



**Norske Skog Paper Mills
(Australia) Ltd**

**Groundwater Status Review of
Delaney's Quarry Landfill**

December, 2001

Ref: 1113-02

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Printed on Recycled Paper

REF: 1113-02

Document Issue and Status

Rev.	Status	Date	Project Manager	Reviewer
1-1	Draft to Client	23/10/01	Jon Bartley	Jon Bartley
1-2	Final	10/01/2002		

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1 INTRODUCTION

Norske Skog Paper Mills (Australia) Ltd operates a paper mill approximately 12 km north of Albury. In the period from 1983 to 1996 the Mill deposited solid waste 'biosolid' material in a landfill known as Delaney's quarry approximately 3 km north west of the mill site. In late 1992 a series of bores were installed in this quarry to investigate and monitor any groundwater that might be present.

Leachate collected from the landfill is irrigated over an 8 ha area in the quarry vicinity.

Nolan-ITU has been engaged to conduct a review of the groundwater monitoring data. The review involved the:

- Analysis and interpretation of groundwater monitoring data;
- Assessment of compliance with EPA licence 412 and development consent conditions; and
- Development of recommendations regarding future monitoring and potential environmental impacts.

2 BACKGROUND

2.1 Setting

The site is located 12 km north of Albury (Figure 2.1) and comprises a granite quarry, part of which is used for land filling biosolid wastes from the pulp and paper Mill. An eight hectare area of pasture to the north west of the quarry working area is used for the irrigation of leachate.

2.2 Geology and Hydrogeology

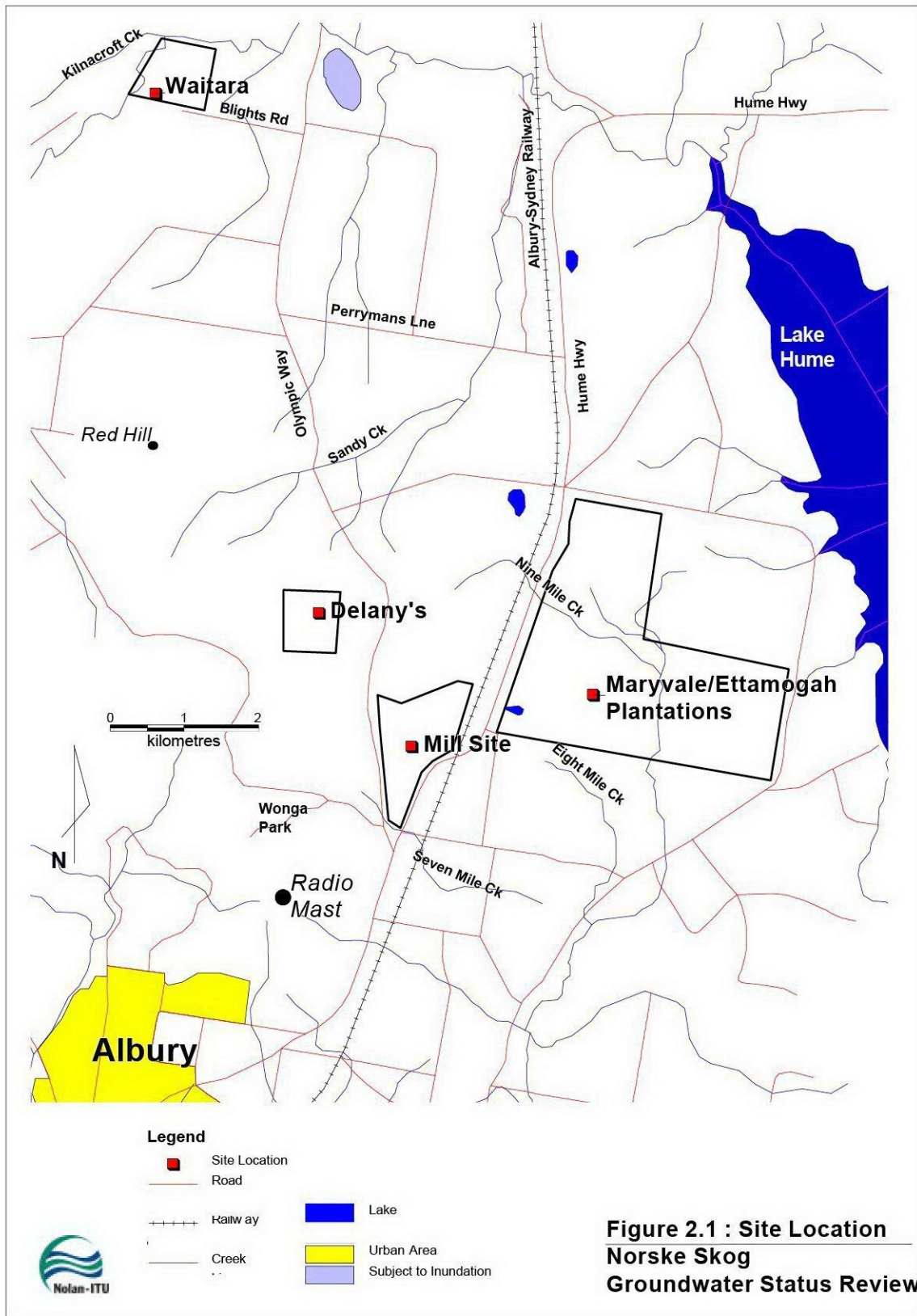
The geological sequence comprises Late Silurian fine grained biotite granite forming the quarry area (Degeling, 1977).

The weathering profile of the granite bedrock can be deep although in the quarry fresh granite outcrops.

Overlying the fresh granite is a weathered *in situ* soil profile along drainage lines colluvial/alluvial material. This soil material is generally coarse grained and relatively free draining. A perched watertable is present in the shallow sediments.

Monitoring records from bores located in the quarry site (Figure 2.2) indicate the regional watertable to be around 40 m below surface, a similar depth to the Maryvale property.

Groundwater yields in the granite are small to negligible and groundwater salinity ranges between 1 500 $\mu\text{S}/\text{cm}$ and 2 500 $\mu\text{S}/\text{cm}$.



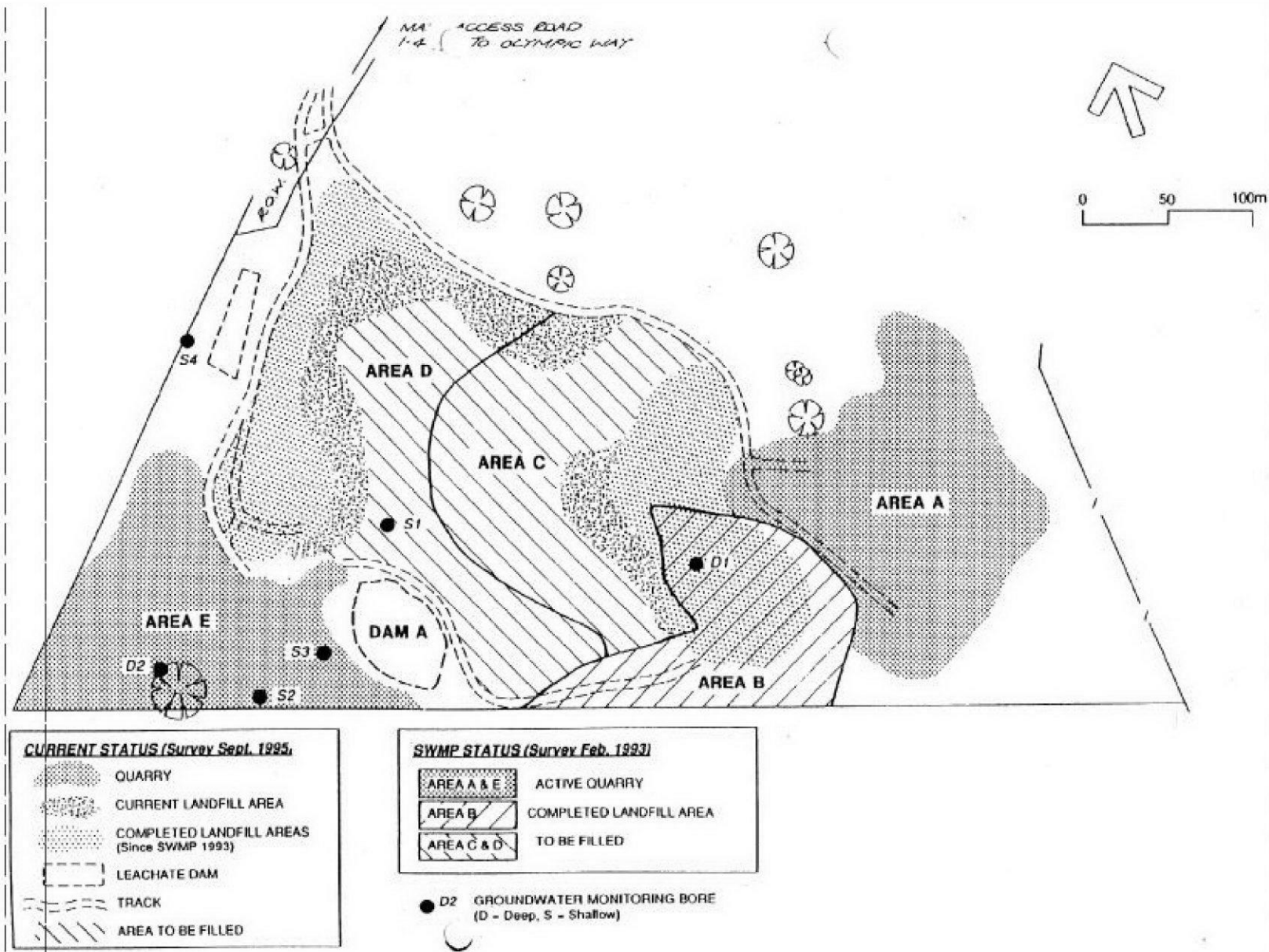


Figure 2.2
Bore Location Plan

Norske Skog Paper Mills (Australia)
Groundwater Status Review of
Delaney's Landfill

3 LANDFILL HISTORY

Delaney's Quarry has been used for disposal of paper mill biosolid wastes since 1983. EPA licence No. 00412 specifies the leachate management requirements associated with the site.

The landfill areas are located in disused parts of the quarry and cover approximately 5.5 Ha (GHD, 1995) forming 3 disposal areas separated by embankments.

The waste inputs to the quarry have reduced since 1995 when agricultural land spreading of biosolids commenced. The main components of waste to the landfill include recycled fibre plant ink waste, primary and biological sludges, screenings and grit and large diameter wood wastes.

Information in GHD (1993) indicates the leachate collection system was installed prior to 1993 and regularly upgraded with increased landfilling volume and with improving management practices at the site. Between 1993 and 1995 the leachate pondage capacity was increased and clay lined and an irrigation area recycling system was installed. During this time the original leachate collection pond, located immediately north of bore S1 was decommissioned and replaced by Dam B (Figure 2.2).

Groundwater monitoring bores were installed in December 1992, consisting of two deep and five shallow bores.

Stabilisation works on the western face of the quarry, between the leachate collection pond (Dam B) and Area D (Figure 2.1) was undertaken after November 1994 (Coffey Partners 1994).

The total remaining space for landfilling in 1995 was about 160 000 m³, allowing an anticipated 12 to 15 year operating life.

The operational spreading of biosolids, which commenced in 1996 has meant that only a small volume of biosolid material now enters the landfill during prolonged wet weather. This is generally converted to topsoil and transported off the site.

4 GROUNDWATER STATUS

4.1 Regional Aquifer

a) Monitoring Bores

There are currently two monitoring bores within the regional aquifer at Delaney's Quarry. Bore locations are given in Figure 2.2.

Monitoring bore construction details are presented in Appendix A and groundwater levels and chemistry time series data are presented in Appendix B.

b) Groundwater Levels

The last measurement made in D2 was in June 1997, while data for D1 shows monitoring until February 2001.

The regional watertable recorded by bores D1 & D2 shows a flat trend over the monitoring period between 1994 to present. The watertable is shown to be approximately 35 m below ground surface in bore D2 and about 37 m below ground surface in bore D1.

c) Salinity

Groundwater conductivity is stable. It averages around 1 700 $\mu\text{S}/\text{cm}$ in D1 and fluctuates in a range from about 1 400 $\mu\text{S}/\text{cm}$ to 2 000 $\mu\text{S}/\text{cm}$. Groundwater conductivity in D2 fluctuates between 1 600 $\mu\text{S}/\text{cm}$ and 2 500 $\mu\text{S}/\text{cm}$. There have been no samples taken in D2 since June 1997, as it is understood the bores dedicated bladder pump is not working.

There was a fall in conductivity to around 500 $\mu\text{S}/\text{cm}$ in December 1999 and January 2000. The reason for this fall is unknown but corresponds to a fall in groundwater level over the same period. Conductivity has since returned to previous levels, with the last three measurements ranging between 1 400 $\mu\text{S}/\text{cm}$ and 2 000 $\mu\text{S}/\text{cm}$.

d) Nutrients

Concentration of nitrogen species range between 0.05 and 3.5 mg/L. These concentrations are below guideline threshold concentrations for protection of human and animal health.

There are no obvious trends in the nitrogen species other than normal seasonal fluctuations.

e) Metals

Groundwater metal concentrations from samples taken in D1 and from D2 between 1994 and 1997 show no obvious trends and in a number of cases concentrations are below limits of detection.

f) Other

There are no discernible trends in pH.

4.2 Shallow Aquifer

a) Monitoring Bores

All shallow bores monitor the water level and chemistry of the perched watertable.

There are five shallow monitoring bores at the quarry site. All bores have groundwater level and chemistry recordings except bore S3, which has been damaged by earth moving equipment.

b) Groundwater Levels

Water levels in the shallow bores have flat long term trends over the monitoring period between 1994 to present, with typical seasonal fluctuations for shallow aquifer systems. While bores S4 & S5 are quite stable, S2 has fluctuated markedly from 4 m to 10 m below top of casing (TOC).

c) Salinity

Groundwater conductivity has generally averaged around 2 000 $\mu\text{S}/\text{cm}$ except for S2 which has averaged around 300 $\mu\text{S}/\text{cm}$ over the monitoring period. Since 1997 bores S2 & S5 have exhibited upward trends. S2 from around 240 $\mu\text{S}/\text{cm}$ in October 1997 to 400 $\mu\text{S}/\text{cm}$ in Early 2001. S5 has increased from 1 529 $\mu\text{S}/\text{cm}$ in February 1997 to around 2 000 $\mu\text{S}/\text{cm}$ in Early 2001. Reasons for the increase are unclear, but appear to correlate to falls in watertable levels, suggesting the trends may relate to climatic changes.

d) Nutrients

Bore S1, located adjacent to the former leachate dam, averages approximately 55 mg/L Total Nitrogen (total-N) as ammonia, with total-N and ammonia spiking during September 1998 (177 mg/L) and February 1999 (151 mg/L) respectively. This bore is located near the quarry working face and may be recording stormwater run-off from the quarry, in addition to leachate concentrations from the former leachate collection pond. A comparison of total-N concentrations in S1 and Dam A reveals similar trends in the periods March 1994 to December 1996 and December 1998 to September 2000. There is no total-N data for Dam A for the period January 1997 to November 1998.

In bore S2 total-N and nitrate concentrations have been on an overall downward trend since 1995, falling to less than 2 mg/L total-N in mid 1999. Ammonia is recorded as having concentrations of less than 2 mg/L over the monitoring period.

Other bores show similar concentrations, generally between 1 mg/L and 8 mg/L, for both total-N and nitrate, and less than 2 mg/L for ammonia, well below guideline threshold concentrations for protection of human health.

Bore S4 shows an overall upward total-N trend since 1997. This bore is located beside leachate Dam B. There is no observable relationship between total-N results for Bore S4 and total-N results for both leachate Dams B, D and Sandy Creek.

e) Metals

Metals are stable with no discernible trends. In bores S1, S2 and S5 metals have spiked once in each above guideline concentrations, although on all other occasions have been recorded below laboratory detection limits and represent anomalous results.

f) Other

pH is stable, ranging between 6 and 8.

4.3 Landfill Consent Conditions

Delaney's landfill consent condition requirements relating to groundwater monitoring are presented in Appendix C. Against each consent condition are findings with respect to the monitoring data presented in this report.

4.4 Groundwater Monitoring Review

Based on available information suggested changes to the monitoring regime at the Delaney's are presented in Table 4.1. The suggested changes are applicable to all bores except Bore S4.

Bore S4 shows a rising concentration of nutrients and it is therefore recommended that nutrients be monitored at the current frequency (3-monthly). Other parameters could be reduced to six monthly.

Table 4.1 : Groundwater Monitoring Review

Current Monitoring (All bores)		Suggested Monitoring (All bores except S4)	
Parameter	Frequency	Frequency	Reason
Waterlevel	Monthly	Six-monthly	Seven years monitoring indicates limited or no impact. A reduced monitoring frequency will be sufficient to pick up any changes to long term trends
pH	3 Monthly	Six-monthly	
Conductivity	Monthly	Six-monthly	
Nitrate	3 Monthly	Six-monthly	
Ammonia-N	3 Monthly	Six-monthly	
Kjeldahl-N	3 Monthly	Six-monthly	
Total Nitrogen	3 Monthly	Six-monthly	
Metals (As, Cd, Cr, Co, Cu, Fe, Pb, Mn, Hg, Ni, Zn)	Six Monthly	Six-monthly (Pb, Cu, Hg, Zn only)	A good indicator of gross changes to groundwater chemistry.
TDS	Not monitored but can be inferred from EC data	Six-monthly	

Note that the current monitoring regime is in excess of the consent condition requirements.

5 CONCLUSIONS

5.1 Change in Groundwater Levels

Prior to landfilling regional watertable rises were likely to be in the order of 0.3 m/yr (DLWC, 2000). Monitoring data provided by Norske Skog for the Delaney site shows no evidence of an overall rise in regional watertable attributable to landfilling practices.

The perched watertables at the site also show a flat long term trend.

5.2 Change in Groundwater Quality

Groundwater salinity is stable in the regional aquifer over the monitoring period. In the shallow aquifer there is evidence suggesting that since 1997 groundwater salinity has been on an upward trend in bores S2 and S5. The increase corresponds to a fall in groundwater levels in these bores and suggests a climatic rather than landuse response.

Metals concentrations in the regional aquifer show no discernible trends.

Nutrient levels in the regional aquifer are stable and well below ANZECC guidelines for stock supply.

In the shallow aquifer nutrient concentrations are higher but still well below guidelines, except for the bore adjacent to the working face which may be collecting leachate or stormwater. Bore S4 exhibits an overall upward trend since 1997. Nutrient concentrations in this bore are not expected to increase further as concentrations in the adjacent leachate dam are similar to or less than those recorded in the bore.

5.3 Recommendations

Targeted monitoring regime is outlined in Table 4.1. Nutrient monitoring in Bore S4 should be continued at the current frequency.

Consider replacing damaged Bore S3 and undertaking minor drainage works at Bore D1.

6 REFERENCES

- ANZECC, 1992. Australian Water Quality Guidelines for Fresh and Marine Waters.
- Coffey Partners, 1994. Geotechnical Investigation and Raising Proposal Dam D, Delaney's Quarry Maryvale, NSW. Report No M2703/1-AH, November 1994.
- Degeling P, 1977. Wagga Wagga 1:250 000 Metallogenic Map. Sheet SI55-15. Geological Survey New South Wales; Sydney.
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- DLWC (Department of Land and Water Resources), 2000. Eastern Murray Groundwater Study. Published report prepared by Nimal Kulatunga and Stuart Lucas of the DLWC on behalf of Salt Action, Eastern Murray Landholders, Landcare Co-ordinators and the Murray Catchment Management Committee. October 2000.
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- GHD, 1993. Delaney's Quarry Hydrogeological Assessment Report. Australian Newsprint Mills Limited. May 1993.
- GHD, 1995. Proposed Second Mainland Paper Machine at Albury, NSW. Environmental Impact Statement. Australian Newsprint Mills, November 1995.
- Nolan-ITU, 1999. Albury Newsprint Mill Status Review of Ettamogah Irrigation Scheme – Groundwater. Fletcher Challenge Paper Australia. August 1999.

7 REPORT LIMITATIONS

This report has been prepared in accordance with an agreement between Norske Skog Paper Mills (Australia) and Nolan-ITU.

The services performed by Nolan-ITU have been conducted in a manner consistent with the level of quality and skill generally exercised by members of its profession and consulting practices.

This report is solely for the use of Norske Skog Paper Mills (Australia) and any reliance of this report by third parties shall be at such party's sole risk and may not contain sufficient information for purposes of other parties or for other uses. This report shall only be presented in full and may not be used to support any other objectives than those set out in the report, except where written approval with comments are provided by Nolan-ITU.

No warranty or guarantee of site conditions is intended. The information in this report is considered to be accurate at the date of issue in accordance to the current conditions on the site. Subsurface conditions can vary across a particular site, which cannot be explicitly defined by investigation. Therefore, it is unlikely that the results and estimations expressed in this report will represent the extremes of conditions within the site. Subsurface conditions including contaminant concentrations can change in a limited period of time. This should be considered if the report is to be used after a significant delay in time



Appendix A

Bore Details

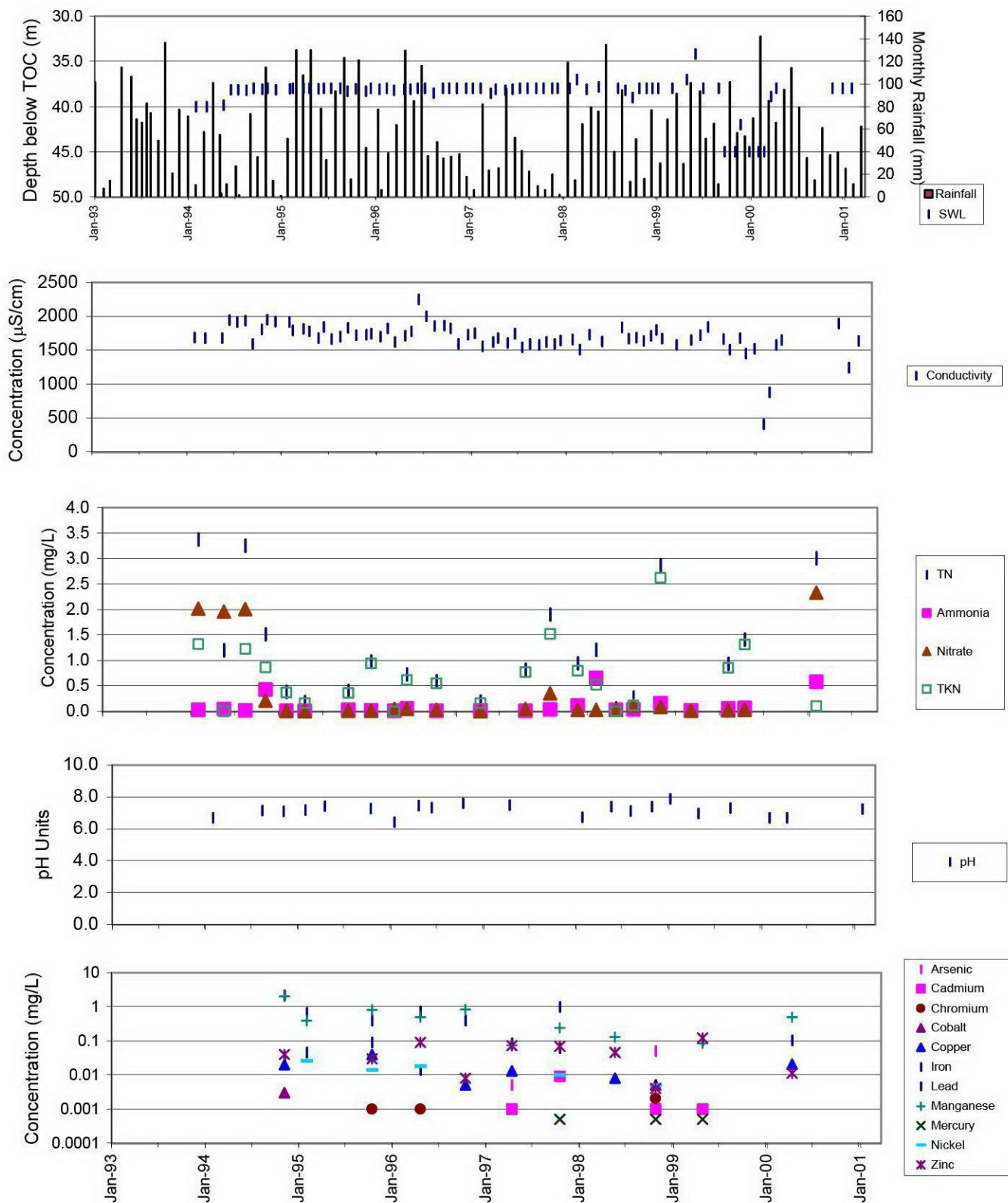
Table A1: Borehole Details

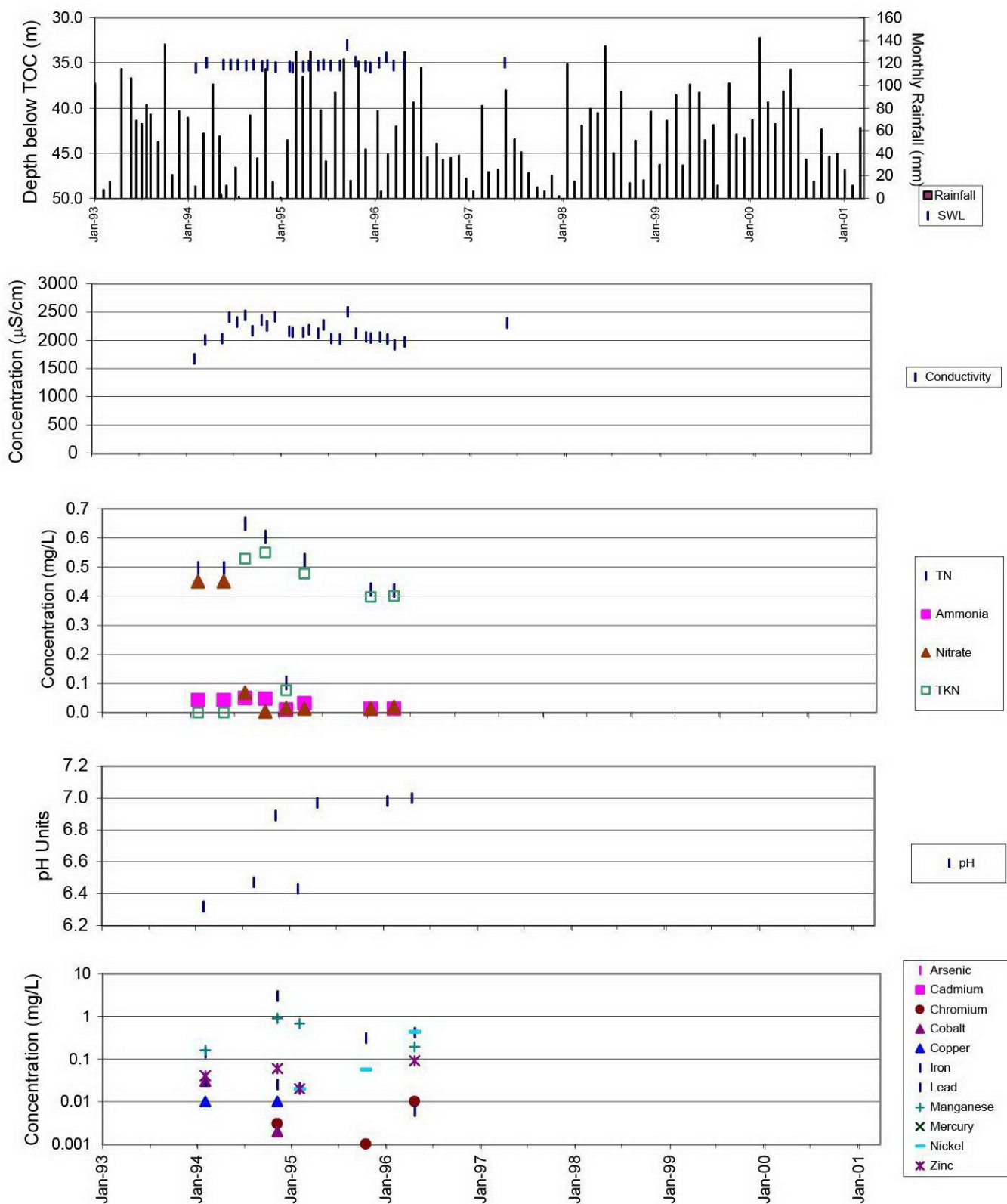
Bore	Construction Date	Easting	Northing	Elevation (mAHD)		Depth (m)	Screen Interval (m)
				Ground Surface	TOC		
S1	14-18/12/92	296459	1016370	324.74	325.15	10	7-10
S2	14-18/12/92	296342	1016312	314.30	314.77	10	7-10
S3	14-18/12/92	296386	1016326	317.11	317.66	20	14-20
S4	14-18/12/92	296364	1016518	313.11	313.56	10	7-10
S5	14-18/12/92	296284	1016658	304.00	304.50	10	7-10
D1	14-18/12/92	296608	1016300	344.32	345.32	130	124-130
D2	14-18/12/92	296293	1016346	315.79	317.13	103	85-103

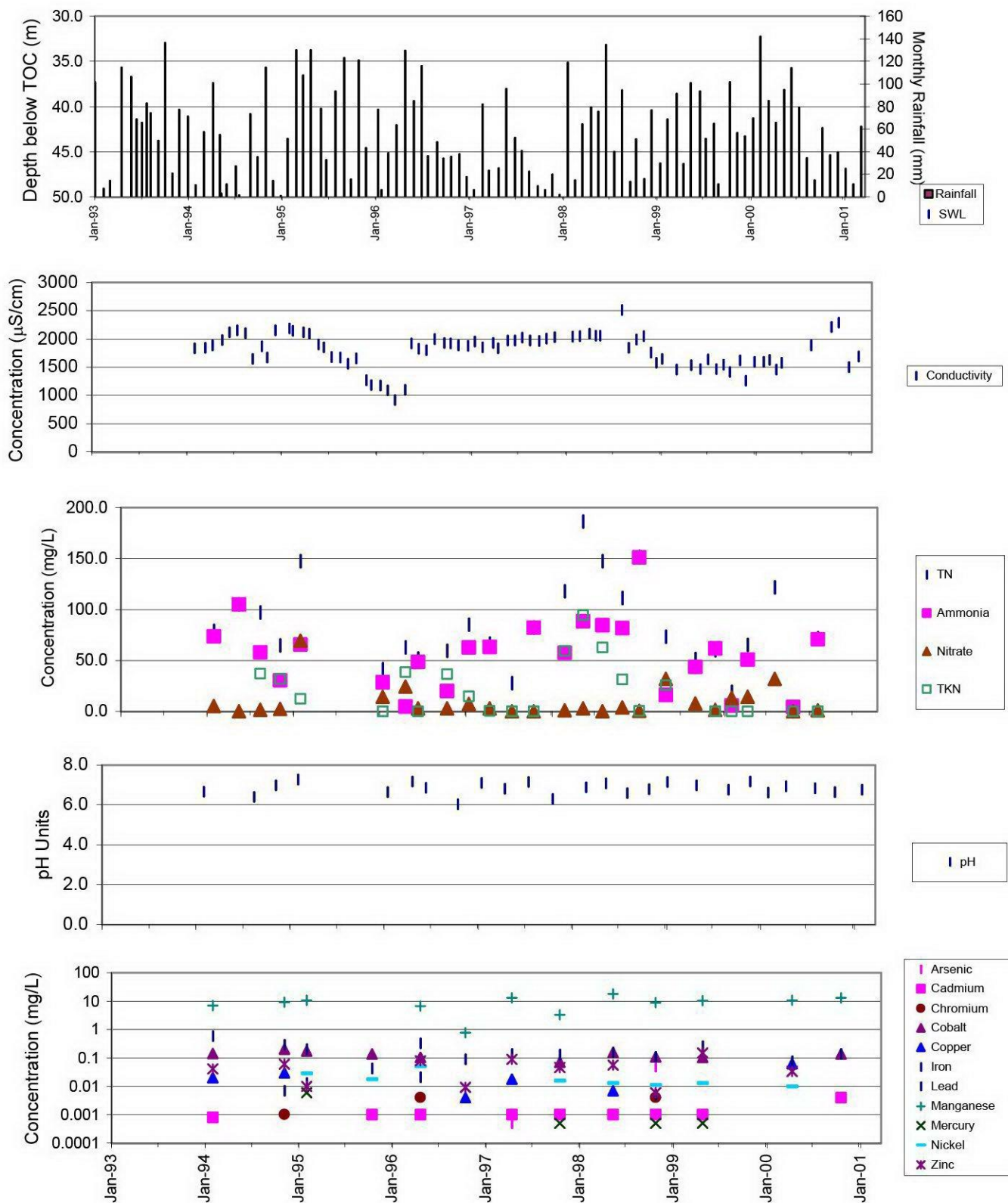


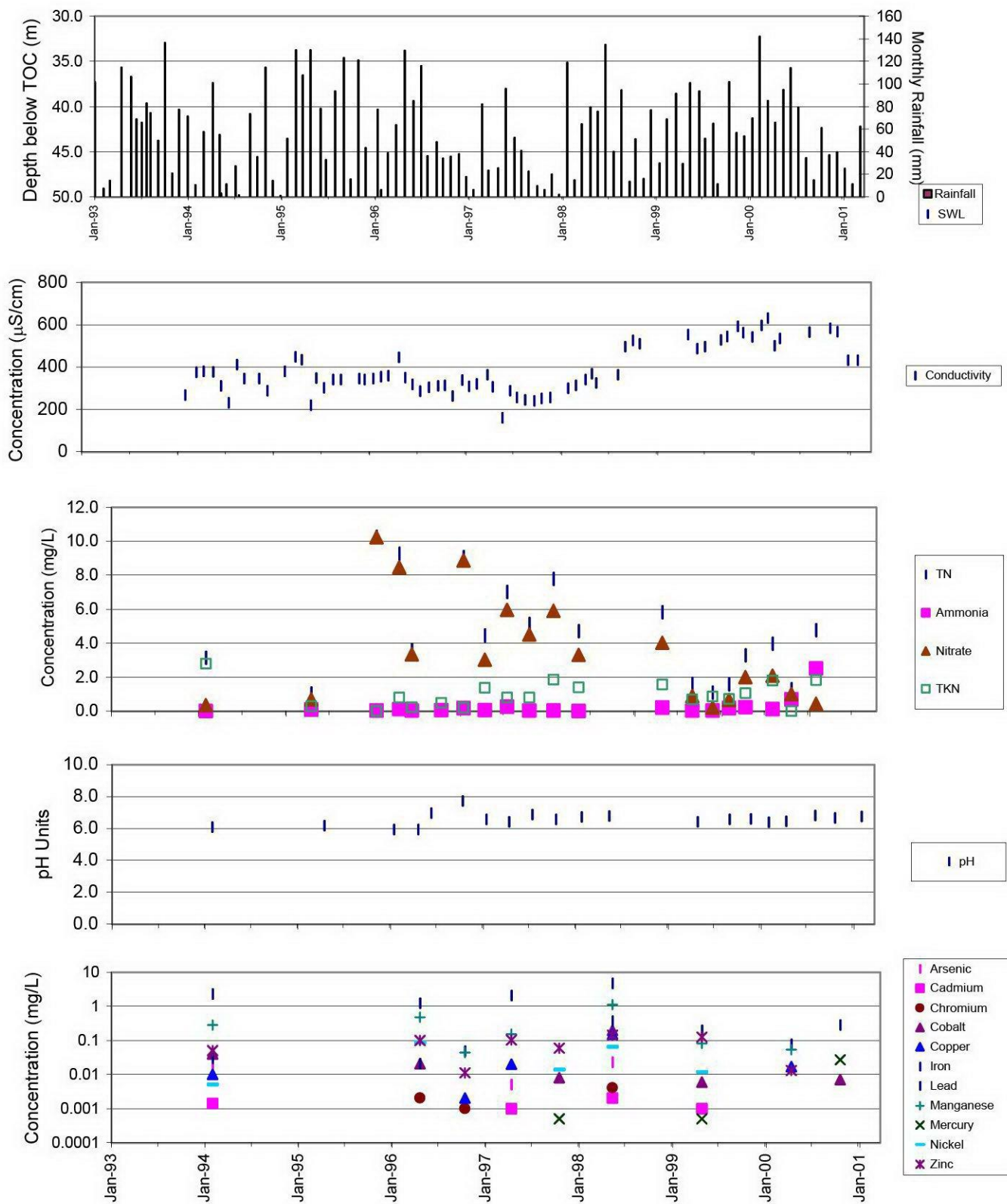
Appendix B

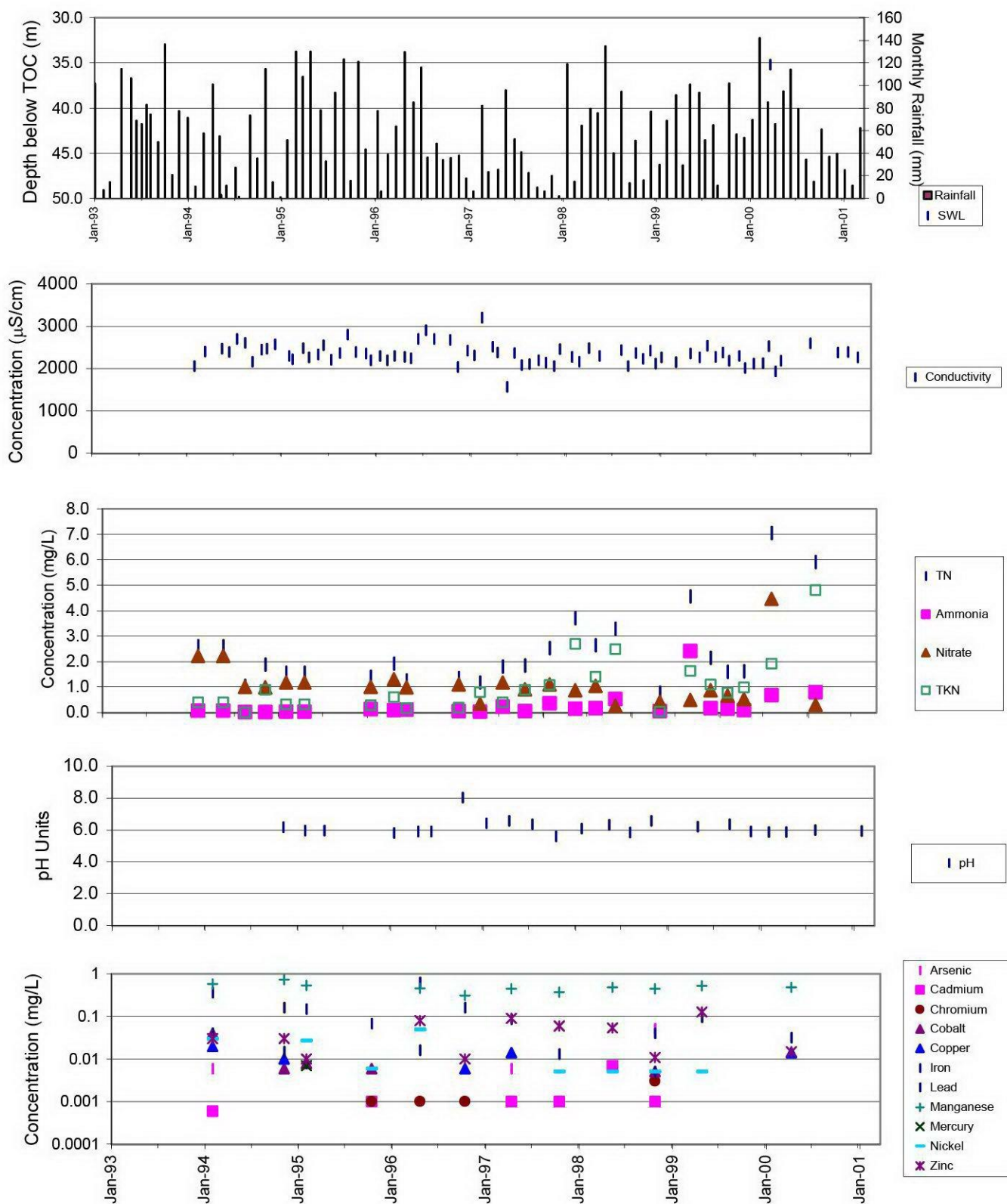
Groundwater Levels and Chemistry

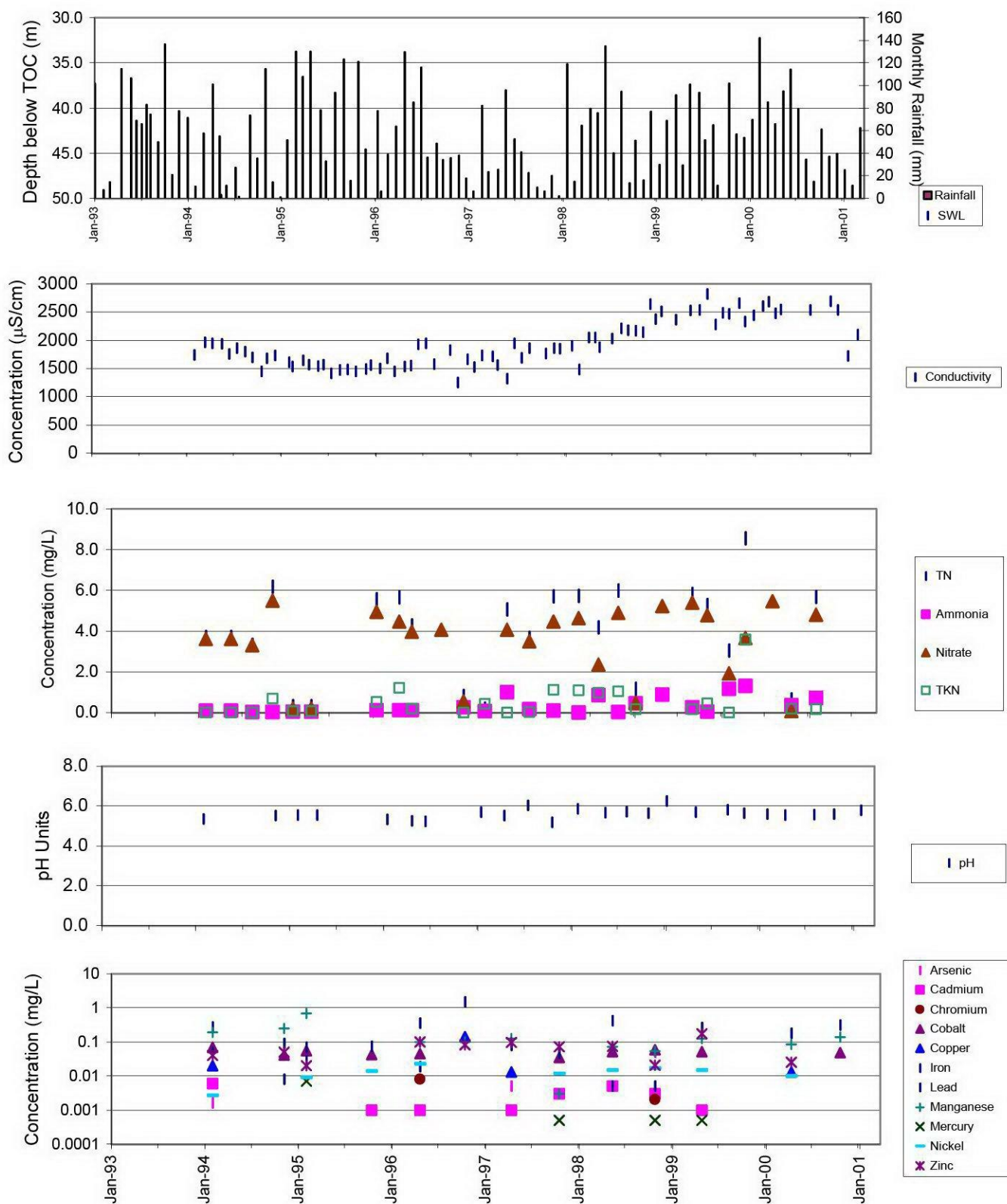














Appendix C

Licence and Consent Conditions

C1 Compliance with Conditions

C1 Conditions of Consent

Consent Conditions were presented in the Environmental Planning and Assessment Act 1979 “Determination of a Development Application Pursuant to Sections 89(1) and 101(8)”, 12 October 1992.

Sections and clauses relevant to groundwater are as follows:

Condition 18.1: This condition requires that a groundwater monitoring strategy for Delaney’s Quarry be submitted within three months of issue of this consent.

To our knowledge this condition has been complied with.

Condition 18.2: This relates to the required number of monitoring bores, monitoring requirements, and a contingency plan to mitigate potential adverse impacts on groundwater.

To our knowledge this condition has been complied with, although currently there is one deep bore and four shallow bores remaining. Other bores were either destroyed or are faulty or dry.

Condition 18.3: This relates to the requirement to revise the groundwater monitoring strategy in negotiation with DLWC and EPA after consideration of the monitoring results.

Negotiation with the DLWC and EPA has not been undertaken to date.

Condition 18.4: This requires that all monitoring piezometers be licensed under Part V of the Water Act with one licence for each site.

To our knowledge this has been undertaken.

Condition 18.5: This requires annual submission of an interpreted report on the groundwater monitoring.

A subset of groundwater monitoring results with periodic interpretation has been submitted to regulators as part of the company’s annual environmental compliance report.

Condition 18.6: This requires testing to be undertaken at a laboratory approved by the EPA.

To our knowledge chemical analyses have been undertaken at an approved laboratory using NSW EPA laboratory standards.

Condition 18.7: This condition requires that all monitoring piezometers, if not already installed, be installed within 3 months of approval of the groundwater monitoring strategies outlined in condition 18.2.

This has been undertaken.

Condition 18.8: This condition states that in the event that a watertable rise in either the shallow or deep piezometers exceed an average 20 cm per year rise over a five year period of record (or part thereof for the first five years) the applicant shall undertake investigations to determine the cause. If the cause of the rise is found to be the irrigation scheme, the applicant shall implement the recommendations of the Department of Water Resources.

Negligible or no rises in the regional watertable have occurred.

Condition 18.9: This condition states that if the regional aquifer system water quality exceeds 1 500 mg/L total salts, or if the salinity is already above 1 200 mg/L and there is a rise of 20%, the Department of Water Resources and EPA shall be notified.

Monitoring data indicates groundwater salinity in the regional aquifer is stable.

Section 22: This condition requires preparation of an Environmental Management Plan.

To our knowledge an Environmental Management Plan has been prepared and includes a groundwater component.

C2 Licence Conditions (EPA licence 000412 Solid Waste Disposal Delaney's QUARRY.

No EPA licence conditions relating to groundwater monitoring are written into the licence.

CERTIFICATE OF ANALYSIS

Batch No:	16-24570	Page	Page 1 of 3
Final Report	560061	Laboratory	Scoresby Laboratory
Client:	Albury City Council	Address	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Contact:	Robyn Cirulis	Phone	03 8756 8000
Address:	Waterview Laboratory PO Box 323 ALBURY NSW 2640	Fax	03 9763 1862
		Contact:	Linna Truong Client Manager Linna.Truong@aisglobal.com
PO No:	18062016-02	Date Sampled:	18-May-2016
Sampler Name:	Norske Skog	Date Samples Received:	19-May-2016
ALS Program Ref:	ALBURY	Date Issued:	25-May-2016
Program Description:	Miscellaneous Samples from Albury Council		
Client Ref:	EMP 18 / 21 / 22 / 30		

The sample(s) referred to in this report were analysed by the following method(s) under NATA Accreditation No. 992. The hash (#) below indicates methods not covered by NATA accreditation in the performance of this service.

Analysis	Method	Laboratory	Analysis	Method	Laboratory
Alg. Count	MB010	Scoresby	Alg. ScCnt	MB006	Scoresby
Alkalinity	CM060 A	Scoresby	EC	CM060 C	Scoresby
MS Total Metals	CM050 C	Scoresby	TCN	CM019	Scoresby
NH3 as N (DA)	EK055G WRG	Scoresby	NO2-N	EK057G	Scoresby
NO3-N	EK058GV	Scoresby	GES Scan	CM060 D (Si not NATA); EA065-69	Scoresby
pH	CM060 B	Scoresby	TDS at 180°C +/- 5°C	EA015WRG	Scoresby
SO4 DA	ED041GWRG	Scoresby	TKN/TP (HL)	CM009	Scoresby
Turbidity	CM013	Scoresby			

Result for pH in water tested in the laboratory may be indicative only as holding time is generally not achievable.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Signatories

These results have been electronically signed by the authorised signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11

Name	Title	Name	Title
Chatura Perera	Team Leader Nutrients	Hoa Nguyen	Analyst
Joseph De Alwis	Analyst	John Earl	Team Leader Metals
Kumar Eliezer	Manager Botany		

Samples not collected by ALS and are tested as received.

Soil results expressed in mg/kg dry weight unless specified otherwise. Microbiological testing was commenced on the day of receipt and within 24 hours of sampling unless otherwise stated.
 MM524: Plate count results <10 per mL and >300 per mL are deemed as approximate.
 MM526: Plate count results <2,500 per mL and >250,000 per mL are deemed as approximate.
 Calculated results are based on raw data.

Page: Page 2 of 3
 Batch No: 16-24570
 Report Number: 560051
 Client: Albury City Council
 ALS Program Ref: ALBURY
 Program Description: Miscellaneous Samples from Albury Council



Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
4775622	16-1218	[REDACTED]	WATER	18/05/16
4775623	16-1219	[REDACTED]	WATER	18/05/16
4775624	16-1220	[REDACTED]	WATER	18/05/16
4775625	16-1221	[REDACTED]	WATER	18/05/16

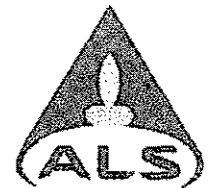
Analysis - Analyte		Sample No. Site Code Units	4775622	4775623	4775624	4775625
pH - pH, units	Units		[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
TKN/TP (HL) - Total Kjeldahl Nitrogen as N	mg N / L		[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
TKN/TP (HL) - Phosphorus, total as P	mg P / L		[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
TDS at 180°C +/- 5°C - Total Dissolved Solids	mg/L		[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
EC - Electrical Conductivity @ 25C	uS/cm		[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Turbidity - Turbidity, NTU	NTU		[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
SO4 DA - Sulphate, as SO4	mg/L		[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Alkalinity - Bicarbonate Alkalinity as CaCO3	mg CaCO3 / L		[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
TCN - Total Nitrogen as N (Calc)	mg/L		[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
NH3 as N (DA) - Ammonia, as N	mg N / L		[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
NO3-N - Nitrate, as N	mg N / L		[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
NO2-N - Nitrite, as N	mg N / L		[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
OES Scan - Calcium	mg/L		[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
OES Scan - Magnesium	mg/L		[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
OES Scan - Potassium	mg/L		[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
OES Scan - Sodium	mg/L		[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
OES Scan - Zinc	mg/L		[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Alg. Count - Algal Count			[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Alg. ScCnt - Algal analyses			[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

IND Reported independently on separate report

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
4775626	16-1222	[REDACTED]	WATER	18/05/16
4775627	16-1223	[REDACTED]	WATER	18/05/16
4775628	16-1224	[REDACTED]	WATER	18/05/16
4775629	16-1225	[REDACTED]	WATER	18/05/16

Analysis - Analyte		Sample No. Site Code Units	4775626	4775627	4775628	4775629
pH - pH, units	Units		[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
EC - Electrical Conductivity @ 25C	uS/cm		[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Page: Page 3 of 3
 Batch No: 16-24570
 Report Number: 560081
 Client: Albury City Council
 ALS Program Ref: ALBURY
 Program Description: Miscellaneous Samples from Albury Council



Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
4775630		16-1226 - [REDACTED]	WATER	18/05/16
4775631		16-1227 - EMP30 54	WATER	18/05/16

Analysis - Analyte	Sample No. Site Code Units	4775630	4775631
pH - pH, units	Units	[REDACTED]	6.4
TKN/TP (H ₂) - Total Kjeldahl Nitrogen as N	mg N / L	[REDACTED]	2.2
TDS at 180°C +/- 5°C - Total Dissolved Solids	mg/L	[REDACTED]	960
EC - Electrical Conductivity @ 25C	uS/cm	[REDACTED]	1800
TCN - Total Nitrogen as N (Calc)	mg/L	[REDACTED]	2.3
NH3 as N (DA) - Ammonia, as N	mg N / L	[REDACTED]	0.4
NO3-N - Nitrate, as N	mg N / L	[REDACTED]	0.16
NO2-N - Nitrite, as N	mg N / L	[REDACTED]	<0.01
MS Total Metals - Arsenic	mg/L	[REDACTED]	0.006
MS Total Metals - Cadmium	mg/L	[REDACTED]	<0.0002
MS Total Metals - Chromium	mg/L	[REDACTED]	0.027
MS Total Metals - Cobalt	mg/L	[REDACTED]	0.007
MS Total Metals - Copper	mg/L	[REDACTED]	0.035
MS Total Metals - Iron	mg/L	[REDACTED]	8.6
MS Total Metals - Lead	mg/L	[REDACTED]	0.026
MS Total Metals - Manganese	mg/L	[REDACTED]	0.39
MS Total Metals - Mercury	mg/L	[REDACTED]	<0.0001
MS Total Metals - Nickel	mg/L	[REDACTED]	0.017
MS Total Metals - Zinc	mg/L	[REDACTED]	0.078

A blank space indicates no test performed.

CERTIFICATE OF ANALYSIS

Batch No:	16-40479	Page	Page 1 of 7
Replacement Report	578803	Laboratory	Scoresby Laboratory
This report replaces Report Number:	578600	Address	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Client:	Albury City Council	Phone	03 8756 8000
Contact:	Robyn Cirulls	Fax	03 9763 1862
Address:	Waterview Laboratory PO Box 323 ALBURY NSW 2640	Contact:	Linna Truong Client Manager Linna.Truong@alsglobal.com
PO No:	30082016-02	Date Sampled:	30-Aug-2016
Sampler Name:		Date Samples Received:	31-Aug-2016
ALS Program Ref:	ALBURY	Date Issued:	08-Sep-2016
Program Description:	Miscellaneous Samples from Albury Council		
Client Ref:	EMP 22/24/31/20/21/18		

The sample(s) referred to in this report were analysed by the following method(s) under NATA Accreditation No. 992. The hash (#) below indicates methods not covered by NATA accreditation in the performance of this service.

Analysis	Method	Laboratory	Analysis	Method	Laboratory
Alg. Count	MB010	Scoresby	Alg. ScCnt	MB006	Scoresby
Alkalinity	CM060 A	Scoresby	EC	CM060 C	Scoresby
MS Total Metals	CM050 C	Scoresby	TCN	CM019	Scoresby
NH3 as N (DA)	EK055G WRG	Scoresby	NO2-N	EK057G	Scoresby
NO3-N	EK058GV	Scoresby	NOX as N (DA)	EK058GV & 059GV	Scoresby
OES Scan	CM050 D (SI not NATA); EA065-69	Scoresby	pH	CM060 B	Scoresby
TDS at 180°C +/- 5°C	EA015WRG	Scoresby	SO4 DA	ED041GWRG	Scoresby
TKN/TP (HL)	CM009	Scoresby	Turbidity	CM013	Scoresby

Result for pH in water tested in the laboratory may be indicative only as holding time is generally not achievable.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Please note that this is an amended report replacing the one originally sent on 7/9/16. Site descriptions have been included in this amended report. The amendments were made by L. Truong on 8/9/16.

Signatories

These results have been electronically signed by the authorised signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11

Name	Title	Name	Title
Hoa Nguyen	Analyst	Joseph De Alwis	Analyst
John Earl	Team Leader Metals	Kirsten Mudie	Team Leader Biology



NATA Accredited
Laboratory No. 992
Accredited for compliance
with ISO/IEC 17025
- Testing

Samples not collected by ALS and are tested as received.

Soil results expressed in mg/kg dry weight unless specified otherwise. Microbiological testing was commenced on the day of receipt and within 24 hours of sampling unless otherwise stated.
MMS24: Plate count results <10 per mL and >300 per mL are deemed as approximate.
MMS26: Plate count results <2,500 per mL and >250,000 per mL are deemed as approximate.
Calculated results are based on raw data.

Page: Page 2 of 7
 Batch No: 16-40479
 Report Number: 578803
 Client: Albury City Council
 ALS Program Ref: ALBURY
 Program Description: Miscellaneous Samples from Albury Council



Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
4901031		16-2090 [REDACTED]	WATER	30/08/16
4901032		16-2091 [REDACTED]	WATER	30/08/16
4901033		16-2092 [REDACTED]	WATER	30/08/16
4901034		16-2093 [REDACTED]	WATER	30/08/16

Analysis - Analyte		Sample No. Site Code Units	4901031	4901032	4901033	4901034
TKN/TP (HL) - Total Kjeldahl Nitrogen as N		mg N / L	0.2	0.2	0.4	4.2
TKN/TP (HL) - Phosphorus, total as P		mg P / L	0.17	0.05	0.06	0.06
TDS at 180°C +/- 5°C - Total Dissolved Solids		mg/L	510	1700	3800	360
TCN - Total Nitrogen as N (Calc)		mg/L	0.3	0.2	8.0	4.3
NOX as N (DA) - Nitrate + Nitrite, as N		mg N / L	0.07	0.03	7.5	0.06
NO3-N - Nitrate, as N		mg N / L	0.06	0.03	7.5	0.06
NO2-N - Nitrite, as N		mg N / L	<0.01	<0.01	<0.01	<0.01

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
4901035		16-2094 [REDACTED]	WATER	30/08/16
4901036		16-2095 [REDACTED]	WATER	30/08/16
4901037		16-2096 [REDACTED]	WATER	30/08/16
4901038		16-2097 [REDACTED]	WATER	30/08/16

Analysis - Analyte		Sample No. Site Code Units	4901035	4901036	4901037	4901038
TKN/TP (HL) - Total Kjeldahl Nitrogen as N		mg N / L	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
TKN/TP (HL) - Phosphorus, total as P		mg P / L	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
TDS at 180°C +/- 5°C - Total Dissolved Solids		mg/L	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
TCN - Total Nitrogen as N (Calc)		mg/L	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
NOX as N (DA) - Nitrate + Nitrite, as N		mg N / L	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
NO3-N - Nitrate, as N		mg N / L	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
NO2-N - Nitrite, as N		mg N / L	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Page: Page 3 of 7
 Batch No: 16-40478
 Report Number: 578803
 Client: Albury City Council
 ALS Program Ref: ALBURY
 Program Description: Miscellaneous Samples from Albury Council



Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
4901039		16-2098 [REDACTED]	WATER	30/08/16
4901040		16-2102 - EMP31 S1	WATER	30/08/16
4901041		16-2103 - EMP31 S2	WATER	30/08/16
4901042		16-2104 - EMP31 S4	WATER	30/08/16

Analysis - Analyte		Sample No. Site Code Units	4901039	4901040	4901041	4901042
pH - pH, units	Units		[REDACTED]	7.1	7.3	6.2
TKN/TP (HL) - Total Kjeldahl Nitrogen as N	mg N / L		[REDACTED]	330	6.2	15
TKN/TP (HL) - Phosphorus, total as P	mg P / L		[REDACTED]			
TDS at 190°C +/- 5°C - Total Dissolved Solids	mg/L		[REDACTED]	2200	1200	930
EC - Electrical Conductivity @ 25C	uS/cm		[REDACTED]	5000	1800	1800
TCN - Total Nitrogen as N (Calc)	mg/L		[REDACTED]	330	9.2	15
NH3 as N (DA) - Ammonia, as N	mg N / L		[REDACTED]	330	1.1	7.8
NOX as N (DA) - Nitrate + Nitrite, as N	mg N / L		[REDACTED]			
NO3-N - Nitrate, as N	mg N / L		[REDACTED]	0.65	3.0	0.44
NO2-N - Nitrite, as N	mg N / L		[REDACTED]	0.09	0.02	0.02
MS Total Metals - Arsenic	mg/L		[REDACTED]	0.024	0.010	0.006
MS Total Metals - Cadmium	mg/L		[REDACTED]	0.0005	<0.0002	0.0002
MS Total Metals - Chromium	mg/L		[REDACTED]	0.006	0.001	0.006
MS Total Metals - Cobalt	mg/L		[REDACTED]	0.29	0.014	0.006
MS Total Metals - Copper	mg/L		[REDACTED]	0.053	0.064	0.062
MS Total Metals - Iron	mg/L		[REDACTED]	40	0.77	4.4
MS Total Metals - Lead	mg/L		[REDACTED]	0.009	0.004	0.034
MS Total Metals - Manganese	mg/L		[REDACTED]	13	0.076	0.67
MS Total Metals - Mercury	mg/L		[REDACTED]	<0.0001	<0.0001	<0.0001
MS Total Metals - Nickel	mg/L		[REDACTED]	0.052	0.039	0.008
MS Total Metals - Zinc	mg/L		[REDACTED]	0.066	0.042	0.16

Page: Page 4 of 7
 Batch No: 16-40479
 Report Number: 578803
 Client: Albury City Council
 ALS Program Ref: ALBURY
 Program Description: Miscellaneous Samples from Albury Council



Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
4901043		16-2105 - EMP31 S5	WATER	30/08/16
4901044		16-2106 - EMP31 D1	WATER	30/08/16
4901045		16-2107 - EMP31 DAM A	WATER	30/08/16
4901046		16-2108 - EMP31 DAM B	WATER	30/08/16

Analysis - Analysis	Sample No. Site Code Units	4901043	4901044	4901045	4901046
pH - pH, units	Units	6.1	7.5	8.3	8.6
TKN/TP (HL) - Total Kjeldahl Nitrogen as N	mg N / L	21	0.4	57	1.0
TDS at 180°C +/- 5°C - Total Dissolved Solids	mg/L	570	1100	2600	260
EC - Electrical Conductivity @ 25C	uS/cm	1100	1900	3000	450
TCN - Total Nitrogen as N (Calc)	mg/L	21	0.9	100	1.1
NH3 as N (DA) - Ammonia, as N	mg N / L	7.0	<0.1	2.3	<0.1
NO3-N - Nitrate, as N	mg N / L	0.08	0.48	41	<0.01
NO2-N - Nitrite, as N	mg N / L	<0.01	<0.01	1.9	0.03
MS Total Metals - Arsenic	mg/L	0.022	0.004	0.012	0.002
MS Total Metals - Cadmium	mg/L	0.0005	<0.0002	0.0003	<0.0002
MS Total Metals - Chromium	mg/L	0.008	<0.001	0.002	<0.001
MS Total Metals - Cobalt	mg/L	0.030	0.004	0.028	0.003
MS Total Metals - Copper	mg/L	0.061	0.019	0.042	0.003
MS Total Metals - Iron	mg/L	15	2.3	0.95	0.20
MS Total Metals - Lead	mg/L	0.017	<0.001	<0.001	<0.001
MS Total Metals - Manganese	mg/L	0.18	4.0	0.26	0.015
MS Total Metals - Mercury	mg/L	<0.0001	<0.0001	<0.0001	<0.0001
MS Total Metals - Nickel	mg/L	0.010	<0.001	0.048	<0.001
MS Total Metals - Zinc	mg/L	0.21	0.005	0.035	0.004

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 Batch No: 16-40479
 Report Number: 578803
 Client: Albury City Council
 ALS Program Ref: ALBURY
 Program Description: Miscellaneous Samples from Albury Council



Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
4901048		16-2109 - EMP31 DAM D	WATER	30/08/16
4901049		16-2110 - EMP31 SANDY CREEK	WATER	30/08/16
4901050		16-2113 [REDACTED]	WATER	30/08/16
4901051		16-2114 [REDACTED]	WATER	30/08/16

Sample No. Site Code Units		4901048	4901049	4901050	4901051
Analysis - Analyte					
pH - pH, units	Units	6.8	7.1	[REDACTED]	[REDACTED]
TKN/TP (HL) - Total Kjeldahl Nitrogen as N	mg N / L	3.1	1.0	[REDACTED]	[REDACTED]
TKN/TP (HL) - Phosphorus, total as P	mg P / L			[REDACTED]	[REDACTED]
TDS at 180°C +/- 5°C - Total Dissolved Solids	mg/L	400	180	[REDACTED]	[REDACTED]
EC - Electrical Conductivity @ 25C	uS/cm	620	190	[REDACTED]	[REDACTED]
Turbidity - Turbidity, NTU	NTU			[REDACTED]	[REDACTED]
TCN - Total Nitrogen as N (Calc)	mg/L	6.0	1.6	[REDACTED]	[REDACTED]
NH3 as N (DA) - Ammonia, as N	mg N / L	<0.1	<0.1	[REDACTED]	[REDACTED]
NO3-N - Nitrate, as N	mg N / L	2.9	0.64	[REDACTED]	[REDACTED]
NO2-N - Nitrite, as N	mg N / L	0.07	<0.01	[REDACTED]	[REDACTED]
MS Total Metals - Arsenic	mg/L	0.002	0.002	[REDACTED]	[REDACTED]
MS Total Metals - Cadmium	mg/L	<0.0002	<0.0002	[REDACTED]	[REDACTED]
MS Total Metals - Chromium	mg/L	<0.001	0.003	[REDACTED]	[REDACTED]
MS Total Metals - Cobalt	mg/L	0.004	0.005	[REDACTED]	[REDACTED]
MS Total Metals - Copper	mg/L	0.004	0.005	[REDACTED]	[REDACTED]
MS Total Metals - Iron	mg/L	0.23	5.9	[REDACTED]	[REDACTED]
MS Total Metals - Lead	mg/L	0.002	0.002	[REDACTED]	[REDACTED]
MS Total Metals - Manganese	mg/L	0.020	0.28	[REDACTED]	[REDACTED]
MS Total Metals - Mercury	mg/L	<0.0001	<0.0001	[REDACTED]	[REDACTED]
MS Total Metals - Nickel	mg/L	<0.001	<0.001	[REDACTED]	[REDACTED]
MS Total Metals - Zinc	mg/L	0.003	0.011	[REDACTED]	[REDACTED]

CERTIFICATE OF ANALYSIS

Batch No:	16-52513	Page	Page 1 of 2
Final Report	594115	Laboratory	Scoresby Laboratory
Client:	Albury City Council	Address	Caribbean Business Park, 22 Daimore Drive, Scoresby, VIC 3179
Contact:	Robyn Cirulis	Phone	03 8756 8000
Address:	Waterview Laboratory PO Box 323 ALBURY NSW 2640	Fax	03 9763 1862
		Contact:	Linna Truong Client Manager Linna.Truong@alsglobal.com
PO No:	17112016-1	Date Sampled:	16-Nov-2016
Sampler Name:	Norske Skog	Date Samples Received:	18-Nov-2016
ALS Program Ref:	ALBURY	Date Issued:	29-Nov-2016
Program Description:	Miscellaneous Samples from Albury Council		
Client Ref:	EMP 18 / 21 / 30		

The sample(s) referred to in this report were analysed by the following method(s) under NATA Accreditation No. 992. The hash (#) below indicates methods not covered by NATA accreditation in the performance of this service.

Analysis	Method	Laboratory	Analysis	Method	Laboratory
Alg. Count	MB010	Scoresby	Alg. SoCnt	MB006	Scoresby
MS Total Metals	CM050 C	Scoresby	TCN	CM019	Scoresby
NH3 as N (DA)	EK056G WRG	Scoresby	NOX as N (DA)	EK058GV & 059GV	Scoresby
OES Scan	CM050 D (Si not NATA); EAD65-69	Scoresby	TKN/TP (HL)	CM009	Scoresby

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Signatories

These results have been electronically signed by the authorised signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11

Name	Title	Name	Title
Chatura Perera	Team Leader Nutrients	Hoa Nguyen	Analyst
John Earl	Team Leader Metals	John Levvey	Principal Trace Metals Chemist
Lisa Synnott	Biologist	Melani Wijayasiri	Analyst



NATA Accredited
Laboratory No. 992
Accredited for compliance
with ISO/IEC 17025
- Testing

Samples not collected by ALS and are tested as received.

Soil results expressed in mg/kg dry weight unless specified otherwise. Microbiological testing was commenced on the day of receipt and within 24 hours of sampling unless otherwise stated.
MM524: Plate count results <10 per mL and >300 per mL are deemed as approximate.
MM526: Plate count results <2,500 per mL and >250,000 per mL are deemed as approximate.
Calculated results are based on raw data.

Page: Page 2 of 2
 Batch No: 16-52513
 Report Number: 594115
 Client: Albury City Council
 ALS Program Ref: ALBURY
 Program Description: Miscellaneous Samples from Albury Council



Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
4995937		16/0404-1	WATER	16/11/16
4995938		16/0404-2	WATER	16/11/16
4995939		16/0404-3	WATER	16/11/16
4995940		16/0404-4	WATER	16/11/16

Analysis - Analyte		Sample No. Site Code Units	4995937	4995938	4995939	4995940
TKN/TP (HL) - Total Kjeldahl Nitrogen as N	mg N / L					
TKN/TP (HL) - Phosphorus, total as P	mg P / L					
TCN - Total Nitrogen as N (Calc)	mg/L					
NH3 as N (DA) - Ammonia, as N	mg N / L					
NOX as N (DA) - Nitrate + Nitrite, as N	mg N / L					
OES Scan - Calcium	mg/L					
OES Scan - Magnesium	mg/L					
OES Scan - Potassium	mg/L					
OES Scan - Sodium	mg/L					
OES Scan - Zinc	mg/L					
OES Scan - Sulphur	mg/L					
OES Scan - Sulphur, as Sulphate	mg/L					
Alg. Count - Algal Count						
Alg. ScCnt - Algal analyses						

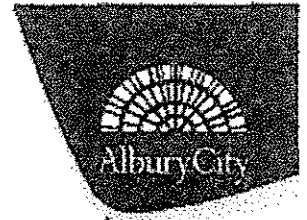
IND Reported independently on separate report

LINT Level of Reporting raised due to interferences in the sample matrix

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
4995941		16/0404-12 - EMP30 S4	WATER	16/11/16

Analysis - Analyte		Sample No. Site Code Units	4995941
TKN/TP (HL) - Total Kjeldahl Nitrogen as N	mg N / L		7.7
TCN - Total Nitrogen as N (Calc)	mg/L		7.9
NH3 as N (DA) - Ammonia, as N	mg N / L		2.9
NOX as N (DA) - Nitrate + Nitrite, as N	mg N / L		0.15
MS Total Metals - Arsenic	mg/L		0.003
MS Total Metals - Cadmium	mg/L		<0.0002
MS Total Metals - Chromium	mg/L		0.006
MS Total Metals - Cobalt	mg/L		0.004
MS Total Metals - Copper	mg/L		0.031
MS Total Metals - Iron	mg/L		2.2
MS Total Metals - Lead	mg/L		0.028
MS Total Metals - Manganese	mg/L		0.43
MS Total Metals - Mercury	mg/L		<0.0001
MS Total Metals - Nickel	mg/L		0.010
MS Total Metals - Zinc	mg/L		0.071

A blank space indicates no test performed.



Certificate of Analysis

Attention: Troy Watkins
Norske Skog
Address: Private Bag
LAVINGTON NSW 2641
Date: 29/11/16
Report Number: 16/0404 Rev. 00

Waterview Laboratory
Howlong Road, Albury, NSW 2640
phone: (02) 6043 5650
email: waterviewlaboratory@alburycity.nsw.gov.au



NATA Accredited Laboratory Number 14214
Accredited for compliance with ISO/IEC 17025.

Sample Reference	Sample Description	Date Sampled	Date Received
16/0404-1	[REDACTED]	16/11/2016	16/11/16
16/0404-2	[REDACTED]	16/11/2016	16/11/16
16/0404-3	[REDACTED]	16/11/2016	16/11/16
16/0404-4	[REDACTED]	16/11/2016	16/11/16
16/0404-5	[REDACTED]	16/11/2016	16/11/16
16/0404-6	[REDACTED]	16/11/2016	16/11/16
16/0404-7	[REDACTED]	16/11/2016	16/11/16
16/0404-8	[REDACTED]	16/11/2016	16/11/16
16/0404-9	[REDACTED]	16/11/2016	16/11/16
16/0404-10	[REDACTED]	16/11/2016	16/11/16
16/0404-11	[REDACTED]	16/11/2016	16/11/16
16/0404-12	Delaney's quarry EMP 30 S4	16/11/2016	16/11/16

Test Description	Method ID	Units	Detection Limit	16/0404-1	16/0404-2	16/0404-3
Electrical conductivity	APHA 2510 B	uS/cm	2	[REDACTED]	[REDACTED]	[REDACTED]
Total dissolved solids	APHA 2540 C	mg/L	2	[REDACTED]	[REDACTED]	[REDACTED]

Test Description	Method ID	Units	Detection Limit	16/0404-4	16/0404-5	16/0404-6
pH	APHA 4500-H+ B			[REDACTED]	[REDACTED]	[REDACTED]
Electrical conductivity	APHA 2510 B	uS/cm	2	[REDACTED]	[REDACTED]	[REDACTED]

Test Description	Method ID	Units	Detection Limit	16/0404-7	16/0404-8	16/0404-9
pH	APHA 4500-H+ B					
Electrical conductivity	APHA 2510 B	uS/cm	2			

Test Description	Method ID	Units	Detection Limit	16/0404-10	16/0404-11	16/0404-12
pH	APHA 4500-H+ B					6.20
Electrical conductivity	APHA 2510 B	uS/cm	2			1,759
Total dissolved solids	APHA 2540 C	mg/L	2			1,018

Comments

Robyn Cirulis, Laboratory Supervisor

R. Cirulis

CERTIFICATE OF ANALYSIS

Batch No:	17-09644	Page	Page 1 of 3
Final Report	610407	Laboratory	Scoresby Laboratory
Client:	Albury City Council	Address	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Contact:	Robyn Cirulis	Phone	03 8756 8000
Address:	Waterview Laboratory PO Box 323 ALBURY NSW 2640	Fax	03 9763 1862
		Contact:	Linna Truong Client Manager Linna.Truong@alsglobal.com
PO No:	15022017-02	Date Sampled:	15-Feb-2017
Sampler Name:	Norske Skog	Date Samples Received:	16-Feb-2017
ALS Program Ref:	ALBURY	Date Issued:	21-Feb-2017
Program Description:	Miscellaneous Samples from Albury Council		
Client Ref:	EMP 18/ 31		

The sample(s) referred to in this report were analysed by the following method(s) under NATA Accreditation No. 992. The hash (#) below indicates methods not covered by NATA accreditation in the performance of this service.

Analysis	Method	Laboratory	Analysis	Method	Laboratory
Alg. Count	MB010	Scoresby	Alg. ScCnt	MB006	Scoresby
Alkalinity	WD037	Scoresby	MS Total Metals	WG020A	Scoresby
TCN	EK062	Scoresby	NH3 as N (DA)	WK055G	Scoresby
NO3-N	EK058GV	Scoresby	NOX as N (DA)	EK058GV & 059GV	Scoresby
OES Scan	WG005A (Si not NATA); EA065-89	Scoresby	SO4 DA	WD041G	Scoresby
TKN/TP (HL)	CM009	Scoresby			

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Signatories

These results have been electronically signed by the authorised signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11

Name	Title	Name	Title
Chatura Perera	Team Leader Nutrients	Hoa Nguyen	Analyst
Joseph De Alwis	Analyst	John Levvey	Principal Trace Metals Chemist
Kirsten Mudie	Team Leader Biology	Melani Wijayasiri	Analyst



Accreditation No. 992
Accredited for compliance with
ISO/IEC 17025 - Testing

Samples not collected by ALS and are tested as received.

Soil results expressed in mg/kg dry weight unless specified otherwise. Microbiological testing was commented on the day of receipt and within 24 hours of sampling unless otherwise stated.
MM524: Plate count results <10 per mL and >300 per mL are deemed as approximate.
MM526: Plate count results <2,500 per mL and >250,000 per mL are deemed as approximate.
Calculated results are based on raw data.

Page: Page 3 of 3
 Batch No: 17-09644
 Report Number: 610407
 Client: Albury City Council
 ALS Program Ref: ALBURY
 Program Description: Miscellaneous Samples from Albury Council



Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
5099535		17/0100-12 - EMP31 DELANEY'S QUARRY S5	WATER	15/02/17
5099536		17/0100-13 - EMP31 DELANEY'S QUARRY DAM A	WATER	15/02/17
5099537		17/0100-14 - EMP31 DELANEY'S QUARRY DAM B	WATER	15/02/17
5099538		17/0100-15 - EMP31 DELANEY'S QUARRY DAM C	WATER	15/02/17

	Sample No. Site Code Units	5099535	5099536	5099537	5099538
Analysis - Analyte					
TKN/TP (HL) - Total Kjeldahl Nitrogen as N	mg N / L	8.9	55	20	16
TCN - Total Nitrogen as N (Calc)	mg/L	11	55	20	16
NH3 as N (DA) - Ammonia, as N	mg N / L	0.7	0.2	0.3	0.2
NOX as N (DA) - Nitrate + Nitrite, as N	mg N / L	2.3	<0.01	<0.01	<0.01
MS Total Metals - Arsenic	mg/L	0.008	0.014	0.022	0.040
MS Total Metals - Cadmium	mg/L	<0.0002	<0.0002	<0.0002	<0.0002
MS Total Metals - Chromium	mg/L	0.009	0.002	<0.001	0.004
MS Total Metals - Cobalt	mg/L	0.012	0.008	0.005	0.006
MS Total Metals - Copper	mg/L	0.037	0.003	0.002	0.005
MS Total Metals - Iron	mg/L	7.8	0.36	0.79	5.3
MS Total Metals - Lead	mg/L	0.009	<0.001	<0.001	0.005
MS Total Metals - Manganese	mg/L	0.078	0.23	0.53	0.39
MS Total Metals - Mercury	mg/L	<0.0001	<0.0001	<0.0001	<0.0001
MS Total Metals - Nickel	mg/L	0.011	0.046	0.021	0.013
MS Total Metals - Zinc	mg/L	0.082	0.039	0.011	0.017
OES Scan - Magnesium	mg/L	14	96	77	26

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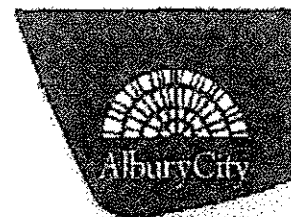
Page: Page 2 of 3
 Batch No: 17-09644
 Report Number: 610407
 Client: Albury City Council
 ALS Program Ref: ALBURY
 Program Description: Miscellaneous Samples from Albury Council



Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
5099531		17/0100-1 [REDACTED]	WATER	15/02/17
5099532		17/0100-9 - EMP31 DELANEY'S QUARRY S1	WATER	15/02/17
5099533		17/0100-10 - EMP31 DELANEY'S QUARRY S2	WATER	15/02/17
5099534		17/0100-11 - EMP31 DELANEY'S QUARRY S4	WATER	15/02/17

Analysis - Analyte	Sample No. Site Code Units	5099531	5099532	5099533	5099534
TKN/TP (HL) - Total Kjeldahl Nitrogen as N	mg N / L	[REDACTED]	280	6.8	3.5
TKN/TP (HL) - Phosphorus, total as P	mg P / L	[REDACTED]			
SO4 DA - Sulphate, as SO4	mg/L	[REDACTED]			
Alkalinity - Bicarbonate Alkalinity as CaCO3	mg CaCO3 / L	[REDACTED]			
TCN - Total Nitrogen as N (Calc)	mg/L	[REDACTED]	310	7.1	3.6
NH3 as N (DA) - Ammonia, as N	mg N / L	[REDACTED]	250	0.4	1.4
NOX as N (DA) - Nitrate + Nitrite, as N	mg N / L	[REDACTED]	26	0.28	0.11
NO3-N - Nitrate, as N	mg N / L	[REDACTED]			
MS Total Metals - Arsenic	mg/L	[REDACTED]	0.009	0.010	0.002
MS Total Metals - Cadmium	mg/L	[REDACTED]	<0.0002	<0.0002	<0.0002
MS Total Metals - Chromium	mg/L	[REDACTED]	0.002	0.007	0.003
MS Total Metals - Cobalt	mg/L	[REDACTED]	0.25	0.034	0.003
MS Total Metals - Copper	mg/L	[REDACTED]	0.020	0.035	0.039
MS Total Metals - Iron	mg/L	[REDACTED]	12	2.0	1.1
MS Total Metals - Lead	mg/L	[REDACTED]	0.005	0.006	0.030
MS Total Metals - Manganese	mg/L	[REDACTED]	11	0.42	0.43
MS Total Metals - Mercury	mg/L	[REDACTED]	0.0001	<0.0001	<0.0001
MS Total Metals - Nickel	mg/L	[REDACTED]	0.041	0.039	0.009
MS Total Metals - Zinc	mg/L	[REDACTED]	0.049	0.040	0.058
OES Scan - Calcium	mg/L	[REDACTED]			
OES Scan - Magnesium	mg/L	[REDACTED]	170	60	21
OES Scan - Potassium	mg/L	[REDACTED]			
OES Scan - Sodium	mg/L	[REDACTED]			
OES Scan - Zinc	mg/L	[REDACTED]			
Alg. Count - Algal Count		[REDACTED]			
Alg. ScCnt - Algal analyses		[REDACTED]			

IND Reported independently on separate report



Certificate of Analysis

Attention: Troy Watkins
Norske Skog
Address: Private Bag
LAVINGTON NSW 2641
Date: 22/02/17
Report Number: 17/0100 Rev. 00

Waterview Laboratory
Howlong Road, Albury, NSW 2640
phone: (02) 6043 5650
email: waterviewlaboratory@alburycity.nsw.gov.au



NATA Accredited Laboratory Number 14214
Accredited for compliance with ISO/IEC 17025.

Sample Reference	Sample Description	Date Sampled	Date Received
17/0100-1	[REDACTED]	15/02/2017	15/02/17
17/0100-2	[REDACTED]	15/02/2017	15/02/17
17/0100-3	[REDACTED]	15/02/2017	15/02/17
17/0100-4	[REDACTED]	15/02/2017	15/02/17
17/0100-5	[REDACTED]	15/02/2017	15/02/17
17/0100-6	[REDACTED]	15/02/2017	15/02/17
17/0100-7	[REDACTED]	15/02/2017	15/02/17
17/0100-8	[REDACTED]	15/02/2017	15/02/17
17/0100-9	EMP 31 Delaney's quarry S1	15/02/2017	15/02/17
17/0100-10	EMP 31 Delaney's quarry S2	15/02/2017	15/02/17
17/0100-11	EMP 31 Delaney's quarry S4	15/02/2017	15/02/17
17/0100-12	EMP 31 Delaney's quarry S5	15/02/2017	15/02/17
17/0100-13	EMP 31 Delaney's quarry DAM A	15/02/2017	15/02/17
17/0100-14	EMP 31 Delaney's quarry DAM B	15/02/2017	15/02/17
17/0100-15	EMP 31 Delaney's quarry DAM D	15/02/2017	15/02/17

Test Description	Method ID	Units	Detection Limit	17/0100-1	17/0100-2	17/0100-3
Total dissolved solids	APHA 2540 C	mg/L	2	[REDACTED]	[REDACTED]	[REDACTED]
pH	APHA 4500-H+ B			[REDACTED]	[REDACTED]	[REDACTED]
Electrical conductivity	APHA 2510 B	uS/cm	2	[REDACTED]	[REDACTED]	[REDACTED]

Test Description	Method ID	Units	Detection Limit	17/0100-4	17/0100-5	17/0100-6
pH	APHA 4500-H+ B					
Electrical conductivity	APHA 2510 B	uS/cm	2			

Test Description	Method ID	Units	Detection Limit	17/0100-7	17/0100-8	17/0100-9
Total dissolved solids	APHA 2540 C	mg/L	2			2,292
pH	APHA 4500-H+ B					6.91
Electrical conductivity	APHA 2510 B	uS/cm	2			4,253

Test Description	Method ID	Units	Detection Limit	17/0100-10	17/0100-11	17/0100-12
Total dissolved solids	APHA 2540 C	mg/L	2	1,566	1,088	556
pH	APHA 4500-H+ B			7.16	6.15	5.95
Electrical conductivity	APHA 2510 B	uS/cm	2	1,919	1,753	882.3

Test Description	Method ID	Units	Detection Limit	17/0100-13	17/0100-14	17/0100-15
Total dissolved solids	APHA 2540 C	mg/L	2	3,228	1,586	900
pH	APHA 4500-H+ B			9.46	8.98	9.33
Electrical conductivity	APHA 2510 B	uS/cm	2	3,067	1,868	989.1

Comments

Robyn Cirulis, Laboratory Supervisor

R. Cirulis

CERTIFICATE OF ANALYSIS

Batch No:	17-23837	Page	Page 1 of 2
Final Report	627130	Laboratory	Scoresby Laboratory
Client:	Albury City Council	Address	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Contact:	Robyn Cirulis	Phone	03 8756 8000
Address:	Waterview Laboratory PO Box 323 ALBURY NSW 2840	Fax	03 9763 1862
		Contact:	Linna Truong Client Manager Linna.Truong@aisglobal.com
PO No:	17052017-01	Date Sampled:	17-May-2017
Sampler Name:		Date Samples Received:	18-May-2017
ALS Program Ref:	ALBURY	Date Issued:	26-May-2017
Program Description:	Miscellaneous Samples from Albury Council		
Client Ref:	EMP 18 / 30		

The sample(s) referred to in this report were analysed by the following method(s) under NATA Accreditation No. 992. The hash (#) below indicates methods not covered by NATA accreditation in the performance of this service.

Analysis	Method	Laboratory	Analysis	Method	Laboratory
Alg. Count	MB010	Scoresby	Alg. ScCnt	MB006	Scoresby
Alkalinity	WD037	Scoresby	MS Total Metals	WG020A	Scoresby
TCN	EK062	Scoresby	NH3 as N (DA)	WK055G	Scoresby
NO3-N	EK058GV	Scoresby	NOX as N (DA)	EK058GV & 059GV	Scoresby
OES Scan	WG005A (Si not NATA); EA065-69	Scoresby	SO4 DA	WD041G	Scoresby
TKN/TP (HL)	CM009	Scoresby			

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Signatories

These results have been electronically signed by the authorised signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11

Name	Title	Name	Title
Chatura Perera	Team Leader Nutrients	John Earl	Team Leader Metals
Kirsten Mudie	Team Leader Biology	Melani Wijayasiri	Analyst

Samples not collected by ALS and are tested as received.

Soil results expressed in mg/kg dry weight unless specified otherwise. Soil microbiological testing was commenced within 48 hours from the day received unless otherwise stated. Water microbiological testing was commenced on the day received and within 24 hours of sampling unless otherwise stated.
MM524: Plate count results <10 per mL and >300 per mL are deemed as approximate.
MM526: Plate count results <2,500 per mL and >250,000 per mL are deemed as approximate.



Page: Page 2 of 2
 Batch No: 17-23837
 Report Number: 627130
 Client: Albury City Council
 ALS Program Ref: ALBURY
 Program Description: Miscellaneous Samples from Albury Council



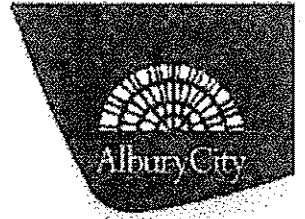
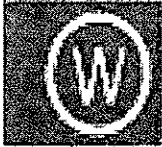
Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
5212595		17/0388- [REDACTED]	WATER	17/05/17
5212596		17/0388-8 EMP 30 S4	WATER	17/05/17

Analysis - Analyte	Sample No. Site Code Units	5212595	5212596
TKN/TP (HL) - Total Kjeldahl Nitrogen as N	mg N / L	[REDACTED]	7.3
TKN/TP (HL) - Phosphorus, total as P	mg P / L	[REDACTED]	
SO4 DA - Sulphate, as SO4	mg/L	[REDACTED]	
Alkalinity - Bicarbonate Alkalinity as CaCO3	mg CaCO3 / L	[REDACTED]	
TCN - Total Nitrogen as N (Calc)	mg/L	[REDACTED]	7.5
NH3 as N (DA) - Ammonia, as N	mg N / L	[REDACTED]	3.7
NOX as N (DA) - Nitrate + Nitrite, as N	mg N / L	[REDACTED]	0.14
NO3-N - Nitrate, as N	mg N / L	[REDACTED]	
MS Total Metals - Arsenic	mg/L	[REDACTED]	0.003
MS Total Metals - Cadmium	mg/L	[REDACTED]	<0.0002
MS Total Metals - Chromium	mg/L	[REDACTED]	<0.001
MS Total Metals - Cobalt	mg/L	[REDACTED]	0.001
MS Total Metals - Copper	mg/L	[REDACTED]	0.002
MS Total Metals - Iron	mg/L	[REDACTED]	0.16
MS Total Metals - Lead	mg/L	[REDACTED]	<0.001
MS Total Metals - Manganese	mg/L	[REDACTED]	0.12
MS Total Metals - Mercury	mg/L	[REDACTED]	<0.0001
MS Total Metals - Nickel	mg/L	[REDACTED]	0.003
MS Total Metals - Zinc	mg/L	[REDACTED]	0.011
OES Scan - Calcium	mg/L	[REDACTED]	
OES Scan - Magnesium	mg/L	[REDACTED]	6.3
OES Scan - Potassium	mg/L	[REDACTED]	
OES Scan - Sodium	mg/L	[REDACTED]	
OES Scan - Zinc	mg/L	[REDACTED]	
Alg. Count - Algal Count		[REDACTED]	
Alg. ScCnt - Algal analyses		[REDACTED]	

IND

Reported independently on separate report

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Certificate of Analysis

Attention: Troy Watkins
Norske Skog
Address: Private Bag
LAVINGTON NSW 2641
Date: 26/05/17
Report Number: 17/0388 Rev. 00

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NATA Accredited Laboratory Number 14214
Accredited for compliance with ISO/IEC 17025.

Sample Reference	Sample Description	Date Sampled	Date Received
17/0388-1	[REDACTED]	17/05/2017	17/05/17
17/0388-2	[REDACTED]	17/05/2017	17/05/17
17/0388-3	[REDACTED]	17/05/2017	17/05/17
17/0388-4	[REDACTED]	17/05/2017	17/05/17
17/0388-5	[REDACTED]	17/05/2017	17/05/17
17/0388-6	[REDACTED]	17/05/2017	17/05/17
17/0388-7	[REDACTED]	17/05/2017	17/05/17
17/0388-8	Delaney's quarry EMP 30 54	17/05/2017	17/05/17

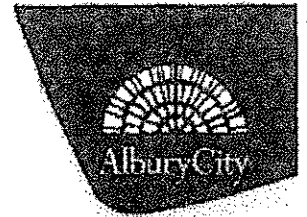
Test Description	Method ID	Units	Detection Limit	17/0388-1	17/0388-2	17/0388-3
pH	APHA 4500-H+ B			[REDACTED]	[REDACTED]	[REDACTED]
Electrical conductivity	APHA 2510 B	uS/cm	2	[REDACTED]	[REDACTED]	[REDACTED]
Total dissolved solids	APHA 2540 C	mg/L	2	[REDACTED]	[REDACTED]	[REDACTED]

Test Description	Method ID	Units	Detection Limit	17/0388-4	17/0388-5	17/0388-6
pH	APHA 4500-H+ B			[REDACTED]	[REDACTED]	[REDACTED]
Electrical conductivity	APHA 2510 B	uS/cm	2	[REDACTED]	[REDACTED]	[REDACTED]

Test Description	Method ID	Units	Detection Limit	17/0388-7	17/0388-8
pH	APHA 4500-H+ B				7.13
Electrical conductivity	APHA 2510 B	uS/cm	2		7,078
Total dissolved solids	APHA 2540 C	mg/L	2		1,049

Comments

Robyn Cirulis, Laboratory Supervisor 



Certificate of Analysis

Attention: Troy Watkins
Norske Skog
Address: Private Bag
LAVINGTON NSW 2641
Date: 13/10/17
Report Number: 17/0844 Rev. 00

Waterview Laboratory
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NATA Accredited Laboratory Number 14214
Accredited for compliance with ISO/IEC 17025 - Testing

Sample Reference	Sample Description	Date Sampled	Date Registered
17/0844-1	[REDACTED]	5/10/2017	4/10/17
17/0844-2	EMP 30 Delaney's Quarry S4		4/10/17
17/0844-3	EMP 31 Delaney's Quarry Dam A		4/10/17
17/0844-4	EMP 31 Delaney's Quarry Dam B		4/10/17
17/0844-5	EMP 31 Delaney's Quarry Dam D		4/10/17
17/0844-6	EMP 31 Delaney's Quarry S1		4/10/17
17/0844-7	EMP 31 Delaney's Quarry S2		4/10/17
17/0844-8	EMP 31 Delaney's Quarry S4		4/10/17
17/0844-9	EMP 31 Delaney's Quarry S5		4/10/17
17/0844-10	[REDACTED]	6/10/2017	4/10/17
17/0844-11	[REDACTED]	6/10/2017	4/10/17
17/0844-12	[REDACTED]	6/10/2017	4/10/17
17/0844-13	[REDACTED]	6/10/2017	4/10/17
17/0844-14	[REDACTED]		4/10/17
17/0844-15	[REDACTED]		4/10/17
17/0844-16	[REDACTED]		4/10/17
17/0844-17	[REDACTED]		4/10/17
17/0844-18	[REDACTED]		4/10/17
17/0844-19	[REDACTED]	6/10/2017	4/10/17
17/0844-20	[REDACTED]	6/10/2017	4/10/17
17/0844-21	[REDACTED]	6/10/2017	4/10/17
17/0844-22	[REDACTED]	6/10/2017	4/10/17

Sample Reference	Sample Description	Date Sampled	Date Registered
17/0844-23		6/10/2017	4/10/17
17/0844-24		6/10/2017	4/10/17
17/0844-25		6/10/2017	4/10/17
17/0844-26		6/10/2017	4/10/17
17/0844-27		6/10/2017	4/10/17

Test Description	Reference Method	Units	Detection Limit	17/0844-1	17/0844-2	17/0844-3
pH	APHA 4500-H+ B				6.40	8.43
Electrical conductivity	APHA 2510 B	uS/cm	2		1,752	2,525
Bicarbonate					[NA]	[NA]
Arsenic (total)*		mg/L	0.02		<0.02	<0.02
Calcium (total)*		mg/L	0.01		[NA]	[NA]
Cadmium (total)*		mg/L	0.0002		<0.0002	<0.0002
Cobalt (total)*		mg/L	0.03		<0.03	<0.03
Chromium (total)*		mg/L	0.00		0.006	<0.001
Copper (total)*		mg/L	0.002		0.042	0.005
Iron (total)*		mg/L	0.01		2.30	2.30
Mercury (total)*		mg/L	0.0001		<0.0001	<0.0001
Potassium (total)*		mg/L			[NA]	[NA]
Magnesium (total)*		mg/L	0.01		19	65
Manganese (total)*		mg/L	0.001		0.440	0.430
Sodium (total)*		mg/L	0.01		[NA]	[NA]
Nickel (total)*		mg/L	0.01		0.07	0.02
Lead (total)*		mg/L	0.001		0.017	<0.001
Zinc (total)*		mg/L	0.002		0.066	0.015
Solids, total dissolved	APHA 2540 C	mg/L	2		1,028	2,391
Ammonia, as N	EPA-103-A Rev 7	mg N/L	0.03		1.90	2.40
Total Kjeldahl nitrogen as N	EPA-125-A Rev 5	mg/L	0.3		3.20	32.00
Total N by calc		mg/L	0.3		3.31	32.00
Nitrate + nitrite, as N	EPA-126 -A Rev 9	mg N/L	0.01		0.11	<0.01
Phosphorus total, as P*	EPA-134-A Rev 4	mg/L	0.05		[NA]	[NA]
Nitrate		mg/L	0.1		[NA]	[NA]
Sulfate	APHA 4110 B	mg/L	0.1		[NA]	[NA]

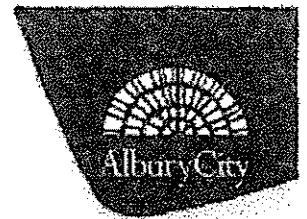
Test Description	Reference Method	Units	Detection Limit	17/0844-4	17/0844-5	17/0844-6
pH	APHA 4500-H+ B			9.68	8.71	7.10
Electrical conductivity	APHA 2510 B	uS/cm	2	643.7	495.2	4,826
Arsenic (total)*		mg/L	0.02	<0.02	<0.02	0.02
Cadmium (total)*		mg/L	0.0002	<0.0002	<0.0002	<0.0002
Cobalt (total)*		mg/L	0.03	<0.03	<0.03	0.15
Chromium (total)*		mg/L	0.00	<0.001	<0.001	0.003
Copper (total)*		mg/L	0.002	0.006	0.006	0.023
Iron (total)*		mg/L	0.01	0.13	1.30	27.00
Mercury (total)*		mg/L	0.0001	<0.0001	<0.0001	<0.0001
Magnesium (total)*		mg/L	0.01	21	15	190
Manganese (total)*		mg/L	0.001	0.056	0.071	10.000
Nickel (total)*		mg/L	0.01	0.01	<0.01	0.04
Lead (total)*		mg/L	0.001	<0.001	0.001	0.033
Zinc (total)*		mg/L	0.002	0.011	0.028	0.074
Solids, total dissolved	APHA 2540 C	mg/L	2	466	355	2,407
Ammonia, as N	EPA-103-A Rev 7	mg N/L	0.03	<0.1	<0.1	280.00
Total Kjeldahl nitrogen as N	EPA-125-A Rev 5	mg/L	0.3	2.90	1.80	280.00
Total N by calc		mg/L	0.3	2.93	1.80	281.10
Nitrate + nitrite, as N	EPA-126 -A Rev 9	mg N/L	0.01	0.03	<0.01	1.10

Test Description	Reference Method	Units	Detection Limit	17/0844-7	17/0844-8	17/0844-9
pH	APHA 4500-H+ B			7.19	6.29	6.23
Electrical conductivity	APHA 2510 B	uS/cm	2	2,402	1,752	879.0
Arsenic (total)*		mg/L	0.02	<0.02	<0.02	<0.02
Cadmium (total)*		mg/L	0.0002	<0.0002	<0.0002	<0.0002
Cobalt (total)*		mg/L	0.03	<0.03	<0.03	<0.03
Chromium (total)*		mg/L	0.03	0.003	0.004	0.009
Copper (total)*		mg/L	0.002	0.050	0.028	0.036
Iron (total)*		mg/L	0.01	1.30	1.50	18.00
Mercury (total)*		mg/L	0.0001	<0.0001	<0.0001	<0.0001
Magnesium (total)*		mg/L	0.01	73	19	14
Manganese (total)*		mg/L	0.001	0.097	0.400	0.200
Nickel (total)*		mg/L	0.01	0.04	0.01	0.01
Lead (total)*		mg/L	0.001	0.005	0.015	0.010
Zinc (total)*		mg/L	0.002	0.053	0.048	0.120
Solids, total dissolved	APHA 2540 C	mg/L	2	1,971	1,012	505
Ammonia, as N	EPA-103-A Rev 7	mg N/L	0.03	1.60	1.80	3.70
Total Kjeldahl nitrogen as N	EPA-125-A Rev 5	mg/L	0.3	7.70	2.80	9.80
Total N by calc		mg/L	0.3	7.81	3.20	10.43
Nitrate + nitrite, as N	EPA-126 -A Rev 9	mg N/L	0.01	0.11	0.40	0.63

Comments

Tests marked * from external laboratory (NATA 992). Refer to report no. 17-44732

Robyn Cirulis, Laboratory Supervisor 



Certificate of Analysis

Attention: Troy Watkins
Norske Skog
Address: Private Bag
LAVINGTON NSW 2641
Date: 14/12/17
Report Number: 17/1033 Rev. 00

Waterview Laboratory
Howlong Road, Albury, NSW 2640
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NATA Accredited Laboratory Number 14214
Accredited for compliance with ISO/IEC 17025 - Testing

Sample Reference	Sample Description	Date Sampled	Date Registered
17/1033-1		23/11/2017	22/11/17
17/1033-2		22/11/2017	22/11/17
17/1033-3		22/11/2017	22/11/17
17/1033-4		22/11/2017	22/11/17
17/1033-5		22/11/2017	22/11/17
17/1033-6		22/11/2017	22/11/17
17/1033-7		22/11/2017	22/11/17
17/1033-8		22/11/2017	22/11/17
17/1033-9		22/11/2017	22/11/17
17/1033-10		22/11/2017	22/11/17
17/1033-11		22/11/2017	22/11/17
17/1033-12	EMP 30 Delaney's Quarry S4	22/11/2017	22/11/17

Test Description	Reference Method	Units	Detection Limit	17/1033-1	17/1033-2	17/1033-3
pH	APHA 4500-H+ B					
Nitrate	APHA 4110 B	mg/L	0.1			
Sulfate	APHA 4110 B	mg/L	0.1			
Electrical conductivity	APHA 2510 B	uS/cm	2			
Solids, total dissolved	APHA 2540 C	mg/L	2			
Turbidity	APHA 2130 B	NTU	0.1			
Calcium (total)*		mg/L	0.01			
Potassium (total)*		mg/L				

Test Description	Reference Method	Units	Detection Limit	17/1033-1	17/1033-2	17/1033-3
Magnesium (total)*		mg/L	0.01			
Sodium (total)*		mg/L	0.01			
Zinc (total)*		mg/L	0.002			
Ammonia, as N	EPA-103-A Rev 7	mg N/L	0.03			
Total Kjeldahl nitrogen as N	EPA-125-A Rev 5	mg/L	0.3			
Total N by calc	WWM-2021	mg/L	0.3			
Nitrate + nitrite, as N	EPA-126 -A Rev 9	mg N/L	0.01			
Bicarbonate alk. as CaCO ₃ *		mg/L				
Phosphorus total, as P	EPA-134-A Rev 4	mg/L	0.01			

Test Description	Reference Method	Units	Detection Limit	17/1033-4	17/1033-5	17/1033-6
pH	APHA 4500-H+ B					
Electrical conductivity	APHA 2510 B	uS/cm	2			

Test Description	Reference Method	Units	Detection Limit	17/1033-7	17/1033-8	17/1033-9
pH	APHA 4500-H+ B					
Electrical conductivity	APHA 2510 B	uS/cm	2			

Test Description	Reference Method	Units	Detection Limit	17/1033-10	17/1033-11	17/1033-12
pH	APHA 4500-H+ B					6.30
Electrical conductivity	APHA 2510 B	uS/cm	2			1,736
Solids, total dissolved	APHA 2540 C	mg/L	2			1,012
Arsenic (total)*		mg/L	0.02			<0.02
Cadmium (total)*		mg/L	0.0002			<0.0002
Cobalt (total)*		mg/L	0.03			<0.03
Chromium (total)*		mg/L	0.00			0.014
Copper (total)*		mg/L	0.01			0.04
Iron (total)*		mg/L	0.01			1.80
Mercury (total)*		mg/L	0.0001			<0.0001
Magnesium (total)*		mg/L	0.01			22
Manganese (total)*		mg/L	0.001			0.420
Nickel (total)*		mg/L	0.01			0.02
Lead (total)*		mg/L	0.001			0.014
Zinc (total)*		mg/L	0.002			0.061
Ammonia, as N	EPA-103-A Rev 7	mg N/L	0.03			1.42

Test Description	Reference Method	Units	Detection Limit	17/1033-10	17/1033-11	17/1033-12
Total Kjeldahl nitrogen as N	EPA-125-A Rev 5	mg/L	0.3	[NA]	[NA]	3.42
Total N by calc	WWM-2021	mg/L	0.3	[NA]	[NA]	3.48
Nitrate + nitrite, as N	EPA-128 -A Rev 9	mgN/L	0.01	[NA]	[NA]	0.07

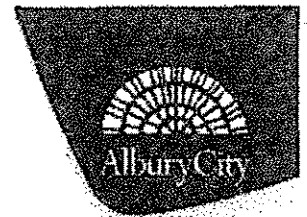
Comments

Tests marked * from external laboratory (NATA 992). Refer to report no. 17-52164.

Algal scans sent in separate reports.

Robyn Cirulis, Laboratory Supervisor





Certificate of Analysis

Attention: Troy Watkins
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Address: Private Bag
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Date: 8/03/18
Report Number: 18/0158 Rev. 00

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NATA Accredited Laboratory Number 14214
Accredited for compliance with ISO/IEC 17025 - Testing

Sample Reference	Sample Description	Date Sampled	Date Registered
18/0158-1		22/02/2018	22/02/18
18/0158-2		22/02/2018	22/02/18
18/0158-3		22/02/2018	22/02/18
18/0158-4		22/02/2018	22/02/18
18/0158-5		22/02/2018	22/02/18
18/0158-6		22/02/2018	22/02/18
18/0158-7		22/02/2018	22/02/18
18/0158-8		22/02/2018	22/02/18
18/0158-9		22/02/2018	22/02/18
18/0158-10	EMP 31 Delaney's Quarry Dam A	22/02/2018	22/02/18
18/0158-11	EMP 31 Delaney's Quarry Dam B	22/02/2018	22/02/18
18/0158-12	EMP 31 Delaney's Quarry Dam D	22/02/2018	22/02/18
18/0158-13	EMP 31 Delaney's Quarry S1	22/02/2018	22/02/18
18/0158-14	EMP 31 Delaney's Quarry S2	22/02/2018	22/02/18
18/0158-15	EMP 31 Delaney's Quarry S4	22/02/2018	22/02/18
18/0158-16	EMP 31 Delaney's Quarry S5	22/02/2018	22/02/18

Test Description	Reference Method	Units	Detection Limit	18/0158-1	18/0158-2	18/0158-3
Nitrate	APHA 4110 B	mg/L	0.1			
Sulfate	APHA 4110 B	mg/L	0.1			
pH	APHA 4500-H+ B					
Electrical conductivity	APHA 2510 B	uS/cm	2			
Solids, total dissolved	APHA 2540 C	mg/L	2			
Calcium (total)*		mg/L	0.01			
Potassium (total)*		mg/L				
Magnesium (total)*		mg/L	0.01			
Sodium (total)*		mg/L	0.01			
Zinc (total)*		mg/L	0.002			
Total Kjeldahl nitrogen as N	EPA-125-A Rev 5	mg/L	2			
Total N by calc	WWM-2021	mg/L	0.3			
Nitrate + nitrite, as N	EPA-126 -A Rev 9	mgN/L	0.01			
Bicarbonate alk. as CaCO3*		mg/L				
Phosphorus total, as P	EPA-134-A Rev 4	mg/L	0.01			

Test Description	Reference Method	Units	Detection Limit	18/0158-4	18/0158-5	18/0158-6
pH	APHA 4500-H+ B					
Electrical conductivity	APHA 2510 B	uS/cm	2			

Test Description	Reference Method	Units	Detection Limit	18/0158-7	18/0158-8	18/0158-9
pH	APHA 4500-H+ B					
Electrical conductivity	APHA 2510 B	uS/cm	2			

Test Description	Reference Method	Units	Detection Limit	18/0158-10	18/0158-11	18/0158-12
pH	APHA 4500-H+ B			9.36	2.06	8.29
Electrical conductivity	APHA 2510 B	uS/cm	2	5,550	4,850	552.3
Solids, total dissolved	APHA 2540 C	mg/L	2	6,644	1,374	458
Arsenic (total)*		mg/L	0.02	0.04	<0.02	<0.02
Cadmium (total)*		mg/L	0.002	<0.0020	<0.0020	<0.0020
Cobalt (total)*		mg/L	0.03	0.03	<0.03	<0.03
Chromium (total)*		mg/L	0.00	<0.01	<0.01	<0.01
Copper (total)*		mg/L	0.01	0.02	<0.01	<0.01
Iron (total)*		mg/L	0.01	8.90	3.30	6.50
Mercury (total)*		mg/L	0.03	<0.03	<0.03	<0.03

Test Description	Reference Method	Units	Detection Limit	18/0158-10	18/0158-11	18/0158-12
Magnesium (total)*		mg/L	0.01	170	48	22
Manganese (total)*		mg/L	0.001	1.200	0.660	0.640
Nickel (total)*		mg/L	0.01	0.10	<0.01	<0.01
Lead (total)*		mg/L	0.01	0.01	<0.01	0.01
Zinc (total)*		mg/L	0.002	<0.01	0.070	<0.01
Ammonia, as N	EPA-103-A Rev 7	mg N/L	0.03	0.44	0.36	0.05
Total Kjeldahl nitrogen as N	EPA-125-A Rev 5	mg/L	2	188	16	9
Total N by calc	WWM-2021	mg/L	0.3	188.06	16.04	9.03
Nitrate + nitrite, as N	EPA-126 -A Rev 9	mg N/L	0.01	0.06	0.04	0.03

Test Description	Reference Method	Units	Detection Limit	18/0158-13	18/0158-14	18/0158-15
pH	APHA 4500-H+ B			7.01	7.16	6.25
Electrical conductivity	APHA 2510 B	uS/cm	2	4,591	2,205	1,711
Solids, total dissolved	APHA 2540 C	mg/L	2	2,416	1,780	992
Arsenic (total)*		mg/L	0.02	0.02	<0.02	<0.02
Cadmium (total)*		mg/L	0.002	<0.0020	<0.0020	<0.0020
Cobalt (total)*		mg/L	0.03	0.21	0.03	<0.03
Chromium (total)*		mg/L	0.00	0.030	0.010	<0.01
Copper (total)*		mg/L	0.01	0.05	0.06	0.06
Iron (total)*		mg/L	0.01	26.00	4.40	1.10
Mercury (total)*		mg/L	0.03	<0.03	<0.03	<0.03
Magnesium (total)*		mg/L	0.01	180	78	23
Manganese (total)*		mg/L	0.001	9.900	0.270	0.390
Nickel (total)*		mg/L	0.01	0.05	0.04	0.01
Lead (total)*		mg/L	0.01	0.07	0.01	0.01
Zinc (total)*		mg/L	0.002	0.110	0.060	0.050
Ammonia, as N	EPA-103-A Rev 7	mg N/L	0.03	291.83	0.92	1.70
Total Kjeldahl nitrogen as N	EPA-125-A Rev 5	mg/L	2	186	65	10
Total N by calc	WWM-2021	mg/L	0.3	187.09	65.74	10.07
Nitrate + nitrite, as N	EPA-126 -A Rev 9	mg N/L	0.01	1.09	0.74	0.07

Test Description	Reference Method	Units	Detection Limit	18/0158-16
pH	APHA 4500-H+ B			5.98
Electrical conductivity	APHA 2510 B	uS/cm	2	799.0
Solids, total dissolved	APHA 2540 C	mg/L	2	486
Arsenic (total)*		mg/L	0.02	<0.02
Cadmium (total)*		mg/L	0.002	<0.0020
Cobalt (total)*		mg/L	0.03	<0.03
Chromium (total)*		mg/L	0.00	<0.01
Copper (total)*		mg/L	0.01	0.03
Iron (total)*		mg/L	0.01	14.00
Mercury (total)*		mg/L	0.03	<0.03
Magnesium (total)*		mg/L	0.01	16
Manganese (total)*		mg/L	0.001	0.150
Nickel (total)*		mg/L	0.01	0.01
Lead (total)*		mg/L	0.01	0.01
Zinc (total)*		mg/L	0.002	0.110
Ammonia, as N	EPA-103-A Rev 7	mg N/L	0.03	1.28
Total Kjeldahl nitrogen as N	EPA-126-A Rev 5	mg/L	2	65
Total N by calc	WWM-2021	mg/L	0.3	67.59
Nitrate + nitrite, as N	EPA-126 -A Rev 9	mg N/L	0.01	2.59

Comments

Tests marked * from external laboratory (NATA 992). Refer to report no. 18-11025

Robyn Cirulis, Laboratory Supervisor

