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Survey of Western Australian agricultural lime sources

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Department of
Agriculture and **Food**

Disclaimer

Acknowledgements

The Lime WA Inc. industry code of practice has given permission for the results of this lime survey to be presented in the same format used by the voluntary code of practice members in the hope that it will encourage more lime suppliers to become members of the code and provide detailed information about their products to their customers.

The cooperation of the participating agricultural lime suppliers enabled this survey to be successful and represent the majority of agricultural lime suppliers in WA.

This project was supported by the National Landcare Program's Western Australian Soil Health Extension project (No. 053039g), hosted by South Coast Natural Resource Management Inc. and Avon Catchment Council in partnership with the Department of Agriculture and Food, Western Australia and funded jointly by the Australian and Western Australian Governments.

Contents

Summary

As a service to WA wheatbelt farmers, to assist with cost-effective management of soil acidity, a survey of agricultural lime availability and quality was conducted by the Department of Agriculture and Food, Western Australia.

The quality of agricultural lime surveyed varied widely between pits. High quality lime is available from limesand, limestone and dolomite sources. Twice as much of the lowest neutralising value lime surveyed would need to be applied compared to the highest to achieve the same increase in soil pH. Limes also varied in the distribution of particle sizes. Selecting limes with a high proportion of finer particles would be necessary if rapid amelioration of acidity is important.

The west coast from Perth to Geraldton has abundant high quality lime sources. The number of sources diminishes moving south of Perth and east across the South Coast to Esperance. Limited numbers of inland sources of varying quality are also available.

The survey was well received and if repeated has potential to be a valuable source of communication with the industry and would provide valuable information to farmers and government.

Introduction

Applying agricultural lime is the most economical way of ameliorating low soil pH in broadscale agriculture. WA agriculture is well serviced by lime suppliers although pressures do exist on supplies which are in or near conservation areas and those impacted by urban development. Other pressures on the availability of lime for agricultural use include the increased demand by the mining, power and construction industries. The price of lime is subject to these and many other market influences, however the cost does not always reflect the quality as measured by neutralising value and fineness.

The quality of lime varies markedly around the state and it is recommended that both suppliers and purchasers of agricultural lime have a good knowledge of the product. The cost of lime should be considered in terms of the cost per tonne of neutralising value (delivered and spread). Both neutralising value and particle size distribution (fineness) are significant factors of lime quality which govern the rate of pH change in the soil over the short term (six months to a few years).

Members of the Lime WA Inc. group of independent lime suppliers in WA operate under a voluntary industry code of practice (www.limewa.com.au) and provide a standard Product Information Sheet with a detailed product description that allows growers to compare cost effectiveness using the online Lime Comparison Calculator (www.soilquality.org.au). Not all suppliers of agricultural lime are members of the Lime WA Inc. group and the level of information available to growers is inconsistent.

The Department of Agriculture and Food, Western Australia (DAFWA) conducted a survey in 2008 to assess the quality of agricultural lime available to WA wheatbelt farmers to assist them to cost-effectivley manage soil acidity. Participation by agricultural lime suppliers was voluntary and offered to all suppliers as a service to farmers.

This project was supported by the National Landcare Program's Western Australian Soil Health Extension project (No. 053039g), hosted by South Coast Natural Resource Management Inc. and Avon Catchment Council in partnership with the Department of Agriculture and Food, Western Australia and funded jointly by the Australian and Western Australian Governments.

Methods

Sampling

Lime pit owners were contacted and/or provided with a letter (Appendix C) inviting them to participate in a survey of lime supplies to WA agriculture. Once permission had been obtained and suitable times for sample collection organised, sampling was commenced and carried out during April and May in 2008 by Mr Dave Gartner, Senior Technical Officer at the Department of Agriculture and Food, Northam.

Representative samples (approximately 20) of lime were collected from the working face or current stockpile for each of the sources in the study. Care was taken to ensure that the sample was an accurate representation of the lime at each site. A total of about 15 kg of lime was collected at each site. The bulk sample was thoroughly mixed and divided into three plastic bags labelled with the survey (SCLS) number assigned to each pit. One set of bags was delivered to the laboratory for analysis, the second bag was retained at the Northam DAFWA office as a spare and the third bag was entered into the lime bank at the Northam office for future reference.

Site details, contact numbers and directions as well as pit photographs and GPS location were all recorded during the pit visit.

Laboratory analyses

The analytical results presented in this report were determined by the Chemistry Centre of WA in accordance with the procedures used to test lime samples for the Lime Industry Code of Practice. The methods are presented in more detail in Appendix B.

Results

A total of 37 agricultural lime pits were sampled over three weeks during April and May 2008, with one pit no longer operating and data not presented. A further six pits were contacted but either did not give approval to sample or did not return calls. In the main, suppliers were supportive of the project and its intent.

Many suppliers were aware of the importance of particle size and had modified their processes to get a higher proportion of fine particles. They were aware of needing to monitor their crushing plant performance.

The map shows the locations of all pits sampled, labelled with the sample identification; the corresponding pit names are shown in Table 1.

Table 1. *Agricultural lime pits sampled as part of the survey.*

Sample ID	Pit	Product	Location
SCLS1	Redgate Lime	Limestone	Witchcliffe
SCLS2	Doust Enterprises	Limesand	Karridale
SCLS4	WALCO Windy Harbour	Limestone	Windy Harbour
SCLS5	Ocean Beach Lime	Limesand	Denmark
SCLS6	Bornholm Ag Lime	Limesand	Bornholm
SCLS7	WALCO Manypeaks	Chalk lime	Manypeaks
SCLS8	Mason Bay Lime	Limestone	Hopetoun
SCLS9	Krystal Park Estate	Limestone	Hopetoun
SCLS10	Triple M Transport	Limesand	Esperance
SCLS11	Bremer Industrial Services	Limestone	Bremer Bay
SCLS12	Beaufort River Dolomite	Dolomite	Beaufort River
SCLS13	Kojonup Dolomite	Dolomite	Kojonup
SCLS14	Marononi Dolomite	Dolomite	Kojonup
SCLS15	Watheroo Dolomite	Dolomite	Watheroo
SCLS16	Watheroo Minerals W	Dolomite	Watheroo
SCLS17	Watheroo Minerals Y	Dolomite	Watheroo
SCLS18	Aglime Jurien	Limesand	Jurien Bay
SCLS19	Jurien Lime Sands	Limesand	Jurien Bay
SCLS20	Yarra Sands	Limesand	Coolimba
SCLS21	Aglime Dongara	Limesand	Dongara
SCLS22	Irwin Lime Sands	Limesand	Dongara
SCLS23	Greenhead Sands	Limesand	Green Head
SCLS24	Aglime Cervantes	Limesand	Cervantes
SCLS25	Aglime Lancelin	Limesand	Lancelin
SCLS26	Dala Pit	Limesand	Lancelin
SCLS27	Rules Limesand	Limesand	Lancelin
SCLS28	Optima Lancelin	Limesand	Lancelin
SCLS29	Optima Gingin	Limestone	Guilderton
SCLS30	JJ Hawkins	Limestone	Wanneroo
SCLS31	Doyle's Lime Service	Limestone	Myalup
SCLS32	Lake Preston Lime	Limestone	Myalup
SCLS33	Versaci Lime	Limestone	Myalup
SCLS34	Carbone Bros	Limestone	Myalup
SCLS37	Newdegate Dolomite	Dolomite	Magenta
SCLS39	Greens Dolomite	Dolomite	Magenta
SCLS40	Pingrup Dolomite	Dolomite	Pingrup

Survey details and analytical results as supplied by the Chemistry Centre of WA are presented in Appendix A.

There was a large range of neutralising values (Table 2) for the agricultural lime available to WA agriculture. In general, the limesand products had a higher proportion of particles below 0.5 mm, and higher neutralising values.

Locations of agricultural lime sources —surveyed April /May 2008

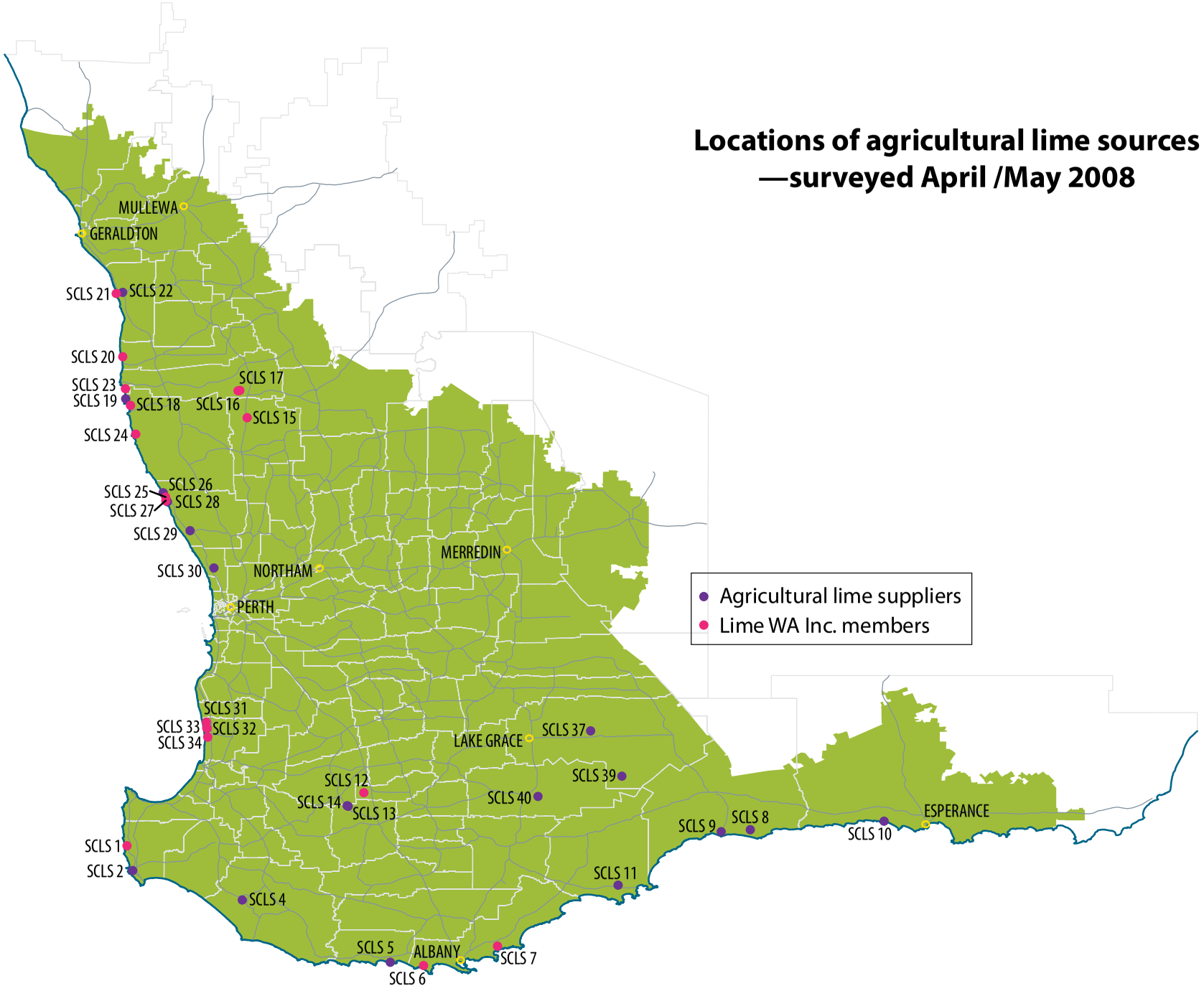

Table 2. *Range of bulk neutralising values for the different agricultural lime products.*

Product	Number of pits	Bulk neutralising value (%)	
		minimum	maximum
Limesand	15	60	96
Limestone	11	42	96
Dolomite	9	50	98
Chalk lime	1	76	

Industry feedback

The survey provided an opportunity to gather information from all suppliers of agricultural lime and in particular including those not currently members of Lime WA Inc. with whom the Department of Agriculture and Food has a long-standing relationship.

Many of the South Coast suppliers were concerned about the impact and future effect the mining industry will have on agricultural lime availability. It was reported that a lot of lime deposits have been pegged by mining companies and some traditional agricultural lime suppliers have been approached to supply lime to mines.

While most suppliers provided an estimate of the amount of lime that they had sold, they preferred not to disclose precise amounts for publication. Based on these estimates, the volume of lime distributed in 2007/08 would appear to be in excess of 800,000 tonnes, which is significantly more than Department of Agriculture and Food esitmates. However, this is less than half of the annual requirement for WA agriculture to treat existing low pH soils and on-going acidification.

How to interpret the results

Background chemistry

How lime works

Excess hydrogen ions in the soil solution cause soil acidity. When agricultural lime is applied, carbonate from calcium carbonate (or magnesium carbonate) neutralises acid in the soil. In acidic soil, calcium carbonate breaks up into calcium and carbonate ions. The carbonate joins with two hydrogen ions in the soil solution and forms carbon dioxide and water. The hydrogen ions that were contributing to soil acidity are now chemically bound in water.

$$\underset{\text{LIME}}{CaCO_3} + \underset{\text{ACID}}{2H^+} \longrightarrow \underset{\text{CALCIUM}}{Ca^{2+}} + \underset{\text{CARBON DIOXIDE}}{CO_2} + \underset{\text{WATER}}{H_2O}$$

Neutralising value (NV)

Since it is the carbonate that neutralises the acid in soil, how much carbonate the lime contains is important; and whether it is from limesand, limestone or dolomite doesn't matter. The neutralising value of lime is expressed as a percentage of pure calcium carbonate, which is given a value of 100%. The higher the neutralising value, the greater the capacity to neutralise acid in the soil and raise pH.

Particle size

The size of the lime particles determines how quickly the lime can neutralise acid. Lime with a higher proportion of finer particles has a larger surface area to react with the acid in soil. Research shows that finer limes increase pH faster (Whitten, 2001). For high neutralising value lime applied at rates greater than about 2.5 t/ha, the relative efficiency of coarse particles increases because of the greater total density of particles (Cregan *et al.*, 1989).

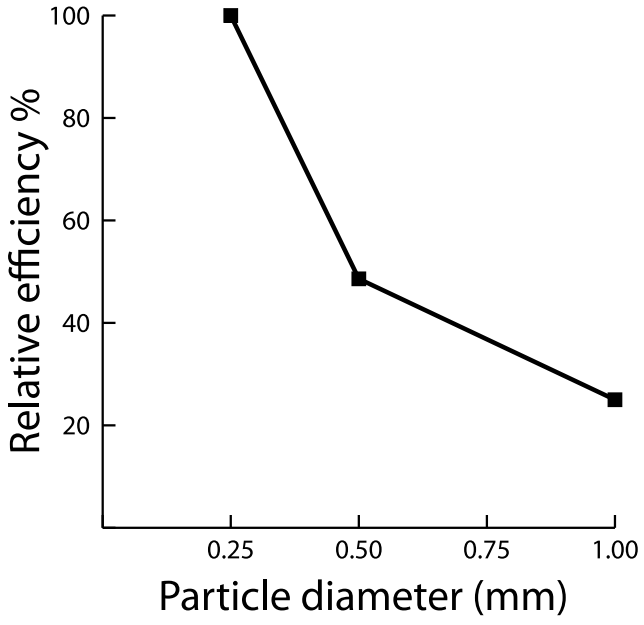

Figure 1. *Relative efficiencies of particles of agricultural lime in changing soil pH for an application rate of 2.5 t/ha. Adapted from Cregan et al., 1989.*

Cost effectiveness of limes

When selecting an agricultural lime to treat soil acidity the total cost needs to be considered. The total cost includes the purchase cost at pit, transport cost to paddock and spreading cost; all converted to 100% NV for equal comparison and discounted to allow for differences in particle size and speed of reaction. A useful tool for calculating and comparing the cost effectiveness of agricultural limes is the Lime Comparison Calculator on the soilquality.org.au website.

To allow comparison of the total cost per hectare for the equivalent of 100% neutralising value of lime, the Lime Comparison Calculator takes into account:

- cost of the lime
- cost of transport
- cost of spreading
- particle size distribution of the lime
- neutralising value of each particle size

The neutralising values of larger particle sizes are discounted using the values of Cregan *et al*. (1989) (see Figure 1) to account for the reduced capacity to change soil pH in the short term. The NV of particles under 0.5 mm is not discounted, the NV of 0.5–1 mm particles is discounted by 50% and the NV of particles greater than 1 mm is discounted by 80%.

A worked example

The calculations performed by the lime comparison calculator can be calculated by hand.

1. Calculate the percentage efficiency (EP)

Particle size (mm)	**% of lime***	**NV***	**Per cent efficiency (EP)** (% of lime) x NV x particle size discount factor
0–0.125	5	90.0	(5÷100) x 90 x **1** = 4.5
0.125–0.25	48	90.5	(48÷100) x 90.5 x **1** = 43.4
0.25–0.5	38	94.8	(38÷100) x 94.8 x **1** = 36.0
0.5–1	8	72.1	(8÷100) x 72.1 x **0.5** = 2.9
>1	1	62.5	(1÷100) x 62.5 x **0.2** = 0.1
			SUM = 86.9

***The neutralising value of each particle size and the percentage of the sample that it comprises can be found in Appendix A (current information should always be provided by the lime supplier).

2. Calculate the costs

Item	Cost/tonne ($)
lime	10
transport (@10c/km/t for 250 km)	25
spreading	8
	SUM =$43

3. Calculate the cost of effective lime on paddock

Effective cost = (100 ÷ EP) x costs

In this example, effective cost = (100÷86.9) x 43 **= $49.48**

For a lime with 100% percent efficiency, the effective cost would be the same as the actual cost. For a lime with an overall percentage efficiency of 50, the effective cost would be twice the actual cost.

Figure 2 shows the results from the above example (lime X) compared to a coarser lime of lower overall neutralising value (lime Y). Even though lime Y is 100 km closer to the farm it is still more cost-effective to purchase lime X.

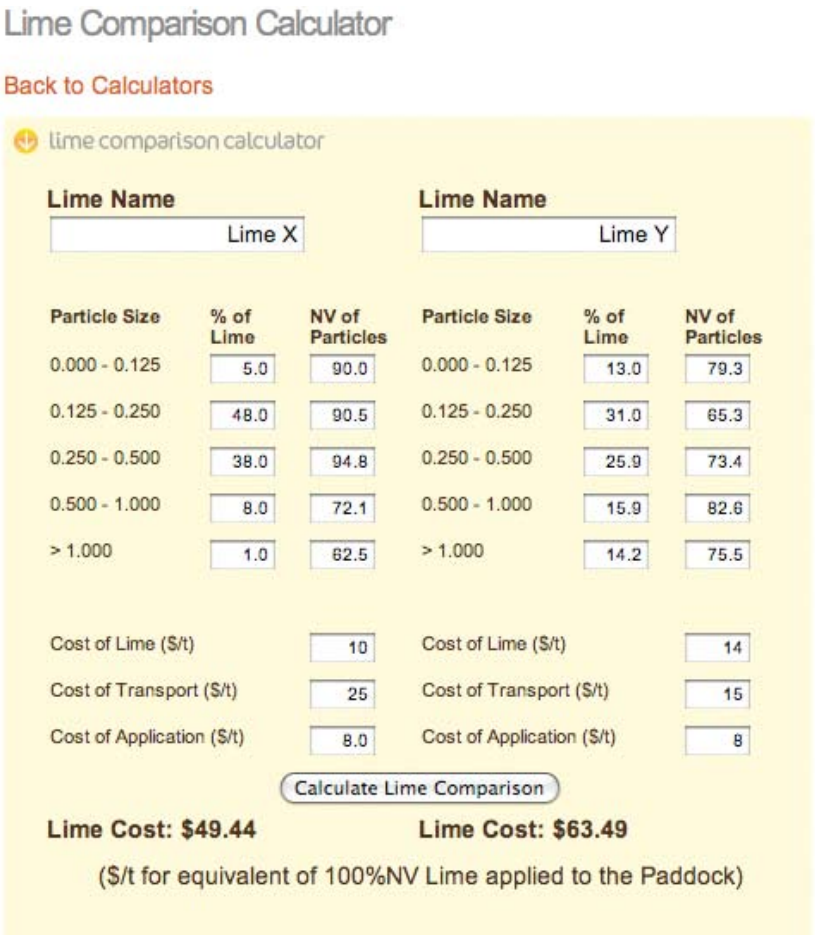

Figure 2. *Cost of effective lime calculated for two different limes using the soilquality.org.au on-line lime comparison calculator. Easy to follow instructions for use are available on the website.*

Recommendations

A range in lime quality was shown, however, a single measurement such as this survey only provides a snapshot in time. Repeat measurements over time generate a range for each pit which is an extremely valuable parameter to determine natural variability of the lime sources. A consistent product will have a narrow range while the range of a highly variable product will be wider, leading to less certainty that the purchased product will meet the specification. This information is available from Lime WA Inc. members on their Product Information Sheets (www.limewa.com.au).

This survey has highlighted some significant issues associated with the analysis of agricultural lime. One major commercial laboratory was unable to conduct the analyses to a consistent standard. The size of the analytical job presented a significant challenge to the resources of the Chemistry Centre of WA and resulted in further delays in completion.

Due to the discrepancies between laboratories in determining neutralising value and methods for determining particle size distribution, it is recommended that the Lime WA Inc. group use only one laboratory. We are confident that the results provided by the Chemistry Centre of WA are accurate.

It is recommended that advance notice of future surveys be given to the laboratory to assist them to make appropriate arrangements. Similarly, Lime WA Inc. members need to coordinate submission of samples in bulk well in advance of the liming season.

Accurate estimates of lime use are required to firstly determine how well soil acidity is being treated and secondly to provide an indication of the effectiveness of extension efforts to change management practices (liming). This survey was well received and if repeated has the potential to be a valuable source of communication with the industry, including non Lime WA Inc. members, and would also provide valuable information to farmers and government.

Efforts to ensure the continued availability of lime deposits for WA agriculture are a priority. The State Lime Supply Strategy (Department of Industry and Resources, 2006) should be further developed to ensure on-going access to agricultural lime, which is essential to treat acidity and maintain the soil resource condition.

References

Cregan PD, Hirth JR, Conyers, MK (1989) Liming and other Amendments. In 'Soil Acidity and Plant Growth'. (Ed. AD Robson) pp 205–264.

Department of Industry and Resources (2006) Towards a State Lime Supply Strategy (Draft).

Whitten M (2001) Comparing size in lime. *Journal of Agriculture* **42**, 10–14.

Appendix A

—Survey details for each pit sampled.

—Laboratory test report as supplied by the Chemistry Centre of WA.

REDGATE LIME

Pit details:

Pit location:	**Redgate Road, Witchcliffe**
Pit contact:	**Richard & Karen Nash**
Telephone:	**9757 6263**
Mobile:	**0407 385 489**
Fax:	**9757 6071**
Email:	**rglime@bigpond.com**
UHF radio:	**Channel 40**

Owner details:

Owner:	**Redgate Holdings Pty Ltd**
Contact:	**Karen Nash**
Address:	**566 Redgate Rd Redgate WA 6286**
Telephone:	**9757 6263**
Mobile:	**0407 305 488 / 0419 951 511**
Fax:	**9757 6071**
Email:	**rglime@bigpond.com**

Survey details:

GPS lat. & long. (TomTom®):	**-34.031060, 115.017990**	Sampled by:	**Dave Gartner**
Product:	**Limestone**	Date:	**21st April 2008**
Lime WA Inc. member?	**Yes**	Time:	**3 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS1**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS1** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-001** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	0.9	94.0
0.125 – 0.250	14.4	94.8
0.250 – 0.50	47.4	95.9
0.50 – 1.00	28.1	93.2
>1.00	9.2	92.4
Overall Result		**94.7**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	8.7 %
Neutralising Value	95.8 %
Calcium, soluble in 1 M HCl	35.0 %
Magnesium, soluble in 1 M HCl	2.0 %
Sodium, soluble in 1 M HCl	0.2 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

DOUST ENTERPRISES

Pit details:

Pit location:	**Karridale**
Pit contact:	**Greg Tenardi (pit foreman)**
Telephone:	
Mobile:	**0427 421 118**
Fax:	
Email:	
UHF radio:	

Owner details:

Owner:	**Geoff Doust**
Contact:	
Address:	**PO Box 386 Margaret River WA 6285**
Telephone:	**9757 3986**
Mobile:	**0418 907 692**
Fax:	**9757 3851**
Email:	**doust_ent@westnet.com.au**

Survey details:

GPS lat. & long. (TomTom®):	**-34.244010, 115.067270**	Sampled by:	**Dave Gartner**
Product:	**Limesand**	Date:	**2nd April 2008**
Lime WA Inc. member?	**No**	Time:	**9.40 am**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS2**
Comments:	**They work with two types. One is used for fill sand and the other for agricultural lime.**		

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS2** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-002** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	2.2	92.0
0.125 – 0.250	5.2	93.3
0.250 – 0.50	33.2	95.0
0.50 – 1.00	43.9	91.0
>1.00	15.5	90.5
Overall Result		**92.4**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	8.0 %
Neutralising Value	93.7 %
Calcium, soluble in 1 M HCl	34.6 %
Magnesium, soluble in 1 M HCl	1.8 %
Sodium, soluble in 1 M HCl	0.2 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

WALCO WINDY HARBOUR

Pit details:

Pit location:	**Windy Harbour**
Pit contact:	**Keith Jackson**
Telephone:	**9776 1206**
Mobile:	**0428 936 003**
Fax:	
Email:	
UHF radio:	**channel 40**

Owner details:

Owner:	**Western Australian Agricultural Lime Co**
Contact:	**Keith Jackson**
Address:	**PO Box 40 Pemberton WA 6260**
Telephone:	**9776 1206**
Mobile:	**0428 936 003**
Fax:	**9776 1486**
Email:	**walco@westnet.com.au**

Survey details:

GPS lat. & long. (TomTom®):	**-34.497340, 116.007920**	Sampled by:	**Dave Gartner**
Product:	**Limestone**	Date:	**22nd April 2008**
Lime WA Inc. member?	**No**	Time:	**2.25 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS4**
Comments:	**Not a lot of agricultural lime produced this year, intend to open pit further in future years.**		

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WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS4** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-004** Report Date: 5-08-2008

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	2.3	91.8
0.125 – 0.250	7.8	74.5
0.250 – 0.50	29.4	82.5
0.50 – 1.00	35.1	86.0
>1.00	25.3	91.7
Overall Result		**85.6**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	8.0 %
Neutralising Value	89.0 %
Calcium, soluble in 1 M HCl	35.0 %
Magnesium, soluble in 1 M HCl	0.4 %
Sodium, soluble in 1 M HCl	<0.1 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

OCEAN BEACH LIME QUARRY

Pit details:

Pit location:	**Denmark**
Pit contact:	**Rob Hoolee**
Telephone:	**9848 0300 (Shire)**
Mobile:	**0427 448 603**
Fax:	**9848 1985**
Email:	**denmarkeng@denmark.wa.gov.au**
UHF radio:	

Owner details:

Owner:	**Denmark Shire**
Contact:	**Rob Hoolee**
Address:	**PO Box 183 Denmark WA 6333**
Telephone:	**9848 0300 (Shire)**
Mobile:	**0427 448 603**
Fax:	**9848 1985**
Email:	**denmarkeng@denmark.wa.gov.au**

Survey details:

GPS lat. & long. (TomTom®):	**-35.032617, 117.280051**	Sampled by:	**Dave Gartner**
Product:	**Limesand**	Date:	**22nd April 2008**
Lime WA Inc. member?	**No**	Time:	**5.00 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS5**
Comments:	**Agricultural limesand crushed and screened.**		

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS5** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-005** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	2.9	86.4
0.125 – 0.250	30.3	76.4
0.250 – 0.50	42.6	78.4
0.50 – 1.00	9.9	80.0
>1.00	14.3	85.7
Overall Result		**79.3**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	8.4 %
Neutralising Value	80.7 %
Calcium, soluble in 1 M HCl	31.8 %
Magnesium, soluble in 1 M HCl	0.6 %
Sodium, soluble in 1 M HCl	0.1 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

BORNHOLM AG LIME

Pit details:

Pit location:	**South Bornholm Rd, Bornholm**
Pit contact:	**Darren Wolfe**
Telephone:	**9845 1170**
Mobile:	**0409 108 811**
Fax:	**9845 1314**
Email:	**tazoje@bigpond.com**
UHF radio:	**Channel 30**

Owner details:

Owner:	**H. Wolfe and Co.**
Contact:	**Darren Wolfe**
Address:	**114 Bornholm South Rd Bornholm WA 6330**
Telephone:	**9845 1170**
Mobile:	**0409 108 811**
Fax:	**9845 1314**
Email:	**tazoje@bigpond.com**

Survey details:

GPS lat. & long. (TomTom®):	**-35.060530, 117.565760**	Sampled by:	**Dave Gartner**
Product:	**Limesand**	Date:	**22nd April 2008**
Lime WA Inc. member?	**Yes**	Time:	**8.00 am**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS6**
Comments:	**Screen through 3.5 mm sieve.**		

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS6** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-006** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	0.6	81.7
0.125 – 0.250	24.7	65.3
0.250 – 0.50	59.6	54.5
0.50 – 1.00	11.4	58.3
>1.00	3.5	68.1
Overall Result		**58.1**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	8.0 %
Neutralising Value	60.1 %
Calcium, soluble in 1 M HCl	21.7 %
Magnesium, soluble in 1 M HCl	0.9 %
Sodium, soluble in 1 M HCl	0.2 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

WALCO MANYPEAKS

Pit details:

Pit location:	**Manypeaks**
Pit contact:	**Gary (pit foreman) & Keith Jackson**
Telephone:	
Mobile:	**0427 983 426**
Fax:	
Email:	
UHF radio:	**channel 40**

Owner details:

Owner:	**Western Australian Agricultural Lime Co**
Contact:	**Keith Jackson**
Address:	**PO Box 40 Pemberton WA 6260**
Telephone:	**1800 803 003 / 9846 1308**
Mobile:	**0428 936 003**
Fax:	**9776 1486**
Email:	**walco@westnet.com.au**

Survey details:

GPS lat. & long. (TomTom®):	**-34.894200, 118.201250**	Sampled by:	**Dave Gartner**
Product:	**Chalk lime**	Date:	**23rd April 2008**
Lime WA Inc. member?	**Yes**	Time:	
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS7**
Comments:	**Wet sieve analysis also available, contact Keith Jackson**		

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS7** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-007** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	7.0	77.0
0.125 – 0.250	4.9	75.4
0.250 – 0.50	11.2	79.0
0.50 – 1.00	17.7	77.6
>1.00	59.1	72.5
Overall Result		**74.5**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	24.3 %
Neutralising Value	76.2 %
Calcium, soluble in 1 M HCl	29.2 %
Magnesium, soluble in 1 M HCl	0.5 %
Sodium, soluble in 1 M HCl	<0.1 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

MASON BAY LIME

Pit details:

Pit location:	**Hopetoun**
Pit contact:	**Jim & Kay Hanrahan**
Telephone:	**9838 5051**
Mobile:	**042 738 5051**
Fax:	**9838 5072**
Email:	
UHF radio:	**channel 40**

Owner details:

Owner:	**Jim & Kay Hanrahan**
Contact:	
Address:	**PO Box 198** **Hopetoun WA 6348**
Telephone:	**9838 5051**
Mobile:	**042 738 5051**
Fax:	**9838 5072**
Email:	

Survey details:

GPS lat. & long. (TomTom®):	**-33.893070, 120.372640**	Sampled by:	**Dave Gartner**
Product:	**Limestone**	Date:	**23rd April 2008**
Lime WA Inc. member?	**No**	Time:	**3.00 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS8**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS8** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-008** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	17.8	79.7
0.125 – 0.250	21.7	67.7
0.250 – 0.50	22.2	69.2
0.50 – 1.00	19.1	72.4
>1.00	19.2	78.4
Overall Result		**73.1**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	13.2 %
Neutralising Value	74.7 %
Calcium, soluble in 1 M HCl	22.0 %
Magnesium, soluble in 1 M HCl	4.2 %
Sodium, soluble in 1 M HCl	0.1 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

KRYSTAL PARK ESTATE HOPETOUN

Pit details:

Pit location:	**Hopetoun**
Pit contact:	**Chris Fisher**
Telephone:	**9838 3189**
Mobile:	**0427 088 266**
Fax:	**9838 3357**
Email:	**krstpark@bigpond.com**
UHF radio:	

Owner details:

Owner:	**Chris & Allen Fisher**
Contact:	
Address:	**PO Box 36** **Hopetoun WA 6348**
Telephone:	**9838 3189**
Mobile:	**0427 383 189**
Fax:	**9838 3357**
Email:	**krstpark@bigpond.com**

Survey details:

GPS lat. & long. (TomTom®):	**-33.910450, 120.122670**	Sampled by:	**Dave Gartner**
Product:	**Limestone**	Date:	**23rd April 2008**
Lime WA Inc. member?	**No**	Time:	**3.55 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS9**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS9** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-009** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	9.2	62.8
0.125 – 0.250	31.2	23.3
0.250 – 0.50	20.6	35.9
0.50 – 1.00	6.7	49.0
>1.00	32.3	53.9
Overall Result		**41.2**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	1.8 %
Neutralising Value	41.5 %
Calcium, soluble in 1 M HCl	15.8 %
Magnesium, soluble in 1 M HCl	0.2 %
Sodium, soluble in 1 M HCl	<0.1 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

TRIPLE M TRANSPORT

Pit details:

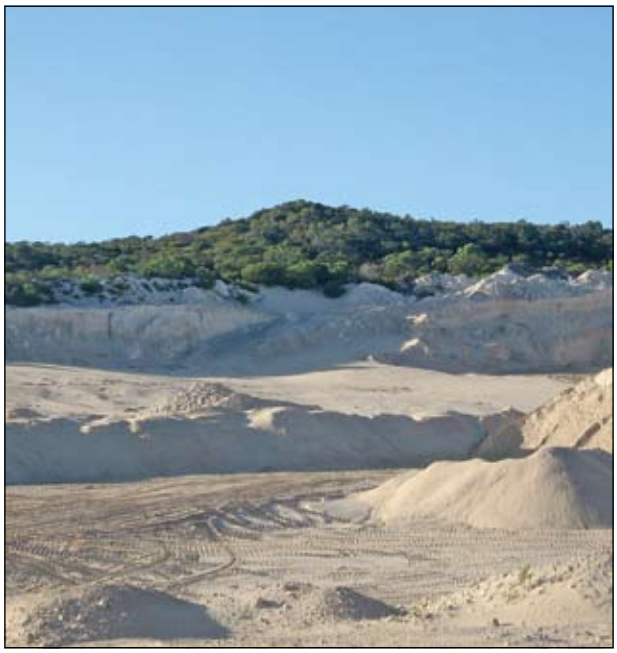
Pit location:	**Esperance**
Pit contact:	**Chip Murray**
Telephone:	**9076 1291**
Mobile:	**0428 934 627**
Fax:	**9076 1037**
Email:	**sandymurray@bigpond.com**
UHF radio:	

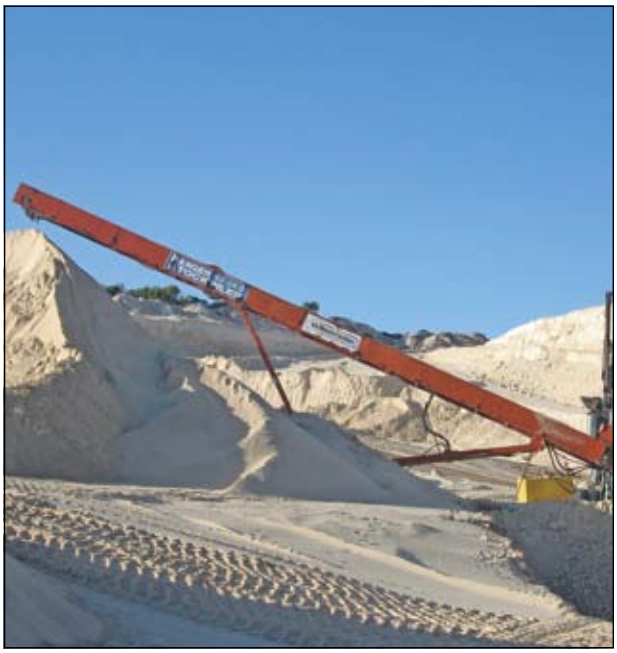
Owner details:

Owner:	**Chip Murray**
Contact:	
Address:	**PO Box 900 Esperance WA 6450**
Telephone:	**9076 1291**
Mobile:	**0428 934 627**
Fax:	**9076 1037**
Email:	**sandymurray@bigpond.com**

Survey details:

GPS lat. & long. (TomTom®):	**-33.819990, 121.521880**	Sampled by:	**Dave Gartner**
Product:	**Limesand**	Date:	**24th April 2008**
Lime WA Inc. member?	**No**	Time:	**7.50 am**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS10**
Comments:			





CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS10** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-010** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	6.1	59.5
0.125 – 0.250	72.1	67.8
0.250 – 0.50	18.7	84.2
0.50 – 1.00	0.7	86.5
>1.00	2.4	78.2
Overall Result		**70.7**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	6.5 %
Neutralising Value	71.5 %
Calcium, soluble in 1 M HCl	25.7 %
Magnesium, soluble in 1 M HCl	1.5 %
Sodium, soluble in 1 M HCl	0.2 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

BREMER INDUSTRIAL SERVICES

Pit details:

Pit location:	**Bremer Bay**
Pit contact:	**Merv & Graeme Drew**
Telephone:	
Mobile:	**0428 425 104**
Fax:	**9837 4110**
Email:	
UHF radio:	

Owner details:

Owner:	**Bremer Industrial Services**
Contact:	**Merv & Graeme Drew**
Address:	**PO Box 473** **Albany WA 6331**
Telephone:	
Mobile:	**0428 425 103 / 0428 425 104**
Fax:	**9837 4110**
Email:	

Survey details:

GPS lat. & long. (TomTom®):	**-34.369800, 119.237130**	Sampled by:	**Dave Gartner**
Product:	**Limestone**	Date:	**24th April 2008**
Lime WA Inc. member?	**No**	Time:	**1.50 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS11**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS11** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-011** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	16.9	74.8
0.125 – 0.250	14.9	68.3
0.250 – 0.50	17.6	70.9
0.50 – 1.00	17.7	72.4
>1.00	32.8	79.1
Overall Result		**74.0**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	13.4 %
Neutralising Value	74.2 %
Calcium, soluble in 1 M HCl	27.0 %
Magnesium, soluble in 1 M HCl	1.6 %
Sodium, soluble in 1 M HCl	0.1 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

BEAUFORT RIVER DOLOMITE

Pit details:

Pit location:	**299 Leggoe Rd Beaufort River**
Pit contact:	**Ray Kowald**
Telephone:	**9862 5014**
Mobile:	**0427 625 014**
Fax:	**9862 5014**
Email:	**raydenkowald@bigpond.com.au**
UHF radio:	

Owner details:

Owner:	**Beaufort River Dolomite**
Contact:	**Ray Kowald**
Address:	**299 Leggoe Rd Beaufort River WA 3694**
Telephone:	**9862 5014**
Mobile:	**0427 625 014**
Fax:	**9862 5014**
Email:	**raydenkowald@bigpond.com.au**

Survey details:

GPS lat. & long. (TomTom®):	**-33.574800, 117.052530**	Sampled by:	**Dave Gartner**
Product:	**Dolomite**	Date:	**25th April 2008**
Lime WA Inc. member?	**Yes**	Time:	**9.45 am**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS12**
Comments:	**Dolomite is grey in colour.**		

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS12** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-012** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	10.7	66.9
0.125 – 0.250	7.9	65.8
0.250 – 0.50	11.3	65.3
0.50 – 1.00	14.7	64.0
>1.00	55.5	67.7
Overall Result		**66.7**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	11.2 %
Neutralising Value	67.8 %
Calcium, soluble in 1 M HCl	12.7 %
Magnesium, soluble in 1 M HCl	8.5 %
Sodium, soluble in 1 M HCl	1.6 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

KOJONUP DOLOMITE

Pit details:

Pit location:	**Kojonup**
Pit contact:	**Tony Paini**
Telephone:	**9833 1240**
Mobile:	**0428 331 241**
Fax:	**9833 1240**
Email:	
UHF radio:	

Owner details:

Owner:	**Tony Paini**
Contact:	
Address:	**RMB 516** **Kojonup WA 6395**
Telephone:	**9833 1240**
Mobile:	**0428 331 241**
Fax:	
Email:	

Survey details:

GPS lat. & long. (TomTom®):	**-33.687070, 116.908900**	Sampled by:	**Dave Gartner**
Product:	**Dolomite**	Date:	**25th April 2008**
Lime WA Inc. member?	**No**	Time:	**12 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS13**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS13** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-013** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	14.5	46.3
0.125 – 0.250	12.2	63.5
0.250 – 0.50	17.3	65.4
0.50 – 1.00	17.8	61.1
>1.00	38.2	64.3
Overall Result		**61.2**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	15.6 %
Neutralising Value	62.7 %
Calcium, soluble in 1 M HCl	14.2 %
Magnesium, soluble in 1 M HCl	6.8 %
Sodium, soluble in 1 M HCl	0.3 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

MARONONI DOLOMITE

Pit details:

Pit location:	**Kojonup**
Pit contact:	**Kelvin**
Telephone:	**9833 1224**
Mobile:	
Fax:	
Email:	
UHF radio:	

Owner details:

Owner:	
Contact:	**Kelvin**
Address:	
Telephone:	**9833 1224**
Mobile:	
Fax:	
Email:	

Survey details:

GPS lat. & long. (TomTom®):	**-33.691490, 116.918000**	Sampled by:	**Dave Gartner**
Product:	**Dolomite**	Date:	**25th April 2008**
Lime WA Inc. member?	**No**	Time:	**11.25 am**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS14**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS14** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-014** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	11.3	54.4
0.125 – 0.250	9.5	48.7
0.250 – 0.50	16.0	43.1
0.50 – 1.00	20.0	39.3
>1.00	43.2	48.6
Overall Result		**46.5**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	12.4 %
Neutralising Value	49.7 %
Calcium, soluble in 1 M HCl	10.0 %
Magnesium, soluble in 1 M HCl	5.6 %
Sodium, soluble in 1 M HCl	0.1 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

WATHEROO DOLOMITE

Pit details:

Pit location:	**Watheroo**
Pit contact:	**Peter & Terri Manns**
Telephone:	**9651 8078**
Mobile:	**0428 922 340**
Fax:	**9651 8079**
Email:	**karlu@wn.com**
UHF radio:	**channel 40**

Owner details:

Owner:	**Mulit-Ag Nutrient Supplies**
Contact:	**Peter & Terri Manns**
Address:	**RSM 736 Coomberdale WA 6512**
Telephone:	**9651 8078**
Mobile:	**0428 922 340**
Fax:	**9651 8079**
Email:	**karlu@wn.com**

Survey details:

GPS lat. & long. (TomTom®):	**-30.351510, 116.050250**	Sampled by:	**Dave Gartner**
Product:	**Dolomite**	Date:	**28th April 2008**
Lime WA Inc. member?	**Yes**	Time:	**1.15 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS15**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS15** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-015** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	34.8	99.7
0.125 – 0.250	9.1	90.4
0.250 – 0.50	13.0	91.4
0.50 – 1.00	14.0	93.8
>1.00	29.1	96.4
Overall Result		**96.0**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	8.0 %
Neutralising Value	97.6 %
Calcium, soluble in 1 M HCl	18.5 %
Magnesium, soluble in 1 M HCl	11.7 %
Sodium, soluble in 1 M HCl	0.1 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

WATHEROO MINERALS W PIT

Pit details:

Pit location:	**Watheroo**
Pit contact:	**Robyn Hills, Stuart Crockett**
Telephone:	**9446 1533**
Mobile:	**0409 815 197 (Stuart)**
Fax:	**9446 1599**
Email:	**rhils@alosca.com.au**
UHF radio:	

Owner details:

Owner:	**Watheroo Minerals**
Contact:	**Robyn Hills, Stuart Crockett**
Address:	**PO Box 1761** **Osborne Park WA 6916**
Telephone:	**9446 1533**
Mobile:	**0409 815 197 (Stuart)**
Fax:	**9446 1599**
Email:	**rhils@alosca.com.au**

Survey details:

GPS lat. & long. (TomTom®):	**-30.120260, 115.972430**	Sampled by:	**Dave Gartner**
Product:	**Dolomite**	Date:	**28th April 2008**
Lime WA Inc. member?	**Yes**	Time:	**2.00 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS16**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS16** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-016** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	11.7	85.3
0.125 – 0.250	8.9	83.3
0.250 – 0.50	14.4	80.3
0.50 – 1.00	19.4	80.4
>1.00	45.7	83.2
Overall Result		**82.6**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	10.5 %
Neutralising Value	84.7 %
Calcium, soluble in 1 M HCl	21.2 %
Magnesium, soluble in 1 M HCl	7.2 %
Sodium, soluble in 1 M HCl	1.3 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

WATHEROO MINERALS Y PIT

Pit details:

Pit location:	**Watheroo**
Pit contact:	**Robyn Hills, Stuart Crockett**
Telephone:	**9446 1533**
Mobile:	**0409 815 197 (Stuart)**
Fax:	**9446 1599**
Email:	**rhils@alosca.com.au**
UHF radio:	

Owner details:

Owner:	**Watheroo Minerals**
Contact:	**Robyn Hills, Stuart Crockett**
Address:	**PO Box 60** **Watheroo WA 6513**
Telephone:	**9446 1533**
Mobile:	**0409 815 197 (Stuart)**
Fax:	**9446 1599**
Email:	**rhils@alosca.com.au**

Survey details:

GPS lat. & long. (TomTom®):	**-30.117020, 115.987390**	Sampled by:	**Dave Gartner**
Product:	**Dolomite**	Date:	**28th April 2008**
Lime WA Inc. member?	**Yes**	Time:	**2 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS17**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS17** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-017** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	11.2	76.4
0.125 – 0.250	12.8	75.2
0.250 – 0.50	20.4	73.7
0.50 – 1.00	21.9	74.8
>1.00	33.7	77.4
Overall Result		**75.7**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	7.9 %
Neutralising Value	78.5 %
Calcium, soluble in 1 M HCl	16.1 %
Magnesium, soluble in 1 M HCl	8.8 %
Sodium, soluble in 1 M HCl	1.3 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

AGLIME JURIEN

Pit details:

Pit location:	**Jurien Bay**
Pit contact:	**Geoff Armstrong (mine manager)**
Telephone:	**9652 1389**
Mobile:	**0428 953 770**
Fax:	
Email:	
UHF radio:	

Owner details:

Owner:	**Aglime of Australia**
Contact:	**Steve Carr**
Address:	**Suite 1, 110 Robinson Ave Belmont WA 6984**
Telephone:	**1800 644 951**
Mobile:	**0429 917 742**
Fax:	**9277 5379**
Email:	**steve@aglime.com.au**

Survey details:

GPS lat. & long. (TomTom®):	**-30.246280, 115.047870**	Sampled by:	**Dave Gartner**
Product:	**Limesand**	Date:	**28th April 2008**
Lime WA Inc. member?	**Yes**	Time:	**4.30 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS18**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS18** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-018** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	3.5	91.1
0.125 – 0.250	53.4	91.3
0.250 – 0.50	39.2	93.2
0.50 – 1.00	3.8	92.2
>1.00	0.1	55.9
Overall Result		**92.0**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	6.6 %
Neutralising Value	93.5 %
Calcium, soluble in 1 M HCl	32.9 %
Magnesium, soluble in 1 M HCl	1.9 %
Sodium, soluble in 1 M HCl	0.3 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

JURIEN LIME SANDS

Pit details:

Pit location:	**Jurien Bay**
Pit contact:	**Stuart Kempton**
Telephone:	
Mobile:	**0427 709 678**
Fax:	**9652 3030**
Email:	
UHF radio:	

Owner details:

Owner:	**Stuart Kempton**
Contact:	
Address:	**PO Box 54 Badgingarra WA 6521**
Telephone:	
Mobile:	**0427 709 678**
Fax:	**9652 3030**
Email:	

Survey details:

GPS lat. & long. (TomTom®):	**-30.189040, 115.006700**	Sampled by:	**Dave Gartner**
Product:	**Limesand**	Date:	**28th April 2008**
Lime WA Inc. member?	**No**	Time:	**5.30 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS19**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS19** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-019** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	2.1	94.4
0.125 – 0.250	47.5	91.3
0.250 – 0.50	44.5	91.5
0.50 – 1.00	5.7	85.5
>1.00	0.2	89.8
Overall Result		**91.1**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	2.9 %
Neutralising Value	93.2 %
Calcium, soluble in 1 M HCl	33.2 %
Magnesium, soluble in 1 M HCl	1.9 %
Sodium, soluble in 1 M HCl	0.2 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

YARRA SANDS

Pit details:

Pit location:	**Coolimba**
Pit contact:	**Peter Rayner**
Telephone:	**9951 1028**
Mobile:	**0427 511 028**
Fax:	**9951 1048**
Email:	
UHF radio:	

Owner details:

Owner:	**Peter Rayner**
Contact:	
Address:	**PO Box 127** **Carnamah WA 6517**
Telephone:	**9951 1028**
Mobile:	**0427 511 028**
Fax:	**9951 1048**
Email:	

Survey details:

GPS lat. & long. (TomTom®):	**-29.827030, 114.981300**	Sampled by:	**Dave Gartner**
Product:	**Limesand**	Date:	**29th April 2008**
Lime WA Inc. member?	**Yes**	Time:	**7.30 am**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS20**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS20** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-020** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	0.8	93.8
0.125 – 0.250	18.9	94.3
0.250 – 0.50	60.4	93.0
0.50 – 1.00	19.2	83.8
>1.00	0.6	71.2
Overall Result		**91.2**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	5.0 %
Neutralising Value	92.5 %
Calcium, soluble in 1 M HCl	33.6 %
Magnesium, soluble in 1 M HCl	1.9 %
Sodium, soluble in 1 M HCl	0.2 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

AGLIME DONGARA

Pit details:

Pit location:	**Dongara**
Pit contact:	**Steve Carr**
Telephone:	**1800 644 951**
Mobile:	**0429 917 742**
Fax:	**9277 5379**
Email:	**steve@aglime.com.au**
UHF radio:	

Owner details:

Owner:	**Aglime of Australia**
Contact:	**Steve Carr**
Address:	**Suite 1, 110 Robinson Ave Belmont WA 6984**
Telephone:	**1800 644 951**
Mobile:	**0429 917 742**
Fax:	**9277 5379**
Email:	**steve@aglime.com.au**

Survey details:

GPS lat. & long. (TomTom®):	**-29.284021, 114.925155**	Sampled by:	**Dave Gartner**
Product:	**Limesand**	Date:	**29th April 2008**
Lime WA Inc. member?	**Yes**	Time:	**8.30 am**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS21**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS21** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-021** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	18.7	94.3
0.125 – 0.250	66.0	93.4
0.250 – 0.50	14.7	94.9
0.50 – 1.00	0.4	79.5
>1.00	0.2	93.0
Overall Result		**93.7**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	16.1 %
Neutralising Value	93.0 %
Calcium, soluble in 1 M HCl	34.7 %
Magnesium, soluble in 1 M HCl	1.7 %
Sodium, soluble in 1 M HCl	0.3 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

IRWIN LIME SANDS

Pit details:

Pit location:	**Dongara**
Pit contact:	**Mark Weinman**
Telephone:	
Mobile:	**0418 242 926**
Fax:	
Email:	**carolinemark@mestnew.com.au**
UHF radio:	

Owner details:

Owner:	**Mark Weinman**
Contact:	
Address:	**PO Box 456** **Dongara WA 6525**
Telephone:	
Mobile:	**0418 242 926**
Fax:	
Email:	**carolinemark@mestnew.com.au**

Survey details:

GPS lat. & long. (TomTom®):	**-29.274180, 114.980410**	Sampled by:	**Dave Gartner**
Product:	**Limesand**	Date:	**29th April 2008**
Lime WA Inc. member?	**No**	Time:	**10 am**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS22**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS22** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-022** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	30.8	93.0
0.125 – 0.250	29.3	93.1
0.250 – 0.50	35.6	87.1
0.50 – 1.00	2.7	77.6
>1.00	1.6	89.4
Overall Result		**90.5**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	4.9 %
Neutralising Value	90.7 %
Calcium, soluble in 1 M HCl	33.3 %
Magnesium, soluble in 1 M HCl	1.4 %
Sodium, soluble in 1 M HCl	0.2 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

GREENHEAD SANDS

Pit details:

Pit location:	**Greenhead**
Pit contact:	**Ross Armstrong**
Telephone:	
Mobile:	**0428 121 143**
Fax:	**9953 1035**
Email:	
UHF radio:	**19**

Owner details:

Owner:	**Ross Armstrong**
Contact:	
Address:	**PO Box 129** **Leeman WA 6514**
Telephone:	
Mobile:	**0428 121 143**
Fax/AH:	**9953 1035**
Email:	

Survey details:

GPS lat. & long. (TomTom®):	**-30.102200, 115.004050**	Sampled by:	**Dave Gartner**
Product:	**Limesand**	Date:	**29th April 2008**
Lime WA Inc. member?	**Yes**	Time:	**11.15 am**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS23**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS23** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-023** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	1.8	93.5
0.125 – 0.250	56.0	92.3
0.250 – 0.50	29.1	93.1
0.50 – 1.00	12.9	85.7
>1.00	0.2	86.5
Overall Result		**91.7**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	1.9 %
Neutralising Value	90.5 %
Calcium, soluble in 1 M HCl	33.8 %
Magnesium, soluble in 1 M HCl	1.8 %
Sodium, soluble in 1 M HCl	0.2 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

AGLIME CERVANTES

Pit details:

Pit location:	**Cervantes**
Pit contact:	**Kim Crossland (mine manager)**
Telephone:	**9652 7018**
Mobile:	**0418 956 607**
Fax:	**9652 7518**
Email:	
UHF radio:	

Owner details:

Owner:	**Aglime of Australia**
Contact:	**Steve Carr**
Address:	**Suite 1, 110 Robinson Ave Belmont WA 6984**
Telephone:	**1800 644 951**
Mobile:	**0429 917 742**
Fax:	**9277 5379**
Email:	**steve@aglime.com.au**

Survey details:

GPS lat. & long. (TomTom®):	**-30.492530, 115.093010**	Sampled by:	**Dave Gartner**
Product:	**Limesand**	Date:	**29th April 2008**
Lime WA Inc. member?	**Yes**	Time:	**12.30 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS24**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS24** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-024** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	4.7	94.9
0.125 – 0.250	68.9	92.6
0.250 – 0.50	25.7	97.0
0.50 – 1.00	0.7	94.9
>1.00	<0.1	-
Overall Result		**93.9**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	11.0 %
Neutralising Value	93.7 %
Calcium, soluble in 1 M HCl	34.8 %
Magnesium, soluble in 1 M HCl	1.7 %
Sodium, soluble in 1 M HCl	0.3 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KWalton

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

AGLIME LANCELIN

Pit details:

Pit location:	**Lancelin**
Pit contact:	**Kim Riley (mine manager)**
Telephone:	**9655 1211**
Mobile:	**0408 092 022**
Fax:	**9655 1608**
Email:	
UHF radio:	

Owner details:

Owner:	**Aglime of Australia**
Contact:	**Steve Carr**
Address:	**Suite 1, 110 Robinson Ave Belmont WA 6984**
Telephone:	**1800 644 951**
Mobile:	**0429 917 742**
Fax:	**9277 5379**
Email:	**steve@aglime.com.au**

Survey details:

GPS lat. & long. (TomTom®):	**-31.034250, 115.349960**	Sampled by:	**Dave Gartner**
Product:	**Limesand**	Date:	**29th April 2008**
Lime WA Inc. member?	**Yes**	Time:	**2.30 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS25**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS25** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-025** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	4.2	89.9
0.125 – 0.250	42.3	89.4
0.250 – 0.50	40.0	94.8
0.50 – 1.00	13.1	75.1
>1.00	0.5	70.1
Overall Result		**89.7**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	7.0 %
Neutralising Value	89.0 %
Calcium, soluble in 1 M HCl	32.9 %
Magnesium, soluble in 1 M HCl	1.7 %
Sodium, soluble in 1 M HCl	0.3 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

DALA PIT

Pit details:

Pit location:	**Lancelin**
Pit contact:	**Lyn Posselt**
Telephone:	**9573 1999**
Mobile:	**0417 961 252**
Fax:	**9573 1888**
Email:	
UHF radio:	

Owner details:

Owner:	**Lyn Posselt**
Contact:	
Address:	**PO Box 6** **Mundaring WA 6073**
Telephone:	**9573 1999**
Mobile:	**0417 961 252**
Fax:	**9573 1888**
Email:	

Survey details:

GPS lat. & long. (TomTom®):	**-30.996470, 115.328510**	Sampled by:	**Dave Gartner**
Product:	**Limesand**	Date:	**29th April 2008**
Lime WA Inc. member?	**No**	Time:	**3 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS26**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS26** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-026** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	4.0	92.8
0.125 – 0.250	63.5	93.0
0.250 – 0.50	31.9	93.9
0.50 – 1.00	0.5	86.3
>1.00	<0.1	-
Overall Result		**93.2**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	0.8 %
Neutralising Value	93.4 %
Calcium, soluble in 1 M HCl	34.2 %
Magnesium, soluble in 1 M HCl	1.7 %
Sodium, soluble in 1 M HCl	0.3 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

RULES LIMESAND

Pit details:

Pit location:	**Lancelin**
Pit contact:	**Glenn Rule**
Telephone:	**9575 2266**
Mobile:	**0418 919 553**
Fax:	
Email:	**gsrule@bigpond.com**
UHF radio:	

Owner details:

Owner:	**Glenn Rule**
Contact:	
Address:	**6 Kuyan Place Gingin WA 6503**
Telephone:	**9575 2266**
Mobile:	**0418 919 553**
Fax:	
Email:	**gsrule@bigpond.com**

Survey details:

GPS lat. & long. (TomTom®):	**-31.065950, 115.351610**	Sampled by:	**Dave Gartner**
Product:	**Limesand**	Date:	**29th April 2008**
Lime WA Inc. member?	**Yes**	Time:	**3.15 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS27**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS27** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-027** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	2.9	94.8
0.125 – 0.250	42.9	96.9
0.250 – 0.50	48.7	96.2
0.50 – 1.00	5.3	97.8
>1.00	0.1	92.8
Overall Result		**96.4**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	6.5 %
Neutralising Value	96.3 %
Calcium, soluble in 1 M HCl	35.6 %
Magnesium, soluble in 1 M HCl	1.8 %
Sodium, soluble in 1 M HCl	0.3 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

OPTIMA LANCELIN

Pit details:

Pit location:	**Old Ledge Point Rd Lancelin**
Pit contact:	**Brendan Edwards**
Telephone:	**9445 1819**
Mobile:	
Fax:	**9244 2071**
Email:	
UHF radio:	

Owner details:

Owner:	**Optima Agriculture**
Contact:	**Brendan Edwards**
Address:	**PO Box 1544 Osborne Park WA 6916**
Telephone:	**9445 1819**
Mobile:	
Fax:	**9244 2071**
Email:	

Survey details:

GPS lat. & long. (TomTom®):	**-31.073820, 115.365370**	Sampled by:	**Dave Gartner**
Product:	**Limesand**	Date:	**29th April 2008**
Lime WA Inc. member?	**No**	Time:	**4 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS28**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS28** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-028** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	2.5	91.1
0.125 – 0.250	52.9	79.8
0.250 – 0.50	41.9	89.2
0.50 – 1.00	2.6	72.9
>1.00	0.1	77.8
Overall Result		**83.8**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	5.0 %
Neutralising Value	85.0 %
Calcium, soluble in 1 M HCl	30.9 %
Magnesium, soluble in 1 M HCl	1.6 %
Sodium, soluble in 1 M HCl	0.2 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

OPTIMA GINGIN

Pit details:

Pit location:	**Caraban Rd Guilderton**
Pit contact:	**Brendan Edwards**
Telephone:	**9445 1819**
Mobile:	
Fax:	**9244 2071**
Email:	
UHF radio:	

Owner details:

Owner:	**Optima Agriculture**
Contact:	**Brendan Edwards**
Address:	**PO Box 1544 Osborne Park WA 6916**
Telephone:	**9445 1819**
Mobile:	
Fax:	**9244 2071**
Email:	

Survey details:

GPS lat. & long. (TomTom®):	**-31.322720, 115.559810**	Sampled by:	**Dave Gartner**
Product:	**Limestone**	Date:	**29th April 2008**
Lime WA Inc. member?	**No**	Time:	**4.30 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS29**
Comments:	**GPS taken at gate**		

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS29** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-029** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	7.8	90.4
0.125 – 0.250	31.6	80.2
0.250 – 0.50	34.0	80.0
0.50 – 1.00	7.8	80.2
>1.00	18.9	87.0
Overall Result		**82.3**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	3.4 %
Neutralising Value	83.3 %
Calcium, soluble in 1 M HCl	32.6 %
Magnesium, soluble in 1 M HCl	0.3 %
Sodium, soluble in 1 M HCl	<0.1 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

JJ HAWKINS

Pit details:

Pit location:	**Wanneroo**
Pit contact:	**Jamie Hawkins**
Telephone:	**0402 137 300 Peter Ronan (manager)**
Mobile:	**0429 922 166**
Fax:	
Email:	
UHF radio:	

Owner details:

Owner:	**JJ Hawkins**
Contact:	**Julian Riches**
Address:	**PO Box 1004 Wangarra WA 6947**
Telephone:	**9409 7377**
Mobile:	**0429 912 223**
Fax:	**9302 4555**
Email:	**enquiries@jjhawkins.com.au**

Survey details:

GPS lat. & long. (TomTom®):	**-31.643180, 115.764860**	Sampled by:	**Dave Gartner**
Product:	**Limestone**	Date:	**30th April 2008**
Lime WA Inc. member?	**No**	Time:	**12 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS30**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS30** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-030** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	6.4	85.8
0.125 – 0.250	27.1	82.3
0.250 – 0.50	31.0	89.8
0.50 – 1.00	10.8	85.8
>1.00	24.7	88.3
Overall Result		**86.7**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	6.4 %
Neutralising Value	87.2 %
Calcium, soluble in 1 M HCl	34.5 %
Magnesium, soluble in 1 M HCl	0.4 %
Sodium, soluble in 1 M HCl	<0.1 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

DOYLE'S LIME SERVICE

Pit details:

Pit location:	**Myalup**
Pit contact:	**Eddy & Pia Doyle**
Telephone:	**9797 2478**
Mobile:	**0427 084 102**
Fax:	**9797 1606**
Email:	**doyleslimeservice@iinet.net.au**
UHF radio:	

Owner details:

Owner:	**Eddy & Pia Doyle**
Contact:	
Address:	**PO Box A345** **Australind WA 6233**
Telephone:	**9797 2478**
Mobile:	**0427 084 102**
Fax:	**9797 1606**
Email:	**doyleslimeservice@iinet.net.au**

Survey details:

GPS lat. & long. (TomTom®):	**-32.968070, 115.699530**	Sampled by:	**Dave Gartner**
Product:	**Limestone**	Date:	**30th April 2008**
Lime WA Inc. member?	**Yes**	Time:	**1 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS31**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS31** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-031** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	13.5	72.0
0.125 – 0.250	55.5	71.6
0.250 – 0.50	20.7	70.5
0.50 – 1.00	4.2	79.0
>1.00	6.2	77.2
Overall Result		**72.2**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	9.2 %
Neutralising Value	73.2 %
Calcium, soluble in 1 M HCl	27.0 %
Magnesium, soluble in 1 M HCl	1.0 %
Sodium, soluble in 1 M HCl	0.2 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

LAKE PRESTON LIME

Pit details:

Pit location:	**Myalup**
Pit contact:	**Rob Dixon**
Telephone:	**1800 889 493**
Mobile:	**0428 615 161**
Fax:	**9725 7724**
Email:	**lakepreston@bigpond.com**
UHF radio:	

Owner details:

Owner:	**Blair Howe**
Contact:	**Rob Dixon**
Address:	**PO Box 1230** **Bunbury WA 6230**
Telephone:	**1800 889 493**
Mobile:	**0428 615 161**
Fax:	**9725 7724**
Email:	**lakepreston@bigpond.com**

Survey details:

GPS lat. & long. (TomTom®):	**-33.022010, 115.706610**	Sampled by:	**Dave Gartner**
Product:	**Limestone**	Date:	**30th April 2008**
Lime WA Inc. member?	**Yes**	Time:	**2.15 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS32**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS32** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-032** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	6.3	85.7
0.125 – 0.250	25.9	69.7
0.250 – 0.50	33.9	74.3
0.50 – 1.00	15.9	69.2
>1.00	18.0	85.2
Overall Result		**75.0**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	8.7 %
Neutralising Value	74.7 %
Calcium, soluble in 1 M HCl	28.6 %
Magnesium, soluble in 1 M HCl	0.8 %
Sodium, soluble in 1 M HCl	0.1 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

VERSACI LIME

Pit details:

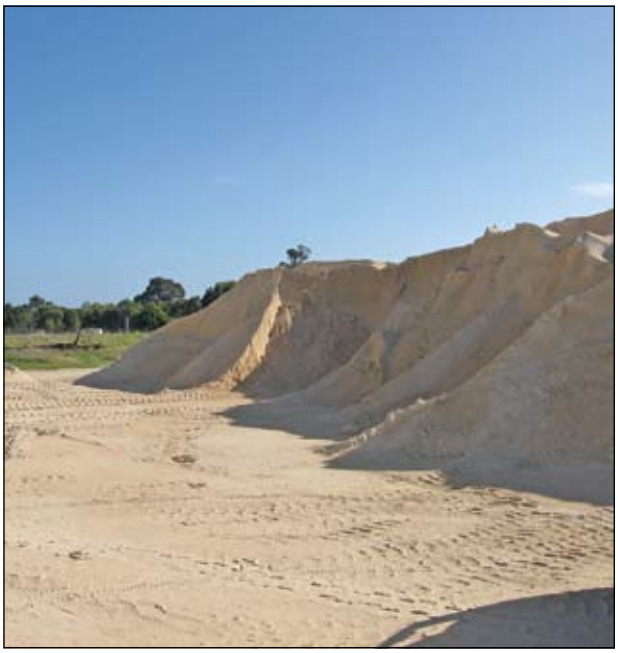
Pit location:	**Myalup**
Pit contact:	**Andrew Zappia**
Telephone:	
Mobile:	**0428 980 106**
Fax:	
Email:	
UHF radio:	**channel 38**

Owner details:

Owner:	**Barry &Tina Versaci**
Contact:	
Address:	**29 Third St Harvey WA 6220**
Telephone:	**9729 1797**
Mobile:	**0418 931 777**
Fax:	**9729 1797**
Email:	

Survey details:

GPS lat. & long. (TomTom®):	**-33.017360, 115.702390**	Sampled by:	**Dave Gartner**
Product:	**Limestone**	Date:	**30th April 2008**
Lime WA Inc. member?	**Yes**	Time:	**2.30 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS33**
Comments:			



CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS33** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-033** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	7.5	77.7
0.125 – 0.250	26.9	61.8
0.250 – 0.50	28.7	61.6
0.50 – 1.00	17.4	50.7
>1.00	19.4	83.2
Overall Result		**65.1**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	6.7 %
Neutralising Value	64.8 %
Calcium, soluble in 1 M HCl	25.1 %
Magnesium, soluble in 1 M HCl	0.4 %
Sodium, soluble in 1 M HCl	0.1 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

CARBONE BROS

Pit details:

Pit location:	**Myalup**
Pit contact:	**Craig Carbone**
Telephone:	**9726 1178**
Mobile:	**0417 902 338**
Fax:	**9726 1474**
Email:	**craig.carbone@bigpond.com**
UHF radio:	

Owner details:

Owner:	**Carbone Bros Pty Ltd**
Contact:	**Craig Carbone**
Address:	**PO Box 61** **Brunswick WA 6224**
Telephone:	**9726 1178**
Mobile:	**0417 902 338**
Fax:	**9726 1474**
Email:	**craig.carbone@bigpond.com**

Survey details:

GPS lat. & long. (TomTom®):	**-33.097030, 115.711428**	Sampled by:	**Dave Gartner**
Product:	**Limestone**	Date:	**30th April 2008**
Lime WA Inc. member?	**Yes**	Time:	**4 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS34**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS34** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-034** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	8.4	72.3
0.125 – 0.250	41.0	80.7
0.250 – 0.50	30.0	86.0
0.50 – 1.00	10.8	77.5
>1.00	9.8	88.7
Overall Result		**82.0**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	11.6 %
Neutralising Value	82.7 %
Calcium, soluble in 1 M HCl	31.2 %
Magnesium, soluble in 1 M HCl	1.1 %
Sodium, soluble in 1 M HCl	0.2 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

NEWDEGATE DOLOMITIC LIME

Pit details:

Pit location:	**Newdegate**
Pit contact:	
Telephone:	**9871 2023**
Mobile:	**0427 212 023**
Fax:	**9871 2018**
Email:	**ash.fanmcdonald@bordernet.com.au**
UHF radio:	

Owner details:

Owner:	**Ashley McDonald**
Contact:	
Address:	**Box 49** **Newdegate WA 6355**
Telephone:	**9871 2023**
Mobile:	**0427 212 023**
Fax:	**9871 2018**
Email:	**ash.fanmcdonald@bordernet.com.au**

Survey details:

GPS lat. & long. (TomTom®):	**-33.043460, 119.000940**	Sampled by:	**Dave Gartner**
Product:	**Dolomite**	Date:	**6th May 2008**
Lime WA Inc. member?	**No**	Time:	**2 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS37**
Comments:			

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS37** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-037** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	28.3	71.9
0.125 – 0.250	7.2	63.3
0.250 – 0.50	17.3	58.4
0.50 – 1.00	15.6	60.8
>1.00	31.6	84.9
Overall Result		**71.3**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	5.6 %
Neutralising Value	71.9 %
Calcium, soluble in 1 M HCl	12.5 %
Magnesium, soluble in 1 M HCl	9.4 %
Sodium, soluble in 1 M HCl	0.2 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

GREENS DOLOMITE

Pit details:

Pit location:	**Magenta**
Pit contact:	
Telephone:	
Mobile:	
Fax:	
Email:	
UHF radio:	

Owner details:

Owner:	
Contact:	**Pearl Green**
Address:	
Telephone:	
Mobile:	
Fax:	
Email:	

Survey details:

GPS lat. & long. (TomTom®):	**-33.433130, 119.269508**	Sampled by:	**Dave Gartner**
Product:	**Dolomite**	Date:	**6th May 2008**
Lime WA Inc. member?	**No**	Time:	**4.20 pm**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS39**
Comments:	**Not currently active**		

CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS39** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-039** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	13.6	71.8
0.125 – 0.250	12.2	65.2
0.250 – 0.50	15.4	59.1
0.50 – 1.00	14.7	65.6
>1.00	44.1	85.9
Overall Result		**74.3**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	6.9 %
Neutralising Value	76.7 %
Calcium, soluble in 1 M HCl	14.7 %
Magnesium, soluble in 1 M HCl	9.2 %
Sodium, soluble in 1 M HCl	0.3 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

PINGRUP DOLOMITE

Pit details:

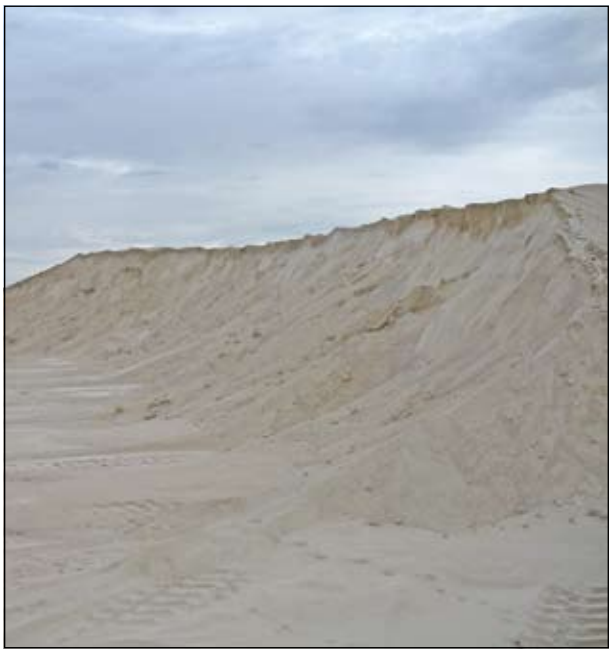
Pit location:	**Pingrup**
Pit contact:	**Gary Featherstone**
Telephone:	**9820 1078**
Mobile:	
Fax:	**9820 1003**
Email:	**feathersone3@bigpond.com**
UHF radio:	**channel 5**

Owner details:

Owner:	**Gary Featherstone**
Contact:	
Address:	**PO Box 36** **Pingrup WA 6343**
Telephone:	**9820 1078**
Mobile:	
Fax:	**9820 1003**
Email:	**feathersone3@bigpond.com**

Survey details:

GPS lat. & long. (TomTom®):	**-33.606980, 118.549050**	Sampled by:	**Dave Gartner**
Product:	**Dolomite**	Date:	**7th May 2008**
Lime WA Inc. member?	**No**	Time:	**9 am**
Agree to DAFWA testing?	**Yes**	Sample ID:	**SCLS40**
Comments:			



CHEMISTRY
CENTRE

WESTERN AUSTRALIA AGRICULTURAL LIME INDUSTRY CODE OF PRACTICE

Project: **South Coast Lime Survey**
Sample Identification Mark: **SCLS40** Date Forwarded: **27-06-2008**
Chemistry Centre Laboratory No: **07A652-040** Report Date: **5-08-2008**

LABORATORY TEST REPORT

Sieve Range (mm)	% weight	Neutralising Value %
0 – 0.125	16.5	67.9
0.125 – 0.250	12.5	61.2
0.250 – 0.50	16.8	57.0
0.50 – 1.00	17.2	71.7
>1.00	36.9	83.8
Overall Result		**71.7**

Notes:
% weight = *per cent by weight of air dry sample in each fraction*
Neutralising Value = *percent of liming material expressed as calcium carbonate*

Analysis of Bulked Sample

Moisture content, as received	6.7 %
Neutralising Value	72.9 %
Calcium, soluble in 1 M HCl	18.5 %
Magnesium, soluble in 1 M HCl	5.9 %
Sodium, soluble in 1 M HCl	0.3 %

Notes:
Moisture content is determined from the weight loss upon air-drying (40 degrees)
Results for Neutralising Value, calcium, magnesium and sodium are expressed on an air dried basis

KS WALTON
Chemist and Research Officer
Natural Resources Chemistry Laboratory

Appendix B—laboratory analytical methods

The chemical analyses of the lime samples were conducted by the Chemistry Centre of WA. The analytical methods of the Chemistry Centre are protected by copyright however the following is a general description of the method used for agricultural lime analysis for the Lime Industry Code of Practice analyses.

Particle size distribution

Samples for the Lime Industries Code of Practice are first air-dried, then the particle size distribution is measured by sieving through wire mesh screens (brass or stainless steel) with hole diameters of 1.0, 0.5, 0.25 and 0.125 mm. Hand sieving is always used because of the variability of the samples received and the soft nature of many lime materials. Extended sieving of some types of lime increases the percentage of the finer fractions by abrasion of the larger particles.

In order to obtain sufficient material of the coarse fractions for the neutralising value test, it is necessary to take a relatively large sample size, often in excess of 1 kg. However, it is not practical to sieve the entire sample through all screens, as 'blinding' of at least one of the finer screens inevitably occurs. This is overcome by quantitatively reducing the size of the sample as required.

Sieving through each screen is continued until the amount of additional material passing a particular screen is less than 0.1% of the sample weight, being the reporting limit for each fraction. This is equivalent to 1 g for a 1 kg fraction, or 0.1 g for a 100 g fraction.

To ensure that all results are reproducible, the following steps are taken:

- All screens are of the highest analytical quality and are well maintained. Commercial wire meshes are unlikely to have the high tolerance of analytical mesh sieves.
- Sieving is undertaken by trained and experienced operators. The Chemistry Centre is registered by the National Association of Testing Authorities (NATA) for particle sizing.
- Manual sieving is used in preference to mechanical procedures to overcome the difficulties such as abrasion of soft samples and blinding of fine mesh screens described earlier.

Neutralising value

The neutralising value of each size fraction is measured. The neutralising value of a sample of the bulk material is also determined as another quality assurance check for the analysis of each sample.

Each sample or fraction requiring determination of the neutralising value is ground to a fine powder in a ring grinding mill.

A sample of the finely ground material is treated with 100 mL of 1 M hydrochloric

acid. There is an excess amount of acid to ensure that all of the free lime dissolves. The reaction between the lime and the acid is completed by boiling gently for several minutes, then adjusting the volume of the solution to its original value.

After cooling to room temperature, a 10 mL aliquot of the solution is transferred to the titration system using a glass pipette. The excess acid of the test sample is then titrated with standardised sodium hydroxide solution using an automatic burette and the 'end-point' is measured with a pH meter (the reaction is complete when the pH of the test solution increases to 7 or higher). The automatic burette is very accurate, with a volume delivery tolerance of approximately ± 0.01 mL, which is significantly better than glass burettes. Indicator solutions, such as phenolphthalein, can also be used to determine the 'end-point' of the titration. The pH meter, however, is preferred as the method is not affected by the presence acid-soluble iron materials which can be presence in some lime samples.

The accuracy of the method is approximately ± 1% or better.

Calcium and magnesium

If required, the calcium (Ca) and magnesium (Mg) content is measured in the acid solution of the sample. The instrument used for these measurements is an Inductively Coupled Plasma-Atomic Emission Spectrometer (ICP-AES), which can also be used to measure other elements such as sodium, sulphur, copper, iron, manganese and zinc.

Note that these results are not a true 'total' value, but a measure of acid-soluble forms of these elements. For lime materials, these values should be very similar to the true 'total' figures which can be measured independently using either X-Ray Fluorescence Spectrometry (XRF) or strong acid digestion using hydrofluoric acid.

The calcium and magnesium concentrations are checked for consistency with the measured neutralising values. The neutralising value should be closely related to the Ca and Mg concentrations by the following formula (where the molecular weight of calcium is 40 and of magnesium is 24):

$$NV \approx \frac{100 * \%Ca}{40} + \frac{100 * \%Mg}{24}$$

Appendix C—letter sent to lime suppliers

Project: Survey of Agricultural lime quality and availability to growers in the South West of Western Australia (April/May 2008).

Dear Lime Producer

In recent years the profile of soil acidity as a constraint to productive agriculture and the importance of maintaining or improving the soil resource has increased. As a consequence the importance of understanding the lime resources available to farmers in WA has been recognised.

South Coast Natural Resource Management Inc have commissioned the Department of Agriculture and Food to conduct an independent survey in April/May 2008 of agricultural lime available to farmers in the south-west of Western Australia. Ultra-Trace Laboratories will conduct analysis of the lime samples collected.

All suppliers of lime to the agricultural industry in the south-west agricultural region of Western Australia are offered the opportunity to take part in the survey. Participation in the survey by lime producers is entirely voluntary. However, for completeness, if a supplier declines to participate this will be recorded in the published report of the results. The final report will be submitted to South Coast Natural Resource Management Inc. and a copy will be posted to all participants of the study.

The report will indicate if the supplier is a current member of the Lime Industry WA Inc. group. This group is a group of independent suppliers of agricultural lime who follow an industry code of practice and provide a standard set of information to growers via their website at www.limewa.com.au. Membership of this group is open to all suppliers of agricultural lime in Western Australia.

The protocol for testing:

Mr Dave Gartner, Senior Technical Officer with the Department of Agriculture and Food will be contacting suppliers and collecting the samples from the working face/current stockpile at each of the mines. Subsamples will be mixed on site and bagged into three bags of approximately 3 kg each.

One sample will be sent for analysis, at Ultra Trace Analytical laboratories. This analysis will include % by weight and % Neutralising Value (NV) for each of 5 particle size fractions; Bulk NV; Ca; Mg and Na. The second sample will be kept as a reserve and the third will be stored in the Lime Bank at DAFWA, Northam.

At the time of sampling, relevant contact details will be collected to update records. Details of lime type, weigh system and screen size (mm) if relevant will recorded as well as the GPS location of the site and a photograph of the site will be taken for the report. Lime suppliers are welcome to provide additional information which may also be used in the report.

We thank you for your participation in this project which we are confident will assist farmers to make informed decisions and contribute to better management of acidic soils in WA.

Yours sincerely,

Chris Gazey (0429 107 976)
Senior Research Officer,
DAFWA Northam WA

Dave Gartner (0429 882 029)
Senior Technical Officer
DAFWA Northam WA

This project is supported by South Coast Natural Resource Management Inc. with investment from the National Landcare Program, and has received financial support from the Commonwealth Government and the State Government through the Regional Group