

POLICY NO.	I.19
POLICY SUBJECT	Gravel Procurement
ADOPTION DATE	31 August 2017 (C.13/0817)
LAST REVIEW DATE	26 November 2020 (C.05/1120)

Objective

To provide guidelines for the acquisition of gravel for road construction and maintenance purposes. The policy explains the processes used by the Shire when approached by property owners seeking to sell/supply gravel as well as when the Shire approaches property owners.

Background

The taking of materials from private land is allowed under S 3.27 of the Local Government Act with the taking of materials to be subject to an agreement between the Shire and the landowner(s), including but not limited to addressing the royalty to be paid to the landowner(s) and rehabilitation of the pit area.

The Shire is continually on the lookout for prospective new gravel resources and regularly advertises its interest via notices in the Shire newsletter and in general discussions with rural land owners. Ideally the Shire would like to have suitable gravel sources throughout the Shire so that carting of materials to specific roadworks jobs can be reduced as much as possible however it is noted that this may not be possible due to the suitability and specification of gravel. Also land owners may only be interested in supplying gravel if the extraction is a “one-off” exercise and they may not be interested in allowing the Shire to develop a long term gravel source on their property.

The Department of Mines and Petroleum produces geological survey mapping for Western Australia. The following tertiary deposits have been identified as most likely to host gravels suitable for road construction specifications:

- CZL – Ironstone gravel plains, Laterite, chiefly massive but it includes overlying pizolithic gravel.
- Tg – Aluvial deposits, strongly laterized in part, conglomerate sand and clay

Two publications are extensively used in Western Australia to guide the selection of gravel for roadworks, being:

- “A Guide to the Selection and Use of Naturally Occurring Materials as Base and Sub-Base in Roads in Western Australia” (Main Roads WA & Australian Geo Mechanics Society 2002).
- “Standard Specification for Granular Pavement Materials” (Golder Associates on behalf of WALGA 2012). This publication specifies the requirements of unbound and lightly bound granular pavement materials including base course and sub base materials. The standard covers crushed or otherwise manufacture materials and naturally occurring materials such as laterite gravels and provides standard specifications for a range of crushed rock base course materials, gravel base course materials, ferricrete base course materials, stabilised base course materials and sub base materials. The

specification has been prepared for use throughout Western Australia and different types of materials have been identified based on factors such as traffic volumes and climatic conditions.

Policy

1. When contacted by land owners the Shire will conduct an assessment of the gravel source and if evidence exists that a suitably prospective supply of gravel exists the Shire will proceed to laboratory testing of the material. If quantity and quality of gravel is proven the Shire will register the location of the site and dependent upon the need for gravel a legal agreement will be entered into with the land owner identifying the location of the gravel, the responsibilities of each party (including access, recording of material taken, rehabilitation, etc.).
2. When investigating potential gravel sources (i.e. when the Shire approaches land owners directly) Shire staff will focus on areas within the CZL and Tg tertiary deposits.
3. Notwithstanding the focus that the Shire has when investigating potential gravel sources (Part 2 above), when receiving approaches from landowners seeking to offer gravel to the Shire all prospective sites will be assessed and investigated as suitable gravels may be found in other areas as geological mapping may not have identified all existing gravel deposits within the area.
4. In assessing the suitability of gravel, Shire staff will have regard to the following table:

TABLE 14
Typical Selection Criteria For Lateritic Gravels Based On Grading And Classification Tests⁽¹⁾

Type of Material	Lateritic Gravel				Crushed Rock ⁽²⁾
	Designation ⁽³⁾	Lt6	Lt10	Lt16	NS
	Sieve Size mm	% Passing	% Passing	% Passing	% Passing
Grading ⁽⁵⁾	37.5	100 ⁽⁴⁾	100 ⁽⁴⁾	100 ⁽⁴⁾	
	26.5				100
	19.0	71-100	95-100	95-100	95-100
	13.2				70-90
	9.5	50-81	50-100	50-100	60-80
	4.75	36-66	36-81	36-81	40-60
	2.36	25-53	25-66	25-66	30-45
	1.18	18-43	18-53	18-53	20-35
	0.60				13-27
	0.425	11-32	11-39	11-39	11-23
	0.30				8-20
	0.15				5-14
	0.075	4-19	4-23	4-23	5-11
	0.0135	2-9	2-11	2-11	
Dust Ratio ⁽⁶⁾	0.3-0.7	0.3-0.7	0.3-0.7	0.35-0.6	
Liquid Limit ⁽⁷⁾ %	≤25	≤30	≤35	≤25	
Plasticity Index %	≤6	≤10	≤16	NS	
Linear Shrinkage %	≤3	≤5	≤8	0.4-2.0	
P0.425 x LS ⁽⁸⁾	≤150	≤200	≤250	NS ⁽¹¹⁾	
Expected maximum Dry Compressive Strength ⁽⁹⁾ kPa	≥1700	≥1700	≥1700	≥1700	
Particle Toughness	Note ⁽¹⁰⁾	Note ⁽¹⁰⁾	Note ⁽¹⁰⁾	35	
Dryback %	≤ 85 ⁽¹²⁾	≤ 85 ⁽¹²⁾	≤ 85 ⁽¹²⁾	≤ 60 ⁽¹²⁾	

Source: "A Guide to the Selection and Use of Naturally Occurring Materials as Base and Sub-Base in Roads in Western Australia" (Main Roads WA & Australian Geo Mechanics Society 2002).

Note: The Lt6 selection criteria is used for base course and is the same as used by Main Roads Western Australia to select natural occurring laterite gravels for pavement construction of most rural roads in the South-West during the past 50 years. The Lt10 selection is used for subbase and as sheeting material on low traffic unsealed roads and is also suitable for light traffic sealed roads. Therefore, for the Shire of Bridgetown-Greenbushes:

- Any material generally meeting the Lt6 selection criteria is suitable base course material for any road construction; and
 - Any material generally meeting the Lt10 selection criteria is suitable as base course for light traffic sealed roads and for unsealed roads or as a sub base material.
 - Blending of materials can be undertaken to provide sufficient binder for base course material or to reduce plasticity of other material.
5. The Shire will also assess potential gravel sources against the specifications for 'Type 2.2 gravel base course material' and 'Type 2.5 gravel base course material' as specified in the "Standard Specification for Granular Pavement Materials (Golder Associates on behalf of WALGA 2012)" with the applicable specifications being:
- Type 2.2 gravel base course material – this material is suitable for use with a design traffic loading of less than 5×10^6 ESAs (equivalent standard axle) and is to consist of durable pebble in soil mortar. The

material shall be free from particles having any dimension greater than 50mm and free from clods, stumps, roots, sticks, vegetable matter or other deleterious materials.

- Type 2.5 gravel base course material – this material is suitable for use on most local government roads with a design traffic loading of less than 5×10^6 ESAs and is to consist of durable laterite pebble in soil mortar. The material shall be free from particles having any dimension greater than 50mm and free from clods, stumps, roots, sticks, vegetable matter or other deleterious materials.

6. Other factors to be taken into account when identifying potential gravel sources and procurement are:

- Proximity to planned road works
- Road access for haulage trucks
- Cost of extraction – machinery (dozer) requirements, site access, etc.
- Lifespan of pit and potential to stage extraction works
- Cost of rehabilitation