Report

SUPPLEMENTARY STATEMENT OF EXPERT EVIDENCE

ANSEVATA NOMINEES PTY LTD V SOUTH GIPPSLAND SHIRE COUNCIL

WALKERVILLE, VICTORIA

21 May 2018

Environmental Engineering
Science & Management
Consultants

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USE OF REPORT

The preparation of this report has been undertaken for the purpose of providing supplementary expert evidence in the matter between Ansevata Nominees Pty Ltd and South Gippsland Shire Council regarding the dam at “Marapana”, Loop Road, Walkerville, Victoria, and it is not intended that this report should be used for any other purpose.

LIST OF ABBREVIATIONS

ANZECC	Australian and New Zealand Environment Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
BOD	Biological Oxygen Demand
COC	Chain of Custody
EPA	Environment Protection Authority
IWRG	Industrial Waste Resource Guideline
MST	Microbial Source Tracking
SEPP	State Environment Protection Policy
VCAT	Victorian Civil and Administrative Tribunal
WoV	Waters of Victoria

1. INTRODUCTION

I was instructed by Wisewould Mahony Lawyers (Wisewould Mahony) on behalf of Ansevata Nominees Pty Ltd (Ansevata) to provide expert evidence regarding the dam at "Marapana", Loop Road, Walkerville, Victoria. I subsequently issued my expert evidence report to Wisewould Mahony on 1 May 2018.

On 4 May 2018 I was further instructed by Wisewould Mahony to review additional documentation and provide a supplementary expert witness statement in the form of a report. Refer to **Appendix A** for a copy of Wisewould Mahony's instructions regarding the expert evidence statement of 1 May 2018 and this supplementary expert evidence report. The results of my review of the documentation provided by Russell Kennedy are provided in Section 4.

The expert evidence relates to an Agreement for Taking of Water between Ansevata and South Gippsland Shire Council (Council), which provides Ansevata the right to use water from a dam located on the retarding basin land ('the dam') for the purpose of irrigation of pasture and crops and watering of stock without charge. This matter relates to concerns held by Ansevata regarding the quality of the water within the dam.

2. SCOPE

I have been instructed to:

- Review the available additional documentation in relation to the matter;
- Undertake such inquiries as appropriate to enable me to prepare a response to the questions set out in the instructions; and
- Prepare a supplementary expert evidence report providing my opinion in relation to several specific questions, and any other matters relevant based on my review.

3. EXPERT EVIDENCE DETAILS

3.1 Expert Witness Details

Expert Witness:	Dr Darren Bennetts
Address:	Level 10, 222 Kings Way, South Melbourne, Victoria, 3205
Company:	Peter J Ramsay & Associates Pty Ltd

3.2 Expert's Qualifications and Experience

I am a qualified hydrogeologist, holding a Bachelor of Environmental Science (Hons) and a PhD in hydrogeology, geochemistry and hydrology. I am appointed as an Environmental Auditor pursuant to the *Environment Protection Act 1970* by Environment Protection Authority (EPA) Victoria in the category of contaminated land and am a member of Mr Peter Ramsay's expert support team for statutory audits. I have over 13 years' experience in environmental consulting, with significant expertise in soil, groundwater and gas investigations, groundwater and soil vapour modelling, risk assessments, site remediation, due diligence transactions, and water resource management.

I have extensive experience in conducting hydrogeological assessments, including for water resources in Australia, New Zealand, Papua New Guinea, New Caledonia, Fiji, Samoa and Tahiti. In addition, I have conducted numerous investigations regarding the potential environmental impacts associated with various industrial facilities, including a number of environmental investigations into the storage, treatment and management of wastewater.

Prior to my role at Peter J Ramsay & Associates, I conducted research into the hydrogeology, hydrochemistry and hydrology of groundwater flow systems in western Victoria and their role in the development of dryland salinity. I have authored numerous papers, which have been published in International peer reviewed journals, in relation to dryland salinity, hydrogeology and geochemistry, and geology.

My curriculum vitae is provided in **Appendix B**.

3.3 Expert's Area of Expertise

My professional career has focused on identifying and resolving environmental issues at industrial and commercial facilities or associated with historical land uses. This includes soil, groundwater and gas investigations, groundwater and soil vapour modelling, risk assessments, site remediation (including soil, groundwater and vapour remediation), environmental management and water resource management. I have expertise and experience in hydrogeology, hydrology, geochemistry, contaminant fate and transport, assessment of exposure pathways and risk, and remedial technologies.

I have previously acted as an expert witness at Victorian Civil and Administrative Tribunal (VCAT) and have provided assistance to Mr Peter Ramsay in relation to various expert witness cases in the Supreme Court of Victoria, County Court, VCAT and panel hearings.

3.4 Statement of Expertise

In view of my professional qualifications and expertise, I believe I am well qualified to prepare and present this evidence.

3.5 Existence of Private or Business Relationship with the Party Requesting this Report

There is no relationship between myself and Ansevata Nominees Pty Ltd, beyond the commercial arrangement to prepare this expert evidence report.

3.6 Instructions that Defined the Scope of the Report

Written instructions were received from Wisewould Mahony on behalf of Ansevata on 4 May 2018 to provide a supplementary expert witness report in relation to the matter between Ansevata and Council. A copy of the instructions from Wisewould Mahony is provided in **Appendix A**.

In preparing this supplementary expert evidence report, I have read and agree to be bound to by the Expert Witness Code of Conduct for the Supreme Court of Victoria. In addition, I acknowledge the obligation on an expert witness imposed by the *Civil Procedure Act 2010*, and have complied with those obligations in preparing my report.

3.7 Facts, Matters and Assumptions Used

The following facts, matters and assumptions were used in the preparation of this report:

- The Brief of Documents provided by Wisewould Mahony on 26 March 2018 and additional documents provided on 4 and 14 May 2018 (Section 3.8.1);
- Consideration of relevant legislation and guidelines (Sections 3.8.2 and 3.8.3); and
- My experience in surface water investigations, water resource management and evaluating the risk to the environment due to the reuse of reclaimed water.

3.8 Documents and Other Materials Used to Prepare Report

The documentation and materials used to prepare this report are listed following.

3.8.1 Supplied Documents

The following documents were provided by Wisewould Mahony Lawyers for my consideration:

1. Letter from Mr Rob McGirr of Wisewould Mahony Lawyers to Dr Darren Bennetts dated 26 March 2018 outlining the instructions and background information relating to the matter.
2. Expert Witness Code of Conduct for the Court of Victoria (Form 44A).
3. Extract of the Civil Procedure Act 2010 (Vic) about the obligations on expert witnesses in Victorian Courts.
4. Agreement for taking water dated 8 May 1990.
5. Deed of variation to the water agreement dated 28 November 2016.
6. Storage capacity area and location plan 30-158 dated 16 November 1997.
7. Walkerville basin feature level survey dated 27 January 2016 by Mackie Surveying.
8. Copies of certificates of analysis as per the schedule attached.
9. Aerial photograph of the site.
10. Map showing sampling locations SP1 to SP4: SP1 and SP3 are water outlets of the North West and South West corner of the dam SP2 is the stormwater outlet of the South East corner of the dam from the Estate by underground pipe.
11. Letter to Mr Rob McGirr of Wisewould Mahony Lawyers from Mr Andrew Sherman of Russell Kennedy regarding the proposed works at Walkerville Retarding Basin dated 20 April 2018.
12. Original design drawings for Promontory Views Estate Drainage Scheme plan file number 30-160 dated February 1988.
13. Updated Walkerville basin feature level survey dated 27 January 2016 by Mackie Surveying.
14. Proposed plans for Promontory Views Basin Works plan file number 40/1703/1 dated 30 November 2017.
15. Letter from Mr McGirr to Dr Darren Bennetts dated 4 May 2018 outlining the instructions and providing supplementary documentation relating to the matter.
    a. *Water and Sediment Quality Assessment, Walkerville Retarding Basin*, prepared by RM Consulting Group Pty Ltd (RMCG), Version 3, 14 March 2018.

b. *Expert Statement, Walkerville Retarding Basin*, by Dr David Rendell and Dr Kathryn Robertson, 21 March 2018.

16. Email of 14 May 2018 from Mr McGirr to Dr Darren Bennetts dated 4 May 2018 providing copies of Certificates of Analysis dated 29 March 2016 and 17 November 2017.
17. Updated Schedule of Copies of Certificate of Analysis with additional certificates, provided on 15 May 2018.

The document numbers proceeding the document details are used throughout this report to reference each document.

3.8.2 Legislation

I have considered the following pieces of legislation in the preparation of my evidence:

- *Environment Protection Act 1970;*
- *Water Act 1989*;
- State Environment Protection Policy [SEPP] (Waters of Victoria) (WoV),1988; and
- Variation to SEPP (WoV), 2003.

3.8.3 Technical References and Guidelines

I have considered the following technical references and guidelines in the preparation of my evidence:

- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand Environment Conservation Council (*ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ), October 2000 (ANZECC/ARMCANZ 2000);
- Australian/New Zealand Standard 5667.1:1998, *Water Quality-Sampling, Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*, 1998;
- Environment Protection Authority Publication 441, 6th Edition, *A Guide to the Sampling and Analysis of Water and Wastewater*, 1995;
- Environment Protection Authority Victoria 2003, *Guidelines for Environmental Management, Use of Reclaimed Water,* Publication 464.2, June 2003 (EPA Publication 464.2);
- *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1)*, Natural Resource Management Ministerial Council, Environment Protection and Heritage Council and Australian Health Ministers Conference, November 2006 (NRMMC *et al.*, 2006);
- Environment Protection Authority Publication, Industrial Waste Resource Guideline (IWRG) 701, *Sampling and Analysis of Waters, Wastewaters, Soils and Wastes*, June 2009; and

- World Health Organisation, *Quantitative Microbial Risk Assessment: Application for Water Safety Management,* 2016 (WHO 2016);

3.9 Summary of Opinions

Based on my review of the facts, matters and documents relating to the site, and my opinions outlined in my expert witness statement of 1 May 2018 and this supplementary expert witness statement, I am of the opinion that:

- It is not possible to confirm that the monitoring program was undertaken in accordance with EPA requirements as insufficient documentation was available.
- Based on my review of the results provided with regard to the relevant criteria for irrigation and livestock watering, consideration of the potential for human derived faecal matter to enter the dam, and evaluation of subsequent risk, I am of the opinion that it cannot be confidently determined that the dam water is suitable for unencumbered irrigation of pasture and crops, and watering of livestock. Therefore, it must be considered that the water is unsuitable until such time that management measures can be implemented to reduce risks to acceptable levels..
- Dam water quality in Victoria is regulated by both the *Water Act 1989* and the *Environment Protection Act 1970*. These require that the uses of the water that it is intended to be used should not be compromised.
- In accordance with both the *Water Act 1989* and the *Environment Protection Act 1970*, the water is considered to be polluted. Specifically, under the *Water Act 1989*, the water is considered to be potentially harmful to the health, welfare or safety of human beings and animals. Similarly, under the *Environment Protection Act 1970*, the water quality has been changed such that it is reasonably expected to make those waters potentially harmful to the health, welfare, safety or property of human beings and animals.
- Based on the data provided for the November 2017 monitoring event, it is considered that the source at that time was animal derived faecal matter. However, in view of the limited dataset available (one inconclusive test and the other two taken on the same date) and nature of the wastewater system, it cannot be ruled out that human sources have not contributed to the elevated thermotolerant coliforms reported at other times as the data are also consistent with a combination of treated septic tank effluent from the adjacent Estate mixed (essentially diluted) with stormwater.
- The mixing of stormwater with septic tank effluent is inappropriate and inconsistent with the management principle of segregating wastewater from clean water streams. To that end, it is considered to be inherently very difficult to ensure suitable water quality within the dam to support irrigation and livestock watering purposes based on the current system.

- The system would need to be upgraded to prevent ingress of partially treated wastewater into the stormwater system, For example, an expanded adsorption trench system capable of accepting the volume of wastewater without migrating to stormwater could be utilised. Upgrades from primary to secondary septic systems could also be implemented. Otherwise, restrictions on the use of the water would need to apply.

3.10 Provisional Opinions

The opinions expressed are not considered to be provisional.

3.11 Limitation

I consider myself qualified to prepare and present the report, and where an area is beyond the area of my expertise, I have noted this in the report. I have not addressed questions falling outside my area of expertise, and do not consider it incomplete or inaccurate in any respect.

My opinions are based on my review of the documentation provided for my review and other relevant documentation that I have sourced and my professional experience.

3.12 Declaration

I have made all the enquiries that I believe are desirable and appropriate and that no matters of significance which I regard as relevant have to my knowledge been withheld.

4. FINDINGS AND OPINIONS

4.1 Background

In 1990 Ansevata provided Shire of Woorayl with approximately 2.585 ha of its land to construct a retarding basin and dam to receive stormwater drainage and treated septic effluent from the nearby Promontory Views Estate (the Estate) (Document 1). The dam is located off Panoramic Drive, Walkerville, approximately 200 m north of the local Country Fire Authority building.

Ansevata subsequently entered into an agreement with the Shire of Woorayl, dated 8 May 1990, whereby Ansevata had an entitlement to use the water in the dam for the purpose of irrigation of pasture and crops and watering of stock on their remaining land (Document 4). The Agreement sets out the rights and obligations of the parties. As part of the Agreement, the Shire was to ensure that the water in the dam was of suitable quality for the purposes of irrigation and stock watering. In 1994 the Shire of Woorayl was merged into the South Gippsland Shire Council, with responsibilities under the Agreement being taken on by the South Gippsland Shire Council (the Council). In 2016, a variation was made to the Agreement whereby the Council may not take or use water from the dam except in certain circumstances (Document 5).

Ansevata uses the farm to graze cattle and sheep and operate a vineyard, and has used the water in the dam to irrigate crops and pastures, and water livestock. A windmill pump next to the retarding basin dam pumps water via an underground water pipe of approximately 1 km in length from the retarding basin to another dam referred to as the ‘home dam as necessary.

I am instructed that the land immediately surrounding the dam (retarding basin land) is fenced. The dam itself was designed with dimensions of 120 m x 200 m and a storage capacity of 15 ML (Document 6). As constructed plans for the dam were not available (Document 11).

The dam receives storm water from the majority, but not the entirety, of the Estate (Document 1). The Estate covers approximately 25 ha, including 380 allotments, of which approximately three quarters have dwellings. There is no reticulated water supply or sewerage (Document 1). Domestic wastewater is understood to be treated and reused/disposed on each individual site. Pursuant to the Agreement the Council has undertaken various tests of the water in the dam. Copies of all of the tests results which have been provided to Ansevata by the Council were provided for my review (Documents 8, 16 and 17).

4.2 Answers to Questions Posed

4.2.1 Question 1

What are the "methods recommended by the Environmental Protection Authority", as at 1990 and now, for testing biological and chemical pollution referred to in clause 8 of the agreement? Have the methods recommended by the Environmental Protection Authority been followed?

The answer to Question 1 provided in my expert evidence report of 1 May 2018 remains unchanged, apart from my opinion regarding analytical program. Based on additional documentation provided, it is apparent that the analytical program was expanded in March 2016 when elevated concentrations were identified, so that the risks associated with the use of the water for irrigation and stock watering could be further evaluated. This is appropriate.

4.2.2 Question 2

Is there an appropriate, common or standard methodology or regime for collecting samples of water from a dam for testing? Has that methodology been followed?

The answer to Question 2 provided in my expert evidence report of 1 May 2018 remains unchanged.

4.2.3 Question 3

What if any are the standards to assess whether water in the dam is suitable for the purpose of irrigation of pasture and crops or watering of stock?

The answer to Question 3 provided in my expert evidence report of 1 May 2018 remains unchanged.

4.2.4 Question 4

Based on the tests results attached to this letter, is the water in the dam suitable for the purpose of irrigation of pasture and crops and watering of stock?

In view of the additional documentation that has been made available since my expert witness report of 1 May 2018, I have re-evaluated the suitability of the water for the purpose of irrigation of pasture and crops and watering of stock.

The samples that have been retrieved from the dam have been routinely analysed for pH, *E.coli*, BOD, turbidity and suspended solids (Document 8). In addition, the following supplementary analyses were performed (Document 16):

- On 18 March 2016 analysis for Microbial Source Tracking (MST) was performed and reported on 29 March 2016 (Report No. 549623); and
- On 10 November 2017 an extended analytical suite comprising cyanobacteria, thermotolerant coliforms, TDS, sulfate, heavy metals, fluoride, calcium and nitrate was requested and reported on 17 November 2017 (Report No. 657008).

I note that the laboratory report dated 29 March 2016 (Report No. 549623) (Document 16) is different to that previously provided for the same sampling and reporting date (Report No. 549622) (Document 8) and appear to related to different sampling points within the dam (Sampling Point 2 vs Sampling Point 1 respectively).

The MST analysis on 18 March 2016 (Report No. 549623) appears to have been in response to elevated *E.coli* results of 380 cfu/100 ml and 440 cfu/100 ml on 10 March 2016 and 16 March 2016 respectively, which subsequently culminated in a peak E.coli result of 4,400 cfu/100 ml on 29 March 2016. The reason for the test on 10 November 2017 has not been reported.

My comparison of the analytical results reported to the relevant guidelines is provided in Table 1.

Table 1 Comparison of Analytical Results from 10 November 2017 to Water Quality Criteria for Irrigation and Livestock Watering

Analyte	Guideline Values		Sample 5424381 (SP2/W)	Sample 5424382 (SP4/W)
	Irrigation	Livestock Watering		
Thermotolerant coliforms (cfu/100mL) (a)	<10 (b) <100 (c) <1,000 (d) <10,000 (e)	100	**100** (as *E.coli*)	**35** (as *E.coli*)
Calcium	-	1,000	9.1	9.2
Sodium	<115 (f)	-	-	-
Phosphorus, total as P	0.05	-	**0.14**	**0.12**
Chloride	<175 (f)		-	-
Nitrate (as N)	-	90.3	0.15	0.26
Nitrite (as N)	-	9.1	<0.01	<0.01
Ammonia, as N	-	-	0.022	0.058
Total Nitrogen as N	5	-	1.5	1.6
Sulphate	-	1,000	<20	<20
Total dissolved solids	-	4,000 (g)	310	320

Analyte	Guideline Values		Sample 5424381 (SP2/W)	Sample 5424382 (SP4/W)
	Irrigation	Livestock Watering		
pH (pH units)	6 to 9	-	7.2	7.1
Aluminium	5	5	0.56	0.61
Arsenic	0.1	0.5	0.002	0.002
Beryllium	0.1	n/a	<0.001	<0.001
Boron	0.5	5	0.04	0.04
Cadmium	0.01	0.01	<0.0002	<0.0002
Chromium	0.1	1	0.002	0.002
Cobalt	0.05	1	<0.001	<0.001
Copper	0.2	0.4	0.002	0.002
Fluoride	1	2	0.07	0.06
Iron	**0.2**	-	**2.8**	**3.2**
Lead	2	0.1	<0.001	<0.001
Lithium	0.075	-	-	-
Magnesium	-	n/a	8.6	8.9
Manganese	0.2	-	0.028	0.031
Mercury	0.002	0.002	<0.0001	<0.0001
Molybdenum	0.01	0.15	<0.001	<0.001
Nickel	0.2	1	0.003	0.003
Selenium	0.02	0.02	<0.001	<0.001
Uranium	0.01	0.2	-	-
Vanadium	0.1	n/a	0.001	0.002
Zinc	2	20	0.026	0.025

Notes:
Values highlighted in **bold** are above the corresponding criterion also in bold.

a) It is recommended that a median value of thermotolerant coliforms is used, based on a number of readings generated over time from a regular monitoring program. Investigations of likely causes are warranted when 20% of results exceed four times the median trigger value (ANZECC/ARMCANZ 2000).
b) Raw human food crops in direct contact with irrigation water (e.g. via sprays, irrigation of salad vegetables)
c) Pasture and fodder for dairy animals (without withholding period)
d) Raw human food crops not in direct contact with irrigation water (edible product separated from contact with water, e.g. by peel, use of trickle irrigation); or crops sold to consumers cooked or processed, and Pasture and fodder for dairy animals (with withholding period of 5 days), and Pasture and fodder (for grazing animals except pigs and dairy animals, i.e. cattle, sheep and goats)
e) Silviculture, turf, cotton, etc. (restricted public access)
f) Criterion for grapes.
g) Criterion for beef cattle.

The analytes measured above the relevant criteria on 10 November 2017 are discussed following.

Iron

Iron was measured above the criterion for irrigation of 0.2 mg/L, which is based on using the water as irrigation water for up to 100 years. The iron is below the guideline for short-term irrigation usage (up to 20 years) of 10 mg/L. The criterion is based on the prevention of fouling of irrigation equipment and staining on foliage/earth rather than health or ecological considerations. It is my opinion that the iron is likely to be naturally occurring and indicative of the catchment area rather than indicative of contamination. Therefore, it is not considered to be significant.

Phosphorous

ANZECC/ARMCANZ 2000 states that the phosphorous criterion of 0.05 mg/L for irrigation is to minimise bioclogging of irrigation equipment. This can lead to a need for increased maintenance of irrigation equipment.

However, ANZECC/ARMCANZ 2000 also indicates that there is the risk of algal bloom formation at total phosphorous and total nitrogen concentrations above 0.05 mg/L and 0.5 mg/L respectively for lowland rivers in south-eastern Australia. Algal blooms can in turn result in the mortality of fish and other aquatic organisms, as well as present human health concerns. Loss of amenity could also be experienced (i.e. odour and discoloration). An algal bloom has the potential to result in the release of toxins (e.g. microsystin) which can be toxic to humans and animals ingesting water. In this case, the concentrations of total phosphorous and total nitrogen as reported in the samples are above the aforementioned concentrations.

In the presence of elevated nutrient concentrations, algal blooms will typically only form when there is sufficient light penetration (as can occur when the turbidity is <30 nephelometric turbidity units) and there are sufficient ‘growth events’ of greater than 6 days in duration. Based on the above there is considered to be a heightened risk that algal blooms could arise, however algal blooms have not been reported in the documentation available.

Elevated nutrient concentrations are consistent with the presence of faecal contamination (both human and animal), as well inputs of detergents, soaps etc. in greywater.

The following information in relation to algal blooms is provided in ANZECC/ARMCANZ 2000:

> *“Since all blooms of cyanobacteria have the potential to be toxic and all livestock are susceptible, it is prudent to consider all scums toxic until proven safe, as described above. In the interim, stock should be withdrawn from the water supply and an alternative source used.*

Where an alternative source is not available and the bloom is localised, it may be possible to allow stock to drink from an area on the upwind side of the bloom. In the long term, prevention of blooms is by far the best strategy, and water supplies should be managed so that nutrient inputs are minimal."

NHMRC et al., 2006 outlines a qualitative risk assessment process for assessing potential risks to water supplies and subsequent management response. This utilises subjective assessments of likelihood and consequence to arrive at an estimate of risk. An excerpt from NHMRC et al., 2006 is presented in Figure 1.

Table 2.5 Qualitative measures of likelihood

Level	Descriptor	Example description
A	Rare	May occur only in exceptional circumstances. May occur once in 100 years
B	Unlikely	Could occur within 20 years or in unusual circumstances
C	Possible	Might occur or should be expected to occur within a 5- to 10-year period
D	Likely	Will probably occur within a 1- to 5-year period
E	Almost certain	Is expected to occur with a probability of multiple occurrences within a year

Table 2.6 Qualitative measures of consequence or impact

Level	Descriptor	Example description
1	Insignificant	Insignificant impact or not detectable
2	Minor	Health — Minor impact for small population Environment — Potentially harmful to local ecosystem with local impacts contained to site
3	Moderate	Health — Minor impact for large population Environment — Potentially harmful to regional ecosystem with local impacts primarily contained to on-site
4	Major	Health — Major impact for small population Environment — Potentially lethal to local ecosystem; predominantly local, but potential for off-site impacts
5	Catastrophic	Health — Major impact for large population Environment — Potentially lethal to regional ecosystem or threatened species; widespread on-site and off-site impacts

Table 2.7 Qualitative risk estimation

	Consequences				
Likelihood	**1-Insignificant**	**2-Minor**	**3-Moderate**	**4-Major**	**5-Catastrophic**
A Rare	Low	Low	Low	High	High
B Unlikely	Low	Low	Moderate	High	Very high
C Possible	Low	Moderate	High	Very high	Very high
D Likely	Low	Moderate	High	Very high	Very high
E Almost certain	Low	Moderate	High	Very high	Very high

Note: Level of environmental risk is specific to definitions of likelihood and consequence defined in Tables 2.5 and 2.6

Figure 1 Qualitative Risk Assessment Classifications (after *NHMRC et al.*, 2006)

Using the qualitative risk assessment process outlined in NRMMC *et al.*, 2006, I would classify the likelihood of an algal bloom occurring as a result of the elevated nutrients as 'unlikely' on the basis of the presence of elevated nutrient concentrations but acknowledging that algal blooms have not been previously reported. That is, there is the potential that an event "could occur within 20 years or in unusual circumstances" (NRMMC *et al.*, 2006).

In relation to consequence, a classification of 'moderate' is considered appropriate based on the significant toxicity of algal blooms. The subsequently assessed risk in accordance with the qualitative risk assessment process documented in NRMMC *et al.*, 2006 would be 'moderate'. NRMMC *et al.*, 2006 outlines that where moderate, high and very high risks are identified, preventative measures should be implemented. This could include nutrient reduction strategies (such as addressing inputs of wastewater to the dam), and/or ongoing surveillance and usage limitations in the event that a bloom is identified.

E.coli

There are no specific criteria for *E.coli* in water used for irrigation and livestock watering. However, as *E.coli* is the most common thermotolerant coliform present in faeces (typically >90%) it is regarded as the most specific indication of recent faecal contamination and, therefore, the measured *E.coli* concentrations are considered appropriate to compare to the criteria for thermotolerant (or faecal) coliforms.

In evaluating the significance of the *E.coli* concentrations for the uses of irrigation and livestock watering, ANZECC/ARMCANZ 2000 (Sections 4.2.3.3 and 4.3.2.2) states that "It is recommended that a median value of thermotolerant coliforms is used, based on a number of readings generated over time from a regular monitoring program. Investigations of the likely causes are warranted when 20% of results exceed four times the median trigger value".

The *E.coli* values measured between February 2016 and January 2018 and the median value are shown in Figures 2 and 3. This includes the additional analyses performed on 18 March 2016 and 10 November 2017.

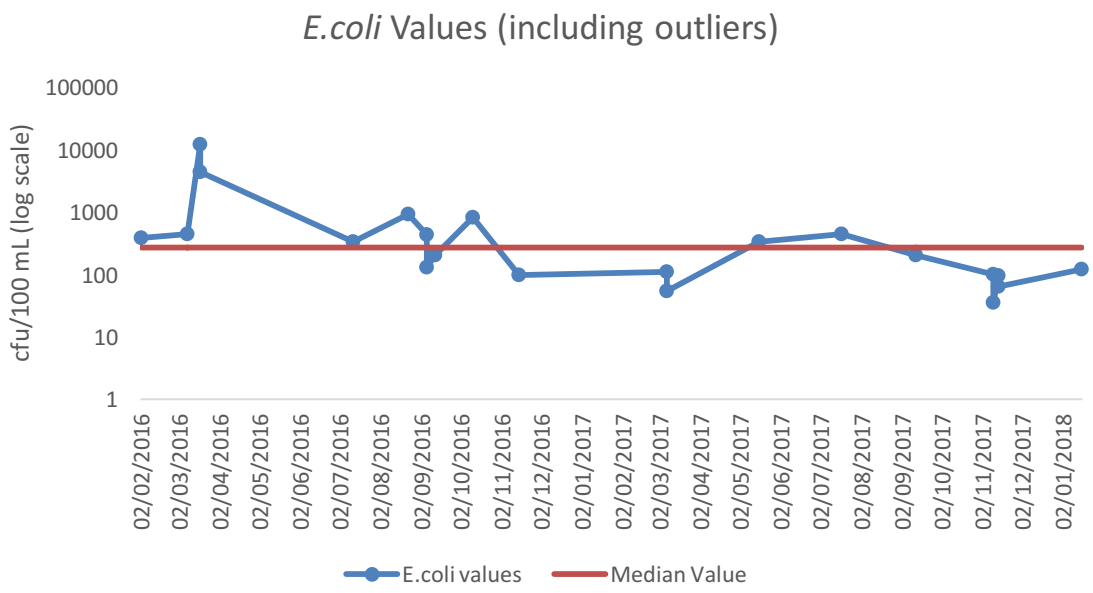

Figure 2 ***E.coli*** **Concentrations with Time (including outlier)**

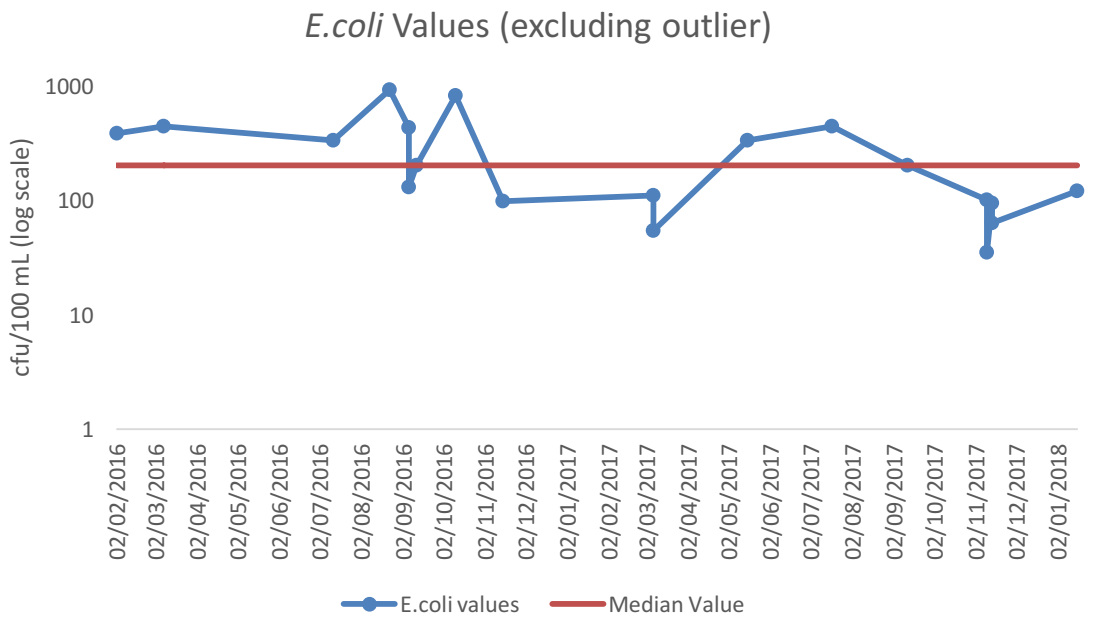

Figure 3 ***E.coli*** **Concentrations with Time (excluding outlier)**

A median value (200 cfu/100 mL) was calculated based on all of the laboratory results provided (Document 8). This median value included the outliers of 4,400 cfu/100 mL and 12,000 cfu/ml measured in March 2016. When these apparent outliers are excluded from the calculation, the median value is 165 cfu/100 mL.

Both of the calculated median values for *E.coli* are above the criteria for irrigation (specifically 'raw human food crops in direct contact with irrigation water (e.g. via sprays, irrigation of salad vegetables)' and 'pasture and fodder for dairy animals (without withholding period)'), and livestock watering.

It is noted that the criteria for *E.coli* and faecal coliforms are only indicators of the presence of pathogens that may presents a subsequent risk to the health of animals and humans; *E.coli* and faecal coliforms do not necessarily present a risk in their own right. However, it is outlined in ANZECC/ARMCANZ 2000 that:

> "It is generally not feasible nor warranted to test irrigation water for the presence of the wide range of water-borne microbial pathogens that may affect human and animal health. The guidelines recommended here are based on the practicable testing of irrigation waters for the presence of thermotolerant coliforms (also known as faecal coliforms), which gives an indication of faecal contamination and thus the possible presence of microbial pathogens (NHMRC & ARMCANZ 1996). However, the test does not specifically indicate whether pathogenic organisms are present."

The guideline values subsequently adopted in ANZECC/ARMCANZ 2000 "are based on:

- A consensus of local practice which has been demonstrated to be safe; and
- Consideration of the current status of scientific understanding and worldwide practice in reclaimed water use" (*Guidelines for Sewerage Systems, Use of Reclaimed Water, November 2000*)."

Therefore, whilst the data do directly indicate an unacceptable risk is present, they highlight that conditions are such that there is a heightened risk of unacceptable risk occurring, which warrant management to maintain risks at an acceptable level.

In order to further evaluate the potential risk, RMCG considered the results of MST analysis (Document 15a). MST testing uses markers contained with molecular material to provide a qualitative assessment of the likely source of the faecal coliforms present.

The testing undertaken on 18 March 2016 reported neither human nor animal bacteriodes in a sample containing and *E.coli* concentration of 12,000 cfu/100ml. As the source of the elevated E.coli was not able to be determined, the test conducted on this date is considered to be inconclusive.

For the MST testing conducted on 10 November 2017, human bacteriodes were not detected and instead only animal bacteriodes were reported (Documents 15a and 16). These data indicate that at the time of measurement, when thermotolerant coliforms were measured at concentrations of 35 cfu/100ml and 100 cfu/100ml, the source was of animal origin.

RMCG subsequently interpreted that the source of the elevated thermotolerant coliforms measured in the dam is most likely due to birds defecating in the water body, rather than stock or other mammals (Document 15a). Based on the assumption that animal sources pose a lower risk than human sources, it was considered that the consequence of exposure to pathogens and parasite of human origin was 'minor', and due to animals (birds), was 'insignificant'. Risks were subsequently classified as being 'low'. This assessment is reasonable for the dates that sampling was performed (November 2017).

However, it is my opinion that there are insufficient data to verify that this applies to all times when *E.coli* has been elevated and to all *E.coli* concentrations. Further investigations (apart from one inconclusive test in March 2016) have not been undertaken during other periods of elevated *E.coli*, and the reported *E.coli* concentrations in November 2017 when MST testing was performed were within the lowest 30th percentile of values. It has therefore not been demonstrated that human derived sources have not influenced water quality in the past, and therefore are unlikely to do so in the future. It is my view that based on the nature of the wastewater system there remains the potential for human derived faecal matter to enter the dam, or to have in the past. This is discussed further in Question 5.

Using the qualitative risk assessment process as outlined in NRMMC *et al.*, 2006 and Figure 1 for a hypothetical scenario of periodic contamination by human derived faecal matter, I would classify the likelihood as 'possible'. That is, there is the potential that an event "might occur or should be expected to occur within a 5- to 10-year period" (NRMMC *et al.*, 2006). I do not consider a likelihood of 'unlikely' ("could occur within 20 years or in unusual circumstances"; NRMMC *et al.*, 2006) is appropriate based on the existing controls in place and monitoring data available, noting that the dam is not used as a treatment vessel in its own right; the water received in the dam is to be treated effluent and suitable for irrigation and stock watering purposes (Document 4).

In relation to consequence associated with periodic contamination by human derived faecal matter, a classification of 'minor' to 'moderate' is considered appropriate, with the differentiator being whether produce irrigated with contaminated water is only consumed by occupants of the property or sold to the wider community for consumption (that is, health impacts are constrained to a small population, or a larger population).

The subsequently assessed risk in accordance with the qualitative risk assessment process documented in NRMMC *et al.*, 2006 risk due to a hypothetical scenario of periodic contamination by human derived faecal matter based on the above would be 'moderate' to 'high'. NRMMC *et al.*, 2006 outlines that where moderate, high and very high risks are identified, preventative measures should be implemented.

For the same scenario, RMCG determined that the risk would be 'low' (Table 6-1, Document 15a). However, this appears to have not considered the potential uses of the water for "raw human food crops in direct contact with irrigation water (e.g. via sprays, irrigation of salad vegetables)" and "pasture and fodder for dairy animals (without withholding period)". That is, the implementation of management controls was assumed. I disagree with this assumption, on the basis that I have not been provided with any documentation which indicates that there is the need for management or limitation on use.

The risk assessment conducted by RMCG also appears to be underpinned in part by the assumption that animal sources pose a much reduced risk than human sources. This is a reasonable assumption at a qualitative level, however, it does not always follow that when animal sources are invoked that the risk is 'low'. In this case, RMCG has made reference to a single study undertaken in the USA, which was reported as a Case Study in WHO 2016. The study involved a site specific evaluation of risk to recreational water users (e.g. swimmers and bathers) associated with faecal matter from birds (seagulls) rather than human derived faecal matter. The study does not address risks associated with irrigation or stock watering uses. The study provides an example of a risk-based methodology that can be applied to other sites to understand risk or enable a site-specific acceptance criterion to be derived.

The study reports that for the data considered in the study that "median illness risk associated with human sewage is approximately 2 orders of magnitude higher than that associated with seagulls, illustrating that a water body at the recreational water quality limit may present a different risk to swimmers depending on the source of the faecal contamination." It does not necessarily translate that a similar pattern will apply to Australia or the Walkerville site, nor to human exposures to irrigation water (e.g. consuming vegetables irrigated with contaminated water), which were not considered in the study. Typically, dose-response relationships are determined based on multiple studies from a range of settings and exposures.

It therefore does not follow that the risks at the site are always likely to be low and acceptable at the site as there are a range of site specific variable that can influence the findings of a study. Rather, the case study serves as an example of an investigation that could be performed at the site to more accurately appraise risk.

Such a detailed study as presented in WHO 2016 has not been conducted and is likely to be impracticable for the site. Rather than undertaking detailed scientific study, the National water management framework, which is outlined in ANZECC/ARMCANZ 2000, utilises generic criteria which are demonstrated to be provide users with confidence that water is safe for use.

In lieu of detailed study demonstrating a consistently low and acceptable risk, the potential for human derived faecal matter to enter the dam and subsequent risks, and consideration of the review of the results provided with regard to the relevant criteria for irrigation and livestock watering, I am of the opinion that it cannot be confidently determined that the dam water is suitable for unencumbered irrigation of pasture and crops, and watering of livestock. Therefore, it must be considered that the water is unsuitable until such time that management measures can be implemented to reduce risks to acceptable levels. That is, the water is considered to be unsuitable for the irrigation of pasture and crops, and watering of livestock.

4.2.5 Question 5

If in your opinion the water of the dam is not suitable for the purpose of irrigation of pasture and crops and watering of stock, what are the likely causes of the water not meeting that purpose?

Surface water samples retrieved on 18 March 2016 and 10 November 2017 were analysed for MST parameters (Document 15a). The testing undertaken on 18 March 2016 reported neither human nor animal bacteriodes in a sample containing an *E.coli* concentration of 12,000 cfu/100ml. As the source of the elevated *E.coli* was not able to be determined, the test conducted on this date is considered to be inconclusive.

For the MST testing conducted on 10 November 2017, human bacteriodes were not detected and instead only animal bacteriodes were reported (Documents 15a and 16). These data indicate that at the time of measurement, when thermotolerant coliforms were measured at concentrations of 35 cfu/100ml and 100 cfu/100ml, the source was of animal origin.

It has been interpreted that the source of the elevated thermotolerant coliforms measured in the dam is most likely due to birds defecating in the water body, rather than stock or other mammals (Document 15a). Whilst I agree with this view point based on the data for the specific sampling period and given that the dam is fenced off from livestock, in view of the limited dataset available

(one inconclusive test and the other two taken on the same date) and nature of the wastewater system (as described following), it cannot be ruled out that human sources have not contributed to the elevated thermotolerant coliforms reported at other times as the data are also consistent with a combination of treated septic tank effluent from the adjacent Estate mixed (essentially diluted) with stormwater.

Specifically, it is reported that the Estate is unsewered, with treated wastewater discharged to subsurface absorption trenches (Document 15a). Due to the nature of the underling soil (permeable sand overlying dense clay subsoil) and small allotment sizes, it is reported that deep subsurface drainage can be limited, resulting in the migration of wastewater into the stormwater system, particularly in wet weather or in peak population times (Document 15a).

The treatment system employed at the Estate appears to rely on the use of predominantly primary treatment (i.e. septic systems), with only recent dwellings having secondary treatment systems. In addition, it appears that the systems can become periodically overloaded. That is, under abnormal conditions, there is the potential that treatment is not optimal, resulting in the release of partially treated septic tank effluent to stormwater.

The aforementioned wastewater regime appears to be restricted to the older dwellings in the Estate. Specifically, “The houses that have been constructed in recent years have installed secondary treatment systems to increase the quality of wastewater reused or disposed onsite. The EPA and South Gippsland Shire have become more stringent in their requirements for domestic wastewater - for Victoria in general and for the Estate specifically” (Document 15a).

It is my opinion from an environmental perspective that the mixing of stormwater with partially treated septic tank effluent is inappropriate and inconsistent with the management principle of segregating wastewater from ‘clean’ water streams. It is stated in EPA Publication 464.4, *Use of Reclaimed Water*, June 2003, that “.. supplementing reclaimed water with other water sources in order to meet the minimum treatment standards (such as levels for BOD, SS, E.coli, pH).. is not an acceptable practice as reclaimed water must meet the required criteria prior to dilution with other sources.” It is acknowledged that this situation appears to reflect a legacy planning issue that has been more recently addressed.

Based on the nature of the wastewater disposal at the Estate, it is considered to be inherently very difficult to consistently and reliably ensure suitable water quality within the dam to support irrigation and livestock watering purposes based on the current system. The system would need to be upgraded to include a pre-treatment step to ensure that only acceptably treated septic tank effluent is released into the dam. For example, an expanded adsorption trench system capable of accepting the volume of wastewater without migrating to stormwater could be utilised. Upgrades

from primary to secondary septic systems could also be implemented. Otherwise, restrictions on the use of the water would need to apply.

4.2.6 Question 6

What external controls exist to regulate dam water quality?

Dam water quality in Victoria is regulated by both the *Water Act 1989* and the *Environment Protection Act 1970*.

The *Water Act 1989* provides for the protection of the 'beneficial purpose' of water resources, including dams. In the *Water Act 1989, '*pollute' is defined as "..to alter (directly or indirectly) the physical, thermal, chemical, biological or radioactive properties of the water so as to make the water—

(a) less fit for any beneficial purpose for which it is, or may reasonably be expected to be, used; or

(b) harmful or potentially harmful to—

(i) the health, welfare or safety of human beings; or

(ii) animals, birds, wildlife, fish or other aquatic life; or

(iii) plants or other vegetation; or

(iv) other organisms;"

In addition, the *Environment Protection Act 1970* requires that:

"(1) A person shall not pollute any waters so that the condition of the waters is so changed as to make or be reasonably expected to make those waters—

(a) noxious or poisonous;

(b) harmful or potentially harmful to the health, welfare, safety or property of human beings;

(c) poisonous, harmful or potentially harmful to animals, birds, wildlife, fish or other aquatic life;

(d) poisonous, harmful or potentially harmful to plants or other vegetation; or

(e) detrimental to any beneficial use made of those waters. "

'Waters' is defined in the *Environment Protection Act 1970* as "reservoir, tank, billabong, anabranch, canal, spring, swamp, natural or artificial channel, lake, lagoon, waterway, dam, tidal water, coastal water or groundwater". I note that the *Environment Protection Act 1970* also provides requirements for the regulation of septic tank systems, which is of relevance as the dam receives septic tank effluent from the adjacent Estate. The requirements include those related to permitting and maintenance.

The quality of surface waters in Victoria is further protected by the provisions of the SEPP (WoV). However, in the SEPP (WoV), “surface waters excludes groundwaters and waters within artificial wastewater treatment systems, reticulated water supply distribution systems, off-stream private dams, and piped or underground drains”.

Based on my opinion that it cannot be confidently determined that the dam water is suitable for unencumbered irrigation of pasture and crops, and watering of livestock, and therefore that it must be considered that the water is unsuitable for the irrigation of pasture and crops, and watering of livestock, in accordance with both the *Water Act 1989* and the *Environment Protection Act 1970*, the water is considered to be polluted.

Specifically, under the *Water Act 1989*, the water is considered to be potentially harmful to the health, welfare or safety of human beings and animals. Similarly, under the *Environment Protection Act 1970*, the water quality has been changed such that it is reasonably expected to make those waters potentially harmful to the health, welfare, safety or property of human beings and animals.

5. CONCLUSIONS

Based on my consideration of the available documentation, I conclude that:

- It is not possible to confirm that the monitoring program was undertaken in accordance with EPA requirements as insufficient documentation was available.
- Based on my review of the results provided with regard to the relevant criteria for irrigation and livestock watering, consideration of the potential for human derived faecal matter to enter the dam, and evaluation of subsequent risk, I am of the opinion that it cannot be confidently determined that the dam water is suitable for unencumbered irrigation of pasture and crops, and watering of livestock. Therefore, it must be considered that the water is unsuitable until such time that management measures can be implemented to reduce risks to acceptable levels.
- Dam water quality in Victoria is regulated by both the *Water Act 1989* and the *Environment Protection Act 1970*. These require that the uses of the water that it is intended to be used should not be compromised.
- In accordance with both the *Water Act 1989* and the *Environment Protection Act 1970*, the water is considered to be polluted. Specifically, under the *Water Act 1989*, the water is considered to be potentially harmful to the health, welfare or safety of human beings and animals. Similarly, under the *Environment Protection Act 1970*, the water quality has been changed such that it is reasonably expected to make those waters potentially harmful to the health, welfare, safety or property of human beings and animals.
- Based on the data provided for the November 2017 monitoring event, it is considered that the source at that time was animal derived faecal matter. However, in view of the limited dataset available (one inconclusive test and the other two taken on the same date) and nature of the wastewater system, it cannot be ruled out that human sources have not contributed to the elevated thermotolerant coliforms reported at other times as the data are also consistent with a combination of treated septic tank effluent from the adjacent Estate mixed (essentially diluted) with stormwater.
- The mixing of stormwater with septic tank effluent is inappropriate and inconsistent with the management principle of segregating wastewater from clean water streams. To that end, it is considered to be inherently very difficult to ensure suitable water quality within the dam to support irrigation and livestock watering purposes based on the current system.
- The system would need to be upgraded to prevent ingress of partially treated wastewater into the stormwater system, For example, an expanded adsorption trench system capable of accepting the volume of wastewater without migrating to stormwater could be utilised. Upgrades from primary to secondary septic systems could also be implemented. Otherwise, restrictions on the use of the water would need to apply.

Appendix A

Instructions from Wisewould Mahony Lawyers

LAWYERS
MELBOURNE | GEELONG
ABN: 26 965 814 421

Our reference: 40064584
Direct Line: (03) 9612 7209
Email: rob.mcgirr@wisemah.com.au

Monday, 26 March 2018

Darren Bennetts
Peter J Ramsay and Associates
Level 10, 222 Kings Way
South Melbourne, Vic 3205

BY EMAIL: darren.bennetts@pjra.com.au

Dear Darren,

Ansevata Nominees Pty Ltd ("Ansevata") v South Gippsland Shire Council ("SGSC")

1. Summary Of Factual Background

1.1. We act for Ansevata (our client). Our client owns and operates a farm at its property known as "Marapana" at Loop Road, Walkerville. Marapana is about 400 hectares in size.

1.2. In about 1990 the then Shire of Woorayl acquired about 2.585 hectares of our client's land to construct a retarding basin or dam (**dam**) to receive storm water drainage and treated septic effluent from an area known as the Promontory Views Estate at Walkerville (**Estate**).

1.3. We are instructed that the dam is unfenced but the retarding basin is fenced. The dam is located off Panoramic Drive, Walkerville, approximately 200 m north of the local CFA building on the basin land. The dam was designed with dimensions of 120 metres x 200 metres and a storage capacity of 15 ML. – See plan 30-158 dated 16/11/1987

1.4. The dam captures flows from the Estate. The Estate covers approximately 25 ha, including 380 lots, of which approximately three quarters have dwellings most of which are holiday homes. The dam receives storm water from the majority, but not the entirety, of the Estate. There is no reticulated water supply or sewerage. Domestic wastewater is treated and reused/disposed on each individual site.

1.5. Our client uses the farm to graze cattle and conduct a vineyard. Our client has used the water in the dam to irrigate its crops and pastures and water stock. Our client breeds cattle and sheep on the property. Currently they have 220 breeding cows, 2400 cross ewes and 40 rams. The vineyard is a Pinot Noir area of approximately 2 hectares. Our clients have a windmill pump next to the retarding basin dam connected to an underground water pipe of about 1 KM which takes the water from the retarding basin to the home dam as required.

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PO Box 4140 Geelong VIC 3220
DX 22057 Geelong
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enquiries@wisemah.com.au

1.6. By an agreement dated 8 May 1990 our client and the Shire agreed that our client had an entitlement to use the water in the dam for the purpose of irrigation of pasture and crops and watering of stock (**Agreement**). The Agreement sets out the rights and obligations of the parties. We enclose a copy of the Agreement. We refer you in particular to clauses 6 and 8 of the Agreement.

1.7. Pursuant to the Agreement the Shire has undertaken various tests of the water in the dam. Copies of all of the tests results which have been provided to our client by the Shire are attached.

2. Material Provided

2.1. We enclose the following materials for your consideration:

2.1.1. Expert Witness Cod of Conduct for the Court of Victoria (Form 44A).

2.1.2. Extract of the Civil Procedure Act 2010 (Vic) about the obligations on expert witnesses in Victorian Courts.

2.1.3. Agreement for taking water dated 8, May 1990

2.1.4. Deed of variation to the water agreement dated 28, November 2016

2.1.5. Storage capacity area and location plan 30-158 dated 16, November 1887

2.1.6. Walkerville basin feature level survey dated 27, January 2016 by Mackie Surveying

2.1.7. Copies of certificates of analysis as per the schedule attached

2.1.8. Aerial site view

2.1.9. Basin sampling locations SP1 to SP4: SP1 and SP3 are water outlets of the North West and South West corner of the dam: SP2 is the stormwater outlet of the South East corner of the dam from the Estate by underground pipe

3. Opinion Required

We are instructed to request that you provide us with a written report containing your opinion as to the following matters

3.1. What are the "methods recommended by the Environmental Protection Authority", as at 1990 and now, for testing biological and chemical pollution referred to in clause 8 of the agreement? Have the methods recommended by the Environmental Protection Authority been followed?

3.2. Is there an appropriate, common or standard methodology or regime for collecting samples of water from a dam for testing? Has that methodology been followed?

3.3. What if any are the standards to assess whether water in the dam is suitable for the purpose of irrigation of pasture and crops of watering of stock?

3.4. Based on the tests result attached to this letter, is the water in the dam suitable for the purpose of irrigation of pasture and crops and watering of stock?

3.5. If in your opinion the water of the dam is not suitable for the purpose of irrigation of pasture and crops and watering of stock, what are the likely causes of the water not meeting that purpose?

3.6. What external controls exist to regulate dam water quality?

4. Contents of report

4.1 Please ensure that you include the following in the report:

a) An acknowledgement from you that you have read and agree to be bound by the Expert Witness Code of Conduct for the Supreme Court of Victoria (a copy is enclosed). Please note that paragraph three of the Code specifies matters that your report must contain including the declaration in paragraph 3(i) of the code.

b) An acknowledgement of the obligations on an expert witness imposed by the Civil Procedure Act 2010 and that you have compiled with those obligations in preparing your report.

5. Your Duties and Responsibilities as an Expert Witness:

5.1. The Report ultimately prepared by you must be prepared in accordance with the Expert Witness Code of Conduct. In particular, we note that you are required to include in your report the following matters:

a) your name and address;

b) your qualifications as an expert on the issue the subject of the report

c) a statement identifying your areas of expertise

d) a statement setting out your expertise to make the report

e) all instructions that define the scope of the report (original and supplementary and whether in writing or oral);

f) the facts, matters and all assumptions of fact, on which the opi8noins are based on which the report proceeds;

g) your reasons for each opinion expressed;

h) reference to those documents and other literature or materials you have been instructed to consider or take into account in preparing your report and the literature or other materials used in making the report.

i) any examinations, tests or other investigations upon which you relied in the making of the report, including details of the identity and qualifications of the person who carried out the examinations, tests or other investigations;

j) a summary of your opinion or opinions (to be located at the beginning of the report); and

k) a statement setting out any questions falling outside your expertise and also a statement indicating whether the report is incomplete or inaccurate in any respect.

6. Terms of Engagement

6.1. The terms of your retainer are set out in the Schedule A enclosed. Please sign and return a copy of the Terms of Engagement.

You are instructed to undertake such inquiries as you may regard as appropriate to enable you to respond to the questions set out above. In particular, if you require any further information please let us know.

If we have requested that you express an opinion on a matter which is outside your area of expertise, please inform us.

We look forward to receiving your report.

Yours faithfully,

WISEWOULD MAHONY
Partner: Robert McGirr
Contact: Rob McGirr – Partner
Email: rob.mcgirr@wisemah.com.au
Phone: (03) 9612 7209

Enc.

Schedule of Copies of Certificate of Analysis

Date of Issue	Document	Laboratory	Nata Approved	Level of E.coli org/100ml	Sample Time	pH (Units)	Test Date	Sealed Container	Other
10/03/2016	Certificate of Analysis	ALS Water	Yes	380	02/02/2016	7.2	No test date	No mention	Batch no. 16-06822
16/03/2016	Certificate of Analysis	ALS Water	Yes	440	08/03/2016	7.2	No test date	No mention	Batch no. 16-12750
29/03/2016	Certificate of Analysis	ALS Water	Yes	4400	18/03/2016	7.6	No Test date	No mention	Batch 16-14804
30/05/2016	Certificate of Analysis	ALS Water	Yes	260	24/05/2016	7.7	No Test date	No mention	Batch No. 16-39325
13/09/2016	Certificate of Analysis	ALS Water	Yes	430/130	06/09/2016	7.3/7.1	No test date	No Mention	Batch no. 16-41090
20/10/2016	Certificate of Analysis	ALS Water	Yes	820	11/10.2016	7.2	No test date	No mention	Batch no. 16-46351
14/03/2017	Certificate of Analysis	ALS Water	Yes	110	07/03/2017	8.2	No test date	No mention	Batch no. 17-12392
14/03/2017	Certificate of Analysis	ALS Water	Yes	54	07/03/2017	8	No test date	No mention	Batch no. 17-12396
23/05/2017	Certificate of Analysis	ALS Water	Yes	330	16/05/2017	7.3	No test date	No Mention	Batch no. 17-23516
25/07/2017	Certificate Of Analysis	ALS Water	Yes	440	18/07/2017	6.9	No test date	No mention	Batch no. 17-33391
18/09/2017	Certificate of Analysis	ALS Water	Yes	200	12/09/2017	6.7	No test date	No mention	Batch no. 17-41320
18/09/2017	Certificate of Analysis	ALS Water	Yes	200	12/09/2017	6.7	No test date	No Mention	Batch no. 17-41322
21/11/2017	Certificate of Analysis	ALS Water	Yes	94	14/11/2017	7.0	No test date	No mention	Batch no. 17-50258
21/11/2017	Certificate of Analysis	ALS Water	Yes	63	14/11/2017	6.9	No test date	No mention	Batch no. 17-50259
23/01/2018	Certificate of Analysis	ALS Water	Yes	120	16/01/2018	7.5	No test date	No mention	18-04813

SCHEDULE A

Terms of Engagement

Your engagement will be on the following terms:

1 Your fees/accounts

1.1 Prior to undertaking any work please provide an estimate of your fees prior to undertaking this retainer. Ansevata Pty Ltd will only pay fees that have our prior approval in writing;

1.2 You will be required to provide a tax invoice for work performed in relation to this matter each month, by the second last business day of each month. Any tax invoice must:

1.2.1 Provide a detailed breakdown of the specific tasks performed by you and time spent by you in performing each of those tasks; and

1.2.2 Set out the total fees and disbursements (including those being invoiced at the time) incurred to date in this matter.

1.3 Your accounts will be paid when Ansevata Pty Ltd has put us in funds to meet payment. In that regard, we advise that we intend to issue accounts to Ansevata Pty Ltd on a monthly cycle and for payment to be made within a month from date of issue. The result is that there can be a delay of an equivalent period between you rendering an account and it being paid.

1.4 Given point 1.1.1 above, you acknowledge and agree that payment to you of any fees comprised in any tax invoice rendered to us under the terms of this letter is conditional upon Wisewould Mahony receiving a corresponding payment in respect of that invoice from Ansevata Pty Ltd.

2 Disbursements

2.1 You will be required to advise us of any anticipated disbursements so that Ansevata Pty Ltd can agree to them prior to expenditure.

2.2 Ansevata Pty Ltd will only pay for expenses that have our prior approval in writing.

3 Legal professional privilege

3.1 All information, instructions and communications provided to you are confidential and are not to be used by you for any purpose other than for the purpose of your engagement under this letter.

3.2 Any communications by Ansevata Pty Ltd or us with you concerning the assistance you are providing in this matter are subject to legal professional privilege. Such communications include written documents, oral communications, electronic communications, video communications etc. For example, privilege will attach to:

3.2.1 Letters to you;

3.2.2 Notes you make of meetings or discussions with Ansevata Pty Ltd, us or with any other member of the legal team, including counsel, experts etc.;

3.2.3 Notes you make in the course of preparing any document or statement;

3.2.4 Drafts of any statements;

3.2.5 Your copies of any final statements.

3.3 If you are ever called upon to produce such documents to a third party (whether by subpoena or otherwise) you must contact us immediately, so that steps may be taken to preserve that privilege on behalf of our client.

3.4 You acknowledge that you owe a fiduciary duty to Ansevata Pty Ltd pursuant to your engagement under this letter not to use any information you have obtained for any purpose other than for the purpose of your engagement under this letter.

3.5 You must do everything reasonably necessary to protect the confidentiality of all information acquired during the course of your engagement under this letter so as not to waive legal professional privilege.

4 Confidential information

4.1 By virtue of your retainer you may become aware of information relating to the business affairs of SGSC and its subsidiaries, the business affairs of Ansevata and Wisewould Mahony, including but not limited to technical information, financial information and information about staff and clients (**Confidential Information**).

4.2 Confidential Information relating to:

4.2.1 SGSC and its subsidiaries remains the sole property of SGSC;

4.2.2 The Ansevata Pty Ltd Parties remains the sole property of the Ansevata Pty Ltd Parties; and

4.2.3 Wisewould Mahony remains the sole property of Wisewould Mahony.

4.3 You must not either during (except in the lawful discharge of your duties) or after your retainer has ceased, without the prior written consent of Ansevata Pty Ltd or Wisewould Mahony as the case may be, directly or indirectly, disclose to any person the Confidential Information for your own or another's benefit. That

consent may be withheld or given on such terms as Ansevata Pty Ltd or Wisewould Mahony in their sole and unfettered discretion consider appropriate.

4.4 You must immediately notify Wisewould Mahony if you suspect misuse of any Confidential Information and assist in any proceedings taken for alleged misuse of Confidential Information.

4.5 Further, the Proceeding may be sensitive and you acknowledge that you must not make any statements (oral, written or otherwise) in public or the media in relation to the Proceeding.

4.6 The terms of the retainer are and remain confidential.

5 Intellectual Property

5.1 You acknowledge and agree that Ansevata Pty Ltd is the exclusive owner of all copyright, databases and other intellectual property related to works created or designed by you in the course of your assistance under this letter.

5.2 The restraints contained in this clause are separate, distinct and several so that the unenforceability of any restraint does not affect the enforceability of other restraints.

6 Termination

6.1 Wisewould Mahony on the instructions of Ansevata Pty Ltd , may terminate your assistance under this letter without cause at any time.

6.2 You may terminate the retainer by giving Wisewould Mahony not less than one month's notice in writing during the term of the retainer.

6.3 On termination, you must return to Wisewould Mahony all documents, computer disks, files and other material, including draft copies and final copies of any reports that came into existence pursuant to your engagement under this letter, either provided to you or created by you in respect of your assistance under this letter and your engagement under this letter.

7 Acknowledgement of terms of engagement

7.1 A copy of these terms is enclosed for your approval. If you accept these terms of engagement, please sign the copy provided and return.

7.2 In the absence of receipt by us of the signed acknowledgment your acceptance of our instructions will serve as acceptance of these terms.

_____ _____

Dated Signed

SUPREME COURT OF VICTORIA

Form 44A Rule 44.01

EXPERT WITNESS CODE OF CONDUCT

Application of Code

1. This Code of Conduct applies to any expert witness engaged or appointed—

   (a) to provide an expert's report for use as evidence in proceedings or proposed proceedings; or

   (b) to give opinion evidence in proceedings or proposed proceedings.

General Duties to the Court

2. An expert witness is not an advocate for a party and has a paramount duty, overriding any duty to the party to the proceedings or other person retaining the expert witness, to assist the Court impartially on matters relevant to the area of expertise of the witness.

Content of Report

3. Every report prepared by an expert witness for use in Court shall clearly state the opinion or opinions of the expert and shall state, specify or provide—

   (a) the name and address of the expert;

   (b) an acknowledgment that the expert has read this code and agrees to be bound by it;

   (c) the qualifications of the expert to prepare the report;

   (d) the assumptions and material facts on which each opinion expressed in the report is based (a letter of instructions may be annexed);

   (e) the reasons for and any literature or other materials utilised in support of each such opinion;

(f) (if applicable) that a particular question, issue or matter falls outside the expert's field of expertise;

(g) any examinations, tests or other investigations on which the expert has relied, identifying the person who carried them out and that person's qualifications;

(h) to the extent to which any opinion which the expert has expressed involves the acceptance of another person's opinion, the identification of that other person and opinion expressed by that other person;

(i) a declaration that the expert has made all the inquiries which the expert believes are desirable and appropriate (save for any matters identified explicitly in the report) and that no matters of significance which the expert regards as relevant have, to the knowledge of the expert, been withheld from the Court;

(j) any qualification of an opinion expressed in the report without which the report is or may be incomplete or inaccurate;

(k) whether any opinion expressed in the report is not a concluded opinion because of insufficient research or insufficient data or for any other reason; and

(l) where the report is lengthy or complex, a brief summary of the report at the beginning of the report.

Supplementary Report Following Change of Opinion

4. Where an expert witness has provided to a party (or that party's legal representative) a report for use in Court, and the expert thereafter changes his or her opinion on a material matter, the expert shall forthwith provide to the party (or that party's legal representative) a supplementary report which shall state, specify or provide the information referred to in paragraphs (a), (d), (e), (g), (h), (i), (j), (k) and (l) of clause 3 of this code and, if applicable, paragraph (f) of that clause.

5. In any subsequent report (whether prepared in accordance with clause 4 or not) the expert may refer to material contained in the earlier report without repeating it.

Duty to Comply with the Court's Directions

6. If directed to do so by the Court, an expert witness shall—

   (a) confer with any other expert witness;

   (b) provide the Court with a joint report specifying (as the case requires) matters agreed and matters not agreed and the reasons for the experts not agreeing; and

   (c) abide in a timely way by any direction of the Court.

Conference of Experts

7. Each expert witness shall—

   (a) exercise his or her independent judgment in relation to every conference in which the expert participates pursuant to a direction of the Court and in relation to each report thereafter provided, and shall not act on any instruction or request to withhold or avoid agreement; and

   (b) endeavour to reach agreement with the other expert witness (or witnesses) on any issue in dispute between them, or failing agreement, endeavour to identify and clarify the basis of disagreement on the issues which are in dispute.

THE CIVIL PROCEDURE ACT 2010

PART 2.3—THE OVERARCHING OBLIGATIONS

16 Paramount duty

Each person to whom the overarching obligations apply has a paramount duty to the court to further the administration of justice in relation to any civil proceeding in which that person is involved, including, but not limited to—

(a) any interlocutory application or interlocutory proceeding;

(b) any appeal from an order or a judgment in a civil proceeding;

(c) any appropriate dispute resolution undertaken in relation to a civil proceeding.

17 Overarching obligation to act honestly

A person to whom the overarching obligations apply must act honestly at all times in relation to a civil proceeding.

18 Overarching obligation—requirement of proper basis

A person to whom the overarching obligations apply must not make any claim or make a response to any claim in a civil proceeding that—

(a) is frivolous; or

(b) is vexatious; or

(c) is an abuse of process; or

(d) does not, on the factual and legal material available to the person at the time of making the claim or responding to the claim, as the case requires, have a proper basis.

19 Overarching obligation to only take steps to resolve or determine dispute

For the purpose of avoiding undue delay and expense, a person to whom the overarching obligations apply must not take any step in connection with any claim or response to any claim in a civil proceeding unless the person reasonably believes that the step is necessary to facilitate the resolution or determination of the proceeding.

20 Overarching obligation to cooperate in the conduct of civil proceeding

A person to whom the overarching obligations apply must cooperate with the parties to a civil proceeding and the court in connection with the conduct of that proceeding.

21 Overarching obligation not to mislead or deceive

A person to whom the overarching obligations apply must not, in respect of a civil proceeding, engage in conduct which is—

(a) misleading or deceptive; or

(b) likely to mislead or deceive.

22 Overarching obligation to use reasonable endeavours to resolve dispute

A person to whom the overarching obligations apply must use reasonable endeavours to resolve a dispute by agreement between the

persons in dispute, including, if appropriate, by appropriate dispute resolution, unless—

(a) it is not in the interests of justice to do so; or

(b) the dispute is of such a nature that only judicial determination is appropriate.

Example

A proceeding where a civil penalty is sought may be of such a nature that only judicial determination is appropriate.

23 Overarching obligation to narrow the issues in dispute

If a person to whom the overarching obligations apply cannot resolve a dispute wholly by agreement, the person must use reasonable endeavours to—

(a) resolve by agreement any issues in dispute which can be resolved in that way; and

(b) narrow the scope of the remaining issues in dispute—

unless—

(c) it is not in the interests of justice to do so; or

(d) the dispute is of such a nature that only judicial determination is appropriate.

24 Overarching obligation to ensure costs are reasonable and proportionate

A person to whom the overarching obligations apply must use reasonable endeavours to ensure that legal costs and other costs incurred in connection with the civil proceeding are reasonable and proportionate to—

(a) the complexity or importance of the issues in dispute; and

(b) the amount in dispute.

25 Overarching obligation to minimise delay

For the purpose of ensuring the prompt conduct of a civil proceeding, a person to whom the overarching obligations apply must use reasonable endeavours in connection with the civil proceeding to—

(a) act promptly; and

(b) minimise delay.

26 Overarching obligation to disclose existence of documents

(1) Subject to subsection (3), a person to whom the overarching obligations apply must disclose to each party the existence of all documents that are, or have been, in that person's possession, custody or control—

(a) of which the person is aware; and

(b) which the person considers, or ought reasonably consider, are critical to the resolution of the dispute.

(2) Disclosure under subsection (1) must occur at—

(a) the earliest reasonable time after the person becomes aware of the existence of the document; or

(b) such other time as a court may direct.

(3) Subsection (1) does not apply to any document which is protected from disclosure—

(a) on the grounds of privilege which has not been expressly or impliedly waived; or

(b) under any Act (including any Commonwealth Act) or other law.

(4) The overarching obligation imposed by this section—

(a) is an ongoing obligation for the duration of the civil proceeding; and

(b) does not limit or affect a party's obligations in relation to discovery.

27 Protection and use of information and documents disclosed under overarching obligation in section 26

(1) A person who receives any information or documents provided by another person involved in the civil proceeding as a result of disclosure in compliance with the overarching obligation in section 26 is subject to an obligation not to use the information or documents, or permit the information or documents to be used, for a purpose other than in connection with the civil proceeding.

(2) The obligation under subsection (1) is taken to be an obligation to the court, contravention of which constitutes contempt of court.

(3) A person—

(a) may agree in writing to the use of information or documents otherwise protected under subsection (1); or

(b) may be released from the obligation imposed under subsection (1) by leave of the court.

(4) Without limiting this section or discovery in any civil proceeding any information or documents exchanged in compliance with the overarching obligation in section 26 is required to be discovered in the civil proceeding to be admissible in that proceeding.

(5) Nothing in this section limits any other undertaking to a court (implied or specific) whether at common law or otherwise, in relation to information or documents disclosed or discovered in a civil proceeding.

PART 2.4—SANCTIONS FOR CONTRAVENING THE OVERARCHING OBLIGATIONS

28 Court may take contravention of overarching obligations into account

(1) In exercising any power in relation to a civil proceeding, a court may take into account any contravention of the overarching obligations.

(2) Without limiting subsection (1), in exercising its discretion as to costs, a court may take into account any contravention of the overarching obligations.

29 Court may make certain orders

(1) If a court is satisfied that, on the balance of probabilities, a person has contravened any overarching obligation, the court may make any order it considers appropriate in the interests of justice including, but not limited to—

(a) an order that the person pay some or all of the legal costs or other costs or expenses of any person arising from the contravention of the overarching obligation;

(b) an order that the legal costs or other costs or expenses of any person be payable immediately and be enforceable immediately;

(c) an order that the person compensate any person for any financial loss or other loss which was materially contributed to by the contravention of the overarching obligation, including—

(i) an order for penalty interest in accordance with the penalty interest rate in respect of any delay in the payment of an amount claimed in the civil proceeding; or

(ii) an order for no interest or reduced interest;

(d) an order that the person take any steps specified in the order which are reasonably necessary to remedy any contravention of the overarching obligations by the person;

(e) an order that the person not be permitted to take specified steps in the civil proceeding;

(f) any other order that the court considers to be in the interests of any person who has been prejudicially affected by the contravention of the overarching obligations.

(2) An order under this section may be made—

(a) on the application of—

(i) any party to the civil proceeding; or

(ii) any other person who, in the opinion of the court, has a sufficient interest in the proceeding; or

(b) on the court's own motion.

(3) This section does not limit any other power of a court to make any order, including any order as to costs.

30 Applications for orders under section 29

(1) An application for an order under section 29 is to be made—

(a) in the court in which the civil proceeding was, or is being, heard; and

(b) in accordance with the rules of court.

(2) An application for an order under section 29 must be made prior to the finalisation of the civil proceeding to which the application relates (excluding any period for appeals).

(3) For the purposes of subsection (2), if an order, including an order in respect of costs, is made after the date of finalisation of the civil proceeding to which the application relates, the date of making of the last of the orders is taken to be the date of finalisation of that proceeding.

31 Extension of time for application

(1) Despite section 30(2), a person may apply to the court for an extension of time to apply for an order under section 29 after the finalisation of the civil proceeding.

(2) The court may grant an extension of time for making an application under section 29 if satisfied that the party making the application was not aware of the contravention of the overarching obligations until after the end of the period specified in section 30(2).

ANNEXURE A
Water Agreement

10

TAYLOR SPLATT & PARTNERS
LAWYERS
FRANKSTON

AGREEMENT FOR TAKING OF WATER

THIS AGREEMENT made the 8th day of May 1990

BETWEEN THE PRESIDENT COUNCILLORS AND RATEPAYERS OF THE SHIRE OF WOORAYL of 9 Smith Street Leongatha in the State of Victoria a municipality incorporated under the Local Government Act (hereinafter called "the Shire" which expression shall include its successors and the successors of the basin land as hereinafter defined and each and every part thereof) of the one part and ANSEVATA NOMINEES PTY. LTD. of 492 St. Kilda Road Melbourne in the State of Victoria (hereinafter called "the Licensee" which expression shall include the said Ansevata Nominees Pty. Ltd. and its receivers liquidators and assigns and the registered proprietor or proprietors for the time being and from time to time of the Licensee's land as hereinafter defined, and each and every part thereof) of the other part WITNESSES THAT WHEREAS:-

A. The Shire is empowered pursuant to the Local Government Act to undertake drainage works for the provision, inter alia, of adequate storm water control;

B. The Shire has approved a scheme pursuant to Section 651 of the Local Government Act for the construction of an underground storm water drainage scheme and retarding basin to receive storm water and treated septic tank effluent from the area known as Promontory Views Estate at Walkerville within the municipal district of the Shire;

C. The Licensee is the registered proprietor of all that piece of land comprises Lots 1 and 2 on Plan of Subdivision No. 212161J Parish of Waratah being the land comprised in Certificates of Title Volume 9829 Folios 950 and 951 ("the Licensee's land" which expression shall not include "the basin land" hereinafter described, where the context so requires);

D. The Shire has agreed with the Licensee to purchase that part of the licensee's land comprising 2.7 hectares of Lot 1 aforesaid delineated and coloured red on the plan in Schedule 1 to this Agreement ("the basin land") for the construction and maintenance of a storm water retarding basin ("the dam"). The precise dimensions of the basin land are being surveyed by or under direction of the Shire;

E. The sale and transfer by the Licensee to the Shire of the basin land is conditional on the execution and exchange of this Agreement and the Shire making available all water to be stored in the dam free of charge to the Licensee for irrigation and stock watering purposes in accordance with this Agreement,

NOW THEREFORE IT IS EXPRESSLY AGREED by and between the parties hereto as follows:-

1. This Agreement shall bind the Shire and the Licensee and come into full force and effect upon:-

1.1 The approval of the Scheme for the drainage of Promontory Views Estate pursuant to Section 651 or any other appropriate provisions of the Local Government Act 1958, and

1.2 The exchange of a Contract of Sale in the form of Schedule 2 executed by the Licensee as vendor and the Shire as purchaser of the basin land including a condition that it is subject to this Agreement, and the delivery to the Shire of a registrable form of Transfer of the basin land free of encumbrances save for any presently registered easements and the covenant and easement and profit á prendre hereinafter described, and the Licensee doing all acts, matters or things required to enable the Shire to become registered as the proprietor of the basin land, subject as aforesaid.

1.3 The Shire shall prepare a Plan of Survey of the basin land in sufficient form for registration in the Land Titles Office.

2. The Shire shall, within six months from the date of commencement of this Agreement as provided in 1 hereof:-

2.1 Erect a stock proof post and wire fence on the common boundary between the basin land and the Licensee's land and in any event before commencement of any dam construction works referred to in Clause 2.2;

2.2 Not before erection of the fence referred to in 2.1, construct a dam having a capacity of not less than 13.5 megalitres on the basin land in accordance with sound engineering knowledge and practice generally as shown in Schedule 3.

3. The Shire shall, after construction of the dam:

3.1 Properly maintain and repair the said fence and the dam and ensure that the same does not in any way become or cause a nuisance;

3.2 Not without the consent of the Licensee use the basin land for any purpose other than for the collection, storage and disposal of water in or from the dam and purposes necessarily incidental thereto, including the purposes authorized by this Agreement. It is expressly agreed that this restriction shall run with the land in favour of the Licensee's land and each and every part thereof (save for the basin land) and shall be registered as a covenant against the title of the basin land to issue to the Shire after registration of the Transfer thereof from the Licensee. Such covenant shall be incorporated in the Transfer of the basin land in registrable form.

4. In part consideration for the transfer of the basin land from the Licensee to the Shire and conditionally upon such transfer, the Shire agrees, and hereby grants to the Licensee, the right hereinafter described in perpetuity or until, with the Licensee's consent as provided in the immediately preceding paragraph, the basin land is no longer used for the purpose therein described PROVIDED THAT should it become necessary, by reason of any declaration or order by any Court of appropriate jurisdiction or for any other legal reason, to read down or reduce the period of this right, it is expressly agreed that this right shall continue

for a period of 80 years from the date of commencement of this Agreement unless earlier terminated with the consent of the Licensee. The right hereby given is for the Licensee free of any charge by the Shire:-

4.1 To take water from the dam in such quantities and at such times as the Licensee requires for irrigation of and watering of stock on, the Licensee's land without causing nuisance or negligence but the Licensee shall not take more than 50% of the water in the dam at intervals of not less than 30 days;

4.2 To construct or place on or within that part of the basin land and into the water of the dam (as may be required from time to time) such pipes, pumps and equipment and facilities as are reasonably necessary for the purpose described in 4.1 hereof and to maintain, repair, replace and/or remove the same as the Licensee deems fit without causing or creating nuisance or negligence and without damaging the dam structure or any fences constructed on the basin land or its boundaries by the Shire PROVIDED THAT the Licensee may enter the basin land for the aforesaid purposes described in 4.1 and 4.2 hereof through a gate to be constructed and maintained at the Shire's expense on the common boundary between the basin land and the Licensee's land. The Licensee shall be entitled to place such pipe, pumps, etc. at one or more points on the basin land as may be required and the gate shall be constructed in such place as directed by the

Licensee.

5. It is expressly agreed that the right described in paragraph 4 hereof is not only a personal right but the benefit of it shall run with and attach to the Licensee's land and each and every part thereof whether or not the present Licensee, Ansevata Nominees Pty. Ltd., continues to be the registered proprietor thereof.

6. It is expressly agreed that the water from the dam shall not be suitable for human consumption and the Shire gives no warranty or representation that the waters from the dam will be suitable for any purpose other than the irrigation of pasture and crops and watering of stock.

7. Nothing herein contained authorizes or permits the Shire by any act or omission to be negligent or cause any nuisance or breach of statutory duty or any other breach of the law in relation to:

7.1 The construction and/or maintenance of the dam;

7.2 The quality of the water in the dam or to be in the dam;

7.3 The collection or discharge of water to/from the dam;

7.4 The Shire's ownership/occupation of the basin land.

8. The Shire shall, at least six times per year at no less an interval than one calendar month, and at such other times when the Licensee has reasonable grounds to believe that the

waters of the dam may be polluted, take samples of such waters and have them tested for biological and chemical pollution in accordance with methods recommended by the Environment Protection Authority and make the results of such tests available to the Licensee. It is expressly agreed that the Shire shall take all necessary action to prevent untreated septic tank effluent being discharged into the dam.

9. It is the intention of the Shire and the Licensee that the right given to the Licensee described in paragraph 4 of this Agreement, is a right in the nature of an easement and/or profit á prendre and the Licensee has the right to register notifications thereof on the title to issue to the basin land by registering an easement or profit á prendre in favour of the Licensee's land over such part of the basin land as is described in paragraph 4.1 or to register a Caveat against the title to issue in respect of the basin land giving notice of such right.

10. The Shire shall pay all costs and disbursements of the Licensee incurred in the preparation of this Agreement and the registration or notification of any easement and/or profit á prendre or Caveat against the title to issue in respect of the basin land.

IN WITNESS WHEREOF the parties have hereunto set their hands and seals the day and year first hereinbefore written.

THE COMMON SEAL of THE PRESIDENT COUNCILLORS AND RATEPAYERS OF THE SHIRE OF WOORAYL was hereunto affixed in the presence of:

President .....

Councillor .....

Shire Secretary .....

THE COMMON SEAL of ANSEVATA NOMINEES PTY. LTD. was hereunto affixed in accordance with its Articles of Association in the presence of:

Director .....

Secretary .....

ANNEXURE A

Deed of Variation

THIS DEED OF VARIATION is made on 2016

PARTIES

1 **ANSEVATA NOMINEES PTY LTD**
ACN 004 686 131
of 240 Bay Street Brighton 3186
("**Ansevata**")

2 **SOUTH GIPPSLAND SHIRE COUNCIL**
of 9 Smith Street, Leongatha, VIC 3953
("**Council**")

RECITALS

A On 8 May 1990, Council's predecessor entered into an agreement with Ansevata which gave Ansevata the right to use water from a retarding basin ("**the dam**") for agricultural purposes without charge ("**Water Agreement**"). The Water Agreement is annexed to this Deed and marked "**Annexure A**".

B Differing interpretations of the terms of the Water Agreement led to a dispute between the Parties as to their respective rights and obligations under the Water Agreement.

C This Deed of Variation varies the Water Agreement to clarify the rights and obligations of the Parties.

THE PARTIES AGREE THAT:

1. The Parties agree that this Deed amends the Water Agreement and that the terms of the Water Agreement not amended by this Deed are hereby confirmed.

2. The following clause is inserted in the Water Agreement after Clause 3.2:

3.3 Not take or use water from the basin land, provided however:

3.3.1 water may only be disposed of for the management, repair and maintenance of the Dam, and only via the Dam's existing external drain;

3.3.2 disposal for the purposes of this agreement means the Council may not take or use the water for any other purpose other than set out in clauses 3.3.1 and 3.3.3;

3.3.3 that the Shire may request, and the Licensee at its discretion may consent, to the taking of water by the Shire for other purposes.

3. The variations in this Deed prevail to the extent of any inconsistency with any other clause of the Water Agreement.

4. The variations in this Deed take effect upon the Parties executing this Deed.

EXECUTED as a Deed.

Dated: 28th NOVEMBER **2016**

AJS 6487193v8 LAG

ANSEVATA NOMINEES PROPRIETARY LIMITED
The Common Seal of

SIGNED, SEALED AND DELIVERED by **ANSEVATA NOMINEES PTY LTD** in accordance with section 127(1) of the *Corporations Act 2001* (Cth) by being signed by authorised persons:

Director

JACQUES RICH
Full Name

240 BAY ST, BRIGHTON, VIC 3186
Usual Address

*Director/company secretary
*Delete whichever is inapplicable

JEREMY BENJAMIN RICH
Full Name

240 BAY ST, BRIGHTON, VIC 3186
Usual Address

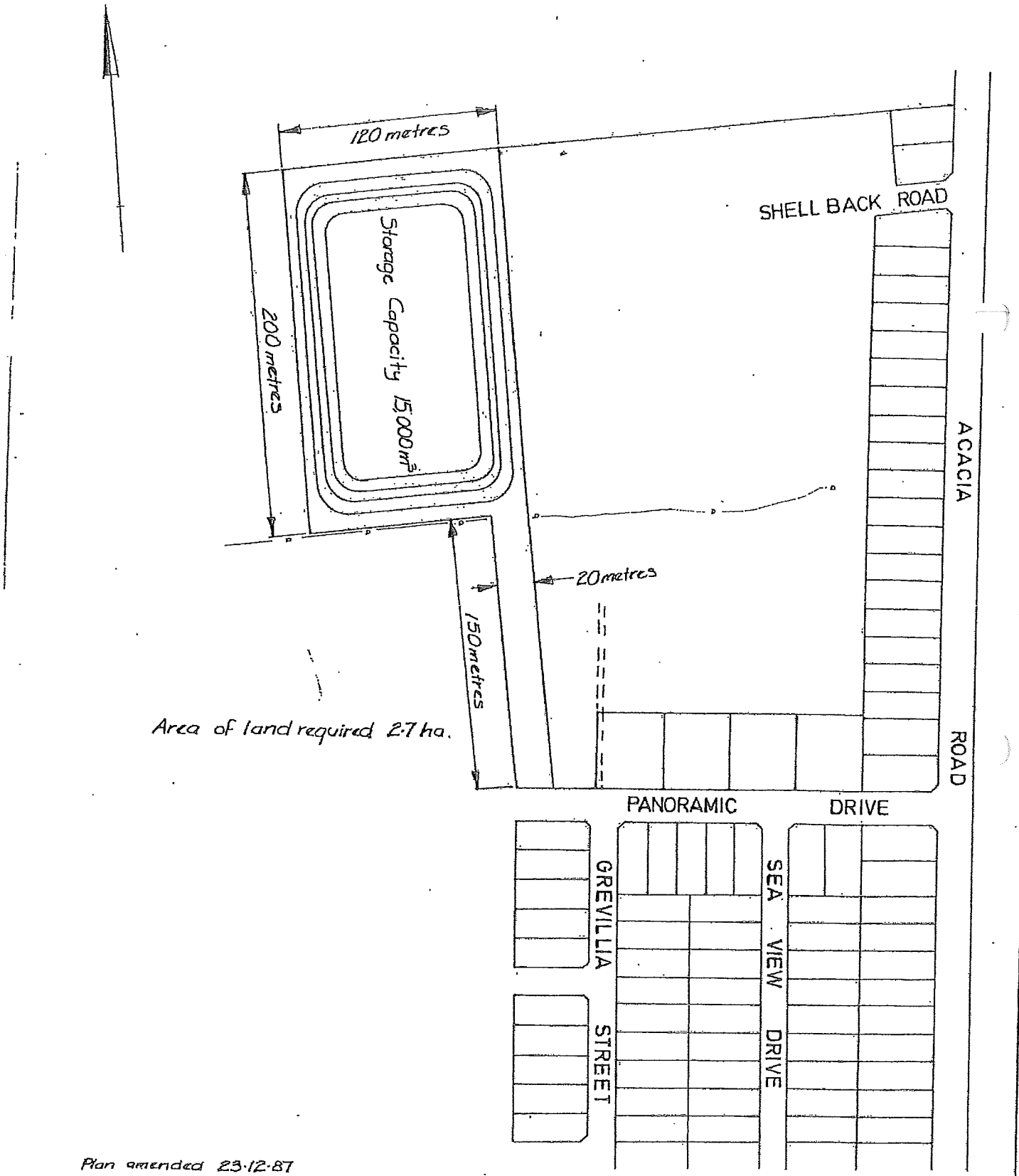
SIGNED SEALED AND DELIVERED by the Chief Executive Officer for and on behalf of **SOUTH GIPPSLAND SHIRE COUNCIL** pursuant to the power delegated to that person in the presence of:

THE SOUTH GIPPSLAND SHIRE COUNCIL
THE COMMON SEAL OF

ANDREW WADDINGTON
Full Name

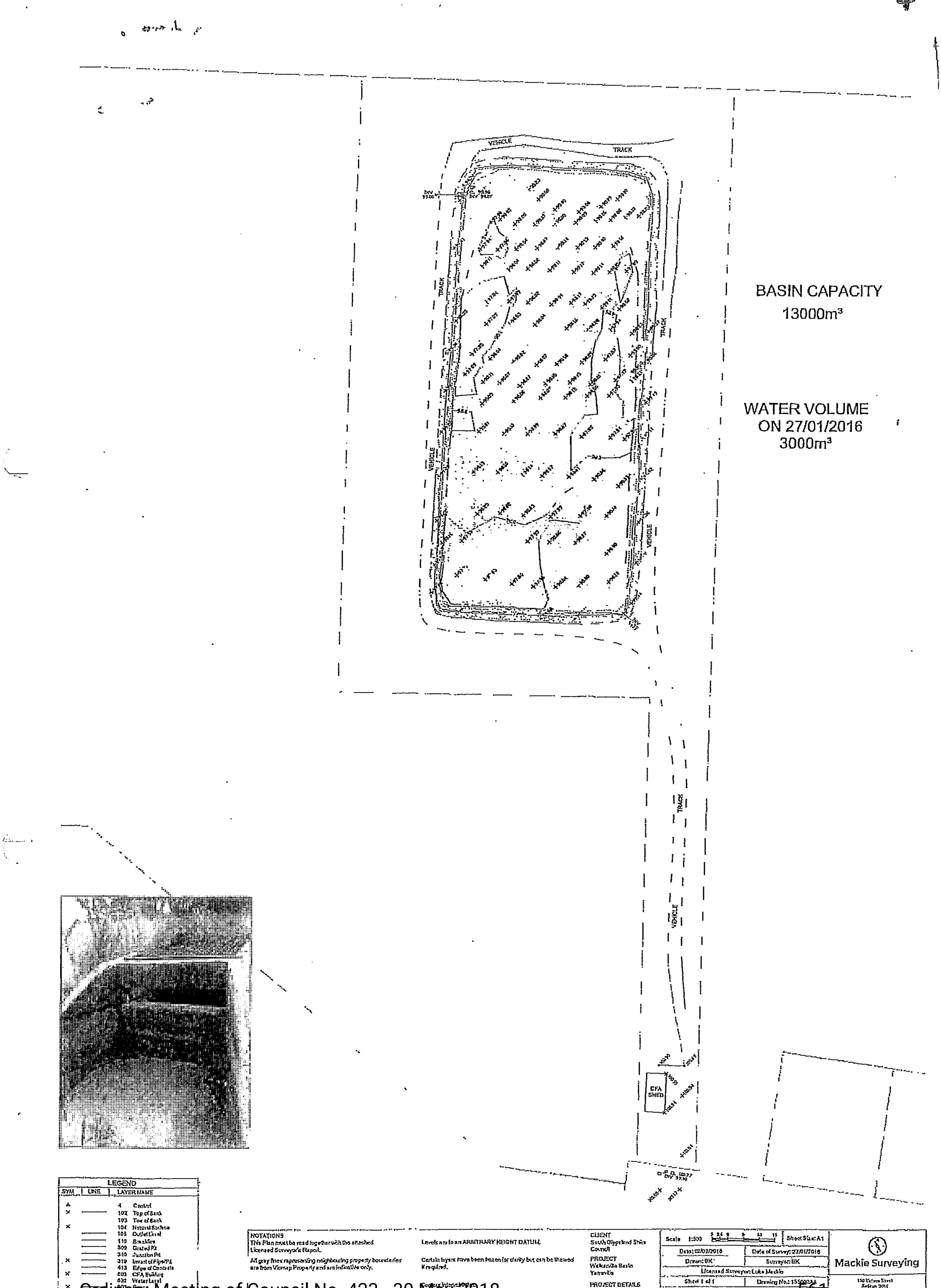
Witness

AJS 5487193v8 LAG



Plan amended 23-12-87

SHIRE OF WOORAYL	SCALE 1:2000	DATE	LEVEL BOOK	FILE No 310210
PROPOSED STORMWATER RETARDING BASIN	DESIGN A.E.C.	16-11-87	APPROVED	PLAN FILE No 30-158
STORAGE CAPACITY AREA AND LOCATION	DRAWN A.E.C.	16-11-87	SHIRE ENGINEER	


BASIN CAPACITY
13000m³
WATER VOLUME
ON 27/01/2016
3000m³
VEHICLE
TRACK
CFA SHED
LEGEND
NOTATIONS
Levels are to an ARBITRARY HEIGHT DATUM.
CLIENT
South Gippsland Shire Council
PROJECT
FEATURE AND LEVEL SURVEY
Mackie Surveying

80

ALS Water

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

CERTIFICATE OF ANALYSIS

Batch No:	**16-06822**	*Page*	**Page 1 of 2**
Replacement Report	**546722**	*Laboratory*	Scoresby Laboratory
This report replaces Report Number:	**540929**	*Address*	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Client:	**South Gippsland Shire Council**	*Phone*	03 8756 8000
Contact:	**Tim Brown**	*Fax*	03 9763 1862
Address:	9 Smith St (Private Bag 4) LEONGATHA VIC 3953	Contact:	Carmin DePalma Client Manager Carmin.DePalma@alsglobal.com
PO No:	**28492**	Date Sampled:	**02-Feb-2016**
Sampler Name:	**J Lambert**	Date Samples Received:	**02-Feb-2016**
ALS Program Ref:	**SUNDRY_MEL**	*Date Issued:*	**10-Mar-2016**
Program Description:	**Sundry Customer Program for Melbourne**		
Client Ref:	**Sample No 1242**		

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*
BOD5	EP030WRG	Scoresby	Colilert (2000)	MM514	Scoresby
pH	CM060 B	Scoresby	SS at 104+/- 2°C	EA025WRG	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**	**Joseph De Alwis**	**Analyst**
Joel Nicholson	**Analyst**		

NATA Accredited Laboratory No. 992

Accredited for compliance with ISO/IEC 17025

WORLD RECOGNISED ACCREDITATION

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 receival 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:	**16-06822**
Report Number:	**546722**
Client:	**South Gippsland Shire Council**
ALS Program Ref:	**SUNDRY_MEL**
Program Description:	**Sundry Customer Program for Melbourne**

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
4643395		Walkerville Retention Basin - Sampling Point 1	WATER	02/02/16 09:15

Analysis - Analyte	*Sample No. Site Code Units*	4643395
pH - pH, units	Units	7.2
BOD5 - Biochemical Oxygen Demand, 5 Day	mg/L	5
SS at 104+/- 2°C - Suspended Solids	mg/L	15
Colilert (2000) - E.coli MPN Colilert	orgs/100mL	380

A blank space indicates no test performed.

CHAIN OF CUSTODY
Water Resources Group

ABN: 94 105 060 320

Page.....of.....

Melbourne Office:
22 Dalmore Drive
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Fax: 03 9763 1862
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Traralgon VIC 3844
Phone:03 5176 4170
Fax: 03 5176 4473
paul.whiffen@alsglobal.com

Client:	SOUTH GIPPSLAND SHIRE COUNCIL		*Office use only*
Contact:	(results) JOHN LAMBERT (johnl@southgippsland.vic.gov.au)		**Lab Work Order No:**
	(invoice) TIM BROWN (timb@southgippsland.vic.gov.au)		**LIMS Program Code:**
Address:	9 Smith St, LEONGATHA, VIC 3953		**TESTS REQUIRED**
Phone:	0409936707	**Fax:**	
Email:	Results to : johnl@southgippsland.vic.gov.au		
P/O No.:	28492	**Quote No.:** SC-129-15	
T/A Time:		**Sampler:** JOHN LAMBERT	
Job/Proj Ref:	WALKERVILLE RETARDING BASIN. SAMPLING POINT 1: **S/N: 1242**		

Lab Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled	Matrix	pH	BOD 5	SUSPENDED SOLIDS	e- coli
	WALKERVILLE RETENTION BASIN, Sampling Point 1	2	2/2/16	09.15	Liquid	Y	Y	Y	
	WALKERVILLE RETENTION BASIN, Sampling Point 1	2	2/2/16	"	Stabilised: Na2S2O3				Y

Special Instructions: Please note Temperature °C at time of delivery

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
J LAMBERT	SGSC	2nd FEB2016		D Cotter	AS	2/2/16	8:55

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of ALS Water Resources Group that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY Sample conditions: Samples received undamaged [Yes/No] Samples adequately preserved [Yes/No] Samples within recommended holding times: [Yes/No] Samples transported at appropriate temperature [Yes/No]

ALS Water

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

CERTIFICATE OF ANALYSIS

Batch No:	**16-12750**	*Page*	**Page 1 of 2**
Final Report	**547688**	*Laboratory*	Scoresby Laboratory
		Address	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Client:	**South Gippsland Shire Council**		
Contact:	**John Lambert**		
Address:	Private Bag 4 LEONGATHA VIC 3953	*Phone*	03 8756 8000
		Fax	03 9763 1862
		Contact:	Carmin DePalma Client Manager Carmin.DePalma@alsglobal.com
PO No:	**29516**	Date Sampled:	**08-Mar-2016**
Sampler Name:	**John Lambert**	Date Samples Received:	**08-Mar-2016**
ALS Program Ref:	**SGSCMISC**	*Date Issued:*	**16-Mar-2016**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**		
Client Ref:	**Walkerville S/N:1246**		

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*
BOD5	EP030WRG	Scoresby	Colilert (2000)	MM514	Scoresby
pH	CM060 B	Scoresby	SS at 104+/- 2°C	EA025WRG	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**	**Joseph De Alwis**	**Analyst**
Joel Nicholson	**Analyst**		

NATA Accredited Laboratory No. 992

Accredited for compliance with ISO/IEC 17025

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 receival 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.	16-12750
Report Number:	547686
Client:	**South Gippsland Shire Council**
ALS Program Ref:	**SGSCMISC**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
4689763		Walkerville Retention Basin - Sampling Point 1	WATER	08/03/16 09:40
4689764		Walkerville Retention Basin - Sampling Point 1	WATER	08/03/16 09:40

Analysis - Analyte	*Sample No.* *Site Code* *Units*	4689763	4689764
pH - pH, units	Units	7.5	
BOD5 - Biochemical Oxygen Demand, 5 Day	mg/L	3	
SS at 104+/- 2°C - Suspended Solids	mg/L	40	
Colilert (2000) - E.coli MPN Colilert	orgs/100mL		440

A blank space indicates no test performed.

ALS Water

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

CERTIFICATE OF ANALYSIS

Batch No:	**16-14804**	*Page*	**Page 1 of 2**
Final Report	**549622**	*Laboratory*	Scoresby Laboratory
Client:	**South Gippsland Shire Council**	*Address*	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Contact:	**John Lambert**		
Address:	Private Bag 4 LEONGATHA VIC 3953	*Phone*	03 8756 8000
		Fax	03 9763 1862
		Contact:	Carmin DePalma Client Manager Carmin.DePalma@alsglobal.com
PO No:	**Not Available**	Date Sampled:	**18-Mar-2016**
Sampler Name:	**John Lambert**	Date Samples Received:	**18-Mar-2016**
ALS Program Ref:	**SGSCMISC**	*Date Issued:*	**29-Mar-2016**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**		
Client Ref:	**S/N:1247 Walkerville**		

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*
BOD5	EP030WRG	Scoresby	Colilert (2000)	MM514	Scoresby
pH	CM060 B	Scoresby	SS at 104+/- 2°C	EA025WRG	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**	**Joseph De Alwis**	**Analyst**
Tracy Prout	**Analyst**		

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

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 receival 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:	**16-14604**
Report Number:	**549622**
Client:	**South Gippsland Shire Council**
ALS Program Ref:	**SGSCMISC**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
4704459		Sampling Point 1-S/N:1247	WATER	18/03/16 09:10

Analysis - Analyte	*Sample No. Site Code Units*	4704459
pH - pH, units	Units	7.6
BOD5 - Biochemical Oxygen Demand, 5 Day	mg/L	30
SS at 104+/- 2°C - Suspended Solids	mg/L	76
Turbidity - Turbidity, NTU	NTU	82
Colilert (2000) - E.coli MPN Colilert	orgs/100mL	4400

A blank space indicates no test performed.

CHAIN OF CUSTODY
Water Resources Group

ALS

ABN: 94 105 060 320

Page........of.........

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Geelong Office:
49 Carr Street,
Geelong VIC 3220
Phone: 03 5246 9403
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geelongwrg@alsglobal.com

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Wangaratta VIC 3677
Phone: 03 5722 2688
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4/55 Hazelwood Rd,
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Traralgon VIC 3844
Phone:03 5176 4170
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paul.whiffen@alsglobal.com

Client:	SOUTH GIPPSLAND SHIRE COUNCIL		
Contact:	(results) JOHN LAMBERT (johnl@southgippsland.vic.gov.au)		
	(invoice) TIM BROWN (timb@southgippsland.vic.gov.au)		
Address:	9 Smith St, LEONGATHA, VIC 3953		
Phone:	0409936707	**Fax:**	
Email:	Results to : johnl@southgippsland.vic.gov.au		
P/O No.:		**Quote No.:**	SC-129-15
T/A Time:		**Sampler:**	JOHN LAMBERT
Job/Proj Ref:	WALKERVILLE RETARDING BASIN. SAMPLING POINT 1: S/N: 1247		

Office use only

Lab Work Order No:	
LIMS Program Code:	

TESTS REQUIRED

Lab Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled	Matrix	pH	BOD 5	SUSPENDED SOLIDS	e- coli	TURBIDITY
	WALKERVILLE RETENTION BASIN, Sampling Point 1	2	18/3/16	09:10	Liquid	Y	Y	Y		Y
	WALKERVILLE RETENTION BASIN, Sampling Point 1	2	18/3/16	09:10	Stabilised: Na2S2O3				Y	

Special Instructions: Please note Temperature °C at time of delivery = 5.0°C

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
J LAMBERT	SGSC	18th MAR2016		Jant	ALS WRG	18/3/16	14:45

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of ALS Water Resources Group that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:

Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

OFM002 (2)

Date Released: 03/09/2014

ALS Water

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

CERTIFICATE OF ANALYSIS

Batch No:	**16-32752**	*Page*	**Page 1 of 2**
Final Report	**569866**	*Laboratory*	Scoresby Laboratory
Client:	**South Gippsland Shire Council**	*Address*	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Contact:	**John Lambert**		
Address:	Private Bag 4 LEONGATHA VIC 3953	*Phone*	03 8756 8000
		Fax	03 9763 1862
		Contact:	Carmin DePalma Client Manager Carmin.DePalma@alsglobal.com
PO No:	**Not Available**	Date Sampled:	**12-Jul-2016**
Sampler Name:	**John Lambert**	Date Samples Received:	**12-Jul-2016**
ALS Program Ref:	**SGSCMISC**	*Date Issued:*	**18-Jul-2016**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**		
Client Ref:	**Walkerville S/N 1251**		

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*
BOD5	EP030WRG	Scoresby	Colilert (2000)	MM514	Scoresby
pH	CM060 B	Scoresby	SS at 104+/- 2°C	EA025WRG	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**	**Joseph De Alwis**	**Analyst**
Tracy Prout	**Analyst**		

NATA Accredited Laboratory No. 992
Accredited for compliance with ISO/IEC 17025
WORLD RECOGNISED ACCREDITATION

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 receival 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:	**16-32752**
Report Number:	**669866**
Client:	**South Gippsland Shire Council**
ALS Program Ref:	**SGSCMISC**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
4841853		Walkerville Retention Basin - Sampling Point 1	WATER	12/07/16 09:15
4841854		Walkerville Retention Basin - Sampling Point 1	WATER	12/07/16 09:15

Analysis - Analyte	*Sample No. Site Code Units*	4841853	4841854
pH - pH, units	Units	7.3	
BOD5 - Biochemical Oxygen Demand, 5 Day	mg/L	2	
SS at 104+/- 2°C - Suspended Solids	mg/L	<2	
Turbidity - Turbidity, NTU	NTU	12	
Colilert (2000) - E.coli MPN Colilert	orgs/100mL		330

A blank space indicates no test performed.

ALS Water

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

CERTIFICATE OF ANALYSIS

Batch No:	**16-39325**	*Page*	**Page 1 of 2**
Final Report	**577576**	*Laboratory*	Scoresby Laboratory
Client:	**South Gippsland Shire Council**	*Address*	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Contact:	**John Lambert**		
Address:	Private Bag 4 LEONGATHA VIC 3953	*Phone*	03 8756 8000
		Fax	03 9763 1862
		Contact:	Carmin DePalma Client Manager Carmin.DePalma@alsglobal.com
PO No:	**Not Available**	Date Sampled:	**23-Aug-2016**
Sampler Name:	**John Lambert**	Date Samples Received:	**23-Aug-2016**
ALS Program Ref:	**SGSCMISC**	*Date Issued:*	**30-Aug-2016**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**		
Client Ref:	**Walkerville S/N: 1252**		

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*
BOD5	EP030WRG	Scoresby	Colilert (2000)	MM514	Scoresby
pH	CM060 B	Scoresby	SS at 104+/- 2°C	EA025WRG	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**	**Joseph De Alwis**	**Analyst**
Tanya Dukhno	**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 receival 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:	**16-39325**
Report Number:	**577576**
Client:	**South Gippsland Shire Council**
ALS Program Ref:	**SGSCMISC**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
4893051		Walkkerville Retention Basin - Sampling Point 1	WATER	23/08/16 09:20
4893052		Walkkerville Retention Basin - Sampling Point 1	WATER	23/08/16 09:20

Analysis - Analyte	*Sample No.* *Site Code* *Units*	4893051	4893052
pH - pH, units	Units	7.0	
BOD5 - Biochemical Oxygen Demand, 5 Day	mg/L	3	
SS at 104+/- 2°C - Suspended Solids	mg/L	4	
Turbidity - Turbidity, NTU	NTU	13	
Colilert (2000) - E.coli MPN Colilert	orgs/100mL		920

A blank space indicates no test performed.

ALS Water

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

CERTIFICATE OF ANALYSIS

Batch No:	**16-41090**	*Page*	**Page 1 of 2**
Final Report	**579524**	*Laboratory*	Scoresby Laboratory
Client:	**South Gippsland Shire Council**	*Address*	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Contact:	**John Lambert**	*Phone*	03 8756 8000
Address:	Private Bag 4 LEONGATHA VIC 3953	*Fax*	03 9763 1862
		Contact:	Susan Cassar Client Manager Susan.Cassar@alsglobal.com
PO No:	**Not Available**	Date Sampled:	**06-Sep-2016**
Sampler Name:	**John Lambert**	Date Samples Received:	**06-Sep-2016**
ALS Program Ref:	**SGSCMISC**	*Date Issued:*	**13-Sep-2016**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**		
Client Ref:	**S/N:1253/1254 Walkerville**		

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*
BOD5	EP030WRG	Scoresby	Colilert (2000)	MM514	Scoresby
pH	CM060 B	Scoresby	SS at 104+/- 2°C	EA025WRG	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**	**Joseph De Alwis**	**Analyst**
Tanya Dukhno	**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 receival 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:	**16-41090**
Report Number:	**579524**
Client:	**South Gippsland Shire Council**
ALS Program Ref:	**SGSCMISC**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
4906941		Samping Point 1 - 1253	WATER	06/09/16 09:40
4906942		Samping Point 3 - 1254	WATER	06/09/16 09:50

Analysis - Analyte	*Sample No. Site Code Units*	4906941	4906942
pH - pH, units	Units	7.3	7.1
BOD5 - Biochemical Oxygen Demand, 5 Day	mg/L	<2	<2
SS at 104+/- 2°C - Suspended Solids	mg/L	2	<2
Turbidity - Turbidity, NTU	NTU	14	14
Colilert (2000) - E.coli MPN Colilert	orgs/100mL	430	130

A blank space indicates no test performed.

ALS Water

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

CERTIFICATE OF ANALYSIS

Batch No:	**16-46351**	*Page*	**Page 1 of 2**
Final Report	**585767**	*Laboratory*	Scoresby Laboratory
		Address	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Client:	**South Gippsland Shire Council**		
Contact:	**John Lambert**		
Address:	Private Bag 4 LEONGATHA VIC 3953	*Phone*	03 8756 8000
		Fax	03 9763 1862
		Contact:	Carmin DePalma Client Manager Carmin.DePalma@alsglobal.com
PO No:	**Not Available**	Date Sampled:	**11-Oct-2016**
Sampler Name:	**John Lambert**	Date Samples Received:	**11-Oct-2016**
ALS Program Ref:	**SGSCMISC**	*Date Issued:*	**20-Oct-2016**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**		
Client Ref:	**Walkerville S/N 1255**		

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*
BOD5	EP030WRG	Scoresby	Colilert (2000)	MM514	Scoresby
pH	CM060 B	Scoresby	SS at 104+/- 2°C	EA025WRG	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**	**Joseph De Alwis**	**Analyst**
Tracy Prout	**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 receival 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:	**16-46351**
Report Number:	**585767**
Client:	**South Gippsland Shire Council**
ALS Program Ref:	**SGSCMISC**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
4948656		Walkerville Retention Basin - Sampling Point 1	WATER	11/10/16 10:05

Analysis - Analyte	*Sample No. Site Code Units*	4948656
pH - pH, units	Units	7.2
BOD5 - Biochemical Oxygen Demand, 5 Day	mg/L	<2
SS at 104+/- 2°C - Suspended Solids	mg/L	<2
Turbidity - Turbidity, NTU	NTU	11
Colilert (2000) - E.coli MPN Colilert	orgs/100mL	820

A blank space indicates no test performed.

ALS Water

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

CERTIFICATE OF ANALYSIS

Batch No:	16-52018	Page	Page 1 of 2
Final Report	592631	Laboratory	Scoresby Laboratory
Client:	South Gippsland Shire Council	Address	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Contact:	John Lambert		
Address:	Private Bag 4 LEONGATHA VIC 3953	Phone	03 8756 8000
		Fax	03 9763 1862
		Contact:	Camin DePalma Client Manager Camin.DePalma@alsglobal.com
PO No:	Not Available	Date Sampled:	15-Nov-2016
Sampler Name:	John Lambert	Date Samples Received:	16-Nov-2016
ALS Program Ref:	SGSCMISC	Date Issued:	22-Nov-2016
Program Description:	Miscellaneous Analysis for South Gippsland Shire Council		
Client Ref:	Walkerville S/N 1257		

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
BOD5	EP030WRG	Scoresby	Colilert (2000)	MM514	Scoresby
pH	CM060 B	Scoresby	SS at 104+/- 2°C	EA025WRG	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	Joseph De Alwis	Analyst
Tracy Prout	Analyst		

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

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 receival 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:	16-52018
Report Number:	592631
Client:	South Gippsland Shire Council
ALS Program Ref:	SGSCMISC
Program Description:	Miscellaneous Analysis for South Gippsland Shire Council

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
4991486		Walkerville Retention Basin - Sampling Point 1	WATER	15/11/16 10:30
4991487		Walkerville Retention Basin - Sampling Point 1	WATER	15/11/16 10:30

Analysis - Analyte	Sample No. / Site Code / Units	4991486	4991487
pH - pH, units	Units	7.3	
BOD5 - Biochemical Oxygen Demand, 5 Day	mg/L	<2	
SS at 104+/- 2°C - Suspended Solids	mg/L	2	
Turbidity - Turbidity, NTU	NTU	8.1	
Colilert (2000) - E.coli MPN Colilert	orgs/100mL		98

A blank space indicates no test performed.

ALS Water

CERTIFICATE OF ANALYSIS

Batch No:	**17-12392**	*Page*	**Page 1 of 2**
Final Report	**614149**	*Laboratory*	Scoresby Laboratory
Client:	**South Gippsland Shire Council**	*Address*	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Contact:	**John Lambert**		
Address:	Private Bag 4 LEONGATHA VIC 3953	*Phone*	03 8756 8000
		Fax	03 9763 1862
		Contact:	Carmin DePalma Client Manager Carmin.DePalma@alsglobal.com
PO No:	**Not Available**	Date Sampled:	**07-Mar-2017**
Sampler Name:	**John Lambert**	Date Samples Received:	**07-Mar-2017**
ALS Program Ref:	**SGSCMISC**	*Date Issued:*	**14-Mar-2017**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**		
Client Ref:	**Walkerville S/N:1265**		

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*
BOD5	WP030	Scoresby	Colilert (2000)	MM514	Scoresby
pH	CM060 B	Scoresby	SS at 104+/- 2°C	WA025	Scoresby
Turbidity	WA045	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**	**Joseph De Alwis**	**Analyst**
Toni Gaal	**Team Leader Microbiology**		

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 commenced on the day of receival 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:	**17-12392**
Report Number:	**614149**
Client:	**South Gippsland Shire Council**
ALS Program Ref:	**SGSCMISC**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
5124494		Walkerville Retention Basin - Sampling Point 1	WATER	07/03/17

Analysis - Analyte	*Sample No. Site Code Units*	5124494
pH - pH, units	Units	8.2
BOD5 - Biochemical Oxygen Demand, 5 Day	mg/L	<2
SS at 104+/- 2°C - Suspended Solids	mg/L	2
Turbidity - Turbidity, NTU	NTU	1.5
Colilert (2000) - E.coli MPN Colilert	orgs/100mL	110

A blank space indicates no test performed.

ALS Water

CERTIFICATE OF ANALYSIS

Batch No:	**17-12396**	*Page*	**Page 1 of 2**
Final Report	**614151**	*Laboratory*	Scoresby Laboratory
		Address	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Client:	**South Gippsland Shire Council**		
Contact:	**John Lambert**		
Address:	Private Bag 4 LEONGATHA VIC 3953	*Phone*	03 8756 8000
		Fax	03 9763 1862
		Contact:	Carmin DePalma Client Manager Carmin.DePalma@alsglobal.com
PO No:	**Not Available**	Date Sampled:	**07-Mar-2017**
Sampler Name:	**John Lambert**	Date Samples Received:	**07-Mar-2017**
ALS Program Ref:	**SGSCMISC**	*Date Issued:*	**14-Mar-2017**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**		
Client Ref:	**Walkerville S/N:1266**		

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*
BOD5	WP030	Scoresby	Colilert (2000)	MM514	Scoresby
pH	CM060 B	Scoresby	SS at 104+/- 2°C	WA025	Scoresby
Turbidity	WA045	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**	**Joseph De Alwis**	**Analyst**
Toni Gaal	**Team Leader Microbiology**		

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 commenced on the day of receival 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:	**17-12396**
Report Number:	**614151**
Client:	**South Gippsland Shire Council**
ALS Program Ref:	**SGSCMISC**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
5124505		Walkerville Retention Basin - Sampling Point 3	WATER	07/03/17 10:00

Analysis - Analyte	*Sample No. Site Code Units*	5124505
pH - pH, units	Units	8.0
BOD5 - Biochemical Oxygen Demand, 5 Day	mg/L	<2
SS at 104+/- 2°C - Suspended Solids	mg/L	2
Turbidity - Turbidity, NTU	NTU	1.4
Colilert (2000) - E.coli MPN Colilert	orgs/100mL	54

A blank space indicates no test performed.

ALS Water

CERTIFICATE OF ANALYSIS

Batch No:	**17-23516**	*Page*	**Page 1 of 2**
Final Report	**626387**	*Laboratory*	Scoresby Laboratory
Client:	**South Gippsland Shire Council**	*Address*	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Contact:	**John Lambert**		
Address:	Private Bag 4 LEONGATHA VIC 3953	*Phone*	03 8756 8000
		Fax	03 9763 1862
		Contact:	Carmin DePalma Client Manager Carmin.DePalma@alsglobal.com
PO No:	**Not Available**	Date Sampled:	**16-May-2017**
Sampler Name:	**John Lambert**	Date Samples Received:	**16-May-2017**
ALS Program Ref:	**SGSCMISC**	*Date Issued:*	**23-May-2017**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**		
Client Ref:	**Walkerville S/N: 1269**		

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*
BOD5	WP030	Scoresby	Colilert (2000)	MM514	Scoresby
pH	CM060 B	Scoresby	SS at 104+/- 2°C	WA025	Scoresby
Turbidity	WA045	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**	**Chatura Perera**	**Team Leader Nutrients**
Joseph De Alwis	**Analyst**	**Tanya Dukhno**	**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.

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

Page:	**Page 2 of 2**
Batch No:	**17-23516**
Report Number:	**626387**
Client:	**South Gippsland Shire Council**
ALS Program Ref:	**SGSCMISC**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
5209656		Walkerville Retention Basin - Sampling Point 3	WATER	16/05/17 09:20
5209657		Walkerville Retention Basin - Sampling Point 3	WATER	16/05/17 09:20

Analysis - Analyte	*Sample No. Site Code Units*	5209656	5209657
pH - pH, units	Units	7.3	
BOD5 - Biochemical Oxygen Demand, 5 Day	mg/L	<2	
SS at 104+/- 2°C - Suspended Solids	mg/L	<2	
Turbidity - Turbidity, NTU	NTU	0.9	
Colilert (2000) - E.coli MPN Colilert	orgs/100mL		330

A blank space indicates no test performed.

ALS Water

CERTIFICATE OF ANALYSIS

Batch No:	17-33391	Page	Page 1 of 2
Final Report	637041	Laboratory	Scoresby Laboratory
Client:	South Gippsland Shire Council	Address	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Contact:	John Lambert		
Address:	Private Bag 4 LEONGATHA VIC 3953	Phone	03 8756 8000
		Fax	03 9763 1862
		Contact:	Carmin DePalma Client Manager Carmin.DePalma@alsglobal.com
PO No:	Not Available	Date Sampled:	18-Jul-2017
Sampler Name:	John Lambert	Date Samples Received:	18-Jul-2017
ALS Program Ref:	SGSCMISC	Date Issued:	25-Jul-2017
Program Description:	Miscellaneous Analysis for South Gippsland Shire Council		
Client Ref:	Walkerville S/N:1270		

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
BOD5	WP030	Scoresby	Colilert (2000)	MM514	Scoresby
pH	WA005	Scoresby	SS at 104+/- 2°C	WA025	Scoresby
Turbidity	WA045	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	Tanya Dukhno	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. 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:	**17-33391**
Report Number:	**637041**
Client:	**South Gippsland Shire Council**
ALS Program Ref:	**SGSCMISC**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
5286191		Walkerville Retention Basin - Sampling Point 3	WATER	18/07/17 09:00

Analysis - Analyte	*Sample No. Site Code Units*	5286191
pH - pH, units	Units	6.9
BOD5 - Biochemical Oxygen Demand, 5 Day	mg/L	<2
SS at 104+/- 2°C - Suspended Solids	mg/L	<2
Turbidity - Turbidity, NTU	NTU	3.8
Colilert (2000) - E.coli MPN Colilert	orgs/100mL	440

A blank space indicates no test performed.

ALS Water

CERTIFICATE OF ANALYSIS

Batch No:	**17-41322**	*Page*	**Page 1 of 2**
Final Report	**646560**		
		Laboratory	Scoresby Laboratory
Client:	**South Gippsland Shire Council**	*Address*	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Contact:	**John Lambert**		
Address:	Private Bag 4 LEONGATHA VIC 3953	*Phone*	03 8756 8000
		Fax	03 9763 1862
		Contact:	Carmin DePalma Client Manager Carmin.DePalma@alsglobal.com
PO No:	**Not Available**	Date Sampled:	**12-Sep-2017**
Sampler Name:	**John Lambert**	Date Samples Received:	**12-Sep-2017**
ALS Program Ref:	**SGSCMISC**	*Date Issued:*	**18-Sep-2017**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**		
Client Ref:	**Walkerville SN:1271**		

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*
BOD5	WP030	Scoresby	Colilert (2000)	MM514	Scoresby
pH	WA005	Scoresby	SS at 104+/- 2°C	WA025	Scoresby
Turbidity	WA045	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**	**Joseph De Alwis**	**Analyst**
Tanya Dukhno	**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.

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

Page:	**Page 2 of 2**
Batch No:	**17-41322**
Report Number:	**646560**
Client:	**South Gippsland Shire Council**
ALS Program Ref:	**SGSCMISC**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
5351436		Walkerville Retention Basin - Sampling Point 1	WATER	12/09/17 09:00

Analysis - Analyte	*Sample No. Site Code Units*	5351436
pH - pH, units	Units	6.7
BOD5 - Biochemical Oxygen Demand, 5 Day	mg/L	<2
SS at 104+/- 2°C - Suspended Solids	mg/L	14
Turbidity - Turbidity, NTU	NTU	24
Colilert (2000) - E.coli MPN Colilert	orgs/100mL	200

A blank space indicates no test performed.

ALS Water

CERTIFICATE OF ANALYSIS

Batch No:	**17-41320**	*Page*	**Page 1 of 2**
Final Report	**646569**	*Laboratory*	Scoresby Laboratory
Client:	**South Gippsland Shire Council**	*Address*	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Contact:	**John Lambert**		
Address:	Private Bag 4 LEONGATHA VIC 3953	*Phone*	03 8756 8000
		Fax	03 9763 1862
		Contact:	Carmin DePalma Client Manager Carmin.DePalma@alsglobal.com
PO No:	**Not Available**	Date Sampled:	**12-Sep-2017**
Sampler Name:	**J. Lambert**	Date Samples Received:	**12-Sep-2017**
ALS Program Ref:	**SGSCMISC**	*Date Issued:*	**18-Sep-2017**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**		
Client Ref:	**Walkerville Pt 3 S/N:1272**		

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*
BOD5	WP030	Scoresby	Colilert (2000)	MM514	Scoresby
pH	WA005	Scoresby	SS at 104+/- 2°C	WA025	Scoresby
Turbidity	WA045	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**	**Joseph De Alwis**	**Analyst**
Tanya Dukhno	**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. 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:	**17-41320**
Report Number:	**646569**
Client:	**South Gippsland Shire Council**
ALS Program Ref:	**SGSCMISC**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
5351395		Walkerville Retention Basin - Point 3	WATER	12/09/17 09:07

Analysis - Analyte	*Sample No. Site Code Units*	5351395
pH - pH, units	Units	6.6
BOD5 - Biochemical Oxygen Demand, 5 Day	mg/L	<2
SS at 104+/- 2°C - Suspended Solids	mg/L	6
Turbidity - Turbidity, NTU	NTU	16
Colilert (2000) - E.coli MPN Colilert	orgs/100mL	200

A blank space indicates no test performed.

ALS Water

CERTIFICATE OF ANALYSIS

Batch No:	**17-50258**	*Page*	**Page 1 of 2**
Final Report	**657856**	*Laboratory*	Scoresby Laboratory
Client:	**South Gippsland Shire Council**	*Address*	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Contact:	**John Lambert**		
Address:	Private Bag 4 LEONGATHA VIC 3953	*Phone*	03 8756 8000
		Fax	03 9763 1862
		Contact:	Carmin DePalma Client Manager Carmin.DePalma@alsglobal.com
PO No:	**Not Available**	Date Sampled:	**14-Nov-2017**
Sampler Name:	**John Lambert**	Date Samples Received:	**14-Nov-2017**
ALS Program Ref:	**SGSCMISC**	*Date Issued:*	**21-Nov-2017**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**		
Client Ref:	**Walkerville S/N 1273**		

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*
BOD5	WP030	Scoresby	Colilert (2000)	MM514	Scoresby
pH	WA005	Scoresby	SS at 104+/- 2°C	WA025	Scoresby
Turbidity	WA045	Scoresby			

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

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**	**Joseph De Alwis**	**Analyst**
Mario Solorzano	**Analyst**	**Tanya Dukhno**	**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. 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.

Measurement Uncertainties values for your compliance results are available at this link

Page:	**Page 2 of 2**
Batch No:	**17-50258**
Report Number:	**657856**
Client:	**South Gippsland Shire Council**
ALS Program Ref:	**SGSCMISC**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
5427107		Walkerville Retention Basin - Sampling Point 1	WATER	14/11/17 09:07
5427108		Walkerville Retention Basin - Sampling Point 1	WATER	14/11/17 09:07

Analysis - Analyte	*Sample No. Site Code Units*	5427107	5427108
pH - pH, units	Units	7.0	
BOD5 - Biochemical Oxygen Demand, 5 Day	mg/L	3	
SS at 104+/- 2°C - Suspended Solids	mg/L	2	
Turbidity - Turbidity, NTU	NTU	7.8	
Colilert (2000) - E.coli MPN Colilert	orgs/100mL		94

A blank space indicates no test performed.

CHAIN OF CUSTODY
Water Resources Group

ABN: 94 105 060 320

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Phone:03 5176 4170
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paul.whiffen@alsglobal.com

Client:	SOUTH GIPPSLAND SHIRE COUNCIL		Office use only 17-50258
Contact:	(results) JOHN LAMBERT (johnl@southgippsland.vic.gov.au)		**Lab Work Order No:**
	(invoice) TIM BROWN (timb@southgippsland.vic.gov.au)		**LIMS Program Code:**
Address:	9 Smith St, LEONGATHA, VIC 3953		**TESTS REQUIRED**
Phone:	0409936707	**Fax:**	
Email:	Results to : johnl@southgippsland.vic.gov.au		
P/O No.:		**Quote No.:**	SC-129-15
T/A Time:		**Sampler:**	JOHN LAMBERT
Job/Proj Ref:	WALKERVILLE RETARDING BASIN. SAMPLING POINT 1: S/N: 1273		

Lab Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled	Matrix	pH	BOD 5	SUSPENDED SOLIDS	e- coli	Turbidity
542707	WALKERVILLE RETENTION BASIN, **Sampling Point 1**	2	14/1117	9:07	Liquid	Y	Y	Y		Y
08	WALKERVILLE RETENTION BASIN, **Sampling Point 1**	1	14/11/17	9:07	Liquid				Y	

Special Instructions: Please note Temperature °C at time of delivery.

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
J LAMBERT	SGSC	14th NOV2017			ALS Scoresby	14/11/2017	16:00

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of ALS Water Resources Group that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

6°C

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

ALS Water

CERTIFICATE OF ANALYSIS

Batch No:	**17-50259**	*Page*	**Page 1 of 2**
Final Report	**657857**	*Laboratory*	Scoresby Laboratory
Client:	**South Gippsland Shire Council**	*Address*	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Contact:	**John Lambert**		
Address:	Private Bag 4 LEONGATHA VIC 3953	*Phone*	03 8756 8000
		Fax	03 9763 1862
		Contact:	Carmin DePalma Client Manager Carmin.DePalma@alsglobal.com
PO No:	**Not Available**	Date Sampled:	**14-Nov-2017**
Sampler Name:	**John Lambert**	Date Samples Received:	**14-Nov-2017**
ALS Program Ref:	**SGSCMISC**	*Date Issued:*	**21-Nov-2017**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**		
Client Ref:	**Walkerville S/N 1274**		

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*
BOD5	WP030	Scoresby	Colilert (2000)	MM514	Scoresby
pH	WA005	Scoresby	SS at 104+/- 2°C	WA025	Scoresby
Turbidity	WA045	Scoresby			

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

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**	**Joseph De Alwis**	**Analyst**
Mario Solorzano	**Analyst**	**Tanya Dukhno**	**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. 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.

Measurement Uncertainties values for your compliance results are available at this link

Page:	**Page 2 of 2**
Batch No:	**17-50259**
Report Number:	**657857**
Client:	**South Gippsland Shire Council**
ALS Program Ref:	**SGSCMISC**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
5427109		Walkerville Retention Basin - Sampling Point 3	WATER	14/11/17 09:00
5427110		Walkerville Retention Basin - Sampling Point 3	WATER	14/11/17 09:00

Analysis - Analyte	*Sample No. Site Code Units*	5427109	5427110
pH - pH, units	Units	6.9	
BOD5 - Biochemical Oxygen Demand, 5 Day	mg/L	2	
SS at 104+/- 2°C - Suspended Solids	mg/L	2	
Turbidity - Turbidity, NTU	NTU	8.7	
Colilert (2000) - E.coli MPN Colilert	orgs/100mL		63

A blank space indicates no test performed.

CHAIN OF CUSTODY
Water Resources Group

ABN: 94 105 060 320

Page........of.........

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Geelong Office: 49 Carr Street, Geelong VIC 3220, Phone: 03 5246 9403, Email: geelongwrg@alsglobal.com

Wangaratta Office: 48 Faithfull Street, Wangaratta VIC 3677, Phone: 03 5722 2688, Fax: 03 5722 4727, Mobile: 0419 007 749, wangarattawrg@alsglobal.com

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Client:	SOUTH GIPPSLAND SHIRE COUNCIL
Contact:	(results) JOHN LAMBERT (johnl@southgippsland.vic.gov.au)
	(invoice) TIM BROWN (timb@southgippsland.vic.gov.au)
Address:	9 Smith St, LEONGATHA, VIC 3953
Phone:	0409936707 — **Fax:**
Email:	Results to : johnl@southgippsland.vic.gov.au
P/O No.:	— **Quote No.:** SC-129-15
T/A Time:	— **Sampler:** JOHN LAMBERT
Job/Proj Ref:	WALKERVILLE RETARDING BASIN. SAMPLING POINT 3: S/N: 1274

Office use only 17-S0259

Lab Work Order No:

LIMS Program Code:

TESTS REQUIRED

Lab Sample ID	Sample Description	No of Containers	Date Sampled	Time sampled	Matrix	pH	BOD 5	SUSPENDED SOLIDS	e- coli	Turbidity
5427109	WALKERVILLE RETENTION BASIN, Sampling Point 3	2	14/1117	9:00	Liquid	Y	Y	Y		Y
10	WALKERVILLE RETENTION BASIN, Sampling Point 3	1	14/11/17	9:00	Stabilised: Na2S2O3				Y	

Special Instructions: Please note Temperature °C at time of delivery.

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
J LAMBERT	SGSC	14th NOV2017		[illegible]	ALS [illegible]	[illegible]	[illegible]

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of ALS Water Resources Group that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY

Sample conditions:
Samples received undamaged [Yes/No]
Samples adequately preserved [Yes/No]
Samples within recommended holding times: [Yes/No]
Samples transported at appropriate temperature [Yes/No]

OFM002 (2)

Date Released: 03/09/2014

ALS Water

CERTIFICATE OF ANALYSIS

Batch No:	18-04813	Page	Page 1 of 2
Final Report	669684	Laboratory	Scoresby Laboratory
		Address	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Client:	South Gippsland Shire Council		
Contact:	John Lambert		
Address:	Private Bag 4 LEONGATHA VIC 3953	Phone	03 8756 8000
		Fax	03 9763 1862
		Contact:	Carmin DePalma Client Manager Carmin.DePalma@alsglobal.com
PO No:	Not Available	Date Sampled:	16-Jan-2018
Sampler Name:	John Lambert	Date Samples Received:	16-Jan-2018
ALS Program Ref:	SGSCMISC	Date Issued:	23-Jan-2018
Program Description:	Miscellaneous Analysis for South Gippsland Shire Council		
Client Ref:	Walkerville S/N:1275		

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
BOD5	WP030	Scoresby	Colilert (2000)	MM514	Scoresby
pH	WA005	Scoresby	SS at 104+/- 2°C	WA025	Scoresby
Turbidity	WA045	Scoresby			

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

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	Joseph De Alwis	Analyst
Mario Solorzano	Analyst	Ali Shaukat	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. 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.

Calculated results are based on raw data.

Legionella species refers to Legionella species other than Legionella pneumophila

Measurement Uncertainties values for your compliance results are available at this link

Page:	Page 2 of 2
Batch No:	18-04813
Report Number:	669684
Client:	South Gippsland Shire Council
ALS Program Ref:	SGSCMISC
Program Description:	Miscellaneous Analysis for South Gippsland Shire Council

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
5508714		Walkerville Retention Basin - Sampling Point 3	WATER	16/01/18 09:45
5508715		Walkerville Retention Basin - Sampling Point 3	WATER	16/01/18 09:45

Analysis - Analyte	*Sample No. Site Code Units*	5508714	5508715
pH - pH, units	Units	7.5	
BOD5 - Biochemical Oxygen Demand, 5 Day	mg/L	2	
SS at 104+/- 2°C - Suspended Solids	mg/L	<2	
Turbidity - Turbidity, NTU	NTU	1.9	
Colilert (2000) - E.coli MPN Colilert	orgs/100mL		120

A blank space indicates no test performed.

CHAIN OF CUSTODY
Water Resources Group

ABN: 94 105 060 320

Page.....of.....

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Fax: 03 5176 4473
paul.whiffen@alsglobal.com

Client:	SOUTH GIPPSLAND SHIRE COUNCIL		
Contact:	(results) **JOHN LAMBERT (johnl@southgippsland.vic.gov.au)**		
	(invoice) **TIM BROWN (timb@southgippsland.vic.gov.au)**		
Address:	9 Smith St, LEONGATHA, VIC 3953		
Phone:	0409936707	**Fax:**	
Email:	Results to : johnl@southgippsland.vic.gov.au		
P/O No.:		**Quote No.:**	SC-129-15
TAT Time:		**Sampler:**	JOHN LAMBERT
Job/Proj Ref:	WALKERVILLE RETARDING BASIN. SAMPLING POINT 3: S/N: 1275		

Office use only

Lab Work Order No:

LIMS Program Code:

TESTS REQUIRED

Lab Sample	Sample Description	No of Containers	Date Sampled	Time sampled	Matrix	pH	BOD 5	SUSPENDED SOLIDS	e- coli	Turbidity
	WALKERVILLE RETENTION BASIN, Sampling Point 3	2	16/01/18	9:45	Liquid	Y	Y	Y		Y
	WALKERVILLE RETENTION BASIN, Sampling Point 3	1	16/01/18	9:45	Stabilised: Na2S2O3				Y	

Special Instructions: Please note Temperature °C at time of delivery. 2°C

Relinquished By:	Company:	Date:	Time:	Received By:	Company:	Date:	Time:
J LAMBERT	SGSC	16th JAN2018		MK	ALS	16/01/18	1:40pm

This form is for recording of sample data after prior consultation with an analyst regarding sampling procedures and does not over-ride pricing agreements, OHS requirements and our terms and conditions.

As an Occupational Health and Safety consideration, it is a requirement of ALS Water Resources Group that all samples received be undamaged and prior advice given in writing of any potential health risks.

LAB USE ONLY Sample conditions: Samples received undamaged [Yes/No] Samples adequately preserved [Yes/No] Samples within recommended holding times: [Yes/No] Samples transported at appropriate temperature [Yes/No]

Aerial site view

Department of Environment, Land, Water & Planning

Southern Rural Water

Managing Water, Serving Communities

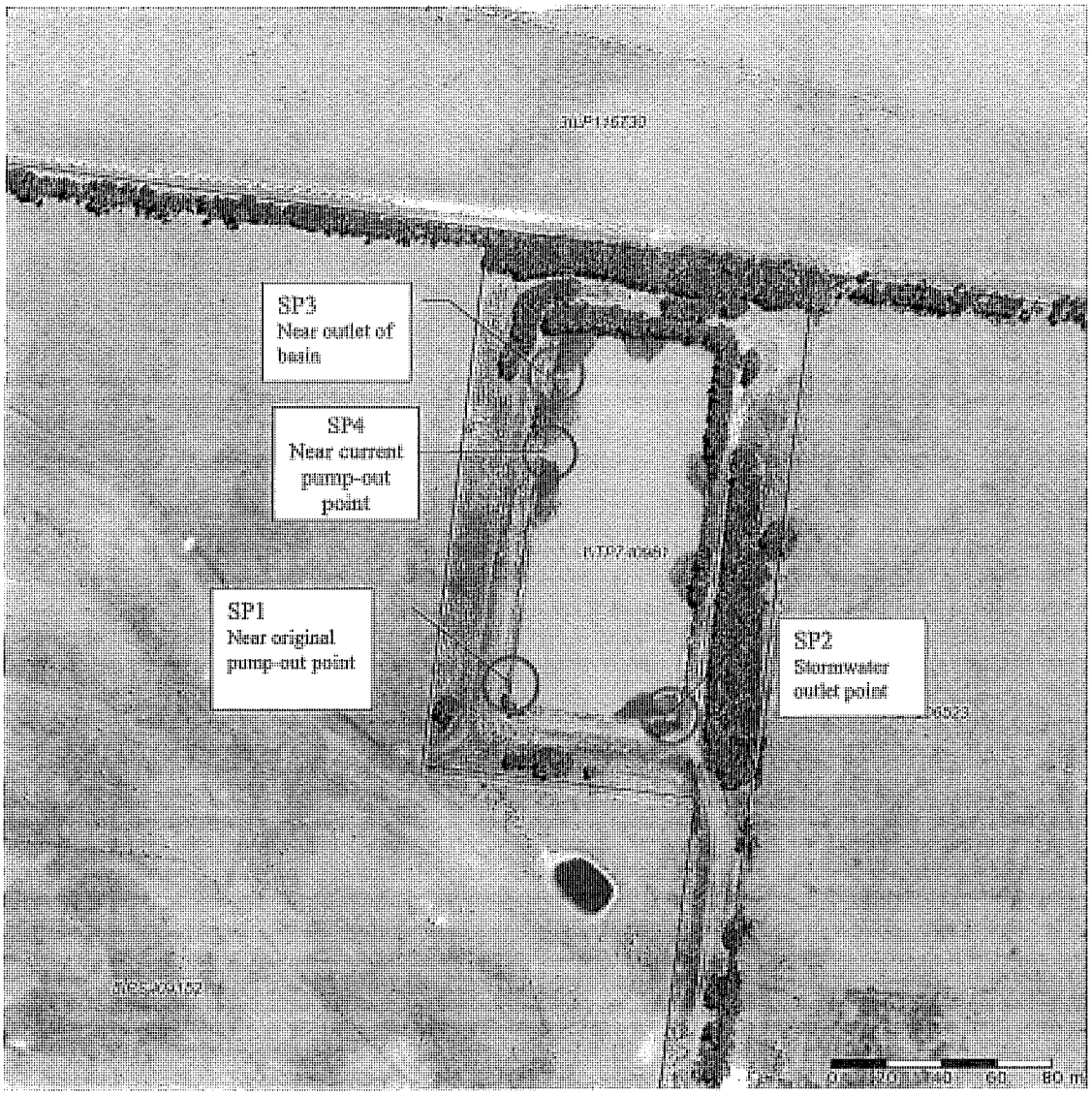

Figure 3-1: Basin sampling locations

The water and sediment samples have been tested for a range of parameters including microbial pathogens, nutrients, salinity and heavy metals. Details are provided in Sections 4 and 5.

As there has been no identification as to the specific 'toxic' nature of the sediment, the sampling and testing proposed can be considered an initial screen to determine if there are any general indicators of contaminants in the sediment that could cause harm to stock or irrigated land/crops. The sampling and testing set has been used to determine if further detailed analysis is warranted.

Sampling of stormwater in the drains was not undertaken. This can only be conducted during a rain event and the water quality during an event is likely to have high variability (e.g. first flush will be of different quality to sustained flow). Multiple events would need to be sampled to provide statistically relevant data.

Sampling and testing of drain water quality was undertaken by the South Gippsland Shire following rainfall in September 2017. This has been considered, but given it relates to only one rainfall event, it is difficult to draw meaningful conclusions.

LAWYERS
MELBOURNE | GEELONG
ABN: 26 965 814 421

Our reference: 40064584
Direct Line: (03) 9612 7209
Email: rob.mcgirr@wisemah.com.au

Friday, 4 May 2018

Darren Bennetts
Peter J Ramsay and Associates
Level 10, 222 Kings Way
South Melbourne, Vic 3205

BY EMAIL: darren.bennetts@pjra.com.au

Dear Darren,

Ansevata Nominees Pty Ltd ("Ansevata") v South Gippsland Shire Council ("SGSC")

1. **Request for Supplementary Report**

   1.1 We refer to our letter of instructions to you of 26 March 2018 and to your subsequent report dated 1 May 2018.

2. **Provision of Additional Documents**

   2.1 We **enclose** the following reports received from SGSC as following:

   (a) RMCG "Water and Sediment Quality Assessment Walkerville Retarding Basin" – March 2018;

   (b) Expert witness statement Walkerville Retarding Basin Dr David Rendell and Kathryn Robertson – 21 March 2018.

We would appreciate it if you could please peer review these reports and provide us with your assessment of the conclusions reached in these reports.

Yours faithfully,

WISEWOULD MAHONY
Partner: Rob McGirr
Accredited Commercial Litigation Specialist | Insurance and Litigation
Email: rob.mcgirr@wisemah.com.au
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Enc.

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RMCG

MARCH 2018

Water and sediment quality assessment Walkerville retarding basin

Final Report

This report has been requested by Russell Kennedy on behalf of South Gippsland Shire Council and is subject to legal professional privilege.

135 Mollison Street, Bendigo, Victoria 3550
(03) 5441 4821 – rmcg.com.au

Table of Contents

1 Introduction

1.1 INSTRUCTIONS

This report has been prepared in response to a letter of instruction from Andrew Sherman of Russell Kennedy.

Russell Kennedy acts for the South Gippsland Shire Council in relation to suitability of water captured in the Walkerville Retarding Basin for irrigation and livestock drinking uses on a neighbouring property.

RM Consulting Group Pty Ltd (RMCG) provides in this report an independent expert view of the suitability of the water in the Walkerville Retarding Basin. Particular attention is given to its use for livestock drinking (cattle and sheep) and irrigation (pasture for stock and grapes). This view has been formed through sampling and analysis of both sediment and water within the basin; review of previous sampling data; and a risk assessment of potential inputs (e.g. domestic wastewater).

1.2 SITE BACKGROUND

There is a settlement known as Promontory Views Estate near the small township of Walkerville on the South Gippsland coast.

The stormwater and drainage solution for this settlement includes a retarding basin. Water collected in the basin is accessed by an adjoining property, Ansevata, for irrigation and livestock watering.

Ansevata has indicated concern with use of the stormwater, including:

- That wastewater from the septic systems used in the Promontory Views Estate may be reaching the storm water drainage system.
- That the build-up of silt in the base of the Basin is "toxic" – which is assumed to mean that a component of the silt is expected to impact on water quality and in turn, may impact crops or stock health.

2 Situation Analysis

2.1 STORMWATER CATCHMENT

This discussion is informed by the *Township Land Capability Assessment of the Prom Views Estate – Walkerville* prepared by LandSafe in 2011, as well as spatial/mapping data and an inspection of the area on Friday the 10th of November 2017.

The Walkerville retarding basin captures stormwater from the Peninsula Views Estate. The Estate covers approximately 25 ha, including 380 lots, of which approximately three quarters have dwellings. The retarding basin receives stormwater from the majority, but not the entirety, of the Estate.

There is no reticulated water supply or sewerage. Domestic wastewater is treated and reused/disposed on each individual site. There is potential for domestic wastewater to enter the stormwater system via the following routes:

- Treated wastewater is discharged on the majority of sites to subsurface absorption trenches, irrigation fields or similar. It may then seep through the soil into the stormwater system. The Estate has an undulating topography with soils consisting of a layer of windblown sand overlying a dense clay subsoil. The low permeability of the subsoil can result in a shallow perched watertable. The sand depth varies across the Estate generally in correlation with topography. House construction to date has prioritised the areas with higher elevation and therefore a deeper sand layer.
- Average lot size in the Peninsula Views Estate is relatively small, resulting in limited space for reuse/disposal of wastewater flows. The onsite disposal fields may become overloaded in wet weather or in peak population times.
- Direct discharge of greywater. Older dwellings (pre-1980s) may have split systems, where the blackwater (toilet waste) goes to a septic tank and the greywater (shower, laundry and kitchen wastewater) is discharged directly to subsurface absorption trenches or offsite.
- Direct discharge of secondary treated wastewater. Advice from South Gippsland Shire is that there are three sites with offsite discharge permits. These sites have advanced secondary wastewater treatment systems to ensure the wastewater discharged is of high quality.

However, the risk of stormwater becoming contaminated by domestic wastewater is reduced by:

- Most of the houses are used as holiday homes and therefore only occupied intermittently.
- The use of rainwater tanks is known to result in lower volumes of water use and therefore wastewater production, by comparison to towns with reticulated water supply.[1]
- The houses that have been constructed in recent years have installed secondary treatment systems to increase the quality of wastewater reused or disposed onsite. The EPA and South Gippsland Shire have become more stringent in their requirements for domestic wastewater – for Victoria in general and for the Estate specifically.
- The sandy topsoils provide natural filtration of wastewater prior to potential entry to the drainage collection system. As such they act as another barrier to contaminants entering the retarding basin.

[1] EPA 2016, *Code of Practice – onsite wastewater management*, Publication 891.4

2.2 RETARDING BASIN ENVIRONMENT

The purpose of a stormwater retention basin is to provide a collection point for rainwater that has been shed from a nominated area.

This retarding basin is fenced to stock and the public, with access being through a locked gate to the side of the Walkerville CFA shed.

Whilst onsite, the wildlife encountered included ducks, waterfowl, parrots, snakes and insects. There was no unpleasant odour detected.

Figure 2-1 shows a photo of the basin in November 2017. At the time of this site visit there was extensive weed and grass growth on the Council land surrounding the basin and reed growth particularly in the north-west and south-east corners of the basin itself. The water level in the basin was relatively high.

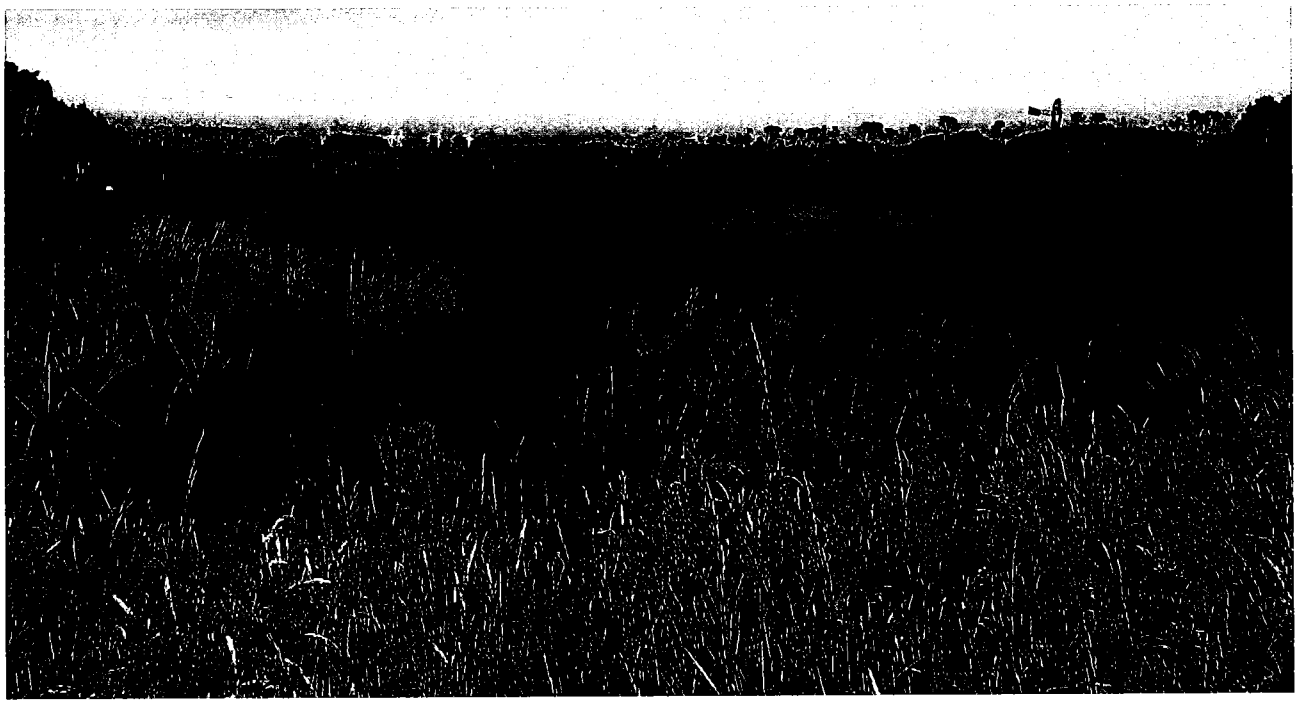

Figure 2-1: Walkerville stormwater retarding basin – 10 November 2017

Stormwater collected in the Walkerville basin has no treatment prior to entering the basin. However, the lagoon environment itself may provide a level of treatment through:

- Biological consumption of nutrients
- Ultraviolet disinfection by sunlight.

Bird life in particular can contribute pathogens. However, it is understood that these pathogens pose less risk to human and livestock health than pathogens sourced from humans or livestock, as discussed in Section 4.3.

3 Assessment Method

3.1 OBJECTIVES

RMCG has been requested to:

- Design and implement an appropriate sampling program (including methodology, extent and parameters analysed) to understand the quality and volume of silt in the Basin as well as the quality of the water.
- Provide a report advising on the results of the sampling, and our opinion as to:
  - The existence of any levels of pollution or contamination or "toxicity" existing within the silt or the water.
  - The prospect of that pollution or contamination or "toxicity" making its way to the Ansevata site; impacting on stock; and/or impacting on crops.

3.2 RISK ASSESSMENT OF POTENTIAL CONTAMINANTS

A risk-based approach has been taken to the sampling, testing and analysis for this project. We consider the retention basin as part of a system and consider the factors that could lead to contamination occurring in this basin.

Along with the sampling and testing data, information was gathered during a site visit, assessment of Shire database information and a review of mapping information (e.g. topography, lot size, soil/geology mapping). Potential inputs to the retarding basin were considered to understand likely contaminants in the water and sediment. Aspects investigated include drain condition and connectivity, evidence of greywater or septic discharge, and condition of fencing to prevent stock access.

No information has been provided as to the 'toxic' nature of the sediment or water. Professional judgement has been used to determine what testing would be most appropriate to identify components in the sediment or water that could make it unfit for purpose.

Based on the information gathered, a risk-based approach has been used to determine the likelihood that identified contaminants could cause adverse impacts (consequences) on livestock, crop or soil health, when water in the basin is used for irrigation or livestock drinking.

3.3 ASSESSMENT OF RELEVANT GUIDELINES

Industry guidelines have been used to develop the sampling and testing program, and as part of the water and sediment quality assessment. These guidelines include:

- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 3, Primary Industries*, 2000 (referred to in this document as the ANZECC Water Quality Guidelines)
- *Revision of the ANZECC/ARMCANZ Sediment Quality Guidelines*, 2013
- EPA Publication 1192 *Tracing faecal contamination in urban drains – toolkit*, 2007
- EPA Publication 891.4 *Code of Practice – onsite wastewater management*, 2016
- EPA Publication IWRG701, *A guide to sampling and analysis of waters, wastewaters, soils and wastes*, 2009.

3.4 SEDIMENT AND WATER SAMPLING

The extent of the sampling was limited by the timeframe available – approximately three weeks. As such, single event sampling was undertaken. Historic sampling has been used to assist with identifying trends – although there are limited parameters that have been tested on multiple occasions.

Grab samples of water and sediment at both the basin inlet and pump-out point were obtained and sent to a NATA accredited laboratory (ALS Scoresby).

Water sampling was conducted using a boom sampler to recover 'grab' samples near the surface, and from bank-edge accessible locations. No 'on water' sampling was considered necessary for this initial screen sampling. Samples were collected by geotechnical engineering firm Tonkin and Taylor.

Sediment samples were collected using a hand-operated piston sampler. Samples were collected at approximately 2 m from the edge, towards the centre of the water body. The piston sampler was advanced to 0.25 m below sediment surface using extension rods.

Samples were transported to the laboratory, under chain of custody documentation.

Decontamination procedures were completed in accordance with AS4482.1-2005 in order to minimise cross-contamination of samples from sampling equipment and comprised removal of sediment adhering to sampling equipment followed by washing.

Results have been compared to historical sampling and testing data provided by the South Gippsland Shire. Data is available from four monitoring sites at the basin, as shown on the map below. Water quality has been tested at various times at all four locations. Sediment quality has been tested at SP2, SP3 and SP4.

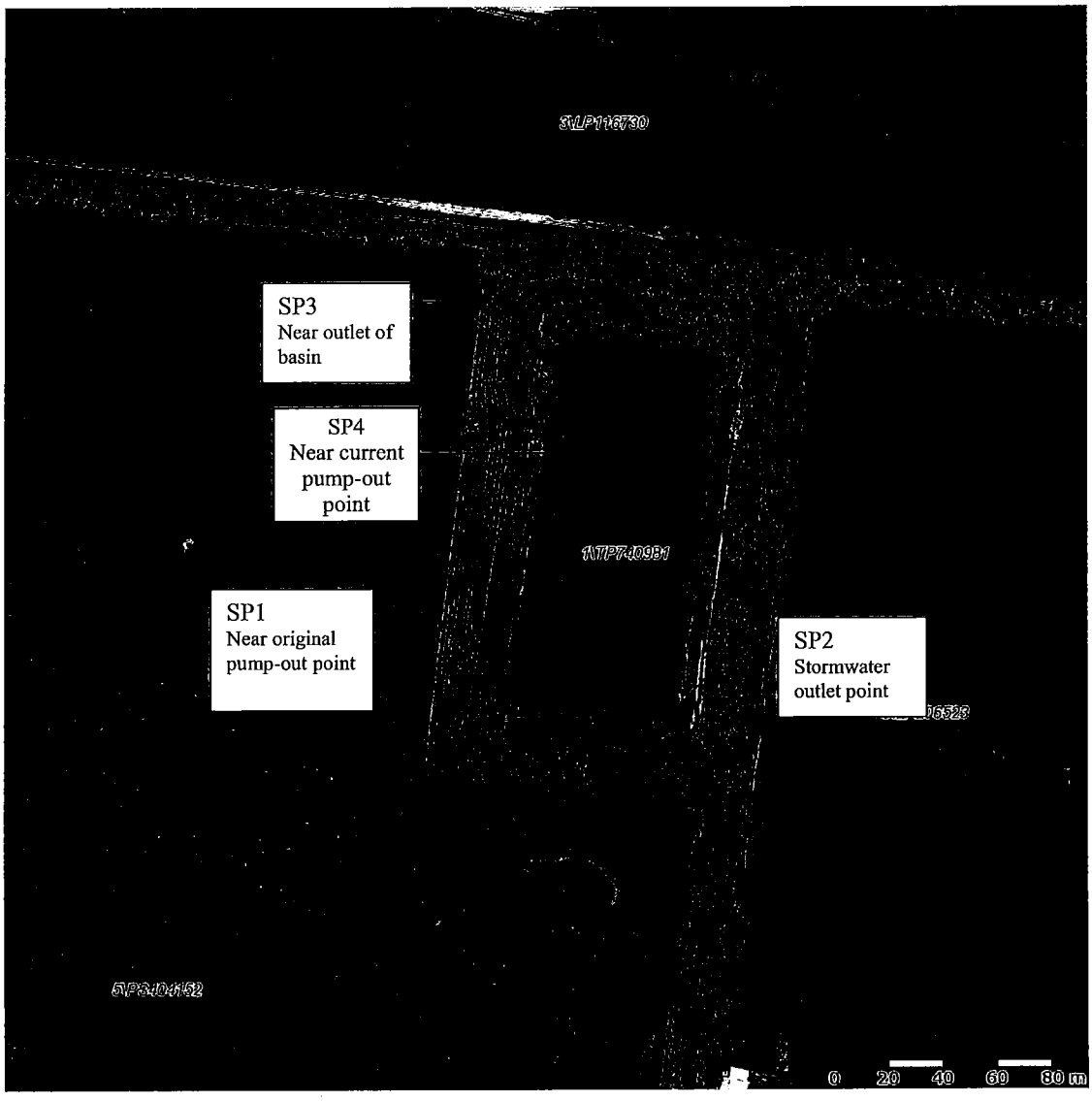

Figure 3-1: Basin sampling locations

The water and sediment samples have been tested for a range of parameters including microbial pathogens, nutrients, salinity and heavy metals. Details are provided in Sections 4 and 5.

As there has been no identification as to the specific 'toxic' nature of the sediment, the sampling and testing proposed can be considered an initial screen to determine if there are any general indicators of contaminants in the sediment that could cause harm to stock or irrigated land/crops. The sampling and testing set has been used to determine if further detailed analysis is warranted.

Sampling of stormwater in the drains was not undertaken. This can only be conducted during a rain event and the water quality during an event is likely to have high variability (e.g. first flush will be of different quality to sustained flow). Multiple events would need to be sampled to provide statistically relevant data.

Sampling and testing of drain water quality was undertaken by the South Gippsland Shire following rainfall in September 2017. This has been considered, but given it relates to only one rainfall event, it is difficult to draw meaningful conclusions.

4 Water Quality Analysis

4.1 LIVESTOCK DRINKING GUIDELINES

The quality of the water in the retention basin has been assessed based on criteria outlined in the ANZECC Water Quality Guidelines. Key parameters for livestock are summarised in Table 4-1.

Note that these guidelines are trigger values. Below the trigger value there is minimal risk of adverse effects on animal health. Above the trigger value, investigations are recommended (e.g. of other factors such as age, condition, other dietary sources) to further evaluate the situation. Exceeding a trigger value therefore does not necessarily mean impact to stock health.

Table 4-1: ANZECC Water Quality Guidelines for livestock and measured values

PARAMETER	UNIT	STOCK WATERING GUIDELINE VALUE	MEASURED AT SP2 (INLET) 10/11/17	MEASURED AT SP4 (CURRENT PUMP-OUT) 10/11/17
Cyanobacteria (blue-green algae)	Microcystis cells/ml	11,500	No algae present	No algae present
	Microcystin-LR toxicity equivalents µg/l	2.3		
Microbial pathogens[2]	Thermotolerant coliforms/100 ml	100	100 *(E. coli)*	35 *(E. coli)*
Total dissolved solids	mg/l	4,000 (2,400 for dairy cattle)	310	320
Sulfate	mg/l	1,000	<20	<20
Aluminium	mg/l	5	0.56	0.61
Fluoride	mg/l	2	0.07	0.06
Calcium	mg/l	1,000	9.1	9.2
Arsenic	mg/l	0.5	0.002	0.002
Boron	mg/l	5	0.04	0.04
Cadmium	mg/l	0.01	<0.0002	<0.0002
Chromium	mg/l	1	0.002	0.002
Cobalt	mg/l	1	<0.001	<0.001
Copper	mg/l	0.5 (sheep) 1 (cattle)	0.002	0.002
Lead	mg/l	0.1	<0.001	<0.001
Mercury	mg/l	0.002	<0.0001	<0.0001
Molybdenum	mg/l	0.15	<0.001	<0.001

[2] The Guidelines consider thermotolerant coliforms (also known as faecal coliforms), while the sampling program has measured *E. coli* (or *Escherichia coli*). *E. coli* is the most common thermotolerant coliform present in faeces (typically >90%) and studies suggest it is a more reliable indicator of faecal contamination. For practical purposes, they can be used interchangeably.

PARAMETER	UNIT	STOCK WATERING GUIDELINE VALUE	MEASURED AT SP2 (INLET) 10/11/17	MEASURED AT SP4 (CURRENT PUMP-OUT) 10/11/17
Nickel	mg/l	1	0.003	0.003
Zinc	mg/l	20	0.026	0.025
Selenium	mg/l	0.02	<0.001	<0.001
Uranium	mg/l	0.2	Not tested	Not tested
Nitrite (as N)	mg/l	30	<0.01	<0.01
Nitrate (as N)	mg/l	400	0.15	0.26

Laboratory analysis was not required for cyanobacteria (blue-green algae). Algae generally proliferate during summer, and were not present at the sample collection time. Anecdotal evidence suggests there has been no history of algal blooms at the basin (Tim Brown and John Lambert, South Gippsland Shire, pers. comm., 10/11/17). Blooms typically occur on warm days with light to calm winds (summer to autumn) in waters of neutral to alkaline pH containing elevated levels of inorganic phosphorus and nitrogen.[3] Therefore, the level of nutrients in the water can be used to indicate whether algal growth is likely to occur during the summer.

Uranium was not tested. It is not considered a parameter of concern. It can result from mineral processing – which does not occur in the area – or it can occur naturally, particularly in groundwater, which is not used for water supply in Walkerville.

All results were well below the guideline values, with the exception of one sample that indicated *E. coli* at the guideline value. In the past *E. coli* has exceeded the trigger value of 100 orgs/100 ml. As such, a more detailed assessment of microbial pathogens has been undertaken and is discussed below in Section 4.3.

4.2 IRRIGATION GUIDELINES

In Table 4-2, sampling results are compared to the ANZECC Water Quality Guideline trigger values for irrigation.

For most parameters, the guideline values are the long-term trigger values (LTV). For short term irrigation (<20 years) higher guideline limits (STV) apply for some parameters (for example, the STV for aluminium is 20 mg/l, compared to the LTV listed below of 5 mg/l).

[3] ANZECC & ARMCANZ, 2000

Table 4-2: ANZECC Water Quality Guidelines for irrigation and measured values

PARAMETER	UNIT	IRRIGATION GUIDELINE VALUE	MEASURED AT SP2 (INLET) 10/11/17	MEASURED AT SP4 (CURRENT PUMP-OUT) 10/11/17
Microbial pathogens[4]	Thermotolerant coliforms/100 ml	1,000	100 *(E. coli)*	35 *(E. coli)*
pH		6 – 9	7.2	7.1
Salinity - Electrical Conductivity (EC)[5]	µS/cm	<650 very low	460	460
Aluminium	mg/l	5	0.56	0.61
Arsenic	mg/l	0.1	0.002	0.002
Beryllium	mg/l	0.1	<0.001	<0.001
Boron	mg/l	0.5	0.04	0.04
Cadmium	mg/l	0.01	<0.0002	<0.0002
Chromium (VI)	mg/l	0.1 (VI)	0.002 (total)	0.002 (total)
Cobalt	mg/l	0.05	<0.001	<0.001
Copper	mg/l	0.2	0.002	0.002
Fluoride	mg/l	1.0	0.07	0.06
Iron	mg/l	0.2	2.8	3.2
Lead	mg/l	2.0	<0.001	<0.001
Lithium	mg/l	2.5	Not tested	Not tested
Manganese	mg/l	0.2	0.028	0.031
Mercury	mg/l	0.002	<0.0001	<0.0001
Molybdenum	mg/l	0.01	<0.001	<0.001
Nickel	mg/l	0.2	0.003	0.003
Selenium	mg/l	0.02	<0.001	<0.001
Uranium	mg/l	0.01	Not tested	Not tested
Vanadium	mg/l	0.1	0.001	0.002
Zinc	mg/l	2.0	0.026	0.025
Nitrogen	mg/l	5.0	1.5	1.6
Phosphorus	mg/l	0.05	0.14	0.12

The majority of parameters are well below the guideline trigger values for irrigation. The exceptions are:

- Iron exceeds the LTV, but is below the STV of 10 mg/l. Iron can cause problems when it precipitates on irrigation equipment causing clogging of trickle or dripper irrigation systems. It is not an issue with other forms of irrigation. Iron does not pose a risk to soil health (most soils are naturally rich in iron), and the

[4] The trigger value of 1,000 coliforms/100ml applies to: raw human food crops not in direct contact with irrigation water (edible product separated from contact with water, e.g. by peel, use of trickle irrigation); human food crops sold to consumers cooked or processed; pasture and fodder for grazing animals (except pigs and dairy animals); non-food crops (silviculture, turf, cotton etc.). Where grazing of dairy cattle is to occur, a five-day withholding period is required following irrigation.

[5] The trigger value given for EC is the lowest water salinity rating and suitable for sensitive crops. Higher irrigation water salinity can be used subject to crop grown, soil characteristics, climate and so on.

STV has been set so that continual irrigation of plants will not expose them to phytotoxic concentrations of iron.

- The LTV for phosphorus is again focussed on bioclogging of equipment. It has been set low enough to restrict algal growth, assuming all other conditions for algal growth are adequate (e.g. sunny, warm and calm conditions and other nutrients also elevated). The STV for phosphorus is a range of 0.8 to 12 mg/l, and the water samples have concentrations well below this. Phosphorus is not expected to build up in soils irrigated with the stormwater to levels where risk to the downstream environment is of concern. Additional phosphorus fertiliser would be required to meet nutrition needs for the crops irrigated.

Lithium and uranium were not tested and are not considered parameters of concern. Higher lithium concentrations tend to be found in association with hot springs in arid hydrogeological conditions. Potential sources of uranium are discussed in Section 4.1 above.

4.3 FURTHER ANALYSIS OF MICROBIAL PATHOGENS

MONITORING TRENDS

Monitoring results for *E. coli* are available since 2012. Results are graphed in Figure 4-1.

The ANZECC Water Quality Guidelines recommend that a median value of thermotolerant coliforms be used. A median value is based on a number of readings generated over a 12-month period from a regular monitoring program. The Guidelines state that investigations of likely causes are warranted when 20% of results exceed four times the median guideline level (400 orgs/100 ml *E. coli.*) in a 12-month period.

Prior to 2016, the sampling results indicated that *E. coli* levels did not exceed the guideline trigger. The median annual level remained below 100 orgs/100 ml *E. coli.*

In 2016, >20% of results exceeded 400 orgs/100 ml *E. coli* for Sampling Point 1. The rolling annual median for Sampling Point 1 also exceeded the guideline limit of 100 orgs/100 ml *E. coli* from May 2016 until early 2017 when regular monitoring at this point ceased.

In 2017, relatively regular monitoring was undertaken at Sampling Point 3. The median result during that calendar year was 63 orgs/100 ml *E. coli.*

Further investigations have been undertaken given the sampling results for 2016. All other years have been below the guideline limits.

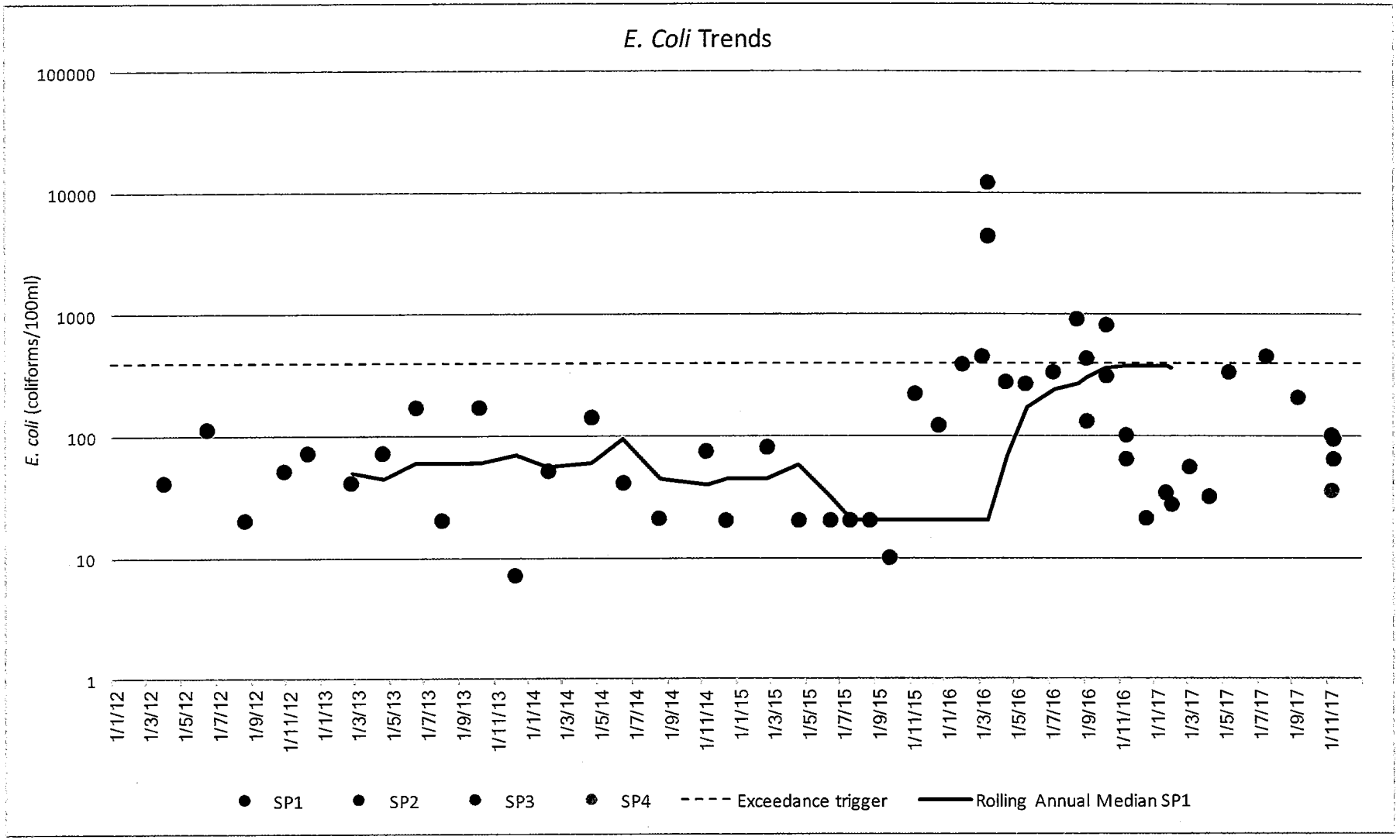

Figure 4-1: Monitoring results for *E. coli*

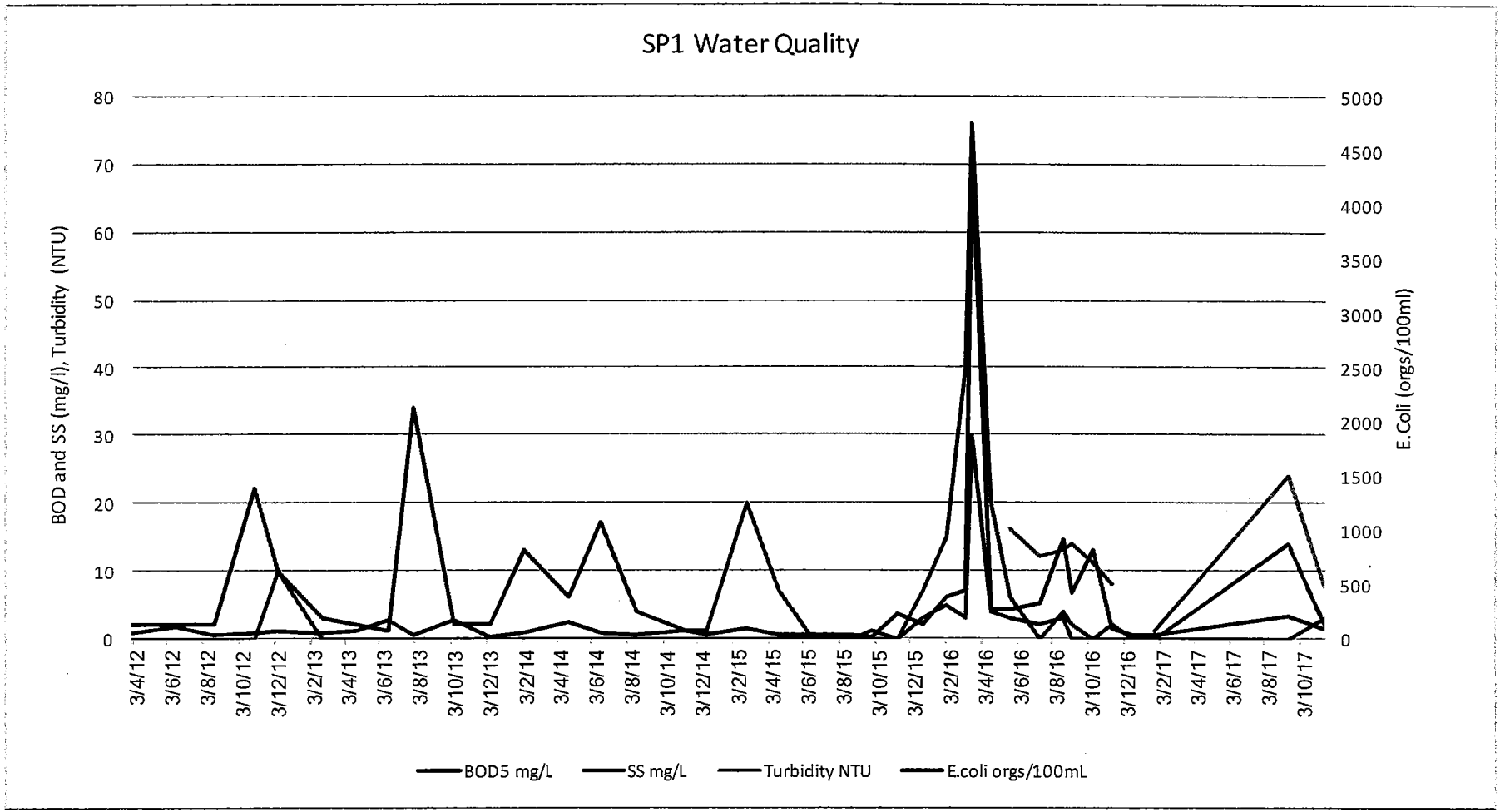

Figure 4-2: Comparison of Monitoring Parameters at SP1

COMPARISON WITH OTHER PARAMETERS

For Sampling Point 1, which has the most data available, comparison has been made between *E. coli* and other available monitoring data (including turbidity, pH, biological oxygen demand (BOD) and suspended solids (SS)), refer to Figure 4-2.

There is no clear correlation between *E. coli* results and the other parameters, with the exception of a corresponding spike in BOD, SS and *E. coli* in March 2016.

South Gippsland Shire noted that there may be a correlation between water depth and water quality (Tim Brown and John Lambert, South Gippsland Shire, pers. comm., 10/11/17). Depth in the basin is not recorded at the time of sampling. However, photos are generally taken of the basin, so approximate depth can be inferred from these. When the basin water level is very low, the sediment is more likely to be mobilised into the water column through wind and wave action. This would increase turbidity and suspended solids levels as shown in the following photo – the water is looking "muddy". However, the correlation with *E. coli* is less clear. It is recommended that water levels are monitored when *E. coli* is sampled in future – refer to Section 8 for further details.

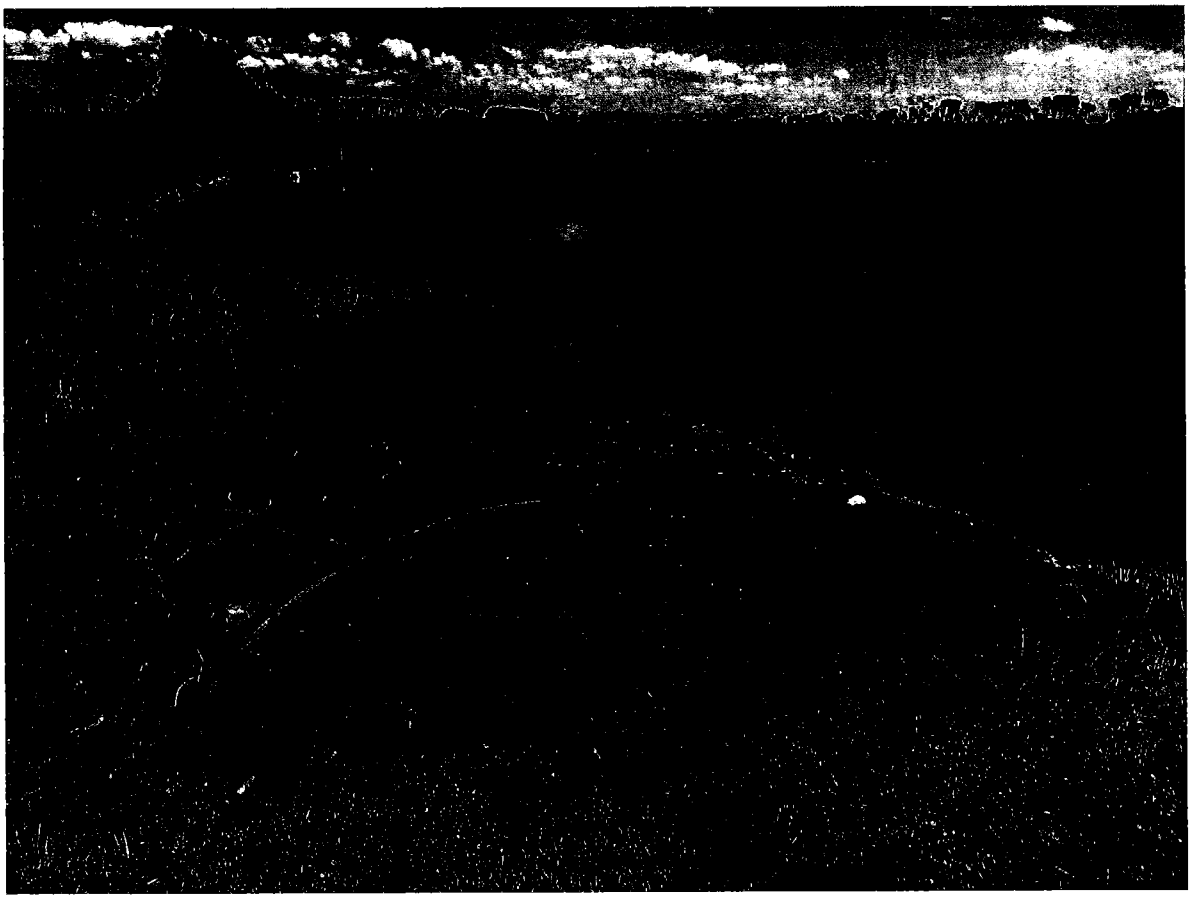

Figure 4-3: Walkerville stormwater retarding basin – 2 March 2016

MICROBIAL SOURCE TRACKING

It is noted that the Livestock Drinking Guideline value for microbial pathogens is 100 thermotolerant coliforms/100 ml. Previous testing indicates that the basin water can exceed this value on occasion.

Thermotolerant coliforms (and/or *E. coli*) are used as an indicator organism. Indicator organisms are used to verify water quality, as monitoring for specific bacterial pathogens is complex, expensive and time consuming. *E. coli* is an indicator of faecal contamination, but does not specifically indicate that pathogens are present.

Faecal contamination can originate from several sources. However, pathogens only originate from a subset of these. Also, faecal contamination may be sourced from multiple hosts, but human-infective (or stock-infective) pathogens are commonly found in only a subset of these.[6]

Sources of human faecal contamination pose a greater risk to public health than non-human sources.[7] Where the faecal source is human – i.e. sewage – the fraction of human infectious pathogenic strains is 1.0. Whereas the fraction is much lower for non-human sources. Cross-species transmission is influenced by genetic distance between different species, geographical range, and other interaction barriers.

The fraction of human infectious pathogenic strains in seagull faeces has been roughly estimated at 0.2. Noting, however, that this will be site specific and related to factors such as feeding patterns of the seagulls.[8] Based on this, combined with other factors such as persistence of different pathogens in the environment, the median illness risk associated with human sewage is approximately two orders of magnitude higher than that associated with seagulls.[9]

Similarly, the risk of transmittal to livestock is greatest in surface waters which are directly accessible by stock or which receive runoff or drainage from intensive livestock operations or human wastes.[10]

As such, microbiological source tracking (MST) has been conducted to determine the likelihood that the thermotolerant coliforms in the water are from human or animal sources. The basic assumption of microbial source tracking is that there are characteristics unique to the faecal bacteria from a particular host. Most of these target key genes can be "fingerprinted" or tied to a type of mammal, human or bird.

Test parameters and results are outlined in Table 4-3.

6 World Health Organization, 2016
7 EPA Victoria, 2007
8 Schoen ME, Ashbolt NJ, 2010
9 World Health Organization, 2016
10 ANZECC & ARMCANZ, 2000

Table 4-3: Microbial Source Tracking Test Parameters

TEST PARAMETER	SP2 (INLET) 10/11/17	SP4 (CURRENT PUMP-OUT) 10/11/17	SP2 (INLET) 18/3/16
Colilert (2000) - *E. coli* MPN Colilert orgs/100 ml	100	35	12000
Enterolert - Enterococci MPN Enterolert orgs/100 ml	52	6	-
Bacteroidales - Bacteroidales PCR	Detected	Detected	Not detected
Bacteroidales - Human Bacteroides QPCR copies/L	Not detected	Not detected	Not detected
Bacteroidales - Animal Bacteroides QPCR copies/L	33,000	280,000	Not detected
MST-1 - Total Weighted Risk	0.25	0.25	-
MST-1 - Risk Ranking	Medium	Medium	-
MST-2 - Human Bacteroides Marker Abundance	Low	Low	Low
MST-2 - Animal Bacteroides Marker Abundance	Medium	Medium	Low

The key risk identified for stormwater at Walkerville is the potential for domestic wastewater contamination. As such the presence of human faecal bacteria is the focus. The testing did not detect any human bacteroides and the marker abundance was considered Low.

Secure fencing is in place around the retarding basin. Therefore, the animal bacteroides identified are unlikely to be from livestock. The source is expected to be the birdlife on the basin. This poses a lower risk to livestock or human health than inputs from stock or humans respectively.

5 Sediment Quality Analysis

Sediments can be both a source and a sink for contaminants. They influence surface water quality, and can potentially impact the aquatic food chain through benthic biota (organisms that live on the surface of the sediment and in some subsurface layers). If the sediment is removed from the basin in future, it could also impact land where it is reused or disposed.

The sediment guideline values have been set to protect ecological values and they take a precautionary approach. Exceedance of a guideline value does not necessarily mean the sediment is toxic. Exceedance is a trigger for further investigation.

Sediment sampling was undertaken by South Gippsland Shire on 18 April 2017 at SP3 near the basin outlet (or overflow point). A further two samples were taken on 10 November 2017 at SP2 (the stormwater inlet) and SP4 (the current pump-out point). Results are compared to guideline values in the table below.

Table 5-1: Sediment Quality Guideline Values

PARAMETER	UNIT	GUIDELINE VALUE	MEASURED AT SP3 (OUTLET) 18/4/17	MEASURED AT SP2 (INLET) 10/11/17[11]	MEASURED AT SP4 (CURRENT PUMP-OUT) 10/11/17
Antimony	mg/kg	2.0	Not tested	Not tested	Not tested
Cadmium	mg/kg	1.5	<0.2	<0.2	<0.2
Chromium[12]	mg/kg	80	<1.0	<1.0	<1.0
Copper	mg/kg	65	7	24	8
Lead	mg/kg	50	11	13	13
Mercury	mg/kg	0.15	<0.05	<0.05	<0.05
Nickel	mg/kg	21	7	30	9
Silver	mg/kg	1.0	<5	<5	<5
Zinc	mg/kg	200	36	190	25
Arsenic	mg/kg	20	<5	8	<5
Tributyltin	µg/kg	9.0	Not tested	Not tested	Not tested
Total PAHs	µg/kg	10,000	<0.1	<0.4	<0.1
Total DDT	µg/kg	1.2	<0.05	<0.2	<0.05
DDE	µg/kg	1.4	<0.05	<0.2	<0.05
DDD	µg/kg	3.5	<0.05	<0.2	<0.05
Chlordane	µg/kg	4.5	<0.05	<0.2	<0.05
Dieldrin	µg/kg	2.8	<0.05	<0.2	<0.05
Endrin	µg/kg	2.7	<0.05	<0.2	<0.05
Lindane	µg/kg	0.9	<0.05	<0.2	<0.05

[11] The SP2 sample was relatively moist (60% moisture content) and as a result the limit of reporting for many parameters was higher than for the other sample.
[12] Sampling results are for total hexavalent chromium, rather than total chromium.

PARAMETER	UNIT	GUIDELINE VALUE	MEASURED AT SP3 (OUTLET) 18/4/17	MEASURED AT SP2 (INLET) 10/11/17[11]	MEASURED AT SP4 (CURRENT PUMP-OUT) 10/11/17
Total PCBs	µg/kg	34	<0.1	<0.4	<0.1
TPHs (total petroleum hydrocarbons)	mg/kg	280	<140	<630	<140

The results show that all analytes tested are lower than the sediment guideline values, with the following exceptions:

- Silver results are inconclusive. Silver was analysed at a limit of reporting higher than the guideline value. The actual laboratory results for the samples were 0.03 mg/kg (Brad Snibson, ALS, pers. comm., November 24, 2017) but the confidence interval for the testing method means they can only report to 5 mg/kg. Water quality results indicate very low levels of silver <0.001 mg/l. It is not noted as a heavy metal of particular risk to livestock health or irrigation water use – there is no ANZECC guideline value for silver. There is unlikely to be toxic levels of silver in the sediment. Sources of silver are generally ore processing, photography, dentistry and electronics.
- The guideline trigger value for nickel was exceeded for one sediment sample. However, this sample was still below the SQG-High value for nickel which is 52 mg/kg. Above this level there would be a high probability of effects. Nickel levels in the water samples are well below the ANZECC guidelines for livestock drinking and irrigation use.
- The result for total petroleum hydrocarbons (TPHs) was inconclusive for one sample. This sediment sample had a relatively high moisture level resulting in the limit of reporting being higher than the guideline limit. This is due to insufficient sediment being available for testing, rather than an indication of the presence of TPHs.

Antimony was not tested in any of the sediment samples and is not considered a parameter of concern. As antimony is naturally occurring in the environment, people are exposed to relatively small amounts every day in air, food and water. Sources of antimony at toxic levels result from mining or processing of its ores and in the production of antimony metal and alloys. Neither occurs in proximity to Walkerville.

6 Risk Assessment

A risk assessment provides an evaluation of the potential risks posed by the stormwater or sediment in the basin to stock and crop health. The risk assessment is provided in Table 6-1. Any assumptions, uncertainties or unknown information has been noted in the table comments.

This is a qualitative estimation of risk. Likelihood and consequence measures are combined to estimate risk as per the process outlined in Appendix 1.

Table 6-1: Risk assessment

POTENTIAL CONTAMINANTS	LIKELIHOOD	CONSEQUENCE	RISK ASSESSED	COMMENT
Pathogens and parasites – human origin	Unlikely There is a possibility from domestic wastewater – particularly given small lot sizes. However there are multiple treatment barriers between houses and Ansevata – including the basin itself.	Minor May cause minor stock illness, but no evidence of this occurring to date.	Low	*E. coli* has exceeded the guideline trigger value on occasion. However, microbial source tracking indicates there is a low risk this is due to human bacteroides.
Pathogens and parasites – animal origin	Almost certain (birds)	Insignificant Lower range of infective pathogens than from humans or livestock.	Low	The *E. coli* levels in the retarding basin are most likely a result of inputs from birdlife. This poses a lower risk to livestock or human health than inputs from stock or humans.
	Rare (livestock) Due to fencing.	Minor May cause minor stock illness, but no evidence of this occurring to date.	Low	
Nutrients	Unlikely From domestic wastes, garden fertilisers, plant material. Multiple treatment barriers between houses and Ansevata – including the basin itself.	Minor Beneficial to crops. Excess levels can lead to algal blooms.	Low	Low levels measured in basin. Fertiliser likely to be required at reuse site to ensure adequate crop growth.

	POTENTIAL CONTAMINANTS	LIKELIHOOD	CONSEQUENCE	RISK ASSESSED	COMMENT
Water Quality	Salts	Unlikely Shallow groundwater. Detergents.	Insignificant High rainfall and sandy topsoils will ensure salt does not accumulate in root zone.	Low	Very low levels measured in basin.
Water Quality	Metals	Rare No industry or mining in stormwater catchment. Possibly trace amounts e.g. lead and zinc from roads; copper from domestic pipes.	Minor/Moderate Varies depending on metal in question.	Low	Sampling results indicate metals at very low levels.
Water Quality	Blue-green algae (cyanobacteria)	Rare No history of algal blooms at site. Not all algal blooms are toxic.	Moderate Direct ingestion by stock can lead to weakness/lethargy and in serious cases respiratory failure.	Low	Refer to 4.1 for further discussion.
Sediment Quality	Metals and metalloids	Rare No industry or mining in stormwater catchment. Possibly trace amounts e.g. lead and zinc from roads; copper from domestic pipes.	Minor/Moderate Varies depending on metal in question.	Low	Sampling results indicate sediment is non-toxic.
Sediment Quality	Organic chemicals	Rare Inappropriate disposal of garden chemicals, paint, solvents, petrochemicals.	Minor/Moderate Varies depending on chemical in question.	Low	Sampling results indicate sediment is non-toxic.

7 Conclusions

The risk assessment identified a low risk for all potential contaminants of water and sediment quality.

Our opinion is that the stormwater in the retarding basin is suitable for the purposes of irrigation of pasture and crops, and for livestock drinking.

It is noted that the guideline values have been exceeded on occasion. However, exceedance of a guideline value is a trigger for further investigation, and this further investigation suggests minimal risk for livestock drinking and irrigation.

In particular, sampling in 2016 has indicated *E. coli* at levels above the guideline value for livestock drinking (median 100 orgs/100 ml). Given the basin is fenced, the *E. coli* is not expected to be from livestock. There is a possibility of contamination from domestic wastewater. However, there are multiple treatment barriers between the houses and Ansevata – including the basin itself. Microbial source tracking has been undertaken. This did not detect any human bacteroides in the stormwater basin. It is deduced that the source is birdlife on the basin. This poses a lower risk to livestock or human health than inputs from stock or humans respectively.

A summary of the risk assessment is provided in the following table. This has taken sampling results into account as well as broader information gathered during a site visit, assessment of Shire database information and a review of mapping information (e.g. topography, lot size, soil/geology mapping).

Table 7-1: Summary of risk assessment

	CONTAMINANT	RISK ASSESSMENT
Water quality	Pathogens & parasites – human origin	Low
	Pathogens & parasites – animal origin	Low
	Nutrients	Low
	Salts	Low
	Metals	Low
	Blue-green algae	Low
Sediment quality	Metals and metalloids	Low
	Organic chemicals	Low

8 Recommendations

Given the low risk levels identified, recommendations for ongoing monitoring are minimal.

It is suggested that South Gippsland Shire continues with monitoring of *E. coli*, turbidity, pH, suspended solids and biological oxygen demand. This should be undertaken on regular basis – for example, monthly or bi-monthly. We recommend sampling at SP4 (refer to Figure 3-1) near the current pump out point.

In addition, a water level gauge could be installed at the basin to track depth. This can be used to assess if there is any correlation between depth and *E. coli*. If a correlation is identified, management of water levels could be used to improve the water quality extracted for livestock and irrigation use.

References

ANZECC & ARMCANZ (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 3, Primary Industries*

EPA Victoria (2007). *Tracing faecal contamination in urban drains – toolkit.* Publication 1192

EPA Victoria (2016). *Code of Practice – onsite wastewater management.* Publication 891.4

EPA Victoria (2009). *A guide to sampling and analysis of waters, wastewaters, soils and wastes.* Publication IWRG701

LandSafe (2011). *Township Land Capability Assessment of the Prom Views Estate – Walkerville.* Prepared for South Gippsland Shire Council

Schoen ME, Ashbolt NJ (2010). "Assessing pathogen risk to swimmers at non-sewage impacted recreational beaches." Environmental Science & Technology, 44(7):2286–91

Simpson SL, Batley GB and Chariton AA (2013). *Revision of the ANZECC/ARMCANZ Sediment Quality Guidelines.* CSIRO Land and Water Science Report 08/07. CSIRO Land and Water.

World Health Organization (2016). *Quantitative Microbial Risk Assessment: Application for Water Safety Management*

Appendix 1: Risk Assessment Process

Qualitative Measures of Likelihood

DESCRIPTOR	EXAMPLE DESCRIPTION
Rare	May occur only in exceptional circumstances.
Unlikely	Could occur in unusual circumstances.
Possible	Might occur or should be expected to occur.
Likely	Will probably occur.
Almost certain	Is expected to occur.

Qualitative Measures of Consequence or Impact

DESCRIPTOR	EXAMPLE DESCRIPTION
Insignificant	Insignificant impact or not detectable.
Minor	Livestock Health – Minor impact for small population (stock growth rate slowed for single or small number of animals). Crops Irrigated – Minor impact to crop (small decrease in yield quantity/quality). Produce Quality – Contaminated produce has minor human health impact (minor illness requiring medical treatment, or causing lost work time). Soil Health – Potentially harmful to soils with impacts contained onsite and can be rehabilitated.
Moderate	Livestock Health – Minor impact for large population (growth rate slowed for numerous animals). Crops Irrigated – Moderate impact to crop (large decreased in yield). Produce Quality – Contaminated produce has moderate human health impact (serious illness with hospitalisation, or multiple minor illnesses). Soil Health – Potentially harmful to local soils and potential for off-site impacts.
Major	Livestock Health – Major impact for small population (single or small number of animal deaths). Crops Irrigated / Produce – Total crop failure. Produce Quality – Contaminated produce has major human health impact for small population (life threatening illness).

DESCRIPTOR	EXAMPLE DESCRIPTION
	Soil Health – Potentially lethal to local soil ecosystem; widespread onsite and offsite impacts.
Catastrophic	Livestock Health – Major impact for large population (numerous animal deaths). Produce Quality – Contaminated produce has major human health impact for large population (e.g. death or multiple life-threatening injuries). Soil Health – Offsite impacts potentially lethal to regional ecosystem or threatened species, soils rendered toxic for decades.

Qualitative Risk Assessment

LIKELIHOOD	CONSEQUENCES				
	Insignificant	Minor	Moderate	Major	Catastrophic
Rare	Low	Low	Low	High	High
Unlikely	Low	Low	Moderate	High	Very high
Possible	Low	Moderate	High	Very high	Very high
Likely	Low	Moderate	High	Very high	Very high
Almost certain	Low	Moderate	High	Very high	Very high

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Document review and authorisation

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1.0	Draft	28/11/2017	A. Kelliher	H. Hall	H. Buck	A. Kelliher	A. Sherman, RK
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3.0	Final	14/3/2018	A. Kelliher		P. Mawson	A. Kelliher	A. Sherman, RK

Expert Statement

Walkerville Retarding Basin

Dr David Rendell

Dr Kathryn Robertson

Contents

EXPERT STATEMENT OF Dr. DAVID RENDELL and Dr. KATHRYN ROBERTSON

1. Names and Addresses of Authors

David Keith **RENDELL**
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HAMILTON, 3300

Kathryn Elise **ROBERTSON**
60 Portland Road
HAMILTON, 3300

2. Capability

2.1. Qualifications of Dr David Rendell

2.1.1. I have a Bachelor of Veterinary Science from the University of Melbourne

2.1.2. I am a member of the Australian and New Zealand College of Veterinary Scientists (ANZCVSc) by examination in the Medicine of Sheep

2.1.3. I also have a Masters of Business Administration (MBA) (Agribusiness) from University of New England

2.2. Experience of Dr David Rendell

2.2.1. I have 38 years of experience as a beef cattle and sheep veterinarian, based in South West Victoria, but consulting throughout Australia. Prior to retiring from Veterinary practice in December 2017 I was a Director of Grampians Animal Health, trading as Livestock Logic and Cox Street Vets. An eleven veterinarian practice and agricultural consultancy clinic that includes a livestock feed analysis laboratory parasitological laboratory, based in Hamilton Victoria

2.2.2. I have provided a joint expert witness report for a Queensland court in a case of alleged cattle water contamination

2.2.3. I have assisted Rural Industries Skill Training (RIST) in the development of a Lifetime Beef Management Course based on RIST's highly successful LTEM program. I have delivered three pilot groups for this program involving 20 participants

2.2.4. I have 12 years' experience as resident co-manager of Bellwyn Pastoral Co, a 2000 hectare property running 600 beef cows and 3000 sheep

2.2.5. I was the Animal Welfare Representative of the Victorian Division of the Australian Veterinary Association 2004- 2015

2.3. Qualifications of Dr Kathryn Robertson

2.3.1. I have a Bachelor of Agricultural Science (hons) from The University of Melbourne

2.3.2. I have a Doctor of Veterinary Medicine (hons) from The University of Melbourne

2.3.3. I am a registered veterinary practitioner in the State of Victoria. My registration number is eight thousand two hundred and twenty one

2.4. Experience of Dr Kathryn Robertson

2.4.1. I am a livestock veterinarian at Grampians Animal Health trading as Livestock Logic and Cox Street Vets

2.4.2. I have been practicing as a veterinarian for over 3 years

2.4.3. I have 14 years experience in the Agricultural industry that included 3 years as an agronomist at Kerang, 3 years as for Agriculture Victoria Animal Health Officer in Hamilton and Grains Industry Development Officer. I have also had an ongoing, active involvement with the family farm

3. Purpose of Report.

3.1. We have been requested by Andrew Sherman to

3.1.1. Review the water quality test results for the Walkerville Water Retention Storage (WWRS) from March 2016 until July 2017

3.1.2. Provide an opinion as to the real risk or prospect of some form of health impact, long or short term, on cattle or sheep drinking water sourced from this retention storage

3.2. The work for the report was commenced by Dr David Rendell who has since retired. Therefore this report has been jointly authored by Dr Kathryn Robertson

4. Source of WWRS water

4.1. Tim Brown Environmental Health Officer from South Gippsland Shire reported on the 5th of September 2017 the source of WWRS water

4.1.1. The majority of water is stormwater drainage from Walkerville residential area

4.1.2. Also includes 1 legal discharge of greywater (bath, basins etc but not toilet waste) that is a significant distance from the WWRS. It also includes at least 1 permitted discharge of septic tank effluent after treatment through a sand-filter.

5. WWRS water quality tests

5.1. Results Received; 51 tests: August 2010 – July 2017

5.1.1. See appendix 1

5.2. Sites Samples Collected from; 3 sites, see attached map appendix 2

5.2.1. Site 1 Adjacent to where pump used by farmer to source water from WWRS up until September 2016

5.2.2. Site 2 Adjacent to storm water inlet to WWRS

5.2.3. Site 3 Adjacent to where pump used by farmer to source water from WWRS up until September 2016

5.3. pH Results Analysis

5.3.1. Range from 6.9 to 9.5, median 7.3 and 9% > pH 9

5.3.2. EPA (2003) guidelines[1] for livestock drinking water median 6 - 9

5.3.3. No health impact risk indicated

[1] Guidelines for Environmental Managements: Use of Reclaimed Water EPA 2003
Australian & New Zealand Environment & Conservation Council 2000) Australian & New Zealand Guidelines for Fresh & Marine Water Quality Vol 1 The Guidelines chap 1-7

5.4. Biological Oxygen Demand 5 days mg/L Results Analysis

5.4.1. 73% less than 2 and a maximum of 6

5.4.2. EPA (2003) guidelines for livestock drinking water median less than 20

5.4.3. No health impact indicated

5.5. Suspended Solids at 104 +/- 2 ^{0} C mg/L (SS) Results Analysis

5.5.1. 66% less than 3 and a maximum of 20

5.5.2. EPA 2003 guidelines for livestock drinking water median less than 30

5.5.3. No health impact indicated

5.6. E. coli Results Analysis Number per 100ml of water

5.6.1. **Site 1 April – Sep 2016**: **range** of 270 – 920 **median** of 270 and 25% greater 400 (only 6 months). August 2016 result 920, next result 440 so changed pump out point to site 3 where result was 130

5.6.2. **All sites;** We were supplied with the results for 51 samples over a 7 year period (10 August 2010 to 18 July 2017). The median for all these test over this time period is 63. For 74 of the 83 months (89%) of testing the median for the previous 12 months was below 100. Four out of 51 samples (8%) were above 400. EPA (2003) guidelines for E. coli is a) the median of the E. coli numbers per 100ml over 12 months should be less than 100. b) suspend supply if two consecutive tests greater than 400

5.6.3. ANZECC (2000) Guidelines[2] less than 20% of results over at least 12 months are greater than 400

5.6.4. The E. coli test results at site 3 since September 2016 when commenced pumping water out of WWRS indicate on track to comply with both above guidelines at that site

[2] Australian & New Zealand Environment & Conservation Council 2000) Australian & New Zealand Guidelines for Fresh & Marine Water Quality Vol 1 The Guidelines chap 1-7

5.7. E. coli Results relevance to livestock health? Whilst the presence of E coli in water usually indicates recent human or animal faecal contamination of the water, the real risk or prospect of a health impact on livestock drinking WWRS water cannot be determined or predicted by E. coli test results in the range observed in the tests conducted on WWRS water. This statement is supported by the following

5.7.1. Most E. coli strains are harmless inhabitants of the bowels that usually do not multiply in the environment. Only some are pathogenic (diseases causing). The water E. coli test does not differentiate between harmless and pathogenic strains or whether the source is human or animal faeces

5.7.2. As conceded by the ANZECC (2000) water quality guidelines the "test does not specifically indicate whether pathogenic (disease causing) organisms are present or not" The EPA (2003) guidelines are based on the ANZECC (2000) guidelines

5.7.3. There is no published study on the association of the level of water E. coli counts with any impact on health of livestock drinking that water.

5.7.4. A large USA study[3] observed no relationship between water coliform count and level of cattle exposure to pathogenic E. coli. They tested total coliform levels in water from 661 water tanks supplying drinking water to cattle in 66 feedlots. The median result was 53,000 and the range was 0 – 1.2 million coliforms, per 100ml. We note E. coli is the main bacteria in total coliform count and the total coliform counts are very high. Thus this study's conclusion is most likely to also apply to the E coli level recorded from Walkerville water supply.

[3] Sanderson et al (2005)

5.8. Relative risk of storm water derived drinking water

5.8.1. Based on our experience and discussion with Larry Walker[4], and David Paynter[5] from Regional Lab Services *(laboratories that provide a water quality testing service for farmers)* E coli levels of over 400 per 100 ml a relatively common and above a 1000 is not unusual in livestock drinking water sourced from farm dams or natural water sources, such as creeks or water courses. A high proportion of which livestock and native birds and fauna walk through and defecate in, or near.

5.8.2. Yet in our experience this faecal contamination rarely impacts livestock health until the contamination reaches a level where it readily observable to the naked eye and/or an offensive smell. This will impact water intake and in summer that can have serious consequences. This will entail E. coli levels many times higher than seen in WWRS water results. Levels of up to 1000 E coli per 100 ml are unlikely to have any detectable odour.

5.8.3. The only case of E. coli mortalities in livestock where we have implicated contaminated water as the source of the infection was where young sheep were introduced to a new paddock with single water source, which was a trough with 18,000 E coli /100ml

5.9. Helminths (Tape worms) Risk; This is not a problem provided any septic effluent is treated through a sand-filter prior to discharge to the stormwater system. Untreated greywater is not considered a risk factor either. Even if some effluent does get through, it is unlikely to be a problem given retention time in the basin

[4] Southern Scientific Water Quality Testing Laboratory, Port Fairy Rd Hamilton 3300
[5] Regional Laboratory Services Samari Road Benalla

6. Real risk impact on stock health

6.1. For all the results over the 7 years we have been supplied with, both the overall median and the percentage of test results above 400 are within stated EPA (2003) and ANZECC (2000) guidelines

6.2. These results provide no material evidence that the water from WWRS poses a risk to livestock drinking it and in our opinion these results indicate the water has most likely been satisfactory for livestock drinking water

7. Declaration

We declare that we have made all the inquiries which we believe are desirable and appropriate, and that no matters of significance which we regard as relevant have, to our knowledge been withheld from this statement.

We hereby acknowledge that this statement is true and correct and we make it in the belief that a person making a false statement is liable to the penalties of perjury.

Signed: _____ _____

Dr Kathryn Robertson Dr David Rendell

Acknowledgement taken and signature witnessed by me at

Livestock Logic, Hamilton

At 4:35 am/pm on 21st March 2018

Signed: _____

Print Name: Claudia Neverauskas

Authority: Veterinarian, V9065

Address: 2029 Glenelg Highway Wannon Vic.

A witness under Schedule 3 of the *Criminal Procedure Act* 2009

Darren Bennetts

From: Rob McGirr <Rob.McGirr@wisemah.com.au>
Sent: Monday, 14 May 2018 3:06 PM
To: Darren Bennetts; Louise McMahon
Subject: FW: Certificates Requested [RK-RK_Legal.FID834811]
Attachments: 16-14806-00549623-F.PDF; 17-50041-00657008-F.PDF

Dear Darren/Louise,

We refer to our letter to you of 4 may 2018 requesting your supplementary report.

We enclose copy of the laboratory analysis/reports received from Council which are said to form the basis if the table in para 4.3 of the RMCG report of march 2018.

Please let us have your supplementary report.

Regards

Rob

Rob McGirr
Partner | Accredited Commercial Litigation Specialist
d +61 3 9612 7209 | **f** +61 3 9629 4035 | **m** +61 413 944 023
Rob.McGirr@wisemah.com.au | Professional profile
WISEWOULD MAHONY | www.wisewouldmahony.com.au
MELBOURNE | Level 8, 419 Collins St, Melbourne VIC 3000
GEELONG | Level 1, 80 Little Malop St, Geelong VIC 3220

From: Andrew Sherman [mailto:ASherman@rk.com.au]
Sent: Monday, 14 May 2018 2:51 PM
To: Rob McGirr
Subject: Certificates Requested [RK-RK_Legal.FID834811]

Hi

Please see attached the 2 certificates of analysis as requested.

Regards

Andrew Sherman

Andrew Sherman
Principal
D +61 3 9609 1557 **> M** 0429 194 510 **> F** +61 3 9609 6702 **> E** asherman@rk.com.au

Recognised by Best Lawyers 2018 for expertise in Planning & Environmental Law and Water Law

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ALS Water

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

CERTIFICATE OF ANALYSIS

Batch No:	**16-14806**	*Page*	**Page 1 of 2**
Final Report	**549623**	*Laboratory*	Scoresby Laboratory
Client:	**South Gippsland Shire Council**	*Address*	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Contact:	**John Lambert**	*Phone*	03 8756 8000
Address:	Private Bag 4 LEONGATHA VIC 3953	*Fax*	03 9763 1862
		Contact:	Carmin DePalma Client Manager Carmin.DePalma@alsglobal.com
PO No:	**Not Available**	Date Sampled:	**18-Mar-2016**
Sampler Name:	**John Lambert**	Date Samples Received:	**18-Mar-2016**
ALS Program Ref:	**SGSCMISC**	*Date Issued:*	**29-Mar-2016**
Program Description:	**Miscellaneous Analysis for South Gippsland Shire Council**		
Client Ref:	**S/N:1248 Walkerville**		

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*
Bacteroidales	#	MP563	Scoresby	BOD5		EP030WRG	Scoresby
Colilert (2000)		MM514	Scoresby	MST-2	#	MP563	Scoresby
NH3 as N (LL)		EK055SF	Scoresby	pH		CM060 B	Scoresby
SS at 104+/- 2°C		EA025WRG	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.

Analysis conducted outside holding time due to late arrival or delayed extraction/analysis. Based on APHA, VICEPA, AS & NEPM

Late Analysis - Turbidity[4704460]

Bacteroides qPCR:

Analysis commenced on 21/03/16. Please note that PCR does not assess the viability or infectivity of the target organism.

Positive procedure controls (Raw Sewage):

Human marker: 1.0 x 10^11 copies/L

Animal marker: 1.0 x 10^10 copies/L

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**	**Greg Sturbaum**	**Specialist Microbiology Manager**
Hoa Nguyen	**Analyst**	**Joseph De Alwis**	**Analyst**
Tracy Prout	**Analyst**		

NATA Accredited Laboratory No. 992 Accredited for compliance with ISO/IEC 17025 WORLD RECOGNISED ACCREDITATION

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 receival 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.

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
4704460		Sampling Point 2-S/N-1248	WATER	18/03/16 09:20

Analysis - Analyte	*Sample No. Site Code Units*	4704460
NH3 as N (LL) - Ammonia, as N	mg N / L	<0.002
pH - pH, units	Units	6.8
BOD5 - Biochemical Oxygen Demand, 5 Day	mg/L	6
SS at 104+/- 2°C - Suspended Solids	mg/L	30
Turbidity - Turbidity, NTU	NTU	10
Colilert (2000) - E.coli MPN Colilert	orgs/100mL	12000
Bacteroidales - Bacteroidales PCR		Not Detected
Bacteroidales - Human Bacteroides QPCR	copies/L	Not Detected
Bacteroidales - Animal Bacteroides QPCR	copies/L	Not Detected
MST-2 - Human Bacteroides Marker Abundance		Low
MST-2 - Animal Bacteroides Marker Abundance		Low

A blank space indicates no test performed.

CERTIFICATE OF ANALYSIS

Batch No:	**17-50041**	*Page*	**Page 1 of 2**
Final Report	**657008**	*Laboratory*	Scoresby Laboratory
		Address	Caribbean Business Park, 22 Dalmore Drive, Scoresby, VIC 3179
Client:	**RM Consulting Group**	*Phone*	03 8756 8000
Contact:	**Nathan Scholes**	*Fax*	03 9763 1862
Address:	PO Box 2410 Mail Centre BENDIGO VIC 3554	Contact:	Brad Snibson Client Manager Brad.Snibson@alsglobal.com
PO No:	**Not Available**	Date Sampled:	**10-Nov-2017**
Sampler Name:		Date Samples Received:	**10-Nov-2017**
ALS Program Ref:	**RMCG**	*Date Issued:*	**17-Nov-2017**
Program Description:	**Miscellaneous Analysis**		
Client Ref:	**Walkerville Retention Bas**		

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*
Bacteroidales	#	MP563	Scoresby	BOD5		WP030	Scoresby
Colilert (2000)		MM514	Scoresby	EC		WA010	Scoresby
Enterolert		MM517	Scoresby	Fluoride		WK040LL	Scoresby
MST-1	#	Calculation	Scoresby	MST-2	#	MP563	Scoresby
MS Total Metals		WG020A	Scoresby	TCN		EK062	Scoresby
NH3 as N (LL)		WK055SF	Scoresby	NO2-N		EK057G	Scoresby
NO3-N		EK058GV	Scoresby	NOX as N (DA)		EK058GV & 059GV	Scoresby
OES Scan		WG005A (Si not NATA); EA065-69	Scoresby	pH		WA005	Scoresby
SS at 104+/- 2°C		WA025	Scoresby	TDS at 180°C +/- 5°C		WA015	Scoresby
SO4 DA		WD041G	Scoresby	TKN/TP (HL)		WK061A	Scoresby
Turbidity		WA045	Scoresby				

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

Analysis conducted outside holding time due to late arrival or delayed extraction/analysis. Based on APHA, VICEPA, AS & NEPM

Late Analysis - NO2-N[5424381,5424382] NO3-N[5424381,5424382]

Bacteroides qPCR:

Analysis commenced on 14/11/17. Please note that PCR does not assess the viability or infectivity of the target organism.

Positive procedure controls (Raw Sewage):

Human marker: 1.0 x 10^10 copies/L

Animal marker: 1.0 x 10^9 copies/L

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*
Brad Snibson	**Client Manager**	**Chatura Perera**	**Team Leader Nutrients**
Chatura Perera	**Team Leader Nutrients**	**Joseph De Alwis**	**Analyst**
John Earl	**Team Leader Metals**	**John Levvey**	**Principal Trace Metals Chemist**
Komal Gosain	**Analyst**	**Mario Solorzano**	**Analyst**
Natalia Jarvis	**Analyst**	**Tanya Dukhno**	**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. 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.
Calculated results are based on raw data.

Measurement Uncertainties values for your compliance results are available at this link

Batch No: 17-50041
Report Number: 657008
Client: RM Consulting Group
ALS Program Ref: RMCG
Program Description: Miscellaneous Analysis

Sample No	Site Code	Site Description	Sample Type	Sampled Date/Time
5424381		SP2/W	WATER	10/11/17
5424382		SP4/W	WATER	10/11/17

Analysis - Analyte	Sample No. / Site Code / Units	5424381	5424382
NH3 as N (LL) - Ammonia, as N	mg N / L	0.022	0.058
pH - pH, units	Units	7.2	7.1
BOD5 - Biochemical Oxygen Demand, 5 Day	mg/L	2	<2
TKN/TP (HL) - Total Kjeldahl Nitrogen as N	mg N / L	1.3	1.4
TKN/TP (HL) - Phosphorus, total as P	mg P / L	0.14	0.12
SS at 104+/- 2°C - Suspended Solids	mg/L	<2	3
TDS at 180°C +/- 5°C - Total Dissolved Solids	mg/L	310	320
EC - Electrical Conductivity @ 25C	uS/cm	460	460
Turbidity - Turbidity, NTU	NTU	7.1	8.6
Fluoride - Fluoride, as F	mg/L	0.07	0.06
SO4 DA - Sulphate, as SO4	mg/L	<20 LINT	<20 LINT
TCN - Total Nitrogen as N (Calc)	mg/L	1.5	1.6
NOX as N (DA) - Nitrate + Nitrite, as N	mg N / L	0.15	0.26
NO3-N - Nitrate, as N	mg N / L	0.15	0.26
NO2-N - Nitrite, as N	mg N / L	<0.01	<0.01
MS Total Metals - Aluminium	mg/L	0.56	0.61
MS Total Metals - Antimony	mg/L	<0.001	<0.001
MS Total Metals - Arsenic	mg/L	0.002	0.002
MS Total Metals - Barium	mg/L	0.010	0.011
MS Total Metals - Beryllium	mg/L	<0.001	<0.001
MS Total Metals - Boron	mg/L	0.04	0.04
MS Total Metals - Cadmium	mg/L	<0.0002	<0.0002
MS Total Metals - Chromium	mg/L	0.002	0.002
MS Total Metals - Cobalt	mg/L	<0.001	<0.001
MS Total Metals - Copper	mg/L	0.002	0.002
MS Total Metals - Iron	mg/L	2.8	3.2
MS Total Metals - Lead	mg/L	<0.001	<0.001
MS Total Metals - Manganese	mg/L	0.028	0.031
MS Total Metals - Mercury	mg/L	<0.0001	<0.0001
MS Total Metals - Molybdenum	mg/L	<0.001	<0.001
MS Total Metals - Nickel	mg/L	0.003	0.003
MS Total Metals - Selenium	mg/L	<0.001	<0.001
MS Total Metals - Silver	mg/L	<0.001	<0.001
MS Total Metals - Strontium	mg/L	0.064	0.068
MS Total Metals - Thallium	mg/L	<0.001	<0.001
MS Total Metals - Tin	mg/L	<0.001	0.002
MS Total Metals - Titanium	mg/L	0.002	0.002
MS Total Metals - Vanadium	mg/L	0.001	0.002
MS Total Metals - Zinc	mg/L	0.026	0.025
OES Scan - Hardness, as CaCO3	mg/L	58	60
OES Scan - Calcium	mg/L	9.1	9.2
OES Scan - Magnesium	mg/L	8.6	8.9
Colilert (2000) - E.coli MPN Colilert	orgs/100mL	100	35
Enterolert - Enterococci MPN Enterolert	orgs/100mL	52	6
Bacteroidales - Bacteroidales PCR		Detected	Detected
Bacteroidales - Human Bacteroides QPCR	copies/L	Not Detected	Not Detected
Bacteroidales - Animal Bacteroides QPCR	copies/L	33000	280000
MST-1 - Total Weighted Risk		0.25	0.25
MST-1 - Risk Ranking		Medium	Medium
MST-2 - Human Bacteroides Marker Abundance		Low	Low
MST-2 - Animal Bacteroides Marker Abundance		Medium	Medium

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

Appendix B

Expert Witness' Curriculum Vitae

PETER J RAMSAY & ASSOCIATES

Darren A Bennetts
Associate

Fields of Competence

- Hydrogeology including geochemistry, conceptual model development, modelling of the fate and transport of contaminated groundwater, and management of polluted groundwater.
- Contaminated land investigations involving soil, surface water, vapour and groundwater.
- Landfill gas assessment and management.
- Development and implementation of site remediation programs.
- Water resource and waste water management.
- Environmental auditing and expert support.

Experience Summary

Darren is an Associate and manager of the soil and groundwater team at Peter J Ramsay & Associates. He is appointed as an Environmental Auditor under the Victorian *Environment Protection Act 1970* for contaminated land.
Darren is a hydrogeologist with over 12 years experience in soil, groundwater and soil gas investigations. This experience includes hydrogeological investigations, water resource and wastewater management, groundwater modelling, soil and groundwater assessments and, landfill gas assessment and management.

Education

Bachelor of Environmental Science (Honours), La Trobe University, 2001.

Doctor of Philosophy, La Trobe University, 2006 in hydrogeology, geochemistry and hydrology. Thesis titled:

- *Hydrogeology, hydrochemistry and hydrology of groundwater flow systems in western Victoria and their role in the development of dryland salinity*.

Language Proficiency

(None, Fair, Moderate, Excellent, Native)

- English: Speak/Read/Write – Native/Native/Native

Professional Affiliations and Registrations

- Australasian Land and Groundwater Association
- Environment Institute of Australia and New Zealand Inc.
- Australian Environment Business Network
- Australian Sustainable Business Group
- International Association of Hydrogeologists
- Peer reviewer for International Journals including Journal of Hydrogeology, Chemical Geology and Geoderma.

Key Projects

Water resource expert for a number of water resource and wastewater investigations in the Australia-Pacific region.

Provision of expert evidence in relation to a geothermal groundwater resource in south-eastern Australia.

Detailed hydrogeological assessments, including contaminant fate and transport modelling at sites impacted by petroleum hydrocarbons, chlorinated solvents and heavy metals.

Project Manager for a long-term audit of a large brownfields site with significant soil and groundwater contamination issues, which was being redeveloped for residential and commercial purposes.

Performance of an independent review of technical reports relating to a landfill used for the disposal of toxic wastes.

Project manager for numerous Phase I and II soil and groundwater contamination assessments at industrial sites in Australia.

Project manager for several long-term groundwater remediation projects.

Hydrological modeling and design of wastewater treatment and storage systems.

Soil vapour assessment and modelling at sites impacted by petroleum and chlorinated hydrocarbons.

Expert support in relation to statutory audits in a number of states. This has included assessment of soil, groundwater and landfill gas investigations, management and remediation strategies.

PETER J RAMSAY & ASSOCIATES

Darren A Bennetts
Associate

Publications

- Raiber, M, Webb, J.A. and Bennetts, D.A., 2009. *Strontium Isotopes as Tracers to Delineate Aquifer Interactions and the Influence of Rainfall in the Basalt Plains of Southeastern Australia*. Journal of Hydrology, 367, 188-199.
- Bennetts, D.A., Webb, J.A., McCaskill, M. and Zollinger, R., 2007. *Dryland Salinity Proceses within the Discharge Zone of a Local Groundwater System, Southeastern Australia, Hydrogeology Journal,* 15: 1197-1210
- Bennetts, D.A., Webb, J.A., Stone, D.J.M. and Hill, D.M., 2006. *Understanding the salinisation process for groundwater in an area of south-eastern Australia, using chemical and isotopic evidence*. Journal of Hydrology, 323:178-192.
- Bennetts, D.A. and Webb, J.A., 2004. *Processes affecting groundwater quality in a basalt aquifer system in southern Australia*. In: R.B. Wanty and R.R. Seal (Editors), Proceedings – International Symposium on Water-Rock Interaction 11. Balkema, Rotterdam, pp. 347-351.
- Bennetts, D.A. and Webb, J.A., 2004. *Groundwater-surface water interaction, Lake Linlithgow, western Victoria*. In: T. Weaver and I. Cartwright (Editors), Inaugural Australasian Hydrogeology Research Conference, University College, Melbourne, Australia, pp. 12-14.
- Paine, M.D., Bennetts, D.A., Webb, J.A. and Morand, V.J., 2004. *Nature and extent of Pliocene strandlines in southwestern Victoria and their application to late Neogene tectonics*. Australian Journal of Earth Sciences, 51(3): 407-422.
- Smitt, C., Cox, J., Dahlhaus, P.D., Bennetts, D.A. and Heislers, D., 2004. *Setting Aspirational, Resource and Management Action Targets Across the Glenelg Hopkins CMA, CSIRO Land and Water Report*.
- Bennetts, D.A., Webb, J.A. and Gray, C.M. 2003. *Distribution of Plio-Pleistocene basalts and regolith around Hamilton, western Victoria, and their relationship to groundwater recharge and discharge*. In: I.C.Roach (Editor), Advances in Regolith. CRC LEME, pp.11-15.


PETER J RAMSAY
& ASSOCIATES