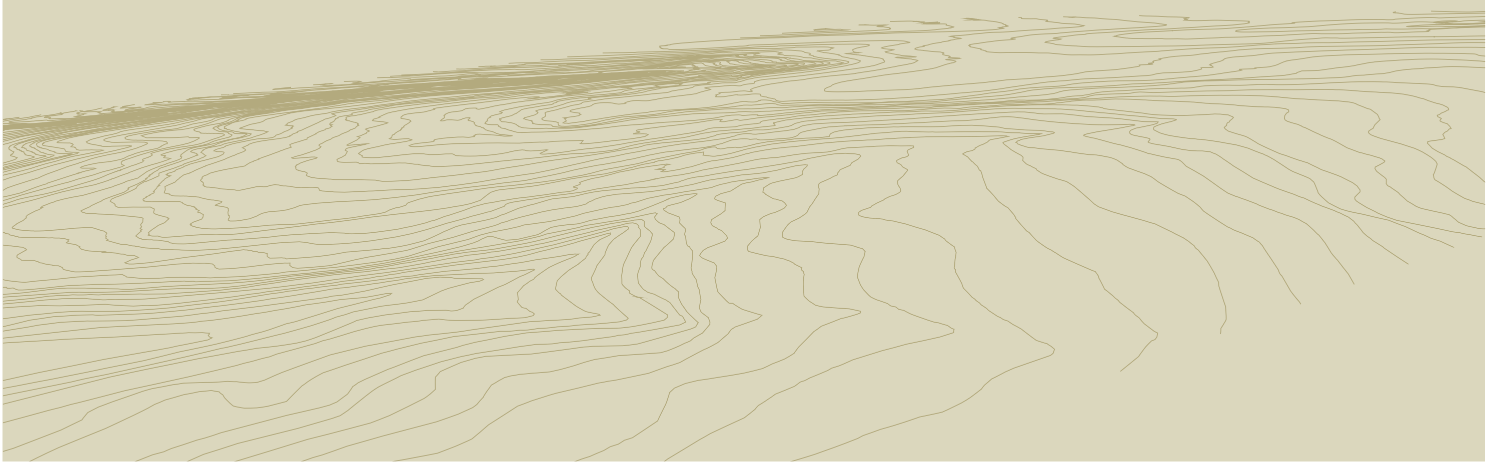
Appendix L

EA Systems, 2006: Salinity Assessment

ARMIDALE REGIONAL LANDFILL
Environmental Assessment



~ Commercial-in-Confidence ~

Salinity Assessment

FINAL REPORT

Armidale Dumaresq Council Landfill Facility Salinity Assessment

Report Number 20969. 13866

Prepared for *by*

Armidale Dumaresq Council

EASystems
ENVIRONMENTAL & AGRICULTURAL SCIENCE & ENGINEERING

PO Box 75A
ARMIDALE NSW 2350
Telephone: (02) 6770 3600
Facsimile: (02) 6772 9275

PO Box 1251
ARMIDALE NSW 2350
Telephone: (02) 6771 4864
Facsimile: (02) 6771 4867
ABN: 67 081 536 281

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Signatures		-	M. Dillon	S. C. Lott.

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This document provides information to address the intent of Project Number 20969 as agreed to by Maunsell Australia Ltd and Armidale Dumaresq Council.

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1. Introduction

E.A. Systems Pty Limited has been commissioned by Maunsell Australia to complete a Hydrogeotechnical Investigation for a proposed landfill site for Armidale. This investigation is a component of the Environmental Assessment prepared on behalf of Armidale Dumaresq Council. As part of the hydrogeotechnical investigation a salinity assessment was conducted at the site to identify any soil salinity issues or saline groundwater that may impact upon the site.

This Salinity Investigation was prepared to:

- Describe and identify the soil landscape of the site;
- Identify any limitations of the soils in regard to the proposed development; and
- Identify the potential salinity related impacts that the landfill may have on localised soil and groundwater conditions.

The salinity investigation consisted of two components. A desktop study was conducted to identify the soil landscapes of the site and a site assessment of the physical and chemical attributes was also undertaken

A soils investigation was completed across the site. This investigation aimed to ground-truth the Electro-Magnetic conductivity (EM) survey results. This provides a more accurate indication of soil conditions across the site and assesses the potential for salinity at the site. Nine test pits were excavated with a backhoe to a depth of approximately 1.5 metres below ground surface. The pits were excavated to allow the collection of bulk samples and to gain a greater understanding of the soil profile. Fifteen representative (15) soil samples were taken from the site for analysis by Lanfax Laboratories, Armidale. Lanfax is an Australian Soil and Plant Analysis Council (ASPAC) proficiency tested laboratory.

1.1 Location of Study Site

The regional context of the site is presented Figure 1.The study site is located approximately 12 km east of the Armidale CBD along the Waterfall way (also known as the Grafton Road) on portions of the two properties *Sherraloy* and *Edington*. The footprint of the proposed landfill will occupy a site approximately 1 kilometre south of the Waterfall way. The estimated total area for the site including buffers and access routes is approximately 100 hectares. The approximate centre of the study site is located at E 30^{o} 33’ 30” and N 151^{o}47’ 30”(AGD 1966 AMG Zone 56) on the Hillgrove (92361N 1:25,000 Topographic Map. The local context of the site is presented in Figure 2.

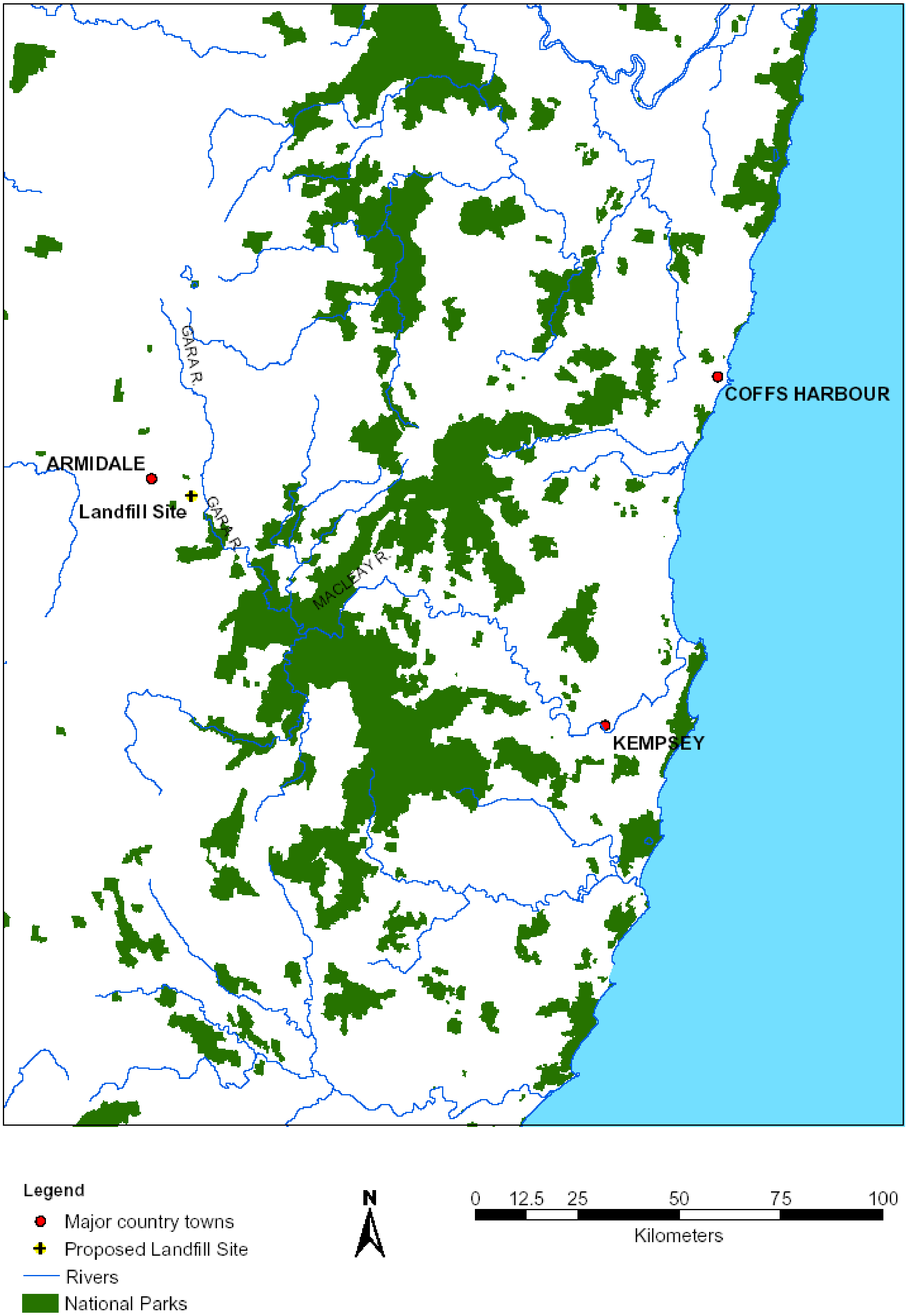

Figure 1. Regional Context of the Study Site.

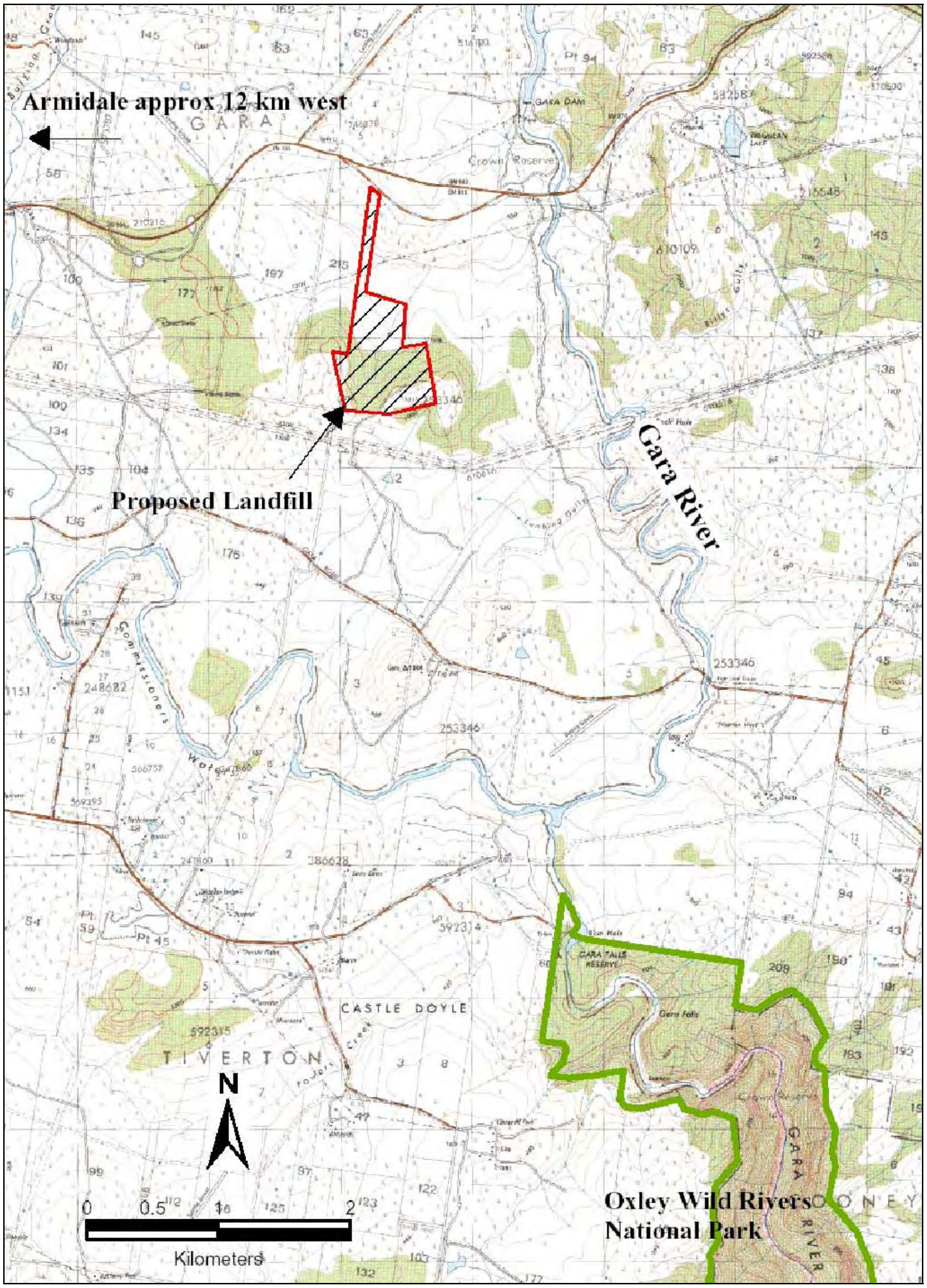

Figure 2. Local Context of the Study Site

2. Armidale Soil Landscape

The most recent and comprehensive soil survey of the area was prepared by the Department of Natural Resources and is currently in draft copy by King, D.P. (in prep), *Soil Landscapes of the Armidale 1:100 000 Sheet* Report, Department of Natural Resources, Sydney.

The proposed landfill site occurs predominantly within two soil landscape groups; Argyle and Middle Earth. A small section of site, located along the drainage gullies, is classified as Commissioners Waters. The distribution of soil landscape classes on and around the study site is presented in Figure 3. King (in prep, 2005) provides the following description of the Argyle, Middle Earth and Commissioners Waters soil landscapes.

2.1 "Argyle" Soils

The Argyle soil landscape group has a landscape of rolling low hills and occasional hills on greywacke/chert and related sediments. Local relief typically ranges from 30 - 80 m, slopes mostly 10 - 30%, and elevation between 910 – 1170 m . Minor rock outcrops if present generally occupy less than 10% of the surface. Typical vegetation on this type of soil in the region is partially cleared *Eucalyptus caliginosa* (New England stringybark) open woodland.

Soil in the Argyle landscape are typified by very shallow to shallow (<50 cm), well drained Basic Lithic Leptic Rudosols (Lithosols) and other shallow soils on crests, ridges and upper slopes. Shallow to moderately deep (40- 80 cm) moderately well drained Haplic Eutrophic Yellow Kandosols/Tenosols (Yellow Earths) occur on midslopes and occasionally extend onto crests. Shallow to moderately deep (<80 cm) moderately well drained Yellow/Red and Grey Chromosols (Yellow and Red Podzolic Soils) occur on mid slopes, footslopes and drainage lines. Mottled-Subnatric Eutrophic Brown and Yellow Sodosols (Soloths) occur along some drainage depressions.

The geology of the area includes the Permian to Late Carboniferous Coffs Harbour Association (the Girrakool Beds) and some Devonian-Carboniferous Sandon Association metasediments. Lithology is mostly lithofeldspathic wacke (greywacke), with slate, shale, mudstone, siltstone, chert and rare mafic and felsic volcanics (Gilligan *et al*. 1992). In the vicinity of the "Argyle" landscape group, greywacke is the most commonly occurring rock type. Other common rock types in the area include chert and sandstone. The greywacke/chert and related rocks are seldom heavily weathered forming resistant outcrops which rise above the surrounding less resistant countryside. Some metamorphosed rocks e.g. slates, phyllites, and schists may also be present. The geology is often locally referred to as trap or traprock country.

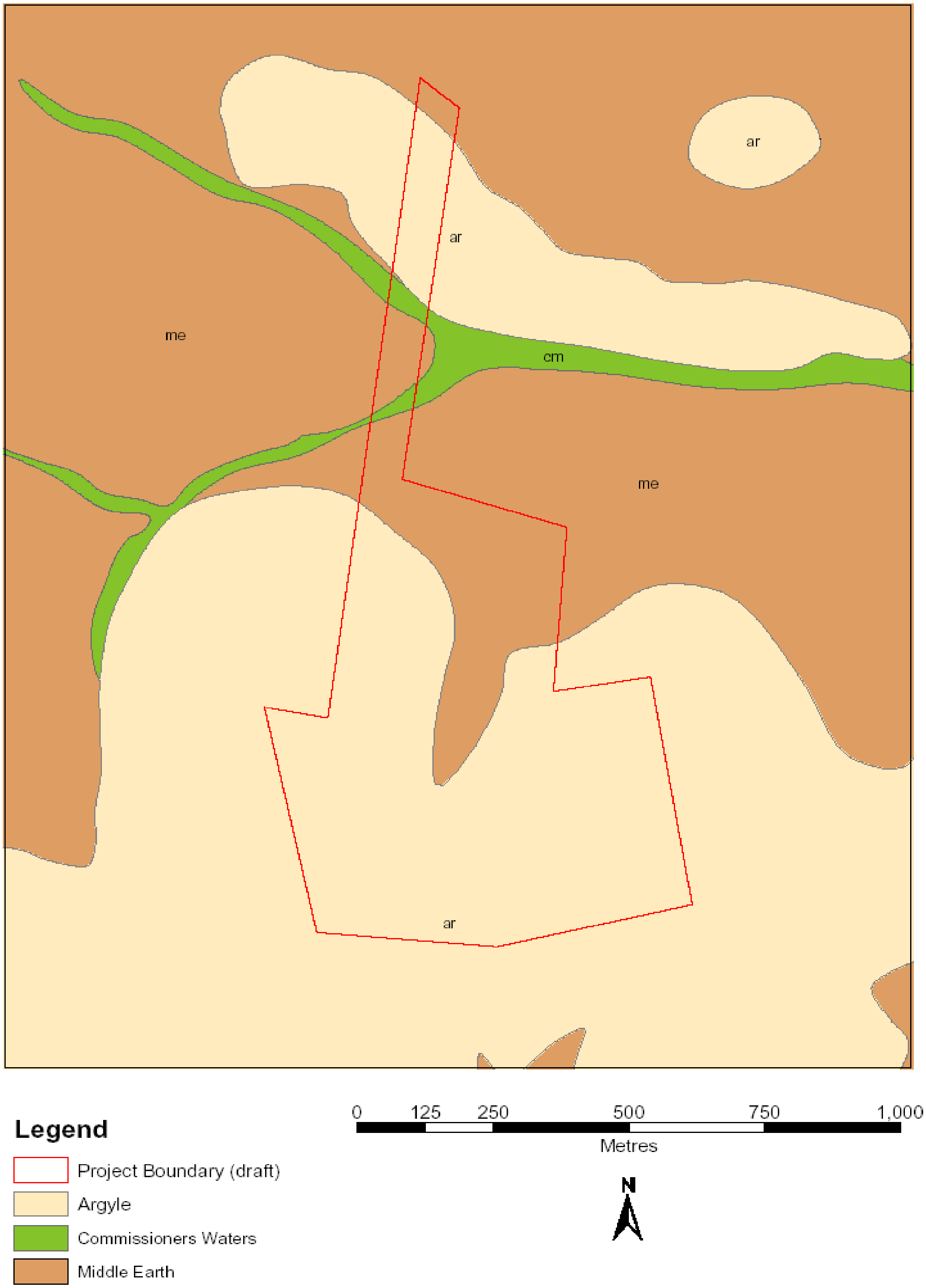

Figure 3. The distribution of soil landscape classes around the study (King, in prep, 2005)

2.2 “Middle Earth” Soils

The Middle Earth landscape occupies undulating plains, rises and footslopes on Sandon Beds. Local relief ranges from 0-30 m, slopes range from 0-10%, and elevation falls between 910 - 1120 m. Typical vegetation cover is partially to extensively cleared open woodland.

The soils across the Middle Earth landscape group can be identified as moderately deep to deep (>70 cm), moderately well drained Bleached-Mottled Haplic Eutrophic Yellow Kurosols and Chromosols (Yellow Podzolic Soils). Deep (>100 cm), poorly drained Yellow Chromosols and Mottled-Mesonatric and Mottled-Subnatric Eutrophic Yellow Sodosols (Soloths) and Bleached-Manganic and Bleached-Ferric Eutrophic Yellow Chromosols (Lateritic Podzolic Soils/Grey Brown Podzolic Soils) occupy drainage depressions and poorly drained areas. There are occasional shallow (<40 cm), well drained Bleached Eutrophic Yellow Kandosols (Yellow Earths) on slopes with bedrock close to the surface.

Geology and Regolith of the Middle earth landscape group is identified as Sandon Beds. Greywacke is the main rock type with chert, slate, and ferricrete. Some Girrakool Beds (Coffs Harbour Association) with a similar lithology underlie parts of this landscape. Traise (1973) noted the soil colour at any give site reflected the bedrock from which the soil was developed with rusty brown coloured soils associated with chert and a dusty yellow colour associated with the greywacke lithologies.

2.3 “Commissioners Waters” Soils

The Commissioners Waters landscape group is described as narrow streams, swamps and occasional small floodplains/terraces on Quaternary alluvium. This soil landscape is present along local waterways including Commissioners Waters and the Gara River. Local relief typically ranges from 0-10 m, slopes 0 – 3%, and elevation 900 –1070 m. Typical vegetation cover is extensively cleared open woodland.

Commisioners Waters soils are variable according somewhat to the source rocks from which they are derived. Shallow to moderately deep (40 – 100 cm) well drained Alluvial Sands and Alluvial Loams (Yellow/ Brown and Grey Earths) occur in areas derived from coarse grained parent materials. Moderately deep to deep (>80 cm), moderately well drained Mottled Eutrophic Grey Chromosols/Grey Sodosols (Gleyed Podzolic Soils/Grey Brown Podzolic Soils/ Lateritic Podzolic Soils) are also fairly common.

The geology and Regolith of Commissioners Waters include quaternary alluvium derived primarily from metasediments (the Sandon Beds). Some areas also have some granite source rock – the Gara adamellite and Hillgrove adamellite and more rarely basalt source rock (giving rise to slightly darker coloured soils).

3. Field observations

The investigation site can be broadly broken down into three geomorphological areas; the 'flats' running out to the creek line (See Plate 1 below), the wooded mid-slope(See Plate 2 below) area and the rocky crests of the hills. These areas, and the locations of the excavated test pits on the study site are presented in Figure 4. With the exception of the hill crests where the profile was generally shallower and contained more rock, the soils were relatively uniform across the site. The general soil profile also reflected those described by King, P, D (in prep) in the soil landscape group classifications.

Plate 1. The 'flats running down to the creek line (photo taken from across the main drainage line looking south up towards the proposed landfill.

Plate 2. Typical area of the wooded midslope area.

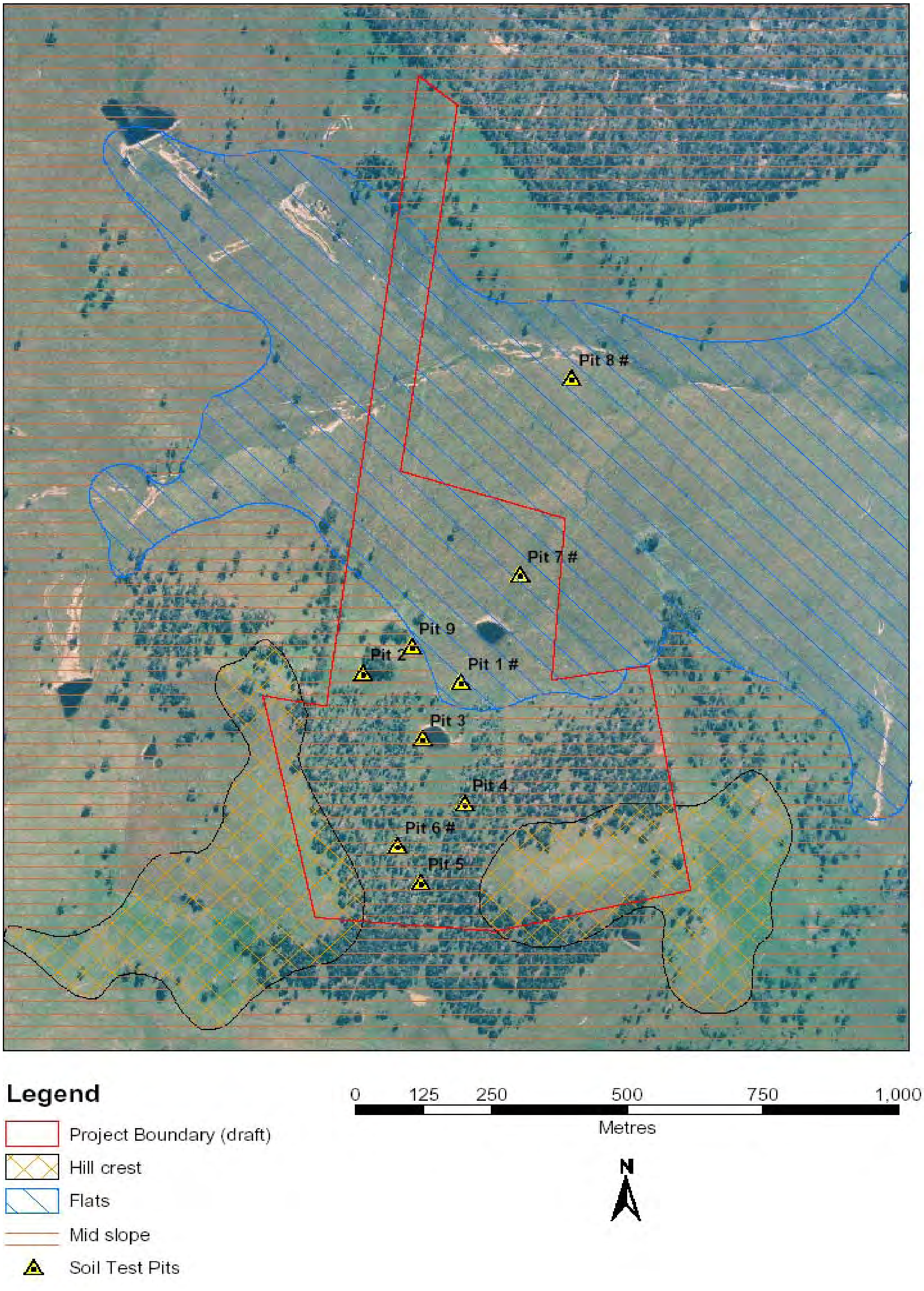

Figure 4. Site geomorphology and the locations of the test pits.

Generally, the soils in the lower section of the site showed;

Layer 1, A1 topsoil horizon of approximately 150 mm thick. This soil can be described as very dark brown to greyish brown (10YR 3/1 or 3/2) with a clay loam texture. The soil in this horizon contains some sand and gravel. An abrupt boundary to...

Layer 2, highly bleached A2 horizon, extended from approximately 150 mm to 300 mm. Greyish yellow brown (10YR 5/2) to bleached light grey (10YR 8/2D) hardsetting sandy clay. The highly bleached nature of the A2 horizon indicates that this is a layer of high permeability and transient flow. The transient flow is generated by the less permeable clay layer underlying the A2 horizon. An abrupt boundary to…

Layer 3, B1 horizon, extending form a depth of approximately 300mm to 550mm.Yellowish Red (5YR 5/8) to strong brown (7.5YR 5/8) heavy clay. This clay is generally sticky with an absence of rock or gravel.

Layer 4, B2 horizon, extending from a depth of approximately 550 mm to a depth of around 850mm. Yellowish brown (10YR 6/6) heavy clay. This stiff clay has a number of gravel seams through it, which may provide a conduit for the movement of groundwater. These gravels are generally small and angular.

Layer 5, B3 horizon. Depth >900mm. Below these clays are sub-soils of decomposed and mineralised, sedimentary sandstone rock. The backhoe investigation encountered difficulties digging through this layer, which provides and indication of the soil strength. The light drilling operation ground this material into fine clay.

Plate 3 shows the soil profile of pit 1, which is typical for the lower areas of the site.

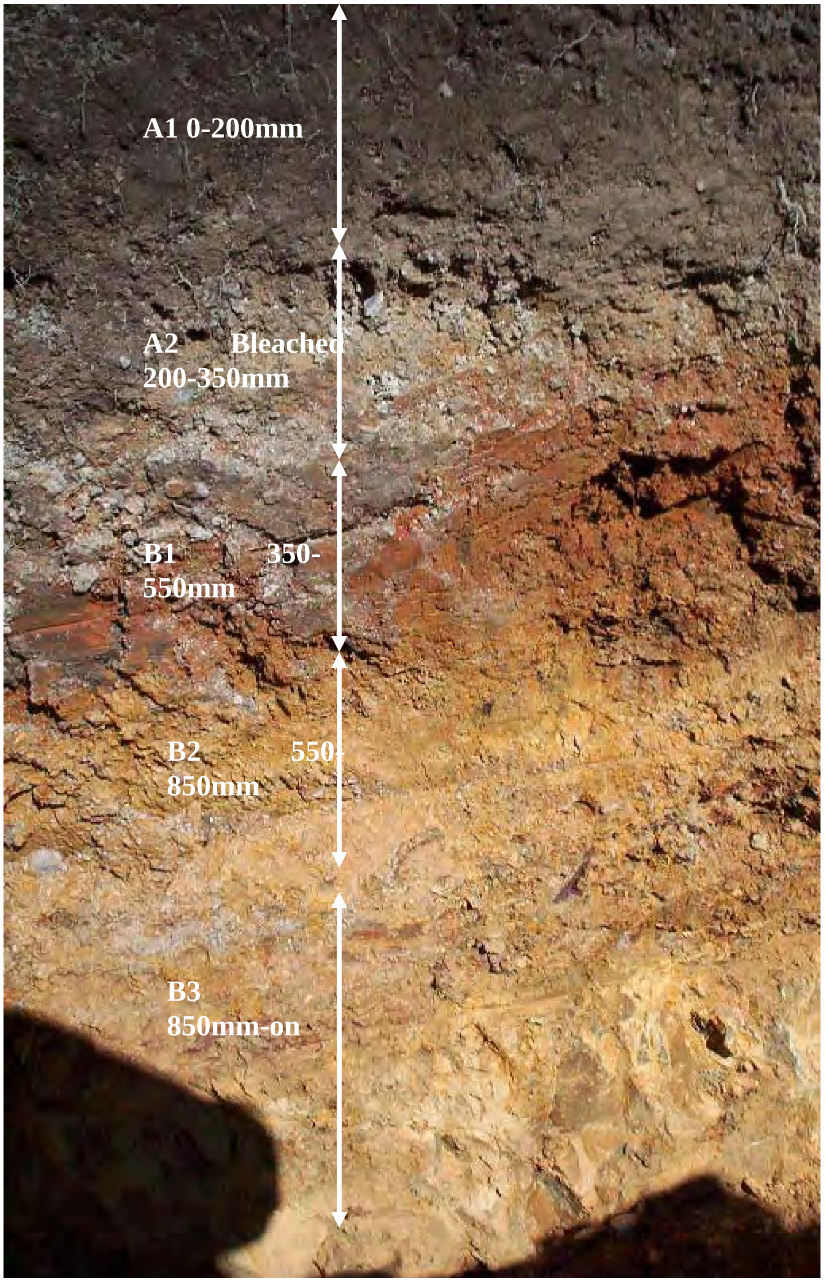

Plate 3. Soil profile at Pit 1. This profile is typical of the soils lower at the site.

Further up the slope to soil can generally be described as;

Layer 1, A1 topsoil horizon of approximately 150 mm thick. This soil can be described as very dark brown to greyish brown (10YR 3/1 or 3/2) with a clay loam texture. The soil in this horizon contains some sand and gravel. An abrupt boundary to...

Layer 2, A2 horizon, extended from approximately 150 mm to 300 mm. A small horizon of Brown (10YR 5/3) to brownish yellow (10YR 6/8) heavy clay. This layer has some sand and small gravel throughout.

Layer 3, B1 horizon, extending form a depth of approximately 300mm to 1100mm. Brown (10YR 5/3) to brownish yellow (10YR 6/8) heavy clay with orange and grey mottles.

Layer 4, B2 horizon, extending form a depth of approximately 1100 mm to 1450mm. Olive Yellow (2.5YR 6/8) heavy clay, very smooth and no rocks.

Plate 4 below shows the soil profile of pit 6, which is typical for the upper areas of the site.

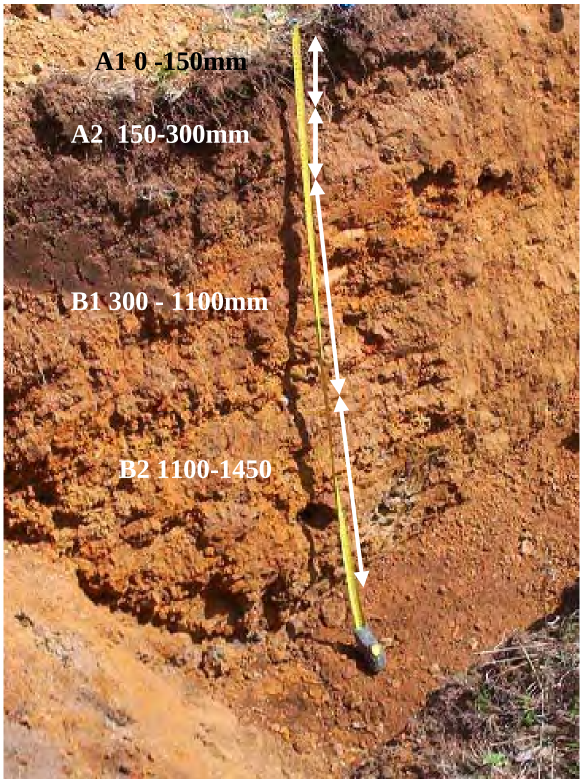

Plate 4. Soil Profile in pit 6. This profile is typical of soils further up the slope.

4. Laboratory results

Fifteen samples from four profiles were sent to Lanfax Laboratories, Armidale for analysis. Lanfax is an Australian Soil and Plant Analysis Council (ASPAC) proficiency tested laboratory.

Soils were analysed for:

- pH (1:5 soil/0.01M $CaCl_2$),
- Electrical Conductivity (1:5 soil/water suspension),
- Sodium (Na),
- Potassium (K),
- Calcium (Ca),
- Magnesium (Mg),
- Cation Exchange Capacity (CEC), and
- Slaking and Dispersion. (Emerson Aggregate Test)

Calculations were made for:

- Exchangeable Sodium Percentage (ESP), and
- Calcium/Magnesium Ratio.

The major salinity related analytes are electrical conductivity (ECe), sodium (Na), potassium (K), and exchangeable sodium percentage (ESP). Chemical analysis showed the soils to have mean ECe of 0.4 dS/m (range 0.1 - 1.1dS/m), mean Na levels of 255.2 mg/kg (range 12.0 - 931.5 mg/kg), and a mean ESP of 8.2% (range 1.3 - 24.1%) (Table1).

Table 1. Summary Table of Laboratory Analysis. n = number of samples

		Overall			Sampling Depth (mm)			
					A1 0-200	A2 200-320	B 320-700	B2 700-1200
		min	*mean*	*max*	*mean*	*mean*	*mean*	*mean*
	n	*15*	*15*	*15*	*4*	*4*	*4*	*2*
pH (CaCl)	*scale*	3.8	5.0	6.5	4.5	4.7	5.0	6.02
ECe	*dS/m*	0.1	0.4	1.1	0.30	0.02	0.05	0.65
Na	*mg/kg*	12.0	255.2	931.5	17.6	55.5	357.8	685.9
K	*mg/kg*	9.2	44.7	96.6	41.8	19.8	59.6	62.9
Ca	*mg/kg*	28.3	668.0	2422.0	406.0	296.8	769.7	1671.7
Mg	*mg/kg*	75.4	601.0	1365.0	97.8	212.2	974.9	1296.5
ESP	*%*	1.3	8.2	24.1	2.0	6.4	10.7	14.3
CEC	*mg/kg*	2.4	11.4	26.6	4.0	5.0	17.8	22.8
Ca / Mg	*ratio*	0.0	1.3	3.2	2.6	1.2	0.5	0.8

4.1 Soil pH

In general the soils at the site range from strongly acidic to slightly acidic with pHca range from 3.8 - 6.5. These pH levels are considered to be in the range common for most mineral soil (Peverill *et al*, 1999). A pH range of 4.5 to 6.5 is considered optimal for the growth of most plants species. The majority of the samples analysed fell within this optimal range. If the soils at the site continue to acidify over time possible amelioration strategies may include applying lime to the soil.

4.2 Emerson Aggregate Test

The Emerson aggregate test is a measure of soil structural stability in water (Patterson 1999). The degree of soil aggregate stability increases from Class 1 through to Class 8. Aggregates in Emerson Classes 1 and 2 are generally regarded as being unstable while those in classes 4 to 8 are considered to be stable. Results of the EAT on soils from the proposed landfill site are presented in table 2 below.

Table 2. Summary table of laboratory results – Emerson Class

Sample Number	Depth (mm)	Emerson Class	Description
Pit 1	0-200	8	No swelling
Pit 1	200-350	3	Dispersion
Pit 1	350-550	6	Complete flocculation
Pit 1	550-850	2	Some dispersion
Pit 1	850-1200	1	Complete dispersion
Pit 6	0-300	7	Swelling
Pit 6	300-1100	6	Complete flocculation
Pit 6	1100-1400	6	Complete flocculation
Pit 7	0-100	8	No swelling
Pit 7	100-300	3	Dispersion
Pit 7	300-800	2	Some dispersion
Pit 8	0-150	7	Swelling
Pit 8	150-320	6	Complete flocculation
Pit 8	320-700	6	Complete flocculation
Pit 8	700-1200	6	Complete flocculation

Soils from the A1 surface horizon from the site are classified as being in Emerson classes 7 and 8. This showed that soil aggregates either remained unchanged when immersed in water (Class 8) or the aggregates remained intact but showed some visible swelling (Class 7). This is mainly a function of the presents of organic matter in the soil. Many of the soils are in class 6 and displayed complete flocculation when dropped into water. Flocculation occurs when there are long-range attractive forces between clay particles, even if the clay particles are moved far apart in water, the particles come together again. This flocculating nature is noted in soils generally from the B1 or lower horizons. Soils pits 6 and 8 have a flocculating nature in all horizons except the A1 surface horizon. The soil from the A2 horizon in pit 1 has a dispersive nature, this soil can be unstable when wet. Some soils are classified as Class 1 or 2 these samples were reported, by the laboratory, as being mostly weathered and decaying sandstone rock fragments.

4.3 Soil Salinity

Soil salinity is a measure of the presence of water soluble salts, mainly sodium, calcium and magnesium in the soil solution. Soil salinity can have major impacts on plant productivity and survival. Other effects of soil salinity can include a breakdown of soil structure and erosion. Soil samples taken from the site have a mean ECe of 0.4 dS/m (range 0.1 - 1.1dS/m). These low ECe results indicate that there are no salinity issues in the soil from the site and all sample are below the salinity threshold of ECe <4ds/m. Table 3 shows the ECe Values of Soil Salinity Classes.

Table 3. ECe Values of Soil Salinity Classes (Richards 1954)

Class	ECe (dS/m)	Comments
Non-saline	<2	Salinity effects mostly negligible
Slightly saline	2-4	Yields of very sensitive crops may be affected
Moderately	4-8	Yields of many crops affected
Very	8-16	Only tolerant crops will yield satisfactorily
Extremely	>16	Only a few very tolerant crops will yield satisfactorily

4.4 Soil Sodicity

Sodic soils contain high levels of sodium which take up a significant portion of the total exchangeable cations. Sodic soils readily lose their structure upon becoming wet causing structural collapse and closing off soil and water pores. This leads to restricted air and water movement through the soil and reduces hydraulic conductivity. As conditions dry out these soils form a hard crust effectively sealing the layer and reducing water infiltration.

Exchangeable sodium levels vary with depth and position across the site. On average soils are non-sodic in the surface A1 horizon and subsurface A2 horizon, and becoming sodic (ESP>6%) deeper through the profile. Specifically the soils in Pit 1 start becoming sodic (ESP 9.9%) in the B 1 350-550mm horizon. Sodicity increases (ESP 17.9%) in the B 2 550-850mm horizon and become very sodic (ESP 21.4%) at depth in the B 3 >850mm horizon. Pit 7 displays a similar pattern with sodicity increasing with depth, the B 2 400-800mm horizon had an ESP 24.1%. None of the soils in pit 6 were above the sodicity threshold ESP>6%. Pit 8 displayed a slightly high ESP result of 7.2% in the B3 700-1200mm horizon. The high sodicity levels in the sub soils may cause a breakdown in soil structure during wet conditions, this may inturn cause sealing in these layers and a reduction in future water infiltration.

5. Conclusions

Soils at the proposed landfill site vary from the lower to the upper slope and reflect the landscape and soils descriptions made by King (in prep, 2005). Soil pH levels fall within a range that is common for most mineral soils and will not restrict plant growth. All soils at the proposed landfill site are considered to be non-saline and at the present there is no salinity issue at the site. On average the surface and sub-surface soils are non sodic. However, most soils are considered sodic at depth in the B2 and B3 horizons. These soils may become unstable when initially wet though will form a surface crust and seal very well upon drying. This crust will reduce the likelihood of moisture infiltration in future rainfall events. Once these soils form a seal on the surface potential water infiltration is reduced. While sodicity in the soils at the proposed landfill site is evident it should pose no restrictions to the development of the Armidale landfill. Clay material located in the B1 300-550mm horizon is suitable for a lining/capping material. Soils from this horizon were generally only slightly sodic. This would indicate that after compaction they would form a lining with low permeability suitable for the proposed landfill.

It is recommended that standard erosion control measures are employed during the construction and operation stages of the development to avoid the possibility of erosion or dispersion of any sodic soils that may be exposed during excavations. In the event that clearing of portions of the woodland regrowth occupying the mid-slopes is required, bunding should be employed to minimise surface water run-on onto the cleared areas to prevent potential problems with salinity. Precautions should also be taken to ensure the base of the landfill is completely sealed so that the site does not contribute to potential groundwater recharge zones.

6. References

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7. Appendices

Appendix A. Results of the Soil Sampling Analyses

Site Name	Collection Date	Location	Latitude	Longitude	Surface Slope	Sample Number	Horizon_From mm	Horizon_To mm	Colour	Texture
ADC Land fill	28-9-05	Pit 1	383405	6619103	1%	155301	0	200	10yr 4/2 dark grayish brown	Fine sandy loam
ADC Land fill	28-9-05	Pit 1	383405	6619103	1%	155302	200	350	10yr 5/2 Graysih brown	Sandy clay
ADC Land fill	28-9-05	Pit 1	383405	6619103	1%	155303	350	550	5yr 5/8 yellowish red or 7.5 yr 5/8 strong brown	Heavy clay
ADC Land fill	28-9-05	Pit 1	383405	6619103	1%	155304	550	850	10yr 5/8 yellowish brown	Heavy clay
ADC Land fill	28-9-05	Pit 1	383405	6619103	1%	155305	850	1200	10yr 6/6 brownish yellow	Heavy clay
ADC Land fill	28-9-05	Pit 6	383288	6618773	5-6%	155306	0	300	10yr 4/2 dark grayish brown	Sandy clay loam
ADC Land fill	28-9-05	Pit 6	383288	6618773	5-6%	155307	300	1100	10yr 6/8 brownish yellow	Heavy clay
ADC Land fill	28-9-05	Pit 6	383288	6618773	5-6%	155308	1100	1400	2.5yr 6/8 olive yellow	Heavy clay
ADC Land fill	28-9-05	Pit 7	383514	6619319	1%	155309	0	100	10yr 4/2 dark grayish brown	Sandy clay loam
ADC Land fill	28-9-05	Pit 7	383514	6619319	1%	155310	100	300	10yr 5/3 Brown	medium clay
ADC Land fill	28-9-05	Pit 7	383514	6619319	1%	155311	400	800	10yr 5/6 yellow brown	medium clay
ADC Land fill	28-9-05	Pit 8	383609	6619714	1%	155312	0	150	10yr 4/2 dark grayish brown	Fine sandy loam
ADC Land fill	28-9-05	Pit 8	383609	6619714	1%	155313	105	320	7.5yr strong brown	sandy clay
ADC Land fill	28-9-05	Pit 8	383609	6619714	1%	155314	320	700	10yr 5/8 yellowish brown	Heavy clay
ADC Lan d fill	28-9-05	Pit 8	383609	6619714	1%	155315	700	1200	no colour decayed rock	Heavy clay

PointName	pHw	pHca	EC dS/m	Texture Factor (EC Multiplier)	ECe dS/m	Dispersion test Emerson class	Exc.Al+H meq/100g	Ca mg/kg	K mg/kg	Mg mg/kg	Na mg/kg	ESP %	ECEC me/100g	Ca/Mg ratio
Pit 1	5.76	4.56	0.038	12.00	0.46	8	0.4	496.8	69.83	111.9	19.76	2.1	4.1	2.7
Pit 1	6.1	4.95	0.018	10.00	0.18	3	0.16	323	20.66	129.1	41.26	5.9	3.1	1.5
Pit 1	6.4	5.16	0.043	6.00	0.26	6	0.32	734.8	60.22	1026	319.2	9.9	14.0	0.4
Pit 1	7.58	6.35	0.183	6.00	1.10	2	0	786.2	60.33	1283	733.6	17.9	17.8	0.4
Pit 1	7.85	6.5	0.147	6.00	0.88	1	0.08	921.4	54.14	1228	931.5	21.4	19.0	0.5
Pit 6	5.23	4.41	0.017	11.00	0.19	7	1.68	288.5	36.26	114.7	15.25	1.6	4.2	1.5
Pit 6	5.21	4.2	0.023	6.00	0.14	6	4.72	117.9	22.15	405.7	69.11	3.3	9.0	0.2
Pit 6	4.94	3.83	0.058	6.00	0.35	6	13.92	28.3	47.26	1156	289.7	5.0	25.0	0.0
Pit 7	5.45	4.64	0.031	11.00	0.34	8	0.56	438.3	35.21	89.07	23.4	2.8	3.7	3.0
Pit 7	6.23	4.95	0.03	8.00	0.24	3	0.24	225.9	9.241	83.54	74.45	13.5	2.4	1.6
Pit 7	7.63	6.26	0.09	8.00	0.72	2	0.32	656.8	34.23	613.7	639.1	24.1	11.5	0.6
Pit 8	5.17	4.4	0.018	12.00	0.22	7	1.12	400.5	25.95	75.39	11.96	1.3	3.9	3.2
Pit 8	5.78	4.64	0.014	10.00	0.14	6	0.72	520.4	26.96	230.5	37.14	3.0	5.4	1.4
Pit 8	5.66	4.56	0.026	6.00	0.16	6	2.32	1659	96.59	1104	183	3.8	20.7	0.9
Pit 8	6.63	5.54	0.068	6.00	0.41	6	1.2	2422	71.63	1365	440.3	7.2	26.6	1.1
Min	4.9	3.8	0.0	6.0	0.1	1.0	0.0	28.3	9.2	75.4	12.0	1.3	2.4	0.0
Mean	6.1	5.0	0.1	8.3	0.4	5.1	1.9	668.0	44.7	601.0	255.2	8.2	11.4	1.3
Max	7.9	6.5	0.2	12.0	1.1	8.0	13.9	2422.0	96.6	1365.0	931.5	24.1	26.6	3.2