian
	OITP106	Little Sandy	0.0-0.2	Sand	fine to coarse	none	Aeolian
			0.2-3.0	Silty sand	fine to coarse	none	Aeolian
	OITP119	Little Sandy	0.0-0.3	Sand	fine to coarse	none	Aeolian
			0.3-2.3	Silty sand	fine to coarse	none	Aeolian

Soil Inspection Site	Geotech site	Land system	Depth	Texture
	NH02-01	Callawa	0.0-0.1	Sand
			0.1-2.2	Gravel
	NG02-02	Callawa	0.0-0.6	Sand
			0.6-1.0	Gravelly Sand/Sandy gravel
			1.0-2.5	Clayey gavelly sand
	NH02-03	Callawa	0.0-1.6	Sand
			1.6-2.5	Gravel
	NH02-04	Callawa	0.0-0.1	Sand
			0.1-2.5	Gravel
	NH02-05	Callawa	0.0-0.2	Sand
			0.2-2.5	Gravel
	NH02-06	Callawa	0.0-0.1	Sand
			0.1-0.6	Sandy gravel
			0.6-2.5	Clayey sandy gravel
	NH02-07	Callawa	0.0-0.2	Sand
			0.2-1.5	Clayey sandy
			1.5-2.5	Clayey sandy gravel
	NH02-08	Callawa	0.0-1.4	Sand
			1.4-2.5	Sandy gravel
	NH02-09	Callawa	0.0-0.1	Sand
			0.1-2.5	Sandy gravel
	NH02-10	Callawa	0.0-0.1	Sand
			0.1-2.5	Sandy gravel
	NH02-11	Callawa	0.0-0.5	Sand
			0.5-2.5	Gravelly Sand/Sandy Gravel
	NH02-12	Callawa	0.0-0.6	Silty sand
			0.6-1.4	Clayey gavelly sand
			1.4-2.5	Gravelly sand
	NH02-13	Callawa	0.0-0.6	Sand
			0.6-1.9	Sandy gravel
	NH02-14	Callawa	0.0-0.1	Sand
			0.1-2.5	Sandy gravel
	NH02-15	Callawa	0.0-0.4	Sandy gravel
			0.4-1.9	Ferricrete gravel
	NH03-01	Callawa	0.0-0.1	Sand
			0.1-2.5	Gravel
	NH03-02	Callawa	0.0-0.2	Sand
			0.2-0.5	Sandy gravel
			0.5-1.0	Ferricrete gravel
	NH03-03	Callawa	0.0-0.2	Sand
			0.2-0.5	Sandy gravel
			0.5-1.1	Ferricrete gravel
	NH03-04	Callawa	0.0-0.2	Sand
			0.2-1.1	Sandy gravel
			1.1-1.3	Ferricrete gravel

Soil Inspection Site	Geotech site	Land system	Depth	Texture
	NH03-05	Callawa	0.0-0.2	Sand
			0.2-0.8	Gravel
			0.8-1.3	Ferricrete gravel
	NH03-06	Callawa	0.0-0.3	Sand
			0.3-0.6	Gravel
			0.6-1.9	Ferricrete gravel
	NH03-07	Callawa	0.0-0.2	Sand
			0.2-0.7	Sandy gravel
			0.7-1.8	Ferricrete gravel
	NH03-08	Callawa	0.0-0.2	Sand
			0.2-0.6	Sandy gravel
			0.6-1.3	Ferricrete gravel
	NH03-09	Callawa	0.0-0.2	Sand
			0.2-2.5	Gravel
	NH03-10	Callawa	0.0-0.2	Sand
			0.2-2.5	Gravel
	NH03-11	Callawa	0.0-0.2	Sand
			0.2-0.7	Sandy gravel
			0.7-1.2	Ferricrete gravel
	NH03-12	Callawa	0.0-0.2	Sand
			0.2-2.5	Gravel
	NH03-13	Callawa	0.0-0.1	Sand
			0.1-0.3	Gravel
			0.3-0.7	Ferricrete gravel
	NH03-14	Callawa	0.0-0.1	Sand
			0.1-2.5	Gravel
	NH03-15	Callawa	0.0-0.2	Sand
			0.2-0.6	Gravel
			0.6-2.0	Ferricrete gravel
	NH04A-01	Callawa	0.0-0.3	Sand
			0.3-0.9	Sandy gravel
			0.9-1.1	Ferricrete gravel
	NH04A-02	Callawa	0.0-0.5	Sand
			0.5-0.9	Gravel
			0.9-1.1	Ferricrete gravel
	NH04A-03	Callawa	0.0-0.1	Gravely sand
			0.1-0.8	Ferricrete gravel
	NH04A-04	Callawa	0.0-0.5	Sand
			0.5-1.4	Sandy gravel
	NH04A-05	Callawa	0.0-0.2	Sand
			0.2-1.3	Gravel
			1.3-1.5	Ferricrete gravel
	NH04A-06	Callawa	0.0-0.7	Silty sand
			0.7-1.5	Sandy gravel
			1.5-1.7	Ferricrete gravel

Soil Inspection Site	Geotech site	Land system	Depth	Texture
	NH04A-07	Callawa	0.0-0.6	Sand
			0.6-0.9	Sandy gravel
			0.9-1.3	Ferricrete gravel
	NGH04A-08	Callawa	0.0-0.2	Sand
			0.2-0.8	Sandy gravel
			0.8-1.1	Ferricrete gravel
	NH04A-09	Callawa	0.0-0.9	Sand
			0.9-1.9	Sandy gravel
	NH04A-10	Callawa	0.0-1.0	Sand
			1.0-1.4	Sandy gravel
			1.4-2.0	Ferricrete gravel
	NH04A-11	Callawa	0.0-1.0	silty sand
			1.0-1.9	Sandy gravel
	NH04A-12	Callawa	0.0-0.5	sand
			0.5-1.0	gravel
			1.0-1.5	Ferricrete gravel
	NH04A-13	Callawa	0.0-0.2	sand
			0.2-0.7	gravel
			0.7-1.5	Ferricrete gravel
	NH04A-14	Callawa	0.0-0.2	Sand
			0.2-0.4	Silty gravel
			0.4-0.9	Ferricrete gravel
	NH04A-15	Callawa	0.0-0.3	Sand
			0.3-0.7	Gravel
			0.7-1.2	Ferricrete gravel
	NH04A-16	Callawa	0.0-0.3	Sand
			0.3-1.6	Gravel
	NH04B-01	Callawa	0.0-0.7	Sand
			0.7-2.0	Sandy gravel
	NH04B-02	Callawa	0.0-0.4	Sand
			0.4-1.0	Sandy gravel
			1.0-1.8	Ferricrete gravel
	NH04B-03	Callawa	0.0-0.5	Silty sand
			0.5-0.7	Sandy gravel
			0.7-0.8	Ferricrete gravel
	NH04B-04	Callawa	0.0-1.0	Silty sand
			1.0-1.2	Sandy gravel
			1.2-1.7	Ferricrete gravel
	NH04B-05	Callawa	0.0-0.5	Silty sand
			0.5-2.5	Sandy gravel
	NH04B-06	Callawa	0.0-1.2	Silty sand
			1.2-2.5	Sandy gravel
	NH04B-07	Callawa	0.0-1.3	Silty sand
			1.3-2.0	Sandy gravel
			0.0-0.9	Silty sand

Soil Inspection Site	Geotech site	Land system	Depth	Texture
	NH04B-08	Callawa	0.9-1.2	Sandy gravel
			1.2-1.5	Ferricrete gravel
	NH04B-09	Callawa	0.0-0.8	Silty sand
			0.8-1.3	Sandy gravel
			1.3-1.7	Ferricrete gravel
	NH04B-10	Callawa	0.0-0.9	silt sand
			0.9-1.7	Sandy gravel
	NH04B-11	Callawa	0.0-1.8	Silty sand
			1.8-2.7	Sandy gravel
	NH04B-12	Callawa	0.0-1.3	Silty sand
			1.3-1.8	Sandy gravel
	NH04B-13	Callawa	0.0-0.7	Silty sand
			0.7-1.7	Sandy gravel
	NH04B-14	Callawa	0.0-2.0	Silty sand
	NH04B-15	Callawa	0.0-1.1	Silty sand
			1.1-2.0	Sandy gravel
	NH05-01	Nita	0.0-0.2	Sand
			0.2-1.1	Clayey sandy gravel
	NH05-02	Nita	0.0-0.1	Sand
			0.1-1.2	Sandy gravel
	NH05-03	Nita	0.0-1.0	Silty sand
			1.0-1.4	Silty sandy gravel
	NH05-04	Nita	0.0-06	Sand
			0.6-1.2	Ferricrete gravel
	NH05-05	Nita	0.0-0.6	Silty sand
			0.6-1.5	Ferricrete gravel
	NH05-06	Nita	0.0-1.4	Silty sand
			1.4-1.7	Sandy gravel
			1.7-2.1	Ferricrete gravel
	NH05-07	Nita	0.0-0.6	Silty sand
			0.6-0.9	Sandy gravel
			0.9-1.2	Ferricrete gravel
	NH05-08	Nita	0.0-0.4	Sand
			0.4-1.7	Sandy gravel
	NH05-09	Nita	0.0-0.5	Sand
			0.5-1.5	Sandy gravel
	NH05-10	Nita	0.0-0.5	Sand
			0.5-1.1	Sandy gravel
	NH05-11	Nita	0.0-0.5	sand
			0.5-2.2	Sandy gravel
	NH05-12	Nita	0.0-0.6	Sand
			0.6-2.2	Sandy gravel
	NH05-13	Nita	0.0-1.1	Sand
			1.1-2.0	Sandy gravel
	NH05-14	Nita	0.0-1.0	Sand

Soil Inspection Site	Geotech site	Land system	Depth	Texture
	NH05-14	Nita	1.0-1.6	Sandy gravel
	NH05-15	Nita	0.0-1.8	Sand
			1.8-2.2	Gravelly sand
	NH06A-01	Nita	0.0-0.3	Gravelly sand
			0.3-0.9	Sandy gravel
			0.9-1.4	Ferricrete gravel
	NH06A-02	Nita	0.0-0.4	Gravelly sand
			0.4-0.8	Sandy gravel
			0.8-1.6	Ferricrete gravel
	NH06A-03	Nita	0.0-0.4	gravelly sand
			0.4-1.0	Clayey sandy gravel
			1.0-2.0	Ferricrete gravel
	NH06A-04	Nita	0.0-2.5	Silty sandy gravel
	NH06A-05	Nita	0.0-0.4	Gravelly sand
			0.4-0.7	Sandy gravel
			0.7-1.5	Ferricrete gravel
	NH06A-06	Nita	0.0-0.3	gravelly sand
			0.3-2.0	Sandy gravel
	NH06A-07	Nita	0.0-0.1	Sand
			0.1-0.6	gravel
			0.6-1.8	Ferricrete gravel
	NH06A-08	Nita	0.0-0.5	Gravel
			0.5-1.4	Ferricrete gravel
	NH06A-09	Nita	0.0-0.3	Gravel
			0.3-1.1	Ferricrete gravel
	NH06A-10	Nita	0.0-1.0	Sandy gravel
	NH06A-11	Nita	0.0-0.2	Sand
			0.2-0.6	Sandy gravel
			0.6-1.2	Ferricrete gravel
	NH06A-12	Nita	0.0-1.2	Sandy gravel
			1.2-1.6	Ferricrete gravel
	NH06A-13	Nita	0.0-0.3	Sand
			0.3-0.6	Clayey sandy gravel
			0.6-1.4	Ferricrete gravel
	NH06A-14	Nita	0.0-0.4	Sandy gravel
			0.4-0.6	Clayey sandy gravel
			0.6-1.8	Ferricrete gravel
	NH06B-01	Nita	0.0-0.5	Sand
			0.5-2.8	Silty sandy gravel
	NH06B-02	Nita	0.0-0.6	Silty sand
			0.6-2.8	Clayey sandy gravel
	NH06B-03	Nita	0.0-0.4	Sand
			0.4-2.8	Gravel
	NH06B-04	Nita	0.0-0.3	Sand
			0.3-0.6	Sandy gravel

Soil Inspection Site	Geotech site	Land system	Depth	Texture
			0.6-1.7	Ferricrete gravel
	NH06B-05	Nita	0.0-0.7	Sand
			0.7-1.0	Sandy gravel
			1.0-1.8	Ferricrete gravel
	NH06B-06	Nita	0.0-0.5	Sand
			0.5-1.4	Silty sandy gravel
	NH06B-07	Nita	0.0-0.1	Sand
			0.1-0.4	Sandy gravel
			0.4-1.3	Ferricrete gravel
	NH06B-08	Nita	0.0-0.3	Sand
			0.3-1.1	Gravel
			1.1-1.6	Ferricrete gravel
	NH06B-09	Nita	0.0-0.2	Sand
			0.2-1.0	Clayey sandy gravel
			1.0-2.0	Ferricrete gravel
	NH06B-10	Nita	0.0-0.2	Sand
			0.2-0.8	Sandy gravel
			0.8-2.6	Ferricrete gravel
	NH06B-11	Nita	0.0-0.1	Sand
			0.1-1.5	Clayey sandy gravel
			1.5-2.1	Ferricrete gravel
	NH06B-12	Nita	0.0-0.3	Sand
			0.3-1.0	Sandy gravel
			1.0-2.5	Ferricrete gravel
	NH07B-01	Callawa	0.0-0.3	Clayey sandy gravel
			0.3-1.9	Ferricrete gravel
	NH07B-02	Callawa	0.0-0.5	Clayey sandy gravel
			0.5-2.5	Ferricrete gravel
	NH07B-03	Callawa	0.0-1.0	Clayey sandy gravel
			1.0-2.5	Ferricrete gravel
	NH07B-04	Callawa	0.0-2.5	Clayey sandy gravel
	NH07B-05	Callawa	0.0-2.7	Gravel
	NH07B-06	Callawa	0.0-0.4	Clayey sand
			0.4-2.0	Clayey gravelly sand
	NH07B-07	Callawa	0.0-2.8	Clayey sandy gravel
	NH07B-08	Callawa	0.0-2.5	Gravel
	NH07B-09	Callawa	0.0-2.5	Gravel
	NH07B-10	Callawa	0.0-0.3	Sand
			0.3-1.1	clayey gravelly sand
			1.1-1.4	Ferricrete gravel
	NH07B-11	Callawa	0.0-1.0	Sandy gravel
			1.0-1.2	Ferricrete gravel
	NH07B-12	Callawa	0.0-0.2	sand
			0.2-2.3	clayey sandy gravel
	NH07B-13	Callawa	0.0-0.2	Sand

Soil Inspection Site	Geotech site	Land system	Depth	Texture
	NH07B-13	Callawa	0.2-2.3	Clayey sandy gravel
	NH07B-14	Callawa	0.0-1.0	Clayey sandy gravel
			1.0-1.5	Ferricrete gravel
	NH07B-15	Callawa	0.0-1.5	Clayey sandy gravel
			1.5-2.0	Ferricrete gravel
	NH08A-01	Callawa	0.0-2.5	Clayey sand
	NH08A-02	Callawa	0.0-2.6	Clayey sand
	NH08A-03	Callawa	0.0-2.3	Clayey sand
	NH08A-04	Callawa	0.0-2.4	Gravel
	NH08A-05	Callawa	0.0-2.5	Gravel
	NH08A-06	Callawa	0.0-2.0	Gravel
	NH08A-07	Callawa	0.0-2.1	Gravel
	NH08A-08	Callawa	0.0-1.6	Sand
			1.6-2.7	Clayey sandy gravel
	NH08A-09	Callawa	0.0-0.5	Sand
			0.5-1.5	clayey sand/sandy clay
			1.5-2.5	Sandy gravel
	NH08A-10	Callawa	0.0-2.5	Sand
	NH08A-11	Callawa	0.0-2.5	Clayey sand
	NH08A-12	Callawa	0.0-2.5	Clayey sand
	NH08A-13	Callawa	0.0-2.2	Clayey sand
	NH08A-14	Callawa	0.0-1.6	Clayey gravel
	NH08A-15	Callawa	0.0-2.4	gravel
	NH08B-01	Nita	0.0-2.5	Clayey sand
	NH08B-02	Callawa	0.0-2.5	Clayey sand
	NH08B-03	Callawa	0.0-0.3	Sand
			0.3-2.2	Clayey gravel
	NH08B-04	Callawa	0.0-0.3	FILL clayey gravel
			0.3-2.5	clayey gravel
	NH08B-05	Callawa	0.0-0.5	Gravel
			0.5-2.5	Clayey gravel
	NH08B-06	Callawa	0.0-0.5	Clayey gravel
			0.5-2.5	Gravel
	NH08B-07	Callawa	0.0-2.5	Clayey gravel
	NH08B-08	Callawa	0.0-2.5	Clayey gravel
	NH08B-09	Callawa	0.0-1.0	Clayey sand
			1.0-2.5	Clayey gravely sand
	NH08B-10	Callawa	0.0-2.5	Clayey sand
	NH08B-11	Nita	0.0-2.5	Clayey sand
	NH08B-12	Callawa	0.0-2.5	Clayey sand
	NH08B-13	Callawa	0.0-2.5	Clayey gravel
	NH08B-14	Callawa	0.0-2.5	Clayey gravel
	NH08B-15	Callawa	0.0-2.5	Clayey grave

Soil Inspection Site	Geotech site	Land system	Depth	Texture
	NH09-01	Callawa	0.0-0.5	Clayey sand
			0.5-2.5	Clayey sandy gravel
	NH09-02	Callawa	0.0-2.0	Clayey sand
	NH09-03	Callawa	0.0-2.5	Sand
	NH09-04	Callawa	0.0-2.7	Clayey sand
	NH09-05	Callawa	0.0-2.5	Clayey sand
	NH09-06	Callawa	0.0-2.5	clayey sand
	NH09-07	Callawa	0.0-2.5	clayey sand
	NH09-08	Callawa	0.0-2.5	clayey sand
	NH09-09	Callawa	0.0-2.5	Clayey sand
	NH09-10	Callawa	0.0-2.5	Clayey sand
	NH09-11	Callawa	0.0-1.0	Silty sand
			1.0-2.5	Clayey sand
	NH09-12	Callawa	0.0-2.5	Silty sand
	NH09-13	Callawa	0.0-2.2	Silty sand
	NH09-14	Callawa	0.0-2.2	Clayey sand
	NH09-15	Callawa	0.0-0.5	Clayey sand
			0.5-2.2	Silty sandy gravel
	NH10-01	Nita	0.0-2.9	Silty sand
	NH10-02	Nita	0.0-3.0	Silty sand
	NH10-03	Nita	0.0-3.1	Silty sand
	NH10-04	Nita	0.0-3.0	Silty sand
	NH10-05	Nita	0.0-1.2	Silty sand
			1.2-2.3	Sandy gravel
	NH10-06	Nita	0.0-2.2	Silty sand
	NH10-07	Nita	0.0-2.4	Silty sand
	NH10-08	Nita	0.0-2.9	Silty sand
	NH10-09	Nita	0.0-2.8	Silty sand
	NH10-10	Nita	0.0-2.5	Silty sand
	NH10-11	Nita	0.0-2.5	Silty sand
	NH10-12	Nita	0.0-2.5	Silty sand
	NH10-13	Nita	0.0-1.7	Silty sand
			1.7-2.7	Clayey gravel
	NH10-14	Nita	0.0-2.0	Sand
	NH10-15	Nita	0.0-2.4	Silty sand
	BPA-01	Callawa	0.0-0.1	Sand
			0.1-0.9	Ferricrete gravel
	BPA-02	Callawa	0.0-0.1	Sand
			0.1-2.3	Gravel
	BPA-03	Callawa	0.0-1..8	Gravel
	BPA-04	Nita	0.0-0.6	Sand
			0.6-2.0	Sandy gravel
	BPA-05	Callawa	0.0-0.4	Sand
			0.4-1.1	Gravel
			1.1-2.0	Sandy gravel

Soil Inspection Site	Geotech site	Land system	Depth	Texture
	BPA-06	Nita	0.2-2.8	Silty Sand
	BPA-07	Nita	0.0-0.1	Sand
			0.1-1.7	Gravel
	BPA-08	Nita	0.0-2.7	Clayey sand
	BPA-09	Nita	0.0-2.2	Clayey sand
	BPA-10	Nita	0.0-2.1	clayey sand
	BPA-11	Nita	0.0-0.5	Sand
			0.5-2.6	Sandy gravel
	BPA-12	Nita	0.0-2.5	Silty sand
	BPA-13	Nita	0.0-1.7	Clayey sand
	BPA-14	Nita	0.0-2.3	Clayey sand
	BPA-15	Nita	0.0-2.8	Silty sand
	BPA-16	Nita	0.0-2.8	Silty sand
	BPA-17	Nita	0.0-2.8	Sand
	BPA-18	Nita	0.0-2.8	Silty sand
	BPA-19	Nita	0.0-2.0	Silty sand
	BPA-20	Callawa	0.0-0.2	Sand
			0.2-2.3	Gravel
	BPA-21	Callawa	0.0-0.3	Sand
			0.3-3.0	clayey sand
	BPA-22	Callawa	0.0-0.2	Sand
			0.2-0.6	Sandy gravel
			0.6-1.3	Ferricrete gravel
	BPA-23	Nita	0.0-0.3	Sand
			0.3-3.0	Silty sand
	BPA-24	Nita	0.0-0.4	Sand
			0.4-3.0	Silty sand
	BPA-25	Nita	0.0-0.4	Sand
			0.4-3.0	Silty sand
	BPA-26	Nita	0.0-0.2	Sand
			0.2-3.0	Silty sand
	BPA-27	Nita	0.0-0.2	Sand
			0.2-3.0	Silty sand
	BPA-28	Nita	0.0-0.2	Sand
			0.2-3.0	Silty sand
	BPA-29	Nita	0.0-0.5	Sand
			0.5-3.0	Silty sand
	BPA-30	Nita	0.0-0.5	Sand
			0.5-3.0	Silty Sand
	BPA-31	Little Sandy	0.0-0.5	Sand
			0.5-3.0	Silty sand
	BYP1-01	Nita	0.0-1.5	Silty sand
			1.5-2.8	Clayey gravelly sand
	BYP1-02	Nita	0.0-0.4	Silty sand
			0.4-3.0	Clayey sand

Soil Inspection Site	Geotech site	Land system	Depth	Texture
	BYP1-03	Callawa	0.0-0.2	Sand
			0.2-2.0	clayey sand
	BYP1-04	Nita	0.0-0.4	Sand
			0.4-1.1	Silty sand
			1.1-2.2	silty sand
	BYP1-05	Nita	0.0-0.3	Sand
			0.3-3.0	silty sand
	BYP1-06	Nita	0.0-0.2	Sand
			0.2-3.0	Clayey sand
	BYP1-07	Nita	0.0-0.3	Sand
			0.3-3.0	Clayey sand
	BYP1-08	Callawa	0.0-0.3	Sand
			0.3-1.1	Clayey sand
			1.1-2.5	Sandy gravel
	BYP1-09	Callawa	0.0-0.3	Sand
			0.3-1.8	Sandy gravel
	BYP1-10	Callawa	0.0-1.0	Sand
			1.0-2.5	Silty sand
	BYP1-11	Callawa	0.0-1.5	Sand
			1.5-2.0	Sandy gravel
	BYP1-12	Callawa	0.0-1.0	Sand
			1.0-2.5	Clayey sand
	BYP1-13	Callawa	0.0-1.0	Sand
			1.0-3.0	Clayey sand
	BYP1-14	Callawa	0.0-1.5	Sand
			1.5-3.0	Clayey sand
	BYP1-15	Callawa	0.0-1.0	Sand
			1.0-2.2	Clayey sand
	BYP2-01	Callawa	0.0-0.3	Sand
			0.3-1.1	Gravel
			1.1-1.8	Ferricrete gravel
	BYP2-02	Callawa	0.0-0.2	Sand
			0.2-0.4	Sandy gravel
			0.4-1.7	Ferricrete gravel
	BYP2-03	Callawa	0.0-0.2	Sand
			0.2-0.5	Sandy gravel
			0.5-1.5	Ferricrete gravel
	BYP2-04	Callawa	0.0-0.1	Sand
			0.1-0.5	Sandy gravel
			0.5-1.4	Ferricrete gravel
	BYP2-05	Callawa	0.0-0.4	Sand
			0.4-0.5	Sandy gravel
			0.5-1.3	Ferricrete gravel
	BYP2-06	Callawa	0.0-0.3	Sand
			0.3-1.3	Gravelly sand

Soil Inspection Site	Geotech site	Land system	Depth	Texture
			1.3-2.6	Sandy gravel
	BYP2-07	Callawa	0.0-0.7	Silty sand
			0.7-2.6	Sandy gravel
	BYP2-08	Callawa	0.0-0.8	Silty sand
			0.8-1.8	Sandy gravel
	BYP2-09	Callawa	0.0-1.7	Silty sand
			1.7-2.4	Sandy gravel
	BYP2-10	Callawa	0.0-0.5	Silty sand
			0.5-2.5	Sandy gravel
	BYP2-11	Callawa	0.0-2.2	silty sand
			2.2-3.0	Sandy gravel
	BYP2-12	Callawa	0.0-0.8	Silty sand
			0.8-1.8	Sandy gravel
	BYP2-13	Callawa	0.0-0.5	Sand
			0.5-2.1	Silty sand
	BYP2-14	Callawa	0.0-0.5	Sand
			0.5-2.0	Silty sand
	BYP2-15	Callawa	0.0-0.6	Sand
			0.6-2.1	Silty sand
	BYP3-01	Callawa	0.0-0.2	Sand
			0.2-0.6	Sandy gravel
			0.6-1.4	Ferricrete gravel
	BYP3-02	Callawa	0.0-0.1	Sand
			0.1-0.4	Sandy gravel
			0.4-0.8	Ferricrete gravel
	BYP3-03	Callawa	0.0-0.3	Sand
			0.3-0.8	Sandy gravel
			0.8-1.2	Ferricrete gravel
	BYP3-04	Callawa	0.0-0.6	sand
			0.6-0.8	Sandy gravel
			0.8-1.0	Ferricrete gravel
	BYP3-05	Callawa	0.0-0.3	Sand
			0.3-0.6	silty gravelly sand
			0.6-1.2	Sandy gravel
	BYP3-06	Callawa	0.0-0.2	Sand
			0.2-0.8	Sandy gravel
	BYP3-07	Callawa	0.0-0.2	Sand
			0.2-0.4	Sandy gravel
			0.4-0.9	Ferricrete gravel
	BYP3-08	Callawa	0.0-0.2	Sand
			0.2-0.5	Sandy gravel
			0.5-1.1	Ferricrete gravel
	BYP3-09	Callawa	0.0-0.7	Sandy gravel
			0.7-0.9	Ferricrete gravel
			0.0-0.3	gravelly sand

Soil Inspection Site	Geotech site	Land system	Depth	Texture
	BYP3-10	Callawa	0.3-0.5	Sandy gravel
			0.5-0.9	Ferricrete gravel
	BYP3-11	Callawa	0.0-0.4	sand
			0.4-2.2	Sandy gravel
	BYP3-12	Callawa	0.0-0.5	Sand
			0.5-2.3	Sandy gravel
	BYP3-13	Callawa	0.0-0.7	Sand
			0.7-1.6	Sandy gravel
			1.6-2.1	Ferricrete gravel
	BYP3-14	Callawa	0.0-0.6	Sand
			0.6-2.3	Sandy gravel
	BYP3-15	Callawa	0.0-0.2	Sand
			0.2-1.5	Sandy gravel
			1.5-1.8	Ferricrete gravel
	HDP02	Little Sandy	0.0-0.3	Sand
			0.3-3.0	Silty sand
	HDP03	Little Sandy	0.0-0.3	Sand
			0.3-3.0	Silty sand
	HDP09	Little Sandy	0.0-0.3	Sand
			0.3-3.0	silty sand
	HDP10	Little Sandy	0.0-0.3	Sand
			0.3-3.0	Silty sand
	OD1A-01	Little Sandy	0.0-0.2	Sand
			0.2-2.6	clayey sand
	OD1A-02	Little Sandy	0.0-0.2	Sand
			0.2-2.7	Clayey sand
	OD1A-03	Little Sandy	0.0-0.3	Sand
			0.3-2.6	Clayey sand
	OD1A-04	Little Sandy	0.0-0.2	Sand
			0.2-2.7	Clayey sand
	OD1A-05	Little Sandy	0.0-0.3	Sand
			0.3-2.8	Clayey sand
	OD1A-06	Little Sandy	0.0-0.3	Sand
			0.3-2.6	Clayey sand
	OD1A-07	Little Sandy	0.0-0.3	Sand
			0.3-2.6	Clayey sand
	OD1A-08	Little Sandy	0.0-0.3	Sand
			0.3-2.7	Clayey Sand
	OD1A-09	Little Sandy	0.0-0.3	Sand
			0.3-2.4	Clayey Sand
	OD1A-10	Little Sandy	0.0-0.2	Sand
			0.2-2.6	Clayey Sand
	OD1A-11	Little Sandy	0.0-0.3	Sand
			0.3-2.7	Clayey sand
	OD1A-12	Little Sandy	0.0-0.3	Sand

Soil Inspection Site	Geotech site	Land system	Depth	Texture
	OD1A-12	Little Sandy	0.3-3.0	Clayey sand
	OD1B-01	Little Sandy	0.0-0.3	Sand
			0.3-2.1	Clayey sand
	OD1B-02	Little Sandy	0.0-0.3	Sand
			0.3-3.0	Clayey sand
	OD1B-03	Little Sandy	0.0-0.3	Sand
			0.3-3.0	Silty Sand
	OD1B-04	Little Sandy	0.0-0.2	Sand
			0.2-1.6	Clayey Sand
			1.6-2.1	Silcrete
	OD1B-05	Little Sandy	0.0-0.2	Sand
			0.2-0.5	Clayey Sand
			0.5-2.7	Silcrete
	OD1B-06	Little Sandy	0.0-0.3	Sand
			0.3-1.8	Clayey sand
			1.8-2.1	Silcrete
	OD1B-07	Little Sandy	0.0-0.3	Sand
			0.3-3.0	Silty Sand
	OD1B-08	Little Sandy	0.0-0.3	Sand
			0.3-3.0	Clayey sand
	OD1B-09	Little Sandy	0.0-0.3	Sand
			0.3-2.8	Clayey sand
	OD1B-10	Little Sandy	0.0-0.3	Sand
			0.3-2.3	Clayey Sand
	OD1B-11	Little Sandy	0.0-0.3	Sand
			0.3-2.6	Clayey Sand
	OD1B-12	Little Sandy	0.0-0.2	Sand
			0.2-3.0	Clayey Sand
	OD1B-13	Little Sandy	0.0-0.3	Sand
			0.3-1.5	Clayey Sand
			1.5-2.2	Clayey gravelly sand
	OD1B-14	Little Sandy	0.0-0.2	Sand
			0.2-2.4	Clayey Sand
	OD1B-15	Little Sandy	0.0-0.3	Sand
			0.3-3.0	Clayey Sand
	OD1B-16	Little Sandy	0.0-0.3	Sand
			0.3-3.0	Clayey Sand
	OD1B-17	Little Sandy	0.0-0.2	Sand
			0.2-3.0	Clayey sand
	OD2-01	Little Sandy	0.0-0.2	Sand
			0.2-0.4	Clayey sandy gravel
			0.4-1.0	Silcrete
	OD2-02	Little Sandy	0.0-0.2	Sand
			0.2-1.0	Clayey gravelly sand
			1.0-1.8	Silcrete

Soil Inspection Site	Geotech site	Land system	Depth	Texture
	OD2-03	Little Sandy	0.0-0.2	Sand
			0.2-0.5	Clayey gravelly sand
			0.5-1.1	Silcrete
	OD2-04	Little Sandy	0.0-0.3	Sand
			0.3-0.6	Clayey gravelly sand
			0.6-1.1	Silcrete
	OD2-05	Little Sandy	0.0-0.3	Sand
			0.3-0.6	Clayey gravelly sand
			0.6-1.3	Silcrete
	OD2-06	Little Sandy	0.0-0.4	Sand
			0.4-1.0	Silcrete
	OD2-07	Little Sandy	0.0-0.8	clayey Sand
			0.8-1.4	Silcrete
	OD2-08	Little Sandy	0.0-0.3	Sand
			0.3-0.4	Clayey gravelly sand
			0.4-1.7	silcrete
	OD2-09	Little Sandy	0.0-0.3	Sand
			0.3-1.7	Silcrete
	OD2-10	Little Sandy	0.0-0.1	Sand
			0.1-1.0	Clayeye gravelly sand
			1.0-1.3	Silcrete
	OD2-11	Little Sandy	0.0-0.4	Sand
			0.4-0.5	Clayey gravelly sand
			0.5-0.9	Silcrete
	OD2-12	Little Sandy	0.0-0.2	Sand
			0.2-0.9	Silcrete
	OD2-13	Little Sandy	0.0-0.5	Silty sand
			0.5-1.4	Silcrete
	OD2-14	Little Sandy	0.0-0.3	Sand
			0.3-0.5	Clayey gravelly sand
			0.5-1.3	Silcrete
	OD2-15	Little Sandy	0.0-0.3	Sand
			0.3-1.7	Clayey Sand
			1.7-2.1	Clayey sandy gravel
	OD2-16	Little Sandy	0.0-0.3	Sand
			0.3-0.5	Clayey gravelly sand
			0.5-2.3	Silcrete
	CH1-01	Little Sandy	0.0-0.2	Sand
			0.2-2.7	Silty sand
	CH1-02	Little Sandy	0.0-0.2	Sand
			0.2-3.0	Silty sand
	CH1-03	Little Sandy	0.0-0.2	Sand
			0.2-3.0	Silty sand
	CH1-04	Little Sandy	0.0-0.2	Sand
			0.2-3.0	Silty sand

Soil Inspection Site	Geotech site	Land system	Depth	Texture
	CH1-05	Little Sandy	0.0-0.2	Sand
			0.2-3.0	Silty Sand
	CH1-06	Little Sandy	0.0-0.2	Sand
			0.2-3.0	Silty Sand
	CH1-07	Little Sandy	0.0-0.2	Sand
			0.2-3.0	Silty sand
	CH1-08	Little Sandy	0.0-0.2	Sand
			0.2-0.9	Silty sand
			0.9-1.9	Ferricrete gravel
	CH1-09	Little Sandy	0.0-0.2	Sand
			0.2-1.8	Silty Sand
			1.8-2.4	gravelly sand
	CH1-10	Little Sandy	0.0-0.2	Sand
			0.2-3.0	Silty sand
	CH1-11	Little Sandy	0.0-0.2	Sand
			0.2-3.0	Silty sand
	CH1-12	Little Sandy	0.0-0.2	Sand
			0.2-3.0	Silty sand
	CH1-13	Little Sandy	0.0-0.2	Sand
			0.2-3.0	Silty sand
	CH1-14	Little Sandy	0.0-0.2	Sand
			0.2-2.5	Silty Sand
	CH1-15	Little Sandy	0.0-0.2	Sand
			0.2-2.6	Silty sand
	CH2A-01	Little Sandy	0.0-0.2	Sand
			0.2-1.0	Silty Sand
			1.0-2.0	Sandy gravel
	CH2A-02	Little Sandy	0.0-0.2	Sand
			0.2-2.9	Sandy gravel
	CH2A-03	Little Sandy	0.0-0.1	Sand
			0.1-2.0	Ferricrete gravel
	CH2A-04	Little Sandy	0.0-0.2	Sand
			0.2-0.4	Sandy gravel
			0.4-1.4	Ferricrete gravel
	CH2A-05	Little Sandy	0.0-0.2	Sand
			0.2-0.5	Sandy gravel
			0.5-2.0	Ferricrete gravel
	CH2A-06	Little Sandy	0.0-0.3	Sand
			0.3-0.5	Sandy gravel
			0.5-1.5	Ferricrete gravel
	CH2A-07	Little Sandy	0.0-0.5	Sand
			0.5-1.0	Sandy gravel
			1.0-3.0	Ferricrete gravel
	CH2A-08	Little Sandy	0.0-0.6	Sand
			0.6-2.4	Sandy gravel

Soil Inspection Site	Geotech site	Land system	Depth	Texture
	CH2A-09	Little Sandy	0.0-0.4	Sand
			0.4-1.6	gravelly sand
			1.6-2.0	Silcrete
	CH2A-10	Little Sandy	0.0-0.3	Sand
			0.3-0.6	Sandy gravel
			0.6-1.8	Ferricrete gravel
	CH2A-11	Little Sandy	0.0-0.2	Sand
			0.2-0.6	Sandy gravel
			0.6-1.7	Ferricrete gravel
	CH2A-12	Little Sandy	0.0-0.2	Sand
			0.2-0.6	Gravelly sand
			0.6-1.3	Ferricrete gravel
	CH2A-13	Little Sandy	0.0-0.7	Sand
			0.7-1.5	Sandy gravel
			1.5-2.3	Ferricrete gravel
	CH2A-14	Little Sandy	0.0-0.2	Sand
			0.2-1.0	Ferricrete gravel
			1.0-2.8	Gravel
	CH2A-15	Little Sandy	0.0-2.9	Sand
	CH2B-01	Little Sandy	0.0-2.9	Sand
	CH2B-02	Little Sandy	0.0-2.4	Sand
	CH2B-03	Little Sandy	0.0-2.3	Sand
	CH2B-04	Little Sandy	0.0-2.2	Silty sand
	CH2B-05	Little Sandy	0.0-1.6	Silty Sand
			1.6-2.0	Sandy gravel
	CH2B-06	Little sandy	0.0-2.8	Silty sand
	CH2B-07	Little sandy	0.0-3.0	Silty sand
	CH2B-08	Little sandy	0.0-2.4	Silty sand
	CH2B-09	Little sandy	0.0-1.4	Silty sand
			1.4-1.8	Silty sandy gravel
	CH2B-10	Little Sandy	0.0-2.3	Silty sand
	CH2B-11	Little Sandy	0.0-1.1	Silty sand
			1.1-2.6	Ferricrete gravel
	CH2B-12	Little Sandy	0.0-0.8	Sand
			0.8-3.0	Ferricrete gravel
	CH2B-13	Little Sandy	0.0-1.5	Sand
			1.5-1.9	silty gravelly sand
	CH2B-14	Little Sandy	0.0-2.0	Sand
	CH3A-01	Little Sandy	0.0-2.0	Sand
	CH3A-02	Little Sandy	0.0-1.9	Sand
	CH3A-03	Little Sandy	0.0-1.5	Sand
			1.5-2.8	Sandy gravel
	CH3A-04	Little Sandy	0.0-1.6	Sand
			1.6-2.7	Gravelly sand
	CH3A-05	Little Sandy	0.0-3.0	Silty sand

Soil Inspection Site	Geotech site	Land system	Depth	Texture
	CH3A-06	Little Sandy	0.0-2.3	Sand
	CH3A-07	Little Sandy	0.0-1.8	Sand
	CH3A-08	Little Sandy	0.0-1.8	Silty sand
	CH3A-09	Little Sandy	0.0-1.8	Sand
	CH3A-10	Little Sandy	0.0-1.6	Silty sand
			1.6-2.9	Sandy gravel
	CH3A-11	Little Sandy	0.0-2.3	Clayey sand
	CH3A-12	Little Sandy	0.0-0.6	Sand
			0.6-2.5	Silty sand
	CH3B-01	Little Sandy	0.0-0.6	Sand
			0.6-1.6	Silty sand
			1.6-2.0	Gravelly sand
	CH3B-02	Little Sandy	0.0-1.3	Silty Sand
			1.3-1.7	Sandy gravel
			1.7-3.0	Ferricrete gravel
	CH3B-03	Little Sandy	0.0-1.5	Silty sand
			1.5-3.0	Sandy gravel
	CH3B-04	Little Sandy	0.0-0.2	Sand
			0.2-3.0	Silty sand
	CH3B-05	Little Sandy	0.0-1.4	Silty sand
			1.4-3.0	Gravelly sand
	CH3B-06	Little Sandy	0.0-1.8	Silty sand
			1.8-3.0	Gravelly sand
	CH3B-07	Little Sandy	0.0-1.1	Silty Sand
			1.1-2.8	Sandy gravel
	CH3B-08	Little Sandy	0.0-1.5	Silty Sand
			1.5-2.7	silty gravelly sand
	CH3B-09	Little Sandy	0.0-1.9	Silty sand
	CH3B-10	Little Sandy	0.0-1.2	Silty sand
			1.2-2.7	gravelly sand
	CH3B-11	Little Sandy	0.0-1.5	Silty sand
			1.5-2.9	Sandy gravel
	CH3B-12	Little Sandy	0.0-1.9	Silty Sand
HR01	NH02-BORR-05	Callawa	0.0-1.85	Sandy gravel
	NH10B-BOOR-04	Nita	0.0-0.6	Sand
			0.6-1.2	Sandy gravel
			1.2-3.4	Ferricrete gravel
	NH10B-BORR-05	Nita	0.0-0.6	Sand
			0.6-2.75	Sandy gravel
	NH10B-BORR-06	Nita	0.0-0.7	Sand
			0.7-2.65	Sandy gravel
	NH10B-BORR-07	Nita	0.0-0.35	Sand
			0.35-0.75	Sandy gravel
			0.75-3.0	Ferricrete gravel
	NH10B-BORR-	Nita	0.0-0.6	Sand

Soil Inspection Site	Geotech site	Land system	Depth	Texture
	08	Nita	0.6-2.9	Sandy gravel
	NH-201	Nita	0.0-0.3	Sand
			0.3-3.8	Sand
	NH-202	Nita	0.0-0.2	Sand
			0.2-0.8	Sand
			0.8-4.0	Sand
	NH-203	Nita	0.0-0.9	Sand
			0.9-3.8	Sand
	NH-204	Nita	0.0-0.3	Sand
			0.3-4.0	Sand
	NH-205	Nita	0.0-0.2	Sand
			0.2-1.0	Sand
			1.0-4.0	Sand
	NH-206	Nita	0.0-0.4	Sand
			0.4-3.8	Sand
	NH-207	Nita	0.0-0.2	Sand
			0.2-4.5	Sand
	NH-208	Nita	0.0-0.2	Sand
			0.2-3.8	Sand
	NH-209	Nita	0.0-0.2	Sand
			0.2-3.8	Sand
	NH-210	Nita	0.0-0.1	Sand
			0.1-3.8	Sand
	NH-211	Nita	0.0-0.2	Sand
			0.2-4.5	Sand
	NH-212	Nita	0.0-2.8	Sand
	NH-213	Nita	0.0-3.0	Sand
	NH-214	Nita	0.0-2.5	Sand
	NH-215	Nita	0.0-4.5	Sand
	NH-216	Nita	0.0-4.5	Sand
	NH-217	Nita	0.0-4.0	Sand
	NH-218	Nita	0.0-2.8	Sand
	NH-219	Nita	0.0-3.5	Sand
	NH-220	Nita	0.0-2.7	Sand
	NH-221	Nita	0.0-2.8	sand
	NH-223	Nita	0.0-4.0	Sand
	NH-223-C	Nita	0.0-0.85	Sandy gravel
			0.85-1.45	Ferricrete gravel
	NH-223-D	Nita	0.0-0.8	Ferricrete gravel
	NH-224	Nita	0.0-4.0	Sand
	NH-225	Nita	0.0-3.8	Sand
HR06	NH-226	Nita	0.0-4.8	Sand
	NH-227	Nita	0.0-2.8	Sand
	NH-228	Nita	0.0-4.3	Sand
	NH-229	Callawa	0.0-0.65	Sandy gravel

Soil Inspection Site	Geotech site	Land system	Depth	Texture
	NH-229	Callawa	0.65-.95	Ferricrete gravel
HR04	NH-230	Buckshot	0.0-0.3	Sand
			0.3-2.5	Sandy gravel
			2.5-4.0	Ferricrete gravel
	NH-231	Nita	0.0-3.3	Sand
	NH-232	Nita	0.0-3.7	Sand
	NH-233	Nita	0.0-2.0	Sand
HR03	NH-234	Buckshot	0.0-1.0	Sand
			0.9-1.5	Sandy gravel
	NH-235	Nita	0.0-2.0	Sand
	NH-236	Nita	0.0-4.0	Sand
HR05	NH-237	Callawa	0.0-0.2	Sandy gravel
			0.2-2.5	Sandy gravel
	NH-238	Nita	0.0-0.95	sand
			0.95-2.5	Sandy gravel
HR02	NH-239	Nita	0.0-4.0	Sand