Attachment 3 - SESL Soils Report

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21st June 2013

Adam Hunter

Environmental Partnership (NSW) Pty Ltd
2 River Street

Birchgrove NSW 2041

Dear Adam,

Re: Soil Conditions, Analysis and Recommendations: Dame Eadith Walker Estate

Introduction

SESL Australia has been commissioned by Environmental Partnership (the Client) to examine the soil conditions of the paddocks, regeneration area and driveway dual tree lines at Dame Eadith Walker Estate (the Site). The proposed works are to upgrade the pastures as the present soil condition of the agistment facility is poor. The grounds require substantial work to rectify the long-term effects of overgrazing, overdue maintenance and weed control.

The Client has advised in their scope of works that the areas of particular concern are the high level of Fireweed (*Senecio linearifolius and S. lautus*) which is poisonous to horses, the soil nutritional levels and the uneven surface in Paddock 2 due to the trench and backfill works along the north to south direction of the paddock. The backfilling is expected to be mixed subsoil with topsoil that may present a risk to stock injury.

The work will involve characterising and analysing the soil conditions throughout the area highlighted by Environmental Partnership. The three key areas that SESL has focused on for Site amelioration are:

ABN 70 106 810 708
T (02) 9980 6554 **E** info@sesl.com.au PO Box 357 16 Chilvers Rd
F (02) 9484 2427 **W** sesl.com.au Pennant Hills NSW 1715 Thornleigh NSW 2120

1. Regeneration area: This area is located north east of the Site and encompasses a fenced off area of 2.475ha^2. The ground material is comprised of bedrock and crushed shale fill. The area has an existing fenced revegetation area and a well-defined former trotting track.
2. Paddock maintenance: The Site contains 2 primary paddocks that are divided into separate allotments. The conditions of the 2 paddocks vary and are heavily grazed and require further management. Paddock 1 covers an area of 7.34ha^2 and Paddock 2 an area of 6.78ha^2.
3. Driveway: A dual tree line runs parallel to the private driveway through the premises. The soil is heavily compacted and eroded from pedestrian, horse and vehicular traffic. The area covers 1.45ha^2.

Dame Eadith Walker Estate is located off Nullawarra Avenue in Concord, NSW. Chapman and Murphy (1989) describe the natural soil landscape as being at the intersection of Blacktown and some disturbed soil landscape profiles. The disturbed landscape is primarily around the Regeneration Area. Blacktown landscape is a residual soil landscape formed on Wianamatta Shales. Fundamentally The Blacktown soils are shallow Red Podsolics in the crest and midslope positions with deeper Yellow Podsolics in lower slope positions grading into deep Yellow Solodics (sodic Yellow Podsolics) and uniform structured clays. Podsolic soils show a strong contrast between the more loamy A horizon (topsoil) and a clear to abrupt boundary to a heavy clay B horizon (subsoil). Functionally the shallow Red Podsolics are usually well drained but will show perched water tables during intense wet periods and consequently form iron/manganese pellets at the A/B boundary. Waterlogging of transplant specimens, particularly those with larger rootballs, can be a problem in wet periods. The deep subsoils will be sodic and occasionally saline in low-lying locations. Subsoils can be very hostile to plant growth containing few nutrients, variously strong acidity and heavy clay content.

The purpose of the analysis and the report is to conduct a formal soil survey to define the site soil resources, ascertain the suitability for the upgrade and landscaping and to provide a discussion with recommendations for the amelioration options. This report presents the results of a visual inspection and intrusive soil assessment by SESL horticultural and environmental scientists.

ABN 70 106 810 708
T (02) 9980 6554 E info@sesl.com.au PO Box 357 16 Chilvers Rd
F (02) 9484 2427 W sesl.com.au Pennant Hills NSW 1715 Thornleigh NSW 2120

Site assessment

A walk over inspection with soil sampling was conducted on Thursday 16th May 2013 by Chantal Hooper and Luke Jacovides of SESL Australia whereby examining the soil profile and obtaining samples for analysis.

Soil sampling was conducted via hand auger to obtain samples judgmentally selected from across the Site at appropriate depths representative of the A and B horizons in seventeen (17) areas illustrated on the map (Appendix B). The locations were chosen to provide the broadest representation of the soil landscape variability to be encountered, however the sampling density is not sufficient to provide a detailed soil map nor to locate all areas of disturbed soil, fill and other anomalies that may occur. Twenty eight (28) soil samples were collected from seventeen (17) bore holes in total; seventeen (17) topsoils (A Horizon) and eleven (11) sub soil (B-Horizon) were examined. All profiles were described for the basic properties of horizon depth, colour, structure, and texture sufficient to allow recognition of the horizon discussed in the report. All field samples were submitted to the NATA accredited (approval No 15633) SESL Environmental Laboratory for analysis.

Laboratory analysis was conducted on twenty eight (28) soil samples for the following:

- Full soil chemistry (Topsoil only) – pH Levels: pH in H_2O, pH in CaCl2, Nutrients: NO_3, PO_4, K, SO_4, Ca and Mg, Fe, Mn, Zn, Cu and B, EC and cation ratios.
- Total Organic Carbon (Topsoil only)
- Subsoil characterisation (Subsoil only)- pH Levels: pH in H_2O, pH in CaCl2, Nutrients: K, Ca and Mg, EC and cation ratios.

Results of the analysis are presented in Appendix A and are discussed in detail in the results section.

Soil Profiles

The surface topsoil (A-Horizon) profiles in both paddocks are typically a medium to dark brown organic clay loam layer. In the driveway the soil contained less organic matter therefore was a lighter brown colour. The soil was also very compacted, eroded and difficult to auger. The subsoil (B-Horizon) is a orange/reddish light clay podzolic typical of the Blacktown soil profile landscape.

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T (02) 9980 6554 E info@sesl.com.au PO Box 357 16 Chilvers Rd
F (02) 9484 2427 W sesl.com.au Pennant Hills NSW 1715 Thornleigh NSW 2120

Table 1: Soil profiles from Dame Eadith Estate, Concord.

BH1 – Paddock 1			
Sample #	**Horizon**	**Depth**	**Description**
1	A	0-280mm	Medium/dark brown loam. Very organic
2	A2	280mm+	Light clay Orange and red clay mottling present Possible red ironstone
BH2 – Paddock 1			
Sample #	**Horizon**	**Depth**	**Description**
3	A	0-200mm	Medium brown loam Orange clay mottling present
4	B	200mm+	Light clay but topsoil is present, possibly tyned Orange and red mottling present
BH3 – Paddock 1			
Sample #	**Horizon**	**Depth**	**Description**
5	A	0-350mm	Medium brown loam Orange clay mottling present
6	B	350mm	Light clay but topsoil is present, possibly tyned Orange and red mottling present
BH4 – Paddock 1			
Sample #	**Horizon**	**Depth**	**Description**
7	A	0-350mm	Medium/dark brown loam. Very organic
8	B	350mm+	Medium brown light clay Gradual increase of clay Orange and red clay mottling present

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BH5 – Paddock 1			
Sample #	**Horizon**	**Depth**	**Description**
9	A	0-300mm	Medium/dark brown loam. Very organic
10	B	300mm+	Medium brown light clay Shale present, gravelly Orange and red clay mottling present
BH6 - Driveway			
Sample #	**Horizon**	**Depth**	**Description**
11	A	0-200mm	Light brown loam Very compacted, difficult to penetrate Soil friable and loose Aggregates (15mm) Ironstone pellets present on surface, indicative of erosion
BH7 - Driveway			
Sample #	**Horizon**	**Depth**	**Description**
12	A1	0-50mm	Medium dark brown loam. Organic layer build up, most likely from the trees. Ironstone pellets present on surface, indicative of erosion
12	A2	50-350mm	Light brown loam Very compacted, difficult to penetrate Soil friable and loose
13	B	350mm+	Reddish brown light clay podzolic
BH8			
Sample #	**Horizon**	**Depth**	**Description**
14	A1	0-50mm	Medium greyish brown loam Not as organic
14	A2	50-350mm	Medium brown loam Moderately compacted Orange shale present
15	B	350mm+	Orange/red light clay

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BH9			
Sample #	**Horizon**	**Depth**	**Description**
16	A	0-150mm	Medium brown organic layer = top 50mm Dry, friable and heavily compacted Below 50mm is medium brown clay loam
BH10 – Regeneration Area			
Sample #	**Horizon**	**Depth**	**Description**
17	A	Surface sample	Medium brown loam
BH11 – Regeneration Area			
Sample #	**Horizon**	**Depth**	**Description**
18	A	Surface sample	Medium brown loam
BH12 – Regeneration Area			
Sample #	**Horizon**	**Depth**	**Description**
19	A	Surface sample	Medium to dark brown loam More organic
BH13 – Paddock 2			
Sample #	**Horizon**	**Depth**	**Description**
20	A	0-200mm	Medium to dark brown loam Slightly reddish Organic
21	B	200mm+	Brown/orange light clay
BH14 – Paddock 2			
Sample #	**Horizon**	**Depth**	**Description**
22	A	0-250mm	Organic medium to dark brown/ red loam Orange shale present
23	B	250mm+	Brown light clay Orange, red clay mottling

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BH15 – Paddock 2			
Sample #	**Horizon**	**Depth**	**Description**
24	A	0-250mm	Organic medium to dark brown/ red loam Orange shale present
25	B	250mm+	Brown light clay Orange, red clay mottling
BH16 – Paddock 2			
Sample #	**Horizon**	**Depth**	**Description**
26	A	0-250mm	Organic medium to dark brown/ red loam Orange shale present
27	B	250mm+	Brown light clay Orange, red clay mottling
BH17 – Paddock 2			
Sample #	**Horizon**	**Depth**	**Description**
28	A	0-100mm	Organic medium to dark brown/ red loam Orange shale present
29	B	100mm+	Brown light clay Orange, red clay mottling

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Thornleigh NSW 2120

Results

Complete sets of the original results are found in Appendix A. Results are summarized in Table 2.

Table 2. Soil chemistry analysis for Paddock 1

	1	2	3	4	5	6	7	8	9	10
	BH1 0-280mm Paddock 1	BH1 280mm+ Paddock 1	BH2 0-200mm Paddock 1	BH2 200mm+ Paddock 1	BH3 0-350mm Paddock 1	BH3 350mm+ Paddock 1	BH4 0-350mm Paddock 1	BH4 350mm+ Paddock 1	BH5 0-300mm Paddock 1	BH5 300mm+ Paddock 1
pH in H_2O	5.7	5.7	5.8	5.6	5.6	5.2	5.4	5.3	6	5.4
pH in $CaCl_2$	4.7	4.7	4.9	4.6	4.7	4.3	4.6	4.4	5.2	4.3
EC dSm	0.03	0.03	0.06	0.05	0.04	0.04	0.06	0.04	0.08	0.03
Na % CEC	2.9	2.8	1.7	3.1	1.1	2.1	1.3	1.2	1.1	1.7
K % CEC	1.4	1.4	5.2	2.6	6.1	2.8	8.3	6.3	12.1	3.9
Ca % CEC	24.3	14.4	33.8	19.6	22.9	5.6	25.3	15.8	31.6	14.8
Mg % CEC	12.2	16.5	15	16.3	15.2	23.7	13	14	24.5	21.7
H % CEC	54.8	59.2	43	53.4	52.3	50.3	49.3	49.5	30.3	44.9
Al % CEC	3.6	5.8	1.1	4.8	2.5	15.4	2.9	12.9	0.1	13
CEC meq/100g	13.8	11.8	16.1	13.4	15.7	15.2	15.9	13.9	20.3	15.2
NO_3 mg/kg	0.05	N.T	0.8	N.T	0.6	N.T	5.8	N.T	2	N.T
PO_4 mg/kg	4.7	N.T	11.5	N.T	5.6	N.T	5.2	N.T	64.9	N.T
K mg/kg	78.7	61.4	325	137	373	170	517	343	963	229
SO_4 mg/kg	7.2	N.T	21	N.T	14	N.T	18	N.T	17	N.T
Ca mg/kg	672	340	1087	525	719	169	805	440	1284	449
Mg mg/kg	205	236	292	264	289	436	250	236	602	399
Fe mg/kg	80	N.T	196.2	N.T	204.3	N.T	251.7	N.T	220.2	N.T
Mn mg/kg	14	N.T	36	N.T	37	N.T	33	N.T	22	N.T
Zn mg/kg	0.7	N.T	5.9	N.T	2.7	N.T	4.7	N.T	6.9	N.T
Cu mg/kg	1.3	N.T	2.2	N.T	2.3	N.T	1.9	N.T	2	N.T
B mg/kg	1.3	N.T	1.3	N.T	1.1	N.T	1.1	N.T	1.3	N.T

N.T = No Tested

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F (02) 9484 2427 W sesl.com.au Pennant Hills NSW 1715 Thornleigh NSW 2120

Table 3. Soil chemistry analysis for Driveway

	11	12	13	14	15	16
	BH6 0-200mm Driveway	BH7 0-350mm Driveway	BH7 350mm+ Driveway	BH8 0-350mm Driveway	BH8 350mm+ Driveway	BH9 0-150mm Driveway
pH in H_2O	4.6	6	5.6	5.9	5.5	6
pH in $CaCl_2$	4.2	5.3	4.6	5.1	4.5	5.3
EC dSm	0.19	0.07	0.04	0.05	0.02	0.08
Na % CEC	6.5	2.6	1.9	1.1	1.6	3
K % CEC	1.9	8	5.9	5.3	3.7	5
Ca % CEC	2.4	63.8	10.2	40.6	11	66.3
Mg % CEC	6.7	25.8	12.1	17.8	13.6	25.7
H % CEC	65.5	0	62.2	34.8	58.8	0
Al % CEC	16.5	0.2	7.4	0.2	11.5	0
CEC meq/100g	13	17.1	13	20.3	12.8	18.7
NO_3 mg/kg	0.5	1.1	N.T	3.8	N.T	4.4
PO_4 mg/kg	6.5	12.6	N.T	7.4	N.T	11.9
K mg/kg	96.2	532	303	421	184	362
SO_4 mg/kg	84	23	0	8.3	0	20
Ca mg/kg	62.8	2181	265	1648	282	2478
Mg mg/kg	105	535	190	437	211	582
Fe mg/kg	166.2	132.3	N.T	156.9	N.T	262.1
Mn mg/kg	10	20	N.T	19	N.T	29
Zn mg/kg	2	8.9	N.T	7.6	N.T	12
Cu mg/kg	1.4	2	N.T	1.5	N.T	3.3
B mg/kg	1	1.8	N.T	1.3	N.T	2.2

ABN 70 106 810 708
T (02) 9980 6554
F (02) 9484 2427
E info@sesl.com.au
W sesl.com.au
PO Box 357
Pennant Hills NSW 1715
16 Chilvers Rd
Thornleigh NSW 2120

Table 4. Soil chemistry analysis for Regeneration Area

	17	18	19
	BH10 regen surface sample	BH11 regen surface sample	BH12 regen surface sample
pH in H_2O	5.7	5.6	5.8
pH in $CaCl_2$	4.9	4.9	5
EC dSm	0.1	0.07	0.09
Na % CEC	3.4	1.2	2.4
K % CEC	6.3	5.6	7.9
Ca % CEC	20.6	32.4	25.2
Mg % CEC	18.4	21.5	23.4
H % CEC	49.5	38.7	40.1
Al % CEC	1.8	0.5	0.6
CEC meq/100g	15.8	22.6	19.8
NO_3 mg/kg	0.3	2.4	9.9
PO_4 mg/kg	6.4	15	14.1
K mg/kg	387	493	610
SO_4 mg/kg	22	17	8.6
Ca mg/kg	651	1465	996
Mg mg/kg	351	589	561
Fe mg/kg	340.8	263.3	305
Mn mg/kg	11	9.1	15
Zn mg/kg	3.9	12	8.4
Cu mg/kg	1.2	1.6	1.8
B mg/kg	1.3	1.2	1.2

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Table 5. Soil chemistry analysis for Paddock 2

	20	21	22	23	24	25	26	27	28	29
	BH 13 0-200mm Paddock 2	BH13 200mm+ Paddock 2	BH14 0-250mm Paddock 2	BH 14 250mm+ Paddock 2	BH15 0-250mm+ Paddock 2	BH15 250mm+ Paddock 2	BH16 0-250mm Paddock 2	BH16 250mm+ Paddock 2	BH17 0-100mm+ Paddock 2	BH17 100mm+ Paddock 2
pH in H_2O	5.7	5.6	5.7	5.6	5.6	5.5	5.8	5.8	5.9	5.7
pH in $CaCl_2$	4.8	4.6	4.8	4.7	4.9	4.6	5.1	5	5.2	4.8
EC dSm	0.06	0.04	0.07	0.04	0.05	0.03	0.07	0.03	0.08	0.04
Na % CEC	1.8	2.7	2	2.4	1.3	1.4	1.1	1.5	1	0.9
K % CEC	6.7	3.9	7.6	6.9	6.3	5.3	7.7	5.4	10.7	9
Ca % CEC	24.6	8.6	27.1	12.2	22.1	14.4	33.2	16.7	32.5	18.3
Mg % CEC	16.9	12.2	14	10.7	16.2	12.1	20.8	14.8	21.5	13.8
H % CEC	48.1	64	47.8	61.4	52.4	60.9	37.1	59.1	33.9	53.9
Al % CEC	1.9	8.8	1.4	7.1	1.7	6	0.1	2.8	0.1	3.6
CEC meq/100g	18	13.2	16	11.3	15.7	12.6	20.6	12.8	20.7	14
NO_3 mg/kg	1.2	N.T	1.6	N.T	1.7	N.T	6.3	N.T	4.1	N.T
PO_4 mg/kg	6.4	N.T	5.1	N.T	7.9	N.T	16.7	N.T	10.7	N.T
K mg/kg	475	204	476	305	388	261	619	270	865	492
SO_4 mg/kg	15	N.T	18	N.T	12	N.T	13	N.T	20	N.T
Ca mg/kg	883	225	865	276	693	362	1368	428	1343	512
Mg mg/kg	368	195	271	147	308	184	519	230	540	233
Fe mg/kg	263.8	N.T	312.1	N.T	239	N.T	254.1	N.T	330.5	N.T
Mn mg/kg	16	N.T	30	N.T	32	N.T	19	N.T	42	N.T
Zn mg/kg	4	N.T	4.8	N.T	3.7	N.T	8.4	N.T	7.9	N.T
Cu mg/kg	1.4	N.T	1.7	N.T	1.6	N.T	2.6	N.T	2.1	N.T
B mg/kg	1.2	N.T	1.2	N.T	1.1	N.T	1.3	N.T	1.4	N.T

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Generally the results show largely unimproved pasture soils with moderate to strong acidity, calcium deficiency and low phosphorus levels. Only topsoil at BH 5 showed pH, calcium and phosphorus levels indicative of a degree of pasture improvement. These soils typically need liming and applications of phosphorus, sulphur and molybdenum for pasture improvement purposes.

Discussion

Paddock 1 Soil Conditions

The topsoil at Paddock 1 has a primarily medium acidity aside from BH4, which has a strong acidity with, desirably low salinity levels. The effective cation exchange capacity (eCEC) is dominated by high levels of hydrogen and aluminium, resulting from the acidity levels. The acidity has lead to increased availability of aluminium, which will be highly toxic to plants. The eCEC is also very low in calcium. Overall nutrient levels require improvement in all areas. Organic matter levels are high.

The subsoil at Paddock 1 has a primarily strong acidity and very low salinity. Similar to the topsoil the eCEC is dominated by hydrogen and aluminium and is very low in calcium.

Paddock 2 Soil Conditions

The chemical and physical properties at Paddock 2 are very similar to those at Paddock 1. The topsoil has a medium acidity with desirably low salinity levels. The effective cation exchange capacity (eCEC) is dominated by high levels of hydrogen and aluminium as a result of the acidity levels. The acidity has lead to increased availability of aluminium, which is toxic to plants, particularly pasture legumes. The eCEC is also very low in calcium. Overall nutrient levels require improvement in all areas. Organic matter levels are high.

The subsoil at Paddock 1 has a primarily strong acidity and very low salinity. Similar to the topsoil the eCEC is dominant in hydrogen and aluminium and very low in calcium.

Driveway soil conditions

The soil conditions of the driveway are more compacted, eroded and less structured than the paddocks. The soil shows medium to very strong acidity and low salinity. The effective cation

ABN 70 106 810 708
T (02) 9980 6554
F (02) 9484 2427
E info@sesl.com.au
W sesl.com.au
PO Box 357
Pennant Hills NSW 1715
16 Chilvers Rd
Thornleigh NSW 2120

exchange capacity (eCEC) is dominated by high levels of hydrogen and aluminium, as a result of the acidity levels. The conditions at BH7 are slightly different whereby the eCEC is dominated by magnesium and therefore less acidic.

Regeneration areas

The regeneration areas are very similar to the paddocks with medium acidity, low salinity. The eCEC is dominated by high aluminium and hydrogen and low in calcium. Nutritional levels require boosting. The compacted shale fill in the former trotting track region was not analysed in this assessment. The compacted shale nature of the trotting track suggest limited nutrient retention and therefore the material un-amended is not suitable to support surface cover. Further, the material poses a physical limitation to any proposed future use. Recommendations on potential remedial actions are provided further in this report.

Current Carrying Capacity

The pasture is dominated by summer active perennial grasses, Couch (*Cynodon dactylon*) and Paspalum (*Paspalum dilatatum*). There is very little clover or legume component and significant weed content including the following species:

Dandelion species	*Taraxicum officionale*
Fireweed	*Senecio lautus*
Lambs tongue	*Plantago lanceolata*
Thistle	*Cirsium vulgare*
Fleabane	*Conyza spp*
Greater plantain	*Plantago major*
Bindii	*Soliva pterosperma*
Pennywort	*Centella spp*
Paddys lucerne	*Sida rhomobifolia*
Fireweed (groundsel)	*Senecio linearifolius*
Paspalum	*Paspalum dilatatum*
Couch	*Cynodon dactylon*
Scarlet Pimpernel	*Anagalis arvensis*

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F (02) 9484 2427 W sesl.com.au Pennant Hills NSW 1715 Thornleigh NSW 2120

While perennial grass is a good basis for pasture the lack of soil improvement, lack of legume component and lack of appropriate maintenance reduces carrying capacity. The predominance of couch in many places is likely a result of the fact that it is most resistant to the close grazing that horses prefer, it becoming dominant in situations of over-grazing. The current carrying capacity of the paddocks can be estimated at 0.5 horses/ha given the above conditions. With soil and pasture improvement, as well as appropriate maintenance this can potentially be increased to 1 horse/ha (NSW DPI 2007). If holding yards of around 50m2 can be incorporated into the design where horses are fed additional supplementary feeds and kept off pasture on a rotational basis, carrying capacities can be increased further. Just what the carrying capacity can be increased to depends on the degree of supplementary feeding and the issues of soil compaction and wear with increased numbers.

Holding yards can also be used to keep horses off pasture during excessively wet periods or periods of drought where growth is reduced. They are considered a highly desirable part of pasture management.

Horses graze in a manner that results in areas of short grass, dominated by species tolerant of close grazing (eg Couch) and areas of “rough” in toilet areas. Horses will not graze in these areas (likely a natural parasitic worm prevention response) hence the grass becomes long and often weedy in these areas as a response to the additional manure fertilizer and reduced grazing.. This will often leave areas that are overgrazed and other areas of long grasses where weeds inevitably dominate. Horses will not regularly eat weeds and horse pastures inevitably become weedy all over without regular maintenance.

The process of conditioning of renovating horse pastures is essentially one of disrupting this balance. It also helps to “cell graze” where large numbers of horses (say 20 horses) graze a paddock for very short periods eg 10 days and are then removed for pasture renovation and recovery. This may involve a rotation of say 10 days grazing and 30 days recovery. Pastures are less prone to weediness and degradation under such a grazing system than say a single horse for 200 days (same total grazing hours).

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Overall the main issues influencing soil conditions for landscape and pasture uses are:

1. The soil is very acidic and has high levels of hydrogen, and available aluminium. The chief consequence will be poor establishment and growth of legumes.
2. Topsoil nutrition levels require improvement in particular nitrogen, phosphorous and sulphate levels. Although not measured it is a reasonable assumption for the spoil type that molybdenum will also be deficient.
3. Low calcium levels which can be problematic for pregnant or lactacting horses especially where warm season perennial grasses containing oxalates are present.
4. Compacted and uneven soil surface in Paddock 2, which can be detrimental to horses hooves.
5. Eroded, compacted and massive (lacking structure) soil on the tree line parallel to the driveway and surrounding the horse troughs from human and pedestrian traffic.
6. High levels of weeds meaning significant proportion of the paddock is not supporting suitable vegetation for horses.
7. Presence of fireweed which is toxic to horses.
8. Overgrazed areas in the paddocks.

Recommendations

Maximising Carrying Capacity

There are four essential parts to maximizing pasture productivity in these horse pastures: improving soil fertility, improving winter feed production, improving protein levels in the pasture and defining a regular annual maintenance cycle that includes spelling, fertilizing, harrowing and slashing weeds.

Improving the soil fertility.

The soil conditions overall are too low to support improved pasture and should be increased as outlined below. The main requirements are for increased pH, phosphorus, and sulphur levels to allow the inclusion of some winter active legumes and grasses.

1. The pH in all areas will need to be raised. This will improve nutrient availability and lessen the availability of toxic aluminium. This should be done through incorporating **lime at 4t/ha.**

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2. Improve phosphorus and molybdenum levels using an application of **molybdenised Super phosphate (Moly super) at 500kg/ha**.
3. Nitrogen will eventiually be improved by the incorporation of legumes in the pasture but initially, to improve grass growth and protein content apply **urea at 30g/m2**.
4. To improve calcium levels further apply **gypsum at 200g/m2 (2t/ha)**

These fertilizer applications should coincide with a renovation or maintenance treatment and a seasonally appropriate over-sowing treatment as was described below.

Maintenance

To ensure effective pasture management it's important to rotate the horses to allow the pasture respite. Therefore allow the horses to graze in a paddock until over 20% of the paddock has been grazed down to an average height of 5cm. At this point rotate the horses to a new paddock. This may require around four rotations a year but the actual number will depend on growth rates. Twice a year should be considered the absolute minimum. The purpose is not just to spell the grass but to perform conditioning practices aims at eliminating the roughs or toilet areas and the weeds. In the spelled paddock (and as part of the initial increased fertility treatment above) perform the following:

1. Slash the paddock to control weeds.
2. Either use the initial fertilizer treatment as above on new paddocks or, twice a year as part of maintenance spread "After Graze" fertiliser (NPK 22: 2: 7.5) at 250kg/ha.
3. Harrow to break up manure accumulations.
4. Add a seasonally appropriate oversowing treatment:
    a. Autumn and early winter*: subterranean clover (Var Leura) at 6 kg/ha, which is a winter active components. This can be added from May-June but no later than July.
    b. Spring and early summer: White clover (Var Bounty) at 4 kg/ha.
5. Wait until the pasture is 10cm in height before allowing horse to graze (approximately 6 weeks).

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*Annual Rye was originally recommended at a low rate of 0.5kg/hat to prevent the potential adverse properties of Ryegrass (laminitis and staggers and providing excess energy resulting in undesirable weight gain), however following consultation with the client and equine specialists (Equiculture) this has been removed in preference to other winter active grasses or even forage (eg grazing oats), used to enhance winter feed. The lower winter production rate will likely require a supplementary feeding program, particularly in the coldest months.

Productivity of the pasture will improve with rotating the horses and allowing the pasture to recover from overgrazing. Overgrazing can weaken the grass roots from reduced photosynthesis due to the reduced photosynthetic surface. This can lead to loss of grass cover. Fireweed is indicative of overgrazing, high acidity and low fertility pastures. Fireweed is also fatal to horses but thankfully its unpalatable flavour is a deterrent for most horses, however this may not be a deterrent for a hungry horse. The above program itself should be sufficient to eliminate the majority of this weed.

Selecting grass species

Paspalum, Kikuyu and Couch are summer active perennials that contain calcium oxalate. Calcium oxalate is insoluble and is effectively unavailable to the horse. Calcium deficiency in horses can lead to problems with lactating and pregnant horses such as broken bones, stressed limbs and in extreme cases a disease called Big Head whereby foals are born with a large porous skull. Both paspalum and couch are good pasture species for high rainfall areas but do contain oxalates. The above fertiliser and over-sowing program is designed to improve calcium intake but individual owners are well advised to include significant calcium supplements such as licks and dietary supplements. It is not recommended to increase the spread of Kikuyu.

Reducing Compaction and Erosion – Grass Maintenance

The two main areas of compaction and erosion are along the driveway tree lines and surrounding the horse troughs. Rotating the horses will allow some respite for the soil as loss of grass is indicate of where the ratio of rate of wear and rate of recovery is unbalanced. Mulching will also assist,

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E info@sesl.com.au
W sesl.com.au
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over time, with decreasing the density and compaction from pedestrian traffic in the driveway and by the horse troughs to encourage the growth of soil organisms and improving water infiltration. This should be combined with a fertiliser regime to improve the vigor and wear resistance of the grass areas. Ideally horse troughs should have hard surface around them as were rates are so high it is not usually possible to maintain grass cover.

It is also recommended to put up signage to stop vehicular traffic from driving and parking along the driveway tree line.

Compaction and the uneven surface at Paddock 2 can be improved through and the harrowing program which will, over time, level the surface.

Former Trotting Track

Due to the distinct difference in surface condition, the recommendations for the former trotting track have been provided separately. The disturbed nature of the area, being an imported crushed shale base leads to unique difficulties in revegetation. SESL has been advised that a dog-off-leash area is being suggested as a possible use of the region and therefore some degree of surface cover is preferable. To reach this end, SESL propose the following recommendations.

To promote the establishment of a soil profile adequate to sustain surface grass cover, the compacted shale material will require deep ripping and applications of lime at 550g/sqm (to 150mm depth) to increase the hydraulic conductive, prevent re-compaction issues from occurring, increase the acidic pH and correct the cation balance to improve the fertility. The ripped surface will require a further addition of leguminous compost at 20% by volume to further promote the establishment of soil structure, nutrient and moisture retention. This ameliorated surface material would benefit from the sowing of a cover crop to aid in the improvement of organic matter and structure to the surface. Cover crops should be seasonably suitable as recommended in the oversowing treatment discussed above.

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Prior to major ground work being undertaken, the surface of the shale fill will require surveying to ensure no waterlogging conditions are created during the amelioration.

Revegetation Area

The soil chemistry in the revegetation area is not limiting to the re-establishment of plant species within the fenced off region. Any amelioration of soil resources in this area will severely effect the existing vegetation and is therefore not recommended. The recommended management for promoting further revegetation is passive management by invasive species removal only. No additions to soils are considered necessary.

Conclusions

It's our view that the soil conditions and carrying capacity of Dame Eadith Walker Estate can be improved for agistment by the use of corrective management such as soil pH correction agents, gypsum, lime, organic matter applications, fertilizers and regular maintenance. Planting of Clover species both winter and summer varieties and a winter active grass will aid greatly in the carrying capacity of the paddocks.

SESL is pleased to present this report and recommendations. We will be pleased to answer any further questions during the progress of the development therefore please do not hesitate to contact us with any questions or clarifications.

SYDNEY ENVIRONMENTAL & SOIL LABORATORY PTY LTD

Chantal Hooper
Horticultural Consultant
e: chantal@sesl.com.au

Simon Leake
Principal Soil Consultant
e:simon@sesl.com.au

ABN 70 106 810 708
T (02) 9980 6554 **E** info@sesl.com.au PO Box 357 16 Chilvers Rd
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Acknowledgement: The input of Jane and Stuart Myres of Equiculture in the areas of horse grazing and rotational methods is gratefully acknowledged.

Appendices

Appendix A: SESL Laboratory Analysis

Appendix B: Site Map

References

Chapman G.A and Murphy C.L (1989) Soil Landscapes of the Sydney 1:100 000 Sheet. Soil Conservation Service of NSW, Sydney.

NSW DPI (2007) Primefacts, Primefact 525 (replaces Agfact P2.4.3). www.dpi.nsw.gov.au/primefacts

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APPENDIX A

Laboratory Analysis

ABN 70 106 810 708
T (02) 9980 6554
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W sesl.com.au
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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

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Batch N°: 26338 **Sample N°: 1** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH1 0-280mm Paddock 1**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**FSC, TOC_DC**

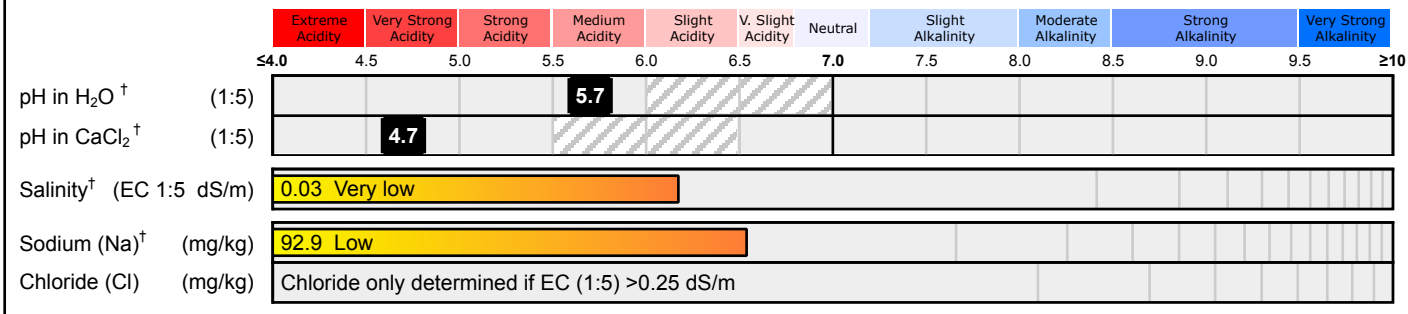
RECOMMENDATIONS

Medium acidity, very low salinity, eCEC is high in aluminium and hydrogen and low in calcium.
Low in all nutrients. organic matter very high (7.4%)

Amelioriants:
Lime = 100g/sqm
Gypsum 180g/sqm
Urea 15g/sqm
General multi purpose fertiliser

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

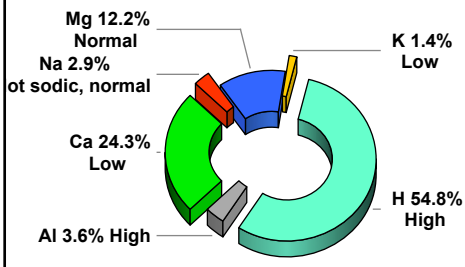
pH and ELECTRICAL CONDUCTIVITY



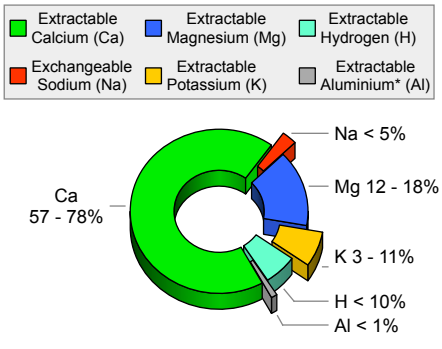
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	2	4.1 – 6.0
Comment: Calcium low		
Mg:K	8.5	2.6 – 5.0
Comment: Potassium low		
K/(Ca+Mg)	0.04	< 0.07
Comment: Acceptable		
K:Na	0.5	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.01 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 1** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	<0.05		<0.3	4.2	3.9
Phosphate-P (PO_4)	4.7		0.9	12.6	11.7
Potassium (K) †	78.7		15.7	52.3	36.6
Sulphate-S (SO_4)	7.2		1.4	13.6	12.2
Calcium (Ca) †	672		134.1	372.1	238
Magnesium (Mg) †	205		40.9	38.7	Drawdown
Iron (Fe)	80		16	110.1	94.1
Manganese (Mn) †	14		2.8	8.8	6
Zinc (Zn) †	0.7		0.1	1	0.9
Copper (Cu)	1.3		0.3	1.3	1
Boron (B) †	1.3		0.3	0.5	0.2

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

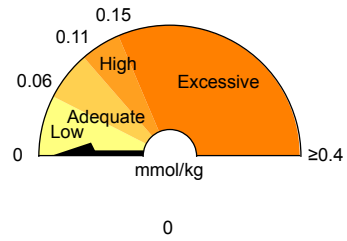
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m^3 and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.7**
Sum of Base Cations (meq/100g^{-1}):	**5.7**
Eff. Cation Exch. Capacity (eCEC):	**13.8**
Base Saturation (%):	**41.3**
Exchangeable Acidity (meq/100g^{-1}):	**7.56**
Exchangeable Acidity (%):	**54.78**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**490**
– to neutralise Al (g/sqm):	**72**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **181**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Did not test**
Typical clay content:	**Did not test**
Size:	
Gravel content:	**Did not test**
Aggregate strength:	**Did not test**
Structural unit:	**Did not test**
Potential infiltration rate:	**Very Slow**
Permeability (mm/hr):	**Did not test**
Calculated EC_{SE} (dS/m):	**-**

Requires EC and Soil Texture result.

Organic Carbon (OC%)†:	**4.4 – Very high**
Organic Matter (OM%):	**7.4**

Additional comments:

Consultant: Chantal Hooper

Authorised Signatory: Simon Leake

Date of Report: 24 May 2013

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

ASPAC

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† This laboratory has been awarded a Certificate of Proficiency for specific soil and plant tissue analyses by the Australasian Soil and Plant Analysis Council (ASPAC). Tests for which proficiency has been demonstrated are highlighted in this report.

Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

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Batch N°: 26338 **Sample N°: 2** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

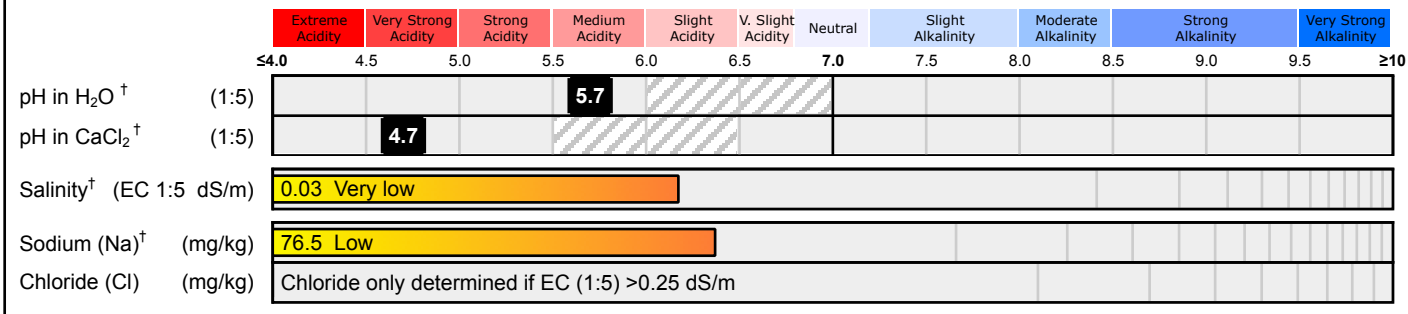
Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH1 280mm+ Paddock 1**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**SSCP**

RECOMMENDATIONS

Medium acidity, very low salinity, eCEC is high in aluminium and hydrogen and low in calcium.
Low nutrients
Amelioriants:
Lime = 300g/sqm
Gypsum 260g/sqm

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

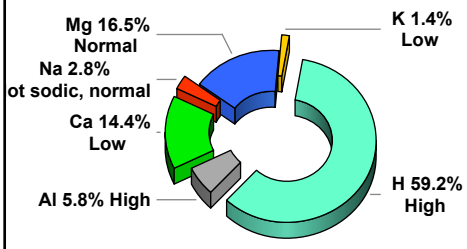
pH and ELECTRICAL CONDUCTIVITY



CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



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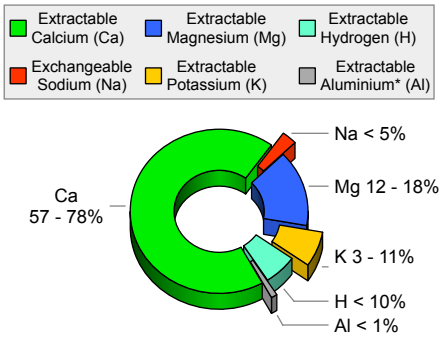

IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	**0.9**	4.1 – 6.0
Comment: Potential Calcium deficiency		
Mg:K	**12.2**	2.6 – 5.0
Comment: Potential Potassium deficiency		
K/(Ca+Mg)	**0.04**	< 0.07
Comment: Acceptable		
K:Na	**0.5**	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.01 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 2** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	-		-	4.2	Did not test
Phosphate-P (PO_4)	0		-	12.6	Did not test
Potassium (K) †	61.4		12.2	52.3	40.1
Sulphate-S (SO_4)	-		-	13.6	13.6
Calcium (Ca) †	340		67.8	372.1	304.3
Magnesium (Mg) †	236		47.1	38.7	Drawdown
Iron (Fe)	-		-	110.1	Did not test
Manganese (Mn) †	-		-	8.8	Did not test
Zinc (Zn) †	-		-	1	Did not test
Copper (Cu)	-		-.	1.3	Did not test
Boron (B) †	-		-.	0.5	Did not test

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

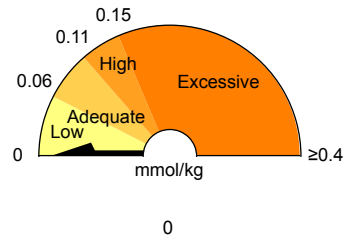
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m^3 and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.8**
Sum of Base Cations (meq/100g^{-1}):	**4.1**
Eff. Cation Exch. Capacity (eCEC):	**11.8**
Base Saturation (%):	**34.75**
Exchangeable Acidity (meq/100g^{-1}):	**6.99**
Exchangeable Acidity (%):	**59.24**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**474**
– to neutralise Al (g/sqm):	**101**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **262**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Light Clay**
Typical clay content:	**35 - 40%**
Size:	**Fine (1 - 10mm)**
Gravel content:	**Not gravelly**
Aggregate strength:	**Weak**
Structural unit:	**Crumb**
Potential infiltration rate:	**Slow**
Permeability (mm/hr):	**2.5 - 5 mm/hr**
Calculated EC_{SE} (dS/m):	**0.26**

– Non-saline. Salinity effects on plants are mostly negligible.

Organic Carbon (OC%)†: **Did not test**
Organic Matter (OM%): **-**
Additional comments:

Consultant: Chantal Hooper **Authorised Signatory: Simon Leake** **Date of Report: 24 May 2013**

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
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Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

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Batch N°: 26338 **Sample N°: 3** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH2 0-200mm Paddock 1**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**FSC, TOC_DC**

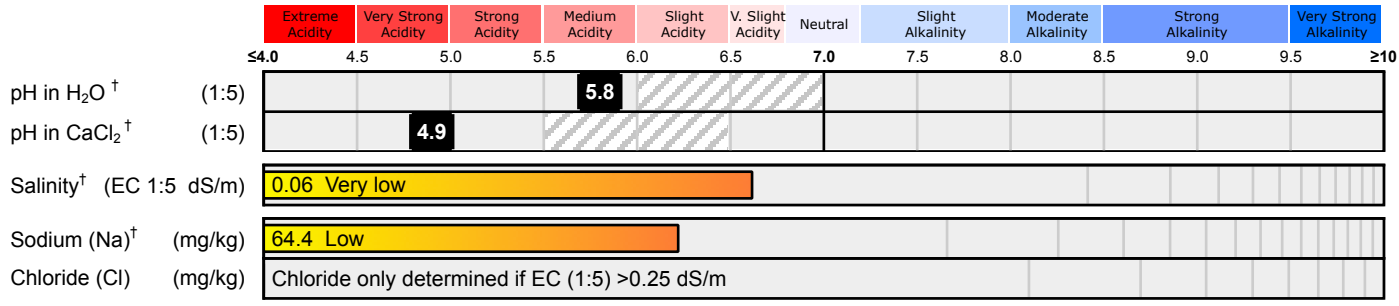
RECOMMENDATIONS

Medium acidity, very low salinity, eCEC is high in aluminium and hydrogen and low in calcium.
Low N , P, S and Ca. organic matter very high (9.2%)

Amelioriants:
Lime = 300g/sqm
Gypsum 125g/sqm
Urea 15g/sqm
General multi purpose fertiliser

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

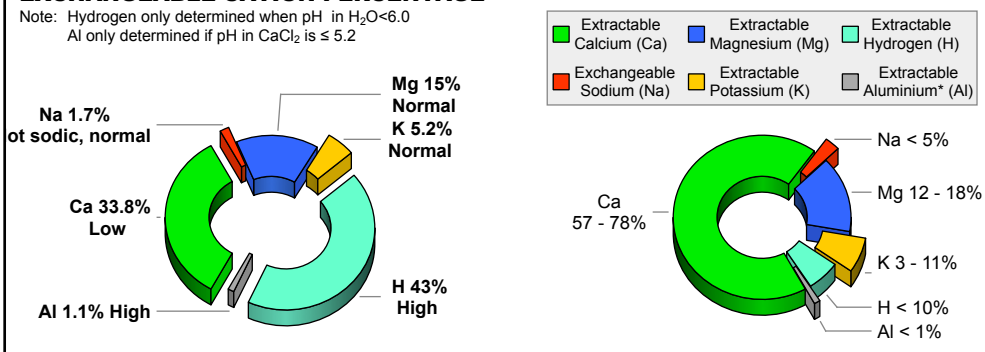
pH and ELECTRICAL CONDUCTIVITY



CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	2.3	4.1 – 6.0
Comment: Calcium low		
Mg:K	2.9	2.6 – 5.0
Comment: Balanced		
K/(Ca+Mg)	0.11	< 0.07
Comment: High		
K:Na	3	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.04 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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Fax: 02 9484 2427
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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 3** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	0.8		0.2	4.2	4
Phosphate-P (PO_4)	11.5		2.3	12.6	10.3
Potassium (K) †	325		64.8	60.6	Drawdown
Sulphate-S (SO_4)	21		4.2	13.6	9.4
Calcium (Ca) †	1087		216.9	431.7	214.8
Magnesium (Mg) †	292		58.3	44.9	Drawdown
Iron (Fe)	196.2		39.1	110.1	71
Manganese (Mn) †	36		7.2	8.8	1.6
Zinc (Zn) †	5.9		1.2	1	Drawdown
Copper (Cu)	2.2		0.4	1.3	0.9
Boron (B) †	1.3		0.3	0.5	0.2

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

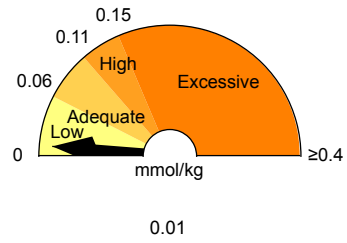
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m³ and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.9**
Sum of Base Cations (meq/100g^{-1}):	**9**
Eff. Cation Exch. Capacity (eCEC):	**16.1**
Base Saturation (%):	**55.9**
Exchangeable Acidity (meq/100g^{-1}):	**6.93**
Exchangeable Acidity (%):	**43.04**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**470**
– to neutralise Al (g/sqm):	**26**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **125**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Did not test**
Typical clay content:	**Did not test**
Size:	
Gravel content:	**Did not test**
Aggregate strength:	**Did not test**
Structural unit:	**Did not test**
Potential infiltration rate:	**Very Slow**
Permeability (mm/hr):	**Did not test**
Calculated EC_{SE} (dS/m):	**-**

Requires EC and Soil Texture result.

Organic Carbon (OC%)†:	**5.4 – Very high**
Organic Matter (OM%):	**9.2**

Additional comments:

Consultant: Chantal Hooper

Authorised Signatory: Simon Leake

Date of Report: 24 May 2013

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

ASPAC

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† This laboratory has been awarded a Certificate of Proficiency for specific soil and plant tissue analyses by the Australasian Soil and Plant Analysis Council (ASPAC). Tests for which proficiency has been demonstrated are highlighted in this report.

Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

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AUSTRALIA'S MOST TRUSTED EARTH SCIENCE SERVICES

Batch N°: 26338 **Sample N°: 4** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

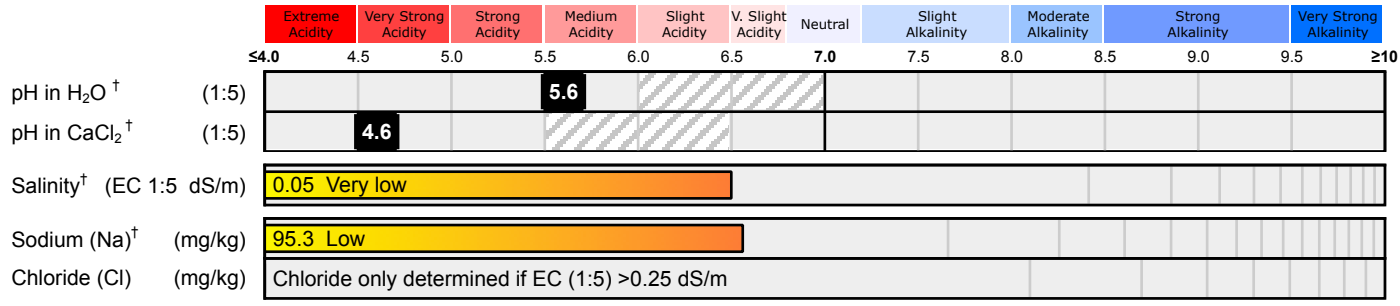
Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH2 200mm+ Paddock 1**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**SSCP**

RECOMMENDATIONS

Medium acidity, very low salinity, eCEC is high in aluminium and hydrogen and low in calcium.
Low nutrients
Amelioriants:
Lime = 300g/sqm
Gypsum 190g/sqm

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

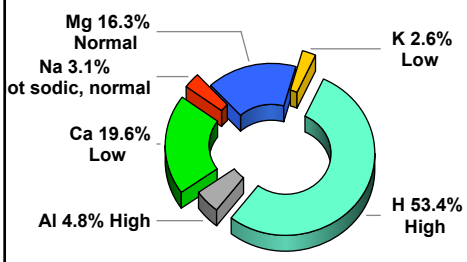
pH and ELECTRICAL CONDUCTIVITY



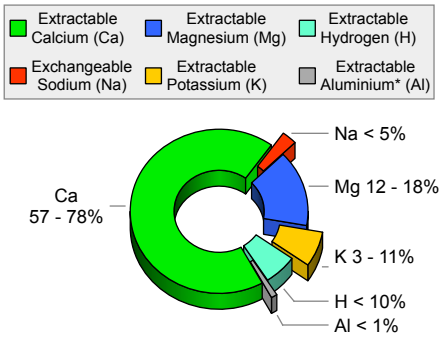
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	**1.2**	4.1 – 6.0
Comment: Calcium low		
Mg:K	**6.2**	2.6 – 5.0
Comment: Potassium low		
K/(Ca+Mg)	**0.07**	< 0.07
Comment: High		
K:Na	**0.9**	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.02 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 4** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	-		-	4.2	Did not test
Phosphate-P (PO_4)	0		-	12.6	Did not test
Potassium (K) †	137		27.3	52.3	25
Sulphate-S (SO_4)	-		-	13.6	13.6
Calcium (Ca) †	525		104.7	372.1	267.4
Magnesium (Mg) †	264		52.7	38.7	Drawdown
Iron (Fe)	-		-	110.1	Did not test
Manganese (Mn) †	-		-	8.8	Did not test
Zinc (Zn) †	-		-	1	Did not test
Copper (Cu)	-		-.	1.3	Did not test
Boron (B) †	-		-.	0.5	Did not test

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

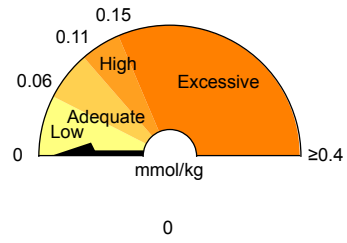
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m^3 and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.8**
Sum of Base Cations (meq/100g^{-1}):	**5.6**
Eff. Cation Exch. Capacity (eCEC):	**13.4**
Base Saturation (%):	**41.79**
Exchangeable Acidity (meq/100g^{-1}):	**7.16**
Exchangeable Acidity (%):	**53.43**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**532**
– to neutralise Al (g/sqm):	**93**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **188**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Light Clay**
Typical clay content:	**35 - 40%**
Size:	**Fine (1 - 10mm)**
Gravel content:	**Not gravelly**
Aggregate strength:	**Weak**
Structural unit:	**Crumb**
Potential infiltration rate:	**Slow**
Permeability (mm/hr):	**2.5 - 5 mm/hr**
Calculated EC_{SE} (dS/m):	**0.43**

– Non-saline. Salinity effects on plants are mostly negligible.

Organic Carbon (OC%)†: **Did not test**
Organic Matter (OM%): **-**
Additional comments:

Consultant: Chantal Hooper **Authorised Signatory: Simon Leake** **Date of Report: 24 May 2013**

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

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AUSTRALIA'S MOST TRUSTED EARTH SCIENCE SERVICES

Batch N°: 26338 **Sample N°: 5** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH3 0-350mm Paddock 1**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**FSC, TOC_DC**

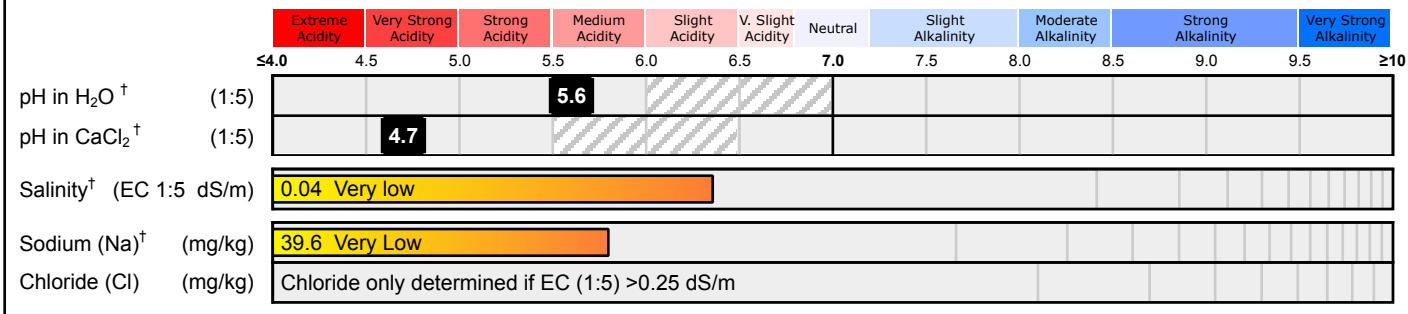
RECOMMENDATIONS

Medium acidity, very low salinity, eCEC is high in aluminium and hydrogen and low in calcium.
Low N , P, S and Ca. organic matter very high (8.4%)

Amelioriants:
Lime = 300g/sqm
Gypsum 290g/sqm
Urea 15g/sqm
General multi purpose fertiliser

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

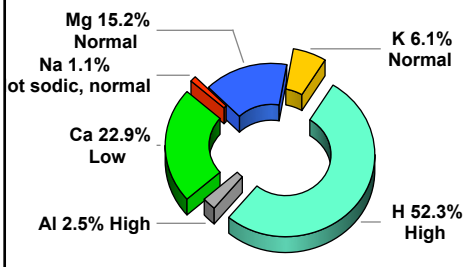
pH and ELECTRICAL CONDUCTIVITY



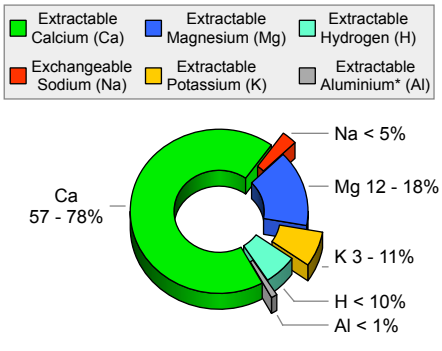
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	1.5	4.1 – 6.0
Comment: Calcium low		
Mg:K	2.5	2.6 – 5.0
Comment: Magnesium low		
K/(Ca+Mg)	0.16	< 0.07
Comment: High		
K:Na	5.6	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.04 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 5** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	0.6		0.1	4.2	4.1
Phosphate-P (PO_4)	5.6		1.1	12.6	11.5
Potassium (K) †	373		74.4	60.6	Drawdown
Sulphate-S (SO_4)	14		2.8	13.6	10.8
Calcium (Ca) †	719		143.4	431.7	288.3
Magnesium (Mg) †	289		57.7	44.9	Drawdown
Iron (Fe)	204.3		40.8	110.1	69.3
Manganese (Mn) †	37		7.4	8.8	1.4
Zinc (Zn) †	2.7		0.5	1	0.5
Copper (Cu)	2.3		0.5	1.3	0.8
Boron (B) †	1.1		0.2	0.5	0.3

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

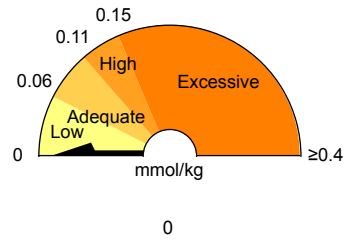
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m³ and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.6**
Sum of Base Cations (meq/100g^{-1}):	**7.1**
Eff. Cation Exch. Capacity (eCEC):	**15.7**
Base Saturation (%):	**45.22**
Exchangeable Acidity (meq/100g^{-1}):	**8.21**
Exchangeable Acidity (%):	**52.29**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**529**
– to neutralise Al (g/sqm):	**58**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **293**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Did not test**
Typical clay content:	**Did not test**
Size:	
Gravel content:	**Did not test**
Aggregate strength:	**Did not test**
Structural unit:	**Did not test**
Potential infiltration rate:	**Very Slow**
Permeability (mm/hr):	**Did not test**
Calculated EC_{SE} (dS/m):	**-**

Requires EC and Soil Texture result.

Organic Carbon (OC%)†:	**5 – Very high**
Organic Matter (OM%):	**8.4**
Additional comments:	

Consultant: Chantal Hooper

Authorised Signatory: Simon Leake

Date of Report: 24 May 2013

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
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Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

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AUSTRALIA'S MOST TRUSTED EARTH SCIENCE SERVICES

Batch N°: 26338 **Sample N°: 6** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

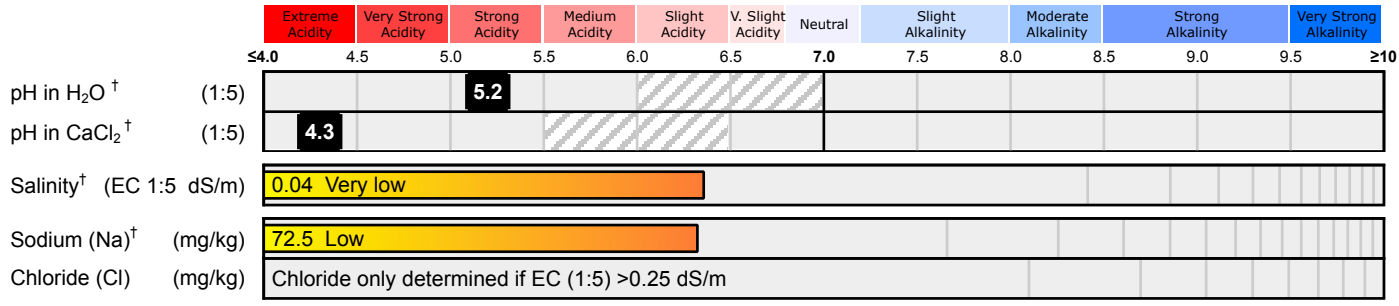
Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH3 350mm+ Paddock 1**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**SSCP**

RECOMMENDATIONS

Strong acidity, very low salinity, eCEC is high in aluminium and hydrogen and very low in calcium.
Low nutrients
Amelioriants:
Lime = 500g/sqm
Gypsum 450g/sqm

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

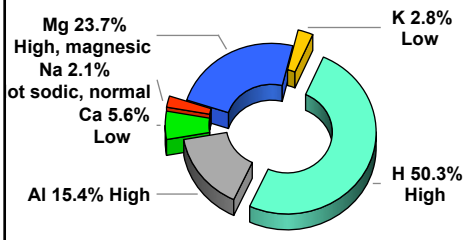
pH and ELECTRICAL CONDUCTIVITY



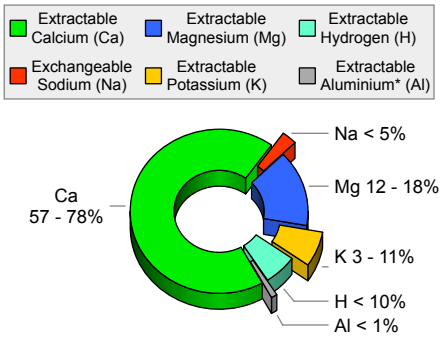
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	**0.2**	4.1 – 6.0
Comment: Potential Calcium deficiency		
Mg:K	**8.4**	2.6 – 5.0
Comment: Potassium low		
K/(Ca+Mg)	**0.1**	< 0.07
Comment: High		
K:Na	**1.3**	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.02 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

A member of the Australasian Soil and Plant Analysis Council
† This laboratory has been awarded a Certificate of Proficiency for specific soil and plant tissue analyses by the Australasian Soil and Plant Analysis Council (ASPAC). Tests for which proficiency has been demonstrated are highlighted in this report.

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Fax: 02 9484 2427
Em: info@sesl.com.au
Web: www.sesl.com.au

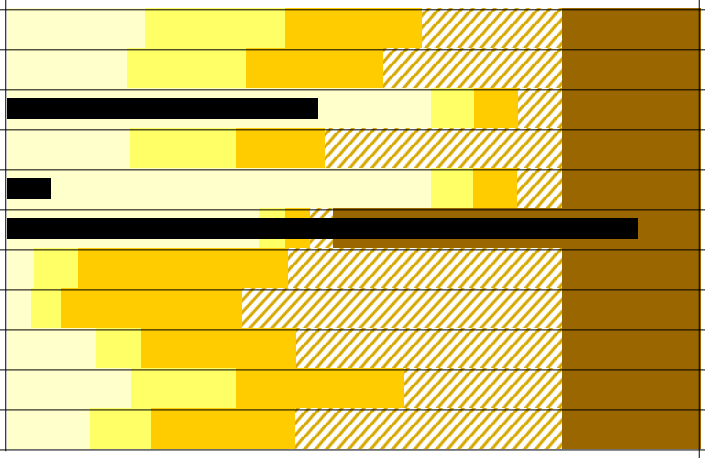
Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 6** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	-		-	4.2	Did not test
Phosphate-P (PO_4)	0		-	12.6	Did not test
Potassium (K) †	170		33.9	60.6	26.7
Sulphate-S (SO_4)	-		-	13.6	13.6
Calcium (Ca) †	169		33.7	431.7	398
Magnesium (Mg) †	436		87	44.9	Drawdown
Iron (Fe)	-		-	110.1	Did not test
Manganese (Mn) †	-		-	8.8	Did not test
Zinc (Zn) †	-		-	1	Did not test
Copper (Cu)	-		-.	1.3	Did not test
Boron (B) †	-		-.	0.5	Did not test



Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

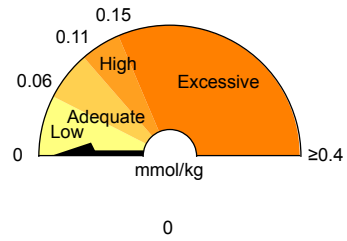
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m^3 and selected soil depth.

Phosphorus Saturation Index



0

Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.4**
Sum of Base Cations (meq/100g^{-1}):	**5.2**
Eff. Cation Exch. Capacity (eCEC):	**15.2**
Base Saturation (%):	**34.21**
Exchangeable Acidity (meq/100g^{-1}):	**7.64**
Exchangeable Acidity (%):	**50.26**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**680**
– to neutralise Al (g/sqm):	**342**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **448**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Light Clay**
Typical clay content:	**35 - 40%**
Size:	**Fine (1 - 10mm)**
Gravel content:	**Not gravelly**
Aggregate strength:	**Weak**
Structural unit:	**Crumb**
Potential infiltration rate:	**Slow**
Permeability (mm/hr):	**2.5 - 5 mm/hr**
Calculated EC_{SE} (dS/m):	**0.34**

– Non-saline. Salinity effects on plants are mostly negligible.

Organic Carbon (OC%)†: **Did not test**
Organic Matter (OM%): **-**
Additional comments:

Consultant: Chantal Hooper **Authorised Signatory: Simon Leake** **Date of Report: 24 May 2013**

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Sample Drop Off: 16 Chilvers Road, Thornleigh NSW 2120
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Em: info@sesl.com.au
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Batch N°: 26338 **Sample N°: 7** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH4 0-350mm Paddock 1**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**FSC, TOC_DC**

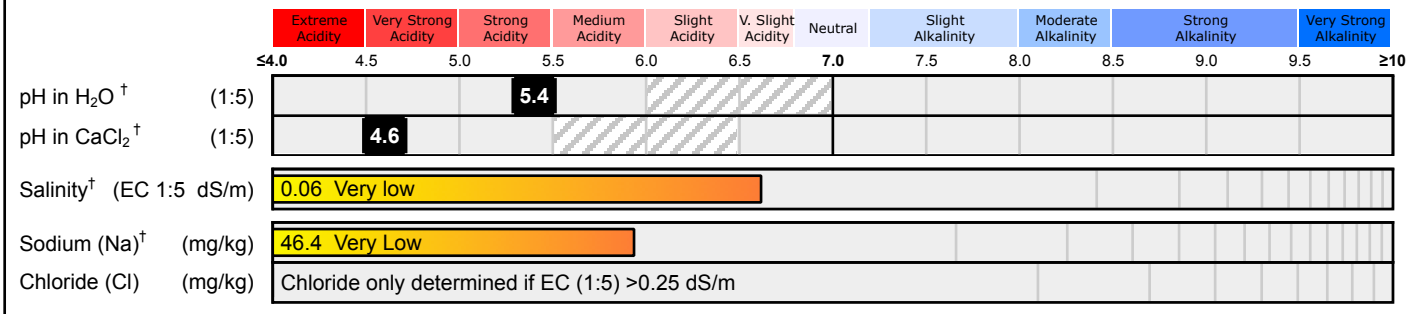
RECOMMENDATIONS

Strong acidity, very low salinity, eCEC is high in aluminium and hydrogen and low in calcium.
High K, Low N , P, S and Ca. organic matter very high (12.2%)

Amelioriants:
Lime = 300g/sqm
Gypsum 135g/sqm
Urea 15g/sqm
General multi purpose fertiliser

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

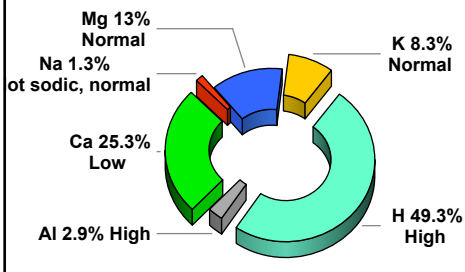
pH and ELECTRICAL CONDUCTIVITY



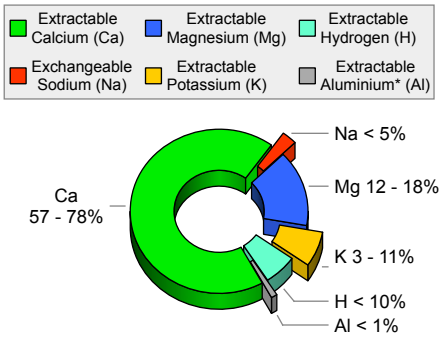
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	1.9	4.1 – 6.0
Comment: Calcium low		
Mg:K	1.6	2.6 – 5.0
Comment: Magnesium low		
K/(Ca+Mg)	0.22	< 0.07
Comment: High		
K:Na	6.6	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.05 Moderate potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

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Em: info@sesl.com.au
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AUSTRALIA'S MOST TRUSTED EARTH SCIENCE SERVICES

Batch N°: 26338 **Sample N°: 7** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	5.8		1.2	4.2	3
Phosphate-P (PO_4)	5.2		1	12.6	11.6
Potassium (K) †	517		103.1	60.6	Drawdown
Sulphate-S (SO_4)	18		3.6	13.6	10
Calcium (Ca) †	805		160.6	431.7	271.1
Magnesium (Mg) †	250		49.9	44.9	Drawdown
Iron (Fe)	251.7		50.2	110.1	59.9
Manganese (Mn) †	33		6.6	8.8	2.2
Zinc (Zn) †	4.7		0.9	1	0.1
Copper (Cu)	1.9		0.4	1.3	0.9
Boron (B) †	1.1		0.2	0.5	0.3

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

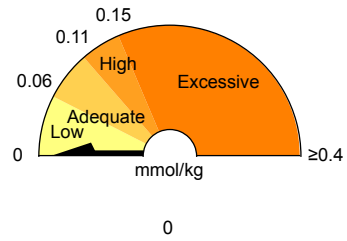
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m³ and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.7**
Sum of Base Cations (meq/100g^{-1}):	**7.6**
Eff. Cation Exch. Capacity (eCEC):	**15.9**
Base Saturation (%):	**47.8**
Exchangeable Acidity (meq/100g^{-1}):	**7.84**
Exchangeable Acidity (%):	**49.31**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**592**
– to neutralise Al (g/sqm):	**67**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **134**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Did not test**
Typical clay content:	**Did not test**
Size:	
Gravel content:	**Did not test**
Aggregate strength:	**Did not test**
Structural unit:	**Did not test**
Potential infiltration rate:	**Very Slow**
Permeability (mm/hr):	**Did not test**
Calculated EC_{SE} (dS/m):	**-**

Requires EC and Soil Texture result.

Organic Carbon (OC%)†:	**7.2 – Very high**
Organic Matter (OM%):	**12.2**

Additional comments:

Consultant: Chantal Hooper

Authorised Signatory: Simon Leake

Date of Report: 24 May 2013

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

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† This laboratory has been awarded a Certificate of Proficiency for specific soil and plant tissue analyses by the Australasian Soil and Plant Analysis Council (ASPAC). Tests for which proficiency has been demonstrated are highlighted in this report.

Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

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AUSTRALIA'S MOST TRUSTED EARTH SCIENCE SERVICES

Batch N°: 26338 **Sample N°: 8** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

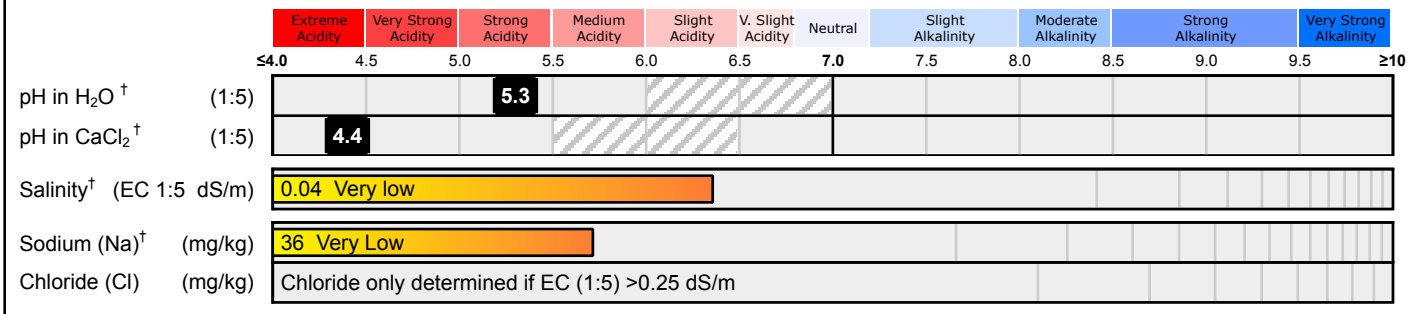
Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH4 350mm+ Paddock 1**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**SSCP**

RECOMMENDATIONS

Strong acidity, very low salinity, eCEC is high in aluminium and hydrogen and very low in calcium.
Low nutrients
Amelioriants:
Lime = 500g/sqm
Gypsum 110g/sqm

SOIL SAMPLE DEPTH (mm): ○ 100 ○ 150 ◉ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

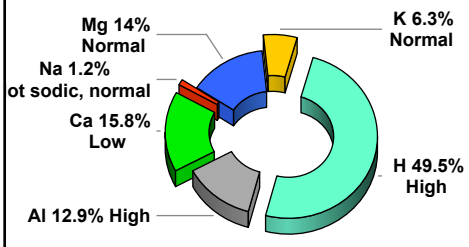
pH and ELECTRICAL CONDUCTIVITY



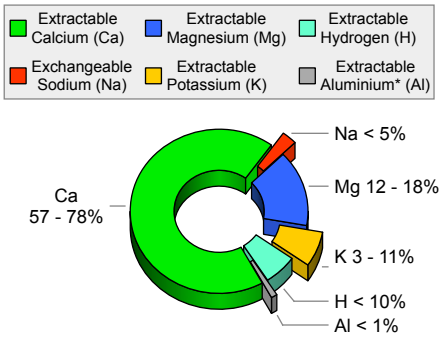
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	**1.1**	4.1 – 6.0
Comment: Calcium low		
Mg:K	**2.2**	2.6 – 5.0
Comment: Magnesium low		
K/(Ca+Mg)	**0.21**	< 0.07
Comment: High		
K:Na	**5.5**	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.03 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 8** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	-		-	5.6	Did not test
Phosphate-P (PO_4)	0		-	16.8	Did not test
Potassium (K) †	343		91.2	69.7	Drawdown
Sulphate-S (SO_4)	-		-	18.1	18.1
Calcium (Ca) †	440		117	496.1	379.1
Magnesium (Mg) †	236		62.8	51.6	Drawdown
Iron (Fe)	-		-	146.8	Did not test
Manganese (Mn) †	-		-	11.7	Did not test
Zinc (Zn) †	-		-	1.3	Did not test
Copper (Cu)	-		-.	1.7	Did not test
Boron (B) †	-		-.	0.7	Did not test

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

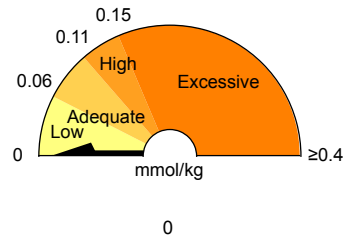
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m^3 and selected soil depth.

Phosphorus Saturation Index



0

Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.6**
Sum of Base Cations (meq/100g^{-1}):	**5.2**
Eff. Cation Exch. Capacity (eCEC):	**13.9**
Base Saturation (%):	**37.41**
Exchangeable Acidity (meq/100g^{-1}):	**6.88**
Exchangeable Acidity (%):	**49.5**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**894**
– to neutralise Al (g/sqm):	**348**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **110**

The CGAR is corrected for a soil depth of 200mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Light Clay**
Typical clay content:	**35 - 40%**
Size:	**Fine (1 - 10mm)**
Gravel content:	**Not gravelly**
Aggregate strength:	**Weak**
Structural unit:	**Crumb**
Potential infiltration rate:	**Slow**
Permeability (mm/hr):	**2.5 - 5 mm/hr**
Calculated EC_{SE} (dS/m):	**0.34**

– Non-saline. Salinity effects on plants are mostly negligible.

Organic Carbon (OC%)†: **Did not test**
Organic Matter (OM%): **-**
Additional comments:

Consultant: Chantal Hooper **Authorised Signatory: Simon Leake** **Date of Report: 24 May 2013**

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 9** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH5 0-300mm Paddock 1**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**FSC, TOC_DC**

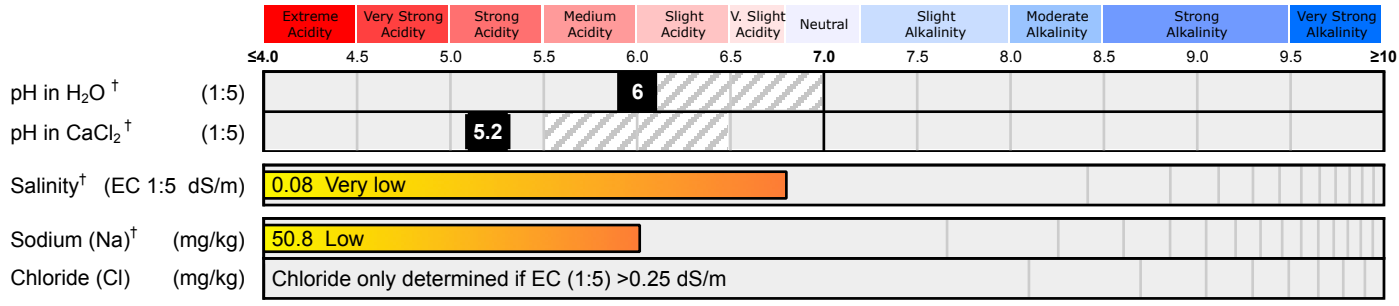
RECOMMENDATIONS

Medium acidity, very low salinity, eCEC is high in potassium, magnesium and hydrogen and low in calcium.
Low N , S and Ca. organic matter very high (8.4%)

Amelioriants:
Lime = 300g/sqm
Gypsum 600g/sqm
Urea 15g/sqm
General multi purpose fertiliser

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

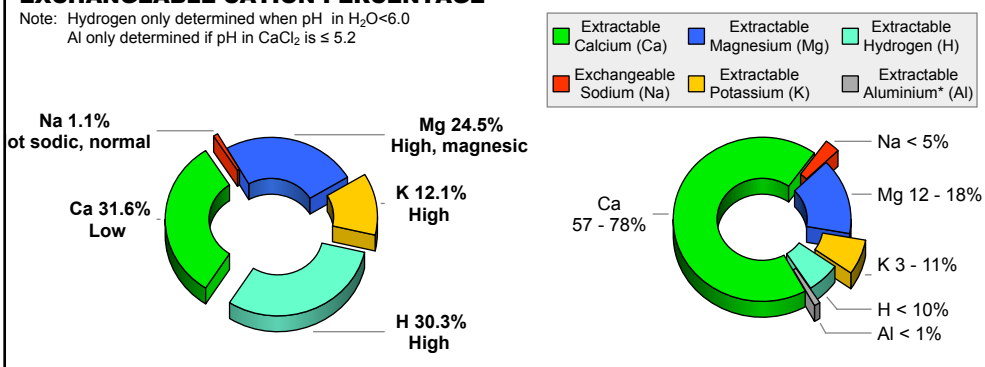
pH and ELECTRICAL CONDUCTIVITY



CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	1.3	4.1 – 6.0
Comment: Calcium low		
Mg:K	2	2.6 – 5.0
Comment: Magnesium low		
K/(Ca+Mg)	0.22	< 0.07
Comment: High		
K:Na	11.2	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.07 Moderate potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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Web: www.sesl.com.au

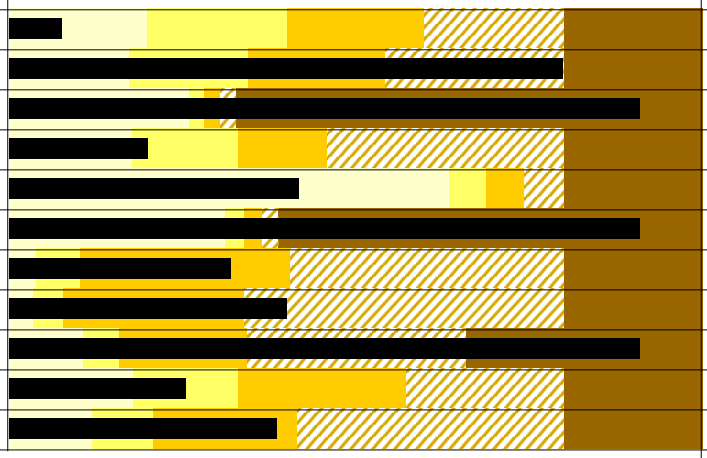
Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 9** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	2		0.4	4.2	3.8
Phosphate-P (PO_4)	64.9		12.9	12.6	Drawdown
Potassium (K) †	963		192.1	69	Drawdown
Sulphate-S (SO_4)	17		3.4	13.6	10.2
Calcium (Ca) †	1284		256.2	491.6	235.4
Magnesium (Mg) †	602		120.1	51.3	Drawdown
Iron (Fe)	220.2		43.9	110.1	66.2
Manganese (Mn) †	22		4.4	8.8	4.4
Zinc (Zn) †	6.9		1.4	1	Drawdown
Copper (Cu)	2		0.4	1.3	0.9
Boron (B) †	1.3		0.3	0.5	0.2



Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

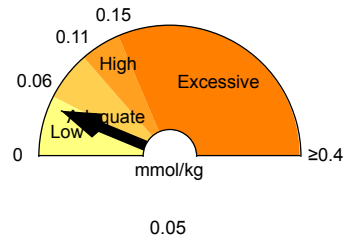
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m³ and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**7**
Sum of Base Cations (meq/100g^{-1}):	**14.1**
Eff. Cation Exch. Capacity (eCEC):	**20.3**
Base Saturation (%):	**69.46**
Exchangeable Acidity (meq/100g^{-1}):	**6.18**
Exchangeable Acidity (%):	**30.44**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**376**
– to neutralise Al (g/sqm):	**4**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **605**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Did not test**
Typical clay content:	**Did not test**
Size:	
Gravel content:	**Did not test**
Aggregate strength:	**Did not test**
Structural unit:	**Did not test**
Potential infiltration rate:	**Very Slow**
Permeability (mm/hr):	**Did not test**
Calculated EC_{SE} (dS/m):	**-**

Requires EC and Soil Texture result.

Organic Carbon (OC%)†:	**4.9 – Very high**
Organic Matter (OM%):	**8.4**

Additional comments:

Consultant: Chantal Hooper

Authorised Signatory: Simon Leake

Date of Report: 24 May 2013

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

ASPAC

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† This laboratory has been awarded a Certificate of Proficiency for specific soil and plant tissue analyses by the Australasian Soil and Plant Analysis Council (ASPAC). Tests for which proficiency has been demonstrated are highlighted in this report.

Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Sample Drop Off: 16 Chilvers Road, Thornleigh NSW 2120
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Tel: 02 9980 6554
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Batch N°: 26338 **Sample N°: 10** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

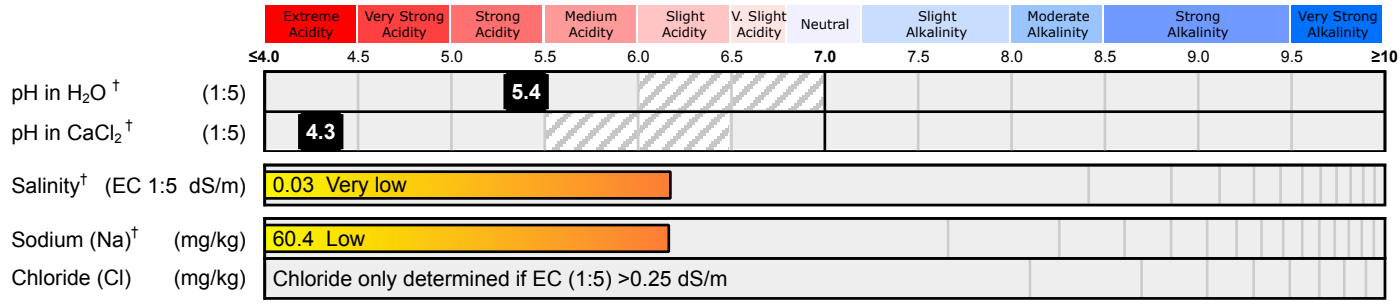
Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH5 300mm+ Paddock 1**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**SSCP**

RECOMMENDATIONS

Strong acidity, very low salinity, eCEC is high in aluminium and hydrogen and very low in calcium.
Low nutrients
Amelioriants:
Lime = 500g/sqm
Gypsum 450g/sqm

SOIL SAMPLE DEPTH (mm): ○ 100 ○ 150 ◉ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

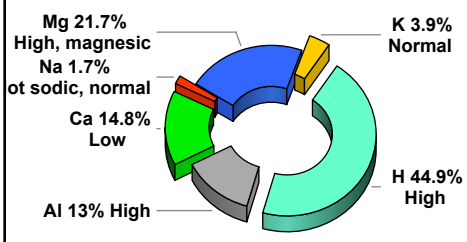
pH and ELECTRICAL CONDUCTIVITY



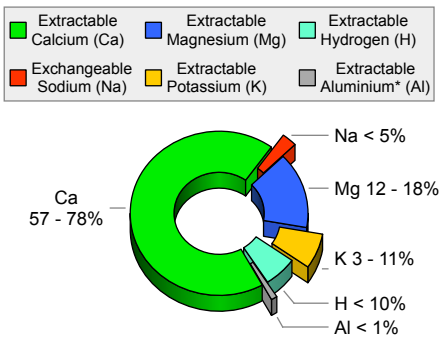
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	**0.7**	4.1 – 6.0
Comment: Potential Calcium deficiency		
Mg:K	**5.6**	2.6 – 5.0
Comment: Potassium low		
K/(Ca+Mg)	**0.11**	< 0.07
Comment: High		
K:Na	**2.3**	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.02 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 10** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	-		-	5.6	Did not test
Phosphate-P (PO_4)	0		-	16.8	Did not test
Potassium (K) †	229		60.9	80.9	20
Sulphate-S (SO_4)	-		-	18.1	18.1
Calcium (Ca) †	449		119.4	575.6	456.2
Magnesium (Mg) †	399		106.1	59.9	Drawdown
Iron (Fe)	-		-	146.8	Did not test
Manganese (Mn) †	-		-	11.7	Did not test
Zinc (Zn) †	-		-	1.3	Did not test
Copper (Cu)	-		-.	1.7	Did not test
Boron (B) †	-		-.	0.7	Did not test

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

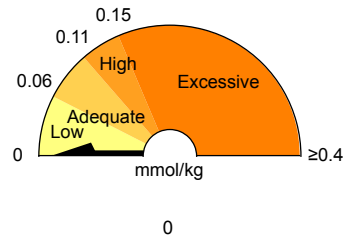
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m³ and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.6**
Sum of Base Cations (meq/100g^{-1}):	**6.4**
Eff. Cation Exch. Capacity (eCEC):	**15.2**
Base Saturation (%):	**42.11**
Exchangeable Acidity (meq/100g^{-1}):	**6.83**
Exchangeable Acidity (%):	**44.93**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**801**
– to neutralise Al (g/sqm):	**383**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **460**

The CGAR is corrected for a soil depth of 200mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Light Clay**
Typical clay content:	**35 - 40%**
Size:	**Fine (1 - 10mm)**
Gravel content:	**Not gravelly**
Aggregate strength:	**Weak**
Structural unit:	**Crumb**
Potential infiltration rate:	**Slow**
Permeability (mm/hr):	**2.5 - 5 mm/hr**
Calculated EC_{SE} (dS/m):	**0.26**

– Non-saline. Salinity effects on plants are mostly negligible.

Organic Carbon (OC%)†: **Did not test**
Organic Matter (OM%): **-**
Additional comments:

Consultant: Chantal Hooper **Authorised Signatory: Simon Leake** **Date of Report: 24 May 2013**

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

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Tel: 02 9980 6554
Fax: 02 9484 2427
Em: info@sesl.com.au
Web: www.sesl.com.au

Batch N°: 26338 **Sample N°: 11** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH6 0-200mm Driveway**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**FSC, TOC_DC**

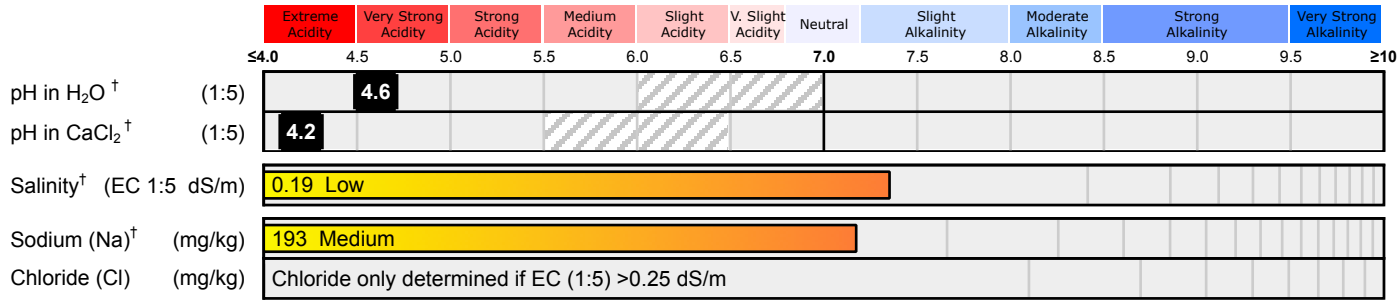
RECOMMENDATIONS

Very strong acidity, low salinity, eCEC is high in aluminium and hydrogen wiht moderate sodicity and low in calcium.
Low nutrients aside from S. Organic matter very high (6.5%)

Amelioriants:
Lime = 70g/sqm
Urea 15g/sqm
General multi purpose fertiliser

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

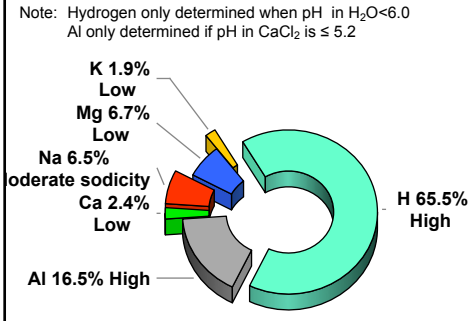
pH and ELECTRICAL CONDUCTIVITY



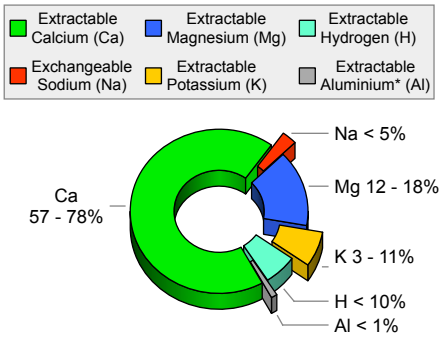
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	0.4	4.1 – 6.0
Comment: Potential Calcium deficiency		
Mg:K	3.5	2.6 – 5.0
Comment: Balanced		
K/(Ca+Mg)	0.21	< 0.07
Comment: High		
K:Na	0.3	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.03 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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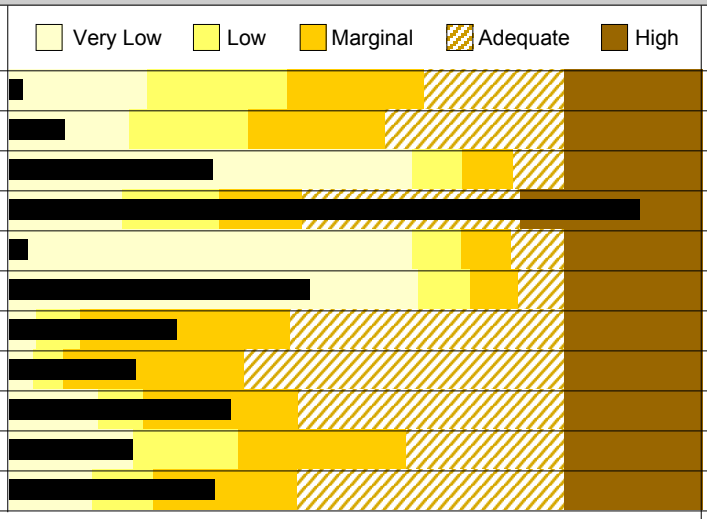
Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 11** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	0.5		0.1	4.2	4.1
Phosphate-P (PO_4)	6.5		1.3	12.6	11.3
Potassium (K) †	96.2		19.2	52.3	33.1
Sulphate-S (SO_4)	84		16.8	13.6	Drawdown
Calcium (Ca) †	62.8		12.5	372.1	359.6
Magnesium (Mg) †	105		20.9	38.7	17.8
Iron (Fe)	166.2		33.2	110.1	76.9
Manganese (Mn) †	10		2	8.8	6.8
Zinc (Zn) †	2		0.4	1	0.6
Copper (Cu)	1.4		0.3	1.3	1
Boron (B) †	1		0.2	0.5	0.3



Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

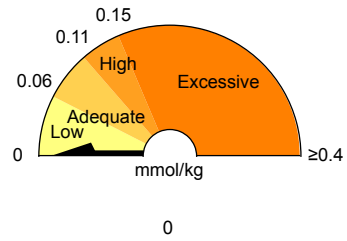
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m³ and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.3**
Sum of Base Cations (meq/100g^{-1}):	**2.3**
Eff. Cation Exch. Capacity (eCEC):	**13**
Base Saturation (%):	**17.69**
Exchangeable Acidity (meq/100g^{-1}):	**8.52**
Exchangeable Acidity (%):	**65.54**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**1125**
– to neutralise Al (g/sqm):	**314**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **0**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Did not test**
Typical clay content:	**Did not test**
Size:	
Gravel content:	**Did not test**
Aggregate strength:	**Did not test**
Structural unit:	**Did not test**
Potential infiltration rate:	**Very Slow**
Permeability (mm/hr):	**Did not test**
Calculated EC_{SE} (dS/m):	**-**

Requires EC and Soil Texture result.

Organic Carbon (OC%)†:	**3.8 – Very high**
Organic Matter (OM%):	**6.5**

Additional comments:

Consultant: Chantal Hooper

Authorised Signatory: Simon Leake

Date of Report: 24 May 2013

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

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Fax: 02 9484 2427
Em: info@sesl.com.au
Web: www.sesl.com.au

Batch N°: 26338 **Sample N°: 12** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH7 0-350mm Driveway**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**FSC, TOC_DC**

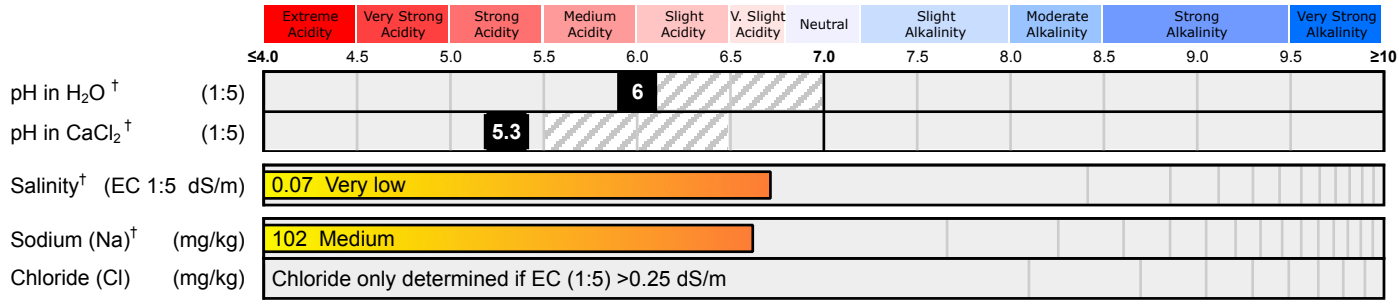
RECOMMENDATIONS

Medium acidity, very low salinity, eCEC is slightly magnesic
N, P and S require improving. Organic matter very high (14.4%)

Amelioriants:
Gypsum 100g/sqm
DAP at 45g/sqm

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

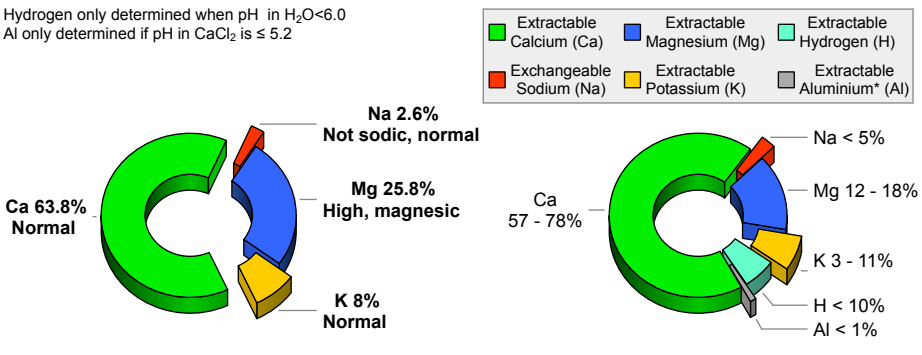
pH and ELECTRICAL CONDUCTIVITY



CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	2.5	4.1 – 6.0
Comment: Calcium low		
Mg:K	3.3	2.6 – 5.0
Comment: Balanced		
K/(Ca+Mg)	0.09	< 0.07
Comment: High		
K:Na	3.1	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.03 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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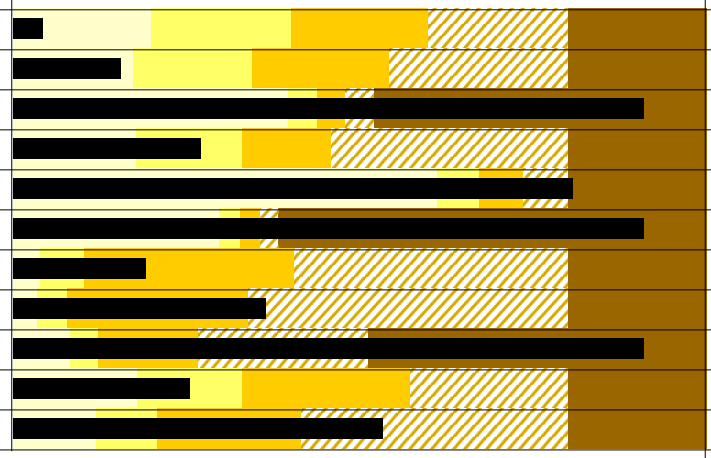
Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 12** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	1.1		0.2	4.2	4
Phosphate-P (PO_4)	12.6		2.5	12.6	10.1
Potassium (K) †	532		106.1	60.6	Drawdown
Sulphate-S (SO_4)	23		4.6	13.6	9
Calcium (Ca) †	2181		435.1	431.7	Drawdown
Magnesium (Mg) †	535		106.7	44.9	Drawdown
Iron (Fe)	132.3		26.4	110.1	83.7
Manganese (Mn) †	20		4	8.8	4.8
Zinc (Zn) †	8.9		1.8	1	Drawdown
Copper (Cu)	2		0.4	1.3	0.9
Boron (B) †	1.8		0.4	0.5	0.1



Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

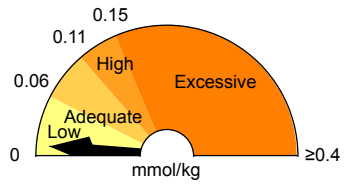
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m³ and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.8**
Sum of Base Cations (meq/100g^{-1}):	**17.1**
Eff. Cation Exch. Capacity (eCEC):	**17.1**
Base Saturation (%):	**100**
Exchangeable Acidity (meq/100g^{-1}):	**-**
Exchangeable Acidity (%):	**-**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**0**
– to neutralise Al (g/sqm):	**4**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **109**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Did not test**
Typical clay content:	**Did not test**
Size:	
Gravel content:	**Did not test**
Aggregate strength:	**Did not test**
Structural unit:	**Did not test**
Potential infiltration rate:	**Very Slow**
Permeability (mm/hr):	**Did not test**
Calculated EC_{SE} (dS/m):	**-**

Requires EC and Soil Texture result.

Organic Carbon (OC%)†:	**8.5 – Very high**
Organic Matter (OM%):	**14.4**
Additional comments:	

Consultant: Chantal Hooper

Authorised Signatory: Simon Leake

Date of Report: 24 May 2013

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

A member of the Australasian Soil and Plant Analysis Council
† This laboratory has been awarded a Certificate of Proficiency for specific soil and plant tissue analyses by the Australasian Soil and Plant Analysis Council (ASPAC). Tests for which proficiency has been demonstrated are highlighted in this report.

Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Sample Drop Off: 16 Chilvers Road, Thornleigh NSW 2120
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AUSTRALIA'S MOST TRUSTED EARTH SCIENCE SERVICES

Batch N°: 26338 **Sample N°: 13** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH7 350mm+ Driveway**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**SSCP**

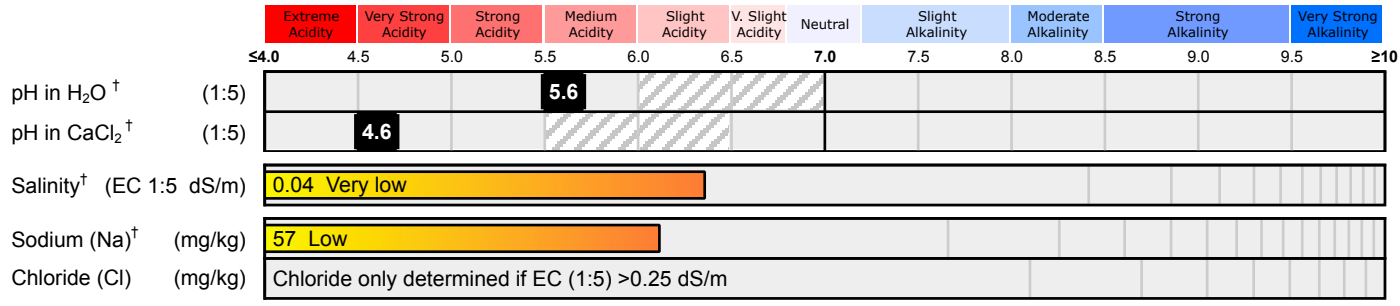
RECOMMENDATIONS

Medium acidity, very low salinity, eCEC is high in aluminium and hydrogen and low in calcium.

Amelioriants:
Lime = 300g/sqm
Gypsum = 350g/sqm

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

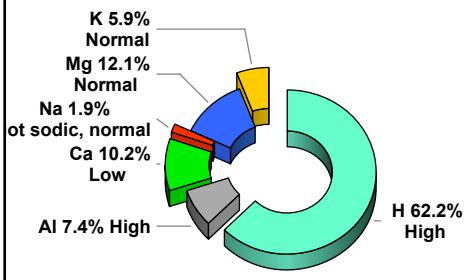
pH and ELECTRICAL CONDUCTIVITY



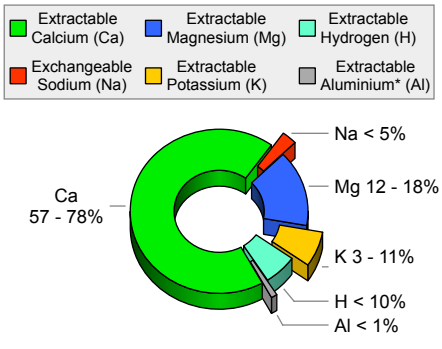
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	0.8	4.1 – 6.0
Comment: Potential Calcium deficiency		
Mg:K	2	2.6 – 5.0
Comment: Magnesium low		
K/(Ca+Mg)	0.27	< 0.07
Comment: High		
K:Na	3.1	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.02 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 13** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	-		-	4.2	Did not test
Phosphate-P (PO_4)	0		-	12.6	Did not test
Potassium (K) †	303		60.4	52.3	Drawdown
Sulphate-S (SO_4)	-		-	13.6	13.6
Calcium (Ca) †	265		52.9	372.1	319.2
Magnesium (Mg) †	190		37.9	38.7	0.8
Iron (Fe)	-		-	110.1	Did not test
Manganese (Mn) †	-		-	8.8	Did not test
Zinc (Zn) †	-		-	1	Did not test
Copper (Cu)	-		-.	1.3	Did not test
Boron (B) †	-		-.	0.5	Did not test

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

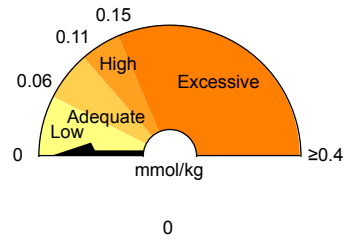
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m^3 and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.6**
Sum of Base Cations (meq/100g^{-1}):	**3.9**
Eff. Cation Exch. Capacity (eCEC):	**13**
Base Saturation (%):	**30**
Exchangeable Acidity (meq/100g^{-1}):	**8.09**
Exchangeable Acidity (%):	**62.23**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**536**
– to neutralise Al (g/sqm):	**140**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **358**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Clay Loam**
Typical clay content:	**25 - 35%**
Size:	**Fine (1 - 10mm)**
Gravel content:	**Not gravelly**
Aggregate strength:	**Weak**
Structural unit:	**Crumb**
Potential infiltration rate:	**Moderate**
Permeability (mm/hr):	**5 - 20 mm/hr**
Calculated EC_{SE} (dS/m):	**0.34**

– Non-saline. Salinity effects on plants are mostly negligible.

Organic Carbon (OC%)†: **Did not test**
Organic Matter (OM%): **-**
Additional comments:

Consultant: Chantal Hooper **Authorised Signatory: Simon Leake** **Date of Report: 24 May 2013**

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

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Batch N°: 26338 **Sample N°: 14** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH8 0-350mm Driveway**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**FSC, TOC_DC**

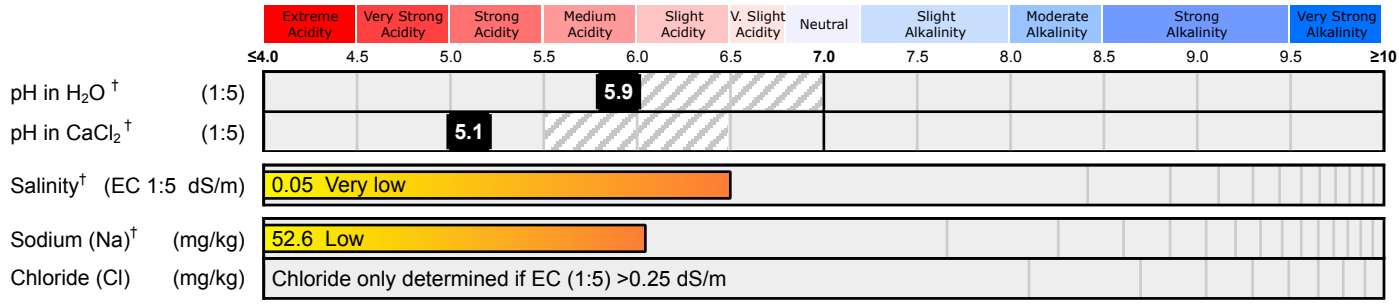
RECOMMENDATIONS

Medium acidity, very low salinity, eCEC is high in hydrogen and low in calcium.
Low nutrients aside from S, Mg and Zn. Organic matter very high (8.8%)

Amelioriants:
Lime = 200g/sqm
Urea 200g/sqm
General multi purpose fertiliser

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

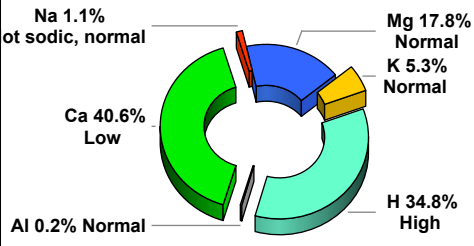
pH and ELECTRICAL CONDUCTIVITY



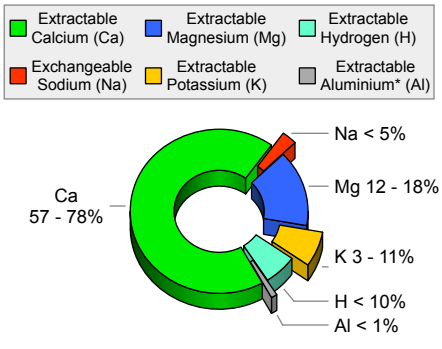
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	**2.3**	4.1 – 6.0
Comment: Calcium low		
Mg:K	**3.3**	2.6 – 5.0
Comment: Balanced		
K/(Ca+Mg)	**0.09**	< 0.07
Comment: High		
K:Na	**4.7**	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.05 Moderate potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 14** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	3.8		0.8	4.2	3.4
Phosphate-P (PO_4)	7.4		1.5	12.6	11.1
Potassium (K) †	421		84	69	Drawdown
Sulphate-S (SO_4)	8.3		1.7	13.6	11.9
Calcium (Ca) †	1648		328.8	491.6	162.8
Magnesium (Mg) †	437		87.2	51.3	Drawdown
Iron (Fe)	156.9		31.3	110.1	78.8
Manganese (Mn) †	19		3.8	8.8	5
Zinc (Zn) †	7.6		1.5	1	Drawdown
Copper (Cu)	1.5		0.3	1.3	1
Boron (B) †	1.3		0.3	0.5	0.2

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

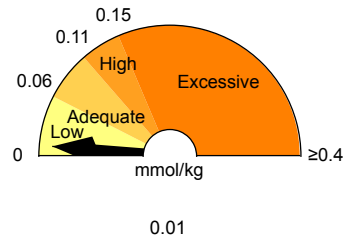
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m³ and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.9**
Sum of Base Cations (meq/100g^{-1}):	**13.2**
Eff. Cation Exch. Capacity (eCEC):	**20.3**
Base Saturation (%):	**65.02**
Exchangeable Acidity (meq/100g^{-1}):	**7.07**
Exchangeable Acidity (%):	**34.83**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**427**
– to neutralise Al (g/sqm):	**6**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **205**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Did not test**
Typical clay content:	**Did not test**
Size:	
Gravel content:	**Did not test**
Aggregate strength:	**Did not test**
Structural unit:	**Did not test**
Potential infiltration rate:	**Very Slow**
Permeability (mm/hr):	**Did not test**
Calculated EC_{SE} (dS/m):	**-**

Requires EC and Soil Texture result.

Organic Carbon (OC%)†:	**5.2 – Very high**
Organic Matter (OM%):	**8.8**

Additional comments:

Consultant: Chantal Hooper

Authorised Signatory: Simon Leake

Date of Report: 24 May 2013

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

ASPAC

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

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Batch N°: 26338 **Sample N°: 15** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH8 350mm+ Driveway**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**SSCP**

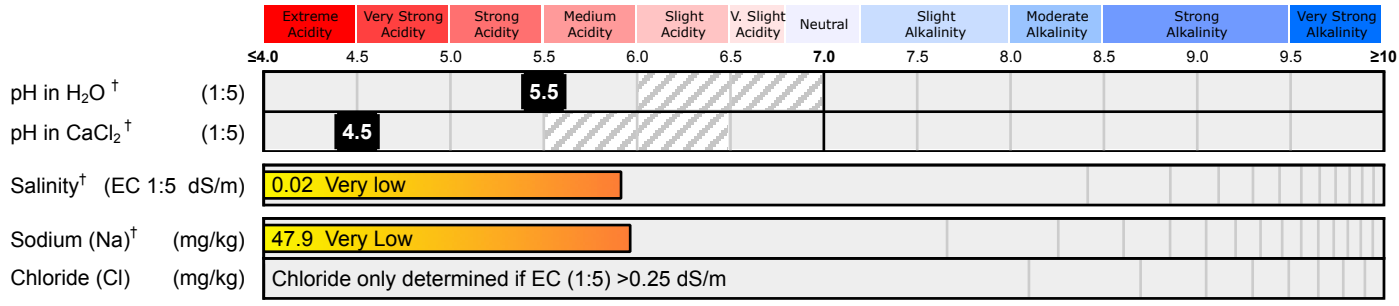
RECOMMENDATIONS

Strong acidity, very low salinity, eCEC is high in aluminium and hydrogen and low in calcium.

Amelioriants:
Lime = 400g/sqm
Urea 275g/sqm

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

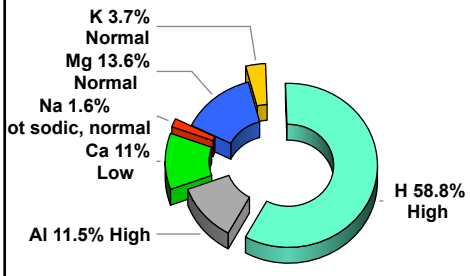
pH and ELECTRICAL CONDUCTIVITY



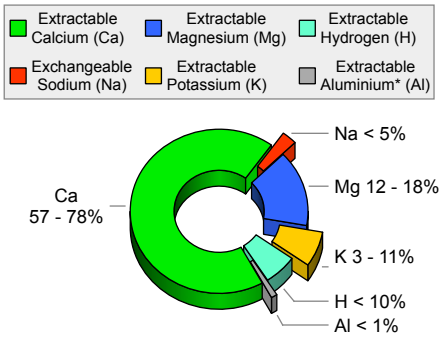
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	0.8	4.1 – 6.0
Comment: Potential Calcium deficiency		
Mg:K	3.7	2.6 – 5.0
Comment: Balanced		
K/(Ca+Mg)	0.15	< 0.07
Comment: High		
K:Na	2.2	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.01 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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Tel: 02 9980 6554
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Em: info@sesl.com.au
Web: www.sesl.com.au

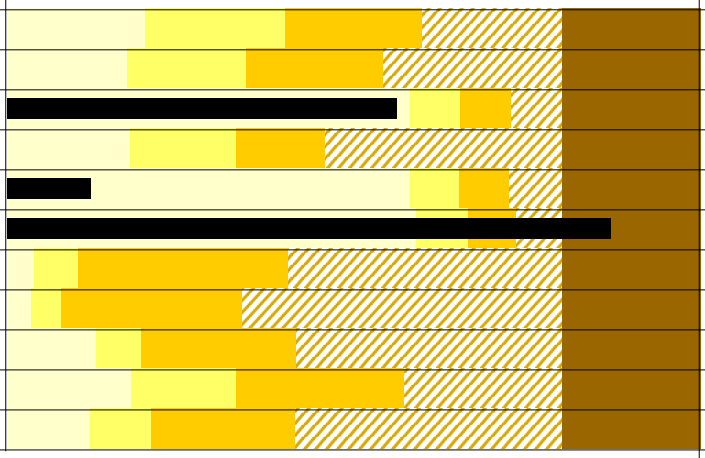
Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 15** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	-		-	4.2	Did not test
Phosphate-P (PO_4)	0		-	12.6	Did not test
Potassium (K) †	184		36.7	52.3	15.6
Sulphate-S (SO_4)	-		-	13.6	13.6
Calcium (Ca) †	282		56.3	372.1	315.8
Magnesium (Mg) †	211		42.1	38.7	Drawdown
Iron (Fe)	-		-	110.1	Did not test
Manganese (Mn) †	-		-	8.8	Did not test
Zinc (Zn) †	-		-	1	Did not test
Copper (Cu)	-		-.	1.3	Did not test
Boron (B) †	-		-.	0.5	Did not test



Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

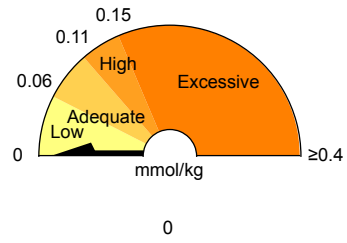
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m^3 and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.6**
Sum of Base Cations (meq/100g^{-1}):	**3.8**
Eff. Cation Exch. Capacity (eCEC):	**12.8**
Base Saturation (%):	**29.69**
Exchangeable Acidity (meq/100g^{-1}):	**7.52**
Exchangeable Acidity (%):	**58.75**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**564**
– to neutralise Al (g/sqm):	**215**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **273**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Light Clay**
Typical clay content:	**35 - 40%**
Size:	**Fine (1 - 10mm)**
Gravel content:	**Not gravelly**
Aggregate strength:	**Weak**
Structural unit:	**Crumb**
Potential infiltration rate:	**Slow**
Permeability (mm/hr):	**2.5 - 5 mm/hr**
Calculated EC_{SE} (dS/m):	**0.17**

– Non-saline. Salinity effects on plants are mostly negligible.

Organic Carbon (OC%)†: **Did not test**
Organic Matter (OM%): **-**
Additional comments:

Consultant: Chantal Hooper **Authorised Signatory: Simon Leake** **Date of Report: 24 May 2013**

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Sample Drop Off: 16 Chilvers Road, Thornleigh NSW 2120
Mailing Address: PO Box 357, Pennant Hills NSW 1715
Tel: 02 9980 6554
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Em: info@sesl.com.au
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Batch N°: 26338 **Sample N°: 16** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH9 0-150mm Driveway**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**FSC, TOC_DC**

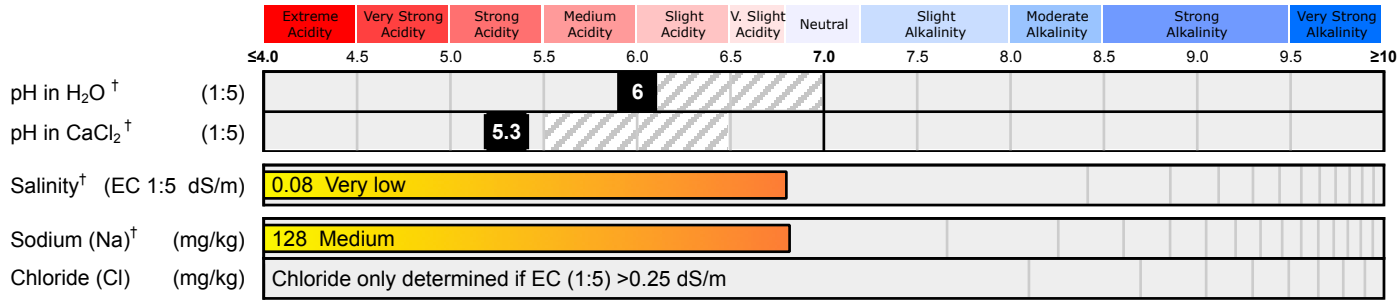
RECOMMENDATIONS

Medium acidity, very low salinity, eCEC is slightly magnesic
Low N, P and S. Organic matter very high (11.1%)

Amelioriants:
Gypsum = 40g/sqm
DAP at 45g/sqm

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

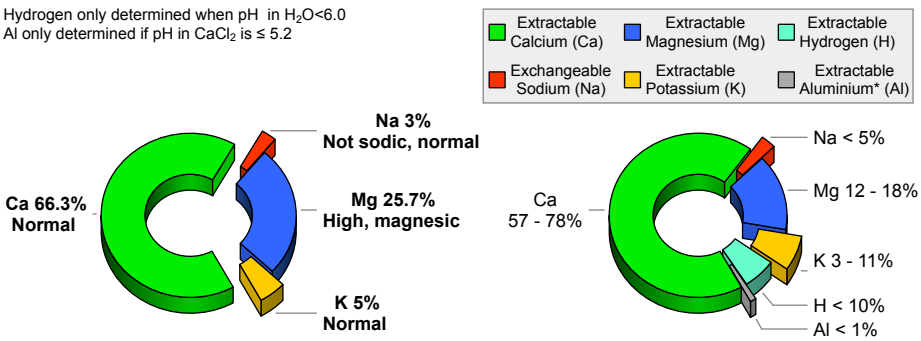
pH and ELECTRICAL CONDUCTIVITY



CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	**2.6**	4.1 – 6.0
Comment: Calcium low		
Mg:K	**5.2**	2.6 – 5.0
Comment: Potassium low		
K/(Ca+Mg)	**0.05**	< 0.07
Comment: Acceptable		
K:Na	**1.7**	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.03 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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Web: www.sesl.com.au

Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 16** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	4.4		0.9	4.2	3.3
Phosphate-P (PO_4)	11.9		2.4	12.6	10.2
Potassium (K) †	362		72.2	60.6	Drawdown
Sulphate-S (SO_4)	20		4	13.6	9.6
Calcium (Ca) †	2478		494.4	431.7	Drawdown
Magnesium (Mg) †	582		116.1	44.9	Drawdown
Iron (Fe)	262.1		52.3	110.1	57.8
Manganese (Mn) †	29		5.8	8.8	3
Zinc (Zn) †	12		2.4	1	Drawdown
Copper (Cu)	3.3		0.7	1.3	0.6
Boron (B) †	2.2		0.4	0.5	0.1

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

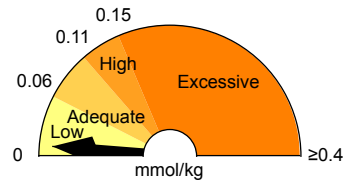
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m³ and selected soil depth.

Phosphorus Saturation Index



0.01

Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.9**
Sum of Base Cations (meq/100g^{-1}):	**18.7**
Eff. Cation Exch. Capacity (eCEC):	**18.7**
Base Saturation (%):	**100**
Exchangeable Acidity (meq/100g^{-1}):	**-**
Exchangeable Acidity (%):	**-**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**0**
– to neutralise Al (g/sqm):	**-**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **40**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Did not test**
Typical clay content:	**Did not test**
Size:	
Gravel content:	**Did not test**
Aggregate strength:	**Did not test**
Structural unit:	**Did not test**
Potential infiltration rate:	**Very Slow**
Permeability (mm/hr):	**Did not test**
Calculated EC_{SE} (dS/m):	**-**

Requires EC and Soil Texture result.

Organic Carbon (OC%)†:	**6.5 – Very high**
Organic Matter (OM%):	**11.1**
Additional comments:	

Consultant: Chantal Hooper

Authorised Signatory: Simon Leake

Date of Report: 24 May 2013

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

A member of the Australasian Soil and Plant Analysis Council
† This laboratory has been awarded a Certificate of Proficiency for specific soil and plant tissue analyses by the Australasian Soil and Plant Analysis Council (ASPAC). Tests for which proficiency has been demonstrated are highlighted in this report.

Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

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Fax: 02 9484 2427
Em: info@sesl.com.au
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Batch N°: 26338 **Sample N°: 17** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH10 regen surface sample**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**FSC, TOC_DC**

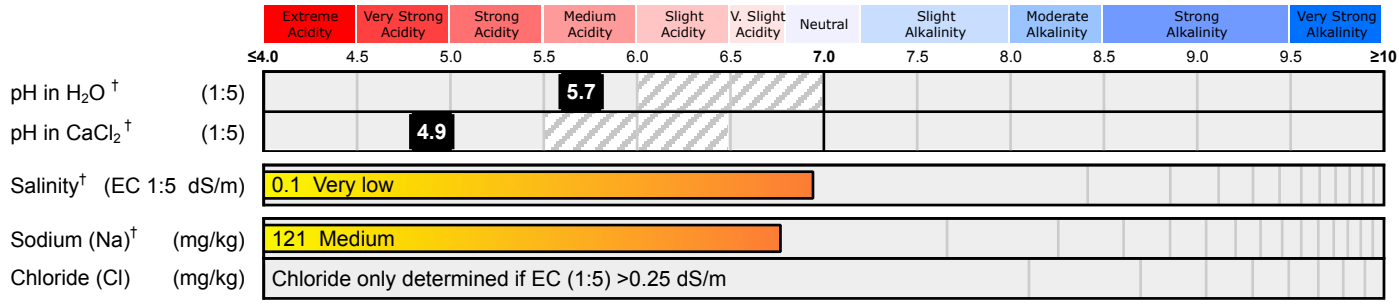
RECOMMENDATIONS

Medium acidity, very low salinity, eCEC is high in aluminium and hydrogen and low in calcium.
Organic matter very high (9.0%)

Amelioriants:
Lime = 200g/sqm
Gypsum = 400g/sqm
General multipurpose fertiliser.

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

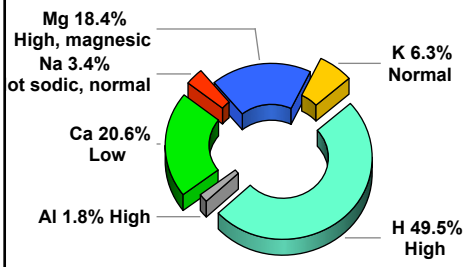
pH and ELECTRICAL CONDUCTIVITY



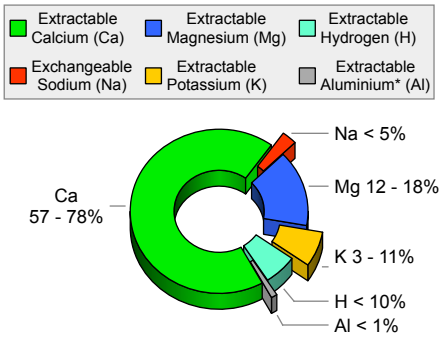
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	**1.1**	4.1 – 6.0
Comment: Calcium low		
Mg:K	**2.9**	2.6 – 5.0
Comment: Balanced		
K/(Ca+Mg)	**0.16**	< 0.07
Comment: High		
K:Na	**1.9**	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.03 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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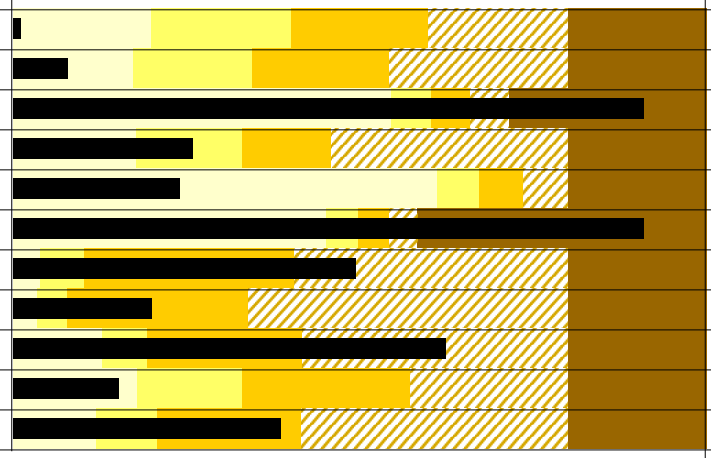
Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 17** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	0.3		0.1	4.2	4.1
Phosphate-P (PO_4)	6.4		1.3	12.6	11.3
Potassium (K) †	387		77.2	60.6	Drawdown
Sulphate-S (SO_4)	22		4.4	13.6	9.2
Calcium (Ca) †	651		129.9	431.7	301.8
Magnesium (Mg) †	351		70	44.9	Drawdown
Iron (Fe)	340.8		68	110.1	42.1
Manganese (Mn) †	11		2.2	8.8	6.6
Zinc (Zn) †	3.9		0.8	1	0.2
Copper (Cu)	1.2		0.2	1.3	1.1
Boron (B) †	1.3		0.3	0.5	0.2



Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

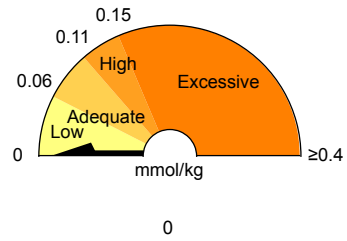
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m³ and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.7**
Sum of Base Cations (meq/100g^{-1}):	**7.7**
Eff. Cation Exch. Capacity (eCEC):	**15.8**
Base Saturation (%):	**48.73**
Exchangeable Acidity (meq/100g^{-1}):	**7.82**
Exchangeable Acidity (%):	**49.49**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**494**
– to neutralise Al (g/sqm):	**42**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **423**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Did not test**
Typical clay content:	**Did not test**
Size:	
Gravel content:	**Did not test**
Aggregate strength:	**Did not test**
Structural unit:	**Did not test**
Potential infiltration rate:	**Very Slow**
Permeability (mm/hr):	**Did not test**
Calculated EC_{SE} (dS/m):	**-**

Requires EC and Soil Texture result.

Organic Carbon (OC%)†:	**5.3 – Very high**
Organic Matter (OM%):	**9**

Additional comments:

Consultant: Chantal Hooper

Authorised Signatory: Simon Leake

Date of Report: 24 May 2013

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

ASPAC

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

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AUSTRALIA'S MOST TRUSTED EARTH SCIENCE SERVICES

Batch N°: 26338 **Sample N°: 18** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH11 regen surface sample**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**FSC, TOC_DC**

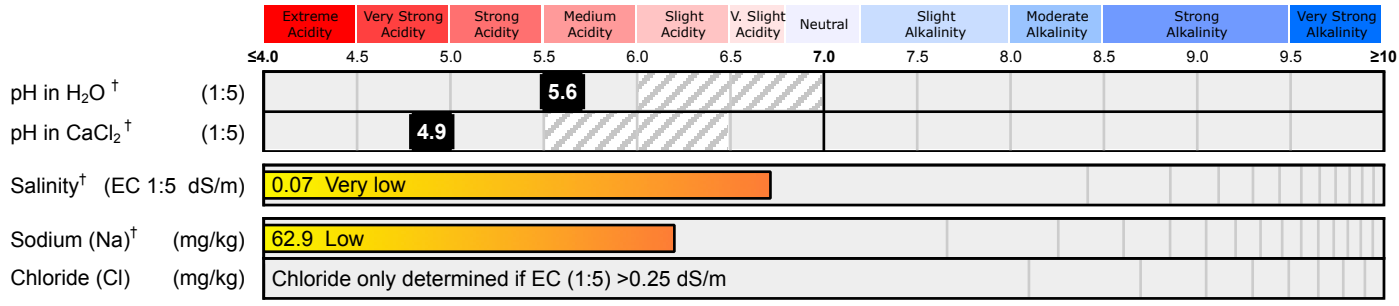
RECOMMENDATIONS

Medium acidity, very low salinity, eCEC is high in hydrogen and low in calcium.
Organic matter very high (15.6%)

Amelioriants:
Lime = 350g/sqm
Gypsum = 480g/sqm
General multipurpose fertiliser.

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

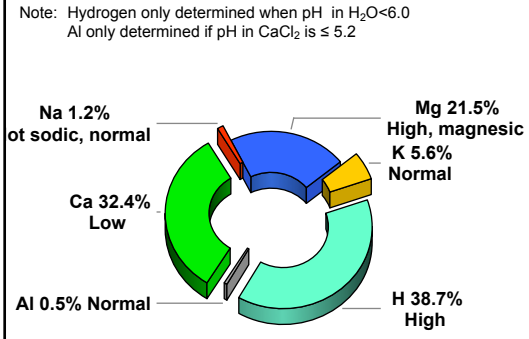
pH and ELECTRICAL CONDUCTIVITY



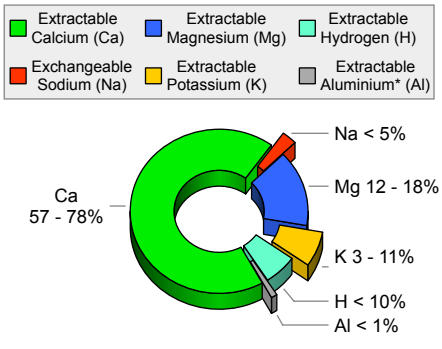
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	**1.5**	4.1 – 6.0
Comment: Calcium low		
Mg:K	**3.9**	2.6 – 5.0
Comment: Balanced		
K/(Ca+Mg)	**0.1**	< 0.07
Comment: High		
K:Na	**4.7**	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.06 Moderate potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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AUSTRALIA'S MOST TRUSTED EARTH SCIENCE SERVICES

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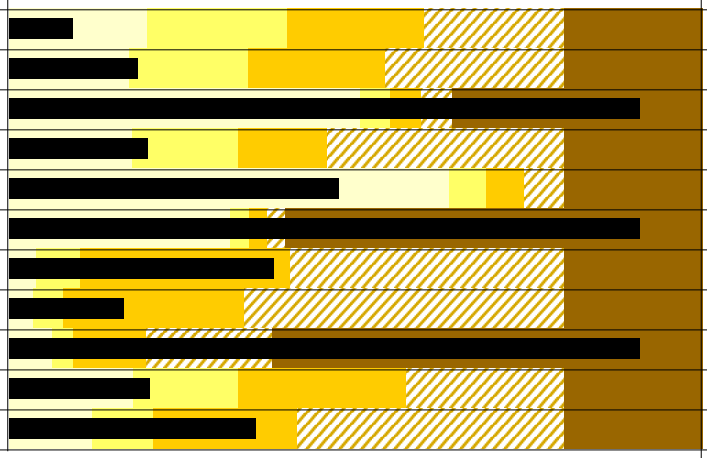
Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 18** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	2.4		0.5	4.2	3.7
Phosphate-P (PO_4)	15		3	12.6	9.6
Potassium (K) †	493		98.4	69	Drawdown
Sulphate-S (SO_4)	17		3.4	13.6	10.2
Calcium (Ca) †	1465		292.3	491.6	199.3
Magnesium (Mg) †	589		117.5	51.3	Drawdown
Iron (Fe)	263.3		52.5	110.1	57.6
Manganese (Mn) †	9.1		1.8	8.8	7
Zinc (Zn) †	12		2.4	1	Drawdown
Copper (Cu)	1.6		0.3	1.3	1
Boron (B) †	1.2		0.2	0.5	0.3



Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

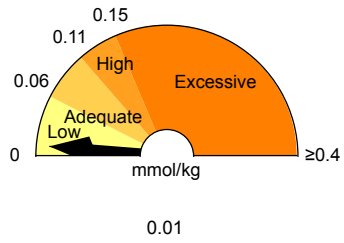
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m³ and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.6**
Sum of Base Cations (meq/100g^{-1}):	**13.7**
Eff. Cation Exch. Capacity (eCEC):	**22.6**
Base Saturation (%):	**60.62**
Exchangeable Acidity (meq/100g^{-1}):	**8.74**
Exchangeable Acidity (%):	**38.67**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**513**
– to neutralise Al (g/sqm):	**18**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **480**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Did not test**
Typical clay content:	**Did not test**
Size:	
Gravel content:	**Did not test**
Aggregate strength:	**Did not test**
Structural unit:	**Did not test**
Potential infiltration rate:	**Very Slow**
Permeability (mm/hr):	**Did not test**
Calculated EC_{SE} (dS/m):	**-**

Requires EC and Soil Texture result.

Organic Carbon (OC%)†:	**9.2 – Very high**
Organic Matter (OM%):	**15.6**

Additional comments:

Consultant: Chantal Hooper

Authorised Signatory: Simon Leake

Date of Report: 24 May 2013

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

ASPAC

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† This laboratory has been awarded a Certificate of Proficiency for specific soil and plant tissue analyses by the Australasian Soil and Plant Analysis Council (ASPAC). Tests for which proficiency has been demonstrated are highlighted in this report.

Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Sample Drop Off: 16 Chilvers Road, Thornleigh NSW 2120
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Em: info@sesl.com.au
Web: www.sesl.com.au

AUSTRALIA'S MOST TRUSTED EARTH SCIENCE SERVICES

Batch N°: 26338 **Sample N°: 19** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH12 regen surface sample**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**FSC, TOC_DC**

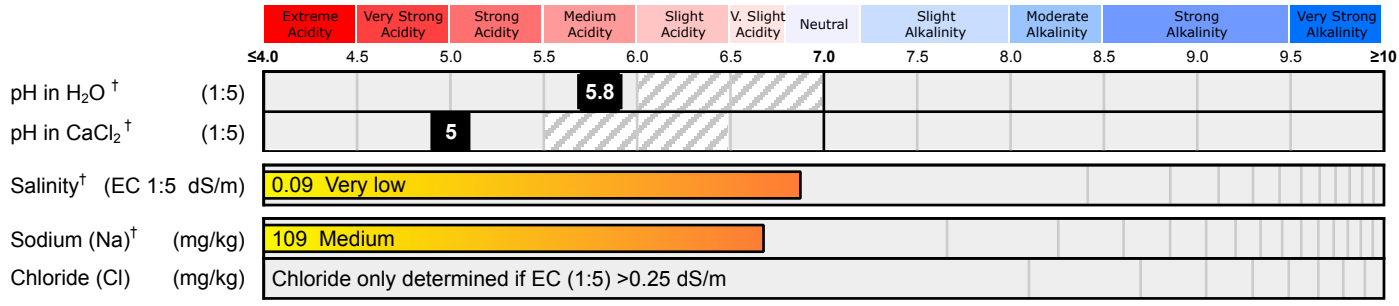
RECOMMENDATIONS

Medium acidity, very low salinity, eCEC is high in aluminium and hydrogen and low in calcium.
Organic matter very high (12.0%)

Amelioriants:
Lime = 400g/sqm
Gypsum = 645g/sqm
General multipurpose fertiliser.

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

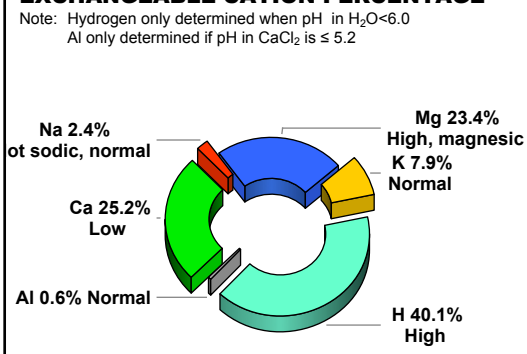
pH and ELECTRICAL CONDUCTIVITY



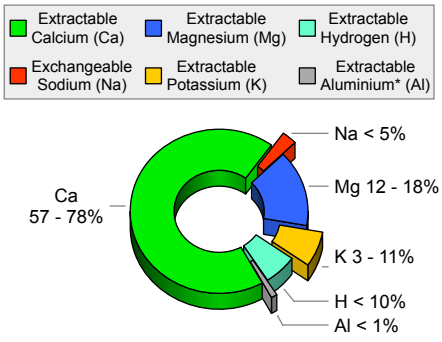
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	**1.1**	4.1 – 6.0
Comment: Calcium low		
Mg:K	**3**	2.6 – 5.0
Comment: Balanced		
K/(Ca+Mg)	**0.16**	< 0.07
Comment: High		
K:Na	**3.3**	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.04 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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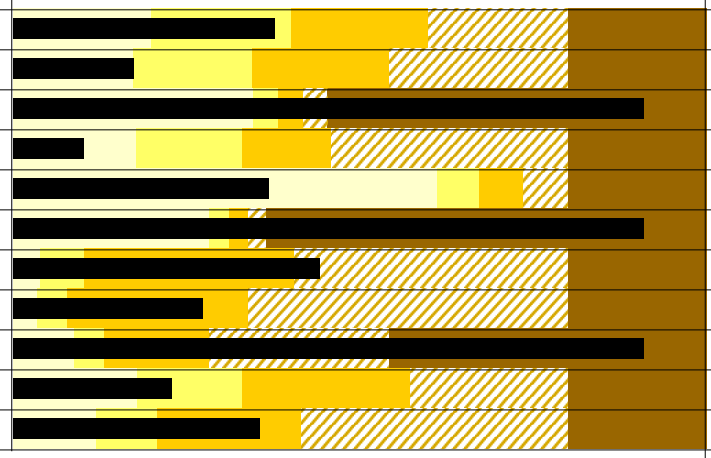
Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 19** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	9.9		2	4.2	2.2
Phosphate-P (PO_4)	14.1		2.8	12.6	9.8
Potassium (K) †	610		121.7	60.6	Drawdown
Sulphate-S (SO_4)	8.6		1.7	13.6	11.9
Calcium (Ca) †	996		198.7	431.7	233
Magnesium (Mg) †	561		111.9	44.9	Drawdown
Iron (Fe)	305		60.8	110.1	49.3
Manganese (Mn) †	15		3	8.8	5.8
Zinc (Zn) †	8.4		1.7	1	Drawdown
Copper (Cu)	1.8		0.4	1.3	0.9
Boron (B) †	1.2		0.2	0.5	0.3



Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

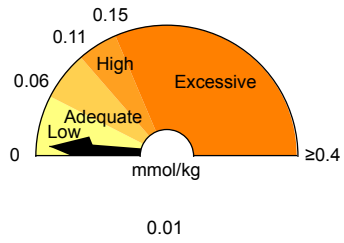
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m³ and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.7**
Sum of Base Cations (meq/100g^{-1}):	**11.7**
Eff. Cation Exch. Capacity (eCEC):	**19.8**
Base Saturation (%):	**59.09**
Exchangeable Acidity (meq/100g^{-1}):	**7.94**
Exchangeable Acidity (%):	**40.1**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**463**
– to neutralise Al (g/sqm):	**16**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **645**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Did not test**
Typical clay content:	**Did not test**
Size:	
Gravel content:	**Did not test**
Aggregate strength:	**Did not test**
Structural unit:	**Did not test**
Potential infiltration rate:	**Very Slow**
Permeability (mm/hr):	**Did not test**
Calculated EC_{SE} (dS/m):	**-**

Requires EC and Soil Texture result.

Organic Carbon (OC%)†:	**7.1 – Very high**
Organic Matter (OM%):	**12**

Additional comments:

Consultant: Chantal Hooper

Authorised Signatory: Simon Leake

Date of Report: 24 May 2013

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

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AUSTRALIA'S MOST TRUSTED EARTH SCIENCE SERVICES

Batch N°: 26338 **Sample N°: 20** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH 13 0-200mm Paddock 2**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**FSC, TOC_DC**

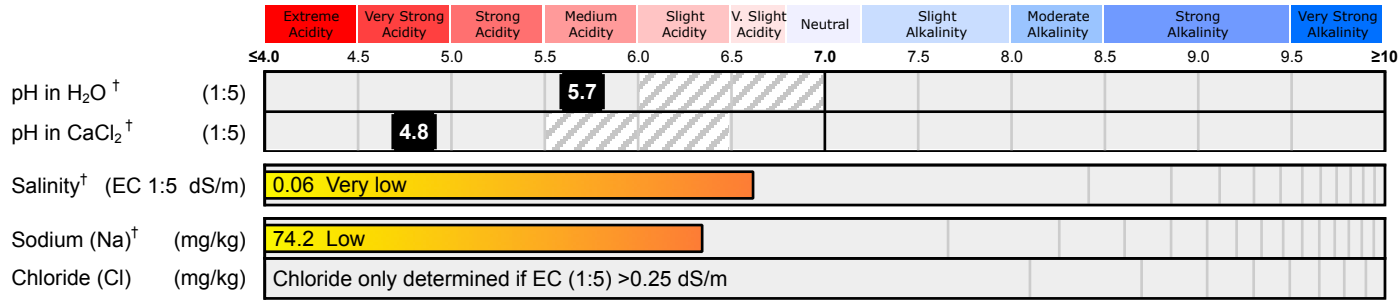
RECOMMENDATIONS

Medium acidity, very low salinity, eCEC is high in aluminium and hydrogen and low in calcium.
Organic matter very high (12.4%)

Amelioriants:
Lime = 300g/sqm
Gypsum = 400g/sqm
General multipurpose fertiliser.

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

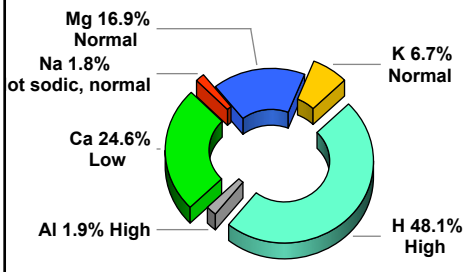
pH and ELECTRICAL CONDUCTIVITY



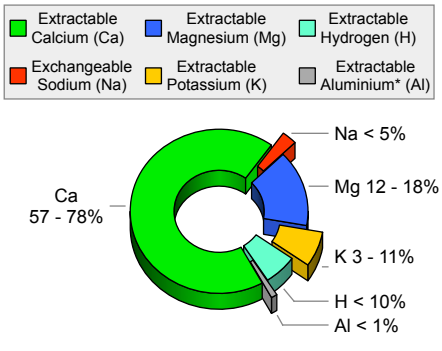
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	**1.5**	4.1 – 6.0
Comment: Calcium low		
Mg:K	**2.5**	2.6 – 5.0
Comment: Magnesium low		
K/(Ca+Mg)	**0.16**	< 0.07
Comment: High		
K:Na	**3.8**	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.03 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 20** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	1.2		0.2	4.2	4
Phosphate-P (PO_4)	6.4		1.3	12.6	11.3
Potassium (K) †	475		94.8	60.6	Drawdown
Sulphate-S (SO_4)	15		3	13.6	10.6
Calcium (Ca) †	883		176.2	431.7	255.5
Magnesium (Mg) †	368		73.4	44.9	Drawdown
Iron (Fe)	263.8		52.6	110.1	57.5
Manganese (Mn) †	16		3.2	8.8	5.6
Zinc (Zn) †	4		0.8	1	0.2
Copper (Cu)	1.4		0.3	1.3	1
Boron (B) †	1.2		0.2	0.5	0.3

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

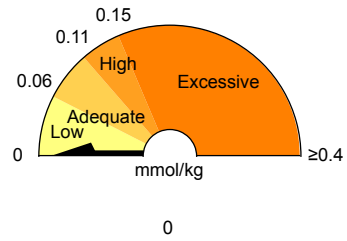
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m³ and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.6**
Sum of Base Cations (meq/100g^{-1}):	**9**
Eff. Cation Exch. Capacity (eCEC):	**18**
Base Saturation (%):	**50**
Exchangeable Acidity (meq/100g^{-1}):	**8.65**
Exchangeable Acidity (%):	**48.06**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**505**
– to neutralise Al (g/sqm):	**50**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **460**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Did not test**
Typical clay content:	**Did not test**
Size:	
Gravel content:	**Did not test**
Aggregate strength:	**Did not test**
Structural unit:	**Did not test**
Potential infiltration rate:	**Very Slow**
Permeability (mm/hr):	**Did not test**
Calculated EC_{SE} (dS/m):	**-**

Requires EC and Soil Texture result.

Organic Carbon (OC%)†:	**7.3 – Very high**
Organic Matter (OM%):	**12.4**

Additional comments:

Consultant: Chantal Hooper

Authorised Signatory: Simon Leake

Date of Report: 24 May 2013

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

ASPAC

A member of the Australasian Soil and Plant Analysis Council
† This laboratory has been awarded a Certificate of Proficiency for specific soil and plant tissue analyses by the Australasian Soil and Plant Analysis Council (ASPAC). Tests for which proficiency has been demonstrated are highlighted in this report.

Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Sample Drop Off: 16 Chilvers Road, Thornleigh NSW 2120
Mailing Address: PO Box 357, Pennant Hills NSW 1715
Tel: 02 9980 6554
Fax: 02 9484 2427
Em: info@sesl.com.au
Web: www.sesl.com.au

AUSTRALIA'S MOST TRUSTED EARTH SCIENCE SERVICES

Batch N°: 26338 **Sample N°: 21** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH13 200mm+ Paddock 2**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**SSCP**

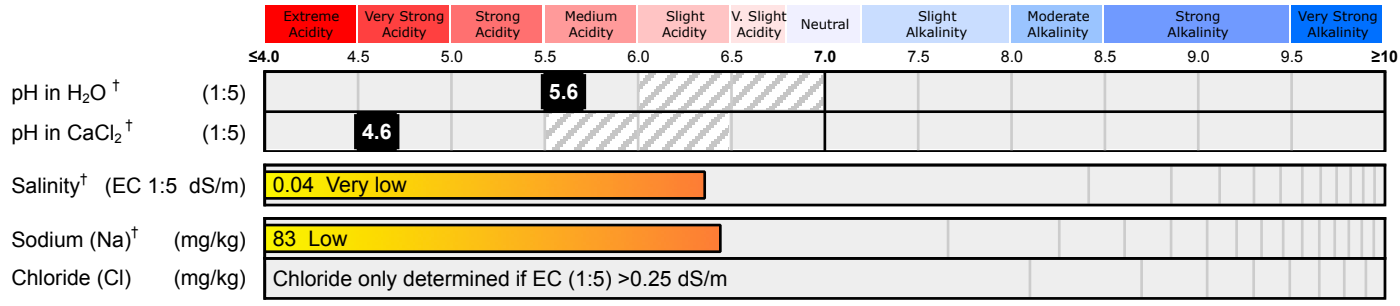
RECOMMENDATIONS

Medium acidity, very low salinity, eCEC is high in aluminium and hydrogen and low in calcium.

Amelioriants:
Lime = 300g/sqm
Gypsum = 400g/sqm

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

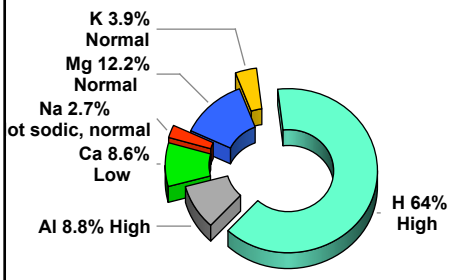
pH and ELECTRICAL CONDUCTIVITY



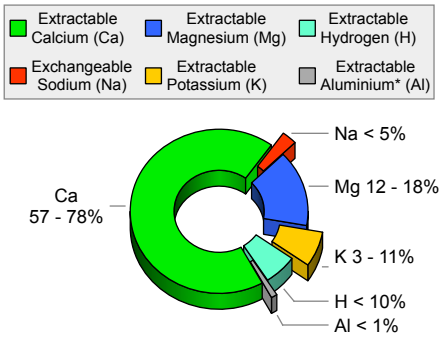
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	0.7	4.1 – 6.0
Comment: Potential Calcium deficiency		
Mg:K	3.1	2.6 – 5.0
Comment: Balanced		
K/(Ca+Mg)	0.19	< 0.07
Comment: High		
K:Na	1.4	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.01 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 21** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	-		-	4.2	Did not test
Phosphate-P (PO_4)	0		-	12.6	Did not test
Potassium (K) †	204		40.7	52.3	11.6
Sulphate-S (SO_4)	-		-	13.6	13.6
Calcium (Ca) †	225		44.9	372.1	327.2
Magnesium (Mg) †	195		38.9	38.7	Drawdown
Iron (Fe)	-		-	110.1	Did not test
Manganese (Mn) †	-		-	8.8	Did not test
Zinc (Zn) †	-		-	1	Did not test
Copper (Cu)	-		-.	1.3	Did not test
Boron (B) †	-		-.	0.5	Did not test

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

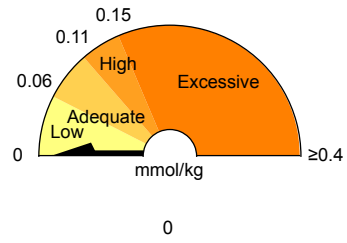
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m^3 and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.5**
Sum of Base Cations (meq/100g^{-1}):	**3.6**
Eff. Cation Exch. Capacity (eCEC):	**13.2**
Base Saturation (%):	**27.27**
Exchangeable Acidity (meq/100g^{-1}):	**8.45**
Exchangeable Acidity (%):	**64.02**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**544**
– to neutralise Al (g/sqm):	**169**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **402**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Light Clay**
Typical clay content:	**35 - 40%**
Size:	**Fine (1 - 10mm)**
Gravel content:	**Not gravelly**
Aggregate strength:	**Weak**
Structural unit:	**Crumb**
Potential infiltration rate:	**Slow**
Permeability (mm/hr):	**2.5 - 5 mm/hr**
Calculated EC_{SE} (dS/m):	**0.34**

– Non-saline. Salinity effects on plants are mostly negligible.

Organic Carbon (OC%)†: **Did not test**
Organic Matter (OM%): **-**
Additional comments:

Consultant: Chantal Hooper **Authorised Signatory: Simon Leake** **Date of Report: 24 May 2013**

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

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AUSTRALIA'S MOST TRUSTED EARTH SCIENCE SERVICES

Batch N°: 26338 **Sample N°: 22** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH14 0-250mm Paddock 2**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**FSC, TOC_DC**

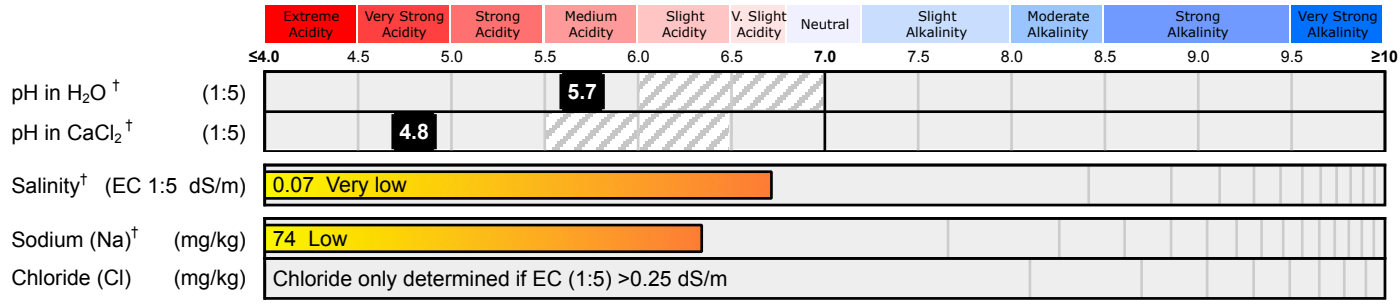
RECOMMENDATIONS

Medium acidity, very low salinity, eCEC is high in aluminium and hydrogen and low in calcium.
Low nutrients. Organic matter very high (10.3%)

Amelioriants:
Lime = 400g/sqm
Gypsum = 230g/sqm
General multipurpose fertiliser.

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

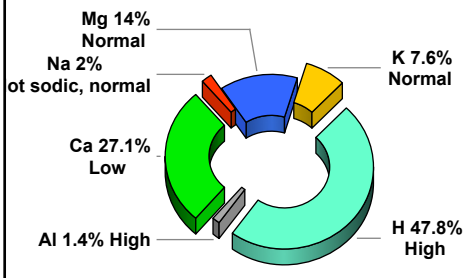
pH and ELECTRICAL CONDUCTIVITY



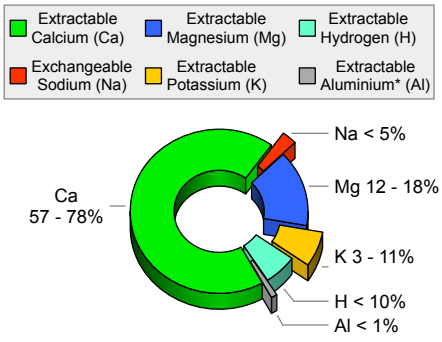
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	**1.9**	4.1 – 6.0
Comment: Calcium low		
Mg:K	**1.8**	2.6 – 5.0
Comment: Magnesium low		
K/(Ca+Mg)	**0.19**	< 0.07
Comment: High		
K:Na	**3.8**	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.04 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 22** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	1.6		0.3	4.2	3.9
Phosphate-P (PO_4)	5.1		1	12.6	11.6
Potassium (K) †	476		95	60.6	Drawdown
Sulphate-S (SO_4)	18		3.6	13.6	10
Calcium (Ca) †	865		172.6	431.7	259.1
Magnesium (Mg) †	271		54.1	44.9	Drawdown
Iron (Fe)	312.1		62.3	110.1	47.8
Manganese (Mn) †	30		6	8.8	2.8
Zinc (Zn) †	4.8		1	1	0
Copper (Cu)	1.7		0.3	1.3	1
Boron (B) †	1.2		0.2	0.5	0.3

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

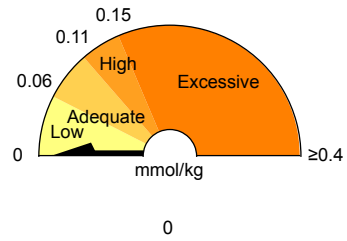
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m³ and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.7**
Sum of Base Cations (meq/100g^{-1}):	**8.1**
Eff. Cation Exch. Capacity (eCEC):	**16**
Base Saturation (%):	**50.63**
Exchangeable Acidity (meq/100g^{-1}):	**7.64**
Exchangeable Acidity (%):	**47.75**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**509**
– to neutralise Al (g/sqm):	**32**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **237**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Did not test**
Typical clay content:	**Did not test**
Size:	
Gravel content:	**Did not test**
Aggregate strength:	**Did not test**
Structural unit:	**Did not test**
Potential infiltration rate:	**Very Slow**
Permeability (mm/hr):	**Did not test**
Calculated EC_{SE} (dS/m):	**-**

Requires EC and Soil Texture result.

Organic Carbon (OC%)†:	**6.1 – Very high**
Organic Matter (OM%):	**10.3**

Additional comments:

Consultant: Chantal Hooper

Authorised Signatory: Simon Leake

Date of Report: 24 May 2013

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

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† This laboratory has been awarded a Certificate of Proficiency for specific soil and plant tissue analyses by the Australasian Soil and Plant Analysis Council (ASPAC). Tests for which proficiency has been demonstrated are highlighted in this report.

Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

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AUSTRALIA'S MOST TRUSTED EARTH SCIENCE SERVICES

Batch N°: 26338 **Sample N°: 23** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH 14 250mm+ Paddock 2**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**SSCP**

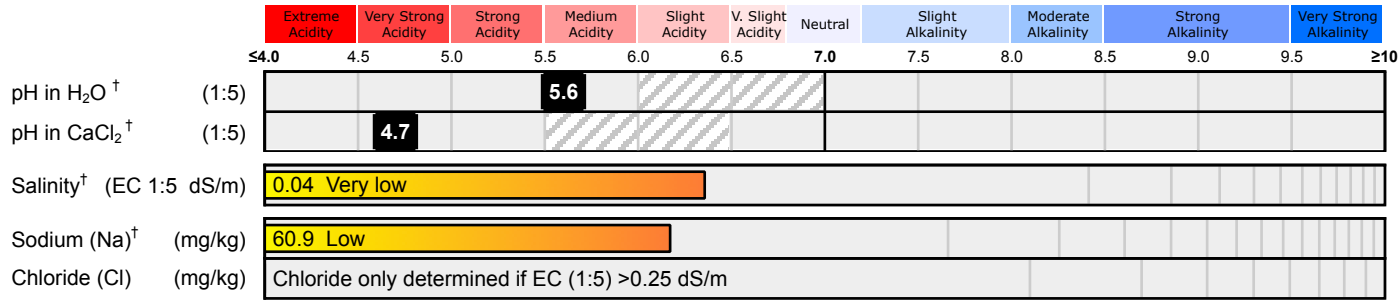
RECOMMENDATIONS

Medium acidity, very low salinity, eCEC is high in aluminium and hydrogen and low in calcium.

Amelioriants:
Lime = 350g/sqm
Gypsum = 185g/sqm

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

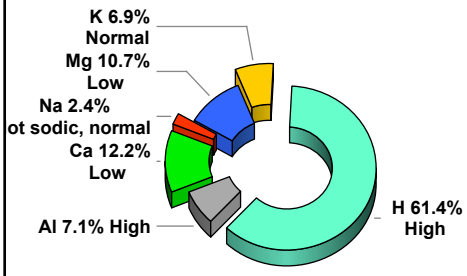
pH and ELECTRICAL CONDUCTIVITY



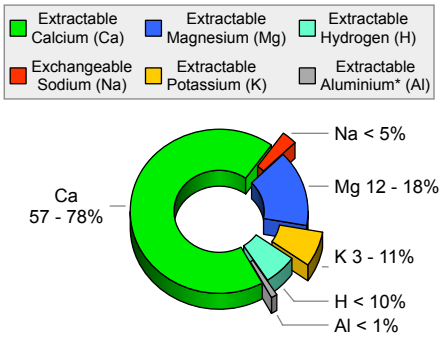
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	**1.1**	4.1 – 6.0
Comment: Calcium low		
Mg:K	**1.6**	2.6 – 5.0
Comment: Magnesium low		
K/(Ca+Mg)	**0.3**	< 0.07
Comment: High		
K:Na	**2.9**	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.02 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 23** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	-		-	4.2	Did not test
Phosphate-P (PO_4)	0		-	12.6	Did not test
Potassium (K) †	305		60.8	52.3	Drawdown
Sulphate-S (SO_4)	-		-	13.6	13.6
Calcium (Ca) †	276		55.1	372.1	317
Magnesium (Mg) †	147		29.3	38.7	9.4
Iron (Fe)	-		-	110.1	Did not test
Manganese (Mn) †	-		-	8.8	Did not test
Zinc (Zn) †	-		-	1	Did not test
Copper (Cu)	-		-.	1.3	Did not test
Boron (B) †	-		-.	0.5	Did not test

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

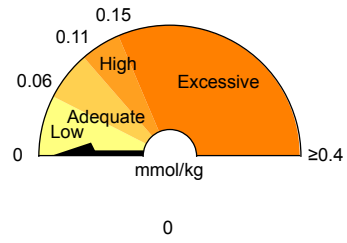
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m^3 and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.8**
Sum of Base Cations (meq/100g^{-1}):	**3.6**
Eff. Cation Exch. Capacity (eCEC):	**11.3**
Base Saturation (%):	**31.86**
Exchangeable Acidity (meq/100g^{-1}):	**6.94**
Exchangeable Acidity (%):	**61.42**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**517**
– to neutralise Al (g/sqm):	**117**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **185**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Light Clay**
Typical clay content:	**35 - 40%**
Size:	**Fine (1 - 10mm)**
Gravel content:	**Not gravelly**
Aggregate strength:	**Weak**
Structural unit:	**Crumb**
Potential infiltration rate:	**Slow**
Permeability (mm/hr):	**2.5 - 5 mm/hr**
Calculated EC_{SE} (dS/m):	**0.34**

– Non-saline. Salinity effects on plants are mostly negligible.

Organic Carbon (OC%)†: **Did not test**
Organic Matter (OM%): **-**
Additional comments:

Consultant: Chantal Hooper **Authorised Signatory: Simon Leake** **Date of Report: 24 May 2013**

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
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Nitrate - Rayment & Higginson (1992) 7B1
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PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Sample Drop Off: 16 Chilvers Road, Thornleigh NSW 2120
Mailing Address: PO Box 357, Pennant Hills NSW 1715
Tel: 02 9980 6554
Fax: 02 9484 2427
Em: info@sesl.com.au
Web: www.sesl.com.au

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Batch N°: 26338 **Sample N°: 24** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH15 0-250mm+ Paddock 2**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**FSC, TOC_DC**

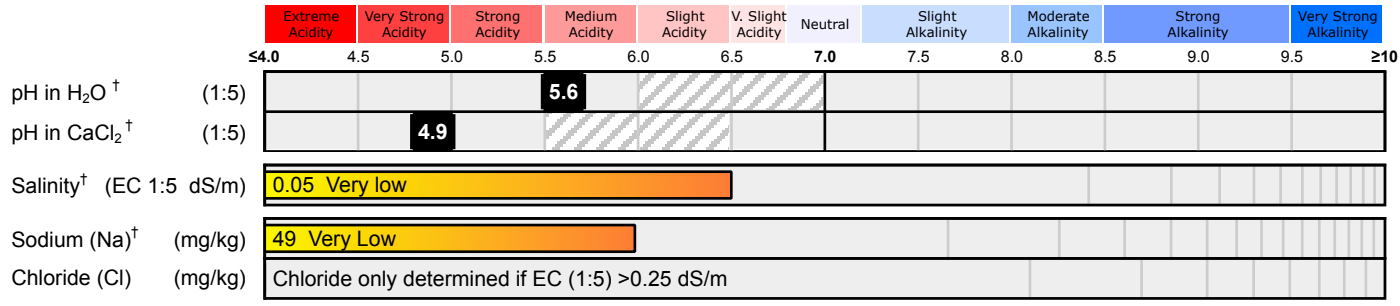
RECOMMENDATIONS

Medium acidity, very low salinity, eCEC is high in aluminium and hydrogen and low in calcium.
Low nutrients. Organic matter very high (8.4%)

Amelioriants:
Lime = 400g/sqm
Gypsum = 280g/sqm
General multipurpose fertiliser.

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

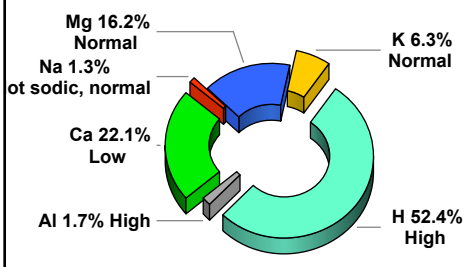
pH and ELECTRICAL CONDUCTIVITY



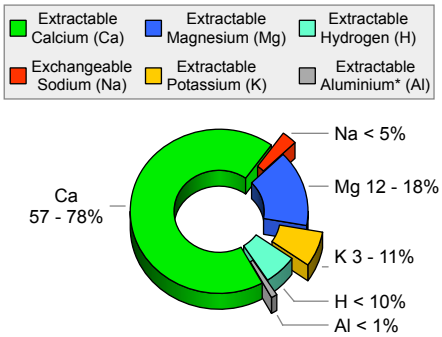
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	**1.4**	4.1 – 6.0
Comment: Calcium low		
Mg:K	**2.6**	2.6 – 5.0
Comment: Balanced		
K/(Ca+Mg)	**0.16**	< 0.07
Comment: High		
K:Na	**4.7**	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.04 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 24** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	1.7		0.3	4.2	3.9
Phosphate-P (PO_4)	7.9		1.6	12.6	11
Potassium (K) †	388		77.4	60.6	Drawdown
Sulphate-S (SO_4)	12		2.4	13.6	11.2
Calcium (Ca) †	693		138.3	431.7	293.4
Magnesium (Mg) †	308		61.4	44.9	Drawdown
Iron (Fe)	239		47.7	110.1	62.4
Manganese (Mn) †	32		6.4	8.8	2.4
Zinc (Zn) †	3.7		0.7	1	0.3
Copper (Cu)	1.6		0.3	1.3	1
Boron (B) †	1.1		0.2	0.5	0.3

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

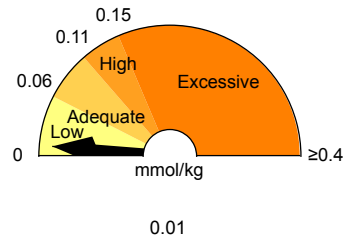
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m³ and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.6**
Sum of Base Cations (meq/100g^{-1}):	**7.2**
Eff. Cation Exch. Capacity (eCEC):	**15.7**
Base Saturation (%):	**45.86**
Exchangeable Acidity (meq/100g^{-1}):	**8.22**
Exchangeable Acidity (%):	**52.36**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**548**
– to neutralise Al (g/sqm):	**39**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **283**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Did not test**
Typical clay content:	**Did not test**
Size:	
Gravel content:	**Did not test**
Aggregate strength:	**Did not test**
Structural unit:	**Did not test**
Potential infiltration rate:	**Very Slow**
Permeability (mm/hr):	**Did not test**
Calculated EC_{SE} (dS/m):	**-**

Requires EC and Soil Texture result.

Organic Carbon (OC%)†:	**4.9 – Very high**
Organic Matter (OM%):	**8.4**

Additional comments:

Consultant: Chantal Hooper

Authorised Signatory: Simon Leake

Date of Report: 24 May 2013

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

ASPAC

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† This laboratory has been awarded a Certificate of Proficiency for specific soil and plant tissue analyses by the Australasian Soil and Plant Analysis Council (ASPAC). Tests for which proficiency has been demonstrated are highlighted in this report.

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 25** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH15 250mm+ Paddock 2**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**SSCP**

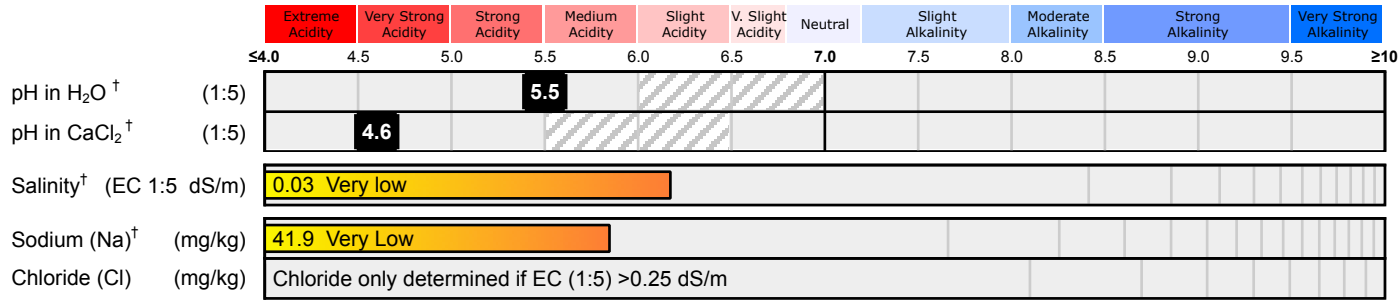
RECOMMENDATIONS

Strong acidity, very low salinity, eCEC is high in aluminium and hydrogen and low in calcium.

Amelioriants:
Lime = 400g/sqm
Gypsum = 190g/sqm

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

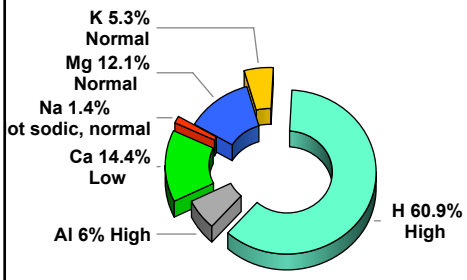
pH and ELECTRICAL CONDUCTIVITY



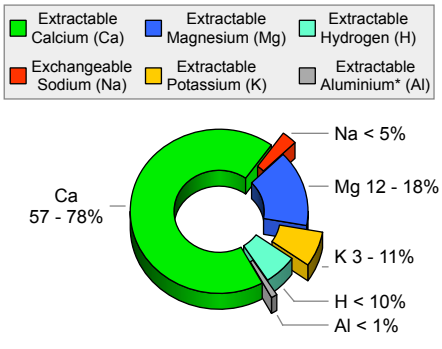
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	**1.2**	4.1 – 6.0
Comment: Calcium low		
Mg:K	**2.3**	2.6 – 5.0
Comment: Magnesium low		
K/(Ca+Mg)	**0.2**	< 0.07
Comment: High		
K:Na	**3.7**	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.02 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 25** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	-		-	4.2	Did not test
Phosphate-P (PO_4)	0		-	12.6	Did not test
Potassium (K) †	261		52.1	52.3	0.2
Sulphate-S (SO_4)	-		-	13.6	13.6
Calcium (Ca) †	362		72.2	372.1	299.9
Magnesium (Mg) †	184		36.7	38.7	2
Iron (Fe)	-		-	110.1	Did not test
Manganese (Mn) †	-		-	8.8	Did not test
Zinc (Zn) †	-		-	1	Did not test
Copper (Cu)	-		-.	1.3	Did not test
Boron (B) †	-		-.	0.5	Did not test

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

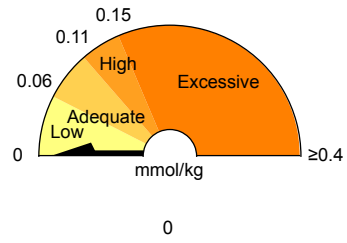
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m^3 and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.7**
Sum of Base Cations (meq/100g^{-1}):	**4.2**
Eff. Cation Exch. Capacity (eCEC):	**12.6**
Base Saturation (%):	**33.33**
Exchangeable Acidity (meq/100g^{-1}):	**7.67**
Exchangeable Acidity (%):	**60.87**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**560**
– to neutralise Al (g/sqm):	**110**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **188**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Light Clay**
Typical clay content:	**35 - 40%**
Size:	**Fine (1 - 10mm)**
Gravel content:	**Not gravelly**
Aggregate strength:	**Weak**
Structural unit:	**Crumb**
Potential infiltration rate:	**Slow**
Permeability (mm/hr):	**2.5 - 5 mm/hr**
Calculated EC_{SE} (dS/m):	**0.26**

– Non-saline. Salinity effects on plants are mostly negligible.

Organic Carbon (OC%)†: **Did not test**
Organic Matter (OM%): **-**
Additional comments:

Consultant: Chantal Hooper **Authorised Signatory: Simon Leake** **Date of Report: 24 May 2013**

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 26** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH16 0-250mm Paddock 2**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**FSC, TOC_DC**

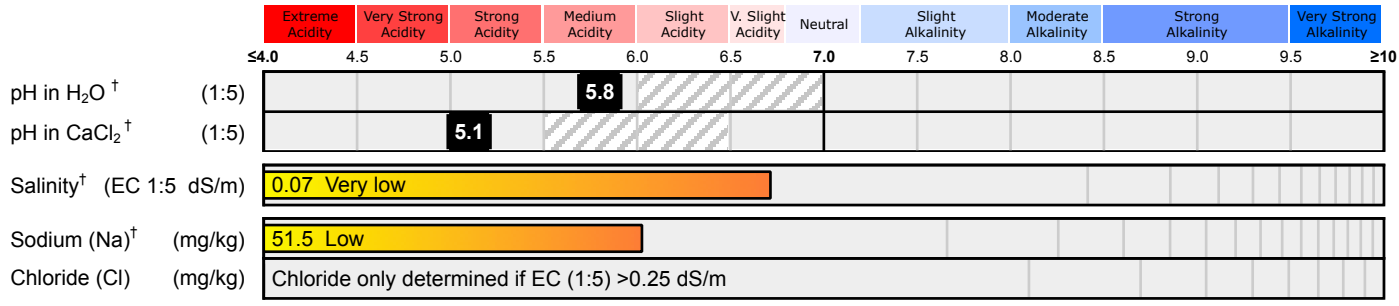
RECOMMENDATIONS

Medium acidity, very low salinity, eCEC is high in hydrogen and low in calcium.
Low nutrients aside from K, Mg, Zn. Organic matter very high (10.5%)

Amelioriants:
Lime = 300g/sqm
Gypsum = 430g/sqm
General multipurpose fertiliser.

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

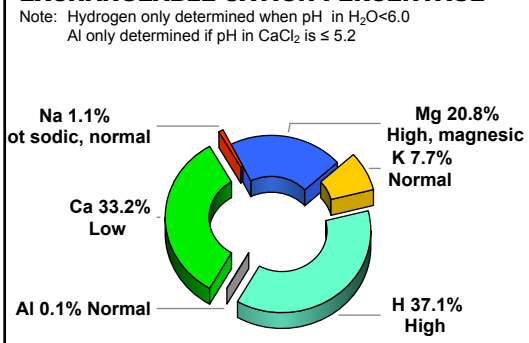
pH and ELECTRICAL CONDUCTIVITY



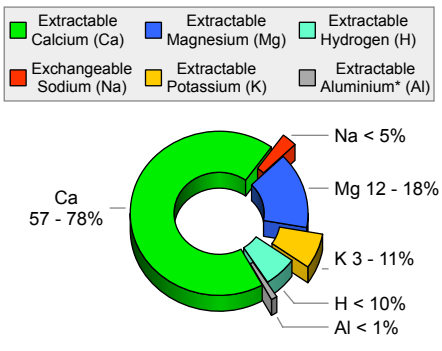
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	**1.6**	4.1 – 6.0
Comment: Calcium low		
Mg:K	**2.7**	2.6 – 5.0
Comment: Balanced		
K/(Ca+Mg)	**0.14**	< 0.07
Comment: High		
K:Na	**7.2**	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.06 Moderate potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 26** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	6.3		1.3	4.2	2.9
Phosphate-P (PO_4)	16.7		3.3	12.6	9.3
Potassium (K) †	619		123.5	69	Drawdown
Sulphate-S (SO_4)	13		2.6	13.6	11
Calcium (Ca) †	1368		272.9	491.6	218.7
Magnesium (Mg) †	519		103.5	51.3	Drawdown
Iron (Fe)	254.1		50.7	110.1	59.4
Manganese (Mn) †	19		3.8	8.8	5
Zinc (Zn) †	8.4		1.7	1	Drawdown
Copper (Cu)	2.6		0.5	1.3	0.8
Boron (B) †	1.3		0.3	0.5	0.2

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

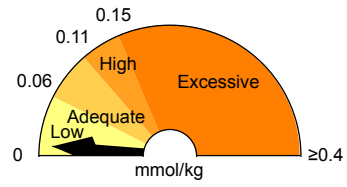
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m³ and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.8**
Sum of Base Cations (meq/100g^{-1}):	**12.9**
Eff. Cation Exch. Capacity (eCEC):	**20.6**
Base Saturation (%):	**62.62**
Exchangeable Acidity (meq/100g^{-1}):	**7.65**
Exchangeable Acidity (%):	**37.14**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**451**
– to neutralise Al (g/sqm):	**4**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **439**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Did not test**
Typical clay content:	**Did not test**
Size:	
Gravel content:	**Did not test**
Aggregate strength:	**Did not test**
Structural unit:	**Did not test**
Potential infiltration rate:	**Very Slow**
Permeability (mm/hr):	**Did not test**
Calculated EC_{SE} (dS/m):	**-**

Requires EC and Soil Texture result.

Organic Carbon (OC%)†:	**6.2 – Very high**
Organic Matter (OM%):	**10.5**

Additional comments:

Consultant: Chantal Hooper

Authorised Signatory: Simon Leake

Date of Report: 24 May 2013

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
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Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

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Tel: 02 9980 6554
Fax: 02 9484 2427
Em: info@sesl.com.au
Web: www.sesl.com.au

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Batch N°: 26338 **Sample N°: 27** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH16 250mm+ Paddock 2**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**SSCP**

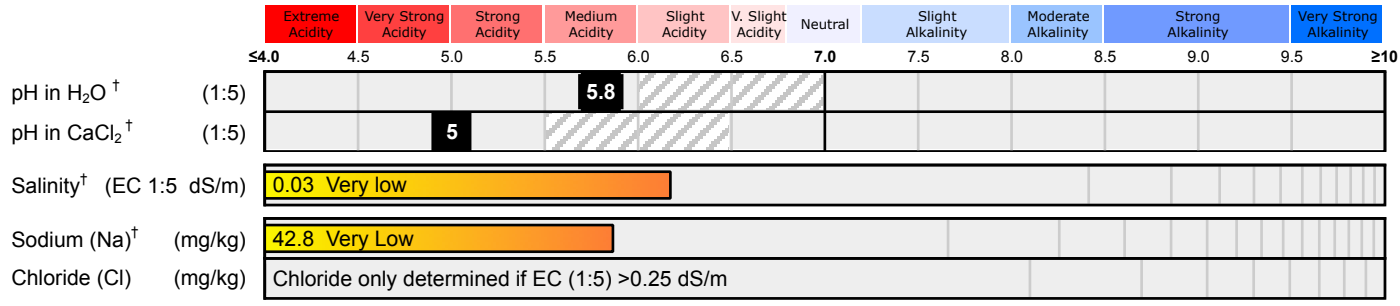
RECOMMENDATIONS

Medium acidity, very low salinity, eCEC is high in aluminium and hydrogen and low in calcium.

Amelioriants:
Lime = 350g/sqm
Gypsum = 355g/sqm

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

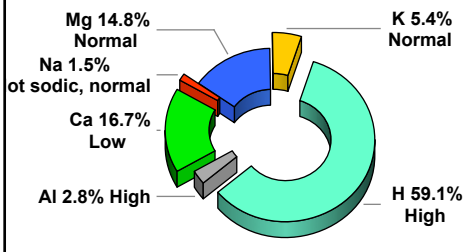
pH and ELECTRICAL CONDUCTIVITY



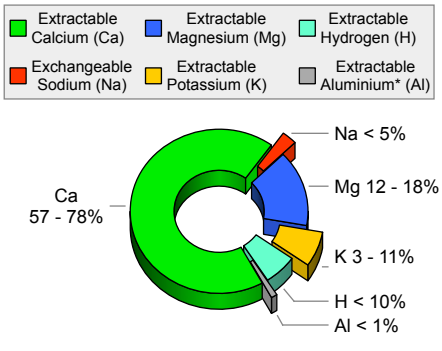
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	**1.1**	4.1 – 6.0
Comment: Calcium low		
Mg:K	**2.8**	2.6 – 5.0
Comment: Balanced		
K/(Ca+Mg)	**0.17**	< 0.07
Comment: High		
K:Na	**3.6**	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.02 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 27** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	-		-	4.2	Did not test
Phosphate-P (PO_4)	0		-	12.6	Did not test
Potassium (K) †	270		53.9	52.3	Drawdown
Sulphate-S (SO_4)	-		-	13.6	13.6
Calcium (Ca) †	428		85.4	372.1	286.7
Magnesium (Mg) †	230		45.9	38.7	Drawdown
Iron (Fe)	-		-	110.1	Did not test
Manganese (Mn) †	-		-	8.8	Did not test
Zinc (Zn) †	-		-	1	Did not test
Copper (Cu)	-		-.	1.3	Did not test
Boron (B) †	-		-.	0.5	Did not test

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

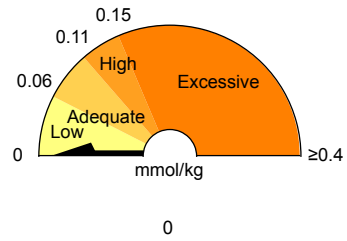
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m^3 and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.7**
Sum of Base Cations (meq/100g^{-1}):	**4.9**
Eff. Cation Exch. Capacity (eCEC):	**12.8**
Base Saturation (%):	**38.28**
Exchangeable Acidity (meq/100g^{-1}):	**7.56**
Exchangeable Acidity (%):	**59.06**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**443**
– to neutralise Al (g/sqm):	**53**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **355**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Light Clay**
Typical clay content:	**35 - 40%**
Size:	**Fine (1 - 10mm)**
Gravel content:	**Not gravelly**
Aggregate strength:	**Weak**
Structural unit:	**Crumb**
Potential infiltration rate:	**Slow**
Permeability (mm/hr):	**2.5 - 5 mm/hr**
Calculated EC_{SE} (dS/m):	**0.26**

– Non-saline. Salinity effects on plants are mostly negligible.

Organic Carbon (OC%)†: **Did not test**
Organic Matter (OM%): **-**
Additional comments:

Consultant: Chantal Hooper **Authorised Signatory: Simon Leake** **Date of Report: 24 May 2013**

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

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AUSTRALIA'S MOST TRUSTED EARTH SCIENCE SERVICES

Batch N°: 26338 **Sample N°: 28** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH17 0-100mm+ Paddock 2**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**FSC, TOC_DC**

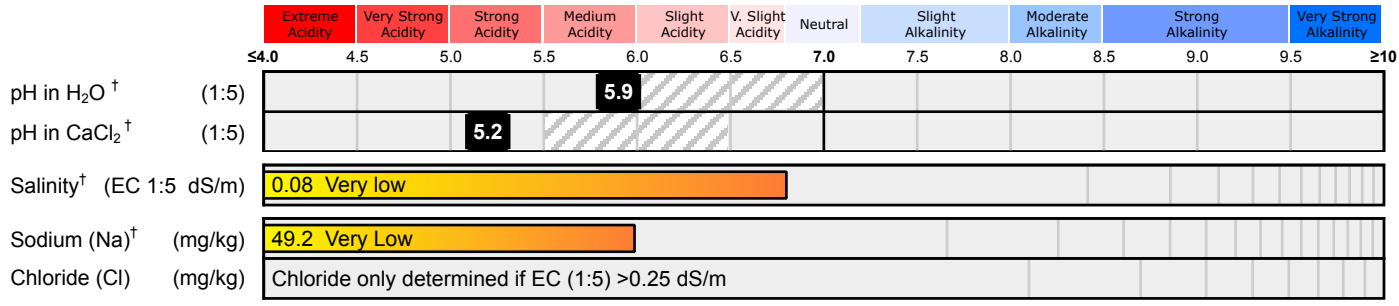
RECOMMENDATIONS

Medium acidity, very low salinity, eCEC is high in hydrogen and low in calcium.
Low nutrients aside from K, Mg, Zn. Organic matter very high (11.6%)

Amelioriants:
Lime = 300g/sqm
Gypsum = 5400g/sqm
General multipurpose fertiliser.

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ○ Low ◉ Moderate ○ High

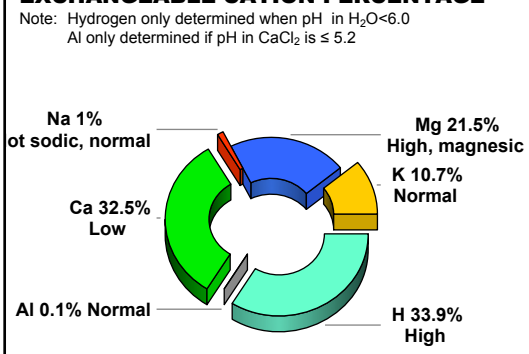
pH and ELECTRICAL CONDUCTIVITY



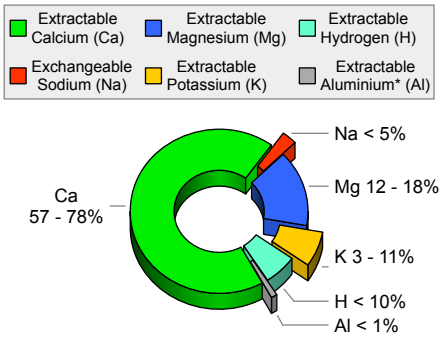
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	1.5	4.1 – 6.0
Comment: Calcium low		
Mg:K	2	2.6 – 5.0
Comment: Magnesium low		
K/(Ca+Mg)	0.2	< 0.07
Comment: High		
K:Na	10.5	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.08 Moderate potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

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Batch N°: 26338 **Sample N°: 28** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	4.1		0.8	4.2	3.4
Phosphate-P (PO_4)	10.7		2.1	12.6	10.5
Potassium (K) †	865		172.6	69	Drawdown
Sulphate-S (SO_4)	20		4	13.6	9.6
Calcium (Ca) †	1343		267.9	491.6	223.7
Magnesium (Mg) †	540		107.7	51.3	Drawdown
Iron (Fe)	330.5		65.9	110.1	44.2
Manganese (Mn) †	42		8.4	8.8	0.4
Zinc (Zn) †	7.9		1.6	1	Drawdown
Copper (Cu)	2.1		0.4	1.3	0.9
Boron (B) †	1.4		0.3	0.5	0.2

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

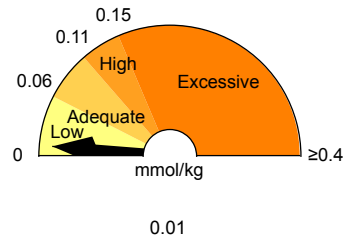
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m³ and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.9**
Sum of Base Cations (meq/100g^{-1}):	**13.6**
Eff. Cation Exch. Capacity (eCEC):	**20.7**
Base Saturation (%):	**65.7**
Exchangeable Acidity (meq/100g^{-1}):	**7.02**
Exchangeable Acidity (%):	**33.91**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**410**
– to neutralise Al (g/sqm):	**4**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **541**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Did not test**
Typical clay content:	**Did not test**
Size:	
Gravel content:	**Did not test**
Aggregate strength:	**Did not test**
Structural unit:	**Did not test**
Potential infiltration rate:	**Very Slow**
Permeability (mm/hr):	**Did not test**
Calculated EC_{SE} (dS/m):	**-**

Requires EC and Soil Texture result.

Organic Carbon (OC%)†:	**6.8 – Very high**
Organic Matter (OM%):	**11.6**

Additional comments:

Consultant: Chantal Hooper

Authorised Signatory: Simon Leake

Date of Report: 24 May 2013

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

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Batch N°: 26338 **Sample N°: 29** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Dame Eadith**
Client Contact:	**Adam Hunter**	Location:	**Concord**
Client Job N°:		SESL Quote N°:	**Q3275**
Client Order N°:		Sample Name:	**BH17 100mm+ Paddock 2**
Address:	**2 River Street BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**SSCP**

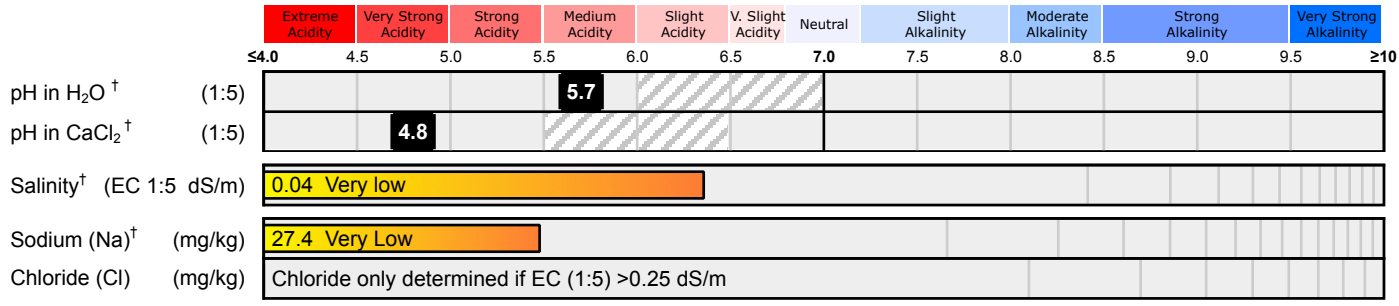
RECOMMENDATIONS

Medium acidity, very low salinity, eCEC is high in aluminium and hydrogen and low in calcium.

Amelioriants:
Lime = 350g/sqm
Gypsum = 355g/sqm

SOIL SAMPLE DEPTH (mm): ○ 100 ○ 150 ◉ 200 **FERTILITY RATING:** ○ Low ○ Moderate ○ High

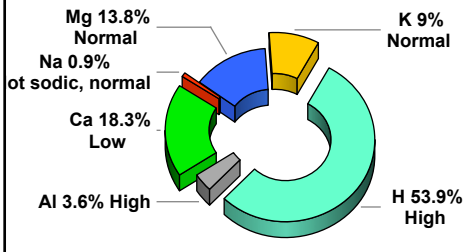
pH and ELECTRICAL CONDUCTIVITY



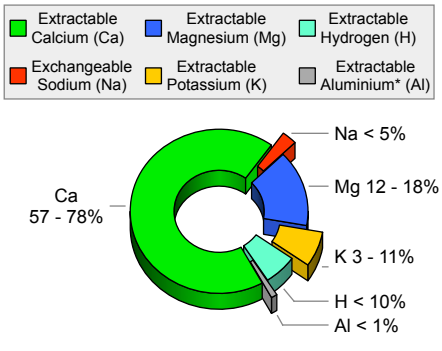
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)

CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	1.3	4.1 – 6.0
Comment: Calcium low		
Mg:K	1.5	2.6 – 5.0
Comment: Magnesium low		
K/(Ca+Mg)	0.28	< 0.07
Comment: High		
K:Na	10.5	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.04 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26338 **Sample N°: 29** **Date Received: 16/5/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	-		-	13.3	Did not test
Phosphate-P (PO_4)	0		-	16.8	Did not test
Potassium (K) †	492		130.9	69.7	Drawdown
Sulphate-S (SO_4)	-		-	18.1	18.1
Calcium (Ca) †	512		136.2	496.1	359.9
Magnesium (Mg) †	233		62	51.6	Drawdown
Iron (Fe)	-		-	146.8	Did not test
Manganese (Mn) †	-		-	11.7	Did not test
Zinc (Zn) †	-		-	1.3	Did not test
Copper (Cu)	-		-.	1.7	Did not test
Boron (B) †	-		-.	0.7	Did not test

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

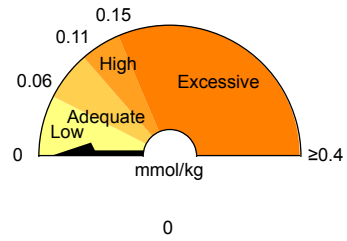
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m^3 and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**6.7**
Sum of Base Cations (meq/100g^{-1}):	**5.9**
Eff. Cation Exch. Capacity (eCEC):	**14**
Base Saturation (%):	**42.14**
Exchangeable Acidity (meq/100g^{-1}):	**7.55**
Exchangeable Acidity (%):	**53.93**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**638**
– to neutralise Al (g/sqm):	**97**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **483**

The CGAR is corrected for a soil depth of 200mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Light Clay**
Typical clay content:	**35 - 40%**
Size:	**Fine (1 - 10mm)**
Gravel content:	**Not gravelly**
Aggregate strength:	**Weak**
Structural unit:	**Crumb**
Potential infiltration rate:	**Slow**
Permeability (mm/hr):	**2.5 - 5 mm/hr**
Calculated EC_{SE} (dS/m):	**0.34**

– Non-saline. Salinity effects on plants are mostly negligible.

Organic Carbon (OC%)†: **Did not test**
Organic Matter (OM%): **-**
Additional comments:

Consultant: Chantal Hooper **Authorised Signatory: Simon Leake** **Date of Report: 24 May 2013**

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
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Em: info@sesl.com.au
Web: www.sesl.com.au

Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26564 | **Sample N°: 1** | **Date Received: 12/6/13** | **Report Status:** ○ Draft ◉ Final

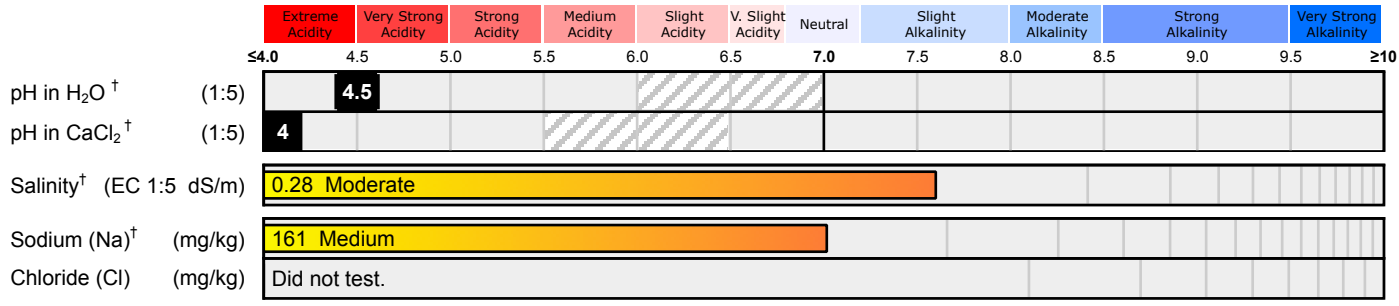
Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Former Trotting Track Analysis**
Client Contact:	**Adam Hunter**	Location:	**Dame Edith Reserve**
Client Job N°:		SESL Quote N°:	
Client Order N°:		Sample Name:	**Ontrack Surface**
Address:	**2 River Street** **BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**FSC**

RECOMMENDATIONS

See body of report for recommendations.

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ◉ Low ○ Moderate ○ High

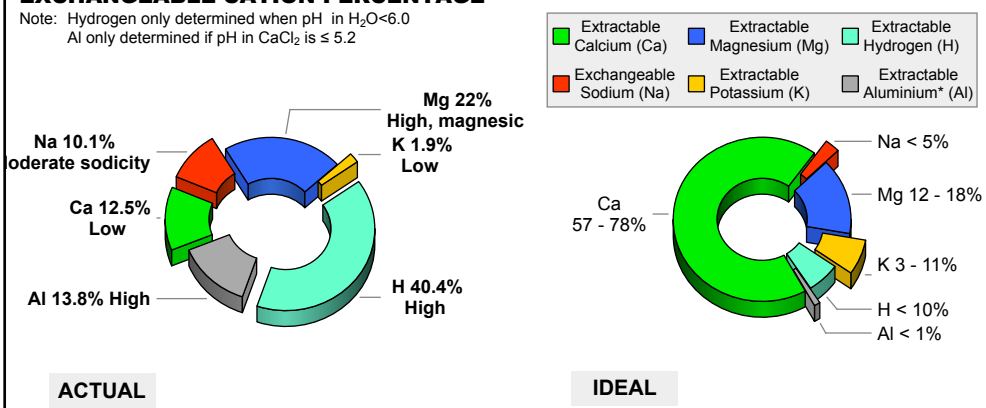
pH and ELECTRICAL CONDUCTIVITY



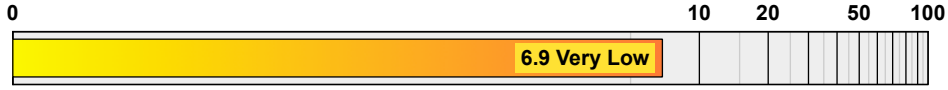
CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
Al only determined if pH in $CaCl_2$ is ≤ 5.2



EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)



CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	0.6	4.1 – 6.0
Comment: Potential Calcium deficiency		
Mg:K	11.7	2.6 – 5.0
Comment: Potential Potassium deficiency		
K/(Ca+Mg)	0.05	< 0.07
Comment: Acceptable		
K:Na	0.2	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.03 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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sesl AUSTRALIA

Sample Drop Off: 16 Chilvers Road, Thornleigh NSW 2120
Mailing Address: PO Box 357, Pennant Hills NSW 1715
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Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

Batch N°: 26564 **Sample N°: 1** **Date Received: 12/6/13** **Report Status:** ○ Draft ◉ Final

PLANT AVAILABLE NUTRIENTS

Major Nutrients	Result (mg/kg)	Very Low / Low / Marginal / Adequate / High	Result (g/sqm)	Desirable (g/sqm)	Adjustment (g/sqm)
Nitrate-N (NO_3)	-		-	4.2	Did not test
Phosphate-P (PO_4)	0		-	12.6	Did not test
Potassium (K) †	49.7		9.9	43.9	34
Sulphate-S (SO_4)	-		-	13.6	13.6
Calcium (Ca) †	171		34.1	312.4	278.3
Magnesium (Mg) †	184		36.7	32.5	Drawdown
Iron (Fe)	72.2		14.4	110.1	95.7
Manganese (Mn) †	61		12.2	8.8	Drawdown
Zinc (Zn) †	4.2		0.8	1	0.2
Copper (Cu)	3.9		0.8	1.3	0.5
Boron (B) †	0		0	0.5	0.5

Explanation of graph ranges:

Very Low
Growth is likely to be severely depressed and deficiency symptoms present. Large applications for soil building purposes are usually recommended. Potential response to nutrient addition is >90%.

Low
Potential "hidden hunger", or sub-clinical deficiency. Potential response to nutrient addition is 60 to 90%.

Marginal
Supply of this nutrient is barely adequate for the plant, and build-up is still recommended. Potential response to nutrient addition is 30 to 60%.

Adequate
Supply of this nutrient is adequate for the plant, and and only maintenance application rates are recommended. Potential response to nutrient addition is 5 to 30%.

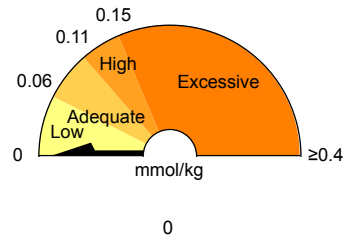
High
The level is excessive and may be detrimental to plant growth (i.e. phytotoxic) and may contribute to pollution of ground and surface waters. Drawdown is recommended. Potential response to nutrient addition is <2%.

NOTES: Adjustment recommendation calculates the elemental application to shift the soil test level to within the **Adequate** band, which maximises growth/yield, and economic efficiency, and minimises impact on the environment.

Drawdown: The objective nutrient management is to utilise residual soil nutrients. There is no agronomic reason to apply fertiliser when soil test levels exceed **Adequate**.

• g/sqm measurements are based on soil bulk density of 1.33 tonne/m³ and selected soil depth.

Phosphorus Saturation Index



Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**7.4**
Sum of Base Cations (meq/100g^{-1}):	**3.2**
Eff. Cation Exch. Capacity (eCEC):	**6.9**
Base Saturation (%):	**46.38**
Exchangeable Acidity (meq/100g^{-1}):	**2.79**
Exchangeable Acidity (%):	**40.43**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**638**
– to neutralise Al (g/sqm):	**139**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **0**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Did not test**
Typical clay content:	**Did not test**
Size:	
Gravel content:	**Did not test**
Aggregate strength:	**Did not test**
Structural unit:	**Did not test**
Potential infiltration rate:	**Did not test**
Permeability (mm/hr):	**Did not test**
Calculated EC_{SE} (dS/m):	**-**

Requires EC and Soil Texture result.

Organic Carbon (OC%)†:	**Did not test**
Organic Matter (OM%):	**-**

Additional comments:

Consultant: Ryan Jacka **Authorised Signatory: Simon Leake** **Date of Report: 21 Jun 2013**

METHOD REFERENCES:
pH (1:5 H_2O) - Rayment & Higginson (1992) 4A1,
pH (1:5 $CaCl_2$) - Rayment & Higginson (1992) 4B1,
EC (1:5) - Rayment & Higginson (1992) 3A1,
Chloride - Rayment & Higginson (1992) 5A2,
Nitrate - Rayment & Higginson (1992) 7B1
Aluminium - SESL in-house,
PO_4, K, SO_4, Ca, Mg, Na, Fe, Mn, Zn, Cu, B - Mehlich 3 (1984),
Buffer pH and Hydrogen - Adams-Evans (1972)
Texture/Structure/Colour - PM0003 (Texture- "Northcote" (1992), Structure- "Murphy" (1991), Colour- "Munsell" (2000))

ASPAC

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† This laboratory has been awarded a Certificate of Proficiency for specific soil and plant tissue analyses by the Australasian Soil and Plant Analysis Council (ASPAC). Tests for which proficiency has been demonstrated are highlighted in this report.

Soil Chemistry Profile

Mehlich 3 - Multi-nutrient Extractant

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Batch N°: 26564 **Sample N°: 2** **Date Received: 12/6/13** **Report Status:** ○ Draft ◉ Final

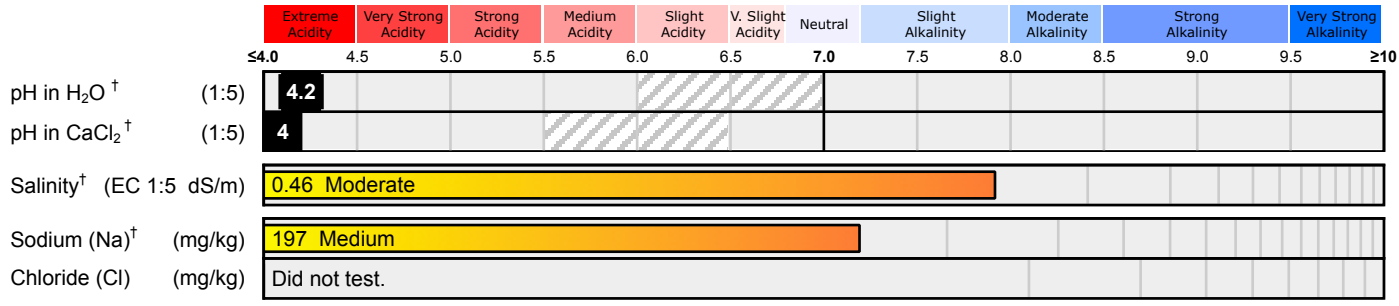
Client Name:	**Environmental Partnership (NSW) Pty**	Project Name:	**Former Trotting Track Analysis**
Client Contact:	**Adam Hunter**	Location:	**Dame Edith Reserve**
Client Job N°:		SESL Quote N°:	
Client Order N°:		Sample Name:	**Centre Surface**
Address:	**2 River Street** **BIRCHGROVE NSW 2041**	Description:	**Soil**
		Test Type:	**FSC**

RECOMMENDATIONS

See body of report for recommendations.

SOIL SAMPLE DEPTH (mm): ○ 100 ◉ 150 ○ 200 **FERTILITY RATING:** ◉ Low ○ Moderate ○ High

pH and ELECTRICAL CONDUCTIVITY



CATION BALANCE

EXCHANGEABLE CATION PERCENTAGE

Note: Hydrogen only determined when pH in H_2O<6.0
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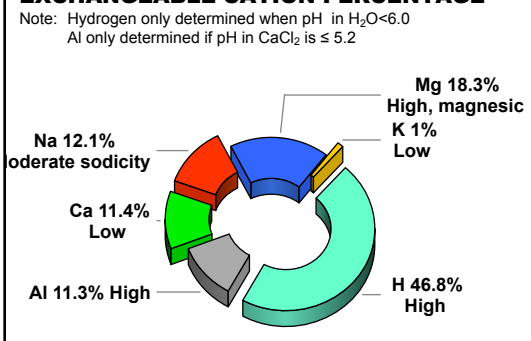
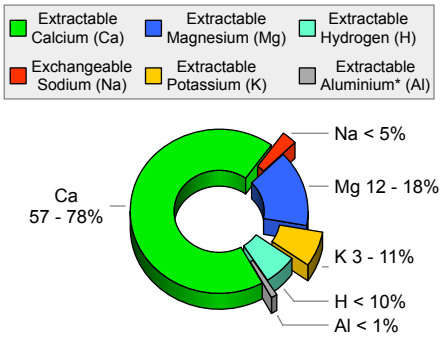
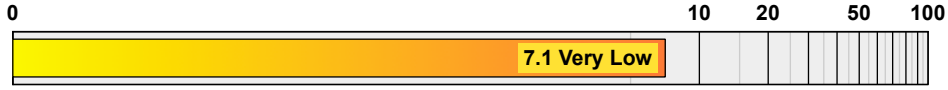


ACTUAL



IDEAL

EFFECTIVE CATION EXCHANGE CAPACITY (eCEC)



CATION RATIOS

Ratio	Result	Target Range
Ca:Mg	0.6	4.1 – 6.0
Comment: Potential Calcium deficiency		
Mg:K	18.6	2.6 – 5.0
Comment: Potential Potassium deficiency		
K/(Ca+Mg)	0.03	< 0.07
Comment: Acceptable		
K:Na	0.1	N/A

Sodium Absorption Ratio: D.N.T.

Electrochemical Stability Index (ESI):
0.04 High potential for dispersion and soil structure collapse

SOLUBLE CATIONS (meq/100g)

Na: K: Ca: Mg:

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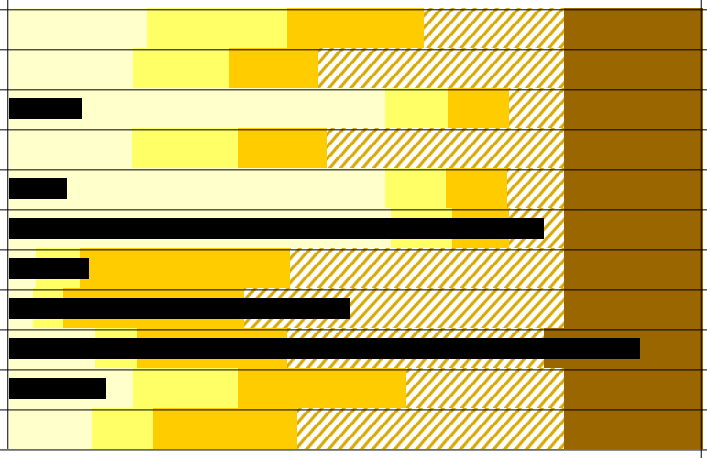
Phosphate-P (PO_4)	0		-	12.6	Did not test
Potassium (K) †	28.9		5.8	43.9	38.1
Sulphate-S (SO_4)	-		-	13.6	13.6
Calcium (Ca) †	162		32.3	312.4	280.1
Magnesium (Mg) †	157		31.3	32.5	1.2
Iron (Fe)	79		15.8	110.1	94.3
Manganese (Mn) †	27		5.4	8.8	3.4
Zinc (Zn) †	5.9		1.2	1	Drawdown
Copper (Cu)	1.1		0.2	1.3	1.1
Boron (B) †	0		0	0.5	0.5



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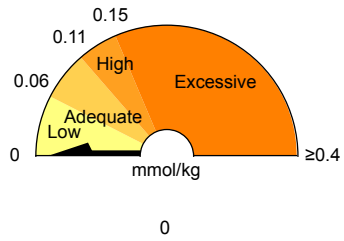

Low. Plant response to applied P is likely.

Exchangeable Acidity

Adams-Evans Buffer pH (BpH):	**7.3**
Sum of Base Cations (meq/100g^{-1}):	**3**
Eff. Cation Exch. Capacity (eCEC):	**7.1**
Base Saturation (%):	**42.25**
Exchangeable Acidity (meq/100g^{-1}):	**3.32**
Exchangeable Acidity (%):	**46.76**

Lime Application Rate

– to achieve pH 6.0 (g/sqm):	**515**
– to neutralise Al (g/sqm):	**117**

Gypsum Application Rate

– to achieve 67.5% exch. Ca (g/sqm): **0**

The CGAR is corrected for a soil depth of 150mm and any Lime addition to achieve pH 6.0.

Physical Description

Texture:	**Did not test**
Typical clay content:	**Did not test**
Size:	
Gravel content:	**Did not test**
Aggregate strength:	**Did not test**
Structural unit:	**Did not test**
Potential infiltration rate:	**Did not test**
Permeability (mm/hr):	**Did not test**
Calculated EC_{SE} (dS/m):	**-**

Requires EC and Soil Texture result.

Organic Carbon (OC%)†:	**Did not test**
Organic Matter (OM%):	**-**

Additional comments:

Consultant: Ryan Jacka **Authorised Signatory: Simon Leake** **Date of Report: 21 Jun 2013**

METHOD REFERENCES:
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APPENDIX B

Site Map

ABN 70 106 810 708
T (02) 9980 6554
F (02) 9484 2427
E info@sesl.com.au
W sesl.com.au
PO Box 357
Pennant Hills NSW 1715
16 Chilvers Rd
Thornleigh NSW 2120


Yarralla
Bay
NEW
ACCESS
Double gates
at back end
Kokoda Track Memorial Walkway
REGENERATION
AREA
PADDOCK
2
PADDOCK
1
Majors
Bay
NULLAWARRA
AVENUE
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