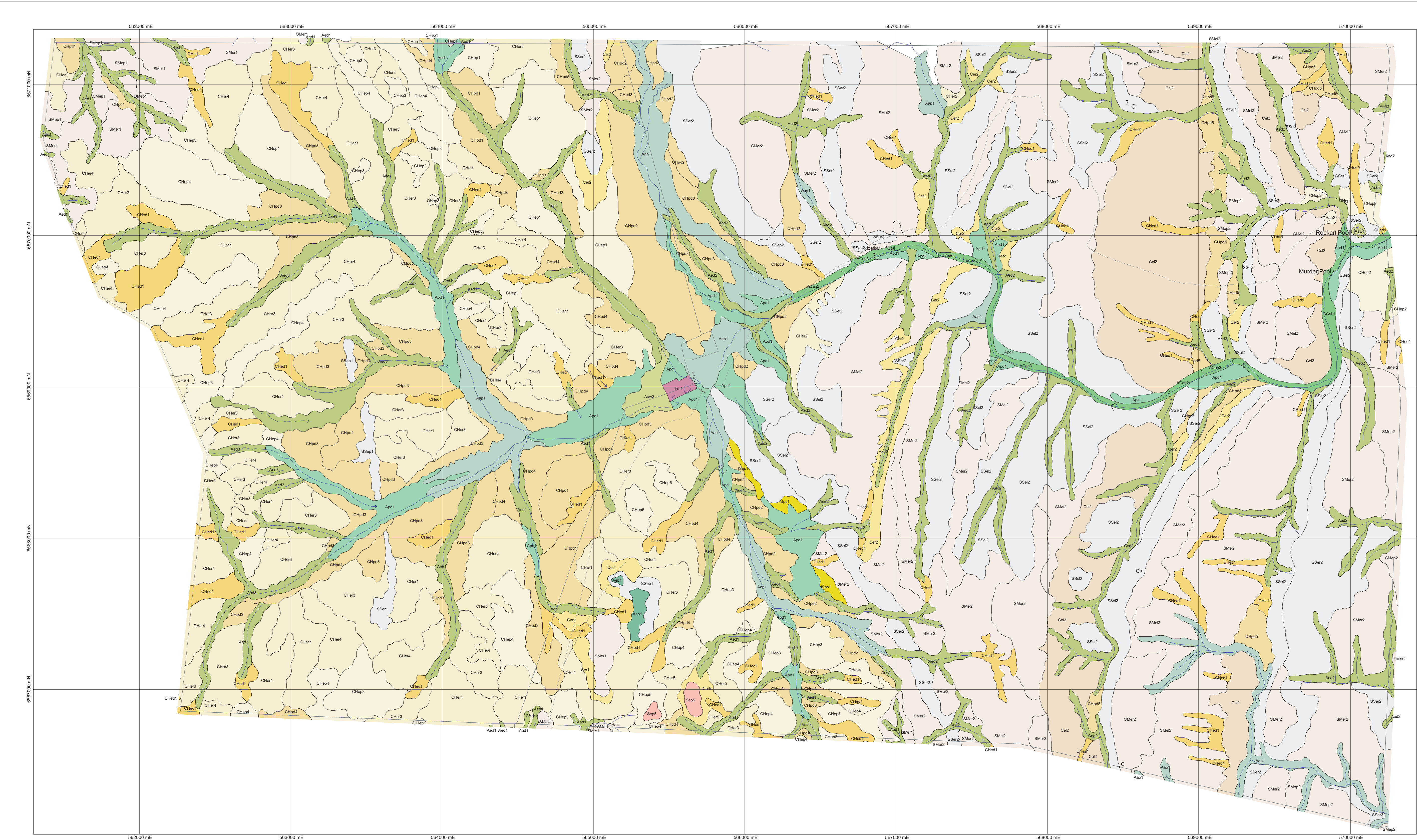


Scale 1:12,500

FOWLERS GAP
Sandstone and Sandstone Ridge Paddocks Regolith-Landforms

SECOND EDITION
Subject to revision



TRANSPORTED REGOLITH

Alluvial sediments	
Aa1	Red-brown, rounded to angular lithic and quartzose sands, gravels and silts. Low relief (< 9 m) landforms containing a mixture of incised channels and overbank deposits, typically associated with local depositorites and floodouts of alluvial channels and drainage depressions. Chenopod shrubland dominated by <i>Atropis vesicaria</i> and <i>Mycoporum montanum</i> . Rounded and minor angular sands and silts with scattered gravel composed of lithic fragments, quartz and minor silicified sediment clasts. Low-lying depressions holding ephemeral standing water within stream channels. Woodland dominated by <i>Eucalyptus camaldulensis</i> trees.
Aa2	Rounded and minor angular sands and silts with scattered gravel composed of lithic fragments, quartz and minor silicified sediment clasts. Low-lying depressions forming pools between stream channels. Typically associated with station dunes. Sparse and forest on exposed sediments with dense shrubland around margins dominated by <i>Acacia victoriae</i> and <i>Mycoporum montanum</i> .
ACa1	Rounded and angular lithic and quartzose sands, gravels and minor silts. Sandy meandering and braided channels. Riparian woodland dominated by <i>Eucalyptus camaldulensis</i> and minor <i>Grevillea striata</i> trees.
ACa2	Rounded and angular lithic and quartzose sands, gravels and minor silts. Sandy meandering and braided channels. Riparian woodland dominated by <i>Acacia victoriae</i> and <i>Mycoporum montanum</i> small trees and shrubs.
ACa3	Rounded and minor angular gravels, sands and silts composed of vein quartz and lithic fragments and minor silicified sediment clasts, some weathered bedrock exposures. Incised channels and gullies and flanking valley sides. Chenopod shrubland dominated by <i>Atropis vesicaria</i> and <i>Mareana</i> spp. with riparian shrubland of <i>Acacia victoriae</i> , <i>Mycoporum montanum</i> , <i>Hakea leucophaea</i> , <i>Xanthium</i> spp. and grasses including <i>Cymbopogon ambiguus</i> .
Ae1	Rounded and minor angular gravels, sands and silts composed of sandstone lithic fragments, minor quartz and silicified sediment clasts, some weathered bedrock exposures. Incised channels and gullies and flanking valley sides. Chenopod shrubland dominated by <i>Atropis vesicaria</i> and <i>Mareana</i> spp. with riparian shrubland of <i>Acacia victoriae</i> , <i>Mycoporum montanum</i> , <i>Hakea leucophaea</i> and <i>Xanthium</i> spp. and grasses including <i>Cymbopogon ambiguus</i> .
Ae2	Rounded to sub-angular quartzose and silicified sediment clast gravels and sands with muscovite. Minor red-brown quartzose sand and silt. Incised channels and gullies and flanking valley sides. Chenopod shrubland dominated by <i>Atropis vesicaria</i> and <i>Mareana</i> spp. with riparian shrubland of <i>Acacia victoriae</i> , <i>Mycoporum montanum</i> , <i>Hakea leucophaea</i> and <i>Xanthium</i> spp. and grasses including <i>Cymbopogon ambiguus</i> .
Ae3	Rounded and minor angular quartzose and lithic sands, gravels and silts. Smooth, low relief (< 9 m) landforms typically associated with intersection point floodouts of alluvial channels and drainage depressions. Chenopod shrubland dominated by <i>Atropis vesicaria</i> and <i>Sclerolobium</i> spp.
Ap1	Red-brown sub-rounded to sub-angular quartzose and lithic sands, gravels and silts. Smooth, low relief (< 9 m) landforms typically associated with intersection point floodouts of alluvial channels and drainage depressions. Chenopod shrubland dominated by <i>Atropis vesicaria</i> , <i>Mareana</i> spp. and <i>Sclerolobium</i> spp.

Colluvial sediments	
Ca2	Angular, lithic and quartzose gravel with red-brown quartzose sand and silt. High topographic relief (30-90 m) landforms. Chenopod shrubland dominated by <i>Atropis vesicaria</i> and open woodland with <i>Acacia aneura</i> trees.
Ca1	Angular, lithic (mostly quartzite clasts but also variably kaolinitised and ferruginised bedrock clasts) and quartzose gravels with red-brown quartzose sands and silts. Slight topographic relief (0-30 m). Chenopod shrubland dominated by <i>Atropis vesicaria</i> and <i>Sclerolobium</i> spp.
Ca3	Angular, lithic (mostly sandstone clasts) gravels and boulders with red-brown quartzose sands and silts with minor hardpan regolith carbonate. Slight topographic relief (0-30 m). Chenopod shrubland dominated by <i>Mareana</i> spp. and <i>Atropis vesicaria</i> .
Ch1	Rounded and minor sub-angular quartzose and silicified sediment clast gravels. Minor red-brown quartzose sand and silt. Slight topographic relief (0-30 m). Chenopod shrubland dominated by <i>Atropis vesicaria</i> .
Ch2	Red-brown, sub-rounded to sub-angular, quartzose and variably kaolinitised and ferruginised lithic sands, gravels and silts. Elongate incised depressions and valleys with irregular 'corridor banding' surface light patterns. Circular depressions ('motelholes') along the long axis of depressions. Chenopod shrubland dominated by <i>Mareana</i> spp., <i>Atropis vesicaria</i> and <i>Sclerolobium</i> spp.
Ch3	Angular lithic (dominantly quartzite clasts) and quartzose gravels and red-brown quartzose sands and silts. Shallow bedrock subcrop. Low-relief (< 9 m), low gradient, locally shading sediment. Chenopod shrubland dominated by <i>Atropis vesicaria</i> and <i>Atropis vesicaria</i> .
Ch4	Angular lithic (dominantly sandstone clasts) gravels and red-brown quartzose sands and silts and hardpan regolith carbonates. Low-relief (< 9 m), low gradient, locally shading sediment. Chenopod shrubland dominated by <i>Mareana</i> spp. and <i>Atropis vesicaria</i> .
Ch5	Rounded to sub-angular quartzose and silicified sediment clast gravels and sands with muscovite. Minor red-brown quartzose sand and silt. Low-relief (< 9 m), low gradient, locally shading sediment. Chenopod shrubland dominated by <i>Atropis vesicaria</i> , <i>Mareana</i> spp. and scattered <i>Casuarina pauper</i> trees.
Ch6	Rounded and angular quartzose, silicified sediment and ferruginised bedrock clasts and sands with muscovite. Minor red-brown quartzose sand and silt. Low-relief (< 9 m), low gradient, locally shading sediment. Chenopod shrubland dominated by <i>Atropis vesicaria</i> , <i>Mareana</i> spp. and scattered <i>Casuarina pauper</i> trees.
Ch7	Rounded and minor sub-angular quartzose and silicified sediment clast gravels. Minor red-brown quartzose sand and silt. Low-relief (< 9 m), low gradient, locally shading sediment. Open chenopod shrubland dominated by <i>Atropis vesicaria</i> and <i>Sclerolobium</i> spp.
Ch8	Angular lithic (dominantly quartzite clasts) and quartzose gravels and red-brown quartzose sands and silts. Shallow bedrock subcrop. Moderate relief (0-30 m), locally shading sediment. Chenopod shrubland dominated by <i>Atropis vesicaria</i> , <i>Mareana</i> spp. and scattered <i>Casuarina pauper</i> trees.
Ch9	Rounded and angular quartzose, silicified sediment and ferruginised bedrock clasts and sands with muscovite. Minor red-brown quartzose sand and silt. Low-relief (< 9 m), low gradient, locally shading sediment. Chenopod shrubland dominated by <i>Atropis vesicaria</i> , <i>Mareana</i> spp. and scattered <i>Casuarina pauper</i> trees.
Ch10	Rounded and minor sub-angular quartzose and silicified sediment clast gravels. Minor red-brown quartzose sand and silt. Moderate relief (0-30 m), locally shading sediment. Open chenopod shrubland dominated by <i>Atropis vesicaria</i> and <i>Sclerolobium</i> spp.
Ch11	Angular lithic (dominantly quartzite clasts) and quartzose gravels and red-brown quartzose sands and silts. Shallow bedrock subcrop. Low-relief (< 9 m), with surficial contour band patterns and receiving sediment. Chenopod shrubland dominated by <i>Atropis vesicaria</i> , <i>Mareana</i> spp. and scattered <i>Casuarina pauper</i> trees.
Ch12	Rounded to sub-angular quartzose and silicified sediment clast gravels and sands with muscovite. Minor red-brown quartzose sand and silt. Low-relief (< 9 m), with surficial contour band patterns and receiving sediment. Chenopod shrubland dominated by <i>Atropis vesicaria</i> , <i>Mareana</i> spp. and scattered <i>Casuarina pauper</i> trees.
Ch13	Rounded and angular, quartzose, silicified sediment and ferruginised bedrock clasts and sands with muscovite. Minor red-brown quartzose sand and silt. Low-relief (< 9 m), with surficial contour band patterns and receiving sediment. Chenopod shrubland dominated by <i>Atropis vesicaria</i> , <i>Mareana</i> spp. and scattered <i>Casuarina pauper</i> trees.
Ch14	Rounded and minor sub-angular quartzose and silicified sediment clast gravels. Minor red-brown quartzose sand and silt. Low-relief (< 9 m), with surficial contour band patterns and receiving sediment. Open chenopod shrubland dominated by <i>Atropis vesicaria</i> and <i>Sclerolobium</i> spp.
Ch15	Rounded and angular, quartzose, silicified sediment and ferruginised bedrock clasts and sands with muscovite. Minor red-brown quartzose sand and silt. Low-relief (< 9 m), with surficial contour band patterns and receiving sediment. Chenopod shrubland dominated by <i>Atropis vesicaria</i> , <i>Mareana</i> spp. and scattered <i>Casuarina pauper</i> trees.

Aeolian sediments	
Isa1	Rounded and well-sorted red-brown, quartzose sand with minor hardpan regolith carbonates. Low-relief (< 9 m) with small coppice dunes surrounding vegetation. Open woodland, dominated by <i>Acacia aneura</i> and an understory with <i>Mareana</i> spp.
Fn1	Regolith disturbed by machinery and construction. Irregular landforms. Sparse vegetation, often introduced weed species, to barren.

IN SITU REGOLITH

Saprolite	
SM1	Kaolinitic and micaceous weathered bedrock with prominent cleavage planes and minor quartz veins. High topographic relief (30-90 m). Chenopod shrublands dominated by <i>Atropis vesicaria</i> , <i>Sclerolobium</i> spp. with scattered <i>Casuarina pauper</i> trees.
SM2	Kaolinitic and micaceous weathered bedrock. Minor surficial ferruginisation and hardpan regolith carbonates. High topographic relief (30-90 m). Chenopod shrubland dominated by <i>Atropis vesicaria</i> , <i>Mareana</i> spp. and <i>Sclerolobium</i> spp. with <i>Acacia aneura</i> and <i>Alecoryx olivaceus</i> trees and <i>Acacia tetragynophylla</i> and <i>Enemophila</i> spp. shrubs.
SM3	Kaolinitic and micaceous weathered bedrock with prominent cleavage planes and minor quartz veins. Minor surficial ferruginisation. Low-relief (< 9 m), low gradient, locally shading sediment. Chenopod shrubland dominated by <i>Atropis vesicaria</i> and <i>Sclerolobium</i> spp. with scattered <i>Casuarina pauper</i> trees.
SM4	Kaolinitic and micaceous weathered bedrock. Minor surficial ferruginisation and hardpan regolith carbonates. Low-relief (< 9 m), low gradient, locally shading sediment. Chenopod shrubland dominated by <i>Atropis vesicaria</i> , <i>Mareana</i> spp. and <i>Sclerolobium</i> spp. with <i>Acacia aneura</i> and <i>Alecoryx olivaceus</i> trees and <i>Acacia tetragynophylla</i> and <i>Enemophila</i> spp. shrubs.
SM5	Kaolinitic and micaceous weathered bedrock with prominent cleavage planes and minor quartz veins. Moderate relief (0-30 m), locally shading sediment. Chenopod shrublands dominated by <i>Atropis vesicaria</i> and <i>Sclerolobium</i> spp. with scattered <i>Casuarina pauper</i> trees.
SM6	Kaolinitic and micaceous weathered bedrock. Minor surficial ferruginisation and hardpan regolith carbonates. Moderate relief (0-30 m), locally shading sediment. Chenopod shrubland dominated by <i>Atropis vesicaria</i> , <i>Mareana</i> spp. and <i>Sclerolobium</i> spp. with <i>Acacia aneura</i> and <i>Alecoryx olivaceus</i> trees and <i>Acacia tetragynophylla</i> and <i>Enemophila</i> spp. shrubs.
SM7	Variably kaolinitic and ferruginised weathered bedrock with or without prominent cleavage planes. Highly friable when not indurated. Minor regolith carbonates and quartz veins. Moderate relief (0-30 m), locally shading sediment. Sparse chenopod shrubland dominated by <i>Atropis vesicaria</i> and <i>Sclerolobium</i> spp. and rare <i>Casuarina pauper</i> trees.

Saprock	
SSa2	Hard, quartzose, slightly weathered bedrock with prominent bedding planes. High topographic relief (30-90 m). Chenopod shrubland dominated by <i>Atropis vesicaria</i> , <i>Mareana</i> spp. and <i>Sclerolobium</i> spp. with <i>Acacia aneura</i> and <i>Alecoryx olivaceus</i> trees and <i>Acacia tetragynophylla</i> and <i>Enemophila</i> spp. shrubs.
SSa1	Hard, quartzose, slightly weathered bedrock with prominent bedding planes. Low topographic relief (< 9 m). Chenopod shrubland dominated by <i>Atropis vesicaria</i> , <i>Mareana</i> spp. and <i>Sclerolobium</i> spp. with <i>Acacia aneura</i> and <i>Alecoryx olivaceus</i> trees and <i>Acacia tetragynophylla</i> and <i>Enemophila</i> spp. shrubs.
SSa3	Hard, quartzose, slightly weathered bedrock with prominent bedding planes. Low-relief (< 9 m), low gradient, locally shading sediment. Chenopod shrubland dominated by <i>Atropis vesicaria</i> , <i>Mareana</i> spp. and <i>Sclerolobium</i> spp. with <i>Acacia aneura</i> and <i>Alecoryx olivaceus</i> trees and <i>Acacia tetragynophylla</i> and <i>Enemophila</i> spp. shrubs.
SSa4	Hard, quartzose, slightly weathered bedrock. Prominent conchoidal features and light part rate. Moderate relief (0-30 m), locally shading sediment. Chenopod shrublands dominated by <i>Atropis vesicaria</i> and <i>Sclerolobium</i> spp. with sparse <i>Acacia aneura</i> trees.
SSa5	Hard, quartzose, slightly weathered bedrock with prominent bedding planes. Moderate relief (0-30 m), locally shading sediment. Chenopod shrubland dominated by <i>Atropis vesicaria</i> , <i>Mareana</i> spp. and <i>Sclerolobium</i> spp. with <i>Acacia aneura</i> and <i>Alecoryx olivaceus</i> trees and <i>Acacia tetragynophylla</i> and <i>Enemophila</i> spp. shrubs.

Saprolite	
SSa6	Rounded to sub-angular quartzose and lithic clast gravel and sand with muscovite. Minor red-brown quartzose sand and silt. Low-relief (< 9 m), low gradient, locally shading sediment. Chenopod shrubland dominated by <i>Atropis vesicaria</i> , <i>Mareana</i> spp. and scattered <i>Casuarina pauper</i> trees.

RLU key descriptions for the Sandstone and Sandstone Ridge Regolith-Landform map

The Regolith-Landform Unit (RLU) polygon codes provide a framework to present the regolith materials and associated landforms on the map sheet across the area. They are designed to first list the regolith lithology in capital letter codes, then landform in lower case codes. The number following each RLU code allows for discrimination of variations within broader regolith landform assemblages (typically due to differences in composition, vegetation assemblages or other attributes). The RLU codes are largely based upon interpretation of the dominant regolith-landform process responsible for their formation (i.e. genetic process). Following the scheme of Pan et al. (2003), lithological and other RLU attributes are described in the map legend descriptions and accompanying map report.

RLU codes for regolith materials used here are:	
A	Alluvial channel
AC	Alluvial channel sediments
C	Cultural sediments
CH	Sheetflow sediments
F	Floodplain
IS	Isolated
SM	Saprolite
SS	Slightly weathered bedrock (saprolite)
S	Weathered bedrock, grade indeterminate (saprolite)

RLU codes for landforms used here are:	
al	alluvial channel
ac	alluvial channel
ed	erosional plain (0-3 m relief)
er	erosional rise (0-30 m relief)
el	erosional low (0-30 m relief)
m	man-made
pd	positional plan
ps	sandplain

Feature: C - cave; or waterhole, named

Track

Fence

Drainage line

Kioskpoint

0 1 2

km

Sandstone and Sandstone Ridge Paddocks 1:12,500 Regolith-Landforms map

Regolith-landform units compiled by S.M. Hill (CRC LEME, University of Adelaide), cartography and images compiled by I.C. Roach, NTCC Lecturer, CRC LEME, Australian National University.

It is recommended that this map be referred to as:

Hill S.M. & Roach I.C. 2007. Sandstone and Sandstone Ridge Paddocks 1:12,500 Regolith-Landform map. Cooperative Research Centre for Landscape Environments and Mineral Exploration, Perth, WA.

The regolith-landform polygons on this map are based on an interpretation of 1:10,000 scale aerial photographs, airborne geophysical imagery (gamma-ray spectrometry and magnetometry) and extensive field mapping. It is the intention of this map to identify and characterise surface materials and landforms for the purposes of landscape studies, natural resource management and mineral exploration.

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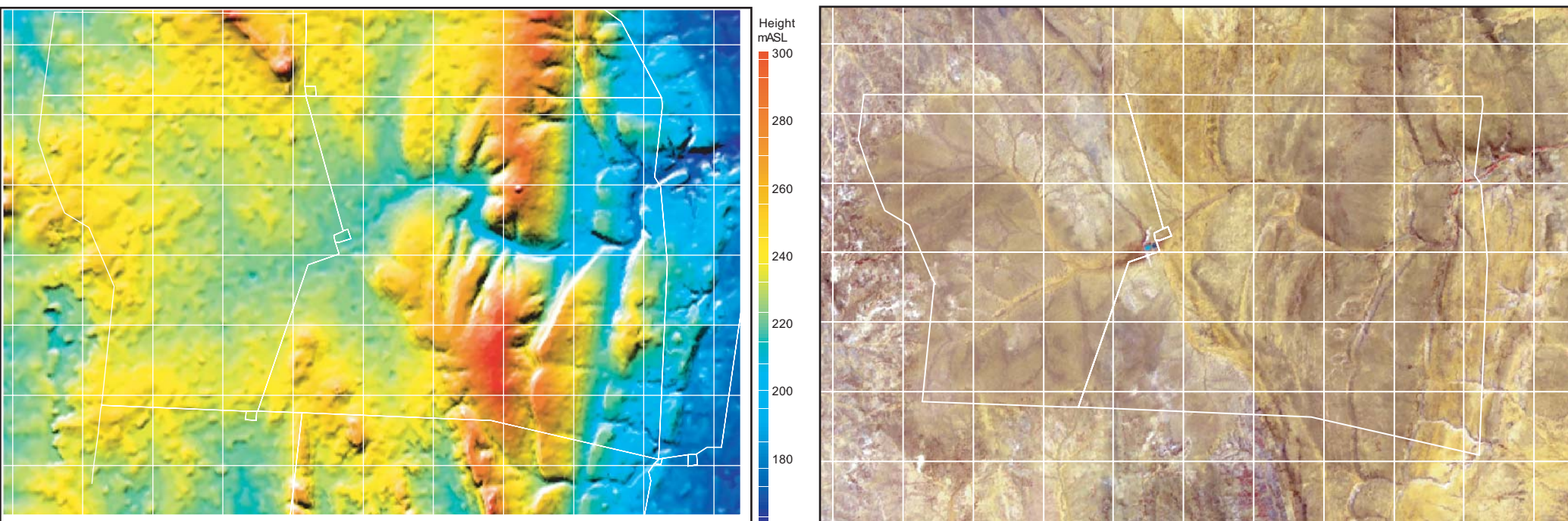
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Most information is digitised from 1:10,000 scale aerial photographs or is taken directly from digital track logs of hand-held GPS devices. A small proportion of information is taken from the New South Wales Department of Primary Industries' BHS-2 Geophysical Dataset.

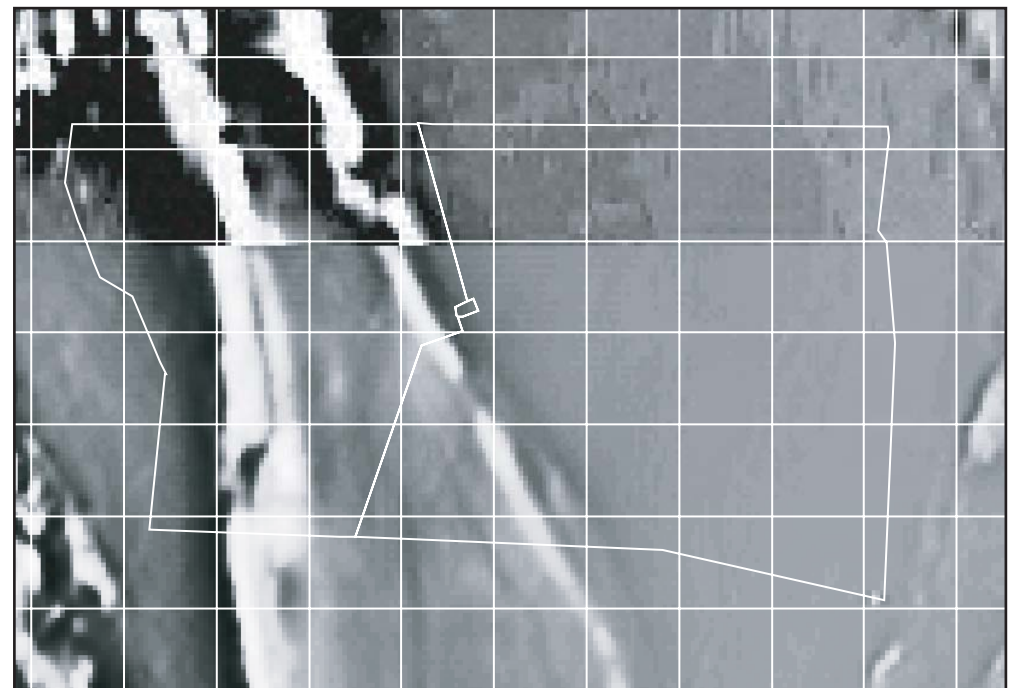
CRC LEME acknowledges the support of Dr David Croft, Director, University of New South Wales Fowler's Gap And Zone Research Station, in the production of this map. Shuttle Radar Topography Mission (SRTM) Digital Elevation Model (DEM) courtesy of NASA. ASTER image courtesy of LP DAAC, USGS. Geophysical images courtesy of the Geological Survey, NSW Department of Primary Industries.

CRC LEME is an unincorporated joint venture between the Australian National University, The University of Adelaide, The University of Technology, Perth, CSIRO Exploration and Mining, Geoscience Australia, Primary Industries and Resources South Australia, The New South Wales Department of Primary Industries and the Minerals Council of Australia, established and supported under the Australian Government's Cooperative Research Centres Program.

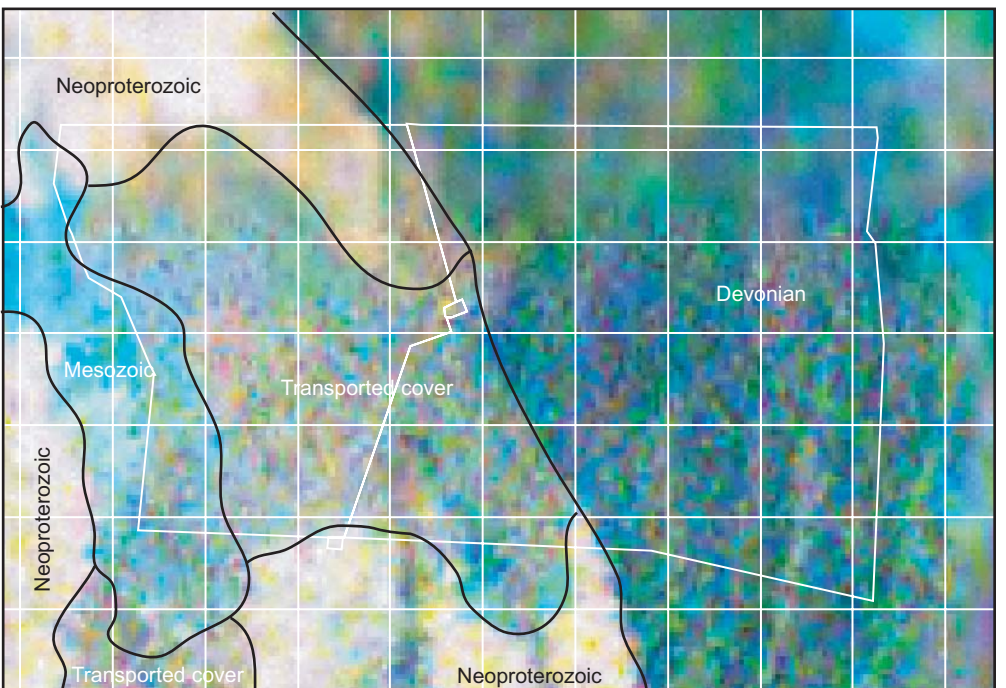
Copies of this map may be obtained from:
c/o CSIRO Division of Exploration and Mining
PO Box 1130
Bentley WA 6102
http://crlme.org.au/



Digital Elevation Model (DEM) of the Sandstone and Sandstone Ridge Paddocks derived from hand-digitised Fowler's Gap Field Station 1:25,000 scale topographic contours at 5 m vertical contour interval and the Shuttle Radar Topography Mission (SRTM) 90 m ground resolution pixel DEM. SRTM heights were used to fill in the 1:25,000 topographic contour heights where gaps of more than 50 m existed horizontally between adjacent topographic contours. The image is sunshaded from the north-east with a sun elevation of 30 degrees. The speckled appearance on areas of low relief is due to digital noise and levelling errors in the SRTM data.



First Vertical Derivative (1VD) aeromagnetics of the Sandstone and Sandstone Ridge Paddocks combined from the BHE (southern two thirds of image) and Koonenberry (northern one third) datasets from the Geological Survey, NSW Department of Primary Industries, with interpretation. The radiollements potassium (K), Thorium (eTh) and Uranium (eU) are displayed as red, green and blue respectively. This image highlights Mesozoic and Neoproterozoic rocks and transported regolith cover in the west and Devonian rocks in the east, separated by the Nundooka Range Fault running diagonally from top left to bottom right. Devonian sandstone in the east has low emissivity and tends to be moderately eTh- and eU-rich. Adelaidean slates in the west have mostly moderate emissivity where saprolite is exposed except for a folded quartzite bed in the central south and eTh-rich ferruginous float in the Sandstone and southwest Sandstone Ridge Paddocks. Cretaceous sediments in the far west and northwest moderate eTh emissivity.



Gamma ray spectrometric (airborne radiometric) image of the Sandstone and Sandstone Ridge Paddocks from the Koonenberry dataset of the Geological Survey, NSW Department of Primary Industries, with interpretation. The radiollements potassium (K), Thorium (eTh) and Uranium (eU) are displayed as red, green and blue respectively. This image highlights Mesozoic and Neoproterozoic rocks and transported regolith cover in the west and Devonian rocks in the east, separated by the Nundooka Range Fault running diagonally from top left to bottom right. Devonian sandstone in the east has low emissivity and tends to be moderately eTh- and eU-rich. Adelaidean slates in the west have mostly moderate emissivity where saprolite is exposed except for a folded quartzite bed in the central south and eTh-rich ferruginous float in the Sandstone and southwest Sandstone Ridge Paddocks. Cretaceous sediments in the far west and northwest moderate eTh emissivity.

