

Surficial materials

- Sandy calcrete, caliche**
Groundwater calcretes, as well as widely separated, slightly raised platforms are distributed along the edges of saline drainages in the east and northeast of the area. Although generally grey to white in colour and massive or nodular, it does contain sand, laterite gravel and clay from adjoining coluvial units. This material has not been worked.
- Fericrete**
Fericrete occurs northeast of Perenjori as small, widely separated outcrops of residual, reddish brown, hard, tabular, plastic or massive laterite crusts on 18 crests and summit surfaces. It is generally up to 3 m in thickness. This material has not been worked.
- Alluvial sand and gravel**
Alluvial plains, floodplains and river terraces are subject to regular flooding from multiple watercourses of the major rivers – the upper reaches of the Lockyer River and its tributaries, and tributaries of the Yarra Yarra Lakes trunk drainage system. The material comprises firm to hardsetting, red and reddish brown sands and silty sands grading to clay at depth. Two active gravel pits are located 35 km southwest of Coorow with a further inactive sand pit 23 km northwest of Camamah.
- Coluvial sand and gravel**
Coluvial material covers 30% of the area in the central, northern and eastern parts of the area. It forms gently undulating slopes flanking the main saline trunk drainages that have a cover of hardsetting, reddish brown sandy silt grading to silty sand with brown to greyish brown quartz sand over pale yellow sands and gravelly sands. Residual, light brownish yellow, slightly gravelly, medium-grained quartz sand forms over weathered granites. Two active gravel pits occur 8 km northwest of Morawa and 35 km northwest of Three Springs. Twenty three inactive sand and gravel pits are present, all in a north trending belt in the central part of the area.
- Eolian sand**
Eolian sand is present as a series of small deposits 40 km east of Morawa as source border dunes on the margins of the main saline trunk drainage. The sand is generally a pale grey, leached, quartz sand overlying yellow quartz sand. This material has not been worked.
- Lateritic gravel**
Lateritic gravel is found in the eastern and southern parts of the area as concentrations of loose, iron-rich nodules and pebbles and fragments, commonly set in a clay-rich or sandy matrix on gently sloping coluvial hilltops. The material on these slopes is relatively thin, 1-2 m. Four active gravel pits are present in the area south of Perenjori. A further 51 inactive gravel pits are located throughout the southern part of the area.
- Sandpelin sand and gravel**
Sandpelin sand and gravel covers 38% of the area and consists of fine to gently undulating sandpelin with few drainage links. The materials of the sandpelin consist of fine, pale yellowish brown, silty quartz sands between 1-3 m in thickness overlying ferruginous, sandy lateritic gravel, which becomes cemented with depth. The gravel overlies weathered sandstone and siltstone bedrock. Eighty one inactive sand and gravel pits lie mainly in the area south of Three Springs and Perenjori.
- Siltcrete**
A single, isolated outcrop of siltcrete is located 42 km east of Morawa. It is a grey, massive, indurated siliceous duricrust of quartz grains cemented by silica and is probably developed on granite bedrock.

Hard rocks

Sedimentary rocks

- Banded iron-formation**
Banded iron-formation (BIF) outcrops in a narrow belt east of Morawa where it is exposed in sequences of laminated BIF with interbedded shale and grey, white and yellowish brown chert bands. This material has not been worked.
- Chert**
Chert outcrops in an area 25 km north of Three Springs, around Camamah and south of Coorow. It represents silicified dolomite, sandstone and other sedimentary rocks. Silicification took place soon after deposition. The chert is silicified, ranging from white to grey and red and brown. It is commonly laminated and brecciated. A small inactive sand pit is found in this material 25 km southwest of Morawa.
- Sandstone**
Sandstone is found in a belt 10-25 km west of Three Springs where it comprises well-bedded, feldspathic quartz sandstone overlain by residual, thin sandy silts and gravels. The sandstone is thinly bedded and cross-bedded in places, with some siltstone and shale. The material has not been worked.
- Sandstone, minor conglomerate**
Sandstone commonly outcrops west of Morawa and north of Three Springs. Lithologies include well-bedded and cross-laminated quartz and feldspathic sandstone, pebbly sandstone and conglomerate. Clasts in the pebbly beds are predominantly of volcanic origin. In places, well-laminated and massive siltstone is common. This material has not been worked.
- Basalt**
Isolated outcrops of basalt dominantly outcrop 27 km east of Morawa. They are grey to dark green, generally massive rocks although pillow and vesicular lavas and breccias are also present. This material has not been worked.
- Felicit volcanic and volcanoclastic rocks**
Rhyolite, dacite, and other felsic lavas, felsic volcanoclastic sediments, pyroclastic tuffs and agglomerates are present 15 km north of Perenjori on hills and ridges with steep rocky upper slopes and stony lower slopes. They are generally dense, pale-coloured and fine-grained, although some may be porphyritic. None of the outcrops have been worked.
- Gabbro**
Small, isolated outcrops of gabbro and dolerite (microgabbro) crop out 32 km east and 47 km east-northeast of Morawa and 50 km northwest of Perenjori on rounded hills and stony ridges. Gabbro is a dense, greenish or dark-coloured, coarse-grained, intrusive igneous rock. This material has not been worked.
- Granite**
Granites include a range of rocks: porphyritic granite, granule and granite gneiss. They outcrop extensively throughout the area as low hills and domes with boulder strewn slopes and deeply dissected terrain. Granites are generally pink to grey, medium- to coarse-grained, equigranular rocks, though porphyritic, banded and other textures are common. A single operating quarry is located 3.5 km northeast of Camamah.
- Ultramafic rock**
Ultramafic rocks – peridotite, pyroxenite and their weathering products – outcrop in two small outcrops 25 km north and 50 km northwest of Perenjori. The rocks are dark coloured, dense, medium to coarse grained. This material has not been worked.

Quarries and pits

- Active
Inactive
Agg Aggregate
Gvl Gravel
Sd Sand

Tenure for basic raw materials

- Crown reserve for basic raw materials

- Homebased
Major road
Minor road
Railway, operating
Dormsite (Land Administration Act 1997)
Class A National Park & Nature Reserve
Local Government Authority boundary
Drainage
Contour, elevation in metres

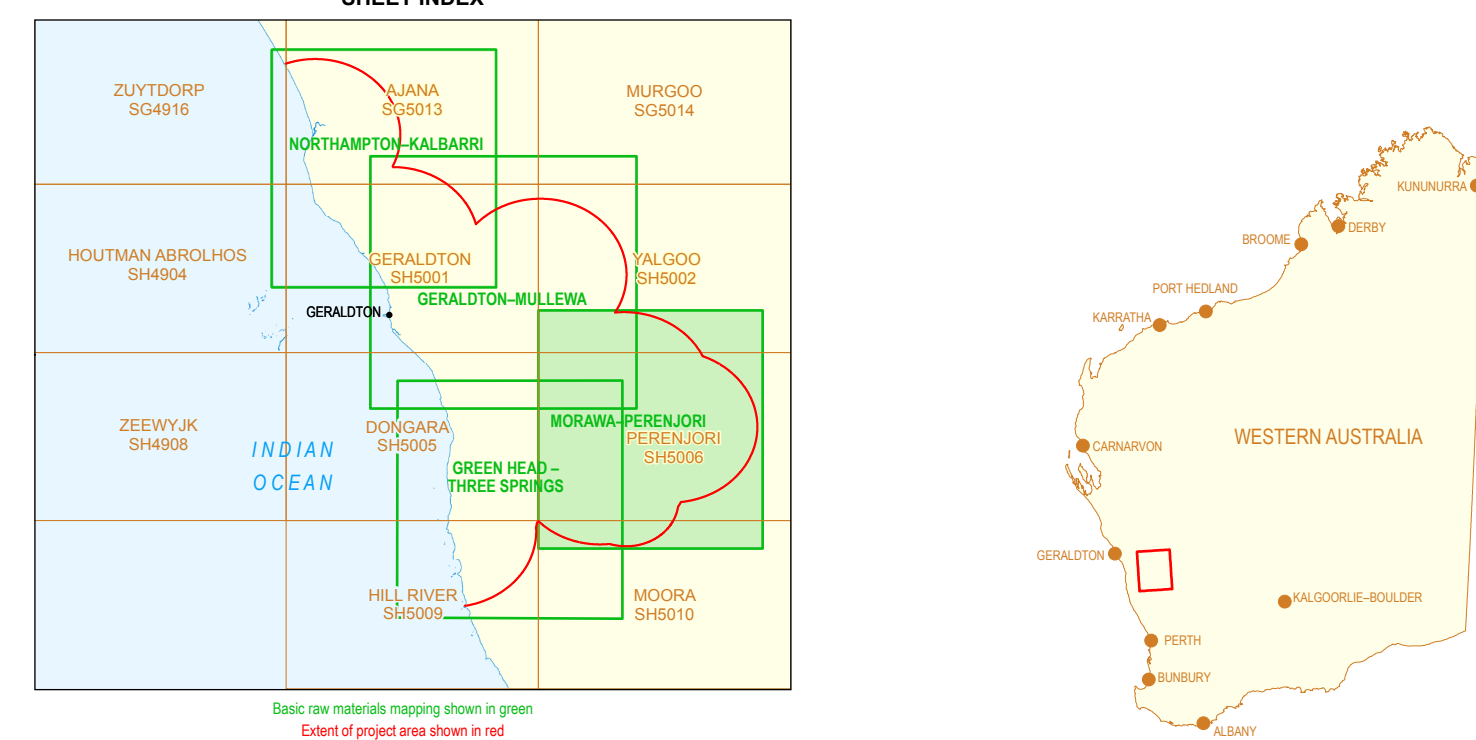
Basic raw materials on this map have been compiled from existing Geological Survey of Western Australia and Department of Agriculture and Food WA maps.
Uncoloured areas indicate unworked bedrock and surficial deposits not considered basic raw material resources.

DATA SOURCES

Theme	Date/Currency	Organization
Basic raw materials	2014	Geological Survey of Western Australia, Department of Mines and Petroleum
Topography	2013	Landgate / Geoscience Australia
Contours	2006	Geological Survey of Western Australia, Department of Mines and Petroleum
Water resources	2016	Mining Titles Division, Department of Mines and Petroleum

1 WA State Government unless otherwise indicated.

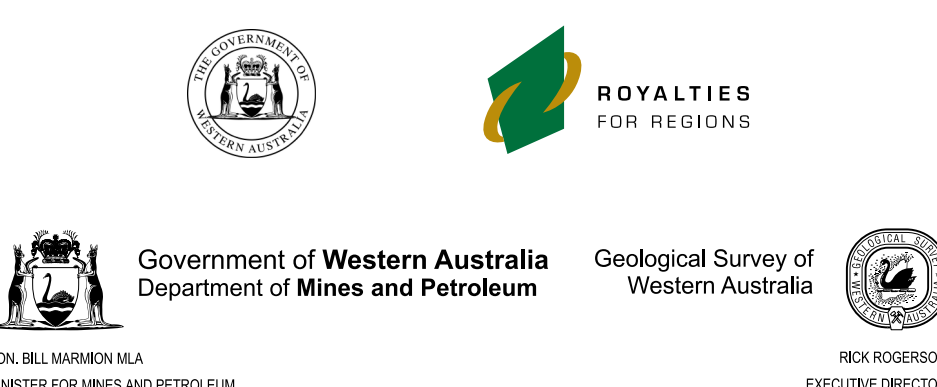
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Compiled by Geological Survey of Western Australia 2015

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Edited by F. Edson and K. Greenberg
Published by the Geological Survey of Western Australia
This map is published in digital format (PDF) and is available online at: www.dmp.wa.gov.au/GSWA/Publications.
Copies are available from:
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The recommended reference for this map is:
Geological Survey of Western Australia 2015, Basic raw material resources, Morawa-Perenjori (1:200 000 scale).
Geological Survey of Western Australia, Resource Potential for Land Use Planning.

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SCALE 1:200 000
Horizontal
Universal Transverse Mercator Projection
MORAWA-GERALDTON DISTRICT COORDINATE SYSTEM AUSTRALIA 1984
VERTICAL DATUM: AUSTRALIAN HEIGHT DATUM
Grid coordinates are 40 000 metres West of the New Grid Australia Zone 50.
The Map Grid Australia (MGA) is based on the Geocentric Datum of Australia 1984 (GDA84).
GDA84 coordinates are compatible within one metre of the datum WGS84 positions.

RESOURCE POTENTIAL FOR LAND USE PLANNING

Basic Raw Material Resources

MORAWA-PERENJORI

This mapping was produced to identify potential Basic Raw Material resources within close proximity of settlements between Green Head, Northampton and Morawa. The project received a funding contribution from the State Government of Western Australia through the Royalties for Regions Program.

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