

23 January 2015

Project No. 087673045-059-L-Rev1

Department of Environment and Heritage Protection
Permit and Licence Management
Implementation and Support Unit
GPO Box 2454
BRISBANE QLD 4001

Email: palm@derm.qld.gov.au

SITE INVESTIGATION SUBMISSION FOR LOT 20 ON SP262379, CAIRNS VILLA CARAVAN PARK

Dear Sir/Madam

Golder Associates has conducted investigations and monitoring at the Cairns Villa Caravan Park (former Lot 1 on RP742725) aimed at confirming the boundaries of an area impacted by chlorinated solvents. The solvent impact is the result of former dry cleaning operations on an adjacent property former Lot 1 on RP745758. As part of legal proceedings, the caravan park site owner and former dry cleaning site owner have entered into a legal agreement to subdivide the impacted area of former Lot 1 on RP742725 from the balance "clean" area of this allotment. The overall objective of the investigations and monitoring was to allow the subdivided, clean portion of the caravan park site to be removed from the Environmental Management Register (EMR).

The subdivision of former Lot 1 on RP745758 into Lot 10 on SP262379 (impacted area combined with former Lot 1 on RP745758) and Lot 20 SP262379 (clean area of caravan park) has now been completed and Lots 10 and 20 on SP262379 have been registered (Attachment K). A title search for Lot 20 on SP262379 is also included in Attachment K.

The originally proposed subdivision to form Lots 10 and 20 on SP262379 was presented in Appendix A of attached report 087673045-056-R-Rev1. A submission to Environment and Heritage Protection (EHP) was previously made on the 13 June 2014 confirming that Golder considered that proposed Lot 20 on SP262379 was suitable for unrestricted land use and recommending that that proposed Lot 20 on SP262379 be removed from the EMR upon registration of this allotment. EHP responded that it could not remove the "particulars – Lot 20 on SP262379" land from the EMR as the "particulars" were not recorded in the environmental management register as per chapter 7, part 8 of the Environmental Protection Act 1994. On this basis the submission was returned as an invalid application.

Subsequent to the above, a minor amendment to the southern boundary of proposed Lot 10 SP262379 was implemented. This amendment comprised moving the southern boundary about 5m northward, removing the easement previously shown in this area. This 5m wide buffer was previously included at the request of the Contaminated Land Auditor (CLA) following the results of groundwater and soil vapour monitoring in March 2013. More recent monitoring provided confidence that this buffer was no longer required. The CLA has confirmed this in a cover letter to his report (Attachment L).

The amendment does not alter Golder's opinion that Lot 20 on SP262379 is suitable for unrestricted land use including ongoing use as a caravan park. Golder recommends that Lot 20 on SP262379 be removed from the EMR.



A Site Management Plan (SMP) will be separately prepared for ongoing pumping and monitoring on the Lot 10 on SP262379. Removal of Lot 20 on SP262379 is not considered to be contingent on the preparation and approval of the SMP for Lot 10 on SP262379.

A copy of the Auditor's Report is also attached to this submission.

If you require further information or assistance with this matter, please do not hesitate to call sch4p4(6) Pers on sch4p4(6) Pers

Yours sincerely

GOLDER ASSOCIATES PTY LTD

sch4p4(6) Person

sch4p4(6) Person

Principal

PKS/AH/ps/dm

Attachments:

- Attachment A: Completed DEHP Disposal Permit Application Forms Part A and B
- Attachment B: Statutory Declaration
- Attachment C: Groundwater Assessment Pease Street, Manunda, Golder Associates Pty Ltd, Ref. No. 087673045-007-Rev1, dated July 2009.
- Attachment D: Conceptual Site Model & Qualitative Risk Assessment, Caravan Park Site Remediation, Pease St, Manunda, Golder Associates Pty Ltd, Ref. No. 0867673045-021-R-Rev0, dated October 2011.
- Attachment E: Delineation Investigation, Cairns Villa Caravan Park, Golder Associates Pty Ltd, Ref. No. 087673045-033-R-Rev0, dated 20 August 2012.
- Attachment F: Delineation Investigation September 2012 - March 2013, Cairns Villa Caravan Park, Golder Associates Pty Ltd, Ref. No. 087673045-040-R-Rev0, dated 10 April 2013.
- Attachment G: Report on Potential Groundwater Impacts Associated with Sewer Failures, Kwikleen Dry Cleaners/Cairns Villa Caravan Park, Pease Street, Cairns, Golder Associates Pty Ltd, Ref. No. 087673045-041-R-Rev0, dated 14 June 2013.
- Attachment H: Amended Boundary Groundwater Monitoring September 2013, Golder Associates Pty Ltd, Ref. No. Letter 087673045-045-L-Rev0, dated 14 October 2013.
- Attachment I: Soil Vapour Monitoring at SVW16 and SVW17 November 2013, Pease St. Caravan Park, Golder Associates Pty Ltd, Ref. No. Letter 087673045-048-L-Rev0, dated 25 November 2013.
- Attachment J: Cairns Villa Caravan Park - Final Confirmation of Area Impacted by Chlorinated Solvents, Golder Associates Pty Ltd, Ref. No. 087673045-056-R-Rev1, dated 6 June 2014.
- Attachment K: Registered Plan
- Attachment L: Auditor's Report

ATTACHMENT A

Completed DEHP Disposal Permit Application Forms Part A and B

Form

Corporate

Part A - General details for all applications

OFFICIAL USE ONLY

DATE RECEIVED

FILE REF

PROJECT REF

COMPLETE FORM

☐

ENTERED BY [SIGNATURE]

DATE

RECEIPTING DETAILS ONLY

DATE RECEIPTED

RECEIPT NUMBER

AMOUNT RECEIVED

\$

PROCESSED BY (INITIALS AND NAME)

Important information for applicants

This form asks for general applicant details and a description of the proposed project and any associated activities. The completed form must be submitted together with relevant activity specific Part B forms.

Specific details must accompany this form to enable your application to be processed. The guide provided will help you complete your application correctly. If you have any difficulties completing the form, contact Permit and Licence Management on 1300 130 372 (Option 4). Please number all attachments alphabetically (e.g. 'Attachment A').

Commercial and confidential information must be marked clearly. This information will not be disclosed, except where required by law (including the *Right to Information Act 2009*). If subsequent activities are added to the project, you will be required to resubmit this application with details of the additional activity.

Tick relevant boxes below if the applicant(s) are:

- ☐ an individual or sole trader
- ☐ individuals in a partnership
- ☐ individual(s) acting on behalf of an unincorporated organisation
- Go to Section 1
- ☒ an incorporated company
- ☐ an incorporated association
- ☐ a statutory authority
- ☐ a body politic
- Go to Section 2

Guide

Question 1

The applicant is the person intending to carry out the activity and in whose name the relevant permits or licences are to be issued.

The registered address is legally required for the serving of notices.

It is the address of a person and cannot be a post office box.

If more than one applicant as part of a partnership, complete the form Joint Applicant Details (EM1863) and attach to this form.

1 Individual applicant(s) details

APPLICANT'S FULL NAME	TITLE	DATE OF BIRTH
-----------------------	-------	---------------

REGISTERED ADDRESS	POST CODE
--------------------	-----------

PHONE	FAX	EMAIL
-------	-----	-------

POSTAL ADDRESS (WRITE "AS ABOVE" IF THE SAME AS REGISTERED ADDRESS)	POST CODE
---	-----------

Guardian details (if applicable)

A parent or legal guardian must complete the following details if an applicant is less than 18 years of age.

GUARDIAN'S FULL NAME	DATE OF BIRTH
----------------------	---------------

GUARDIAN'S REGISTERED ADDRESS	POST CODE
-------------------------------	-----------

GUARDIAN'S SIGNATURE	DATE
----------------------	------

→ Go to Section 3

2 Applicant details

Question 2

The applicant is the registered legal entity (not a business trading name) intending to carry out the activity and in whose name the relevant permits or licences are to be issued.

The registered address is legally required for the serving of notices. It is the registered business address of the company making the application and cannot be a post office box.

Enter the Australian Business Number (ABN); or the Australian Company Number (ACN) of the incorporated company; or the Association Number (AN) of the incorporated association; or the title and section of the legislation that gives the statutory corporation its legal status.

REGISTERED LEGAL ENTITY NAME

Golder Associates Pty Ltd

TRADING NAME (IF APPLICABLE)

REGISTERED ADDRESS

216 Draper Street, Cairns, Queensland

POST CODE

4870

PHONE

07 40548200

FAX

07 4054 8201

E-MAIL/WEBSITE

POSTAL ADDRESS (WRITE "AS ABOVE" IF THE SAME AS REGISTERED ADDRESS)

PO Box 5283, Cairns, Queensland

POST CODE

4870

ABN/ACN/AN OR TITLE AND SECTION OF LEGISLATION

ABN 64 006 107 857

Principal contact or person in charge details

PRINCIPAL CONTACT/PERSON IN CHARGE FULL NAME

sch4p4(6) P

TITLE

Mr

POSITION IN CORPORATION

Principal Engineer

TELEPHONE

07 4054 8211

FASCIMILE

07 4054 8201

E-MAIL/WEBSITE

sch4p4(1@golder.com.au

POSTAL ADDRESS (WRITE "AS ABOVE" IF THE SAME AS REGISTERED ADDRESS)

AS ABOVE

POST CODE

Part A - General details for all applications

Authorised signatory

The authorised signatory is the person authorised to sign an application on behalf of a corporation and in doing so declares that the corporation will be bound by the conditions associated with the granting of the licence or permit.

AUTHORIZED SIGNATORY FULL NAME sch4p4(6) P	TITLE Mr
POSITION IN CORPORATION Principal Engineer	

3 Project details**Pre-lodgement**

Have you previously attended a pre-lodgement meeting or submitted a pre-lodgement form for this project?

- ☒ No
☐ Yes

PROJECT NUMBER (IF APPLICABLE)

Project description

Briefly describe the proposed activities, works, development or management.

Attach a separate sheet if there is insufficient space below.

<p>DESCRIPTION</p> <p>A plume of TCE & PCE has migrated from a dry cleaners on Lot 1 on RP745758 onto the Cairns Villa caravan park (Lot 1 on RP742725). The studies conducted were aimed at:</p> <ol style="list-style-type: none">1. Identifying the extent of impact on Lot 1 on RP742725 to enable this impacted area to be subdivided from the balance of the lot.2. To demonstrate that the "clean" balance area of Lot 1 on RP742725 can be removed from the EMR once this area has been subdivided from the impacted area.

Part A - General details for all applications

This information should at least provide enough details to allow a Department of Environment and Heritage Protection officer to locate the site of the proposal.

Give as much information as possible to accurately locate your activity, for example maps with contextual or boundary lines on plan or GPS boundary co-ordinates.

Geographical co-ordinates can include northing/easting, longitude/latitude.

Approvals required

Please list all Part B application forms you are attaching to this form.

APPLICATION FORMS

Application form Part B -Submission of a Site Investigation Report

Project site

Where will the activities be conducted? Provide the street address, real property description(s) of the land(s) in which the project is located and local government area. If you require more space, attach a separate sheet.

STREET ADDRESS

10-30 Pease Street, Manoora, Cairns

LOT

1

PLAN

RP742725

LOCAL GOVERNMENT AREA

Cairns Regional Council

If possible, provide a specific location within a protected area, a property name or an attached map with the project area clearly delineated. Also include the map name/details.

SPECIFIC LOCATION/PROPERTY NAME

See attached documents

PROTECTED AREA

GEOGRAPHICAL CO-ORDINATES

Part A - General details for all applications

Label all attachments alphabetically
(e.g. 'Attachment A')

Attachments

List all attached documents, including maps containing information supporting this application in the space below. If there are no attachments mark "N/A."

ATTACHMENTS (LABEL ALL ATTACHMENTS ALPHABETICALLY – E.G. "ATTACHMENT A")

Cover letter, Golder Associates 087673045-059-L-Rev0 (22 August 2014)

Attachment A: EHP Form - Part B Submission of a Site Investigation Report

Attachment B: Statutory Declaration

Attachment C: Golder Report 087673045-007-Rev1 (July 2009)

Attachment D: Golder Report 0867673045-021-R-Rev0 (October 2011)

Attachment E: Golder Report 087673045-033-R-Rev0 (20 August 2012)

Attachment F: Golder Report 087673045-040-R-Rev0 (10 April 2013)

Attachment G: Golder Report 087673045-041-R-Rev0 (14 June 2013)

Attachment H: Golder letter 087673045-045-L-Rev0 (14 October 2013)

Attachment I: Golder letter 087673045-048-L-Rev0 (25 November 2013)

Attachment J: Golder Report 087673045-056-R-Rev1 (6 June 2014).

Attachment K: Certificate of Title and Registered Plan

Privacy statement

The Department of Environment and Heritage Protection is committed to protecting the privacy, accuracy and security of your personal information in accordance with the *Information Privacy Act 2009*. The department is collecting your personal information in accordance with the Act specified in the relevant Part B form in order to process your application. The information will only be accessed by authorised employees within the department. Some of this information may be given to another department or agency as indicated in the privacy statement on the relevant Part B form. Your information will not be given to any other person or agency unless you have given us permission or we are authorised or required by law. All information supplied on this form may be disclosed publicly in accordance with the *Right to Information Act 2009* and *Evidence Act 1977*. For queries about privacy matters email: AdminReview@ehp.qld.gov.au or telephone: (07) 3896 3705.

Further Information

The latest version of this publication can be found at <www.ehp.qld.gov.au>. Note: where available, the publication number (e.g. EM1124 for this document) can be used as a search term.

4 Applicant's certification

If you have not told the truth in this application you may be liable for prosecution under the relevant Acts or Regulations.

- I do solemnly and sincerely declare that the information provided is true and correct to the best of my knowledge.
- I understand that information supplied on or with this application form may be disclosed publicly in accordance with the *Right to Information Act 2009* and the *Evidence Act 1977*.

APPLICANT (1) SIGNATURE sch4p4(6) Personal information

Joint applicant signatures (if applicable)

APPLICANT(2) SIGNATURE

APPLICANT(3) SIGNATURE

APPLICANT(4) SIGNATURE

APPLICANT(5) SIGNATURE

DATE

22/8/14

Complete the following checklist.

- ☒ Application form(s) signed and completed
- ☒ Permit fees paid or enclosed (if applicable)
- ☒ Supporting information attached (e.g. maps)

Please return your completed application to:

Permit and Licence Management
Implementation Support Unit
Department of Environment and Heritage Protection
GPO Box 2454
Brisbane Queensland 4001

Enquiries: 1300 130 372 (Option 4)
Fax: (07) 3330 5875
Email: palm@ehp.qld.gov.au

Form

Environmental Protection Act 1994

Part B—Submission of site investigation/validation reports and site management plans

This form asks for details in relation to a submission under s.375, s.376, s.390 and/or s.403 or s.418 of the Environmental Protection Act 1994 (the EP Act) to the Department of Environment and Heritage Protection (the administering authority) for the consideration of a site investigation/validation report and/or approval of a site management plan. Please refer to the Guideline for assessing a suitably qualified person according to s.564 of the Act (EM836)¹ and the Guideline for contaminated land professionals (EM1200).

Note: Your application must be accompanied by the application form Part A—General details for all applications.

1 Submitter details

This section is to be completed by a person who is making the submission to the administering authority

Name: sch4p4(6) Pe	Telephone: sch4p4(6) Personal
Company/organisation: Golder Associates Pty Ltd	
Postal address: PO Box 5823, Cairns, QLD 4870	
Email: sch4p4(6) @golder.com.au	Facsimile: 07 4054 8201

Have any reports or draft plans been certified by an auditor approved to carry out contaminated land auditor functions?

If an approved contaminated land auditor has been involved, please provide their details.

Name: sch4p4(6) F	Telephone: Mobile: sch4p4(6) Pers
--------------------	------------------------------------

¹ This is the publication number. The publication number can be used as a search term to find the latest version of a publication at www.ehp.qld.gov.au.

Form

Part B—Submission of a site investigation/validation reports and site management plans

Company/organisation: Jim Soltau & Associates	
Postal address: PO Box 2128 Toowong, QLD 4066	
Email: sch@jimsoltau.com	Facsimile:

2 Site owner's details

An agent's address is not acceptable.

Name: NQ Villas Pty Limited as Trustee for NQ Villas Trust	Telephone: 02 9221 5133
Postal address: Level 17, 167 Macquarie Street, Sydney NSW 2000	Email: sch4p4@qresham.com.au

3 Site details

If you need to list more than one site, attach the information on a separate sheet marked 'Site details'.

Street address: 10-30 Pease Street, Manoora, Cairns	
Lot(s): 1	Plan(s): RP742725
RELEVANT local government: Cairns Regional Council	
Notifiable activity / potentially contaminating activity: Hazardous Contaminant	
Current land use: Commercial property - Caravan Park	Proposed land use: Commercial property - Caravan Park

4 Details of report

4.1 Is a development application pending under the *Sustainable Planning Act 2009*?

☒ NO

☐ YES

If yes, provide the development application number: Ref no.

Form

Part B—Submission of a site investigation/validation reports and site management plans

4.2 The attached report contains (as per Guideline for contaminated land professionals (EHP, 2012)):

- ☒ Stage 1 – preliminary site investigation
- ☒ Stage 2 – detailed site investigation
- ☐ Stage 3 – health and environmental risk assessment
- ☐ Stage 4 – validation report
- ☐ Draft site management plan
- ☐ Draft amendment to a site management plan
- ☐ Remediation action plan

If previous submissions have been made, quote EHP reference number(s):

Development application project reference. no. (e.g. 362855):

File ref. no. (e.g. BNE46789):

5 Payment

The applicable fee² of \$ 1196.00 (Please contact sch4p4(6) Persona
for credit Card Payment - 07 3721 5432)

☐ is enclosed with this application (cheque, money order, etc); or for any other form of payment, please contact Permit and Licence Management Unit (PaLM) on 1300 130 372 Option (4) for further information.

6 Applicant checklist

All Submissions – valid application

- ☒ Part A: General details for all applicants form completed and signed.
- ☒ Part B: Submission of a site investigation report or validation report (this form) completed and signed.
- ☐ Applicable fees paid or enclosed.
- ☒ Enclosed statutory declaration(s) by a suitably qualified person and any professional support team members (as set out in s.566 of the Act) in accordance with s.564 of the Act and the Guideline for assessing suitably qualified persons according to s.564 of the Act

² These are the fees prescribed under Schedule 10, Part 4 of the Environmental Protection Regulation 2008.

Part B—Submission of a site investigation/validation reports and site management plans

- ☒ Enclosed statutory declaration(s) by the person or recipient submitting the report in accordance with s.383(3) of the Act (for site investigation reports only).
- ☒ Enclosed signed suitably qualified person's report in accordance with Guideline for contaminated land professionals (EHP, 2012). This report must include the land owner's consent in accordance with s.375(2) of the Act for a site investigation and s.390(2) of the Act for remediation works where a person other than the land owner has commissioned the works.
- ☒ Enclosed electronic version of consultant's report(s).
- ☐ Where a draft site management plan is being submitted for approval, consent from the owner is included with the application in accordance with s.403 (2) of the Act; and a statement is enclosed from the land owner agreeing to the draft plan, in accordance with s.404 (c) of the Act, where a person other than the land owner is making the application.
- ☐ Where a draft or amended site management plan is being submitted for approval, enclosed electronic version of the draft site management plan in Microsoft Word format.
- ☒ Enclosed legible copy/copies of proof of ownership of site(s) clearly showing the full name(s) of the registered proprietor(s) e.g. current certificates of Title or Title searches.
- ☒ Enclosed legible copy/copies of all relevant registered plans (available from the Titles Section, Department of Natural Resources and Mines) clearly showing location of the site(s) and current registered plan details.
- ☒ Enclosed copy of a street map/area map clearly showing location of property.

Submissions including certification by an auditor

- ☒ Written certification by the auditor that the report or plan complies with the criteria prescribed in s.115C of the EP Reg.

Note: An incomplete application (including applications that do not include the fee or sufficient detail to show that the fee has been paid where fees are paid by EFT) may be invalid. Invalid applications will be returned without processing and will only be processed if resubmitted with all issues addressed.

Form

Part B—Submission of a site investigation/validation reports and site management plans

Note: It is an offence under s.480 of the Act to give to the administering authority, or an authorised person, a document containing information that you know is false, misleading or incomplete in a material particular.

7 Declaration

I declare that:

- the information provided in my submission is true and correct to the best of my knowledge. I understand that it is an offence under s.480 of the Act to give to the administering authority or an authorised person, a document containing information that I know is false, misleading or incomplete in a material particular.
- I understand that failure to provide sufficient information may result in the application being refused
- I understand that all information supplied with this application may be disclosed publicly in accordance with the *Right to Information Act 2009* and the *Evidence Act 1977*.

Applicant's name
Paul Scells
Applicant's personal information
Date
10/6/2014

Please return your completed application to:

Post:

Permit and Licence Management
Department of Environment and Heritage Protection
GPO Box 2454
BRISBANE QLD 4001

Courier or hand delivery:

Permit and Licence Management
Department of Environment and Heritage Protection
Level 3, 400 George Street,
BRISBANE QLD 4001
Hours: 8.30 am—5.00 pm business days

Enquiries:

Permit and Licence Management
Phone: 13 QGOV (13 74 68)
Fax: (07) 3330 5875
Email: palm@ehp.qld.gov.au

ATTACHMENT B

Statutory Declaration

Published on Resources Disclosure Log
RTI Act 2009

STATUTORY DECLARATION

I sch4p4(6) Personal inform make this declaration as a person who may conduct a site investigation pursuant to section 565 of the EP Act, as I am a person who:

- is a current member of a prescribed organisation under Schedule 8 of the Environmental Protection Regulation 2008 pursuant to section 564; and
- has qualifications and experience relevant to the regulatory function pursuant to section 564.

On the basis of my compliance with section 564 of the EP Act, I am a SQP for the purposes of section 565 of the EP Act for the reports titled:

Groundwater Assessment Pease Street, Manunda, Golder Associates Pty Ltd, Ref. No. 087673045-007-Rev1, dated July 2009.

Conceptual Site Model & Qualitative Risk Assessment, Caravan Park Site Remediation, Pease St, Manunda, Golder Associates Pty Ltd, Ref. No. 0867673045-021-R-Rev0, dated October 2011.

Delineation Investigation, Cairns Villa Caravan Park, Golder Associates Pty Ltd, Ref. No. 087673045-033-R-Rev0, dated 20 August 2012.

Delineation Investigation September 2012 - March 2013, Cairns Villa Caravan Park, Golder Associates Pty Ltd, Ref. No. 087673045-040-R-Rev0, dated 10 April 2013.

Report on Potential Groundwater Impacts Associated with Sewer Failures, Kwikleen Dry Cleaners/Cairns Villa Caravan Park, Pease Street, Cairns, Golder Associates Pty Ltd, Ref. No. 087673045-041-R-Rev0, dated 14 June 2013.

Amended Boundary Groundwater Monitoring September 2013, Golder Associates Pty Ltd, Ref. No. Letter 087673045-045-L-Rev0, dated 14 October 2013.

Soil Vapour Monitoring at SVW16 and SVW17 November 2013, Pease St. Caravan Park, Golder Associates Pty Ltd, Ref. No. Letter 087673045-048-L-Rev0, dated 25 November 2013.

Cairns Villa Caravan Park - Final Confirmation of Area Impacted by Chlorinated Solvents, Golder Associates Pty Ltd, Ref. No. 087673045-056-R-Rev1, dated 6 June 2014.

Site Investigation Submission for Lot 20 on SP262379, Cairns Villa Caravan Park, Golder Associates Pty, Ltd, Ref. No. 087673045-059-L-Rev1, dated 23 January 2015.

I make this declaration with the understanding that this site investigation has been performed in accordance with the 'Guideline for contaminated land professionals' (EHP, 2012) and that the conclusions and recommendations made in this report may be relied upon by the administering authority in making its decisions under the EP Act.

Oaths Act 1867 QUEENSLAND TO WIT

Re: Submission of a site investigation report on the land described as Lot 20 on SP262379

I,

sch4p4(6) Personal inform

of,

Golder Associates Pty Ltd, 216 Draper Street, Cairns

in the state of Queensland do solemnly and sincerely declare that:

☒ as the investigator who conducted the site investigation the subject of this declaration:

- I state that I have the following qualification(s) relevant to the site investigation specified above:

Identified knowledge area required for the site subject of the assessment	Name of degree or post graduate qualifications (and major discipline if relevant)	Institution conferring the degree	Year of completion
Hydrogeology and soils engineering	Bachelor of Engineering (Civil)	Queensland Institute of Technology	1985
Professional development in the past two years			
National Environmental Protection (Assessment of Site Contamination) Amendment Measure (NEPM) Seminar hosted by CRC Care, Brisbane 2012.			
Additionally, I have the following memberships/registrations which require a minimum of 150 hrs of continuing professional development each 3 years.			
<ul style="list-style-type: none"> Member, Engineers Australia and Certified Practicing Engineer (1994) Member of the Risk Engineering Society (1994) Registered Professional Engineer of Queensland (Registration No. 9758) 			

- I state that I have the following experience relevant to the site investigation specified above:
 - More than 25 years' direct experience relevant to the site investigation specified above (assessment of groundwater impact), including regular submission of site investigation, remediation and validation reports (defined as Regulatory Functions under EP Act, Chapter 7, Part 8) to the Department of Environment and Heritage Protection (and its predecessors) Contaminated Land Unit since 1992. My CV is attached and recent examples are provided in the following.

Identified knowledge area required for the site subject of the assessment	DETAILS OF PAST PROJECTS DEMONSTRATING EXPERIENCE IN THE IDENTIFIED KNOWLEDGE AREA					
	Nature of contamination / Notifiable activity	Site details		Role in project	Date finalised	Regulatory function under the EP Act Ch 7 Pt 8. (if applicable)
		Lot and Plan reference	State			
Soils and Groundwater Assessment	Hazardous Contaminant & Petroleum product	Lots 1 on RP 739069	QLD	Technical Lead and Reviewer	2014	Site Investigation and Site Management Plan
Soils and Groundwater Assessment, Remediation/Validation	Hazardous Contaminant & Petroleum product	Lot 7 on SP189990	QLD	Technical Lead and Reviewer	2008	Site Investigation & Validation
Soil & Groundwater Investigation	Petroleum product or oil storage	Lot 145 on CP M918, Lot 2 on RP700938 & Lot 2 on RP747347	QLD	Technical Lead and Reviewer	2012	Site Investigation

- I have not knowingly included any false, misleading or incomplete information in the site investigation report.
- I have not knowingly failed to reveal any relevant information or document to the administering authority.

I also certify that:

- the site investigation and subsequent report addresses the relevant matters and is factually correct
- the opinions expressed in the report are honestly and reasonably held.

And I make this solemn declaration conscientiously believing the same to be true, and by virtue of the provisions of the *Oaths Act 1867*.

Taken and declared before me, at

Cairns

this 23

day of January

in the year 2014

sch4p4(6) Personal information

sch4p4(6) Personal information

Signed

Commissioner for Declarations

CHARLEY STEVENS

Print name and registration number (if applicable)



ATTACHMENT C

Groundwater Assessment Pease Street, Manunda, Golder Associates Pty Ltd, Ref. No. 087673045-007-Rev1, dated July 2009.



July 2009

KWIKLEEN DRYCLEANERS & LAUNDERERS

GROUNDWATER ASSESSMENT PEASE STREET, MANUNDA

Submitted to:
Hospitality Services
32-36 Pease Street
Manunda QLD 4883

REPORT



A world of
capabilities
delivered locally

Report Number: 087673045 007 Rev1

Distribution:

2 Copies - Hospitality Services (1 Bound, 1 CD)





Table of Contents

1.0 INTRODUCTION	1
2.0 SITE SETTING	1
2.1 Property Description.....	1
2.2 Topography and Surface Drainage	1
2.3 Geology.....	2
2.4 Hydrogeology	2
3.0 BACKGROUND	2
3.1 Previous Investigations & Assessments.....	2
3.2 Report 1	2
3.3 Report 2	4
3.4 Report 3	4
3.5 Report 4	5
4.0 CURRENT INVESTIGATION	5
4.1 General	5
4.2 Sampling and Handling Procedures.....	6
5.0 LABORATORY ANALYSIS	6
6.0 ASSESSMENT VALUES	7
6.1 Soil	7
6.2 Groundwater	7
7.0 DISCUSSION OF RESULTS.....	8
7.1 Ground Conditions	8
7.2 Groundwater Conditions	8
7.2.1 Groundwater Levels	8
7.2.2 Contamination	9
8.0 CONCLUSIONS AND RECOMMENDATIONS	10
9.0 LIMITATIONS OF THIS REPORT.....	10



TABLES

Table 1: Groundwater Levels

Table 2: Summary of Groundwater Analytical Results

Table 3: Summary of Soil Analytical Results

Table 4: Summary of QA/QC Results

Table 5: Summary of Water Analytical Results – Equipment Rinsate

FIGURES

Figure 1: Site Locality Plan

Figure 2: Geology Map

Figure 3A: Interpreted Groundwater Contours March 2007

Figure 3B: Interpreted Groundwater Contours April 2007

Figure 4: Interpreted Tetrachloroethene Contours April 2007

Figure 5: Interpreted Groundwater Contours July 2007

Figure 6: Interpreted Tetrachloroethene Contours July 2007

Figure 7: Interpreted Tetrachloroethene Contours October 2007

Figure 8: Interpreted Groundwater Contours March 2008

Figure 9: Interpreted Tetrachloroethene Contours March 2008

Figure 10: Areas of Interest for Perc Usage and Storage

Figure 11: Base of Sand Layer Levels

Figure 12: Top of Clay Layer Levels

Figure 13: Interpreted Groundwater Contours April 2009

Figure 14: Interpreted Tetrachloroethene Contours April 2009

Figure 15: Interpreted Trichloroethylene Contours April 2009

Figure 16: Interpreted cis-1,2-Dichloroethene Contours April 2009

APPENDICES

APPENDIX A

Results of Field Investigation

APPENDIX B

Results of Laboratory Testing

APPENDIX C

Limitations



1.0 INTRODUCTION

Hospitality Services engaged Golder Associates to conduct a groundwater assessment associated with the detection of Perchloroethylene (PERC) in groundwater at a caravan park located adjacent to the Kwikleen Dry Cleaners & Launderers site, Pease Street, Cairns.

PERC is a dry cleaning solvent comprised of Tetrachloroethene. Tetrachloroethene and daughter breakdown products Trichloroethylene and cis-1,2-Dichloroethene had previously been detected in groundwater samples from the caravan park site collected by other parties. These chemicals are considered as the contaminants of concern within this assessment.

The aim of the investigation was to evaluate groundwater conditions on the Kwikleen and caravan park sites in relation to possible sources of PERC impact.

2.0 SITE SETTING

2.1 Property Description

The Kwikleen site covers an area of about 2,760 m² and is located on Pease Street, Cairns. A site locality plan is presented as Figure 1.

The site is located on two separate allotments as follows:

- Lot 1 on RP745758 covering an area of about 1840 m²; and
- Lot 9 on RP735336 covering an area of about 920 m².

The local authority is the Cairns Regional Council. The Site is zoned as "Commercial" under the Cairns Regional Council, Inner Suburbs District Plan. The Site is bounded by:

- Pease Street to the west, then commercial properties;
- A commercial development (garden supplies) to the north; and
- A caravan park site (NQ Villas) to the east and south.

The nearest water body is an open drain running along the eastern boundary of the caravan park about 100m east of the Kwikleen site.

2.2 Topography and Surface Drainage

The Kwikleen site and adjacent caravan park site are relatively flat. Available surface levels across the Kwikleen site indicate levels ranging from between about 3.1m AHD and 3.6m AHD. Limited surface level measurements across the caravan park site indicate levels ranging between about 2.7m AHD and 3.7m AHD.

Surface water runoff from sealed areas of the Kwikleen site is directed towards stormwater drains running along Pease Street to the west. In periods of high rainfall, surface water is understood to have ponded in the south east corner of the in the Kwikleen site.

It is further understood that ponding would enter covered areas where people were working. To satisfy Workplace Health and Safety officers requests to correct this issue, the surface levels across the eastern and southern boundaries were altered in April 2009 to allow surface runoff to drain down the southern boundary to Pease Street. Material excavated at this time was placed in the north east corner of the Kwikleen site.



2.3 Geology

The 2005 Queensland Department of Natural Resources and Mines Digital Geological dataset of the Cairns Region (8064) indicates that the Kwikleen site and western portion of the caravan park site is underlain by Pleistocene age gentle to very gentle coalescing alluvial fans; silty gravels grading to gravelly clays, clays and silts. The eastern portion of the caravan park is underlain by Holocene age sands and gravelly sands in beach ridges, chenier ridges, and river mouth spits and bars. The geological division between these two areas is shown on Figure 2.

2.4 Hydrogeology

A shallow unconfined aquifer is typically present within 2m of the ground surface in this area of Cairns. Previous experience indicates a limited and relatively low yield from this shallow aquifer which restricts its viability as a source of drinking water and limits its use as a source of irrigation supply. Additionally both sites are located in an area supplied by reticulated town water and therefore the potential for ingestion or contact with groundwater was considered to be limited. This restricts the groundwater potential beneficial use to environmental /ecosystem protection.

3.0 BACKGROUND

3.1 Previous Investigations & Assessments

A series of contamination investigations and assessments have been conducted across the Kwikleen and caravan park sites. Golder Associates was provided with copies of the following reports which have relevance to this assessment including:

- Report 1 - Preliminary Contamination Assessment, 10-30 Pease Street, Manoora, Douglas Partners, Project No 38889 dated April 2007.
- Report 2 - Final Report - Groundwater Investigation Cairnsvilla & Leisure Park, Pease Street, Cairns, Queensland LeVert, Document No 07281-001 dated August 2007
- Report 3 - Final Report - Groundwater Investigation Cairnsvilla & Leisure Park, Pease Street, Cairns, Queensland, LeVert, Document No 07281-004 dated May 2008.
- Report 4 – Kwikleen Drycleaners and Launderers - Site Inspection, Pease Street Manunda, Golder Associates, Report 087673045 005 Rev0, dated March 2009.

Information from the above reports has been used to assist in the current assessment and should be read in conjunction with this report. A summary of relevant information from these reports is provided and discussed in the following sections.

3.2 Report 1

A series of six monitoring wells were installed in the caravan park site in March 2007 at locations marked MW1CP to MW6CP on Figure 2.

Conditions encountered in wells MW1CP to MW4CP (along the boundary of the Kwikleen site) generally comprised clayey sandy silts and sandy clays to depths of between 1.6m and 1.8m overlying a saturated sand layer to depths of between 2.1m and 2.4m. The sand layer was generally underlain by sandy clay materials with dark grey clays typically appearing at 3.5m to 3.7m depth. These conditions are considered to be consistent with the Pleistocene deposits indicated on the geology map.

Conditions encountered in wells MW5CP and MW6CP, comprised 0.6m to 0.7m of fill overlying sands to depths of between 2.7m and 2.9m where clay materials were encountered. These conditions are considered to be consistent with the Holocene deposits indicated on the geology map.



Groundwater levels indicated by Douglas Partners are summarised in Table 1. Interpreted groundwater contours based on these results are shown on Figures 3A and 3B. It should be noted that well depth measurements by Golder Associates in 2009 indicate that the well originally logged by Douglas Partners as MW5 has at some stage since been transposed with the location indicated by Douglas Partners for be MW6. As such, all Douglas Partners water level and laboratory results indicated to be MW5 and MW6 have been considered as results from MW6CP and MW5CP, respectively during this assessment.

Analytical results for the main contaminants of concern (Tetrachloroethene, Trichloroethylene and cis-1,2-Dichloroethene) reported by Douglas Partners are summarised in Table 2. Interpreted Tetrachloroethene contours based on these results are shown on Figure 4.

The following issues of concern were identified from the Douglas Partners report:

- The monitoring wells were “excavated using an excavator mounted post hole auger, drilling a 450mm diameter hole”. Golder Associates consider this to be a crude method of well installation which is not considered to be best practice or conducive to achieving high quality, reliable soil and/or groundwater samples. The absence of ground support using this drilling methodology may lead to cross-contamination during the drilling process, particularly in conditions where collapsing sands are encountered (as reported at MWCP5 and MWCP6). It was not clear, if the equipment was decontaminated between locations. Failure to adequately decontaminant this type of equipment between well locations may have lead to cross-contamination between wells.
- “On completion of each bore, a 50mm hand slotted PVC pipe was installed in each bore”. No information was provided on the length of pipe slotted. Golder Associates considers this to be a crude method of well construction that was neither appropriate nor best practice, particularly when solvents are the contaminant of concern. Hand slotting of ‘stock’ PVC pipe may have resulted in the introduction of contaminants on saw blades, in unwashed PVC or from PVC glues (if used).
- Borehole report for Bore 5 (MW5) indicated that “continual hole collapse in water charged sands” and this appeared to have prevented installation of the PVC pipe below 1.8m. Given this shallow depth, Golder Associates considered the usefulness of this well in detecting the presence of denser solvents (such as PERC) to be questionable. Analytical results from this borehole should be viewed and used with caution in interpretation of conditions.
- The wells were reported to have been “developed by removing approximately 100 litres of groundwater”. It was not clear if the wells were developed following installation or immediately prior to sample collection. Typically a minimum period of 24 hours is left between development and collection of samples to allow conditions in the well and surrounding groundwater to stabilise. Failure to observe such practices may result in analytical results which are not representative of actual groundwater conditions.
- Groundwater sampling was reported to have occurred “using a plastic bailer, which was washed using tap water between each sampling event”. Golder Associates considered that the reuse of a bailer and this decontamination methodology to be inappropriate, particularly when solvents are the contaminant of concern. Use of a bailer without a double check valve can result in the water sample being collected from the top of the water column instead of the base and therefore result in poor quality samples that are not representative of actual groundwater conditions. The poor decontamination procedures adopted may have lead to cross-contamination between wells, particularly if a heavily impacted well was sampled initially. This issue alone casts a doubt on the validity of the groundwater results for this sampling round.
- Douglas Partners reported the presence of TPH in the C₆-C₈ fractions in water samples from all bores. Given the absence of heavier end hydrocarbon fractions and BTEX in these samples, it was considered that the TPH results were indicative of the detection of volatiles (such as solvents) rather than fuels.



3.3 Report 2

Groundwater levels were measured and samples were collected from the six monitoring wells in the caravan park site (MW1CP to MW6CP) by LeVert in July 2007.

Groundwater levels indicated by LeVert at this time are summarised in Table 1. Interpreted groundwater contours based on these results are shown on Figure 5.

Analytical results for the main contaminants of concern (Tetrachloroethene, Trichloroethylene and cis-1,2-Dichloroethene) reported by LeVert are summarised in Table 2. Interpreted Tetrachloroethene contours based on these results are shown on Figure 6.

The following issues of concern were identified from this report:

- It was reported that “monitoring wells were bailed of at least five well volumes using individual disposable bailers before being allowed to recover and sampled”. Golder Associates considered that the use of a bailer without double check valves to be inappropriate, particularly when solvents are the contaminant of concern. The use of single check valve bailers in this situation can result in poor quality samples that are not representative of actual groundwater conditions.
- LeVert make a statement that “the exact source appears to be the storage area of spent sludge” as a sample of the sludge returned high concentrations of dry cleaning chemicals. However, it was noted that a sample of soil from this area returned “a low concentration” of these chemicals.
- LeVert also hypothesised that spent sludge is the source of hydrocarbon detected in the groundwater by Douglas Partners. This would appear to be incorrect given that Douglas Partners detected hydrocarbons only in the C₆-C₈ fraction whilst this fraction in the sludge material had concentrations below the laboratory detection limit. The heavier C₁₀-C₃₆ hydrocarbon fractions detected in the sludge were likely to be the results of aliphatic (rather than petroleum based aromatic) oils and greases removed from clothing during the dry cleaning process. Also these C₁₀-C₃₆ hydrocarbon fractions were not detected in the sample of soil collected from this area which does not suggest the presence of significant soil contamination that may have resulted in groundwater impacts.

3.4 Report 3

This report indicated that four additional ‘deeper’ monitoring wells (MW7CP to MW10CP) were installed at the caravan park site by LeVert in October 2007 (see Figure 2 for location). No report (borehole logs, laboratory certificates, etc) have been sighted for these October 2007 works and no comment can be provided on the suitability of these wells or the validity of results obtained from them. Analytical test results for water samples collected by LeVert in the October 2007 were summarised within Report 3. The main contaminants of concern (Tetrachloroethene, Trichloroethylene and cis-1,2-Dichloroethene) from these October 2007 samples are summarised in Table 2. Interpreted Tetrachloroethene contours based on these October 2007 results are shown on Figure 7.

Groundwater levels were measured and samples were collected from the ten monitoring wells in the caravan park site (CPMW1 to CPMW10) by LeVert in March 2008. Groundwater levels indicated by LeVert at this time are summarised in Table 1. Interpreted groundwater contours based on these March 2008 results are shown on Figure 8.

Analytical results for the main contaminants of concern (Tetrachloroethene, Trichloroethylene and cis-1,2-Dichloroethene) reported by LeVert are summarised in Table 2. Interpreted Tetrachloroethene contours based on these March 2008 results are shown on Figure 9.



The following issues of concern were identified from this report:

- It was reported that “shallow monitoring wells were bailed of five well volumes using disposable bailers”. Golder Associates considered that the use of a bailer without double check valves to be inappropriate, particularly when solvents are the contaminant of concern. The use of single check valve bailers in this situation can result in poor quality samples that are not representative of actual groundwater conditions.
- It was further reported that “the deeper wells were bailed using a small down hole electric pump and then sampled”. Golder Associates considered that sampling groundwater for volatile contaminants (such as solvents) using a pump to be inappropriate as this can lead to loss of volatiles. This practice can result in poor quality samples that are not representative of actual groundwater conditions. Also, it is not clear if the pumping equipment was decontaminated between locations. Failure to adequately decontaminate this type of equipment between well locations may have lead to cross-contamination between wells.

3.5 Report 4

This review of PERC use and storage at the Kwikleen site indicated that the activity with the highest level of risk of discharge and potential release to the environment was associated with the historical transferral and storage of sludge and grey water on unsealed ground at the rear of the site. Identified activity locations and their interpreted level of risk is shown on Figure 10.

4.0 CURRENT INVESTIGATION

4.1 General

The current investigation comprised the following:

- **Monitoring Well Installation** – Monitoring Well MW1KK was installed on 5 December 2008 in the immediate vicinity of the historical sludge storage area (see Figure 3). Groundwater sampling of MW1KK was initially undertaken on 8 December 2008.

Additional monitoring wells (MW2KK to MW4KK) were installed on 24 April 2009. These additional monitoring wells were positioned as close as practicable to locations nominated by LeVert. We understand that the basis of these locations was to allow evaluation of groundwater conditions adjacent to portion of the building where the dry cleaning machines are located and in a downgradient surface area. Monitoring well locations are shown on Figure 3.

Wells were installed using a push tube drilling rig to allow continuous soil sample recovery. Clean new disposable tubes were used for each 1m interval. Each hole was advanced to ensure penetration through the saturated sand layer (high permeable zone with potential to act as a “conduit” for contamination migration) and into the dark grey Pleistocene age clay layer that was evaluated as the least permeable material in the profile and therefore the interface where Dense Non-aqueous Phase Liquid “pancaking” was most likely to be detected.

The bottom 1.5m of each well was constructed using acid washed, machine slotted uPVC screen. The remainder of the well was formed using acid washed uPVC casing. Clean washed sand pack was used to backfill around the annulus of the well. Well construction details and the soil profiles encountered are presented on Borehole Reports in Appendix A.

Recovered undisturbed push tube soil samples were screened for field headspace readings using a photo-ionisation detector (PID). PID field headspace readings are shown on the Borehole Reports in Appendix A. Following construction, each well was developed and allowed to stabilise for at least 48 hours before groundwater samples were collected.



Well development comprised pumping from completed wells to remove a minimum of five well volumes. Pumping was continued until all turbid or discoloured water was removed and until stable readings of pH and EC were obtained. New clean waterra footvalve and tube systems were used to pump water from each well.

- **Groundwater Sampling & Level Measurement** – Water levels in each existing and new caravan park and Kwikleen monitoring wells were measured on 29 April 2009 prior to sample purging. All wells were then purged to remove at least three well volumes. Purging was conducted using clean, dedicated waterra footvalve and tube systems in all wells. Groundwater samples were collected from each well on 30 April 2009 in the presence of Mr sch4p4(6) Persc from LeVert. Sampling was conducted using new, clean disposable double check valve bailers. The bailer was lowered slowly to the base of the water column to gather a water sample from the bottom of the well. On withdrawal from the well, the bailer was fitted with a disposable VOC sampler to reduce aeration and the loss of volatiles during transference to sample vials. A total of four vials were sequentially collected per location to provide samples for both Golder and LeVert for laboratory analysis. (i.e. Golder vial, LeVert vial, Golder vial, LeVert vial).

Experienced environmental scientists from Golder Associates positioned the monitoring wells, logged the materials encountered during drilling and recovered soil and water samples.

4.2 Sampling and Handling Procedures

Soil and groundwater samples were collected by experienced personnel in accordance with standard procedures documented in Golder Associates Technical Procedures. These procedures generally include decontamination, sample handling, sample storage and documentation. A brief outline of key procedures is provided below:

- All reusable equipment utilised in the sampling process was decontaminated on arrival at site and prior to collection of each sample. Decontamination included the scrubbing and washing of equipment with a biodegradable phosphate free detergent, followed by washing in potable water and then rinse with de-ionised water.
- Sample containers types appropriate for the analysis proposed were supplied by the testing laboratories. Where required, appropriate preservatives were placed in containers by the laboratory prior to shipment to Golder Associates. Sample containers were marked with a unique sample number, the sample location, the sample depth, date and Golder Associates' project number.
- Samples requiring organic analysis were immediately placed in airtight containers supplied by the testing laboratory and then placed into a chilled insulated esky for transportation to the laboratory. If required, samples were stored overnight in a refrigerator at Golder Associates Cairns office.
- Field log sheets were completed by field staff to compile information on sample locations, soil profile and sample depths. Chain of custody and analysis request forms were completed and sent with soil and water samples to the testing laboratory.
- Nitrile gloves were worn at all times to prevent accidental dermal contact with hydrocarbons. Sampling procedures used were aimed at only decontaminated sampling equipment coming into contact with the soil or water to be sampled to prevent cross-contamination of samples.

5.0 LABORATORY ANALYSIS

Groundwater samples and selected soil samples (recovered during well drilling) were submitted for analysis of Halogenated Aliphatic Compounds (including contaminants of concern Tetrachloroethene, Trichloroethylene and cis-1,2-Dichloroethene). Data Quality Assurance and Quality Control duplicate, triplicate and rinsate samples (where applicable) were also submitted for analysis of Halogenated Aliphatic Compounds.



Primary laboratory analyses were conducted by SGS Environmental Laboratory Pty Ltd (SGS). ALS Environmental Pty Ltd (ALS) was used as the secondary laboratory. SGS and ALS are both NATA registered for the tests conducted. Laboratory certificates of analysis are presented in Appendix B.

Current and previous laboratory results on water samples are summarised in Table 2. The laboratory test results for soil samples are summarised in Table 3.

QA/QC results are summarised in Tables 4 and 5. A review of laboratory internal QA/QC and the results of duplicate, triplicate and rinsate samples indicate that the results from laboratory testing program are valid and suitable for use in this assessment.

6.0 ASSESSMENT VALUES

6.1 Soil

Contaminated land in Queensland is managed on a risk based approach assessed on suitability for a specified end land-use. Under this risk-based process, the potential risk to the environment and human health need to be assessed.

To provide an initial evaluation of the level of risk, the results of chemical analyses on soil samples collected during the field investigation were compared with published criteria. There are no national or state published criteria for assessment of Halogenated Aliphatic Compounds (solvents) in soil. In the absence of Australian criteria, intervention values contained in Dutch Guidelines (Reference 1) have been adopted for an initial assessment of environmental risk.

The adopted assessment criteria are summarised with test results in Table 3.

Where results exceed this initial assessment criteria, more specific risk assessment may be required to evaluate the potential risk to site specific environmental receptors and site users.

6.2 Groundwater

As previously discussed the shallow aquifer present across both sites is not considered to be a viable source of drinking water and therefore assessment against human health criteria for ingestion is not considered to be warranted. However, the contaminants of concern may still represent a risk to human health through volatilisation from groundwater and migration through building foundations and impacting upon indoor air quality. No Australian guidelines have been published on this issue. In the absence of such criteria, intervention values contained in Dutch Guidelines (Reference 1) have been adopted as Tier 1 criteria to provide an initial assessment of human health risk for this potential hazard. Where concentrations exceed these criteria then more detailed, site specific risk assessment will be required to evaluate the level of risk associated with this hazard. A detailed risk assessment is beyond the scope of this assessment.

For initial environmental assessment of Halogenated Aliphatic Compounds (solvents) in groundwater, the Trigger Values for 95% level of protection for Freshwater Ecosystems presented in Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 (Reference 2) have been adopted as the primary assessment criteria. Where no trigger values exists, results have been compared against ANZECC 2000 low reliability values. Comparison of groundwater quality against surface water criteria requires some caution as factors such as advection, absorption and dilution may need to be considered before the groundwater discharges into the environment.

The adopted assessment criteria are summarised with test results in Table 2.



7.0 DISCUSSION OF RESULTS

7.1 Ground Conditions

The ground conditions encountered in MW1KK to MW4KK on the Kwikleen site during recent investigations comprised 0.3m to 0.5m of fill materials overlying silty clay and sandy clays to depths of between 2.0m and 3.5m overlying a saturated sand layer to depths of between 2.3m and 3.7m. The sand layer was generally underlain by sandy clay materials with dark grey clays typically appearing at 3.0m to 3.7m depth. These conditions are considered to be consistent with the Pleistocene deposits indicated on the geology map.

Dense Non-aqueous Phase Liquids (DNAPL) such as Tetrachloroethene, Trichloroethylene and cis-1,2-Dichloroethene are denser than water and migrate downwards through the water column rather than float on the water surface (like fuel). Downwards migration would occur rapidly through more permeable sand bands and could be impeded by a less permeable layer. Less permeable layers will cause the downward flow to pancake and spread at this interface.

Based upon the results of the current and previous investigations, contours of the base of the saturated sand layer and the top of the dark grey clay layer have been developed as shown on Figures 11 and 12, respectively. Using this information it was assessed that significant spillage/leakage of dry cleaning fluid from onsite processes could lead to pooling (and therefore high soil and groundwater concentrations) in the following areas:

- North/north east of the dry cleaning machines (location MW3KK approximately 5 m north east)
- South/south east of historical sludge transfer and storage area (locations MW4KK, MWCP2 and MWCP1)

It is noted that free phase product has not been detected at any investigation locations. This suggests that a significant pool of Tetrachloroethene is not present beneath the Kwikleen site.

PID headspace readings on soil samples recovered during the current monitoring well drilling generally detected soil gas concentrations of less than 10ppm. These concentrations were considered typical of background conditions. PID headspace readings between 10ppm and 21ppm were detected in soils samples from MW4KK in a zone from between 2.3m and 3.6m. This zone contains the sands and sandy clay materials. PID headspace readings returned to 3ppm in the dark grey clays immediately underlying this zone. These field screening results suggest preferential flow of PERC impacted groundwater within zones of saturated sand.

Laboratory test results on soil samples with the highest PID readings contained Tetrachloroethene in MW3 (0.82 mg/kg in sample from 3m to 3.2m) and MW4 (1.7 mg/kg in sample from 3.2m to 3.3m). Other Halogenated Aliphatic Compound concentrations in these samples and other soil samples analysed were below laboratory detection levels and adopted soil assessment criteria.

7.2 Groundwater Conditions

7.2.1 Groundwater Levels

Groundwater contours based on the most recent water level measurements are shown on Figure 13. These indicated a general easterly groundwater flow across the Kwikleen site within the Pleistocene alluvium trending to a north/north easterly groundwater flow in the Holocene deposits underlying most of the caravan park site.

LeVert has previously reported a hydraulic conductivity of 2×10^{-6} m/sec for sands on the caravan park site. Assuming saturated sands on the Kwikleen site have a similar hydraulic conductivity and hydraulic gradients derived from the groundwater contours, the groundwater flow velocity is estimated at between about 8 m/year and 40 m/year. Flatter hydraulic gradients indicated in Holocene deposits on the caravan park site suggest groundwater flow velocities in the order of 1 m/year to 3 m/year.



7.2.2 Contamination

No free phase contamination was observed during development, purging or sampling of the new and existing monitoring wells in April 2009. It is noted that the dissolved concentrations of Tetrachloroethene Trichloroethylene and cis-1,2-dichloroethene detected in all groundwater samples from 2007 to present were well below the maximum solubility for these compounds in water.

Laboratory results from the current sampling round indicated the following:

- Concentrations of Tetrachloroethene exceeding ANZECC Water Quality guideline low reliability value were detected in water samples from MW2KK and MW4KK on the Kwikleen site and MW1CP, MW2CP, MW3CP MW10CP within the caravan park. The concentrations at these locations and MW3KK also exceeded the Dutch Intervention Value. Interpreted Tetrachloroethene contours based on the April 2009 results are shown on Figure 14. Given indicated groundwater flow regime, the Tetrachloroethene concentration detected at MW10CP was not considered to be consistent with a source emanating from the Kwikleen site.
- A concentration of Trichloroethylene exceeding ANZECC Water Quality guideline low reliability value and Dutch Intervention Value was detected in the water sample from MW4KK. Remaining Trichloroethylene concentrations were below initial assessment criteria. Trichloroethylene contours based on the April 2009 results are shown on Figure 15.
- Concentrations of cis-1,2-Dichloroethene exceeding the Dutch Intervention Value were detected in water samples from MW4KK on the Kwikleen site and MW1CP and MW2CP on the caravan park site. Interpreted cis-1,2-Dichloroethene contours based on the April 2009 results are shown on Figure 16.

When factors such as advection, dispersion and dilution were considered, the current groundwater concentrations of Tetrachloroethene, Trichloroethylene and cis-1,2-Dichloroethene were not considered to represent a risk to potential surface water environmental receptors at likely downgradient discharge locations. It was also noted that Vinyl Chloride (a higher risk contaminant to aquatic ecosystems) had not been detected time during previous and current assessments. This suggested that this was not currently a break down product as the Tetrachloroethene degrades at this site.

Due to previously identified issues of concern (see Section 3) relating to well installation and sampling techniques, some caution is required in the interpretation and use of previous results from the caravan park site. In general, the current and previous groundwater monitoring results were considered to indicate the following:

- Significant variations in Tetrachloroethene (also Trichloroethylene and cis-1,2-Dichloroethene) concentrations have been indicated across the investigation area and within individual wells over time. This high degree of variability may be attributable to a number of factors from inappropriate or poor sampling practices in earlier sampling rounds to possible seasonal variations or multiple sources (events) of impact. For example MW5CP appears to have varied from an initial concentration of 1000 ug/L in March 2007 to a maximum concentration of 1980 ug/L in October 2007 to below laboratory detection levels in April 2009. Simplistically this could be interpreted as a plume of impacted groundwater moving through this location. However, the rapid reduction in impact suggests a limited event (such as a one off spill) rather than a source of ongoing impact.
- The highest concentrations of Tetrachloroethene detected on the caravan park site was in October 2007, towards the end of the dry season. If there was a significant source of Tetrachloroethene impact in the soils beneath dry cleaning building, then the lowering of groundwater levels should result in a decrease in groundwater concentrations during the dry season, with an increase expected to occur once the groundwater table rose in the wet season and remobilised such a potential impact source. The groundwater concentrations near the end of the wet season in March 2008 and again in April 2009 indicated that this was not the case.



8.0 CONCLUSIONS AND RECOMMENDATIONS

In general the available groundwater results are considered to indicate the presence of a limited and/or transient source(s) of PERC impact below the Kwikleen Site and adjacent caravan park. Anomalies such as the high concentrations detected at MWCP5 during initial sampling in March 2007 and recent detections at MW10CP suggest that minor solvent impact may have originated on the caravan park or hydraulically upgradient of the caravan park site. Assuming that a source(s) of impact was not present on the caravan park site at any time, the available results were considered to be consistent with possible intermittent and minor spillages associated with the historical sludge transference and storage at the rear of the Kwikleen site. Modifications to the sludge storage area that have been undertaken within the Kwikleen site were considered suitable to reduce the potential for further impact.

The investigation findings do not indicate the presence of other significant or ongoing sources of PERC impact to groundwater from the operation of the Kwikleen site.

The concentrations of Tetrachloroethene and its breakdown products detected in the most recent sampling were considered to indicate the presence of residual impact in groundwater. Whilst concentrations of Tetrachloroethene and breakdown products were detected in caravan park wells, previous experience suggests that a detailed quantitative health risk assessment (which considers the scale and extent of the current groundwater impact) is likely to indicate that caravan park site is suitable for residential use. It is recommended that a DERM (formerly EPA) approved Third Party Reviewer be involved in this process to facilitate approvals that may be required by the caravan park owners.

To further reduce the risk of residual PERC impacted groundwater that may be present migrating from the Kwikleen site to the caravan park it is also recommended that groundwater pumping and off-site disposal be conducted from MW4KK (where the highest concentrations were detected). Pumping from caravan park wells MWCP1, MWCP2 and MWCP3 could also be considered to assist in removal of residual impact.

The concentrations of Tetrachloroethene and its breakdown products in the groundwater to be extracted are suitable for disposal to sewer, without the need for pre-treatment. However, a Council permission and possibly a trade water permit may be required to dispose to sewer.

9.0 LIMITATIONS OF THIS REPORT

Your attention is drawn to the document - "Limitations", which is included as an Appendix to this report. The statements presented in this document are intended to advise you of what your realistic expectations of this report should be. The document is not intended to reduce the level of responsibility accepted by Golder Associates, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in so doing.

GOLDER ASSOCIATES PTY LTD

sch4p4(6) Personal information

sch4p4(6) Perso

Principal

PKS/JSB/rlz

A.B.N. 64 006 107 857

j:\env\2008\087673045 - kwikleen dry cleaners, pease st\correspondence out\087673045 007 r rev1 gw report.doc



REFERENCES

1. Dutch Intervention Value – Environmental Quality Objectives in the Netherlands, 2000
2. Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Australia and New Zealand Guidelines for Fresh and Marine Water Quality, October 2000.

Published on Resources Disclosure Log
RTI Act 2009

Monitoring Well	Date	Top of Case (mAHD)	Depth to Groundwater (m BGL)	Groundwater Level (mAHD)
MW 1CP	28/03/2007	Reported by Douglas Partners		1.85
MW 2CP	28/03/2007	Reported by Douglas Partners		2.1
MW 3CP	28/03/2007	Reported by Douglas Partners		2.5
MW 4CP	28/03/2007	Reported by Douglas Partners		2.15
MW 5CP	28/03/2007	Reported by Douglas Partners		2.2
MW 6CP	28/03/2007	Reported by Douglas Partners		2
MW 1CP	2/04/2007	3.81	1.41	2.4
MW 2CP	2/04/2007	3.65	1.45	2.2
MW 3CP	2/04/2007	3.83	1.78	2.05
MW 4CP	2/04/2007	3.6	1.3	2.3
MW 5CP	2/04/2007	3.42	1.22	2.2
MW 6CP	2/04/2007	3.08	1.03	2.05
MW 1CP	24/07/2007	3.81	1.93	1.88
MW 2CP	24/07/2007	3.65	2.08	1.57
MW 3CP	24/07/2007	3.83	2.06	1.77
MW 4CP	24/07/2007	3.6	1.97	1.63
MW 5CP	24/07/2007	3.42	1.8	1.62
MW 6CP	24/07/2007	3.08	1.51	1.57
MW 1CP	26/03/2008	3.81	1.52	2.29
MW 2CP	26/03/2008	3.65	1.68	1.97
MW 3CP	26/03/2008	3.83	1.66	2.17
MW 4CP	26/03/2008	3.6	1.57	2.03
MW 5CP	26/03/2008	3.42	1.4	2.02
MW 6CP	26/03/2008	3.08	1.13	1.95
MW 7CP	26/03/2008	3.41	1.26	2.15
MW 8CP	26/03/2008	3.01	0.88	2.13
MW 9CP	26/03/2008	2.7	0.72	1.98
MW 10CP	26/03/2008	3.14	1.64	1.5
MW 1CP	29/04/2009	3.81	1.61	2.2
MW 2CP	29/04/2009	3.65	1.77	1.88
MW 3CP	29/04/2009	3.83	1.76	2.07
MW 4CP	29/04/2009	3.6	1.64	1.96
MW 5CP	29/04/2009	3.42	1.5	1.92
MW 6CP	29/04/2009	3.08	1.3	1.78
MW 7CP	29/04/2009	3.41	1.3	2.11
MW 8CP	29/04/2009	3.01	0.86	2.15
MW 9CP	29/04/2009	2.7	0.73	1.97
MW 10CP	29/04/2009	3.14	0.9	2.24
MW 1KK	29/04/2009	3.52	1.59	1.93
MW 2KK	29/04/2009	3.51	1.16	2.35
MW 3KK	29/04/2009	3.63	1.13	2.5
MW 4KK	29/04/2009	3.64	1.46	2.18



TABLE 1
GROUNDWATER LEVELS
 KWIKLEEN DRYCLEANERS
 PEASE STREET
 087673045

		ChemName	cis-1,2-Dichloroethene	Trichloroethylene	Tetrachloroethene
		output unit	µg/l	µg/l	µg/l
		LOR	5	5	5
		ANZECC Water Quality Guidelines 2000, Low Reliability Value ⁽¹⁾		330	70
		Dutch Intervention Values ⁽³⁾	— 20	500	40
Field_ID	Sampled_Date Time	SDG			
MW 1KK	30/04/2009	SE68964	5.1	26	8.5
MW 2KK	30/04/2009	SE68964	<5	<5	86
MW 3KK	30/04/2009	SE68964	<5	<5	49
MW 4KK	30/04/2009	SE68964	640	550	1000
MW 1CP	Apr-07	Douglas Partners	20	63	520
MW 1CP	Jul-07	Le Vert	68	95	785
MW 1CP	Oct-07	Le Vert	52	225	329
MW 1CP	Mar-08	Le Vert	11	8.7	8.2
MW 1CP	30/04/2009	SE68964	120	170	160
MW 2CP	Apr-07	Douglas Partners	31	110	360
MW 2CP	Jul-07	Le Vert	222	170	526
MW 2CP	Oct-07	Le Vert	291	814	2070
MW 2CP	Mar-08	Le Vert	20	16	62
MW 2CP	30/04/2009	SE68964	150	210	650
MW 3CP	Apr-07	Douglas Partners	38	160	210
MW 3CP	Jul-07	Le Vert	43	293	288
MW 3CP	Oct-07	Le Vert	26	309	358
MW 3CP	Mar-08	Le Vert	6.3	6.3	6.9
MW 3CP	30/04/2009	SE68964	<50 ⁽²⁾	210	110
MW 4CP	Apr-07	Douglas Partners	6	7	110
MW 4CP	Jul-07	Le Vert	36	24	171
MW 4CP	Oct-07	Le Vert	<0.5	<0.5	10
MW 4CP	Mar-08	Le Vert	1.6	0.6	3.8
MW 4CP	30/04/2009	SE68964	<5	<5	<5
MW 5CP*	Apr-07	Douglas Partners	92	350	1000
MW 5CP	Jul-07	Le Vert	80	462	1480
MW 5CP	Oct-07	Le Vert	94	929	1980
MW 5CP	Mar-08	Le Vert	63	39	73
MW 5CP	30/04/2009	SE68964	<5	<5	<5
MW 6CP*	Apr-07	Douglas Partners	<0.5	20	70
MW 6CP	Jul-07	Le Vert	6	8	<5
MW 6CP	Oct-07	Le Vert	DRY	DRY	DRY
MW 6CP	Mar-08	Le Vert	<0.5	1	1
MW 6CP	30/04/2009	SE68964	<5	7.5	6.6
MW 7CP	Oct-07	Le Vert	<5	6	<5
MW 7CP	Mar-08	Le Vert	1	2.1	11
MW 7CP	30/04/2009	SE68964	<5	<5	<5
MW 8CP	Oct-07	Le Vert	<5	<5	<5
MW 8CP	Mar-08	Le Vert	<0.5	<0.5	<0.5
MW 8CP	30/04/2009	SE68964	<5	<5	<5
MW 9CP	Oct-07	Le Vert	<5	<5	<5
MW 9CP	Mar-08	Le Vert	<0.5	<0.5	<0.5
MW 9CP	30/04/2009	SE68964	<5	7.1	6.8
MW 10CP	Oct-07	Le Vert	<5	<5	<5
MW 10CP	Mar-08	Le Vert	1300	<0.5	2.6
MW 10CP	30/04/2009	SE68964	<5	<5	89

Notes

All results are expressed as ug/L unless otherwise specified

(1) National Water Quality Management Strategy, Australian and New Zealand Guidelines for Fresh & Marine Water Quality, October 2000

(2) LOR raised due to sample matrix and dilution required

(3) Dutch Intervention Guidelines

— indicates no criteria available

Figures in **bold** exceed ANZECC Low Reliability Value

Figures underlined exceed Dutch Intervention Guideline Value

* Values transposed to be consistent with later monitoring rounds



TABLE 2

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

HAC's - HALOGENATED ALIPHATIC COMPOUNDS

KWIKLEEN DRYCLEANERS

PEASE STREET

087673045

		ChemName	cis-1,2-Dichloroethene	Trichloroethylene	Tetrachloroethene
		output unit	mg/kg	mg/kg	mg/kg
		LOR	0.5	0.5	0.5
		Dutch Intervention Values ⁽³⁾	<u>1</u>	<u>60</u>	<u>4</u>
Field_ID	Sampled_Date_Time	SDG			
MW2-1	24/04/2009	SE68897	<0.5	<0.5	<0.5
MW2-1	24/04/2009	SE68897	<0.5	<0.5	<0.5
MW3-1	24/04/2009	SE68897	<0.5	<0.5	0.82
MW4-1	24/04/2009	SE68897	<0.5	<0.5	<0.5
MW4-2	24/04/2009	SE68897	<0.5	<0.5	1.7
MW4-3	24/04/2009	SE68897	<0.5	<0.5	<0.5

Notes

(3)Dutch Intervention Guidelines

— indicates no criteria available

Figures underlined exceed Dutch Intervention Guideline Value



TABLE 3
SUMMARY OF SOIL ANALYTICAL RESULTS
HAC's - HALOGENATED ALIPHATIC COMPOUNDS
 KWIKLEEN DRYCLEANERS
 PEASE STREET
 087673045

Field ID	MW4-3	MWXA		MW4-3	MWXB		MW 3KK	MWX		MW 3KK	MWXX	
Identifier	Primary Sample	Duplicate	RPD %	Primary Sample	Triplicate	RPD %	Primary	Duplicate	RPD %	Primary	Triplicate	RPD %
Matrix	Soil	Soil		Soil	Soil		Water	Water		Water	Water	
Units	mg/kg	mg/kg		mg/kg	mg/kg		ug/L	ug/L		ug/L	ug/L	

ChemName												
Dichlorodifluoromethane	<0.5	<0.5	0	<0.5	<5	0	<5	<5	0	<5	<50	0
Chloromethane	<0.5	<0.5	0	<0.5	<5	0	<5	<5	0	<5	<50	0
Vinyl Chloride	<0.50	<0.50	0	<0.50	<5	0	<5	<5	0	<5	<50	0
Bromomethane	<0.5	<0.5	0	<0.5	<5	0	<5	<5	0	<5	<50	0
Chloroethane	<0.5	<0.5	0	<0.5	<5	0	<5	<5	0	<5	<50	0
Trichlorofluoromethane	<0.5	<0.5	0	<0.5	<5	0	<5	<5	0	<5	<50	0
1,1-Dichloroethene	<0.5	<0.5	0	<0.5	<0.5	0	<5	<5	0	<5	<5	0
Methylene Chloride	<1	<1	0	<1	<0.5	0	<10	<10	0	<10	<5	0
trans-1,2-Dichloroethene	<0.5	<0.5	0	<0.5	<0.5	0	<5	<5	0	<5	<5	0
1,1-Dichloroethane	<0.5	<0.5	0	<0.5	<0.5	0	<5	<5	0	<5	<5	0
cis-1,2-Dichloroethene	<0.5	<0.5	0	<0.5	<0.5	0	<5	<5	0	<5	<5	0
1,1,1-Trichloroethane	<0.5	<0.5	0	<0.5	<0.5	0	<5	<5	0	<5	<5	0
1,1-Dichloropropene	<0.5	<0.5	0	<0.5	<0.5	0	<5	<5	0	<5	<5	0
Carbon tetrachloride	<0.5	<0.5	0	<0.5	<0.5	0	<5	<5	0	<5	<5	0
1,2-Dichloroethane	<0.5	<0.5	0	<0.5	<0.5	0	<5	<5	0	<5	<5	0
Trichloroethene	<0.5	<0.5	0	<0.5	<0.5	0	<5	<5	0	<5	<5	0
Dibromomethane	<0.5	<0.5	0	<0.5	<0.5	0	<5	<5	0	<5	<5	0
1,1,2-Trichloroethane	<0.5	<0.5	0	<0.5	<0.5	0	<5	<5	0	<5	<5	0
1,3-Dichloropropane	<0.5	<0.5	0	<0.5	<0.5	0	<5	<5	0	<5	<5	0
Tetrachloroethene	<0.5	<0.5	0	<0.5	<0.5	0	49	<5	163	49	81	49
1,1,1,2-Tetrachloroethane	<0.5	<0.5	0	<0.5	<0.5	0	<5	<5	0	<5	<5	0
Trans-1,4-dichloro-2-butene	<0.5	<0.5	0	<0.5	<0.5	0	<5	<5	0	<5	<5	0
Cis-1,4-dichloro-2-butene	<5	<5	0	<5	<0.5	0	<10	<10	0	<10	<5	0
1,1,2,2-Tetrachloroethane	<0.5	<0.5	0	<0.5	<0.5	0	<5	<5	0	<5	<5	0
1,2,3-Trichloropropane	<0.5	<0.5	0	<0.5	<0.5	0	<5	<5	0	<5	<5	0
1,2-Dibromo-3-chloropropane	<0.5	<0.5	0	<0.5	<0.5	0	<5	<5	0	<5	<5	0
Hexachlorobutadiene	<0.5	<0.5	0	<0.5	<0.5	0	<5	<5	0	<5	<5	0



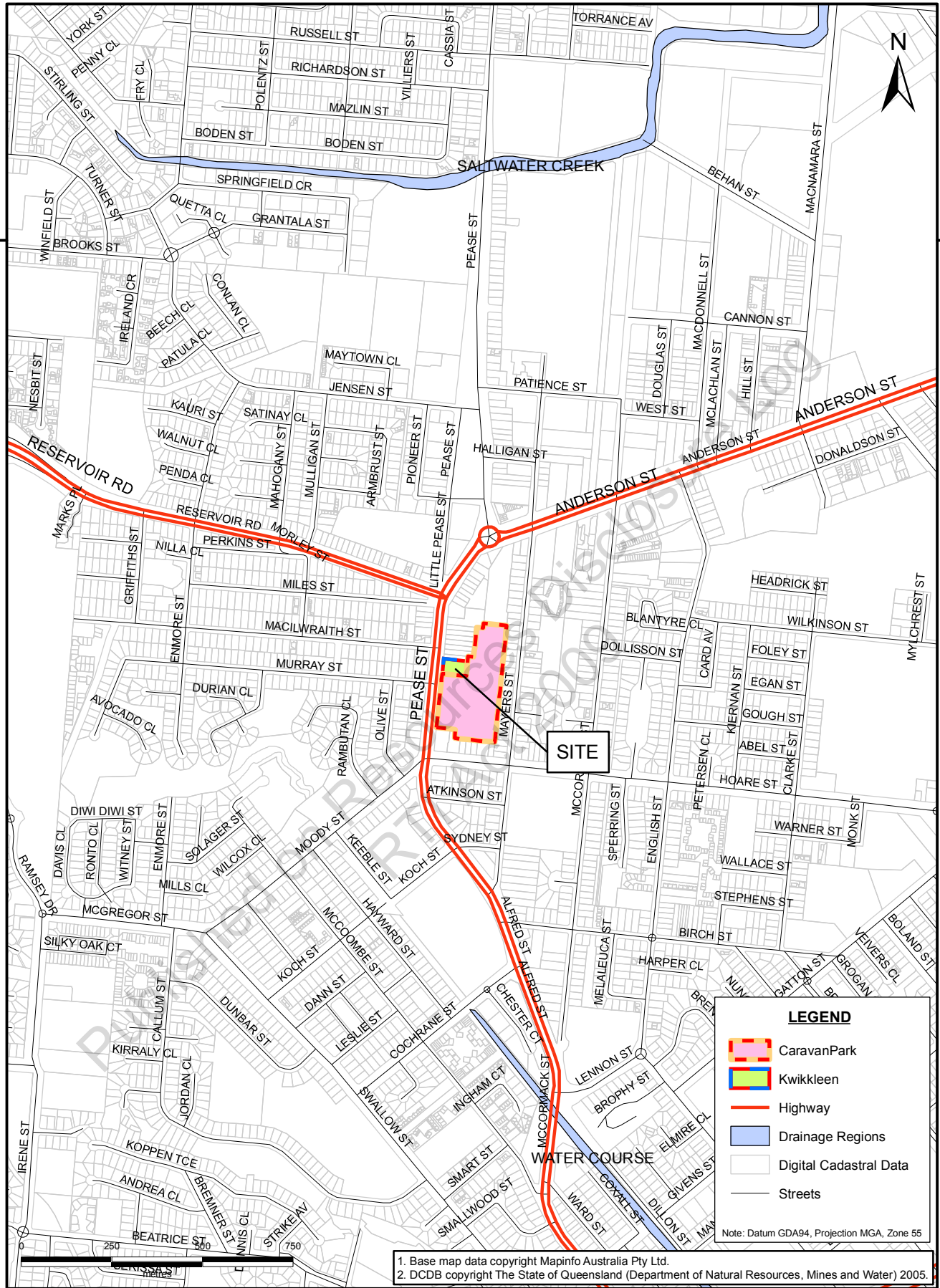
TABLE 4
SUMMARY OF QA/QC RESULTS
 KWIKLEEN DRYCLEANERS
 PEASE STREET
 087673045

SDG	EB0906859
Field_ID	R-240408
Sampled_Date-Time	24/04/2009
Sample_Type	Rinsate

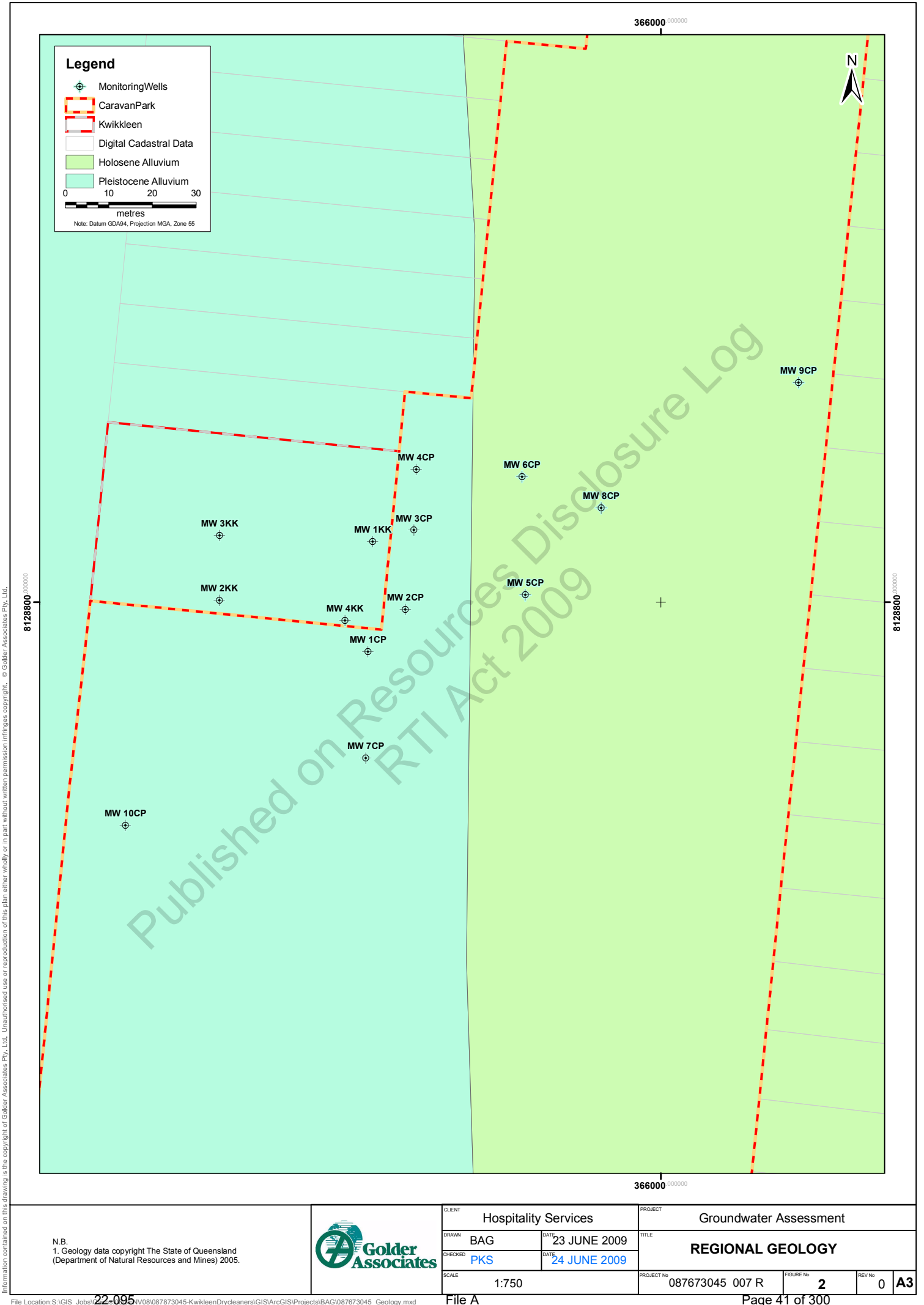
Chem Name	Units	EQL	
Dichlorodifluoromethane		50	<50
Chloromethane	mg/l	50	<50
Vinyl Chloride	mg/l	50	<50
Bromomethane	mg/l	50	<50
Chloroethane	mg/l	50	<50
Trichlorofluoromethane	mg/l	50	<50
1,1-Dichloroethene	mg/l	5	<5
Methylene Chloride	mg/l	5	<5
trans-1,2-Dichloroethene	mg/l	5	<5
1,1-Dichloroethane		5	<5
cis-1,2-Dichloroethene	mg/l	5	<5
1,1,1-Trichloroethane	mg/l	5	<5
1,1-Dichloropropene	mg/l	5	<5
Carbon tetrachloride	mg/l	5	<5
1,2-Dichloroethane	mg/l	5	<5
Trichloroethene	mg/l	5	<5
Dibromomethane	mg/l	5	<5
1,1,2-Trichloroethane	mg/l	5	<5
1,3-Dichloropropane	mg/l	5	<5
Tetrachloroethene	mg/l	5	<5
1,1,1,2-Tetrachloroethane	mg/l	5	<5
Trans-1,4-dichloro-2-butene	mg/l	5	<5
Cis-1,4-dichloro-2-butene	mg/l	5	<5
1,1,2,2-Tetrachloroethane	mg/l	5	<5
1,2,3-Trichloropropane	mg/l	5	<5
1,2-Dibromo-3-chloropropane	mg/l	5	<5
Hexachlorobutadiene	mg/l	5	<5



TABLE 5
SUMMARY OF WATER ANALYTICAL RESULTS - EQUIPMENT RINSATE
 KWIKLEEN DRYCLEANERS
 PEASE STREET
 087673045



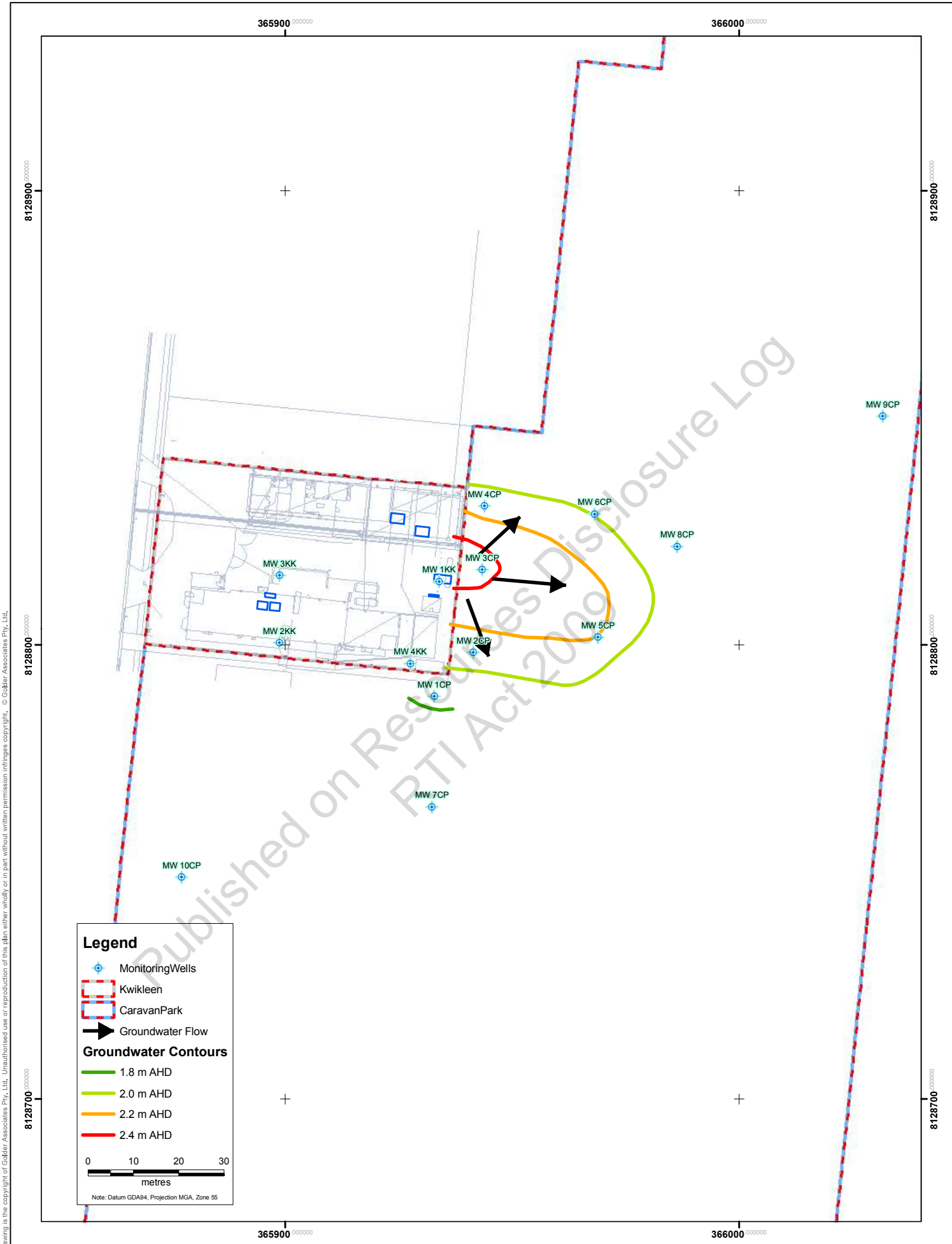
CLIENT Hospitality Services		PROJECT Groundwater Assessment	
DRAWN PAW	DATE 23 JUNE 2009	SITE LOCALITY PLAN	
CHECKED PKS	DATE 26 JUNE 2009		
SCALE 1:15,000		PROJECT No 087673045 007 R	FIGURE No 1
		REV No 0	A4



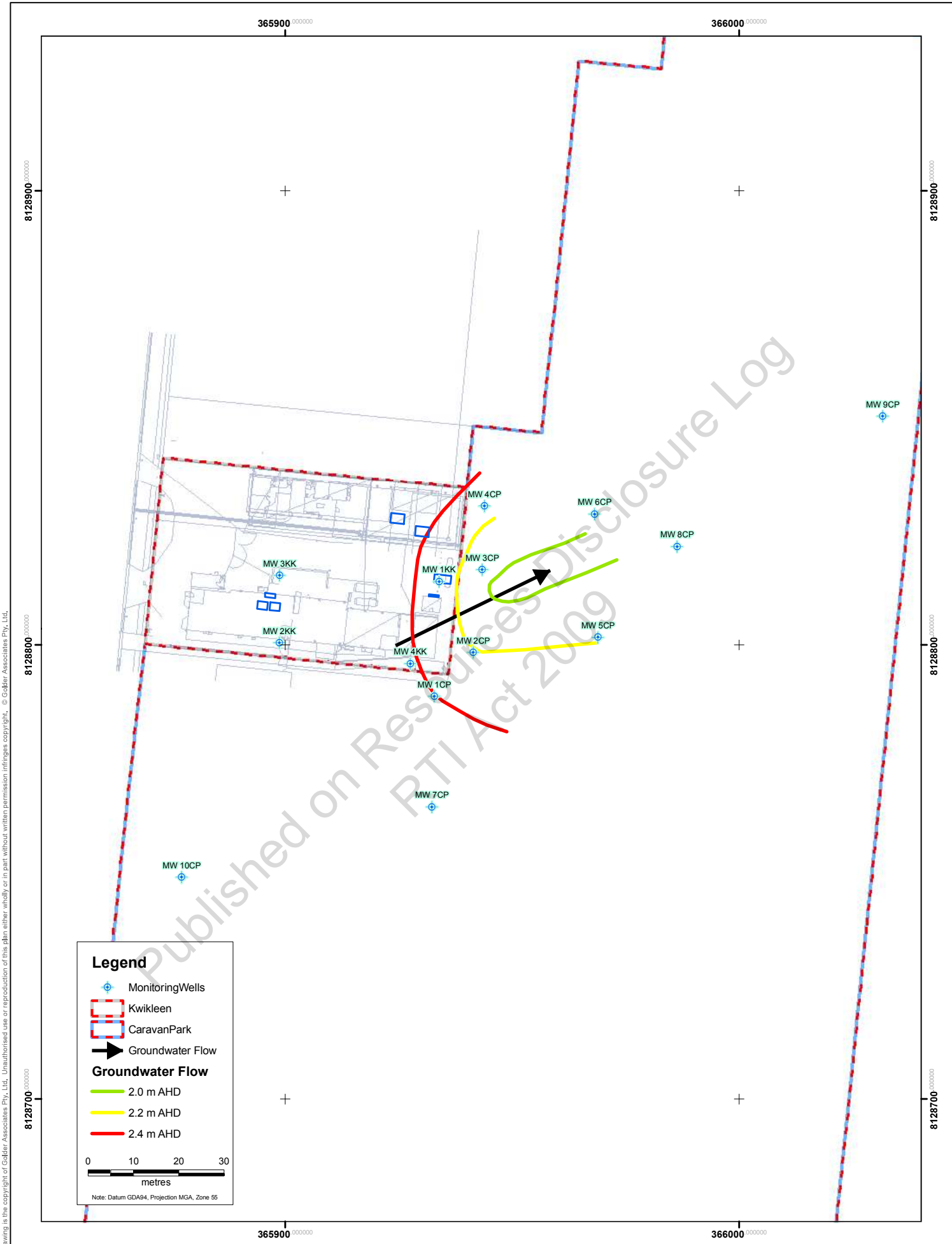
N.B.
1. Geology data copyright The State of Queensland
(Department of Natural Resources and Mines) 2005.



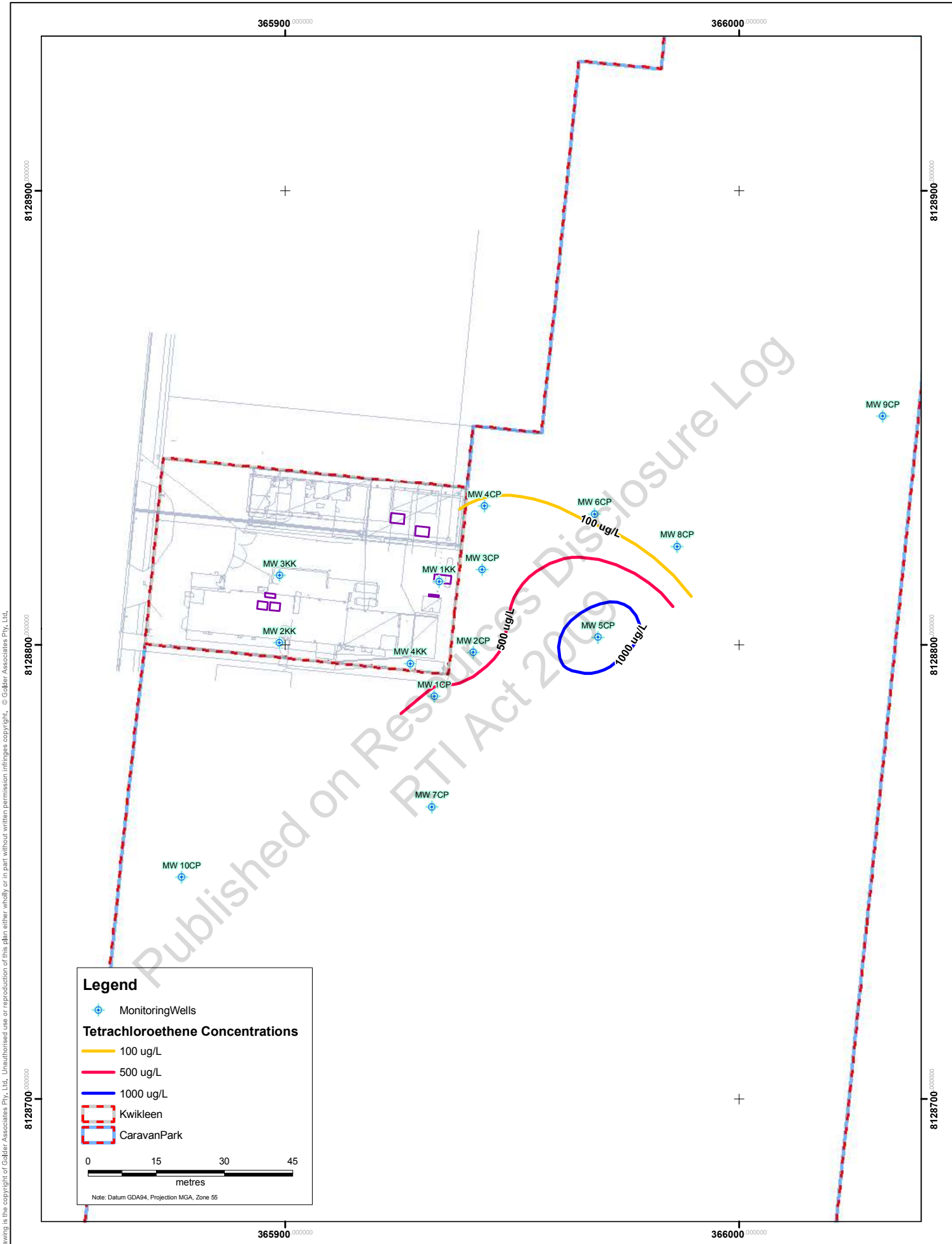
CLIENT Hospitality Services		PROJECT Groundwater Assessment	
DRAWN BAG	DATE 23 JUNE 2009	TITLE REGIONAL GEOLOGY	
CHECKED PKS	DATE 24 JUNE 2009		
SCALE 1:750		PROJECT No 087673045 007 R	FIGURE No 2
		REV No 0	A3



<p>N.B.</p> <p>1. Base map data copyright Mapinfo Australia Pty Ltd.</p> <p>2. DCDB copyright The State of Queensland (Department of Natural Resources, Mines and Water) 2005.</p>		CLIENT Hospitality Services		PROJECT Groundwater Assessment	
		DRAWN BAG	DATE 23 JUNE 2009	TITLE	
		CHECKED PKS	DATE 26 JUNE 2009	Interpreted Groundwater Contours - March 2007	
		SCALE 1:750	PROJECT No 087673045 007 R	FIGURE No 3A	REV No 0 A3



<p>N.B.</p> <p>1. Base map data copyright Mapinfo Australia Pty Ltd.</p> <p>2. DCDB copyright The State of Queensland (Department of Natural Resources, Mines and Water) 2005.</p>		CLIENT Hospitality Services		PROJECT Groundwater Assessment	
		DRAWN BAG	DATE 23 JUNE 2009	TITLE	
		CHECKED PKS	DATE 26 JUNE 2009	Interpreted Groundwater Contours - April 2007	
		SCALE 1:750	PROJECT No 087673045 007 R	FIGURE No 3B	REV No 0 A3



Legend

MonitoringWells

Tetrachloroethene Concentrations

100 ug/L

500 ug/L

1000 ug/L

Kwikleen

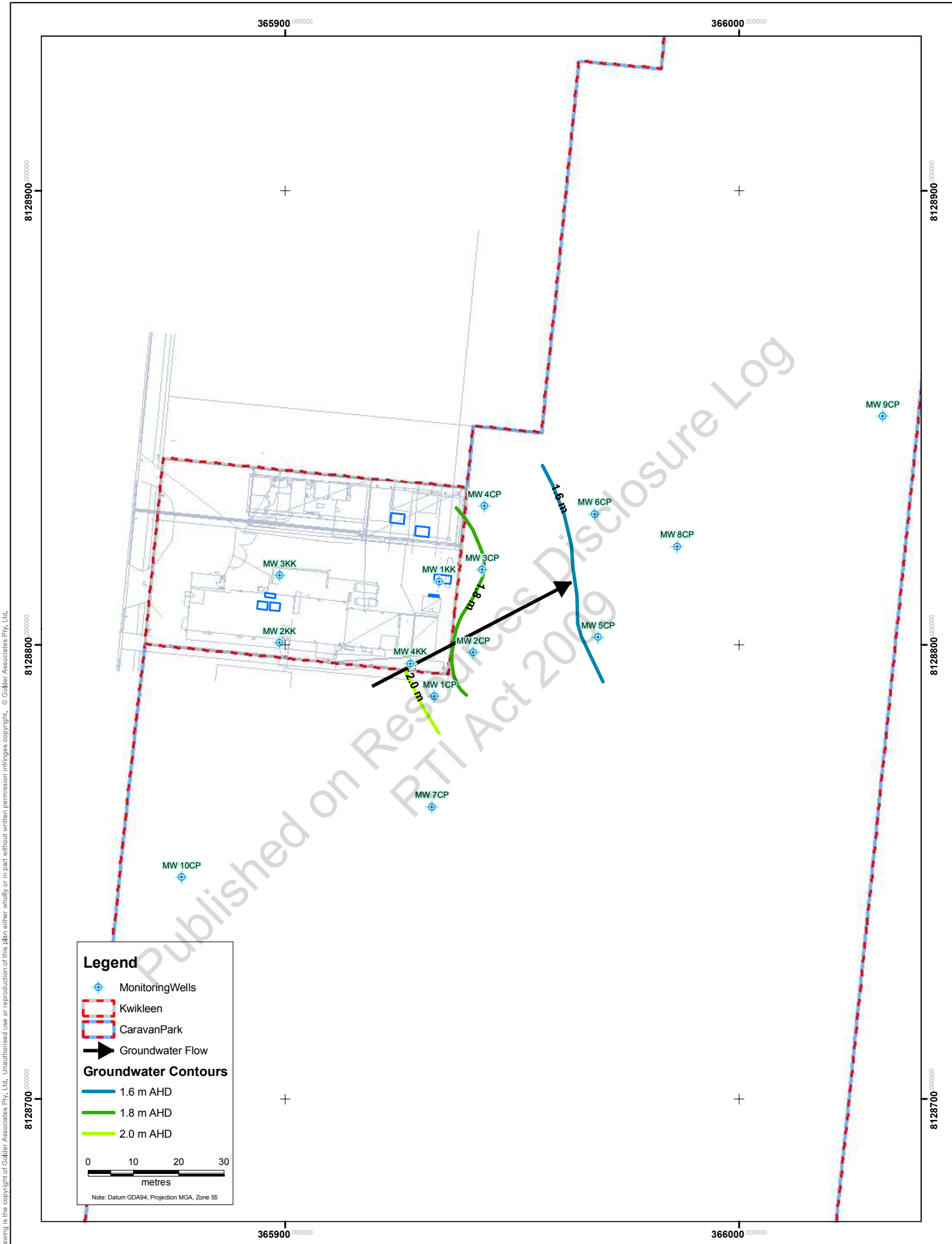
CaravanPark

0153045

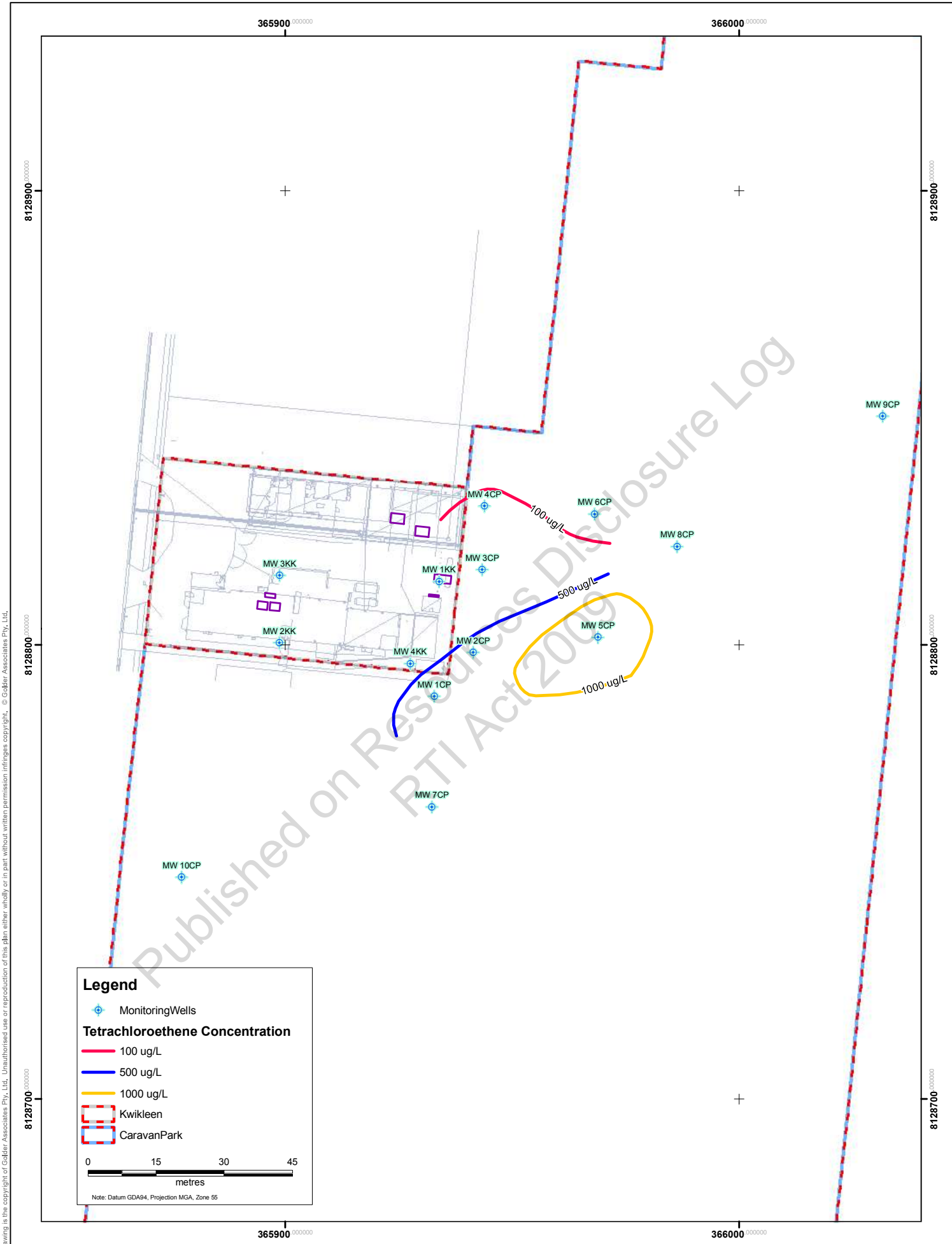
metres

Note: Datum GDA94, Projection MGA, Zone 55

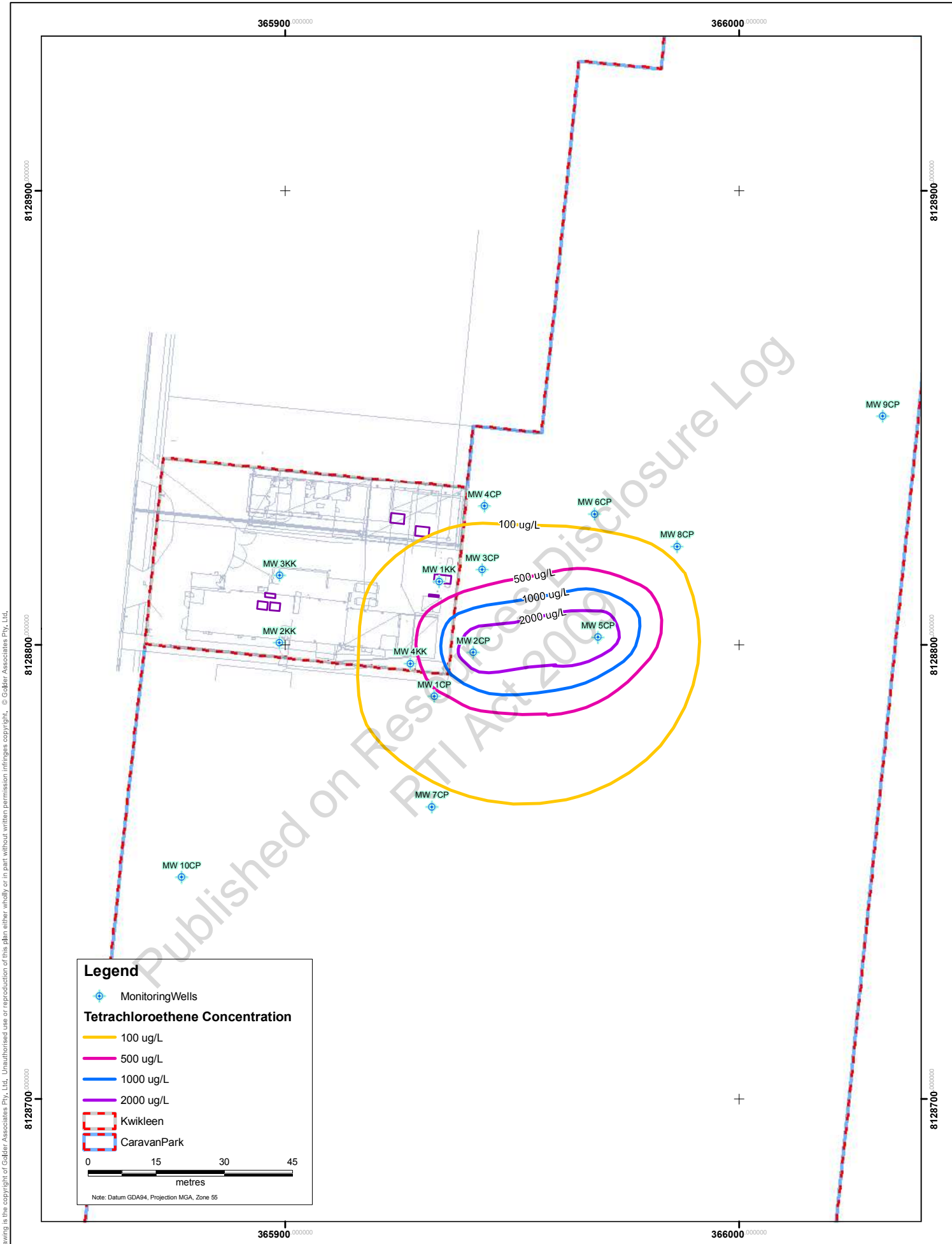
<div>N.B. 1. Base map data copyright Mapinfo Australia Pty Ltd. 2. DCDB copyright The State of Queensland (Department of Natural Resources, Mines and Water) 2005.</div>		CLIENT Hospitality Services		PROJECT Groundwater Assessment	
		DRAWN BAG	DATE 23 JUNE 2009	TITLE Interpreted Tetrachloroethene Concentration Contours - April 2007	
		CHECKED PKS	DATE 26 JUNE 2009		
		SCALE 1:750		PROJECT No 087673045 007 R	FIGURE No 4
				REV No 0	A3



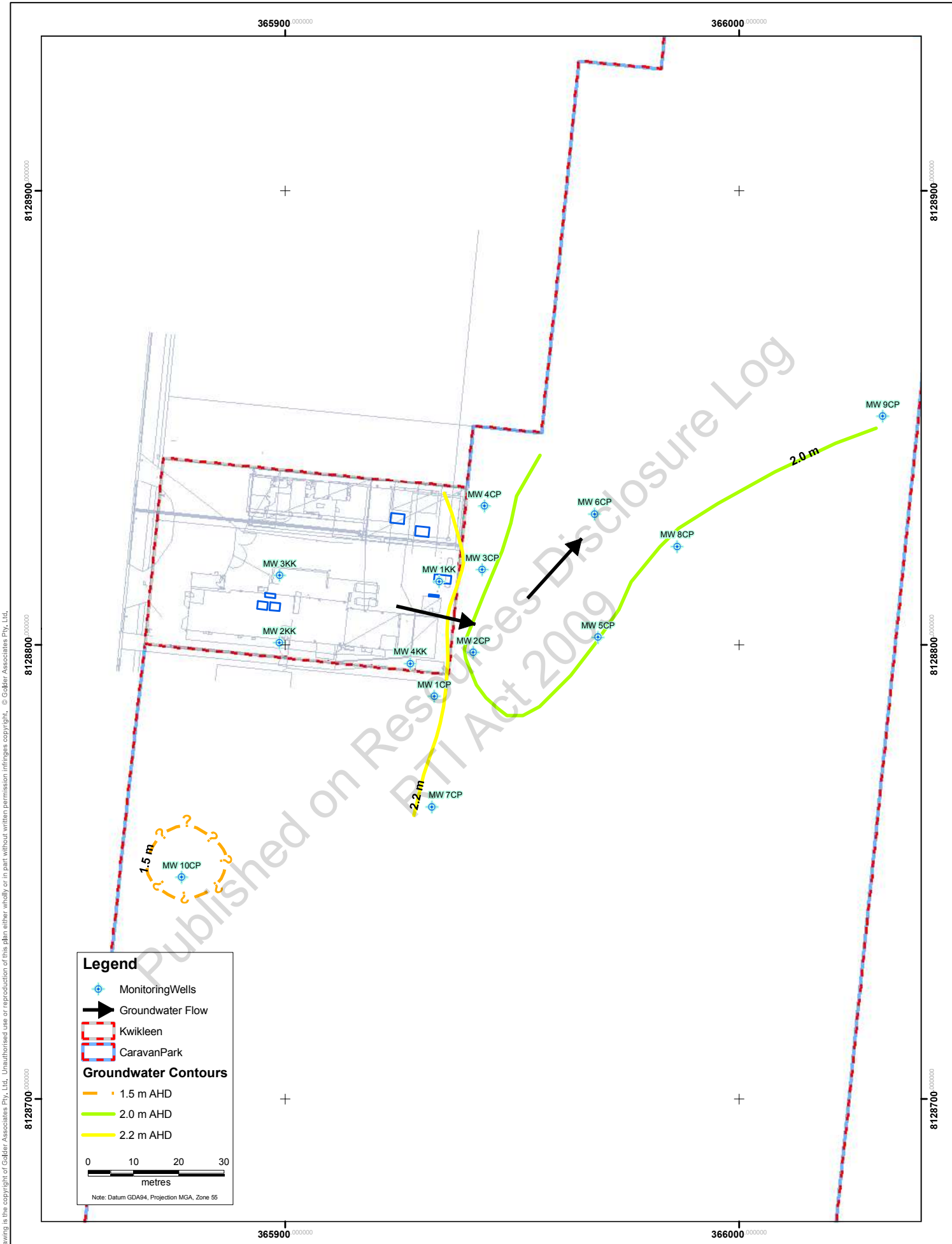
<p>N.B.</p> <p>1. Base map data copyright Mapinfo Australia Pty Ltd.</p> <p>2. DCDB copyright The State of Queensland (Department of Natural Resources, Mines and Water) 2005.</p>		CLIENT Hospitality Services		PROJECT Groundwater Assessment	
		DRAWN BAG	DATE 23 JUNE 2009	TITLE	
		CHECKED PKS	DATE 26 JUNE 2009	Interpreted Groundwater Contours - July 2007	
		SCALE 1:750	PROJECT No 087673045 007 R	FIGURE No 5	REV No 0 A3



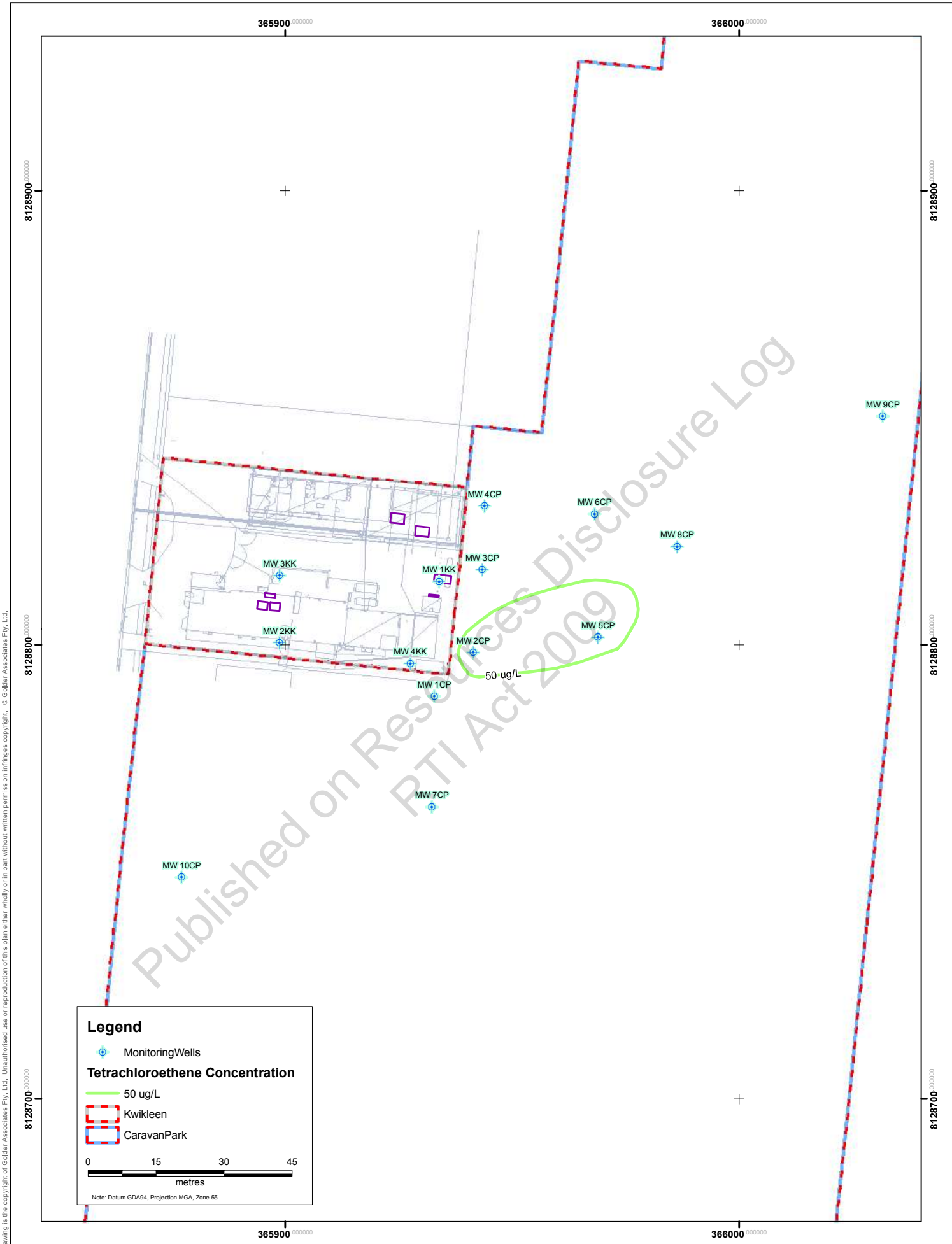
<p>N.B.</p> <p>1. Base map data copyright Mapinfo Australia Pty Ltd.</p> <p>2. DCDB copyright The State of Queensland (Department of Natural Resources, Mines and Water) 2005.</p>		CLIENT Hospitality Services		PROJECT Groundwater Assessment	
		DRAWN BAG	DATE 23 JUNE 2009	TITLE	
		CHECKED PKS	DATE 26 JUNE 2009	Interpreted Tetrachloroethene Concentration Contours - July 2007	
		SCALE 1:750	PROJECT No 087673045 007 R	FIGURE No 6	REV No 0 A3

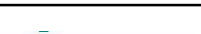


N.B. 1. Base map data copyright Mapinfo Australia Pty Ltd. 2. DCDB copyright The State of Queensland (Department of Natural Resources, Mines and Water) 2005.		CLIENT Hospitality Services		PROJECT Groundwater Assessment	
		DRAWN BAG	DATE 23 JUNE 2009	TITLE	
		CHECKED PKS	DATE 26 JUNE 2009	Interpreted Tetrachloroethene Concentration Contours - October 2007	
		SCALE 1:750	PROJECT No 087673045 007 R	FIGURE No 7	REV No 0 A3



<p>N.B.</p> <p>1. Base map data copyright Mapinfo Australia Pty Ltd.</p> <p>2. DCDB copyright The State of Queensland (Department of Natural Resources, Mines and Water) 2005.</p>		CLIENT Hospitality Services		PROJECT Groundwater Assessment	
		DRAWN BAG	DATE 23 JUNE 2009	TITLE	
		CHECKED PKS	DATE 26 JUNE 2009	Interpreted Groundwater Contours - March 2008	
		SCALE 1:750	PROJECT No 087673045 007 R	FIGURE No 8	REV No 0 A3

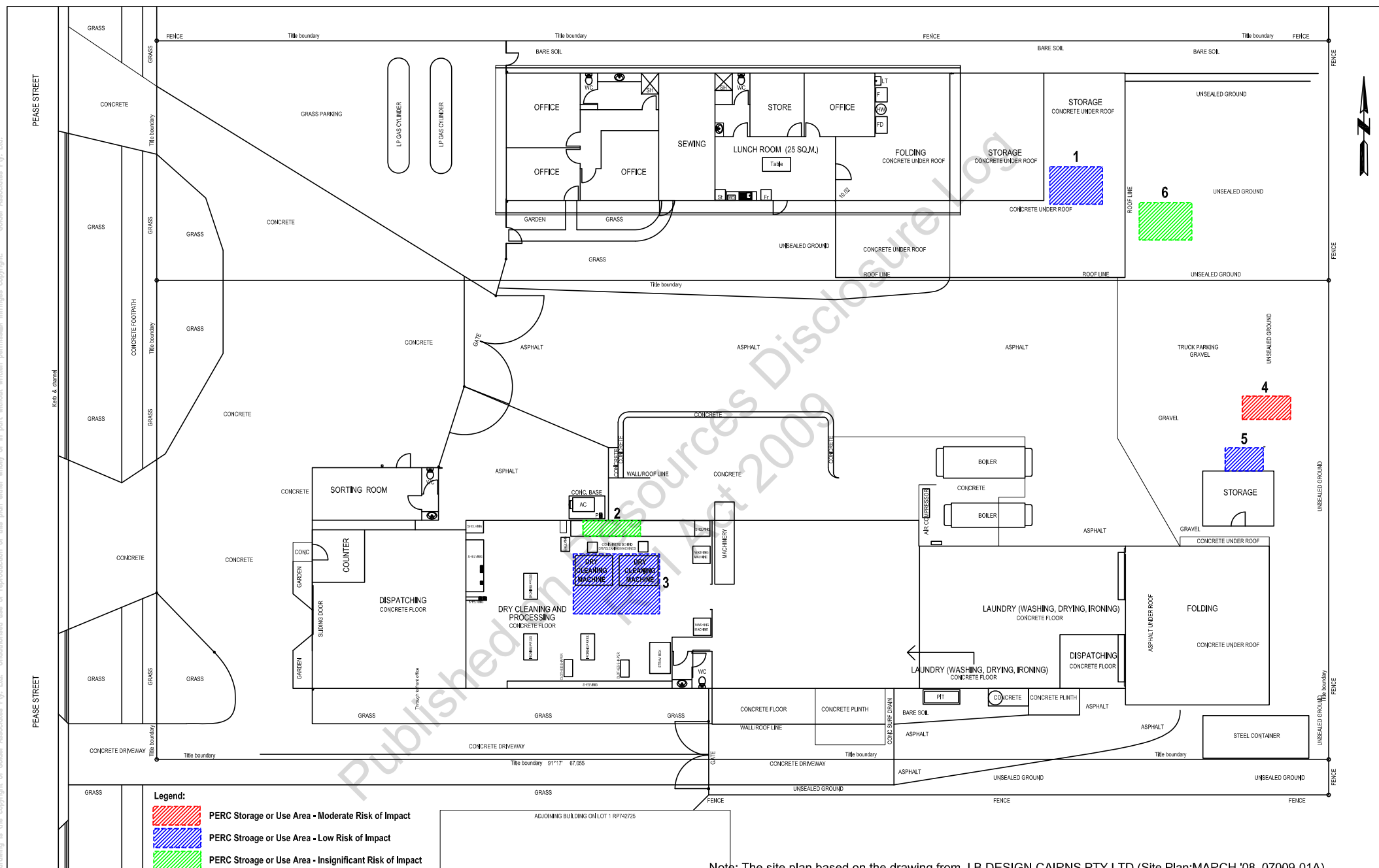


<div>N.B. 1. Base map data copyright Mapinfo Australia Pty Ltd. 2. DCDB copyright The State of Queensland (Department of Natural Resources, Mines and Water) 2005.</div>		CLIENT Hospitality Services		PROJECT Groundwater Assessment		
		DRAWN BAG	DATE 23 JUNE 2009	TITLE		
		CHECKED PKS	DATE 26 JUNE 2009	Interpreted Tetrachloroethene Concentration Contours - March 2008		
		SCALE 1:750		PROJECT No 087673045 007 R	FIGURE No 9	REV No 0
				A3		

22-095

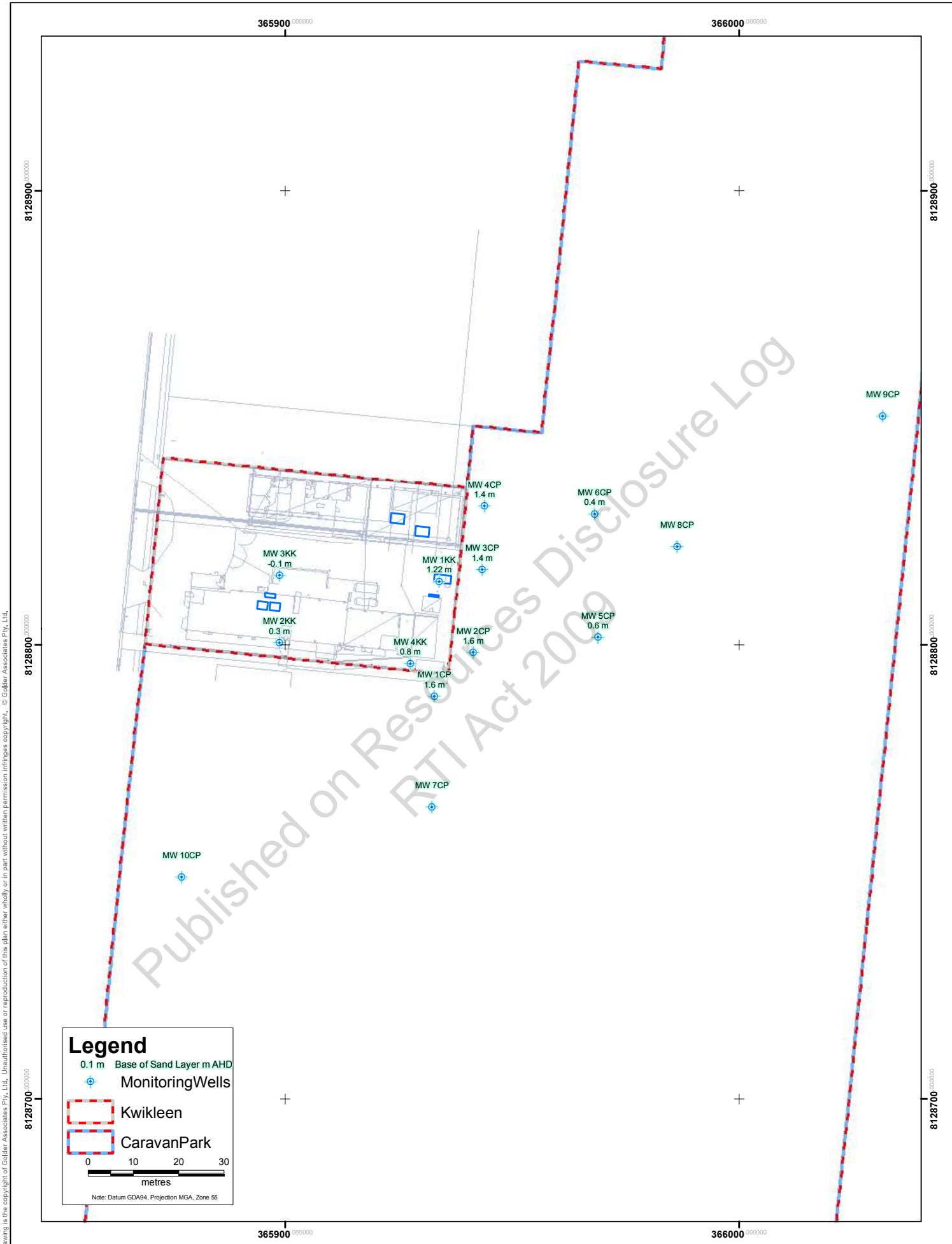
File A

Page 49 of 300



Note: The site plan based on the drawing from J B DESIGN CAIRNS PTY LTD (Site Plan:MARCH '08 07009-01A).

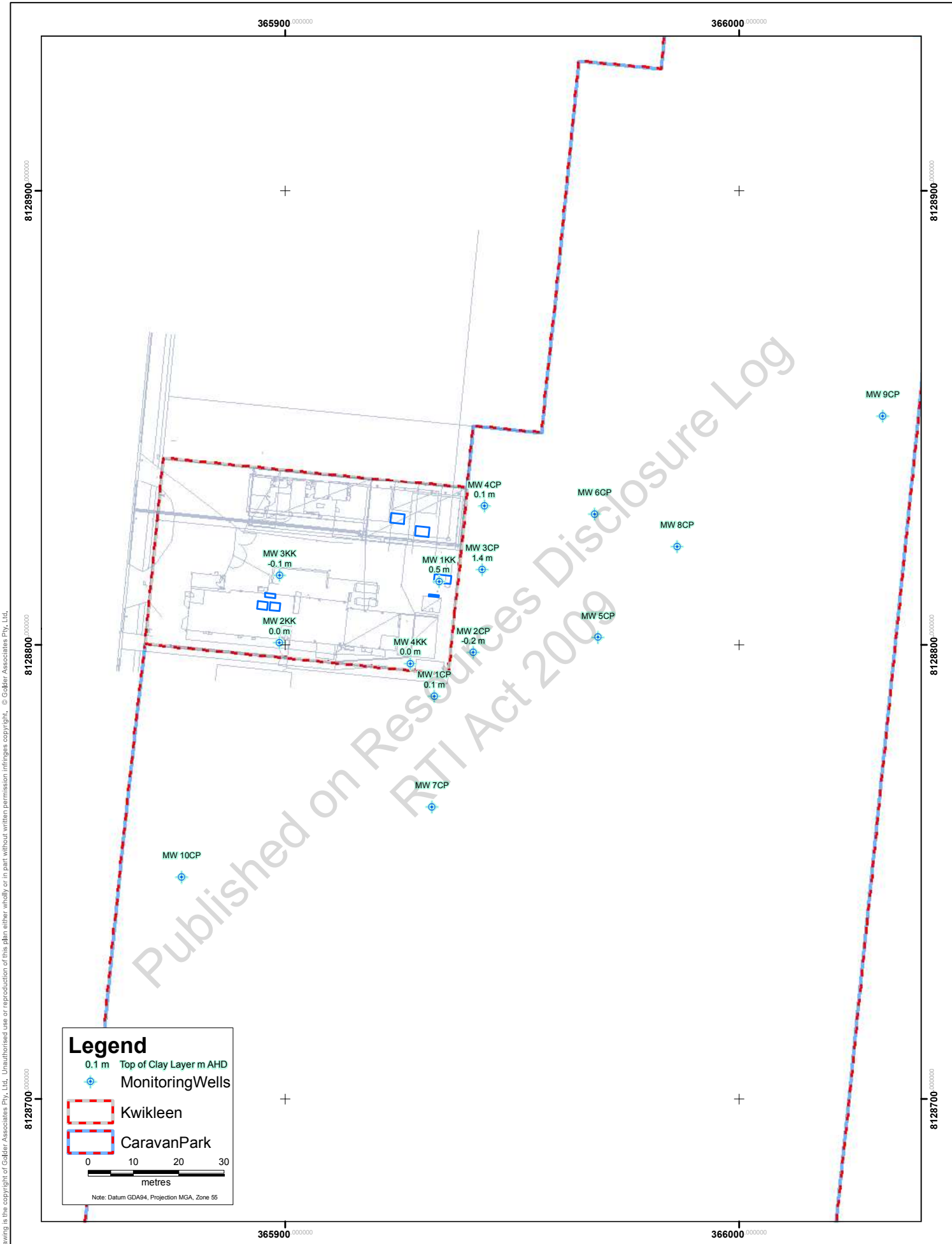
CLIENT Hospitality Services		PROJECT Groundwater Assessment	
DRAWN AL/PAW	DATE 16/03/2009	TITLE AREAS OF INTEREST FOR PERC USAGE AND STORAGE	
CHECKED PKS	DATE 26/06/2009		
SCALE 1:200		PROJECT No 087673045 007	FIGURE No 300 Page 50 of 300
			REV No 0 A:



<div>Information contained on this sheet is the property of Golder Associates Pty Ltd. It is to be used for the purpose for which it was prepared and is not to be used for any other purpose without the written consent of Golder Associates Pty Ltd.</div> <div>N.B. 1. Base map data copyright Mapinfo Australia Pty Ltd. 2. DCDB copyright The State of Queensland (Department of Natural Resources, Mines and Water) 2005.</div>		CLIENT Hospitality Services		PROJECT Groundwater Assessment									
		DRAWN BAG		DATE 23 JUNE 2009		TITLE Base of Sand Layer							
		CHECKED PKS		DATE 26 JUNE 2009									
		SCALE 1:750				PROJECT No 087673045 007 R		FIGURE No 11		REV No 0		A3	
		22-095											

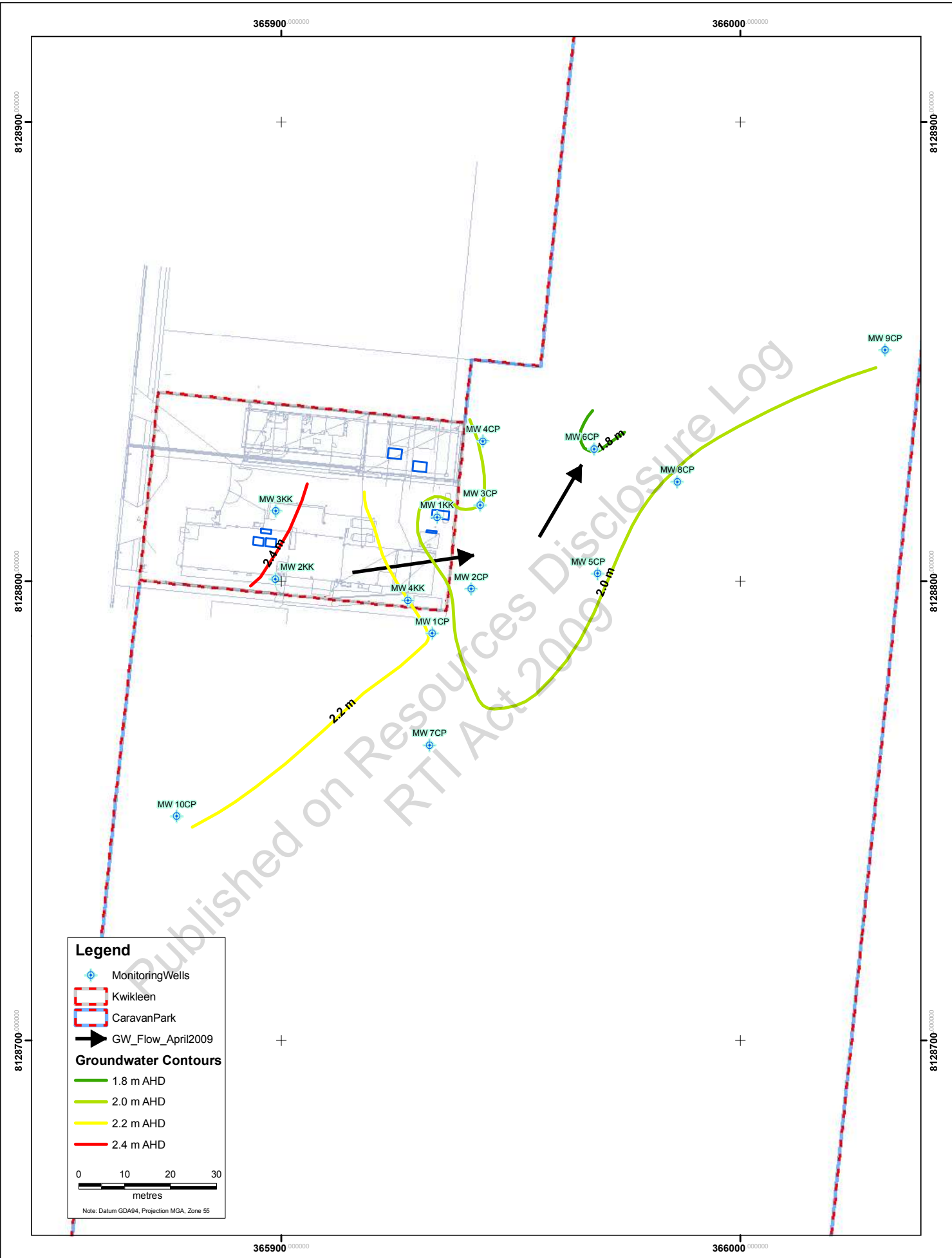
File A

Page 51 of 300



<div>N.B. 1. Base map data copyright Mapinfo Australia Pty Ltd. 2. DCDB copyright The State of Queensland (Department of Natural Resources, Mines and Water) 2005.</div>		CLIENT		Hospitality Services		PROJECT		Groundwater Assessment			
		DRAWN		BAG	DATE		23 JUNE 2009		TITLE		
		CHECKED		PKS	DATE		26 JUNE 2009		Top of Clay Layer		
		SCALE		1:750		PROJECT No		087673045 007 R		FIGURE No	
								12		REV No	
								0		A3	

Information contained on this drawing is the copyright of Golder Associates Pty. Ltd. Unauthorised use or reproduction of this plan either wholly or in part without written permission infringes copyright. © Golder Associates Pty. Ltd.



Legend

- Monitoring Wells
- Kwikleen
- Caravan Park
- GW_Flow_April2009

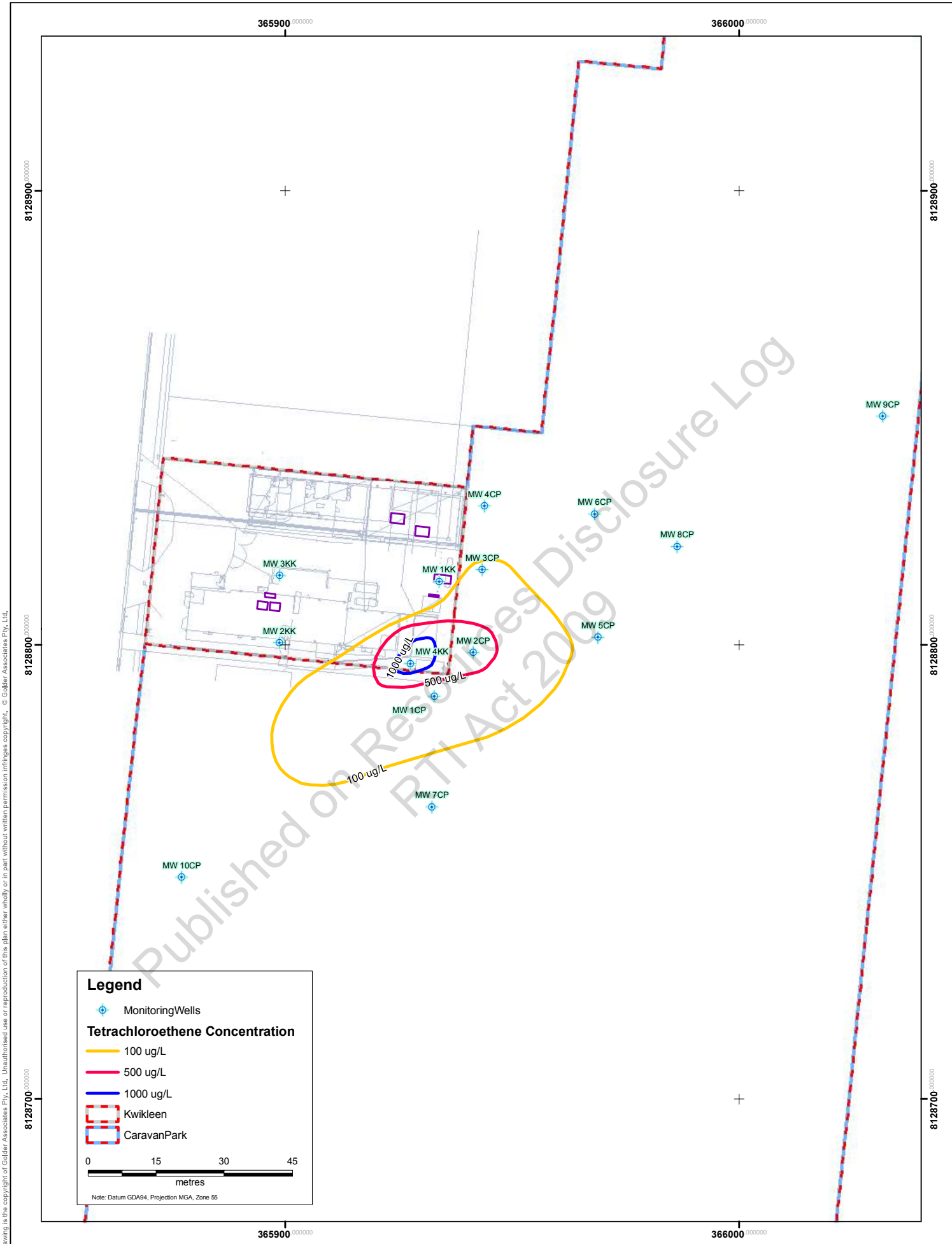
Groundwater Contours

- 1.8 m AHD
- 2.0 m AHD
- 2.2 m AHD
- 2.4 m AHD

0 10 20 30
metres

Note: Datum GDA94, Projection MGA, Zone 55

<p>N.B.</p> <p>1. Base map data copyright Mapinfo Australia Pty Ltd.</p> <p>2. DCDB copyright The State of Queensland (Department of Natural Resources, Mines and Water) 2005.</p>		CLIENT Hospitality Services		PROJECT Groundwater Assessment	
		DRAWN BAG	DATE 23 JUNE 2009	TITLE	
		CHECKED PKS	DATE 26 JUNE 2009	Interpreted Groundwater Contours - April 2009	
		SCALE 1:750	PROJECT No 087673045 007 R	FIGURE No 13	REV No 0 A3



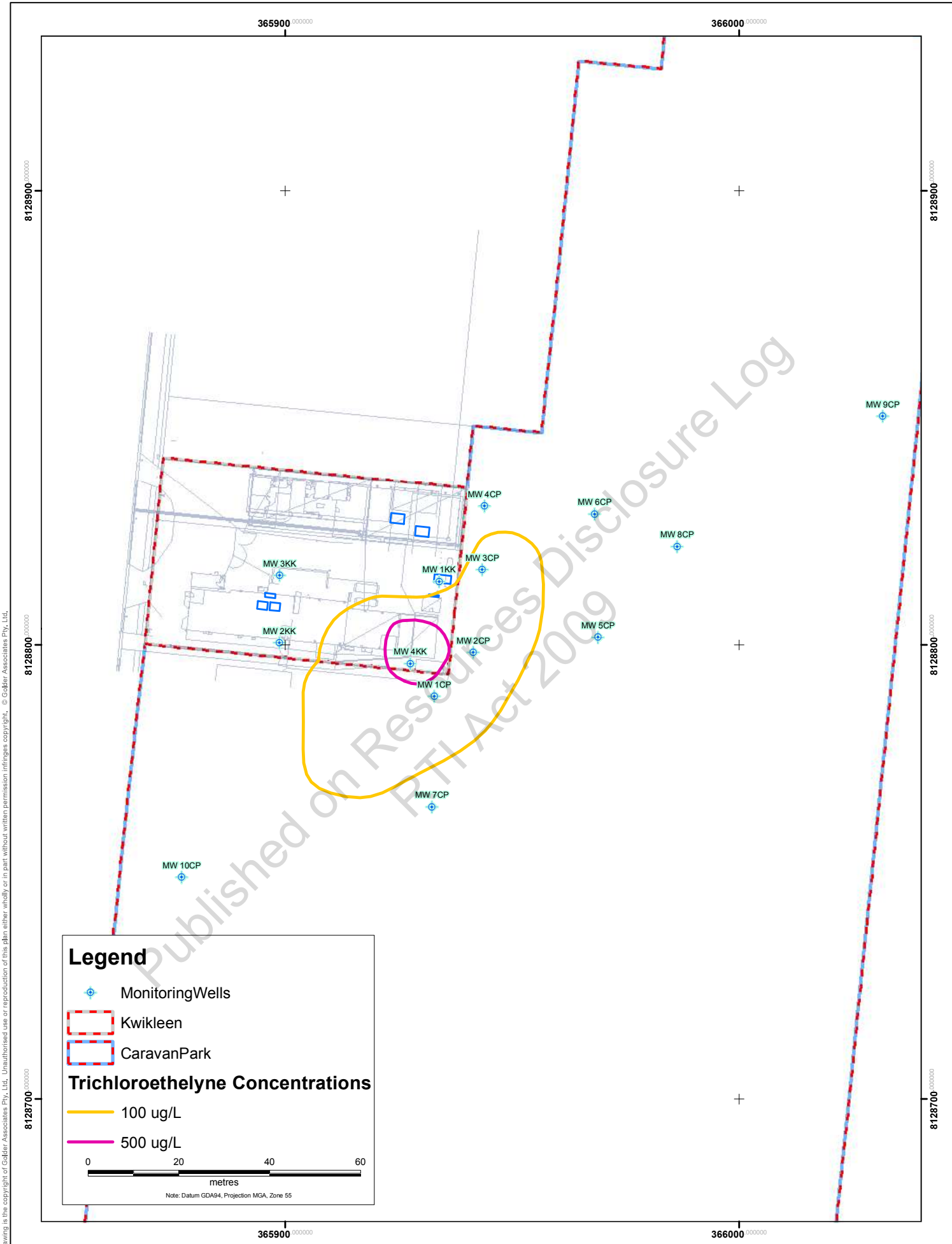
Legend

- Monitoring Wells
- Tetrachloroethene Concentration**
 - 100 ug/L
 - 500 ug/L
 - 1000 ug/L
- Kwikleen
- CaravanPark

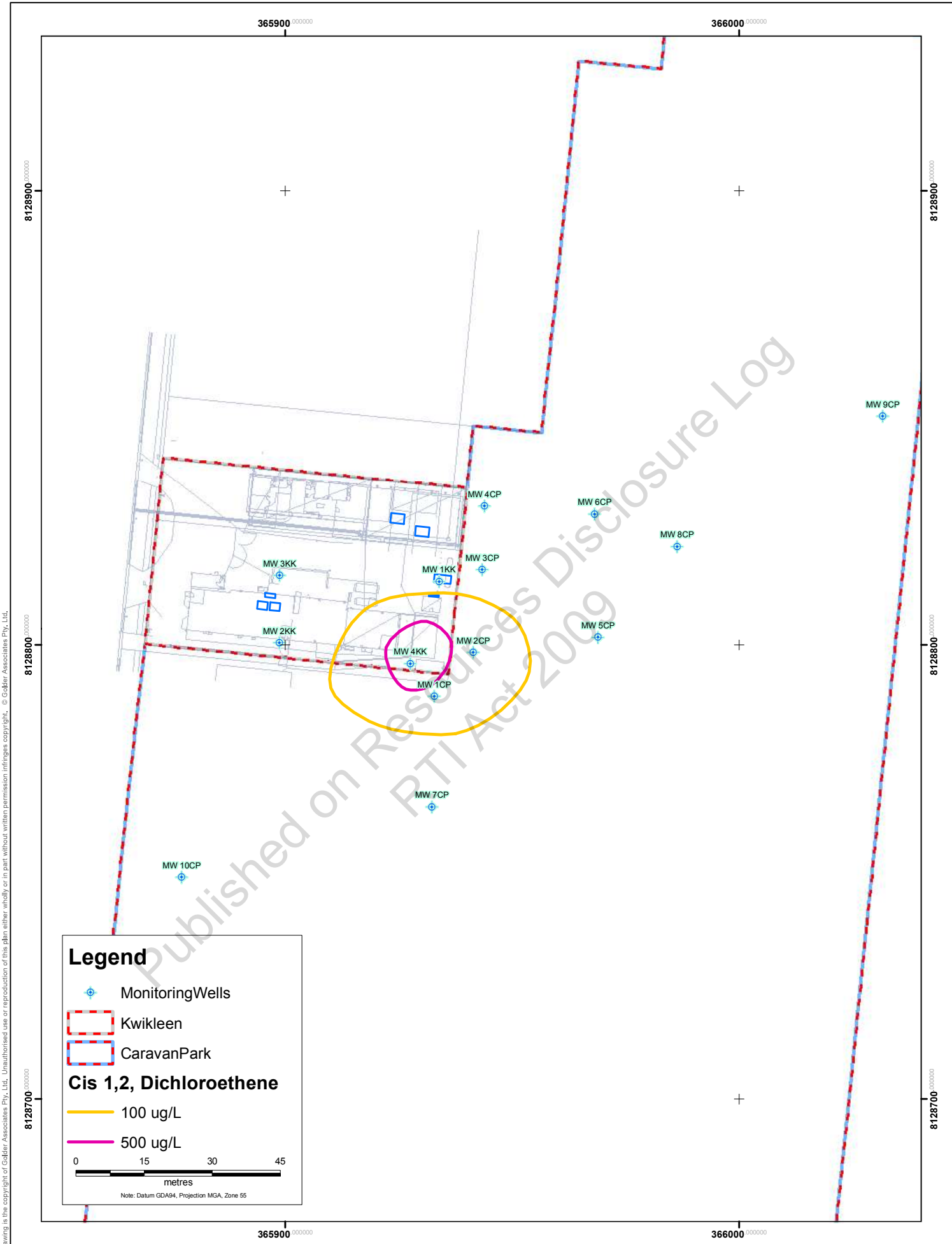
0 15 30 45 metres

Note: Datum GDA94, Projection MGA, Zone 55

<p>N.B.</p> <p>1. Base map data copyright Mapinfo Australia Pty Ltd.</p> <p>2. DCDB copyright The State of Queensland (Department of Natural Resources, Mines and Water) 2005.</p>		CLIENT Hospitality Services		PROJECT Groundwater Assessment	
		DRAWN BAG	DATE 23 JUNE 2009	TITLE	
		CHECKED PKS	DATE 26 JUNE 2009	Interpreted Tetrachloroethene Concentration Contours - April 2009	
		SCALE 1:750	PROJECT No 087673045 007 R	FIGURE No 14	REV No 0 A3



<p>N.B.</p> <p>1. Base map data copyright Mapinfo Australia Pty Ltd.</p> <p>2. DCDB copyright The State of Queensland (Department of Natural Resources, Mines and Water) 2005.</p>		CLIENT Hospitality Services		PROJECT Groundwater Assessment	
		DRAWN BAG	DATE 23 JUNE 2009	TITLE	
		CHECKED PKS	DATE 26 JUNE 2009	Interpreted Trichloroethelyne Contours - April 2009	
		SCALE 1:750	PROJECT No 087673045 007 R	FIGURE No 15	REV No 0 A3



<p>N.B.</p> <p>1. Base map data copyright Mapinfo Australia Pty Ltd.</p> <p>2. DCDB copyright The State of Queensland (Department of Natural Resources, Mines and Water) 2005.</p>		CLIENT Hospitality Services		PROJECT Groundwater Assessment	
		DRAWN BAG	DATE 23 JUNE 2009	TITLE	
		CHECKED PKS	DATE 26 JUNE 2009	Interpreted Cis 1,2, Dichloroethene Contours - April 2009	
		SCALE 1:750	PROJECT No 087673045 007 R	FIGURE No 16	REV No 0 A3



APPENDIX A

Results of Field Investigation

Published on Resources Disclosure Log
RTI Act 2009



REPORT OF BOREHOLE: MW1

CLIENT: Kwikleen Dry Cleaners
 PROJECT: Contamination Investigation
 LOCATION: Pease Street, Manunda
 JOB NO: 087673045

POSITION: Refer To Site Plan
 SURFACE RL: m DATUM: AHD
 INCLINATION: -90°
 HOLE DIA: mm HOLE DEPTH: 3.50 m

SHEET: 1 OF 1
 DRILL RIG: Ezi Probe
 DRILLER: AAB
 LOGGED: PAW DATE: 5/12/08
 CHECKED: JLM DATE: 22/12/08

Drilling				Sampling		Field Material Description				
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE CONSISTENCY DENSITY	PIEZOMETER DETAILS
			0.0					FILL: Clayey SILT Brown, with fine to coarse grained sand and fine to medium gravel, trace of fine roots		
			0.5	0.50				Clayey SILT Brown		
			0.75					Pale brown		
			1.0							
			1.5	1.50				Silty CLAY Pale brown and pale grey		
			1.75					With some fine to medium grained sand		
			2.0	2.00				Silty SAND Fine to medium grained, pale grey		
			2.30					Silty CLAY Pale grey and red brown, trace of orange brown		
			2.70					Silty SAND Fine to medium grained, pale grey, orange brown and red brown		
			3.0	3.00				Sandy CLAY Pale grey, red brown and orange brown, fine to medium grained sand		
								Silty CLAY (Marine Clay) Dark grey		
			3.5	3.50				END OF BOREHOLE @ 3.50 m		
			4.0							
			4.5							
			5.0							

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for environmental purposes only, without attempt to consider geotechnical properties or the geotechnical significance of the materials encountered. As such it should not be relied upon for geotechnical purposes.

GAP gINT FN. F01d
 RL2



REPORT OF BOREHOLE: MW2

CLIENT: Kwikleen Dry Cleaners
PROJECT: Contamination Investigation
LOCATION: Pease Street, Manunda
JOB NO: 087673045

POSITION: Refer to Site Plan
SURFACE RL: m DATUM: AHD
INCLINATION: -90°
HOLE DIA: mm HOLE DEPTH: 4.00 m

SHEET: 1 OF 1
DRILL RIG: Ezi Probe
DRILLER: AAB
LOGGED: MKC DATE: 24/4/09
CHECKED: PKS DATE: 26/6/09

Drilling				Sampling		Field Material Description								
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION			MOISTURE CONSISTENCY DENSITY	PIEZOMETER DETAILS	
Push tube	M	Groundwater @ 1.4 m	0.0		DS 0.01-0.30m PID = 0.5 ppm				Topsoil:- Silty SAND With some rootlets	W	MD			
			0.30		DS 0.30-0.50m PID = 1.6 ppm			Fill:- Clayey SAND Fine to coarse grained, brown, with some fine to medium gravel		F-S				
			0.50		DS 0.70-1.00m PID = 1.8 ppm			Fill:- Sandy CLAY Medium plasticity, red brown, fine grained sand						
								Silty CLAY High plasticity, pale grey brown, fine grained sand						
			1.0											
					DS 1.30-1.40m PID = 2.4 ppm									
			1.5											
					DS 1.70-1.80m PID = 1.3 ppm									
			2.0											
					MW2-1 DS 2.20-2.40m PID = 2.5 ppm									
H			2.5											
			3.00		DS 3.00-3.20m PID = 1.0 ppm			Clayey SAND Fine to medium grained, pale grey and orange brown	W	L				
			3.30											
			3.50		MW2-2 DS 3.30-3.50m PID = 1.0 ppm			Silty CLAY Low plasticity, dark brown, with some organic material and fine grained sand, organic odour		S				
			3.70					Silty CLAY Dark grey, with some organic material and fine grained sand						
			3.90		MW2-3 DS 3.70-3.90m PID = 1.8 ppm			Becoming pale grey brown silty clay	M	F				
			4.00		DS 3.90-4.00m PID = 2.0 ppm			Silty CLAY Pale grey and red brown, with some fine grained sand		F-S				
					END OF BOREHOLE @ 4.00 m									
			4.5											
			5.0											

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for environmental purposes only, without attempt to consider geotechnical properties or the geotechnical significance of the materials encountered. As such it should not be relied upon for geotechnical purposes.

GAP gINT FN. F01d
RL2



REPORT OF BOREHOLE: MW3

CLIENT: Kwikleen Dry Cleaners
PROJECT: Contamination Investigation
LOCATION: Pease Street, Manunda
JOB NO: 087673045

POSITION: Refer to Site Plan
SURFACE RL: m DATUM: AHD
INCLINATION: -90°
HOLE DIA: mm HOLE DEPTH: 4.00 m

SHEET: 1 OF 1
DRILL RIG: Ezi Probe
DRILLER: AAB
LOGGED: MKC DATE: 24/4/09
CHECKED: PKS DATE: 26/6/09

Drilling				Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION			MOISTURE CONSISTENCY DENSITY
											PIEZOMETER DETAILS
Push Tube	Groundwater @ 1.0 m		0.0		DS 0.10-0.30m PID = 0.6 ppm			Fill:- Sandy CLAY Brown fine to medium, with some fine to medium gravel			
			0.30								
			0.5		DS 0.60-0.80m PID = 0.6 ppm			Sandy CLAY Pale brown, red brown, fine grained sand			
			1.0								
			1.5		DS 1.30-1.50m PID = 0.7 ppm						
			2.0		DS 1.70-2.00m PID = 1.7 ppm						
			2.5		DS 2.20-2.50m PID = 0.3 ppm						
			3.0	3.00	DS 2.60-2.90m PID = 2.6 ppm						
			3.5	3.50	MW3-1 DS 3.00-3.20m PID = 3.5 ppm			CLAY Grey, with layers of fine to medium grained sand			
			4.0	4.00	DS 3.50-3.70m PID = 0.4 ppm			SAND Fine to medium grained, pale grey			
					DS 3.70-4.00m PID = 2.5 ppm			Silty CLAY Dark grey, with some organic matter and fine sand			
								END OF BOREHOLE @ 4.00 m			

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for environmental purposes only, without attempt to consider geotechnical properties or the geotechnical significance of the materials encountered. As such it should not be relied upon for geotechnical purposes.

GAP gINT FN. F01d
RL2



REPORT OF BOREHOLE: MW4

CLIENT: Kwikleen Dry Cleaners
PROJECT: Contamination Investigation
LOCATION: Pease Street, Manunda
JOB NO: 087673045

POSITION: Refer to Site Plan
SURFACE RL: m DATUM: AHD
INCLINATION: -90°
HOLE DIA: mm HOLE DEPTH: 4.00 m

SHEET: 1 OF 1
DRILL RIG: Ezi Probe
DRILLER: AAB
LOGGED: MKC DATE: 24/4/09
CHECKED: PKS DATE: 26/6/09

Drilling				Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USC Symbol	SOIL / ROCK MATERIAL DESCRIPTION	MOISTURE	CONSISTENCY DENSITY
											PIEZOMETER DETAILS
			0.0						Fill:- Sandy CLAY Pale brown, fine to medium grained, trace of fine to coarse gravel	D	F
			0.40		DS 0.40-0.90m PID = 2.2 ppm				Silty SAND Fine sand, brown, with some clay	L	
			0.90		DS 1.00-1.50m PID = 1.6 ppm				Silty CLAY Pale brown and pale grey, with some fine grained sand	M	
			1.5		DS 1.60-1.80m PID = 1.5 ppm					F	
			2.30		MW4-1 DS 2.30-2.80m PID = 14.5 ppm				SAND Fine to medium grained, pale grey	W	L
			2.80		DS 2.80-3.20m PID = 11.8 ppm				Sandy CLAY Grey, fine grained sand	M	F-St
			3.20								
			3.30		MW4-2 DS 3.30-3.50m PID = 20.6 ppm				SAND Fine to coarse grained, pale grey		LI
			3.60						Silty CLAY Dark brown, with some organic matter and fine grained sand, organic odour	So	
					MW4-3 DS 3.60-4.00m PID = 2.7 ppm				Silty CLAY Dark grey, with some organic matter and fine grained sand, organic odour	So	
			4.0	4.00					END OF BOREHOLE @ 4.00 m		
			4.5								
			5.0								

This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for environmental purposes only, without attempt to consider geotechnical properties or the geotechnical significance of the materials encountered. As such it should not be relied upon for geotechnical purposes.

GAP gINT FN. F01d
RL2

METHOD OF SOIL DESCRIPTION USED ON BOREHOLE AND TEST PIT REPORTS



FILL

GRAVEL (GP or GW)

SAND (SP or SW)

SILT (ML or MH)



CLAY (CL, CI or CH)

ORGANIC SOILS (OL or OH or Pt)

COBBLES or BOULDERS

Combinations of these basic symbols may be used to indicate mixed materials such as sandy clay.

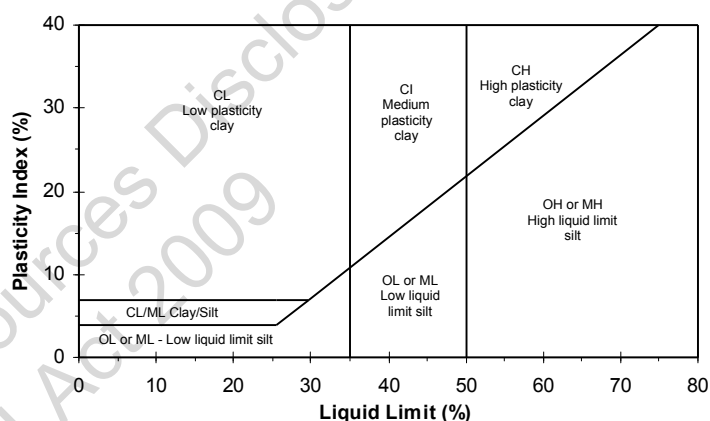
CLASSIFICATION AND INFERRED STRATIGRAPHY

Soil and Rock is classified and described in Reports of Boreholes and Test Pits using the preferred method given in AS1726 – 1993, Appendix A. The material properties are assessed in the field by visual/tactile methods.

Particle Size

Major Division	Sub Division	Particle Size
BOULDERS		> 200 mm
COBBLES		63 to 200 mm
GRAVEL	Coarse	20 to 63 mm
	Medium	6.0 to 20 mm
	Fine	2.0 to 6.0 mm
SAND	Coarse	0.6 to 2.0 mm
	Medium	0.2 to 0.6 mm
	Fine	0.075 to 0.2 mm
SILT		0.002 to 0.075 mm
CLAY		< 0.002 mm

Plasticity Properties



MOISTURE CONDITION

AS1726 - 1993

Symbol	Term	Description
D	Dry	Sands and gravels are free flowing. Clays & Silts may be brittle or friable and powdery.
M	Moist	Soils are darker than in the dry condition & may feel cool. Sands and gravels tend to cohere.
W	Wet	Soils exude free water. Sands and gravels tend to cohere.

CONSISTENCY AND DENSITY

AS1726 - 1993

Symbol	Term	Undrained Shear Strength
VS	Very Soft	0 to 12 kPa
S	Soft	12 to 25 kPa
F	Firm	25 to 50 kPa
St	Stiff	50 to 100 kPa
VSt	Very Stiff	100 to 200 kPa
H	Hard	Above 200 kPa

Symbol	Term	Density Index %	SPT "N" #
VL	Very Loose	Less than 15	0 to 4
L	Loose	15 to 35	4 to 10
MD	Medium Dense	35 to 65	10 to 30
D	Dense	65 to 85	30 to 50
VD	Very Dense	Above 85	Above 50

In the absence of test results, consistency and density may be assessed from correlations with the observed behaviour of the material.

SPT correlations are not stated in AS1726 – 1993, and may be subject to corrections for overburden pressure and equipment type.

EXPLANATION OF NOTES, ABBREVIATIONS & TERMS USED ON BOREHOLE AND TEST PIT REPORTS

DRILLING/EXCAVATION METHOD

AS*	Auger Screwing	RD	Rotary blade or drag bit	HQ	Diamond Core - 63 mm
AD*	Auger Drilling	RT	Rotary Tricone bit	NMLC	Diamond Core - 52 mm
*V	V-Bit	RAB	Rotary Air Blast	NQ	Diamond Core - 47 mm
*T	TC-Bit, e.g. ADT	RC	Reverse Circulation	BH	Tractor Mounted Backhoe
HA	Hand Auger	PT	Push Tube	EX	Tracked Hydraulic Excavator
ADH	Hollow Auger	CT	Cable Tool Rig	EE	Existing Excavation
DTC	Diatube Coring	JET	Jetting	HAND	Excavated by Hand Methods
WB	Washbore or Bailer	NDD	Non-destructive drilling		

PENETRATION/EXCAVATION RESISTANCE

- L Low resistance.** Rapid penetration possible with little effort from the equipment used.
- M Medium resistance.** Excavation/possible at an acceptable rate with moderate effort from the equipment used.
- H High resistance** to penetration/excavation. Further penetration is possible at a slow rate and requires significant effort from the equipment.
- R Refusal or Practical Refusal.** No further progress possible without the risk of damage or unacceptable wear to the digging implement or machine.

These assessments are subjective and are dependent on many factors including the equipment power, weight, condition of excavation or drilling tools, and the experience of the operator.

WATER



Water level at date shown



Partial water loss



Water inflow



Complete water loss

GROUNDWATER NOT OBSERVED The observation of groundwater, whether present or not, was not possible due to drilling water, surface seepage or cave in of the borehole/test pit.

GROUNDWATER NOT ENCOUNTERED The borehole/test pit was dry soon after excavation. However, groundwater could be present in less permeable strata. Inflow may have been observed had the borehole/test pit been left open for a longer period.

SAMPLING AND TESTING

SPT	Standard Penetration Test to AS1289.6.3.1-1993
4,7,11 N=18	4,7,11 = Blows per 150mm. N = Blows per 300mm penetration following 150mm seating
30/80mm	Where practical refusal occurs, the blows and penetration for that interval are reported
RW	Penetration occurred under the rod weight only
HW	Penetration occurred under the hammer and rod weight only
HB	Hammer double bouncing on anvil
DS	Disturbed sample
BDS	Bulk disturbed sample
G	Gas Sample
W	Water Sample
FP	Field permeability test over section noted
FV	Field vane shear test expressed as uncorrected shear strength (s_v = peak value, s_r = residual value)
PID	Photoionisation Detector reading in ppm
PM	Pressuremeter test over section noted
PP	Pocket penetrometer test expressed as instrument reading in kPa
U63	Thin walled tube sample - number indicates nominal sample diameter in millimetres
WPT	Water pressure tests

Ranking of Visually Observable Contamination and Odour (for specific soil contamination assessment projects)

R = 0	No visible evidence of contamination	R = A	No non-natural odours identified
R = 1	Slight evidence of visible contamination	R = B	Slight non-natural odours identified
R = 2	Visible contamination	R = C	Moderate non-natural odours identified
R = 3	Significant visible contamination	R = D	Strong non-natural odours identified

ROCK CORE RECOVERY

TCR = Total Core Recovery (%)

SCR = Solid Core Recovery (%)

RQD = Rock Quality Designation (%)

$$= \frac{\text{Length of core recovered}}{\text{Length of core run}} \times 100$$

$$= \frac{\sum \text{Length of cylindrical core recovered}}{\text{Length of core run}} \times 100$$

$$= \frac{\sum \text{Axial lengths of core} > 100 \text{ mm}}{\text{Length of core run}} \times 100$$



APPENDIX B

Results of Laboratory Testing

Published on Resources Disclosure Log
RTI Act 2009

CHAIN OF CUSTODY/ANALYSIS REQUEST

Golder Associates
216 Draper Street, CAIRNS QLD 4870

Phone: (07) 4054 8200
Fax: (07) 4054 8201

Page 1 of 1

Project No.: 087673045				HACs	ON HOLD					TO BE COMPLETED BY LABORATORY Samples Received In: (Please tick appropriate box)	
Location: Kwikleen Dry Cleaners											
Golder Order No.: CQ 4545											
Quote: ALS/Golder National Master Services Agreement											
Primary Contact: sch4p4(6) Personal information								Appropriate Containers ☐ Pretreated Containers ☐ Chilled State ☐ Other (Comment) ☐			
Sample Location	Sample Matrix	No. of Jars/Bags	Sample Date					sch4p4(6) Environmental Division Brisbane Work Order EB0906859  Telephone : +61-7-3243 7222			
MWXB	Soil	1	24/04/09								
R-240408	Water	3	24/04/09								
								PLEASE SEND RESULTS TO: Name: sch4p4(6) Personal information Email: sch4p4(6) P@golder.com.au Name: sch4p4(6) Pe Email: sch4p4(6) @golder.com.au			
								PLEASE SEND INVOICE TO: Name: sch4p4(6) Persona Email: sch4p4(6) @golder.com.au			
TEST REFERENCE NO.								Project Manager:			
TURN AROUND TIME								Email:			

Special Instructions: Nominated turn-around time from time of submission to ALS. **Penalty Rates to apply for late reports in accordance with National Master Services Agreement.**

Special Instructions: Please Supply in ESDAT Format

Relinquished: sch4p4(6) Personal information Date: 28/04/09 Received by: sch4p4(6) Personal information Date: 29-4-09
 Organisation: Golder Associates Time: 14:00 Organisation: H&M Time: 9:00



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: EB0906859	Page	: 1 of 5
Client	: GOLDER ASSOCIATES	Laboratory	: Environmental Division Brisbane
Contact	: sch4p4(6) Personal informa	Contact	: sch4p4(6) Pe
Address	: PO BOX 5298 TOWNSVILLE QLD, AUSTRALIA 4810	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: sch4p4(6) @golder.com.au	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: sch4p4(6) Person	Telephone	: +61-7-3243 7222
Facsimile	: ----	Facsimile	: +61-7-3243 7218
Project	: 087673045	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: CQ4545	Date Samples Received	: 29-APR-2009
C-O-C number	: ----	Issue Date	: 07-MAY-2009
Sampler	: ----	No. of samples received	: 2
Site	: Kwikleen Dry Cleaners	No. of samples analysed	: 2
Quote number	: EN/002/09		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
sch4p4(6) Person	Senior Inorganic Chemist	Inorganics
sch4p4(6) Person	Organic Chemist	Organics

Environmental Division Brisbane

Part of the **ALS Laboratory Group**

32 Shand Street Stafford QLD Australia 4053
Tel. +61-7-3243 7222 Fax. +61-7-3243 7218 www.alsglobal.com

A Campbell Brothers Limited Company



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Published on Resources Disclosure Log
RTI Act 2009



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				MWXB	----	----	----	----
				24-APR-2009 15:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EB0906859-001	----	----	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	36.4	----	----	----	----
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	5	mg/kg	<5	----	----	----	----
Chloromethane	74-87-3	5	mg/kg	<5	----	----	----	----
Vinyl chloride	75-01-4	5	mg/kg	<5	----	----	----	----
Bromomethane	74-83-9	5	mg/kg	<5	----	----	----	----
Chloroethane	75-00-3	5	mg/kg	<5	----	----	----	----
Trichlorofluoromethane	75-69-4	5	mg/kg	<5	----	----	----	----
1,1-Dichloroethene	75-35-4	0.5	mg/kg	<0.5	----	----	----	----
Iodomethane	74-88-4	0.5	mg/kg	<0.5	----	----	----	----
Methylene chloride	75-09-2	0.5	mg/kg	<0.5	----	----	----	----
trans-1,2-Dichloroethene	156-60-5	0.5	mg/kg	<0.5	----	----	----	----
1,1-Dichloroethane	75-34-3	0.5	mg/kg	<0.5	----	----	----	----
cis-1,2-Dichloroethene	156-59-2	0.5	mg/kg	<0.5	----	----	----	----
1,1,1-Trichloroethane	71-55-6	0.5	mg/kg	<0.5	----	----	----	----
1,1-Dichloropropylene	563-58-6	0.5	mg/kg	<0.5	----	----	----	----
Carbon Tetrachloride	56-23-5	0.5	mg/kg	<0.5	----	----	----	----
1,2-Dichloroethane	107-06-2	0.5	mg/kg	<0.5	----	----	----	----
Trichloroethene	79-01-6	0.5	mg/kg	<0.5	----	----	----	----
Dibromomethane	74-95-3	0.5	mg/kg	<0.5	----	----	----	----
1,1,2-Trichloroethane	79-00-5	0.5	mg/kg	<0.5	----	----	----	----
1,3-Dichloropropane	142-28-9	0.5	mg/kg	<0.5	----	----	----	----
Tetrachloroethene	127-18-4	0.5	mg/kg	<0.5	----	----	----	----
1,1,1,2-Tetrachloroethane	630-20-6	0.5	mg/kg	<0.5	----	----	----	----
trans-1,4-Dichloro-2-butene	110-57-6	0.5	mg/kg	<0.5	----	----	----	----
cis-1,4-Dichloro-2-butene	1476-11-5	0.5	mg/kg	<0.5	----	----	----	----
1,1,2,2-Tetrachloroethane	79-34-5	0.5	mg/kg	<0.5	----	----	----	----
1,2,3-Trichloropropane	96-18-4	0.5	mg/kg	<0.5	----	----	----	----
Pentachloroethane	76-01-7	0.5	mg/kg	<0.5	----	----	----	----
1,2-Dibromo-3-chloropropane	96-12-8	0.5	mg/kg	<0.5	----	----	----	----
Hexachlorobutadiene	87-68-3	0.5	mg/kg	<0.5	----	----	----	----
EP074S: VOC Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	99.9	----	----	----	----
Toluene-D8	2037-26-5	0.1	%	92.4	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	92.2	----	----	----	----



Analytical Results

Sub-Matrix: WATER

Client sample ID

R-240408

Client sampling date / time

24-APR-2009 15:00

Compound	CAS Number	LOR	Unit	EB0906859-002				
EP074E: Halogenated Aliphatic Compounds								
Dichlorodifluoromethane	75-71-8	50	µg/L	<50	----	----	----	----
Chloromethane	74-87-3	50	µg/L	<50	----	----	----	----
Vinyl chloride	75-01-4	50	µg/L	<50	----	----	----	----
Bromomethane	74-83-9	50	µg/L	<50	----	----	----	----
Chloroethane	75-00-3	50	µg/L	<50	----	----	----	----
Trichlorofluoromethane	75-69-4	50	µg/L	<50	----	----	----	----
1,1-Dichloroethene	75-35-4	5	µg/L	<5	----	----	----	----
Iodomethane	74-88-4	5	µg/L	<5	----	----	----	----
Methylene chloride	75-09-2	5	µg/L	<5	----	----	----	----
trans-1,2-Dichloroethene	156-60-5	5	µg/L	<5	----	----	----	----
1,1-Dichloroethane	75-34-3	5	µg/L	<5	----	----	----	----
cis-1,2-Dichloroethene	156-59-2	5	µg/L	<5	----	----	----	----
1,1,1-Trichloroethane	71-55-6	5	µg/L	<5	----	----	----	----
1,1-Dichloropropylene	563-58-6	5	µg/L	<5	----	----	----	----
Carbon Tetrachloride	56-23-5	5	µg/L	<5	----	----	----	----
1,2-Dichloroethane	107-06-2	5	µg/L	<5	----	----	----	----
Trichloroethene	79-01-6	5	µg/L	<5	----	----	----	----
Dibromomethane	74-95-3	5	µg/L	<5	----	----	----	----
1,1,2-Trichloroethane	79-00-5	5	µg/L	<5	----	----	----	----
1,3-Dichloropropane	142-28-9	5	µg/L	<5	----	----	----	----
Tetrachloroethene	127-18-4	5	µg/L	<5	----	----	----	----
1,1,1,2-Tetrachloroethane	630-20-6	5	µg/L	<5	----	----	----	----
trans-1,4-Dichloro-2-butene	110-57-6	5	µg/L	<5	----	----	----	----
cis-1,4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	----	----	----	----
1,1,2,2-Tetrachloroethane	79-34-5	5	µg/L	<5	----	----	----	----
1,2,3-Trichloropropane	96-18-4	5	µg/L	<5	----	----	----	----
Pentachloroethane	76-01-7	5	µg/L	<5	----	----	----	----
1,2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	----	----	----	----
Hexachlorobutadiene	87-68-3	5	µg/L	<5	----	----	----	----
EP074S: VOC Surrogates								
1,2-Dichloroethane-D4	17060-07-0	0.1	%	99.1	----	----	----	----
Toluene-D8	2037-26-5	0.1	%	101	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	98.2	----	----	----	----



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP074S: VOC Surrogates			
1,2-Dichloroethane-D4	17060-07-0	80	121
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP074S: VOC Surrogates			
1,2-Dichloroethane-D4	17060-07-0	80	120
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115

Published on Resources Disclosure Log
 RTI Act 2009



Environmental Division

QUALITY CONTROL REPORT

Work Order	: EB0906859	Page	: 1 of 5
Client	: GOLDER ASSOCIATES	Laboratory	: Environmental Division Brisbane
Contact	: sch4p4(6) Personal informa	Contact	: sch4p4(6) Pe
Address	: PO BOX 5298 TOWNSVILLE QLD, AUSTRALIA 4810	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: sch4p4(6) @golder.com.au	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: sch4p4(6) Personal	Telephone	: +61-7-3243 7222
Facsimile	: ---	Facsimile	: +61-7-3243 7218
Project	: 087673045	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: Kwikleen Dry Cleaners	Date Samples Received	: 29-APR-2009
C-O-C number	: ---	Issue Date	: 07-MAY-2009
Sampler	: ---	No. of samples received	: 2
Order number	: CQ4545	No. of samples analysed	: 2
Quote number	: EN/002/09		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
sch4p4(6) Per	Senior Inorganic Chemist	Inorganics
sch4p4(6) Perso	Organic Chemist	Organics

Environmental Division Brisbane

Part of the **ALS Laboratory Group**

32 Shand Street Stafford QLD Australia 4053
Tel. +61-7-3243 7222 Fax. +61-7-3243 7218 www.alsglobal.com

A Campbell Brothers Limited Company



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :
Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
= Indicates failed QC

Published on Resources Disclosure Log
RTI Act 2009



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: SOIL

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (QC Lot: 964409)									
EB0906883-001	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	----	1.0	%	16.3	16.8	3.2	0% - 50%

Sub-Matrix: WATER

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP074E: Halogenated Aliphatic Compounds (QC Lot: 964775)									
EB0906905-091	Anonymous	EP074: 1,1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Methylene chloride	75-09-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1,2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1,1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1,2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1,1,1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1,1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1,2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1,1,2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1,3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1,1,1,2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1,4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1,4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1,1,2,2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1,2,3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1,2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit		Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
				LCS		Low	High	
EP074E: Halogenated Aliphatic Compounds (QCLot: 964775)								
EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	100 µg/L	106	52	130
EP074: Chloromethane	74-87-3	50	µg/L	<50	100 µg/L	104	43.1	130
EP074: Vinyl chloride	75-01-4	50	µg/L	<50	100 µg/L	104	53	144
EP074: Bromomethane	74-83-9	50	µg/L	<50	100 µg/L	109	57.5	130
EP074: Chloroethane	75-00-3	50	µg/L	<50	100 µg/L	100	70	137
EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	100 µg/L	99.3	64	135
EP074: 1,1-Dichloroethene	75-35-4	5	µg/L	<5	10 µg/L	95.9	63.9	135
EP074: Iodomethane	74-88-4	5	µg/L	<5	10 µg/L	105	57.2	130
EP074: Methylene chloride	75-09-2	5	µg/L	<5	10 µg/L	94.4	49.9	130
EP074: trans-1,2-Dichloroethene	156-60-5	5	µg/L	<5	10 µg/L	97.5	70	128
EP074: 1,1-Dichloroethane	75-34-3	5	µg/L	<5	10 µg/L	103	64	136
EP074: cis-1,2-Dichloroethene	156-59-2	5	µg/L	<5	10 µg/L	99.5	71	128
EP074: 1,1,1-Trichloroethane	71-55-6	5	µg/L	<5	10 µg/L	101	68.4	135
EP074: 1,1-Dichloropropylene	563-58-6	5	µg/L	<5	10 µg/L	94.6	71.4	127
EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	10 µg/L	95.7	64	134
EP074: 1,2-Dichloroethane	107-06-2	5	µg/L	<5	10 µg/L	99.6	68	134
EP074: Trichloroethene	79-01-6	5	µg/L	<5	10 µg/L	94.6	72	127
EP074: Dibromomethane	74-95-3	5	µg/L	<5	10 µg/L	101	63.9	136
EP074: 1,1,2-Trichloroethane	79-00-5	5	µg/L	<5	10 µg/L	105	69.2	133
EP074: 1,3-Dichloropropane	142-28-9	5	µg/L	<5	10 µg/L	96.9	73.7	130
EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	10 µg/L	91.3	73.8	132
EP074: 1,1,1,2-Tetrachloroethane	630-20-6	5	µg/L	<5	10 µg/L	98.5	81	123
EP074: trans-1,4-Dichloro-2-butene	110-57-6	5	µg/L	<5	10 µg/L	91.4	26	130
EP074: cis-1,4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	10 µg/L	106	51.1	130
EP074: 1,1,2,2-Tetrachloroethane	79-34-5	5	µg/L	<5	10 µg/L	96.6	72	133
EP074: 1,2,3-Trichloropropane	96-18-4	5	µg/L	<5	10 µg/L	97.6	59	148
EP074: Pentachloroethane	76-01-7	5	µg/L	<5	10 µg/L	95.8	68	138
EP074: 1,2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	10 µg/L	107	52	150
EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	10 µg/L	79.4	62	142



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: WATER

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number				
EP074E: Halogenated Aliphatic Compounds (QCLot: 964775)							
EB0906905-092	Anonymous	EP074: 1,1-Dichloroethene	75-35-4	10 µg/L	107	70	130
		EP074: Trichloroethene	79-01-6	10 µg/L	88.5	70	130



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: EB0906859	Page	: 1 of 5
Client	: GOLDER ASSOCIATES	Laboratory	: Environmental Division Brisbane
Contact	: sch4p4(6) Personal informa	Contact	: sch4p4(6) Pe
Address	: PO BOX 5298 TOWNSVILLE QLD, AUSTRALIA 4810	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: sch4p4(6) @golder.com.au	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 4724 0311	Telephone	: +61-7-3243 7222
Facsimile	: ----	Facsimile	: +61-7-3243 7218
Project	: 087673045	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: Kwikleen Dry Cleaners	Date Samples Received	: 29-APR-2009
C-O-C number	: ----	Issue Date	: 07-MAY-2009
Sampler	: ----	No. of samples received	: 2
Order number	: CQ4545	No. of samples analysed	: 2
Quote number	: EN/002/09		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Environmental Division Brisbane

Part of the **ALS Laboratory Group**

32 Shand Street Stafford QLD Australia 4053

Tel. +61-7-3243 7222 Fax. +61-7-3243 7218 www.alsglobal.com

A Campbell Brothers Limited Company



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content							
Soil Glass Jar - Unpreserved MWXB	24-APR-2009	----	----	----	30-APR-2009	01-MAY-2009	✓
EP074E: Halogenated Aliphatic Compounds							
Soil Glass Jar - Unpreserved MWXB	24-APR-2009	01-MAY-2009	08-MAY-2009	✓	05-MAY-2009	08-MAY-2009	✓

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP074E: Halogenated Aliphatic Compounds							
Amber VOC Vial - HCl or NaHSO4 R-240408	24-APR-2009	---	---	----	30-APR-2009	08-MAY-2009	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
Analytical Methods		QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	1	6	16.7	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Volatile Organic Compounds	EP074	2	19	10.5	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Volatile Organic Compounds	EP074	1	19	5.3	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Volatile Organic Compounds	EP074	1	19	5.3	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Volatile Organic Compounds	EP074	1	19	5.3	5.0	✔	ALS QCS3 requirement

Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
Analytical Methods		QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Volatile Organic Compounds	EP074	1	3	33.3	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Volatile Organic Compounds	EP074	1	3	33.3	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Volatile Organic Compounds	EP074	1	3	33.3	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Volatile Organic Compounds	EP074	1	3	33.3	5.0	✔	ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (1999) Schedule B(3) (Method 102)
Volatile Organic Compounds	EP074	SOIL	(USEPA SW 846 - 8260B) Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Method 501)
Volatile Organic Compounds	EP074	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Preparation Methods	Method	Matrix	Method Descriptions
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	(USEPA SW 846 - 5030A) 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.

Published on Resources
 RTI Act 2009



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.

Published on Resources Disclosure Log
RTI Act 2009



Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)
Comprehensive Report

Work Order : **EB0906859**

Client : **GOLDER ASSOCIATES**
Contact : sch4p4(6) Personal informa
Address : PO BOX 5298
TOWNSVILLE QLD, AUSTRALIA 4810

E-mail : sch4p4(6) @golder.com.au
Telephone : +61 07 4724 0311
Facsimile : ----

Project : 087673045
Order number : CQ4545
C-O-C number : ----
Site : Kwikleen Dry Cleaners
Sampler : ----

Laboratory : Environmental Division Brisbane
Contact : sch4p4(6) P
Address : 32 Shand Street Stafford QLD Australia
4053

E-mail : Services.Brisbane@alsenviro.com
Telephone : +61-7-3243 7222
Facsimile : +61-7-3243 7218

Page : 1 of 3

Quote number : EM2009GOLASS0333 (EN/002/09)

QC Level : NEPM 1999 Schedule B(3) and ALS
QCS3 requirement

Dates

Date Samples Received : 29-APR-2009
Client Requested Due Date : 07-MAY-2009

Issue Date : 29-APR-2009 16:56
Scheduled Reporting Date : **07-MAY-2009**

Delivery Details

Mode of Delivery : Carrier
No. of coolers/boxes : 1 SMALL
Security Seal : Intact.

Temperature : 3.8 C - Ice bricks present
No. of samples received : 2
No. of samples analysed : 2

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Requested Deliverables
- **Samples received in appropriately pretreated and preserved containers.**
- **Sample(s) have been received within recommended holding times.**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Maggie Kahi.
- Analytical work for this work order will be conducted at ALS Brisbane.
- Sample Disposal - Aqueous (14 days), Solid (90 days) from date of completion of work order.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Matrix: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EA055-103 Moisture Content	SOIL - EP074E VOC - Hal Aliphatics
EB0906859-001	24-APR-2009 15:00	MWXB	✓	✓

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EP074E VOC - CHC (incl DCM)
EB0906859-002	24-APR-2009 15:00	R-240408	✓



Requested Deliverables

sch4p4(6) Personal

- *AU Certificate of Analysis - NATA (COA)
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)
- A4 - AU Sample Receipt Notification - Environmental (SRN)
- Default - Chain of Custody (COC)
- EDI Format - ENMRG
- EDI Format - ESDAT
- EDI Format - GOLDER_EXCEL

Email sch4p4@golder.com.au
Email @golder.com.au
Email @golder.com.au
Email @golder.com.au
Email @golder.com.au
Email @golder.com.au
Email @golder.com.au
Email @golder.com.au

sch4p4(6) Personal inform

- *AU Certificate of Analysis - NATA (COA)
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)
- A4 - AU Sample Receipt Notification - Environmental (SRN)
- Default - Chain of Custody (COC)
- EDI Format - ENMRG (ENMRG)
- EDI Format - ESDAT (ESDAT)
- EDI Format - GOLDER_EXCEL (GOLDER_EXCEL)

Email sch4p4(6)@golder.com.au
Email @golder.com.au
Email @golder.com.au
Email @golder.com.au
Email @golder.com.au
Email @golder.com.au
Email @golder.com.au
Email @golder.com.au

THE ACCOUNTS PAYABLE (CAIRNS)

- A4 - AU Tax Invoice (INV)

Email apcairns@golder.com.au

Published on Resources Disclosure
RTI Act 2009

CHAIN OF CUSTODY/ANALYSIS REQUEST

Golder Associates
216 Draper Street, CAIRNS QLD 4870

Phone: (07) 4054 8200
Fax: (07) 4054 8201

Page 1 of 2

Project No.: <u>087673045</u> Location: <u>Kwikleen Dry Cleaners</u> Golder Order No.: <u>CQ 4545</u> Quote: <u>2009 Customised National Price List – Prepared for Golder</u> Primary Contact: <u>sch4p4(6) Personal</u> & <u>sch4p4(6) Personal</u>				ON HOLD				Environmental Division Brisbane Work Order 30906999  Telephone : +61-7-3243 7222				TO BE COMPLETED BY LABORATORY	
				Published on Resources PTI Act 2009				Samples Received In: (Please tick appropriate box) Appropriate Containers ☒ Pretreated Containers ☒ Chilled State ☒ Other (Comment) ☐ PLEASE SEND RESULTS TO: Name: <u>sch4p4(6) Personal</u> Email: <u>sch4p4(6)@golder.com.au</u> Name: <u>sch4p4(6) P</u> Email: <u>sch4p4(6)@golder.com.au</u> PLEASE SEND INVOICE TO: Name: <u>sch4p4(6) Personal</u> Email: <u>sch4p4(6)@golder.com.au</u> Project Manager: Email:					
Sample Location	Sample Matrix	No. of Jars/Bags	Sample Date										
MWXX	Water	2	30/04/09										
TEST REFERENCE NO.													
TURN AROUND TIME													

Special Instructions: *Nominated turn-around time from time of submission to ALS Cairns. Penalty Rates to apply for late reports in accordance with 2009 Customised National Price List – Prepared for Golder*

Special Instructions: **Please Supply in ESDAT Format**

Relinquished: _____	Date: _____	Received by: <u>sch4p4(6) Pers</u>	Date: <u>1/5/09</u>
Organisation: _____	Time: _____	Organisation: <u>ALS</u>	Time: <u>0805</u>



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: EB0906999	Page	: 1 of 4
Client	: GOLDER ASSOCIATES	Laboratory	: Environmental Division Brisbane
Contact	: sch4p4(6) Personal infor	Contact	: sch4p4(6) Pe
Address	: 216 DRAPER STREET CAIRNS QLD, AUSTRALIA 4870	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: sch4p4(6)@golder.com.au	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 4054 8200	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 4052 1546	Facsimile	: +61-7-3243 7218
Project	: 087673045	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: CQ 454S	Date Samples Received	: 01-MAY-2009
C-O-C number	: ---	Issue Date	: 06-MAY-2009
Sampler	: ---	No. of samples received	: 1
Site	: Kwikleen Dry Cleaners	No. of samples analysed	: 1
Quote number	: EN/002/09		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
sch4p4(6) Persor	Organic Chemist	Organics

Environmental Division Brisbane

Part of the **ALS Laboratory Group**

32 Shand Street Stafford QLD Australia 4053
Tel. +61-7-3243 7222 Fax. +61-7-3243 7218 www.alsglobal.com

A Campbell Brothers Limited Company



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

Published on Resources Disclosure Log
RTI Act 2009



Analytical Results

Sub-Matrix: WATER

Client sample ID

Client sampling date / time

Sub-Matrix: WATER				Client sample ID	MWXX	----	----	----	----
				Client sampling date / time	30-APR-2009 15:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EB0906999-001	----	----	----	----	----
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	50	µg/L	<50	----	----	----	----	----
Chloromethane	74-87-3	50	µg/L	<50	----	----	----	----	----
Vinyl chloride	75-01-4	50	µg/L	<50	----	----	----	----	----
Bromomethane	74-83-9	50	µg/L	<50	----	----	----	----	----
Chloroethane	75-00-3	50	µg/L	<50	----	----	----	----	----
Trichlorofluoromethane	75-69-4	50	µg/L	<50	----	----	----	----	----
1.1-Dichloroethene	75-35-4	5	µg/L	<5	----	----	----	----	----
Iodomethane	74-88-4	5	µg/L	<5	----	----	----	----	----
Methylene chloride	75-09-2	5	µg/L	<5	----	----	----	----	----
trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	----	----	----	----	----
1.1-Dichloroethane	75-34-3	5	µg/L	<5	----	----	----	----	----
cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	----	----	----	----	----
1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	----	----	----	----	----
1.1-Dichloropropylene	563-58-6	5	µg/L	<5	----	----	----	----	----
Carbon Tetrachloride	56-23-5	5	µg/L	<5	----	----	----	----	----
1.2-Dichloroethane	107-06-2	5	µg/L	<5	----	----	----	----	----
Trichloroethene	79-01-6	5	µg/L	<5	----	----	----	----	----
Dibromomethane	74-95-3	5	µg/L	<5	----	----	----	----	----
1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	----	----	----	----	----
1.3-Dichloropropane	142-28-9	5	µg/L	<5	----	----	----	----	----
Tetrachloroethene	127-18-4	5	µg/L	81	----	----	----	----	----
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	----	----	----	----	----
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	----	----	----	----	----
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	----	----	----	----	----
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	----	----	----	----	----
1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	----	----	----	----	----
Pentachloroethane	76-01-7	5	µg/L	<5	----	----	----	----	----
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	----	----	----	----	----
Hexachlorobutadiene	87-68-3	5	µg/L	<5	----	----	----	----	----
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%	100	----	----	----	----	----
Toluene-D8	2037-26-5	0.1	%	98.1	----	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.1	%	97.5	----	----	----	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP074S: VOC Surrogates			
1,2-Dichloroethane-D4	17060-07-0	80	120
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115

Published on Resources Disclosure Log
RTI Act 2009



Environmental Division

QUALITY CONTROL REPORT

Work Order	: EB0906999	Page	: 1 of 6
Client	: GOLDER ASSOCIATES	Laboratory	: Environmental Division Brisbane
Contact	: sch4p4(6) Personal infor	Contact	: sch4p4(6) Pe
Address	: 216 DRAPER STREET CAIRNS QLD, AUSTRALIA 4870	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: sch4p4(6) golder.com.au	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 4054 8200	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 4052 1546	Facsimile	: +61-7-3243 7218
Project	: 087673045	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: Kwikleen Dry Cleaners	Date Samples Received	: 01-MAY-2009
C-O-C number	: ---	Issue Date	: 06-MAY-2009
Sampler	: ---	No. of samples received	: 1
Order number	: CQ 454S	No. of samples analysed	: 1
Quote number	: EN/002/09		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

This document is issued in
accordance with NATA
accreditation requirements.

Accredited for compliance with
ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
sch4p4(6) Perso	Organic Chemist	Organics

Environmental Division Brisbane

Part of the **ALS Laboratory Group**

32 Shand Street Stafford QLD Australia 4053
Tel. +61-7-3243 7222 Fax. +61-7-3243 7218 www.alsglobal.com

A Campbell Brothers Limited Company



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :
Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
= Indicates failed QC

Published on Resources Disclosure Log
RTI Act 2009



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP074E: Halogenated Aliphatic Compounds (QC Lot: 968143)									
EB0906906-001	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Methylene chloride	75-09-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit
EB0906906-011	Anonymous	EP074: 1.1-Dichloroethene	75-35-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Iodomethane	74-88-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Methylene chloride	75-09-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.2-Dichloroethene	156-60-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	0.0	No Limit



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP074E: Halogenated Aliphatic Compounds (QC Lot: 968143) - continued									
EB0906906-011	Anonymous	EP074: 1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	0.0	No Limit
		EP074: Trichloroethene	79-01-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dibromomethane	74-95-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	0.0	No Limit
		EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	0.0	No Limit
		EP074: cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	0.0	No Limit
		EP074: Pentachloroethane	76-01-7	5	µg/L	<5	<5	0.0	No Limit
		EP074: 1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	0.0	No Limit
		EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	0.0	No Limit
		EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloromethane	74-87-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Vinyl chloride	75-01-4	50	µg/L	<50	<50	0.0	No Limit
		EP074: Bromomethane	74-83-9	50	µg/L	<50	<50	0.0	No Limit
		EP074: Chloroethane	75-00-3	50	µg/L	<50	<50	0.0	No Limit
		EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	0.0	No Limit

Published on Resource RTI Act 2009 Disclosure Log



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound	CAS Number	LOR	Unit		Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
				LCS		Low	High	
EP074E: Halogenated Aliphatic Compounds (QCLot: 968143)								
EP074: Dichlorodifluoromethane	75-71-8	50	µg/L	<50	100 µg/L	102	52	130
EP074: Chloromethane	74-87-3	50	µg/L	<50	100 µg/L	103	43.1	130
EP074: Vinyl chloride	75-01-4	50	µg/L	<50	100 µg/L	104	53	144
EP074: Bromomethane	74-83-9	50	µg/L	<50	100 µg/L	99.9	57.5	130
EP074: Chloroethane	75-00-3	50	µg/L	<50	100 µg/L	103	70	137
EP074: Trichlorofluoromethane	75-69-4	50	µg/L	<50	100 µg/L	102	64	135
EP074: 1,1-Dichloroethene	75-35-4	5	µg/L	<5	10 µg/L	102	63.9	135
EP074: Iodomethane	74-88-4	5	µg/L	<5	10 µg/L	103	57.2	130
EP074: Methylene chloride	75-09-2	5	µg/L	<5	10 µg/L	100	49.9	130
EP074: trans-1,2-Dichloroethene	156-60-5	5	µg/L	<5	10 µg/L	101	70	128
EP074: 1,1-Dichloroethane	75-34-3	5	µg/L	<5	10 µg/L	102	64	136
EP074: cis-1,2-Dichloroethene	156-59-2	5	µg/L	<5	10 µg/L	103	71	128
EP074: 1,1,1-Trichloroethane	71-55-6	5	µg/L	<5	10 µg/L	105	68.4	135
EP074: 1,1-Dichloropropylene	563-58-6	5	µg/L	<5	10 µg/L	105	71.4	127
EP074: Carbon Tetrachloride	56-23-5	5	µg/L	<5	10 µg/L	103	64	134
EP074: 1,2-Dichloroethane	107-06-2	5	µg/L	<5	10 µg/L	95.7	68	134
EP074: Trichloroethene	79-01-6	5	µg/L	<5	10 µg/L	103	72	127
EP074: Dibromomethane	74-95-3	5	µg/L	<5	10 µg/L	98.1	63.9	136
EP074: 1,1,2-Trichloroethane	79-00-5	5	µg/L	<5	10 µg/L	95.0	69.2	133
EP074: 1,3-Dichloropropane	142-28-9	5	µg/L	<5	10 µg/L	98.3	73.7	130
EP074: Tetrachloroethene	127-18-4	5	µg/L	<5	10 µg/L	102	73.8	132
EP074: 1,1,1,2-Tetrachloroethane	630-20-6	5	µg/L	<5	10 µg/L	97.5	81	123
EP074: trans-1,4-Dichloro-2-butene	110-57-6	5	µg/L	<5	10 µg/L	85.8	26	130
EP074: cis-1,4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	10 µg/L	93.8	51.1	130
EP074: 1,1,2,2-Tetrachloroethane	79-34-5	5	µg/L	<5	10 µg/L	93.7	72	133
EP074: 1,2,3-Trichloropropane	96-18-4	5	µg/L	<5	10 µg/L	94.3	59	148
EP074: Pentachloroethane	76-01-7	5	µg/L	<5	10 µg/L	109	68	138
EP074: 1,2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	10 µg/L	89.4	52	150
EP074: Hexachlorobutadiene	87-68-3	5	µg/L	<5	10 µg/L	109	62	142



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: WATER

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%) MS	Recovery Limits (%) LowHigh	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number				
EP074E: Halogenated Aliphatic Compounds (QCLot: 968143)							
EB0906906-002	Anonymous	EP074: 1,1-Dichloroethene	75-35-4	10 µg/L	103	70	130
		EP074: Trichloroethene	79-01-6	10 µg/L	87.0	70	130



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: EB0906999	Page	: 1 of 5
Client	: GOLDER ASSOCIATES	Laboratory	: Environmental Division Brisbane
Contact	: sch4p4(6) Personal info	Contact	: sch4p4(6) Per
Address	: 216 DRAPER STREET CAIRNS QLD, AUSTRALIA 4870	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: sch4p4(6)@golder.com.au	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 4054 8200	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 4052 1546	Facsimile	: +61-7-3243 7218
Project	: 087673045	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: Kwikleen Dry Cleaners	Date Samples Received	: 01-MAY-2009
C-O-C number	: ----	Issue Date	: 06-MAY-2009
Sampler	: ----	No. of samples received	: 1
Order number	: CQ 454S	No. of samples analysed	: 1
Quote number	: EN/002/09		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Environmental Division Brisbane

Part of the **ALS Laboratory Group**

32 Shand Street Stafford QLD Australia 4053

Tel. +61-7-3243 7222 Fax. +61-7-3243 7218 www.alsglobal.com

A Campbell Brothers Limited Company



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP074E: Halogenated Aliphatic Compounds							
Clear glass VOC vial - HCl MWXX	30-APR-2009	---	---	----	05-MAY-2009	14-MAY-2009	✓

Published on Resources Disclosure 2009
 RTI Act 2009



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Volatile Organic Compounds	EP074	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Volatile Organic Compounds	EP074	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Volatile Organic Compounds	EP074	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Volatile Organic Compounds	EP074	1	20	5.0	5.0	✓	ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Volatile Organic Compounds	EP074	WATER	USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

Published on Resources Disclosure Log
RTI Act 2009



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.

Published on Resources Disclosure Log
RTI Act 2009



Environmental Division

SAMPLE RECEIPT NOTIFICATION (SRN)
Comprehensive Report

Work Order : **EB0906999**

Client : **GOLDER ASSOCIATES**
Contact : **[redacted] Personal infor**
Address : **216 DRAPER STREET**
CAIRNS QLD, AUSTRALIA 4870

E-mail : **[redacted]@golder.com.au**
Telephone : **+61 07 4054 8200**
Facsimile : **+61 07 4052 1546**

Project : **087673045**
Order number : **CQ 454S**
C-O-C number : **----**
Site : **Kwikleen Dry Cleaners**
Sampler : **----**

Laboratory : **Environmental Division Brisbane**
Contact : **[redacted] Pe**
Address : **32 Shand Street Stafford QLD Australia**
4053

E-mail : **Services.Brisbane@alsenviro.com**
Telephone : **+61-7-3243 7222**
Facsimile : **+61-7-3243 7218**

Page : **1 of 2**

Quote number : **EM2009GOLASS0333 (EN/002/09)**

QC Level : **NEPM 1999 Schedule B(3) and ALS**
QCS3 requirement

Dates

Date Samples Received : **01-MAY-2009**
Client Requested Due Date : **11-MAY-2009**

Issue Date : **01-MAY-2009 12:46**
Scheduled Reporting Date : **11-MAY-2009**

Delivery Details

Mode of Delivery : **Carrier**
No. of coolers/boxes : **1 SMALL**
Security Seal : **Intact.**

Temperature : **7.2 C - Ice present**
No. of samples received : **1**
No. of samples analysed : **1**

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Requested Deliverables
- **Samples received in appropriately pretreated and preserved containers.**
- **Sample(s) have been received within recommended holding times.**
- **Sample(s) requiring volatile organic compound analysis received in airtight containers (ZHE).**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Please direct any queries related to sample condition / numbering / breakages to Maggie Kahi.
- Analytical work for this work order will be conducted at ALS Brisbane.
- Sample Disposal - Aqueous (14 days), Solid (90 days) from date of completion of work order.



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- No sample container / preservation non-compliance exist.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	
EB0906999-001	30-APR-2009 15:00	MWXX	✓

WATER - EP074E
VOC - CHC (incl DCM)

Requested Deliverables

sch4p4(6) Personal

- *AU Certificate of Analysis - NATA (COA) Email
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) Email
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) Email
- A4 - AU Sample Receipt Notification - Environmental (SRN) Email
- Default - Chain of Custody (COC) Email
- EDI Format - ENMRG (ENMRG) Email
- EDI Format - ESDAT (ESDAT) Email
- EDI Format - GOLDER_EXCEL (GOLDER_EXCEL) Email

sch4p4 @golder.com.au
@golder.com.au
@golder.com.au
@golder.com.au
@golder.com.au
@golder.com.au
@golder.com.au
@golder.com.au

sch4p4(6) Personal informa

- *AU Certificate of Analysis - NATA (COA) Email
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) Email
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) Email
- A4 - AU Sample Receipt Notification - Environmental (SRN) Email
- Default - Chain of Custody (COC) Email
- EDI Format - ENMRG (ENMRG) Email
- EDI Format - ESDAT (ESDAT) Email
- EDI Format - GOLDER_EXCEL (GOLDER_EXCEL) Email

sch4p4(6) @golder.com.au
@golder.com.au
@golder.com.au
@golder.com.au
@golder.com.au
@golder.com.au
@golder.com.au
@golder.com.au

sch4p4(6) Personal info

- *AU Certificate of Analysis - NATA (COA) Email
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) Email
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) Email
- A4 - AU Sample Receipt Notification - Environmental (SRN) Email
- Default - Chain of Custody (COC) Email
- EDI Format - ENMRG (ENMRG) Email
- EDI Format - ESDAT (ESDAT) Email
- EDI Format - GOLDER_EXCEL (GOLDER_EXCEL) Email

sch4p4(6) @golder.com.au
@golder.com.au
@golder.com.au
@golder.com.au
@golder.com.au
@golder.com.au
@golder.com.au
@golder.com.au

sch4p4(6) Personal info

- A4 - AU Tax Invoice (INV) Email

sch4p4(@golder.com.au

Golder Associates
216 Draper Street, CAIRNS QLD 4870

Phone: (07) 4054 8200
Fax: (07) 4054 8201

Project No.: 087673045				HACs	ON HOLD	CE63546	TO BE COMPLETED BY LABORATORY	
Location: Kwikleen Dry Cleaners							Samples Received In: (Please tick appropriate box)	
Golder Order No.:								
Quote: SGS/Golder National Master Services Agreement								
Primary Contact: sch4p4(6) Personal i								
Sample Location	Sample Matrix	No. of Jars/Bags	Sample Date					
MW2-1	Soil	1	24/04/09	/				Appropriate Containers ☐
MW3-1	Soil	1	24/04/09	/				Pretreated Containers ☐
MW4-1	Soil	1	24/04/09	/				Chilled State ☐
MW4-2	Soil	1	24/04/09	/				Other (Comment) ☐
MW4-3	Soil	1	24/04/09	/				PLEASE SEND RESULTS TO:
MWXA	Soil	1	24/04/09	/				Name: sch4p4(6) Personal i
								Email: sch4p4(6) P@golder.com.au
MW2-2	Soil	1	24/04/09					Name: sch4p4(6) Per
MW2-3	Soil	1	24/04/09					Email: sch4p4(6) @golder.com.au
MW3-2	Soil	1	24/04/09					PLEASE SEND INVOICE TO:
								Name: sch4p4(6) Personal i
								Email: sch4p4(6) @golder.com.au
								Project Manager:
								Email:
TEST REFERENCE NO.								
TURN AROUND TIME								
Special Instructions: Nominated turn-around time from time of submission to SGS Townsville. Penalty Rates to apply for late reports in accordance with National Master Services Agreement.								
Special Instructions: Please Supply in ESDAT Format								
Relinquished: sch4p4(6) Perso				Date: 27/04/09	Received by: sch4p4(6) Personal information		Date: 27/4/09 4pm.	
Organisation: Golder Associates				Time:	Organisation:		Time:	

ANALYTICAL REPORT

5 May 2009

Golder Associates

216 Draper St
QLD 4870

Attention:

[Redacted] sch4p4(6) Personal informatio

Your Reference: 087673045 - Kwikleen Drycleaners- SGS CE63546

Our Reference: SE68897

Samples: 6 Soils

Received: 29/04/09

Preliminary Report Sent: Not Issued

These samples were analysed in accordance with your written instructions.

For and on Behalf of:

SGS ENVIRONMENTAL SERVICES

Client Services:

[Redacted] sch4p4(6) Personal ir

[Redacted] sch4p4(6) Personal inf@sgs.com

Sample Receipt:

[Redacted] sch4p4(6) Personal info

AU.SampleReceipt.Sydney@sgs.com

Laboratory Manager:

[Redacted] sch4p4(6) Personal ir

[Redacted] sch4p4(6) Personal ir@sgs.com

Results Approved and/or Authorised by:

[Redacted] sch4p4(6) Personal info

[Redacted] sch4p4(6) Personal informatio
Organics Signatory



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562 (4354). This report must not be reproduced except in full.

Page 1 of 8

VOCs in Soil - 84 List Our Reference: Your Reference Sample Matrix	UNITS ----- -----	SE68897-1 MW2-1 Soil	SE68897-2 MW3-1 Soil	SE68897-3 MW4-1 Soil	SE68897-4 MW4-2 Soil	SE68897-5 MW4-3 Soil
Date extracted		1/05/2009	1/05/2009	1/05/2009	1/05/2009	1/05/2009
Date analysed		1/05/2009	1/05/2009	1/05/2009	1/05/2009	1/05/2009
Dichlorodifluoromethane	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Chloromethane	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Vinyl Chloride	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Bromomethane	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Chloroethane	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Trichlorofluoromethane	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethene	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene Chloride	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
<i>trans</i> -1,2-Dichloroethene	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethane	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
<i>cis</i> -1,2-Dichloroethene	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,1-Trichloroethane	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloropropene	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Carbon tetrachloride	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dichloroethane	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Dibromomethane	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
1,3-Dichloropropane	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene	mg/kg	<0.50	0.82	<0.50	1.7	<0.50
1,1,1,2-Tetrachloroethane	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Trans-1,4-dichloro-2-butene	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Cis-1,4-dichloro-2-butene	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
1,2,3-Trichloropropane	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
1,2-Dibromo-3-chloropropane	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Hexachlorobutadiene	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Dibromofluoromethane	%	109	102	105	103	105
1,2-Dichloroethane-d4	%	105	105	102	106	100
Toluene-d8 <i>Surrogate 2</i>	%	110	106	106	107	108
4-Bromofluorobenzene <i>Surrogate 3</i>	%	92	78	81	84	83



This document is issued in accordance
with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025.
NATA accredited laboratory 2562 (4354).
This report must not be reproduced except in full.

WORLD RECOGNISED
ACCREDITATION

22-095

SGS Australia Pty Ltd
ABN 44 000 964 278

Page 2 of 8

Environmental Services Unit 16/33 Maddox Street Alexandria NSW 2015 Australia
t +61 (0)2 8594 0400 f +61 (0)2 8594 0499 www.au.sgs.com

File A

Page 104 of 300

VOCs in Soil - 84 List Our Reference: Your Reference Sample Matrix	UNITS ----- -----	SE68897-6 MWXA Soil
Date extracted		1/05/2009
Date analysed		1/05/2009
Dichlorodifluoromethane	mg/kg	<0.50
Chloromethane	mg/kg	<0.50
Vinyl Chloride	mg/kg	<0.50
Bromomethane	mg/kg	<0.50
Chloroethane	mg/kg	<0.50
Trichlorofluoromethane	mg/kg	<0.50
1,1-Dichloroethene	mg/kg	<0.50
Methylene Chloride	mg/kg	<1.0
<i>trans</i> -1,2-Dichloroethene	mg/kg	<0.50
1,1-Dichloroethane	mg/kg	<0.50
<i>cis</i> -1,2-Dichloroethene	mg/kg	<0.50
1,1,1-Trichloroethane	mg/kg	<0.50
1,1-Dichloropropene	mg/kg	<0.50
Carbon tetrachloride	mg/kg	<0.50
1,2-Dichloroethane	mg/kg	<0.50
Trichloroethene	mg/kg	<0.50
Dibromomethane	mg/kg	<0.50
1,1,2-Trichloroethane	mg/kg	<0.50
1,3-Dichloropropane	mg/kg	<0.50
Tetrachloroethene	mg/kg	<0.50
1,1,1,2-Tetrachloroethane	mg/kg	<0.50
Trans-1,4-dichloro-2-butene	mg/kg	<0.50
Cis-1,4-dichloro-2-butene	mg/kg	<5.0
1,1,2,2-Tetrachloroethane	mg/kg	<0.50
1,2,3-Trichloropropane	mg/kg	<0.50
1,2-Dibromo-3-chloropropane	mg/kg	<0.50
Hexachlorobutadiene	mg/kg	<0.50
Dibromofluoromethane	%	104
1,2-Dichloroethane-d4	%	102
Toluene-d8 <i>Surrogate 2</i>	%	108
4-Bromofluorobenzene <i>Surrogate 3</i>	%	84



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562 (4354). This report must not be reproduced except in full.

Moisture Our Reference: Your Reference Sample Matrix	UNITS ----- -----	SE68897-1 MW2-1 Soil	SE68897-2 MW3-1 Soil	SE68897-3 MW4-1 Soil	SE68897-4 MW4-2 Soil	SE68897-5 MW4-3 Soil
Date Analysed (moisture)		1/05/2009	1/05/2009	1/05/2009	1/05/2009	1/05/2009
Moisture	%	24	25	23	22	35

Moisture Our Reference: Your Reference Sample Matrix	UNITS ----- -----	SE68897-6 MWXA Soil
Date Analysed (moisture)		1/05/2009
Moisture	%	37



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562 (4354). This report must not be reproduced except in full.

Method ID	Methodology Summary
SEO-019	Volatile Organic Compounds - Soil samples are extracted with methanol, purged and concentrated by a purge and trap apparatus, and then analysed using GC/MS technique. Water samples undergo the same analysis without the extraction step. Based on USEPA 5030B and 8260B.
AN002	Preparation of soils, sediments and sludges undergo analysis by either air drying, compositing, subsampling and 1:5 soil water extraction where required. Moisture content is determined by drying the sample at 105 ± 5°C.



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562 (4354). This report must not be reproduced except in full.

QUALITY CONTROL	UNITS	LOR	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
VOCs in Soil - 84 List								
Date extracted				01/05/09	SE68897-1	1/05/2009 1/05/2009	SE68897-2	01/05/09
Date analysed				01/05/09	SE68897-1	1/05/2009 1/05/2009	SE68897-2	01/05/09
Dichlorodifluoromethane	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	[NR]	[NR]
Chloromethane	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	[NR]	[NR]
Vinyl Chloride	mg/kg	0.50	SEO-019	<0.50	SE68897-1	<0.50 <0.50	[NR]	[NR]
Bromomethane	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	[NR]	[NR]
Chloroethane	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	[NR]	[NR]
Trichlorofluoromethane	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	[NR]	[NR]
1,1-Dichloroethene	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	SE68897-2	111%
Methylene Chloride	mg/kg	1	SEO-019	<1.0	SE68897-1	<1.0 <1.0	[NR]	[NR]
<i>trans</i> -1,2-Dichloroethene	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	[NR]	[NR]
1,1-Dichloroethane	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	[NR]	[NR]
<i>cis</i> -1,2-Dichloroethene	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	[NR]	[NR]
1,1,1-Trichloroethane	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	[NR]	[NR]
1,1-Dichloropropene	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	[NR]	[NR]
Carbon tetrachloride	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	[NR]	[NR]
1,2-Dichloroethane	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	SE68897-2	121%
Trichloroethene	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	SE68897-2	108%
Dibromomethane	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	[NR]	[NR]
1,1,2-Trichloroethane	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	[NR]	[NR]
1,3-Dichloropropane	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	[NR]	[NR]
Tetrachloroethene	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	[NR]	[NR]
1,1,1,2-Tetrachloroethane	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	[NR]	[NR]
Trans-1,4-dichloro-2-butene	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	[NR]	[NR]
Cis-1,4-dichloro-2-butene	mg/kg	5	SEO-019	<5.0	SE68897-1	<5.0 <5.0	[NR]	[NR]
1,1,2,2-Tetrachloroethane	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	[NR]	[NR]
1,2,3-Trichloropropane	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	[NR]	[NR]
1,2-Dibromo-3-chloropropane	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	[NR]	[NR]
Hexachlorobutadiene	mg/kg	0.5	SEO-019	<0.50	SE68897-1	<0.50 <0.50	[NR]	[NR]
Dibromofluoromethane	%	0	SEO-019	101	SE68897-1	109 104 RPD: 5	SE68897-2	101%
1,2-Dichloroethane-d4	%	0	SEO-019	100	SE68897-1	105 103 RPD: 2	SE68897-2	107%
Toluene-d8 Surrogate 2	%	0	SEO-019	101	SE68897-1	110 108 RPD: 2	SE68897-2	103%



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562 (4354). This report must not be reproduced except in full.

QUALITY CONTROL	UNITS	LOR	METHOD	Blank	Duplicate Sm#	Duplicate	Spike Sm#	Matrix Spike % Recovery
VOCs in Soil - 84 List						Base + Duplicate + %RPD		Duplicate + %RPD
4-Bromofluorobenzene Surrogate 3	%	0	SEO-019	78	SE68897-1	92 88 RPD: 4	SE68897-2	101%

QUALITY CONTROL	UNITS	LOR	METHOD	Blank
Moisture				
Date Analysed (moisture)				[NT]
Moisture	%	1	AN002	<1

Published on Resources Disclosure Log
RTI Act 2009



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562 (4354). This report must not be reproduced except in full.

Result Codes

[INS] : Insufficient Sample for this test
[NR] : Not Requested
[NT] : Not tested

[RPD] : Relative Percentage Difference
* : Not part of NATA Accreditation
[N/A] : Not Applicable

Report Comments

Samples analysed as received. Solid samples expressed on a dry weight basis.

Date Organics extraction commenced: 01/05/09

NATA Corporate Accreditation No. 2562, Site No 4354

Note: Test results are not corrected for recovery (excluding Dioxins/Furans*)

This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at http://www.sgs.com/terms_and_conditions.htm. The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents.

Quality Control Protocol

Method Blank: An analyte free matrix to which all reagents are added in the same volume or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. A method blank is prepared every 20 samples.

Duplicate: A separate portion of a sample being analysed that is treated the same as the other samples in the batch. One duplicate is processed at least every 10 samples.

Surrogate Spike: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. Surrogates are added to samples before extraction to monitor extraction efficiency and percent recovery in each sample.

Internal Standard: Added to all samples requiring analysis for organics (where relevant) or metals by ICP after the extraction/digestion process; the compounds/elements serve to give a standard of retention time and/or response, which is invariant from run-to-run with the instruments.

Laboratory Control Sample: A known matrix spiked with compound(s) representative of the target analytes. It is used to document laboratory performance. When the results of the matrix spike analysis indicates a potential problem due to the sample matrix itself, the LCS results are used to verify that the laboratory can perform the analysis in a clean matrix.

Matrix Spike: An aliquot of sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Quality Acceptance Criteria

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: <http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf>



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562 (4354). This report must not be reproduced except in full.

CHAIN OF CUSTODY/ANALYSIS REQUEST

Golder Associates
216 Draper Street, CAIRNS QLD 4870

Phone: (07) 4054 8200
Fax: (07) 4054 8201

CE63583

Page 1 of 2

Project No.: <u>087673045</u> Location: <u>Kwikleen Dry Cleaners</u> Golder Order No.: <u>CQ 4544</u> Quote: <u>SGS/Golder National Master Services Agreement</u> Primary Contact: <u>sch4p4(6) Personal</u> <u>sch4p4(6) Personal</u>				HACs Halogenated Aliphatic Compounds ON HOLD				TO BE COMPLETED BY LABORATORY Samples Received In: <u>30/4/09</u> (Please tick appropriate box) ☒ sch4p4(6) Personal inform	
Sample Location	Sample Matrix	No. of Jars/Bags	Sample Date					Appropriate Containers ☒ Pretreated Containers ☐ Chilled State ☒ Other (Comment) ☐	
MW1KK	Water	2	30/04/09	RTI Act 2009 Published on Resources Disclosure Log		PLEASE SEND RESULTS TO: Name: <u>sch4p4(6) Personal</u> Email: <u>sch4p4(6) @golder.com.au</u> Name: <u>sch4p4(6) Pa</u> Email: <u>sch4p4(@golder.com.au</u>			
MW2KK	Water	2	30/04/09			PLEASE SEND INVOICE TO: Name: <u>sch4p4(6) Personal</u> Email: <u>sch4p4(6) @golder.com.au</u>			
MW3KK	Water	2	30/04/09			Project Manager: Email:			
MW4KK	Water	2	30/04/09						
MW1CP	Water	2	30/04/09						
MW2CP	Water	2	30/04/09						
MW3CP	Water	2	30/04/09						
MW4CP	Water	2	30/04/09						
MW5CP	Water	2	30/04/09						
MW6CP	Water	2	30/04/09						
MW7CP	Water	2	30/04/09						
MW8CP	Water	2	30/04/09						
MW9CP	Water	2	30/04/09						
MW10CP	Water	2	30/04/09						
MW11CP	Water	2	30/04/09						
MW12CP	Water	2	30/04/09						
MW13CP	Water	2	30/04/09						
MW14CP	Water	2	30/04/09						
TEST REFERENCE NO.									
TURN AROUND TIME									

Special Instructions: Nominated turn-around time from time of submission to SGS Cairns. **Penalty Rates to apply for late reports in accordance with National Master Services Agreement.**

Special Instructions: **Please Supply in ESDAT Format**

Relinquished: sch4p4(6) Personal information Date: 30.4.09 Received by: sch4p4(6) Personal information Date: 30/4/09
 Organisation: Golder Time: 1:15pm Organisation: Golder Time: 1:30pm

CE63583

Phone: (07) 4054 8200
Fax: (07) 4054 8201

Page 2 of 2

[illegible]

Special Instructions: Please Supply in ESDAT Format

Relinquished: _____ Date: _____ Received by: _____ Date: _____
 Organisation: _____ Time: _____ Organisation: _____ Time: _____

ANALYTICAL REPORT

8 May 2009

Golder Associates

216 Draper St
QLD 4870

Attention:

[Redacted]

Your Reference: 087673045 - Kwikleen Drycleaners- SGS CE63583

Our Reference: SE68964

Samples: 15 Waters

Received: 01/05/09

Preliminary Report Sent: Not Issued

These samples were analysed in accordance with your written instructions.

For and on Behalf of:

SGS ENVIRONMENTAL SERVICES

Client Services:

[Redacted]

[Redacted]@sgs.com

Sample Receipt:

[Redacted]

AU.SampleReceipt.Sydney@sgs.com

Laboratory Manager:

[Redacted]

[Redacted] sgs.com

Results Approved and/or Authorised by:

[Redacted]

[Redacted]

Organics Signatory



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562 (4354). This report must not be reproduced except in full.

Page 1 of 8

VOCs in Water - 86 List Our Reference: Your Reference Sample Matrix Date Sampled Depth	UNITS ----- -----	SE68964-1 MW 1KK Water	SE68964-2 MW 2KK Water	SE68964-3 MW 3KK Water	SE68964-4 MW 4KK Water	SE68964-5 MW 1CP Water
Date extracted (VOCs)		4/05/2009	4/05/2009	4/05/2009	4/05/2009	4/05/2009
Date analysed (VOCs)		5/05/2009	5/05/2009	5/05/2009	5/05/2009	5/05/2009
Dichlorodifluoromethane	µg/L	<5.0	<5.0	<5.0	<50	<50
Chloromethane	µg/L	<5.0	<5.0	<5.0	<50	<50
Vinyl Chloride	µg/L	<5.0	<5.0	<5.0	<50	<50
Bromomethane	µg/L	<5.0	<5.0	<5.0	<50	<50
Chloroethane	µg/L	<5.0	<5.0	<5.0	<50	<50
Trichlorofluoromethane	µg/L	<5.0	<5.0	<5.0	<50	<50
1,1-Dichloroethene	µg/L	<5.0	<5.0	<5.0	<50	<50
Methylene Chloride	µg/L	<10	<10	<10	<100	<100
<i>trans</i> -1,2-Dichloroethene	µg/L	<5.0	<5.0	<5.0	<50	<50
1,1-Dichloroethane	µg/L	<5.0	<5.0	<5.0	<50	<50
<i>cis</i> -1,2-Dichloroethene	µg/L	5.1	<5.0	<5.0	640	120
1,1,1-Trichloroethane	µg/L	<5.0	<5.0	<5.0	<50	<50
1,1-Dichloropropene	µg/L	<5.0	<5.0	<5.0	<50	<50
Carbon tetrachloride	µg/L	<5.0	<5.0	<5.0	<50	<50
1,2-Dichloroethane	µg/L	<5.0	<5.0	<5.0	<50	<50
Trichloroethene	µg/L	26	<5.0	<5.0	550	170
Dibromomethane	µg/L	<5.0	<5.0	<5.0	<50	<50
1,1,2-Trichloroethane	µg/L	<5.0	<5.0	<5.0	<50	<50
1,3-Dichloropropane	µg/L	<5.0	<5.0	<5.0	<50	<50
Tetrachloroethene	µg/L	8.5	86	49	1,000	160
1,1,1,2-Tetrachloroethane	µg/L	<5.0	<5.0	<5.0	<50	<50
Trans-1,4-dichloro-2-butene	µg/L	<5.0	<5.0	<5.0	<50	<50
Cis-1,4-dichloro-2-butene	µg/L	<10	<10	<10	<100	<100
1,1,2,2-Tetrachloroethane	µg/L	<5.0	<5.0	<5.0	<50	<50
1,2,3-Trichloropropane	µg/L	<5.0	<5.0	<5.0	<50	<50
1,2-Dibromo-3-chloropropane	µg/L	<5.0	<5.0	<5.0	<50	<50
Hexachlorobutadiene	µg/L	<5.0	<5.0	<5.0	<50	<50
Dibromofluoromethane	%	97	96	101	99	96
1,2-Dichloroethane-d4	%	97	92	93	99	96
Toluene-d8 <i>Surrogate 2</i>	%	101	102	100	100	97
4-Bromofluorobenzene <i>Surrogate 3</i>	%	101	93	93	96	97



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562 (4354). This report must not be reproduced except in full.

VOCs in Water - 86 List Our Reference: Your Reference Sample Matrix Date Sampled Depth	UNITS ----- -----	SE68964-6 MW 2CP Water	SE68964-7 MW 3CP Water	SE68964-8 MW 4CP Water	SE68964-9 MW 5CP Water	SE68964-10 MW 6CP Water
Date extracted (VOCs)		4/05/2009	4/05/2009	4/05/2009	4/05/2009	4/05/2009
Date analysed (VOCs)		5/05/2009	5/05/2009	5/05/2009	5/05/2009	5/05/2009
Dichlorodifluoromethane	µg/L	<50	<50	<5.0	<5.0	<5.0
Chloromethane	µg/L	<50	<50	<5.0	<5.0	<5.0
Vinyl Chloride	µg/L	<50	<50	<5.0	<5.0	<5.0
Bromomethane	µg/L	<50	<50	<5.0	<5.0	<5.0
Chloroethane	µg/L	<50	<50	<5.0	<5.0	<5.0
Trichlorofluoromethane	µg/L	<50	<50	<5.0	<5.0	<5.0
1,1-Dichloroethene	µg/L	<50	<50	<5.0	<5.0	<5.0
Methylene Chloride	µg/L	<100	<100	<10	<10	<10
<i>trans</i> -1,2-Dichloroethene	µg/L	<50	<50	<5.0	<5.0	<5.0
1,1-Dichloroethane	µg/L	<50	<50	<5.0	<5.0	<5.0
<i>cis</i> -1,2-Dichloroethene	µg/L	150	<50	<5.0	<5.0	<5.0
1,1,1-Trichloroethane	µg/L	<50	<50	<5.0	<5.0	<5.0
1,1-Dichloropropene	µg/L	<50	<50	<5.0	<5.0	<5.0
Carbon tetrachloride	µg/L	<50	<50	<5.0	<5.0	<5.0
1,2-Dichloroethane	µg/L	<50	<50	<5.0	<5.0	<5.0
Trichloroethene	µg/L	210	210	<5.0	<5.0	7.5
Dibromomethane	µg/L	<50	<50	<5.0	<5.0	<5.0
1,1,2-Trichloroethane	µg/L	<50	<50	<5.0	<5.0	<5.0
1,3-Dichloropropane	µg/L	<50	<50	<5.0	<5.0	<5.0
Tetrachloroethene	µg/L	650	110	<5.0	<5.0	6.6
1,1,1,2-Tetrachloroethane	µg/L	<50	<50	<5.0	<5.0	<5.0
Trans-1,4-dichloro-2-butene	µg/L	<50	<50	<5.0	<5.0	<5.0
Cis-1,4-dichloro-2-butene	µg/L	<100	<100	<10	<10	<10
1,1,2,2-Tetrachloroethane	µg/L	<50	<50	<5.0	<5.0	<5.0
1,2,3-Trichloropropane	µg/L	<50	<50	<5.0	<5.0	<5.0
1,2-Dibromo-3-chloropropane	µg/L	<50	<50	<5.0	<5.0	<5.0
Hexachlorobutadiene	µg/L	<50	<50	<5.0	<5.0	<5.0
Dibromofluoromethane	%	98	100	101	100	104
1,2-Dichloroethane-d4	%	102	102	106	100	92
Toluene- <i>d</i> 8 Surrogate 2	%	99	100	100	103	101
4-Bromofluorobenzene Surrogate 3	%	94	94	96	97	96



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562 (4354). This report must not be reproduced except in full.

VOCs in Water - 86 List Our Reference: Your Reference Sample Matrix Date Sampled Depth	UNITS ----- -----	SE68964-1 1 MW 7CP Water	SE68964-1 2 MW 8CP Water	SE68964-1 3 MW 9CP Water	SE68964-1 4 MW 10CP Water	SE68964-1 5 MWX Water
Date extracted (VOCs)		4/05/2009	4/05/2009	4/05/2009	4/05/2009	4/05/2009
Date analysed (VOCs)		5/05/2009	5/05/2009	5/05/2009	5/05/2009	5/05/2009
Dichlorodifluoromethane	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Chloromethane	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Vinyl Chloride	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Bromomethane	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Chloroethane	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Trichlorofluoromethane	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethene	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Methylene Chloride	µg/L	<10	<10	<10	<10	<10
<i>trans</i> -1,2-Dichloroethene	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethane	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
<i>cis</i> -1,2-Dichloroethene	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,1-Trichloroethane	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloropropene	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Carbon tetrachloride	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloroethane	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Trichloroethene	µg/L	<5.0	<5.0	7.1	<5.0	<5.0
Dibromomethane	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2-Trichloroethane	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
1,3-Dichloropropane	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Tetrachloroethene	µg/L	<5.0	<5.0	6.8	89	<5.0
1,1,1,2-Tetrachloroethane	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Trans-1,4-dichloro-2-butene	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Cis-1,4-dichloro-2-butene	µg/L	<10	<10	<10	<10	<10
1,1,2,2-Tetrachloroethane	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
1,2,3-Trichloropropane	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dibromo-3-chloropropane	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Hexachlorobutadiene	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0
Dibromofluoromethane	%	101	98	101	95	100
1,2-Dichloroethane-d4	%	98	96	93	94	99
Toluene- <i>d</i> 8 Surrogate 2	%	101	96	101	100	100
4-Bromofluorobenzene Surrogate 3	%	94	95	91	93	96



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562 (4354). This report must not be reproduced except in full.

Method ID	Methodology Summary
SEO-019	Volatile Organic Compounds - Soil samples are extracted with methanol, purged and concentrated by a purge and trap apparatus, and then analysed using GC/MS technique. Water samples undergo the same analysis without the extraction step. Based on USEPA 5030B and 8260B.

Published on Resources Disclosure Log
RTI Act 2009



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562 (4354). This report must not be reproduced except in full.

Page 5 of 8

QUALITY CONTROL	UNITS	LOR	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
VOCs in Water - 86 List								
Date extracted (VOCs)				04/05/09	[NT]	[NT]	LCS	04/05/09
Date analysed (VOCs)				05/05/09	[NT]	[NT]	LCS	05/05/09
Dichlorodifluoromethane	µg/L	5	SEO-019	<5.0	[NT]	[NT]	[NR]	[NR]
Chloromethane	µg/L	5	SEO-019	<5.0	[NT]	[NT]	[NR]	[NR]
Vinyl Chloride	µg/L	5	SEO-019	<5.0	[NT]	[NT]	[NR]	[NR]
Bromomethane	µg/L	5	SEO-019	<5.0	[NT]	[NT]	[NR]	[NR]
Chloroethane	µg/L	5	SEO-019	<5.0	[NT]	[NT]	[NR]	[NR]
Trichlorofluoromethane	µg/L	5	SEO-019	<5.0	[NT]	[NT]	[NR]	[NR]
1,1-Dichloroethene	µg/L	5	SEO-019	<5.0	[NT]	[NT]	LCS	102%
Methylene Chloride	µg/L	10	SEO-019	<10	[NT]	[NT]	[NR]	[NR]
<i>trans</i> -1,2-Dichloroethene	µg/L	5	SEO-019	<5.0	[NT]	[NT]	[NR]	[NR]
1,1-Dichloroethane	µg/L	5	SEO-019	<5.0	[NT]	[NT]	[NR]	[NR]
<i>cis</i> -1,2-Dichloroethene	µg/L	5	SEO-019	<5.0	[NT]	[NT]	[NR]	[NR]
1,1,1-Trichloroethane	µg/L	5	SEO-019	<5.0	[NT]	[NT]	[NR]	[NR]
1,1-Dichloropropene	µg/L	5	SEO-019	<5.0	[NT]	[NT]	[NR]	[NR]
Carbon tetrachloride	µg/L	5	SEO-019	<5.0	[NT]	[NT]	[NR]	[NR]
1,2-Dichloroethane	µg/L	5	SEO-019	<5.0	[NT]	[NT]	LCS	102%
Trichloroethene	µg/L	5	SEO-019	<5.0	[NT]	[NT]	LCS	93%
Dibromomethane	µg/L	5	SEO-019	<5.0	[NT]	[NT]	[NR]	[NR]
1,1,2-Trichloroethane	µg/L	5	SEO-019	<5.0	[NT]	[NT]	[NR]	[NR]
1,3-Dichloropropane	µg/L	5	SEO-019	<5.0	[NT]	[NT]	[NR]	[NR]
Tetrachloroethene	µg/L	5	SEO-019	<5.0	[NT]	[NT]	[NR]	[NR]
1,1,1,2-Tetrachloroethane	µg/L	5	SEO-019	<5.0	[NT]	[NT]	[NR]	[NR]
Trans-1,4-dichloro-2-butene	µg/L	5	SEO-019	<5.0	[NT]	[NT]	[NR]	[NR]
Cis-1,4-dichloro-2-butene	µg/L	10	SEO-019	<10	[NT]	[NT]	[NR]	[NR]
1,1,2,2-Tetrachloroethane	µg/L	5	SEO-019	<5.0	[NT]	[NT]	[NR]	[NR]
1,2,3-Trichloropropane	µg/L	5	SEO-019	<5.0	[NT]	[NT]	[NR]	[NR]
1,2-Dibromo-3-chloropropane	µg/L	5	SEO-019	<5.0	[NT]	[NT]	[NR]	[NR]
Hexachlorobutadiene	µg/L	5	SEO-019	<5.0	[NT]	[NT]	[NR]	[NR]
Dibromofluoromethane	%	0	SEO-019	100	[NT]	[NT]	LCS	96%
1,2-Dichloroethane-d4	%	0	SEO-019	112	[NT]	[NT]	LCS	98%
Toluene-d8 Surrogate 2	%	0	SEO-019	102	[NT]	[NT]	LCS	96%



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562 (4354). This report must not be reproduced except in full.

QUALITY CONTROL	UNITS	LOR	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
VOCs in Water - 86 List								
4-Bromofluorobenzene Surrogate 3	%	0	SEO-019	94	[NT]	[NT]	LCS	97%

Published on Resources Disclosure Log
RTI Act 2009



This document is issued in accordance
with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025.
NATA accredited laboratory 2562 (4354).
This report must not be reproduced except in full.

Result Codes

[INS] : Insufficient Sample for this test
[NR] : Not Requested
[NT] : Not tested

[RPD] : Relative Percentage Difference
* : Not part of NATA Accreditation
[N/A] : Not Applicable

Report Comments

VOC - LOR raised due to sample matrix and dilution required.

Samples analysed as received. Solid samples expressed on a dry weight basis.

Date Organics extraction commenced: 04/05/09

NATA Corporate Accreditation No. 2562, Site No 4354

Note: Test results are not corrected for recovery (excluding Dioxins/Furans*)

This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at http://www.sgs.com/terms_and_conditions.htm. The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents.

Quality Control Protocol

Method Blank: An analyte free matrix to which all reagents are added in the same volume or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. A method blank is prepared every 20 samples.

Duplicate: A separate portion of a sample being analysed that is treated the same as the other samples in the batch. One duplicate is processed at least every 10 samples.

Surrogate Spike: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. Surrogates are added to samples before extraction to monitor extraction efficiency and percent recovery in each sample.

Internal Standard: Added to all samples requiring analysis for organics (where relevant) or metals by ICP after the extraction/digestion process; the compounds/elements serve to give a standard of retention time and/or response, which is invariant from run-to-run with the instruments.

Laboratory Control Sample: A known matrix spiked with compound(s) representative of the target analytes. It is used to document laboratory performance. When the results of the matrix spike analysis indicates a potential problem due to the sample matrix itself, the LCS results are used to verify that the laboratory can perform the analysis in a clean matrix.

Matrix Spike: An aliquot of sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Quality Acceptance Criteria

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: <http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-09.pdf>



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562 (4354). This report must not be reproduced except in full.



APPENDIX C

Limitations

Published on Resources Disclosure Log
RTI Act 2009



LIMITATIONS

This Document has been provided by Golder Associates Pty Ltd ("Golder") subject to the following limitations:

This Document has been prepared for the particular purpose outlined in Golder's proposal and no responsibility is accepted for the use of this Document, in whole or in part, in other contexts or for any other purpose.

The scope and the period of Golder's Services are as described in Golder's proposal, and are subject to restrictions and limitations. Golder did not perform a complete assessment of all possible conditions or circumstances that may exist at the site referenced in the Document. If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by Golder in regards to it.

Conditions may exist which were not detected given the limited nature of the enquiry Golder was retained to undertake with respect to the site. Variations in conditions may occur between assessment locations, and there may be special conditions pertaining to the site which have not been revealed by the investigation and which have not therefore been taken into account in the Document. Accordingly, additional studies and actions may be required.

In addition, it is recognised that the passage of time affects the information and assessment provided in this Document. Golder's opinions are based upon information that existed at the time the information is collected. It is understood that the Services provided allowed Golder to form no more than an opinion of the actual conditions of the site at the time the site was visited and cannot be used to assess the effect of any subsequent changes in the quality of the site, or its surroundings, or any laws or regulations.

Any assessments, designs, and advice provided in this Document are based on the conditions indicated from published sources and the investigation described. No warranty is included, either express or implied, that the actual conditions will conform exactly to the assessments contained in this Document.

Where data supplied by the client or other external sources, including previous site investigation data, have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by Golder for incomplete or inaccurate data supplied by others.

Golder may have retained subconsultants affiliated with Golder to provide Services for the benefit of Golder. To the maximum extent allowed by law, the Client acknowledges and agrees it will not have any direct legal recourse to, and waives any claim, demand, or cause of action against, Golder's affiliated companies, and their employees, officers and directors.

This Document is provided for sole use by the Client and is confidential to it and its professional advisers. No responsibility whatsoever for the contents of this Document will be accepted to any person other than the Client. Any use which a third party makes of this Document, or any reliance on or decisions to be made based on it, is the responsibility of such third parties. Golder accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this Document.

At Golder Associates we strive to be the most respected global group of companies specialising in ground engineering and environmental services. Employee owned since our formation in 1960, we have created a unique culture with pride in ownership, resulting in long-term organisational stability. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees now operating from offices located throughout Africa, Asia, Australasia, Europe, North America and South America.

Africa	+ 27 11 254 4800
Asia	+ 852 2562 3658
Australasia	+ 61 3 8862 3500
Europe	+ 356 21 42 30 20
North America	+ 1 800 275 3281
South America	+ 55 21 3095 9500

solutions@golder.com
www.golder.com



Golder Associates Pty Ltd
216 Draper Street
Cairns Queensland 4870
Australia
T: +61 7 4054 8200

ATTACHMENT D

Conceptual Site Model & Qualitative Risk Assessment, Caravan Park Site Remediation, Pease St, Manunda, Golder Associates Pty Ltd, Ref. No. 0867673045-021-R-Rev0, dated October 2011.



14 October 2011

CONCEPTUAL SITE MODEL & QUALITATIVE RISK ASSESSMENT

Caravan Park Site Remediation, Pease St, Manunda

Submitted to:

sch4p4(6) Personal
Hospitality Services
32-36 Pease Street
Manunda QLD 4883

REPORT



Report Number. 087673045-021-R-Rev0

Distribution:

1 Copy - Third Party Reviewer- Jim Soltau
1 Copy Hospitality Services





Table of Contents

1.0 INTRODUCTION.....	1
1.1 Background and Project Objectives.....	1
1.2 Scope of Works	1
2.0 SUMMARY OF SITE CONDITIONS	1
2.1 Property Details	1
2.2 Topography and Drainage	2
2.3 Ground Conditions.....	2
2.3.1 Regional Soils and Geology.....	2
2.3.2 Field Observations	2
2.4 Groundwater Conditions	3
2.4.1 Water Bearing Zones	3
2.4.2 Groundwater Monitoring.....	3
2.4.3 Groundwater Regime.....	3
2.4.4 Hydraulic Conductivity.....	3
2.4.5 Groundwater Contamination	4
3.0 CONCEPTUAL SITE MODEL	4
3.1 Introduction.....	4
3.2 Critical Exposure Scenarios.....	1
4.0 SITE REMEDIATION CRITERIA	2
4.1 Published Guidelines.....	2
4.1.1 Draft NEPM Guidelines	2
4.1.2 NOHSC and NIOSH Guidelines.....	2
4.2 Site Remediation Criteria for Critical Exposure Pathways	3
5.0 CONCLUSIONS AND RECOMMENDATIONS.....	4
6.0 LIMITATIONS	5



TABLES

Table 1: Summary of Site Geology	2
Table 2: Standard Residential	5
Table 3: High Density Residential	6
Table 4: Commercial	7
Table 5: Environment	8
Table 6: Standard Residential	1
Table 7: High Density Residential	1
Table 8: Commercial	1
Table 9: Standard Residential	3
Table 10: High Density Residential	3
Table 11: Commercial	4

FIGURES

Figure 1: Site Locality Plan
Figure 2: Groundwater Monitoring Network
Figure 3: Groundwater Levels
Figure 4a: Groundwater Levels
Figure 4b: Geological and Hydrological conceptual Site Model
Figure 4c: Geological and Hydrological conceptual Site Model
Figure 4d: Geological and Hydrological conceptual Site Model

APPENDICES

APPENDIX A

Groundwater Contaminant Concentration

APPENDIX B

Risk Assessment Matrix

APPENDIX C

Limitations



1.0 INTRODUCTION

1.1 Background and Project Objectives

Golder Associates Pty Ltd (Golder) was commissioned by Hospitality Services to prepare a Conceptual Site Model and Qualitative Risk Assessment for the Cairns Villa and Leisure Park (the site) on 28 Pease St, Manunda, QLD. The site location is shown in Figure 1.

The Conceptual Site Model (CSM) has been developed to identify critical source-pathway-receptor relationships associated with groundwater impacted by chlorinated solvents at the site, based on a number of potential land-use scenarios.

The "Groundwater Assessment, Pease St, Manunda" report (Golder reference: 087673045-007-Rev) established Tier 1 Assessment Criteria to provide an initial assessment of human health and environmental risk from impacted groundwater. However, it is important to note that these criteria were not intended to be adopted as the remediation criteria for the site. To address this issue, the CSM provides the basis for a qualitative assessment of the risks to human health and the environment in order to establish suitable remediation criteria aimed at removal of the site from the Environmental Management Register (EMR).

This document will be submitted to the TPR (sch4p4(6) Persc) for review and agreement on the CSM and the proposed remediation criteria to support the site's removal from the EMR.

1.2 Scope of Works

The scope of CSM included the following:

- Summary of relevant soil and groundwater information from previous studies and investigations;
- Summary of chlorinated solvent impacts to groundwater based on current information;
- Identification of potential environmental and human health receptors and document potential exposure pathways;
- Provide a qualitative assessment of risks posed by the various pollution linkages to potential site users, the public and the environment;
- Evaluate remediation criteria based on the CSM and the qualitative assessment of risks to human health and the environment; and
- Provide recommendations for appropriate remediation criteria and how the proposed remediation criteria could be adopted in order to establish whether current site conditions meet these criteria.

The scope of CSM and associated risk assessment is limited to Cairns Villa and Leisure Park and is not intended to fully address the ground and groundwater conditions within the adjacent former dry cleaner's site. However, the assessment is based on the assumption that management measures will continue on the former dry cleaner's site to mitigate further migration of chlorinated solvent impacted groundwater onto the subject site

2.0 SUMMARY OF SITE CONDITIONS

2.1 Property Details

The site is located on Lot 1 RP742725 and covers an area of approximately 4 hectares. The site boundary and its locality are shown in Figure 1.



2.2 Topography and Drainage

The site is relatively flat with limited surface level measurements across the site indicating levels ranging between about 2.7m AHD and 3.7m AHD.

2.3 Ground Conditions

2.3.1 Regional Soils and Geology

The 2005 Queensland Department of Natural Resources and Mines Digital Geological dataset of the Cairns Region (8064) indicates that the western portion of the site is underlain by Pleistocene age gentle to very gentle coalescing alluvial fans of silty gravels grading to gravelly clays, clays and silts. The eastern portion of the site is underlain by Holocene age sands and gravelly sands in beach ridges, chenier ridges, and river mouth spits and bars. This is shown in Figure 2.

A search of Golder's database for borehole logs within the vicinity of the site presented the following information regarding the geological sequence in the area:

- "Younger" Alluvium (unconsolidated) - loose sands overlying soft marine clays and stiff/dense sandy clay/clayey sands to depths of approximately 15m bgl;
- "Older" Alluvium (over-consolidated) - dense to very dense cemented clayey sands/clays overlying very stiff to hard clays from depths of approximately 15m to 40m bgl. The over-consolidated stiff to hard clay formation is considered to be an aquiclude and is of substantial thickness. Zones of coarse material (gravels and sands) are present within the clay aquiclude at depths below approximately 40m bgl.

No Golder borehole logs containing information from within the vicinity of the site were available for depths beyond 40m bgl, but it is inferred that this the "Older" Alluvium continues to the underlying bedrock.

The information presented above was confirmed by a search of DERM groundwater bore records within a 2km radius which indicate that bedrock was generally encountered at depths beyond 60m bgl.

2.3.2 Field Observations

The sequence of geological strata identified within the unconsolidated alluvium during previous site investigations is summarised in Table 1 and borehole locations are shown in Figure 2.

Table 1: Summary of Site Geology

Geological Unit	Lithological Description	Maximum Thickness Detected	Minimum Thickness Detected	Depth Ranges - (Top to Base) m bgl
Pleistocene Alluvium				
Topsoil	Clayey Silt	0.15 m (MW1CP, MW2CP, MW4CP)	0.1 m (MW3CP)	0 – 0.15
Fill	Clayey Silts, Silty Sands, Sandy Clays	0.6 m (MW11CP)	0.3 m (MW12CP)	0 – 0.60
Alluvium	Interbedded layers of Clayey Silts, Silty Clays, Silty Sands and Sandy Clays	3.9 m (MW3CP)	2.8 m (MW12CP)	0.3 – 3.70
Alluvium (Marine Clay)	Silty Clay	+0.9 m (MW12CP)	+0.3 m (MW1CP)	3.5 to +4.2



Geological Unit	Lithological Description	Maximum Thickness Detected	Minimum Thickness Detected	Depth Ranges - (Top to Base) m bgl
Holocene Alluvium				
Fill	Clayey Silts, Silty Sands	0.7 m (MW5CP)	0.5 m (MW13CP)	0 – 0.7
Alluvium	Sands and Sandy Clay	2.5 m (MW13CP)	2.35 m (MW6CP)	0.5 to +3.1
Alluvium (Marine Clay)	Silty Clay	+0.5 m (MW13CP)	+0.5 m (MW13CP)	3.0 to +3.5

2.4 Groundwater Conditions

2.4.1 Water Bearing Zones

The following water bearing zones are present in the geological sequences beneath the site:

- “Younger” Alluvium (unconsolidated) - A shallow unconfined aquifer is present above the soft marine clays. This aquifer is not considered to be a viable source of drinking water and was previously discussed in a letter (Golder document reference: 087673045-L-018-Rev0) dated 1 June 2011;
- “Older” Alluvium (over-consolidated) - The sand/gravel zones at depths below 40m bgl within the clay aquiclude generally have a suitable yield and quality for drinking water purposes;
- Bedrock – an aquifer within the fractured bedrock forms a second viable drinking water source and is likely to be semi-confined by the overlying clay layer.

2.4.2 Groundwater Monitoring

Groundwater levels within the upper unconfined aquifer measured from previous monitoring events are represented graphically in Figure 3. Rainfall data has also been compared with groundwater levels over time. The graph indicates that groundwater fluctuates (up to approximately 2m in some locations) as a direct result of variations in rainfall during the dry and wet seasons.

2.4.3 Groundwater Regime

Groundwater levels in the upper unconfined aquifer measured from previous monitoring events indicate general groundwater flow in a north, north-easterly direction (refer to Golder report: 087673045-007-Rev1, July 2009).

The main mechanism for recharge into the upper unconfined aquifer (into the fill and the alluvial soils overlying the marine clays) is infiltration of rainfall into the entire catchment, which causes groundwater levels to rise. The degree of infiltration is subject to the permeability of the ground at various locations in the catchment surrounding the site.

2.4.4 Hydraulic Conductivity

A groundwater investigation report by LeVert (document reference: 07281-001, dated August 2007) reported hydraulic conductivity values of 2×10^{-6} m/sec for sands and 3×10^{-9} m/s for clays in the site in the upper aquifer. Assuming saturated sands on the former dry cleaner's site have a similar hydraulic conductivity and hydraulic gradients derived from the groundwater contours, the groundwater flow velocity is estimated at between about 8 m/year and 40 m/year. Flatter hydraulic gradients indicated in Holocene deposits on the site suggest groundwater flow velocities in the order of 1 m/year to 3 m/year.



2.4.5 Groundwater Contamination

The contaminants of concern (COCs) identified through previous investigations are residual PCE, TCE and cis-1,2-dichloroethene in the dissolved phase. The concentrations of these contaminants have previously been compared to ANZECC Water Quality Guidelines (low reliability values) or Dutch Intervention Values as screening levels. However, it should be noted that these trigger values were not intended to be used as remediation criteria for the site.

No free product has been observed to date and breakdown products such as vinyl chloride have not been detected through laboratory analysis.

Based on groundwater monitoring to date, the highest concentrations of the COCs have consistently been identified around MWCP2, MW11CP and MW12CP within the site. However, the inferred contamination plume decreases significantly at MW5CP and MW13CP, which are located down-gradient and towards the east of the site (along the groundwater flow direction), and at these locations the concentrations are currently below screening levels adopted in previous investigations.

A product recovery trench was installed in the adjacent former dry cleaners' site in October 2010 and since installation of this trench, groundwater monitoring and sampling to date has indicated a general decreasing trend in contaminant concentrations within the site. These trends are represented in graphs for each contaminant in Appendix A.

3.0 CONCEPTUAL SITE MODEL

3.1 Introduction

A site-specific conceptual model (CSM) has been developed for various potential land use scenarios. For each potential land use scenario, the CSM identifies the potential receptors and exposure pathways associated with residual, dissolved phase chlorinated solvent impact in groundwater.

The potential land use scenarios identified are based on the exposure settings in Appendix 9 of the Draft Guidelines for the Assessment & Management of Contaminated Land in Queensland (May 1998) and include:

- Standard Residential with garden/accessible soil;
- Residential with minimal opportunities for soil access including high-rise apartments and flats with a basement;
- Commercial including premises such as shops and offices

A qualitative risk assessment has also been carried out for each potential receptor/exposure pathway linkage to identify the critical media requiring remediation criteria. The risk matrix used for this assessment is presented in Appendix B.

The same methodology described above has also been applied to potential environmental receptors.

A CSM of the geological and hydrogeological interactions across the site is presented in Figure 4A and is based on the summary of site conditions in Section 2.

The pollution linkages and qualitative risk assessments shown in Tables 2 to 5 below are based on the potential source-pathway-receptor relationships identified for each land-use scenario.



CARAVAN PARK SITE REMEDIATION

Table 2: Standard Residential

Linkage No.	Source	Pathway	Receptor	L	C	Risk	Justification
SR1	Residual dissolved phase chlorinated solvents in groundwater within the site.	Vapour intrusion of gases through cracks/gaps in the floor slab into enclosed spaces resulting in potential inhalation by receptors	Ground floor residents within the site	3	4	12 (Moderate)	Long-term exposure of ground floor residents to vapours.
SR2		Dermal contact with contaminated groundwater	Construction workers with direct access to soil with impacted groundwater.	3	3	9 (Low)	Workers may be in direct contact with impacted groundwater during construction activities.
SR3		Inhalation of soil vapours during excavation of soils	Residents, landscapers or construction workers that may excavate soil for various purposes	3	4	12 (Moderate)	Residents, landscapers or construction workers may be exposed to vapours during any activity requiring excavation of soils.
SR4		Accidental ingestion of impacted groundwater during excavation of soils	Residents, landscapers of construction workers that may excavate soil for various purposes	2	4	8 (Low)	Resident, landscapers or constructions workers may accidentally ingest contaminated groundwater during any activity requiring excavation of soils impacted by contaminated groundwater.
SR5		Ingestion of impacted groundwater	Site users that may extract groundwater for drinking purposes	1	4	4 (Insignificant)	(Refer to Golder letter: 087673045-L-018-Rev0, dated 1 June 2011).



CARAVAN PARK SITE REMEDIATION

Table 3: High Density Residential

Linkage No.	Source	Pathway	Receptor	L	C	Risk	Justification
HR1A	Residual dissolved phase chlorinated solvents in groundwater within the site.	Vapour intrusion of gases through cracks/gaps in the floor slab into enclosed spaces	Basement car park users	3	4	12 (Moderate)	Gas build-up within basements resulting in potential exposure to vapours. Although the basements are likely to incorporate a venting system to manage vehicle exhaust fumes, a conservative approach has been taken by assuming that this may not be incorporated into the building design.
HR1B			Residents in first floor apartments	3	4	12 (Moderate)	Potential for soil vapour to accumulate in first floor apartments resulting in exposure to vapours.
HR2		Dermal contact with contaminated groundwater	Landscapers or construction workers with direct access to soil with impacted groundwater.	3	3	9 (Low)	Landscapers or construction workers may be in direct contact with impacted groundwater during landscaping or construction activities.
HR3		Inhalation of soil vapours during excavation of soils	Landscapers or construction workers that may excavate soil for various purposes	3	4	12 (Moderate)	Landscapers or construction workers may be exposed to vapours during any activity requiring excavation of soils impacted by contaminated groundwater.
HR4		Accidental ingestion of impacted groundwater	Landscapers or construction workers that may excavate soil for various purposes	2	4	8 (Low)	Resident, landscapers or constructions workers may accidentally ingest contaminated groundwater during any activity requiring excavation of soils impacted by contaminated groundwater.
HR5		Ingestion of impacted groundwater	Site users that may extract groundwater for drinking purposes	1	4	4 (Insignificant)	(Refer to Golder letter: 087673045-L-018-Rev0, dated 1 June 2011).



CARAVAN PARK SITE REMEDIATION

Table 4: Commercial

Linkage No.	Source	Pathway	Receptor	L	C	Risk	Justification
C1	Residual dissolved phase chlorinated solvents in groundwater within the site.	Vapour intrusion of gases through cracks/gaps in the floor slab into enclosed spaces resulting in potential inhalation by receptors	Ground floor workers within the site	3	3	9 (Low)	Long-term exposure of ground floor residents to vapours.
			The general public entering commercial outlets	2	3	6 (Low)	Exposure would be intermittent and short term
C2		Dermal contact with contaminated groundwater	Landscapers or construction workers with direct access to soil with impacted groundwater.	3	3	9 (Low)	Landscapers or construction workers may be in direct contact with impacted groundwater during landscaping or construction activities.
C3		Inhalation of soil vapours during excavation of soils	Landscapers or construction workers that may excavate soil for various purposes	3	4	12 (Moderate)	Landscapers or construction workers may be exposed to vapours during any activity requiring excavation of soils impacted by contaminated groundwater.
C4		Accidental ingestion of impacted groundwater	Landscapers or construction workers that may excavate soil for various purposes	2	4	8 (Low)	Landscapers or constructions workers may accidentally ingest contaminated groundwater during any activity requiring excavation of soils impacted by contaminated groundwater.
C5		Ingestion of impacted groundwater	Site users that may extract groundwater for drinking purposes	1	4	4 (Insignificant)	(Refer to Golder letter: 087673045-L-018-Rev0, dated 1 June 2011).



CARAVAN PARK SITE REMEDIATION

Table 5: Environment

Linkage No.	Source	Pathway	Receptor	L	C	Risk	Justification
E1	Residual dissolved phase chlorinated solvents in groundwater within the site.	Horizontal migration via groundwater	Aquatic ecosystems within Saltwater Creek	3	2	6 (Low)	<ul style="list-style-type: none"> The creek is located on the eastern boundary of the site. However, when factors such as advection, dispersion and dilution are taken into account, contaminant concentrations are unlikely to pose any significant risk. The COC concentrations at the eastern most monitoring wells are below screening levels previously adopted.
E2		Horizontal migration via groundwater	Aquatic ecosystems within Trinity Inlet	1	3	3 (Insignificant)	<ul style="list-style-type: none"> When factors such as advection, dispersion and dilution are taken into account, contaminant concentrations are unlikely to pose any significant risk; and The inlet is located approximately 3.5km from the site
E3		Vertical migration through permeable zones	Semi-confined / confined aquifer	2	3	6 (Low)	<ul style="list-style-type: none"> Cohesive material (sandy and silty CLAYS) underlying the perched groundwater table creates a low permeability barrier to limit vertical flow; Groundwater with potential beneficial re-use is located at depths beyond 20m.



3.2 Critical Exposure Scenarios

The results of the qualitative human health and environmental risk assessment of potential pollution linkages indicated that:

- The risks to the environment by impacted groundwater are considered to be **insignificant to low**;
- To risks to human receptors (both residents, the general public and site workers) through the inhalation exposure pathway are considered to be **moderate** for each of the land use scenarios;
- To risks to human receptors (both residents, the general public and site workers) through the dermal exposure pathway are considered to be **low** for each of the land use scenarios;
- To risks to human receptors (both residents and site workers) through the accidental ingestion exposure pathway are considered to be **low** for each of the land use scenarios;
- The risks to human receptors (residents) through ingestion of impacted groundwater are considered to be **insignificant**.

Based on these results, it is considered that inhalation of soil vapours from impacted groundwater pose the highest risk to human receptors under various land use scenarios.

The following linkages are associated with vapour inhalation pathways and are considered to be critical exposure scenarios for which the establishment of site-specific remediation criteria will be based on.

Table 6: Standard Residential

Linkage No.	Pathway	Receptor
SR1	Vapour intrusion of gases through cracks/gaps in the floor slab into enclosed spaces resulting in potential inhalation by receptors	Ground floor residents within the site
SR3	Inhalation of soil vapours during excavation of soils	Residents, landscapers or construction workers that may excavate soil for various purposes

Table 7: High Density Residential

Linkage No.	Pathway	Receptor
HR1A	Vapour intrusion of gases through cracks/gaps in the floor slab into enclosed spaces	Basement car park users
HR1B		Residents in apartments
HR3	Inhalation of soil vapours during excavation of soils	Landscapers or construction workers that may excavate soil for various purposes

Table 8: Commercial

Linkage No.	Pathway	Receptor
C3	Inhalation of soil vapours during excavation of soils	Landscapers or construction workers that may excavate soil for various purposes

A CSM for critical exposure scenarios under each of the various land use scenarios is shown in Figures 4B to 4D.



4.0 SITE REMEDIATION CRITERIA

4.1 Published Guidelines

Published guidelines for addressing human health risks associated with inhalation exposure pathways are discussed in the following sub-sections and should be adopted as the remediation criteria for each of the critical exposure scenarios, as appropriate. Where published guidelines are not available or appropriate for a particular critical exposure scenario, site-specific remediation criteria may need to be derived.

4.1.1 Draft NEPM Guidelines

The Draft NEPM Guidelines for the Assessment of Site Contamination (as varied 2011) provides new guidance on the assessment of volatile organic chlorinated compounds for soil gases to address the risks to human health from vapour exposure pathways. Interim Soil Gas Health Investigation Levels (HILs) have been provided for each of these contaminants and the values for Standard Residential Use with access to soil for the COCs are shown in the table below.

Chemical	Interim HILs (mg/m ³)
TCE	2
PCE	10
Cis-1,2-dichloroethene	2

The values above are based on the potential for vapour intrusion indoors using a conservative indoor air to soil gas attenuation factor of 0.01. These guideline values are considered to be appropriate as Tier 1 assessment criteria for soil gas vapours when considering slab on ground residential dwellings.

4.1.2 NOHSC and NIOSH Guidelines

Landscapers or construction workers may be exposed to vapours during activities requiring excavation of soils.

The National Occupational Health and Safety Commission (NOHSC) of Australia provide eight-hour time weighted average exposure limits (TWA) in the workplace for TCE and PCE. In the absence of TWA values for Cis-1,2-dichloroethene in NOHSC, the U.S. National Institute for Occupational Safety and Health (NIOSH) TWA value has been used instead.

Chemical	TWA (mg/m ³)
TCE	270
PCE	340
Cis-1,2-dichloroethene	790

The TWA values are considered as appropriate Tier 1 assessment criteria for critical exposure pathways associated with site workers.



4.2 Site Remediation Criteria for Critical Exposure Pathways

The proposed site remediation criteria for each of the critical exposure pathways are shown in the tables below and are based on published guidelines. In the absence of suitable published guidelines for addressing human health risks associated with vapour intrusion into basement car parks, vapour intrusion modelling will be required to derive appropriate remediation criteria for this critical exposure scenario.

Table 9: Standard Residential

Linkage No.	Pathway	Receptor	Proposed Criteria
SR1	Vapour intrusion of gases through cracks/gaps in the floor slab into enclosed spaces resulting in potential inhalation by receptors	Ground floor residents within the site	Interim HILs from the Draft NEPM
SR3	Inhalation of soil vapours during excavation of soils	Residents, landscapers or construction workers that may excavate soil for various purposes	TWA values from NOHSC & NIOSH

Table 10: High Density Residential

Linkage No.	Pathway	Receptor	Proposed Criteria
HR1A	Vapour intrusion of gases through cracks/gaps in the floor slab into enclosed spaces	Basement car park users	To be derived by risk assessment for two scenarios: 1. 3m deep basement covering the entire allotment 2. 3m deep basement covering an area of 10m x 30m (typical of unit blocks in the surrounding area)
HR1B		Residents in ground level apartments	Basement gas concentrations not greater than Interim HILs from the Draft NEPM
HR3	Inhalation of soil vapours during excavation of soils	Landscapers or construction workers that may excavate soil for various purposes	TWA values from NOHSC & NIOSH



Table 11: Commercial

Linkage No.	Pathway	Receptor	Proposed Criteria
C3	Inhalation of soil vapours during excavation of soils	Landscapers or construction workers that may excavate soil for various purposes	TWA values from NOHSC & NIOSH

5.0 CONCLUSIONS AND RECOMMENDATIONS

The CSM and the qualitative risk assessment indicated the following:

- Since the groundwater extraction system was installed, the concentrations of the contaminants of concern (COCs) on the caravan park site have generally decreased over time and are generally at low concentrations towards the eastern boundary of the site. This system is currently operational and continues to extract impacted groundwater from the site;
- Proposed Site Remediation Criteria have been derived assuming that extraction of impacted water on the adjacent dry cleaner site will be continued to mitigate future impact to the caravan park site;
- The environmental risks posed by the COCs are generally considered to be insignificant to low;
- Inhalation pathways pose the highest risks to human health for each of land use scenarios adopted (standard residential, high density residential and commercial) and are considered to be appropriate for setting suitable remediation criteria for the site.

In order to evaluate whether current site conditions meet the proposed remediation criteria, the following actions are recommended:

- a) Soil gas samples should be collected from at least six locations across the caravan park site to measure soil vapour concentrations and compared against the proposed remediation criteria for each critical exposure scenario;
- b) Using the soil vapour concentrations, a quantitative risk assessment should be conducted of expected basement air concentrations.;
- c) If soil vapour concentrations exceed the remediation criteria, then further remedial measures will be required to reduce the groundwater and soil vapour concentrations to acceptable levels.

In order to support removal of the site from the EMR, the following conditions should be met in addition to any other statutory requirement:

- If all concentrations measured are below the adopted remediation criteria for each critical exposure scenario, then the site should be considered for removal from the EMR;
- The groundwater extraction system at the former dry cleaners' site must continue to operate to mitigate further migration of impacted groundwater onto the caravan park site.



6.0 LIMITATIONS

Your attention is drawn to the document "Limitations", which is included in Appendix B of this report. The statements presented in this document are intended to advise you of what your realistic expectations of this report should be. The document is not intended to reduce the level of responsibility accepted by Golder Associates, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in so doing.

GOLDER ASSOCIATES PTY LTD

sch4p4(6) Personal information

sch4p4(6) Personal information

sch4p4(6) Personal

Senior Geo-Environmental Engineer

sch4p4(6) Perso

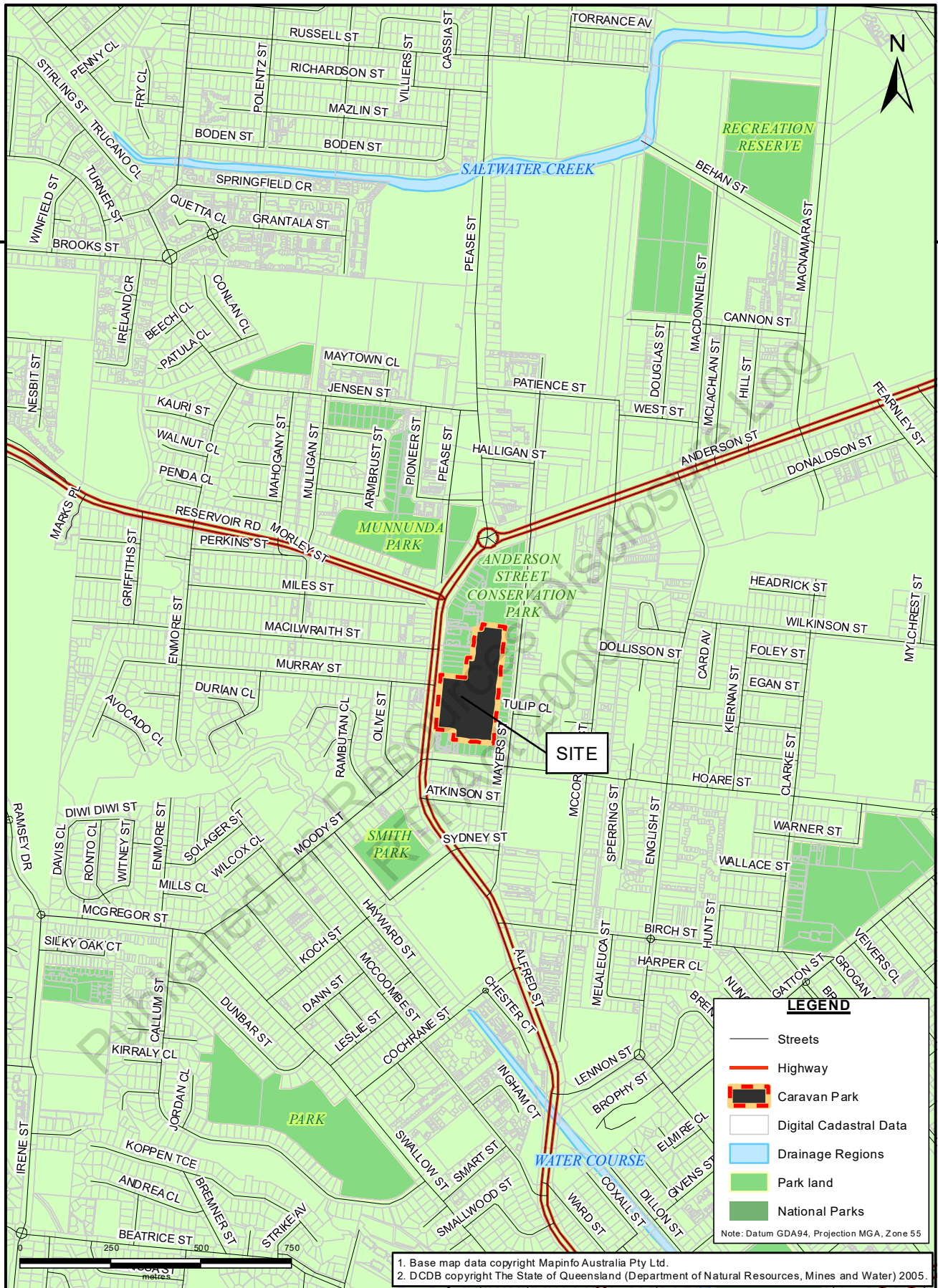
Principal Environmental Engineer

DMD/PKS/klm

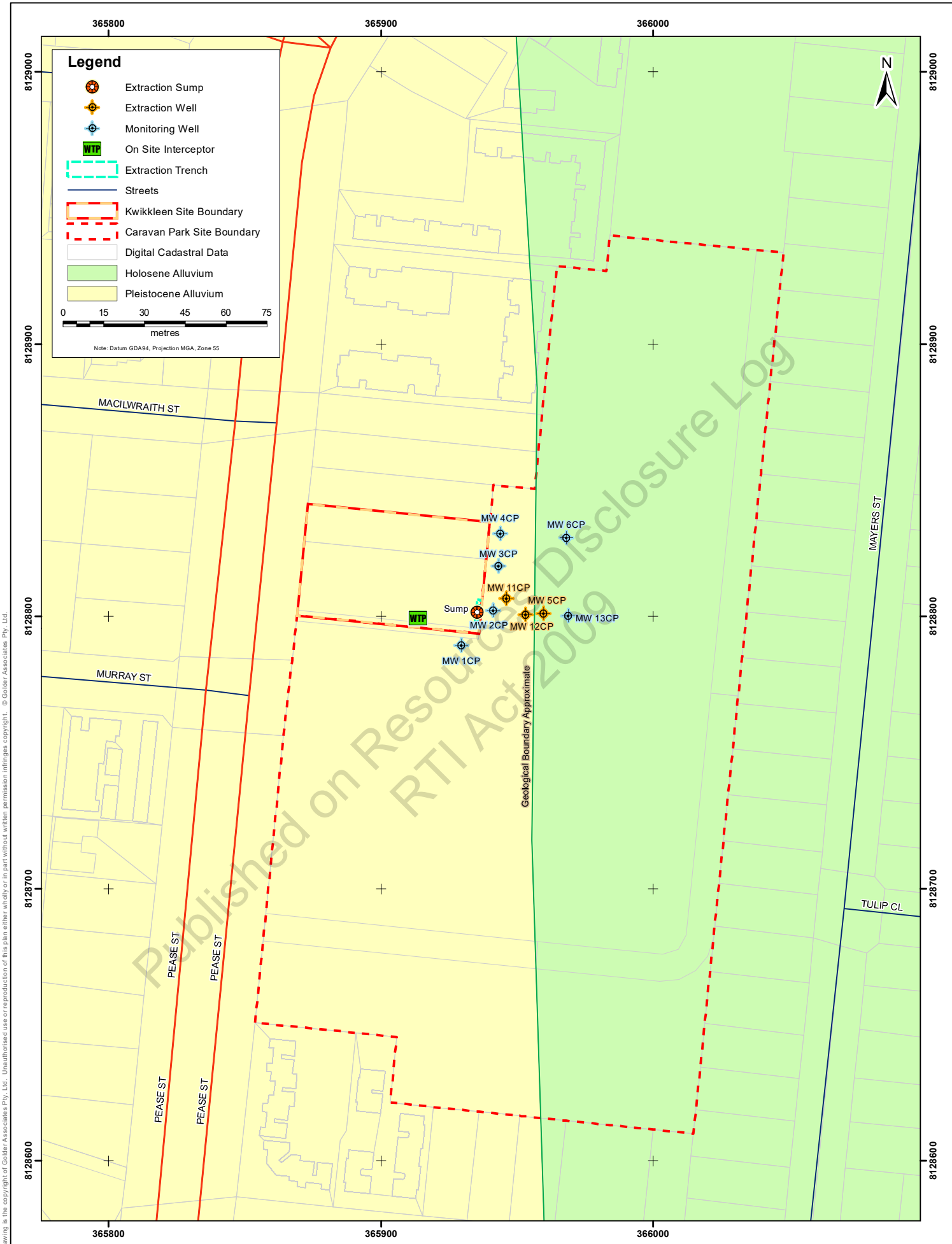
A.B.N. 64 006 107 857

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

document2

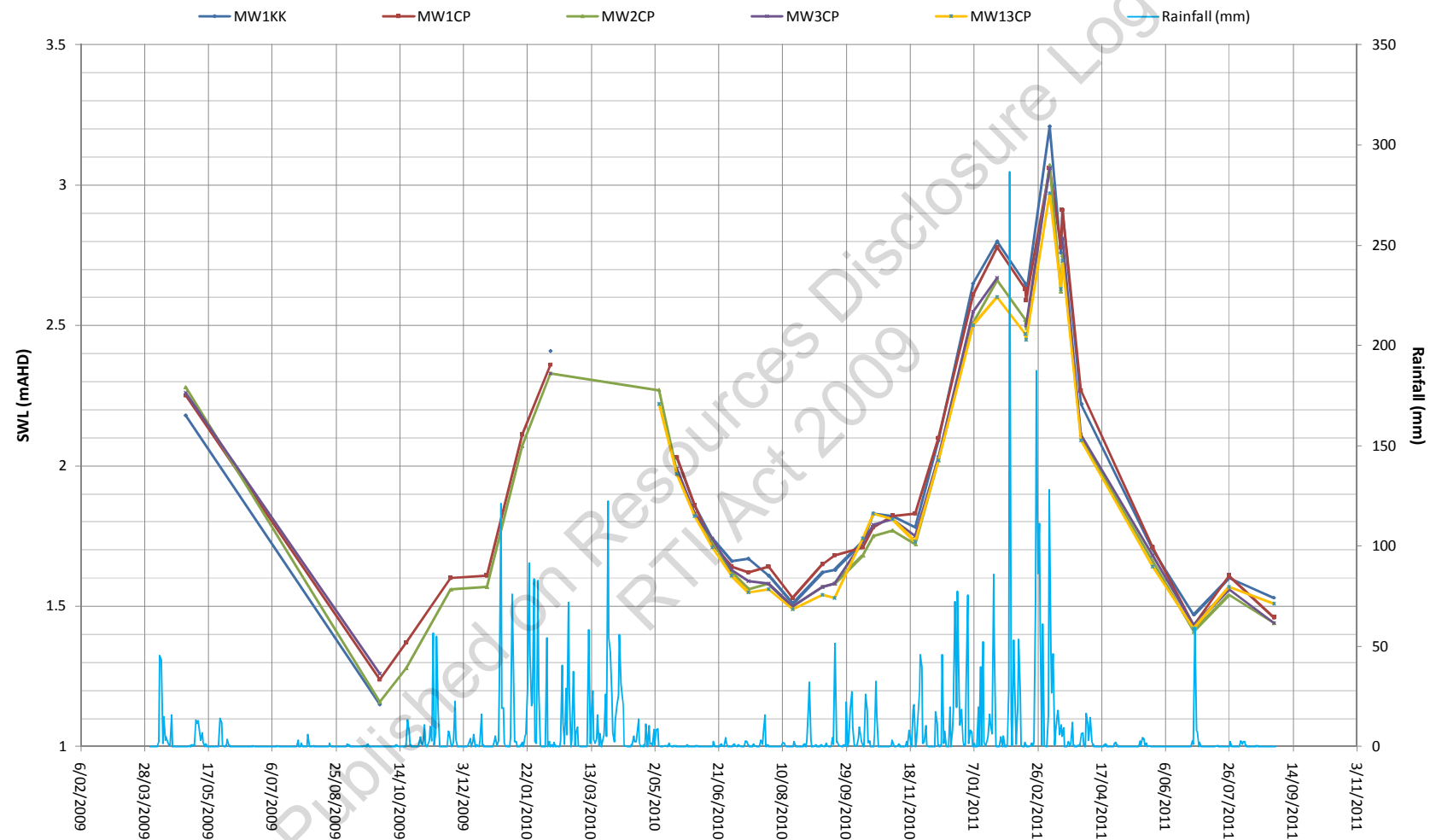


	CLIENT Hospitality Services		PROJECT Groundwater Assessment				
	DRAWN BAG	DATE 14 OCT 2011	TITLE SITE LOCALITY PLAN				
	CHECKED PKS	DATE 14 OCT 2011					
	SCALE 1:15,000		PROJECT No 087673045 021 R		FIGURE No 1	REV No 0	A4



Information contained on this page is unclassified

<p>N.B.</p> <p>1. Base map data copyright Mapinfo Australia Pty Ltd.</p> <p>2. DCDB copyright The State of Queensland (Department of Natural Resources, Mines and Water) 2008.</p> <p>3. Geology data copyright The State of Queensland (Department of Natural Resources and Mines) 2005.</p>		CLIENT Hospitality Services		PROJECT Conceptual Site Model - Cairns Villa & Leisure Park				
		DRAWN BAG		DATE 7 SEPT 2011		TITLE REGIONAL GEOLOGY & GROUNDWATER MONITORING NETWORK		
		CHECKED DD		DATE 7 SEPT 2011				
		SCALE 1:1,250		PROJECT NO 087673045_021_R			FIGURE NO 2	REV NO 0
								A3



Client: Hospitality Services

Drawn By: BAG

Check By: DD

Scale:

Date: 12/09/2011

Date: 13/09/2011

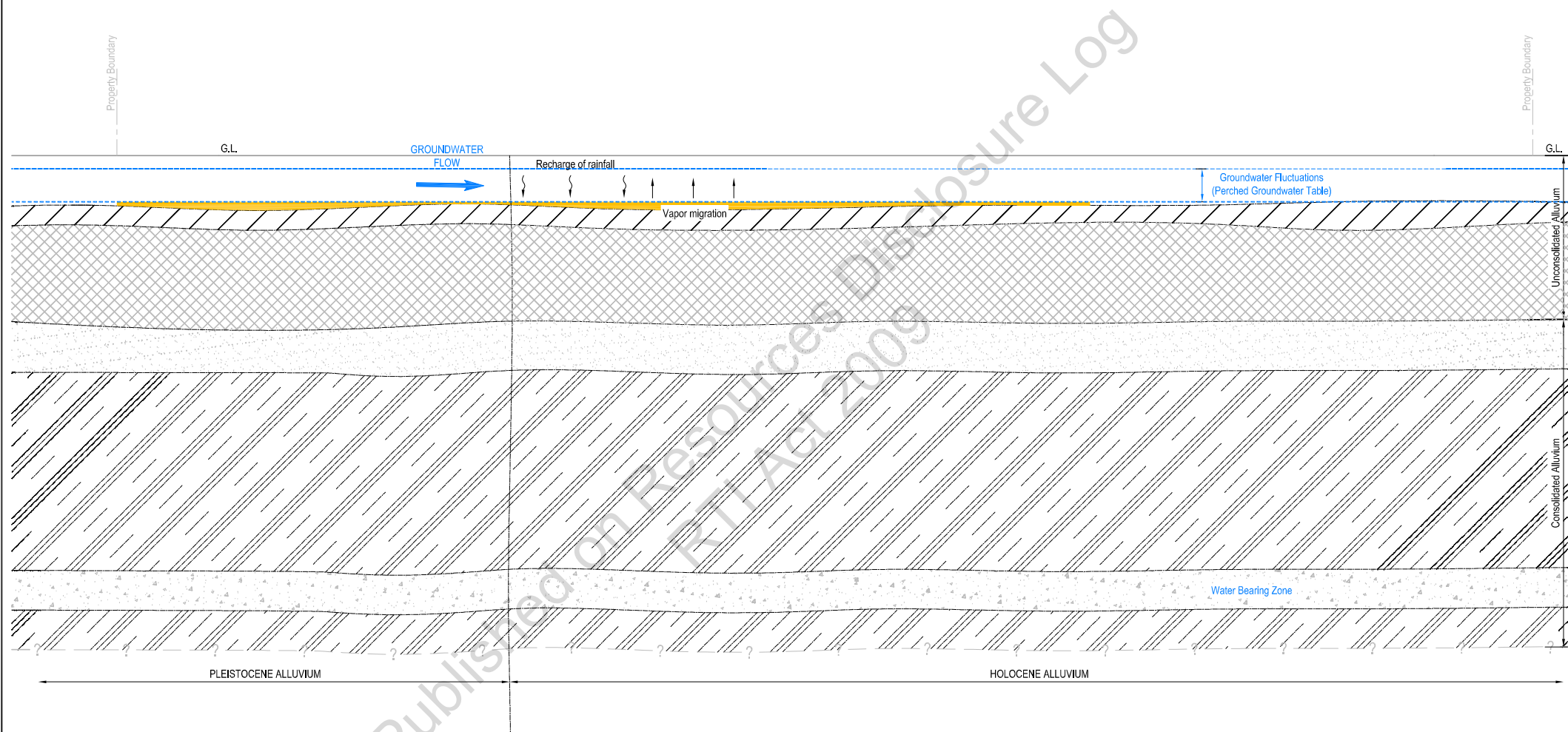
Sheet Size: A3

Project: CSM & QRA FOR PEASE STREET CARAVAN PARK-MANUNDA, QLD

Drawing Title: GROUNDWATER LEVELS

Document Number: 087673045-021-R-Rev0

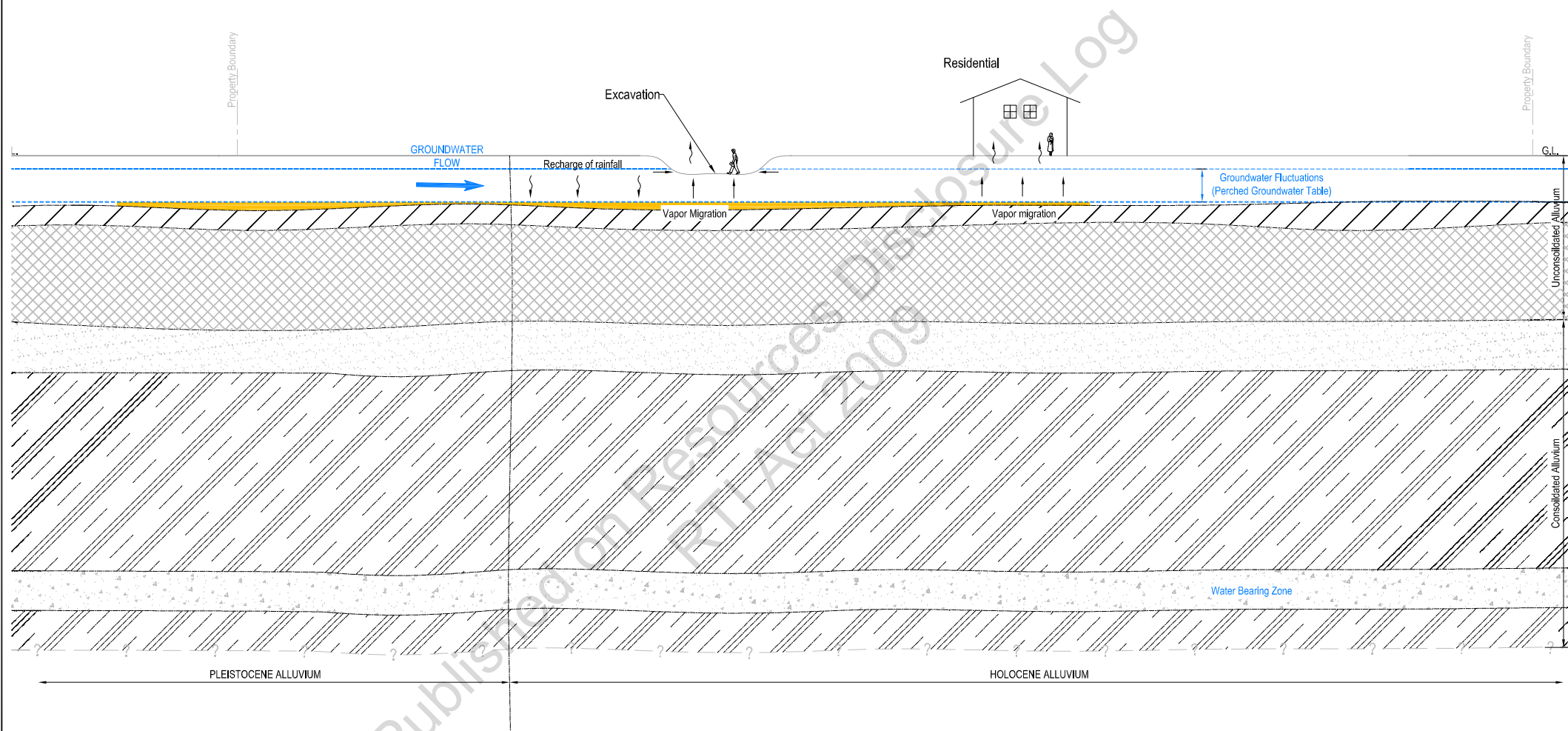
Figure 3



LEGEND

- | | | | |
|--|-------------------------------------|--|--|
| | MARINE CLAY (SEMI CONFINING LAYER) | | CHLORINATED SOLVENTS (DISSOLVED PHASE) |
| | STIFF SANDY CLAY / CLAYEY SAND | | |
| | DENSE CEMENTED SANDS | | |
| | OVER CONSOLIDATED CLAYS (AQUICLUDE) | | |
| | COARSE GRAVELS AND SANDS | | |

 www.golder.com		CLIENT Hospitality Services		PROJECT PEASE STREET CARAVAN PARK - MANUNDA - CSM	
		DRAWN BY ACF	DATE 16.09.2011	DRAWING TITLE GEOLOGICAL AND HYDROLOGICAL CONCEPTUAL SITE MODEL	
		CHECKED BY DD	DATE 05.10.2011		
SCALE NOT TO SCALE		SHEET SIZE A3	PROJECT NO. 087673045	DOC NO. 021	DOC TYPE R
			FIGURE NO. F004	REVISION 0	FIGURE 4A

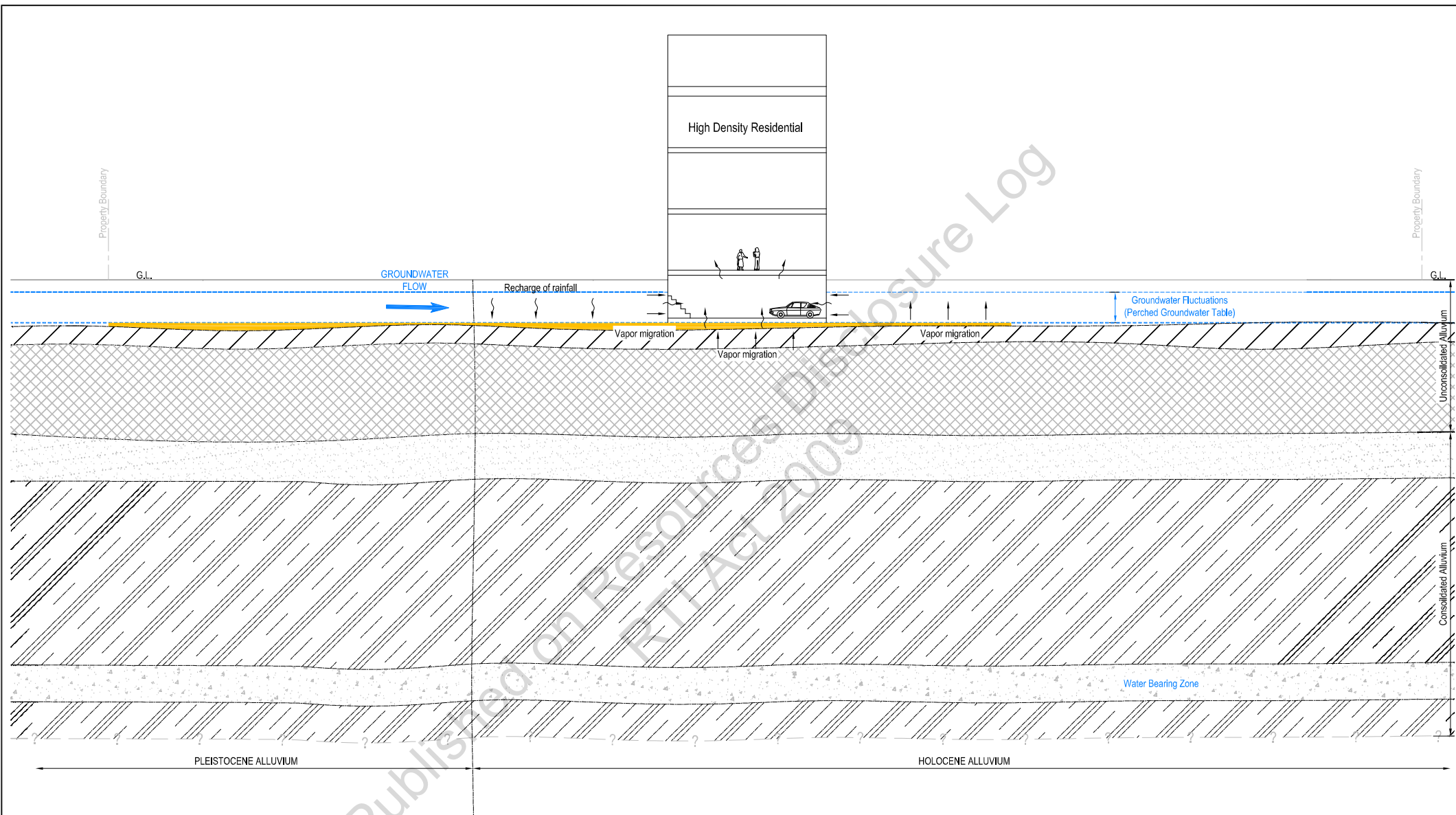


LEGEND

- | | | | |
|--|-------------------------------------|--|--|
| | MARINE CLAY (SEMI CONFINED LAYER) | | CHLORINATED SOLVENTS (DISSOLVED PHASE) |
| | STIFF SANDY CLAY / CLAYEY SAND | | |
| | DENSE CEMENTED SANDS | | |
| | OVER CONSOLIDATED CLAYS (AQUICLUDE) | | |
| | COARSE GRAVELS AND SANDS | | |

 www.golder.com		CLIENT Hospitality Services		PROJECT PEASE STREET CARAVAN PARK - MANUNDA - CSM			
		DRAWN BY ACF	DATE 19.09.2011	DRAWING TITLE GEOLOGICAL AND HYDROLOGICAL CONCEPTUAL SITE MODEL			
		CHECKED BY DD	DATE 05.10.2011				
SCALE NOT TO SCALE		SHEET SIZE A3	PROJECT NO. 087673045	DOC NO. 021	DOC TYPE R	FIGURE NO. F004	REVISION 0
							FIGURE 4B

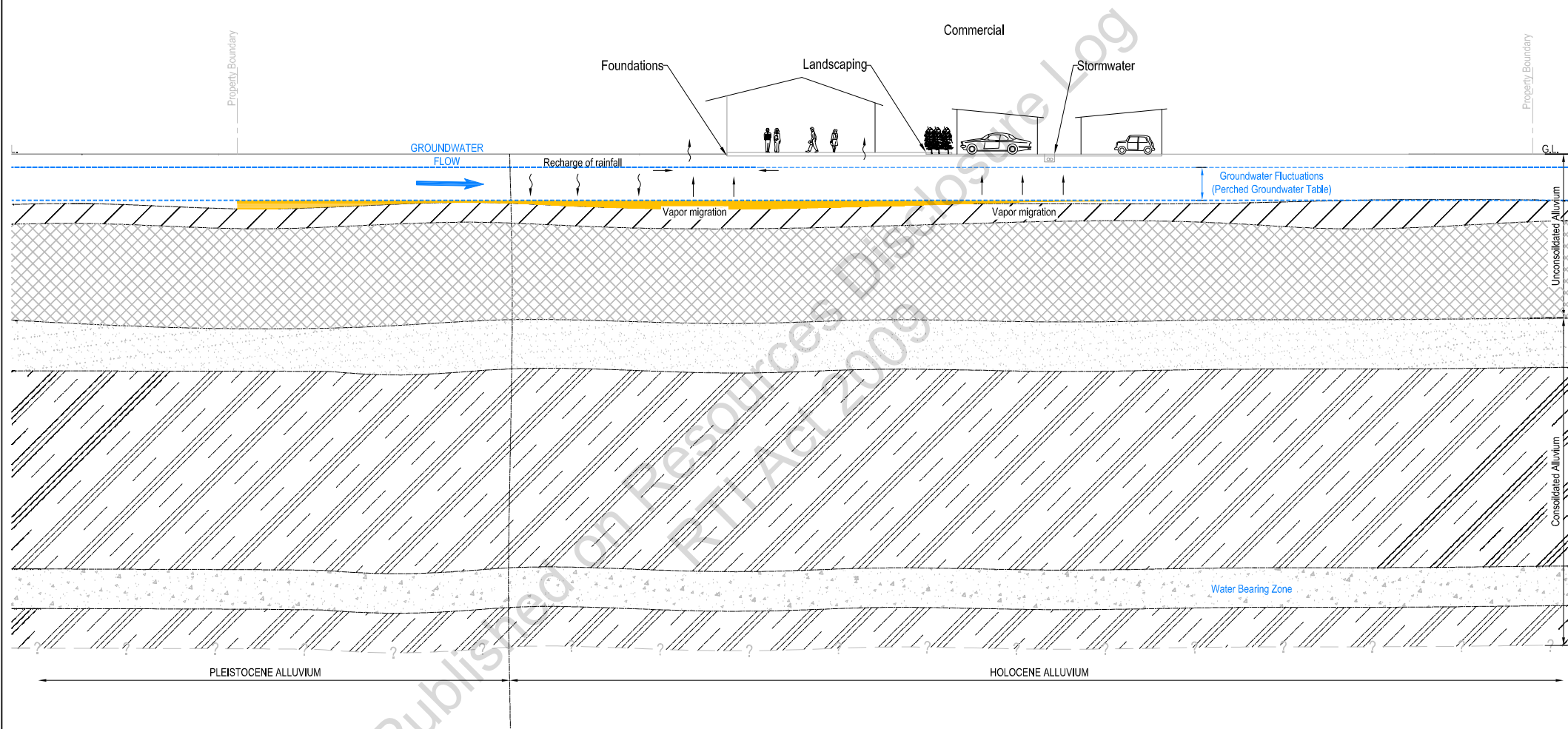
© GOLDER ASSOCIATES PTY. LTD. INFORMATION CONTAINED ON THIS DRAWING IS THE COPYRIGHT OF GOLDER ASSOCIATES PTY. LTD. UNAUTHORISED USE OR REPRODUCTION OF THIS PLAN EITHER WHOLLY OR IN PART WITHOUT WRITTEN PERMISSION INFRINGES COPYRIGHT.



LEGEND

- | | | | |
|--|-------------------------------------|--|--|
| | MARINE CLAY (SEMI CONFINED LAYER) | | CHLORINATED SOLVENTS (DISSOLVED PHASE) |
| | STIFF SANDY CLAY / CLAYEY SAND | | |
| | DENSE CEMENTED SANDS | | |
| | OVER CONSOLIDATED CLAYS (AQUICLUDE) | | |
| | COARSE GRAVELS AND SANDS | | |

 www.golder.com GOLDER ASSOCIATES PTY. LTD.	CLIENT Hospitality Services		PROJECT PEASE STREET CARAVAN PARK - MANUNDA - CSM					
	DRAWN BY ACF	DATE 19.09.2011	DRAWING TITLE GEOLOGICAL AND HYDROLOGICAL CONCEPTUAL SITE MODEL					
	CHECKED BY DD	DATE 05.10.2011						
	SCALE NOT TO SCALE	SHEET SIZE A3	PROJECT NO. 087673045	DWG NO. 021	DWG TYPE R	FIGURE NO. F004	REVISION 0	FIGURE 4C



LEGEND

- | | | | |
|--|-------------------------------------|--|--|
| | MARINE CLAY (SEMI CONFINED LAYER) | | CHLORINATED SOLVENTS (DISSOLVED PHASE) |
| | STIFF SANDY CLAY / CLAYEY SAND | | |
| | DENSE CEMENTED SANDS | | |
| | OVER CONSOLIDATED CLAYS (AQUICLUDE) | | |
| | COARSE GRAVELS AND SANDS | | |

 www.golder.com		CLIENT Hospitality Services		PROJECT PEASE STREET CARAVAN PARK - MANUNDA - CSM			
		DRAWN BY ACF	DATE 19.09.2011	DRAWING TITLE GEOLOGICAL AND HYDROLOGICAL CONCEPTUAL SITE MODEL			
		CHECKED BY DD	DATE 05.10.2011				
SCALE NOT TO SCALE		SHEET SIZE A3	PROJECT NO. 087673045	DOC NO. 021	DOC TYPE R	FIGURE NO. F004	REVISION 0
							FIGURE 4D



APPENDIX A

Groundwater Contaminant Concentration

Published on Resources Disclosure Log
RTI Act 2009

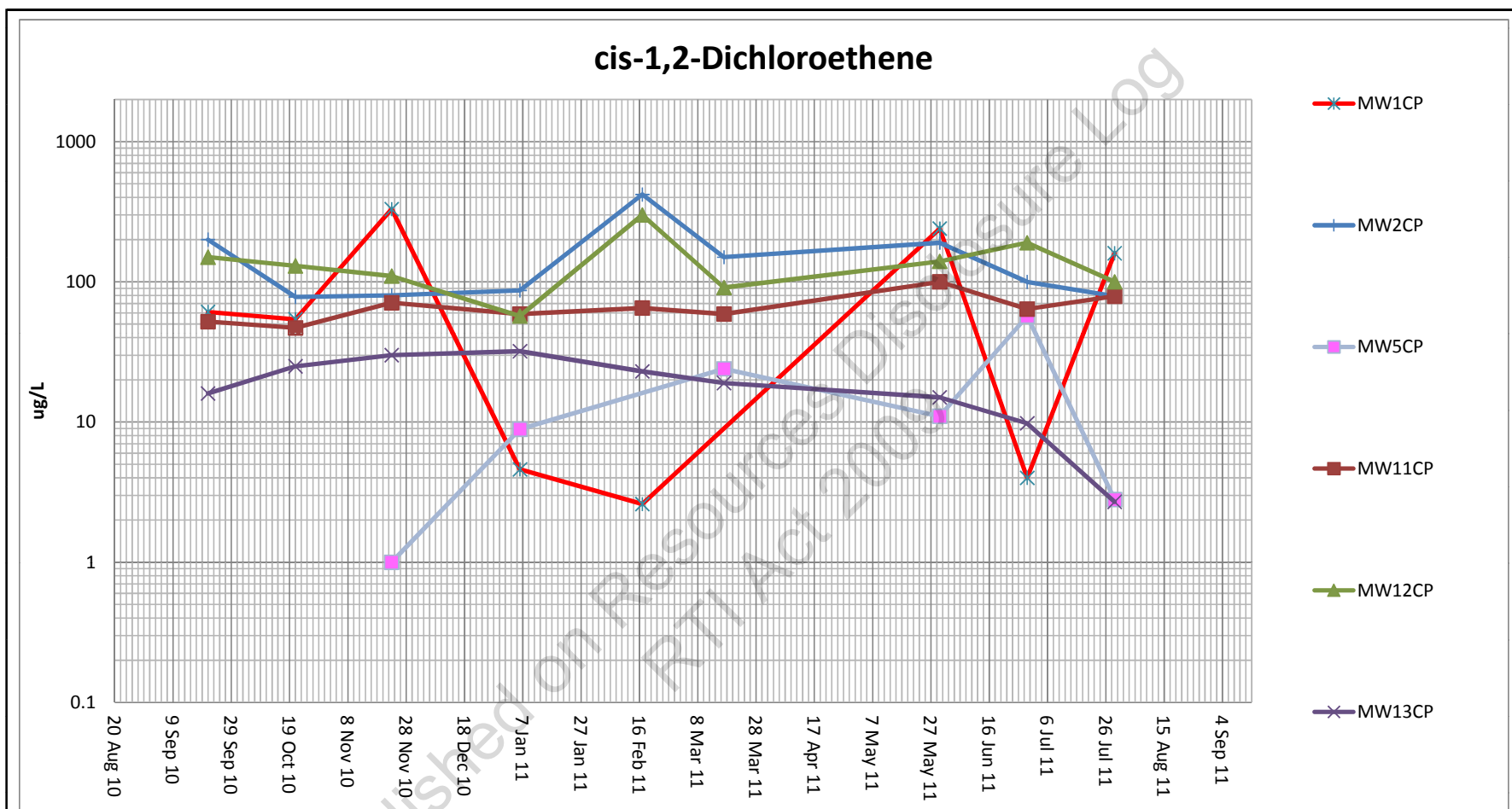


Figure 1

Cis-1,2-Dichlorethene

Date:	Aug 11	Drawn:	BAG
Scale:	nts	Chk'd:	DD
Original:		Rev:	Rev0
File Reference:		087673045	



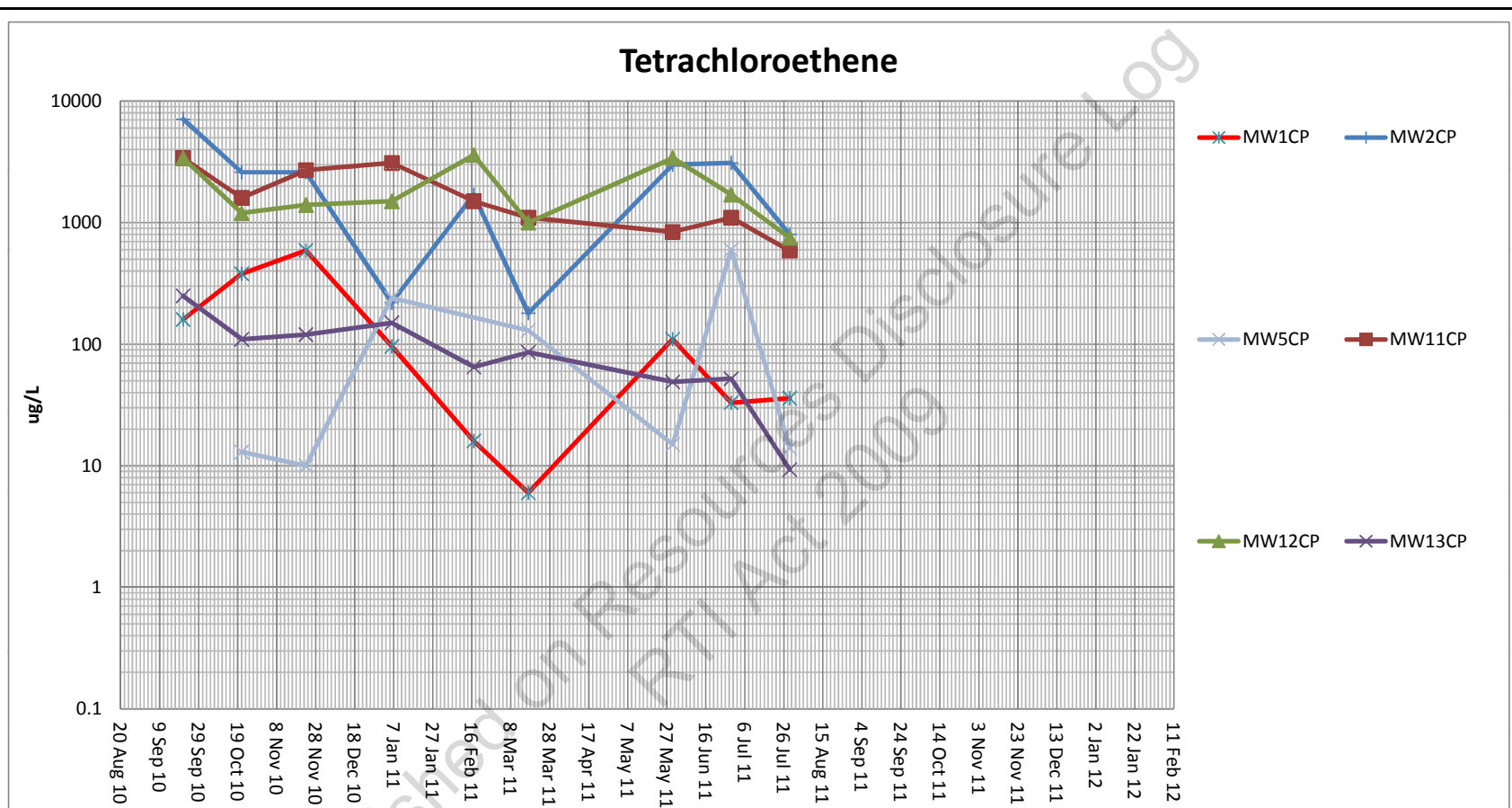


Figure 2

Tetrachlorethene

Date:	Aug 11	Drawn:	BAG
Scale:	nts	Chk'd:	DD
Original:		Rev:	Rev0
File Reference:		087673045	



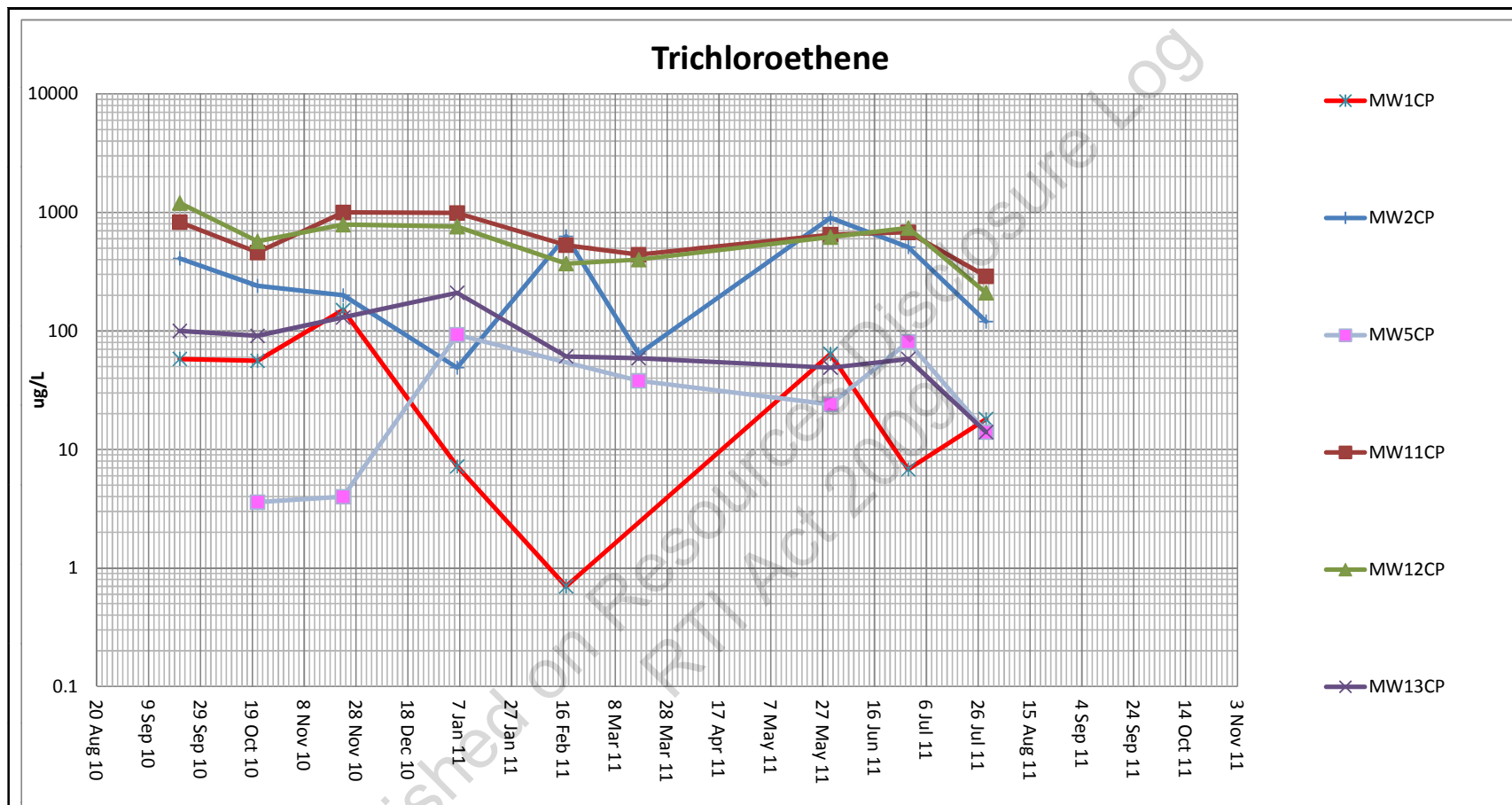


Figure 1

Trichlorethene

Date:	Aug 11	Drawn:	BAG
Scale:	nts	Chk'd:	DD
Original:		Rev:	Rev0
File Reference:		087673045	





APPENDIX B

Risk Assessment Matrix

Published on Resources Disclosure Log
RTI Act 2009



RISK ASSESSMENT MATRIX

Likelihood Description

Almost Certain	5	Is expected to occur in every circumstance (e.g. every time)
Likely	4	Will probably occur in most circumstances (e.g. 1 in 10 times)
Moderate	3	Might occur at some time (e.g. 1 in 100 times)
Unlikely	2	Not expected to occur, but conceivable (e.g. 1 in 1,000 times)
Rare	1	May occur only in exceptional circumstances (e.g. 1 in 10,000 times)

Consequence or Impact Description

		Human Health	Environment
Catastrophic	5	Death	Long-term environmental impact with detrimental effect
Major	4	Extensive injuries, chronic illness	Environmental impact with potential long-term impact
Moderate	3	Medical treatment	Short-term environmental impact requiring assistance to manage.
Minor	2	First aid treatment	Environmental impact can be managed with existing procedures and equipment
Insignificant	1	No injuries	Minimal environmental impact

Risk Level of Hierarchy of Control

1 – 4	(I) Insignificant Risk	Monitor for changed conditions
5 – 9	(L) Low Risk	Monitor for changed conditions
10 – 12	(M) Moderate Risk	General control measures required
15 – 16	(H) High Risk	Specific control measures required
20 – 25	(VH) Very High Risk	The human health or environment risk is unacceptable



Risk Analysis Matrix

Likelihood:		Consequence:				
		Catastrophic	Major	Moderate	Minor	Insignificant
		5	4	3	2	1
Almost Certain	5	25(VH)	20	15	10	5
Likely	4	20	15(H)	12	8	4
Moderate	3	15	12(M)	9(L)	6	3
Unlikely	2	10	8	6	4(I)	2
Rare	1	5	4	3	2	1

Assessment of Risk

Very High – The risk is unacceptable. Proposed methods will need to be altered or an engineered solution provided to avoid or reduce the risk. *Specific control measures required.*

High – The risk is unacceptable. Proposed methods will need to be altered or an engineered solution provided to avoid or reduce the risk. *Specific control measures required.*

Moderate – Proceed with caution. The risk needs to be managed through control procedures. *General control measures required.*

Low – The risk is low and does not require additional controls.

Insignificant – The risk is low and does not require additional controls.



APPENDIX C

Limitations

Published on Resources Disclosure Log
RTI Act 2009



LIMITATIONS

This Document has been provided by Golder Associates Pty Ltd ("Golder") subject to the following limitations:

This Document has been prepared for the particular purpose outlined in Golder's proposal and no responsibility is accepted for the use of this Document, in whole or in part, in other contexts or for any other purpose.

The scope and the period of Golder's Services are as described in Golder's proposal, and are subject to restrictions and limitations. Golder did not perform a complete assessment of all possible conditions or circumstances that may exist at the site referenced in the Document. If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by Golder in regards to it.

Conditions may exist which were undetectable given the limited nature of the enquiry Golder was retained to undertake with respect to the site. Variations in conditions may occur between investigatory locations, and there may be special conditions pertaining to the site which have not been revealed by the investigation and which have not therefore been taken into account in the Document. Accordingly, additional studies and actions may be required.

In addition, it is recognised that the passage of time affects the information and assessment provided in this Document. Golder's opinions are based upon information that existed at the time of the production of the Document. It is understood that the Services provided allowed Golder to form no more than an opinion of the actual conditions of the site at the time the site was visited and cannot be used to assess the effect of any subsequent changes in the quality of the site, or its surroundings, or any laws or regulations.

Any assessments made in this Document are based on the conditions indicated from published sources and the investigation described. No warranty is included, either express or implied, that the actual conditions will conform exactly to the assessments contained in this Document.

Where data supplied by the client or other external sources, including previous site investigation data, have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by Golder for incomplete or inaccurate data supplied by others.

Golder may have retained subconsultants affiliated with Golder to provide Services for the benefit of Golder. To the maximum extent allowed by law, the Client acknowledges and agrees it will not have any direct legal recourse to, and waives any claim, demand, or cause of action against, Golder's affiliated companies, and their employees, officers and directors.

This Document is provided for sole use by the Client and is confidential to it and its professional advisers. No responsibility whatsoever for the contents of this Document will be accepted to any person other than the Client. Any use which a third party makes of this Document, or any reliance on or decisions to be made based on it, is the responsibility of such third parties. Golder accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this Document.

At Golder Associates we strive to be the most respected global company providing consulting, design, and construction services in earth, environment, and related areas of energy. Employee owned since our formation in 1960, our focus, unique culture and operating environment offer opportunities and the freedom to excel, which attracts the leading specialists in our fields. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees who operate from offices located throughout Africa, Asia, Australasia, Europe, North America, and South America.

Africa	+ 27 11 254 4800
Asia	+ 86 21 6258 5522
Australasia	+ 61 3 8862 3500
Europe	+ 356 21 42 30 20
North America	+ 1 800 275 3281
South America	+ 55 21 3095 9500

solutions@golder.com
www.golder.com

Golder Associates Pty Ltd
216 Draper Street
Cairns, Queensland 4870
Australia
T: +61 7 4054 8200

ATTACHMENT E

Delineation Investigation, Cairns Villa Caravan Park, Golder Associates Pty Ltd, Ref. No. 087673045-033-R-Rev0, dated 20 August 2012.



20 August 2012

DELINEATION INVESTIGATION

Cairns Villa Caravan Park

Submitted to:

sch4p4(6) Personal i
32-36 Pease Street
Manunda QLD 4883

REPORT



Report Number.

087673045-033-R-Rev0

Distribution:

1 Electronic Copy
1 Electronic Copy

sch4p4(6) Personal in
Third Party Reviewer





Table of Contents

1.0 INTRODUCTION	1
2.0 BACKGROUND	1
3.0 INVESTIGATIONS	2
3.1 General	2
3.2 MIP	3
3.2.1 Groundwater	4
3.3 Soil Vapour	4
3.3.1 Vapour Well Details	4
3.3.2 Sampling Methodology	5
3.3.3 Investigation Data QA/QC	5
4.0 RESULTS	6
4.1 Subsurface Profile	6
4.2 MIP	6
4.3 Groundwater	7
4.4 Soil Vapour Analysis	7
4.5 Interpreted Contaminant Distribution	8
5.0 CONCLUSIONS AND RECOMMENDATIONS	8
6.0 LIMITATIONS	9



FIGURES

- Figure 1 Site Location
- Figure 2 Previous Investigation Locations
- Figure 3 Current Investigation Locations
- Figure 4 Subsurface Cross-sections
- Figure 5 MIP Contours Upper Sand Layer
- Figure 6 MIP Contours Marine Clay Layer

APPENDICES

APPENDIX A

Groundwater Monitoring Results

APPENDIX B

Soil Gas Vapour Results

APPENDIX C

Field Investigation Results

APPENDIX D

Laboratory Test Certificates

APPENDIX E

Limitations

Published on Resources Disclosure Log
RTI Act 2009



1.0 INTRODUCTION

Golder Associates Pty Ltd (Golder) was commissioned by Mr sch4p4(6) Personal to conduct additional investigations at the Cairns Villa Caravan Park, Pease St, Manunda (Site). The location of the investigation area is shown in Figure 1.

The aim of the additional investigations was to delineate the area of chlorinated solvent impact on the caravan park site where concentrations prevent removal of this site from the Environmental Management Register (EMR).

This report describes the works conducted and the findings of the investigations.

2.0 BACKGROUND

Mr sch4p4(6) Plowns property adjacent to the Cairns Villa Caravan Park site (see Figure 1) which had been used as a dry cleaning and laundry operation. The owners of the caravan park site identified the presence of chlorinated solvents in groundwater samples collected from their site in 2007.

Locations where investigations have previously been conducted by the caravan park owners and Mr sch4p4(6) Pl are shown on Figure 2. These investigations identified the contaminants of concern (COC) to be Tetrachloroethene (PCE) and its breakdown products - Trichloroethylene (TCE) and cis-1,2-dichloroethene (cis DCE). Limited soil sampling during the various previous investigations have not detected significant concentrations of the contaminants of concern on the caravan park site. No free phase product has been observed in groundwater samples collected from the caravan park site during previous investigations or subsequent groundwater monitoring events. Vinyl chloride has not been detected in analysed groundwater samples.

Groundwater extraction using bottom loading pumps has been conducted on the caravan park site since late 2009. Pumps are currently installed in MW4KK (on the dry cleaner site), MW11CP, MW12CP and MW5CP. Additionally, a product recovery trench was installed in October 2010 along part of the eastern boundary of the dry cleaner site to extract impacted groundwater and to mitigate movement of impacted groundwater between the sites. Available groundwater monitoring results are summarised in Appendix A.

Golder prepared a Site Conceptual Model and Qualitative Risk Assessment report (0867673045-021-R-Rev0 in October 2011) aimed at identifying acceptable remediation criteria to allow removal of the caravan park site from the EMR. This report proposed the use of soil gas concentrations as the basis of assessing suitability for unrestricted site use. Following review of this report, the Third Party Reviewer confirmed that the achievement of the following soil gas concentrations [derived from the Draft NEPM Guidelines for the Assessment of Site Contamination (as varied 2011)] would allow removal of the site from the EMR.

Chemical	Remediation Criteria (mg/m ³)
TCE	2
PCE	10
Cis-1,2-dichloroethene	2

Soil vapour sampling conducted in December 2011 and again in February 2012 (summarised in Appendix B) confirmed soil gas concentrations of PCE and TCE above these remediation criteria.



3.0 INVESTIGATIONS

3.1 General

Two stages of investigation were conducted. Stage 1 was carried out between 2 July and 6 July, 2012 and comprised:

- Utilisation of a Membrane Interface Probe (MIP) to provide real-time data to assist in the evaluation of the extent of chlorinated solvent impact. The MIP equipment and an experienced operator were supplied by Numac Drilling with probe pushing conducted using Golder Associate's drill rig. Numac Drilling followed calibration, operational and decontamination procedures in accordance with Geoprobe Systems Standard Operating Procedures.
- Probes were pushed at 29 locations (identified as MIP01 to MIP14, MIP16 to MIP28, SMIP02 and SMIP03) across the site. These locations represent a grid of approximately 10m intervals plus infill locations across the expected area of impact and surrounds. Probe locations are shown on Figure 3.
- The MIP was generally pushed to a depth of approximately 6.5 metres.
- At completion of the probing, groundwater samples were collected from selected groundwater monitoring wells (MW1CP, MW2CP, MW3CP and MW13CP) and analysed to allow correlation with MIP results.

Following preliminary review of the MIP data, Stage 2 investigation was conducted between 6 July 2012 and 30 July 2012 and comprised:

- Three new soil vapour wells identified as SVW05, SVW06 and SVW07) were installed at the interpreted margins of the impacted area to the north, south and east (based on the results of the MIP investigation). New and existing vapour well locations are shown on Figure 3.
- The vapour points were installed at a depth of approximately 1.5 m (at least 0.3m above the groundwater level).
- A first round of soil vapour sampling was conducted on all existing and newly installed wells on 13 July 2012.
- A second round of soil vapour sampling was conducted on all existing and newly installed wells on 30 July 2012.



3.2 MIP

The MIP is used for continuous insitu screening of chlorinated and other volatile organic compounds (VOCs) in both the saturated and vadose zones.

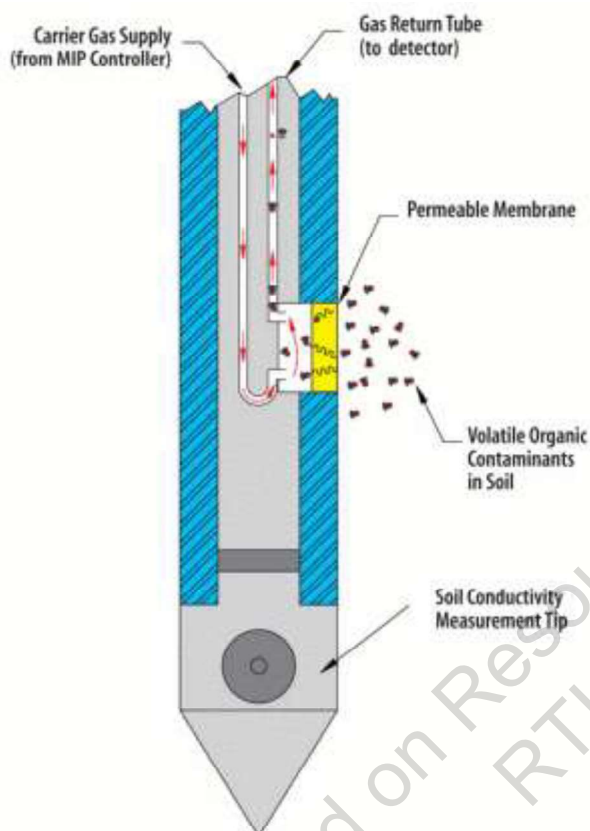


Diagram 1 – Configuration of MIP Probe
(Courtesy of Geoprobe Systems)

As the MIP cone is advanced through the subsurface, it volatilises any VOCs via a heated membrane on the cone's sleeve (Diagram 1). This causes the heated compounds to thermodesorb from the soil and diffuse across the membrane. Inside the probe they are transported by a carrier gas stream through capillaries in the MIP cable up to a truck where they are detected with a gas chromatograph equipped with a photo-ionisation detector (PID), flame ionisation detector (FID) and a halogen specific detector (XSD).

This detector combination allows for qualitative specification of the contaminant types. Each detector provides sensitivity to a particular group or type of contaminant. The XSD is highly specific to halogenated compounds and is the best detector when the MIP is used for logging chlorinated solvent (such as PCE and TCE) plumes or source areas. The PID provides sensitivity to aromatic compounds (such as BTEX) and provides confirmation of chlorinated ethylene compounds detected by the XSD. The FID is a general detector useful for hydrocarbon detection as well as confirmation of high concentration of all compounds seen on the other two detectors.

Petroleum hydrocarbons will respond on the PID and FID but not on the XSD. Double bonded chlorinated compounds such as PCE and TCE are detected by the XSD and PID which will respond with a similar profile. Chlorinated compounds without multiple bonds such as chloroform and methylene chloride have a higher ionisation potential than the PID electron voltage which results in a response on the XSD which does not show up on the PID.

The MIP cone also contains a soil conductivity dipole to measure electrical conductivity (EC). These EC readings are simultaneously recorded with the detector responses. The EC log can be interpreted to provide a probable lithology of the subsurface.

The data produced by the MIP is semi-quantitative, providing detector measurements in micro-volts (uV). These results need to be correlated against laboratory derived concentrations for soil, soil vapour and/or groundwater.

MIP probe results are presented in Appendix C.



3.2.1 Groundwater

Existing groundwater monitoring wells MW1CP, MW2CP, MW3CP and MW13CP were purged on 6 July 2012 and then sampled on 9 July 2012 to allow well conditions to stabilise.

- All wells were purged to remove at least three well volumes. Purging was conducted using clean, dedicated waterra footvalve and tube systems in all wells.
- Sampling was conducted using new, clean disposable double check valve bailers. The bailer was lowered slowly to the base of the water column to gather a water sample from the bottom of the well. On withdrawal from the well, the bailer was fitted with a disposable VOC sampler to reduce aeration and the loss of volatiles during transference to sample vials.
- A duplicate sample was collected for QA/QC purposes.

Groundwater samples were collected by experienced personnel in accordance with standard procedures documented in Golder Associates Technical Procedures. These procedures generally include decontamination, sample handling, sample storage and documentation. A brief outline of key procedures is provided below:

- All reusable equipment utilised in the sampling process was decontaminated on arrival at site and prior to collection of each sample. Decontamination included the scrubbing and washing of equipment with a biodegradable phosphate free detergent, followed by washing in potable water and then rinse with de-ionised water.
- Sample containers types appropriate for the analysis proposed were supplied by the testing laboratories. Where required, appropriate preservatives were placed in containers by the laboratory prior to shipment to Golder Associates. Sample containers were marked with a unique sample number, the sample location, the sample depth, date and Golder Associates' project number.
- Samples requiring organic analysis were immediately placed in airtight containers supplied by the testing laboratory and then placed into a chilled insulated esky for transportation to the laboratory. If required, samples were stored overnight in a refrigerator at Golder Associates Cairns office.
- Field log sheets were completed by field staff to compile information on sample locations, soil profile and sample depths. Chain of custody and analysis request forms were completed and sent with soil and water samples to the testing laboratory.
- Nitrile gloves were worn at all times to prevent accidental dermal contact with contaminants. Sampling procedures used were aimed at only decontaminated sampling equipment coming into contact with the water to be sampled to prevent cross-contamination of samples.

Groundwater samples were submitted to SGS Environmental for analysis of contaminants of concern. Laboratory certificates of analysis are presented in Appendix D.

3.3 Soil Vapour

3.3.1 Vapour Well Details

Soil vapour wells SVW05, SVW06 and SVW07 were installed on 6 July 2012. A single vapour sampling probe implant with attached PTFE (Teflon) tubing was installed near the base of the borehole and covered with at least 300mm of clean, washed sand. The sample point location was sealed with a 50mm thick layer of bentonite mud and the remainder of the borehole was sealed with a cement and bentonite grout. A steel Gattic-style cover was concreted into place to protect each sampling point. The vapour wells were left for a week to enable stabilisation and grout setting, prior to collection of the first round of samples.

Soil profile and construction details are presented in Appendix C.



3.3.2 Sampling Methodology

The procedure for sampling VOCs using evacuated canisters, and for the subsequent analysis, is described in USEPA Method TO-15. The method involves the collection of whole air samples in passivated electropolished stainless steel canisters. The VOCs are subsequently separated by gas chromatography (GC), and measured by mass selective (MS) detector or multi-detector techniques.

SUMMA canister sampling was conducted in accordance with Golder Technical Procedure TP13 'Soil Gas Bore Sampling' as outlined below:

- The sampling train consisted of PTFE tubing, a glass impinger (moisture trap), flow controller and a 1 Litre SUMMA canister;
- The soil gas bore and sampling train (PTFE tubing and glass moisture trap) were purged with a volume equal to three times the total bore and sampling train volume, immediately prior to sample collection;
- Samples were collected in low volume (1 litre) SUMMA canisters to reduce the possibility of atmospheric breakthrough and a false negative result;
- SUMMA canisters were equipped with a flow restricting orifice and a vacuum gauge to enable sampling over a nominal one hour period, again minimising the potential for atmospheric breakthrough; and
- A shroud and tracer gas was used during collection of all primary soil vapour samples.

SUMMA canister sampling was carried out in accordance with Golder Test Method No. C9 "Canister (Evacuated) Sampling for VOC and Reduced Sulphur Compounds: In Ambient Air and Source Emissions".

Sample analysis was conducted by Eurofins Air Toxics Ltd., in accordance with modified USEPA Method TO15. Eurofins Air Toxics Ltd is accredited by NELAP/Florida Department of Health for analyses of VOCs by the described method (Laboratory Accreditation No. E87680). Laboratory certificates of analysis are presented in Appendix D.

3.3.3 Investigation Data QA/QC

The following QA/QC measures were included in the sampling program:

- Above ground sampling tubing and in-line moisture traps (i.e. impingers) were replaced before sampling each bore to prevent cross contamination.
- Field blanks were collected at the rate of 1 per sampling event. Field blanks were obtained as ambient air samples recovered from the sampling train prior to soil gas sample collection to determine possible ambient air and sample train contaminants.
- Replicates were collected at the rate of 1 per sampling event taken as a check for repeatability. A replicate sample was collected immediately following the primary sample and subjected to the same preservation, holding and analysis methods.
- Initial leak tests were conducted on each SUMMA canister prior to collection of sample to ensure that the canisters had not lost vacuum in transit and that flow controllers would not leak during collection of sample.
- Tracer gas (ultra high purity helium) was monitored within a shroud during collection of all primary soil vapour samples to assess the potential for atmospheric breakthrough and a false negative result.
- Chain of custody documentation was completed for all samples collected.



4.0 RESULTS

4.1 Subsurface Profile

Sections A-A and B-B have been constructed based on previous borehole information and the MIP data to provide an update of the conceptual site model subsurface conditions. Section A-A is generally north-south (perpendicular to the direction of groundwater flow) and Section B-B is orientated west-east in the direction of groundwater flow. Cross-sections are presented on Figure 4.

The subsurface conditions present are generally as discussed in the original conceptual site model, comprising:

- Sandy soils typically from the surface to depths of between 2 m and 2.5 m (below the ground surface - bgs) near the dry cleaner/caravan park boundary increasing to a depth of about 3 m bgs towards the eastern extent of the area investigated.
- Sandy soils are underlain by a marine clay unit and other undifferentiated alluvial clay deposits to depths of at least 6.5 m bgs (the maximum depth of investigation).

The key variation to the original conceptual site model revealed by the MIP investigation was a zone of irregular sandy bands indicated to be present in the upper 1 m to 2 m of the marine clay unit. This zone is shown on the cross-sections in Figure 4.

The groundwater depth was measured at between about 1.5 m and 1.9 m bgs at the time of the current investigations (i.e. within the upper sand unit).

4.2 MIP

No to minor ($< 0.3 \times 10^4$ uV) XSD responses were detected over the full probe depth at:

- MIP02
- MIP03
- MIP04
- MIP05
- MIP22
- MIP24
- MIP26

The results at these locations have been interpreted to represent the absence of solvent impact.

The most significant normalised XSD peaks (greater than 1×10^5 uV) were detected in the sand bands within the marine clay unit as follows:

- MIP07 between 3.5 m and 4 m
- MIP09 between 2.6 m and 4.5 m
- MIP14 between 3 m and 3.2 m

To evaluate contaminant distribution underlying the site area the MIP results have been considered as follows:



- Figure 5 show interpreted contours of highest MIP readings encountered in unsaturated and saturated sandy materials overlying the marine clay unit. Readings from this zone were expected to provide a correlation against soil vapour readings.
- Figure 6 shows interpreted contours of highest MIP readings in sandy bands within the marine clay. These readings were generally higher than those obtained in the overlying sandy soil but may represent a risk of future vapour release that could impact the unsaturated soils.

4.3 Groundwater

Groundwater results for MW1CP, MW2CP, MW3CP and MW13CP are presented in Appendix A along with results from previous groundwater monitoring at the site.

These results have been compared against peak normalised XSD values at adjacent MIP locations within an equivalent depth range to the screened section of each well (it was noted that the peak values recorded at each of the adjacent MIP locations fell within the well screened zone). This comparison indicated the following:

Monitoring Well Location	PCE (ug/L)	TCE (ug/L)	Cis DCE (ug/L)	Peak XSD in Screen Zone (uV)
MW1CP	3.8	18	22	2.5×10^4 (MIP16)
MW2CP	3800	2000	510	11.2×10^4 (MIP9)
MW3CP	15	72	33	1.4×10^4 (MIP01)
MW13CP	110	70	0.6	0.4×10^4 (MIP12)

This comparison suggests that the level of groundwater impact may be within acceptable concentrations for normalised XSD values of less than about 2.5×10^4 uV.

4.4 Soil Vapour Analysis

Soil vapour analysis results for SVW1 to SVW7 are presented in Appendix B along with results from previous soil vapour sample events at the site.

The average of results from the current two rounds has been compared against peak normalised XSD values in adjacent MIP locations within the upper sand materials and within the underlying clay unit. This comparison indicated the following:

Monitoring Well Location	PCE (mg/m ³)	TCE (mg/m ³)	Cis DCE (mg/m ³)	Peak XSD in Upper Sands (uV)	Peak XSD in underlying Clay (uV)
SVW1	69.5	16.5	5.8	3.2×10^4 (MIP09)	11.2×10^4 (MIP09)
SVW2	24	6.7	0.8	0.7×10^4 (MIP8)	3.5×10^4 (MIP8)
SVW3	130	11.45	1.65	1.6×10^4 (MIP14)	7.6×10^4 (MIP14)
SVW4	10.7	1.26	0.13	0.4×10^4 (MIP6)	1.7×10^4 (MIP6)
SVW5	5.6	0.08	ND	0.2×10^4 (MIP1)	1×10^4 (MIP1)



SVW6	29	2.65	0.14	0.3×10^4 (SMIP03)	2.5×10^4 (SMIP03)
SVW7	0.49	0.0125	ND	0.2×10^4 (MIP21)	1.3×10^4 (MIP21)

Shading indicates concentrations within the adopted Remediation Criteria

This comparison suggests that the level of soil gas impact is likely to be within acceptable concentrations when:

- Normalised XSD values of less than about 0.2×10^4 uV are present in the upper sand layer; and
- Normalised XSD values of less than about 1.5×10^4 uV are present in the underlying clay layer.

4.5 Interpreted Contaminant Distribution

Based on the findings in the preceding sections, the interpreted extent of contamination of concern has been contained within the area marked on both Figures 5 and 6. The marked area has been “squared” and aligned against existing property boundaries, where possible, to simplify possible subdivision of this area from the remainder of the caravan park site. The marked area equates to approximately 1755 m². This should be confirmed by a licensed cadastral surveyor.

On the basis that a building will not be constructed over this area and that pumping or other longer term remediation measures will continue within this defined area to prevent further migration of contamination, no additional “buffer” zone is considered to be warranted. Should ongoing remediation and management of this area not be planned then further modelling and monitoring of contaminant movement will be required to provide an appropriate “buffer” zone.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Interpretation of results obtained during the additional investigations has resulted in a more comprehensive understanding of the vertical and lateral extent of contamination on the caravan park site. The findings from the investigation are as follows:

- The subsurface conditions contained within the original conceptual site model have generally been confirmed during the additional investigations. The main enhancement of the conceptual site model was the identification of a zone containing irregular sand bands within the upper portion of the marine clay unit, which had previously been assumed to be a confining layer.
- Peak MIP readings across the caravan park site were generally identified in the sand bands within the marine clay, typically within about 4.5m depth below the ground surface. MIP readings in saturated and unsaturated sands overlying the marine clays were lower.
- Groundwater monitoring and pumping wells generally extend below the depth of the identified peak MIP readings. Therefore groundwater results are considered to be indicative of the highest contaminant concentrations and pumping is also considered to be targeting the impacted zone.
- The lateral extent of the area interpreted as having soil gas concentrations exceeding the nominated remediation criteria falls within an approximate 1755 m² parcel of land as marked on Figure 5 and Figure 6. This marked area is considered suitable to define the amount of land that should remain on the EMR at this time. Providing that a building is not be constructed over this area and that pumping or other longer term remediation measures continue within this defined area to prevent further migration of contamination, the remainder of the caravan park site is considered suitable for unrestricted use and we recommend that it be removed from the EMR once subdivision from the impacted area has been completed.
- It is recommended that the pumping system be expanded to the south and in the vicinity of MIP14 to address elevated MIP and soil gas readings in this area.



6.0 LIMITATIONS

Your attention is drawn to the document "Limitations", which is included in Appendix E of this report. The statements presented in this document are intended to advise you of what your realistic expectations of this report should be. The document is not intended to reduce the level of responsibility accepted by Golder Associates, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in so doing.

GOLDER ASSOCIATES PTY LTD

sch4p4(6) Personal information

sch4p4(6) Per

Principal Environmental Engineer

PKS/JSB/klm

A.B.N. 64 006 107 857

Golder, Golder Associates and the GA globe design are trademarks of Golder Associates Corporation.

j:\env\2008\087673045 - kwikleen dry cleaners, pease st\correspondence out\087673045-33-r-rev0 delineation investigation.docx



SITE LOCALITY

MR sch4n4(6) Per



LEGEND

- Former Dry Cleaner
- Caravan Park
- Digital Cadastral Data

NOTES

All locations derived via GPS & groundtruthed by Field staff.

COPYRIGHT

1. Base map data copyright Mapinfo Australia Pty Ltd.
2. DCDB copyright The State of Queensland (Department of Natural Resources, Mines and Water) 2011.

0 5 10 20 30 40 50 metres

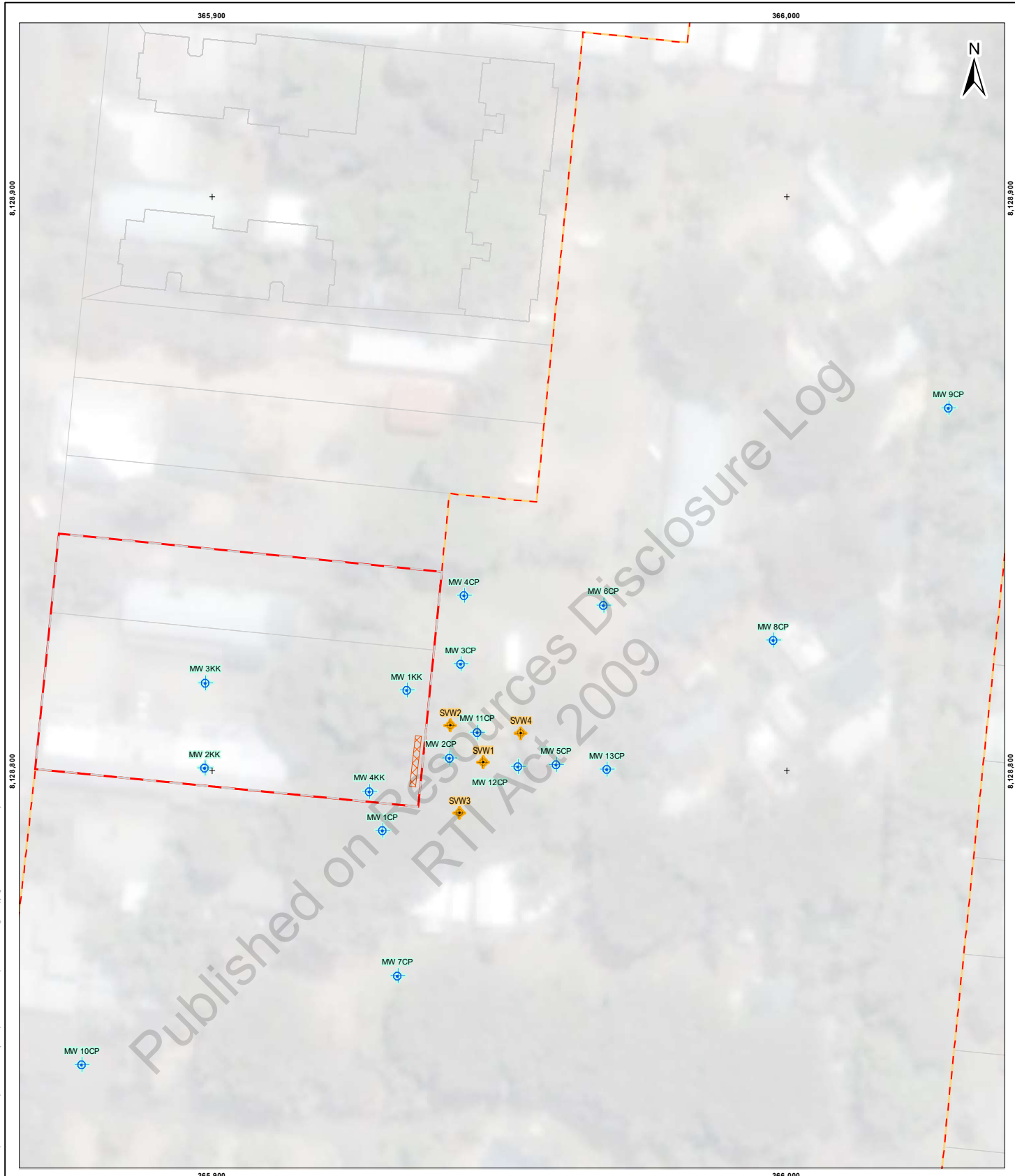
SCALE (at A3) 1:1,500

DATUM GDA94, PROJECTION MGA Zone 55

PROJECT: 087673045
DATE: 20 AUG 2012
DRAWN: sb
CHECKED: PKS

FIGURE 1





FORMER INVESTIGATION LOCATIONS

MR sch4p4(6) Pers



LEGEND

- Soil Gas Wells
- Monitoring Well
- Trench

NOTES

All locations derived via GPS & groundtruthed by Field staff.

COPYRIGHT

1. Base map data copyright Mapinfo Australia Pty Ltd.
2. DCDB copyright The State of Queensland (Department of Natural Resources, Mines and Water) 2011.

0 2.5 5 10 15 20 25 metres

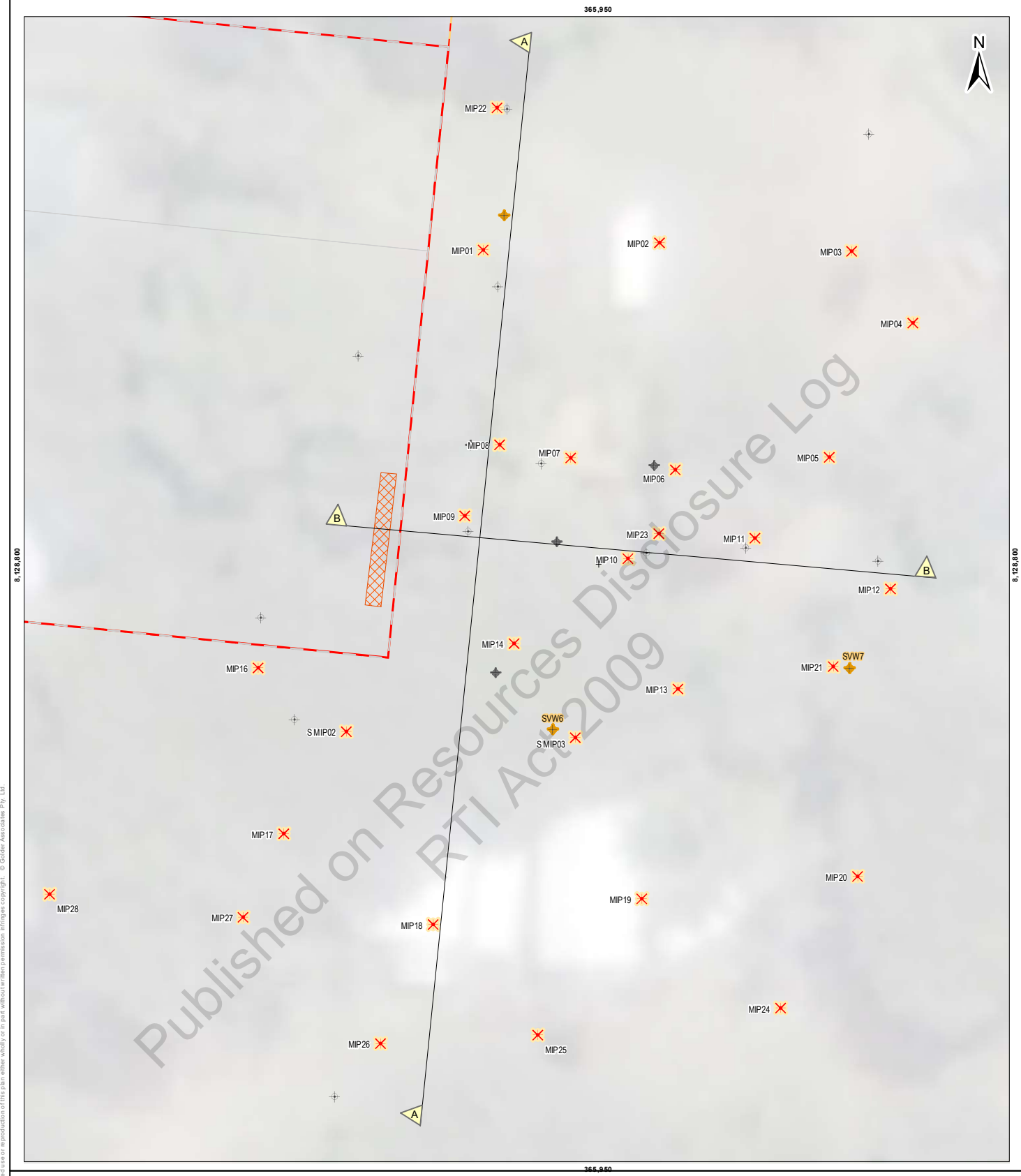
SCALE (at A3) 1:650

DATUM GDA94, PROJECTION MGA Zone 55

PROJECT: 087673045
DATE: 20 AUG 2012
DRAWN: SB
CHECKED: PKS

FIGURE 2





CURRENT INVESTIGATION LOCATIONS

MR sch4p4(6) Per

NOTES
All locations derived via GPS & groundtruthed by Field staff.

COPYRIGHT
1. Base map data copyright Mapinfo Australia Pty Ltd.
2. DCDB copyright The State of Queensland (Department of Natural Resources, Mines and Water) 2011.



- LEGEND**
- Soil Gas Wells
 - MIP Sample Locations
 - Trench
 - Caravan Park
 - Former Dry Cleaner
 - Cross Section

FORMER INVESTIGATION LOCATIONS

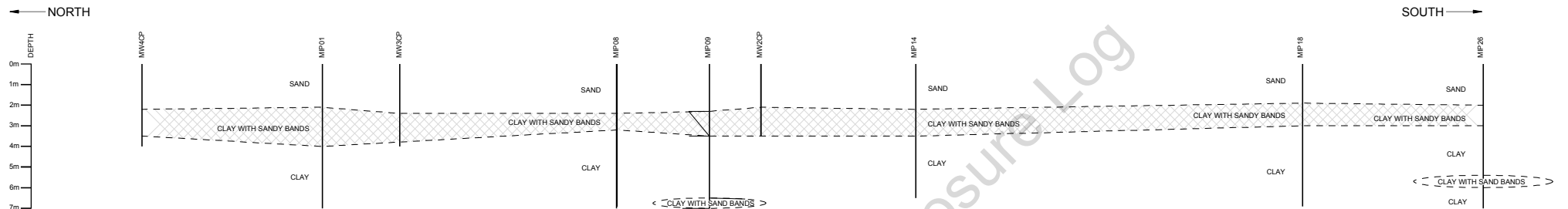
- Soil Gas Wells
- Monitoring Well

0 1 2 4 6 8 10 metres
SCALE (at A3) 1:250
 DATUM GDA 94, PROJECTION MGA Zone 55

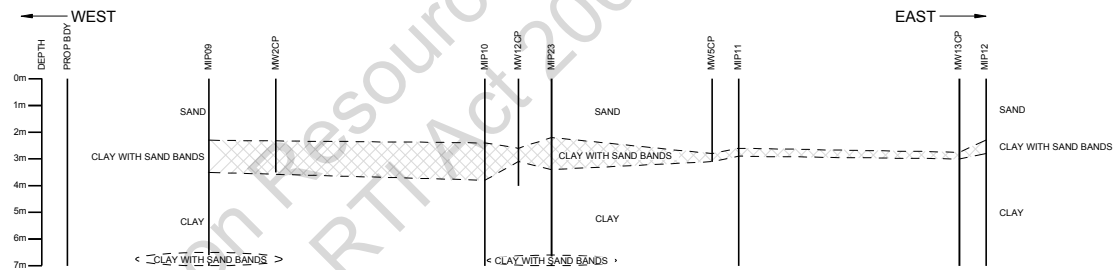
PROJECT: 087673045
DATE: 20 AUG 2012
DRAWN: SB
CHECKED: PKS

FIGURE 3

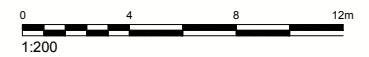




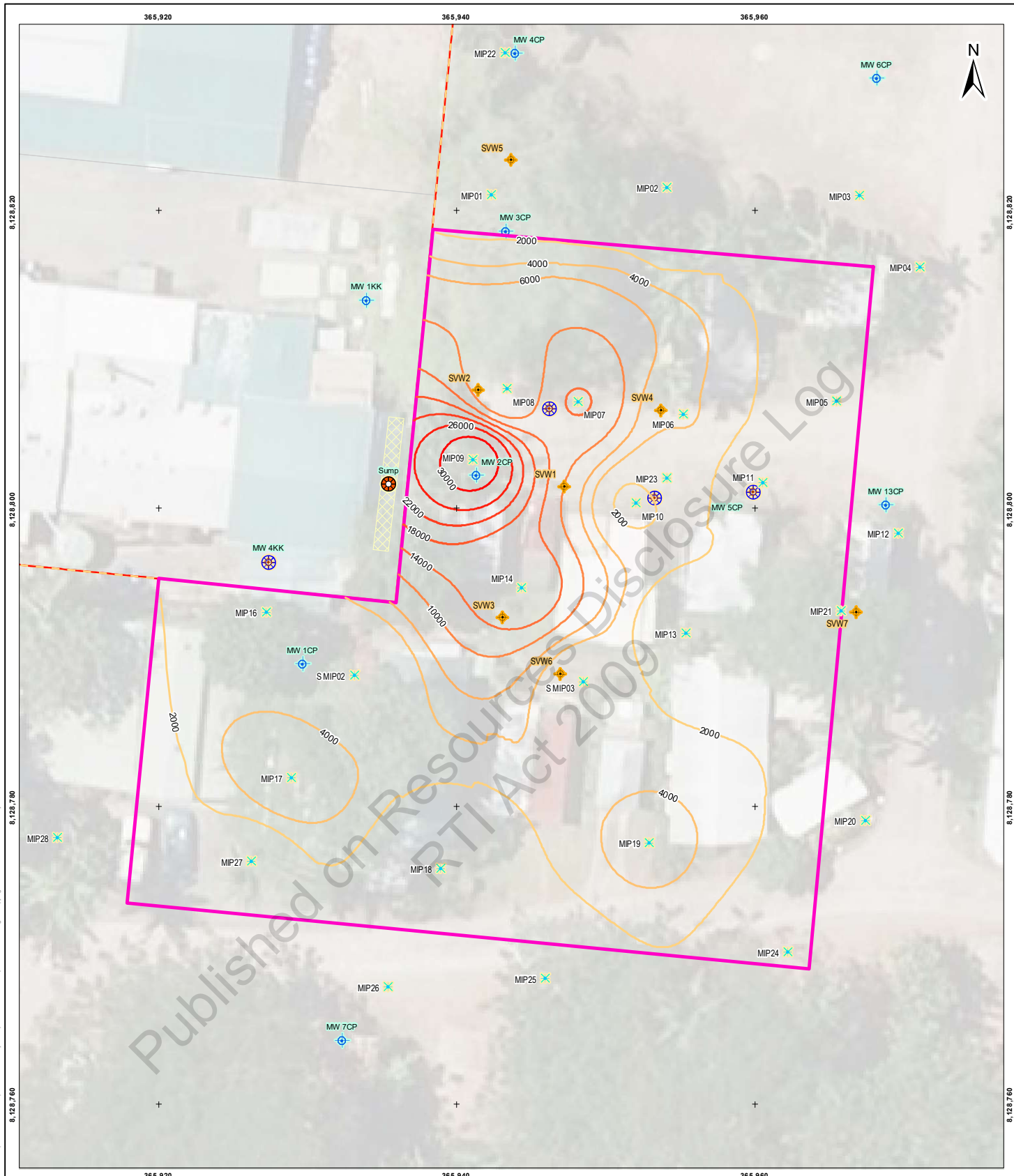
SCALE 1:200 **A** NORTH / SOUTH SECTION
F001



SCALE 1:200 **B** EAST / WEST SECTION
F001



 www.golder.com GOLDER ASSOCIATES PTY. LTD.	CLIENT CAIRNS VILLA CARAVAN PARK SITE		PROJECT MR sch4p4(6) Pers					
	DRAWN BY W.A.Z.	DATE 17.08.2012	DRAWING TITLE SUBSURFACE CROSS SECTIONS					
	CHECKED BY P.K.S.	DATE 17.08.2012						
	SCALE AS SHOWN	SHEET SIZE A3	PROJECT No 087673045	DOC No 033	DOC TYPE R	FIGURE No F001	REVISION 0	FIGURE 4



MIP CONTOURS UPPER SAND LAYER

MR sch4p4(6) Per



LEGEND

- + Soil Gas Wells
- x MIP Sample Locations
- Area of Concern
- Extraction Sump
- Extraction Well
- Monitoring Well
- Inferred MIP Contours (µV)

NOTES

All locations derived via GPS & groundtruthed by Field staff.

COPYRIGHT

1. Base map data copyright Mapinfo Australia Pty Ltd.
2. DCDB copyright The State of Queensland (Department of Natural Resources, Mines and Water) 2011.

0 1 2 4 6 8 10 metres

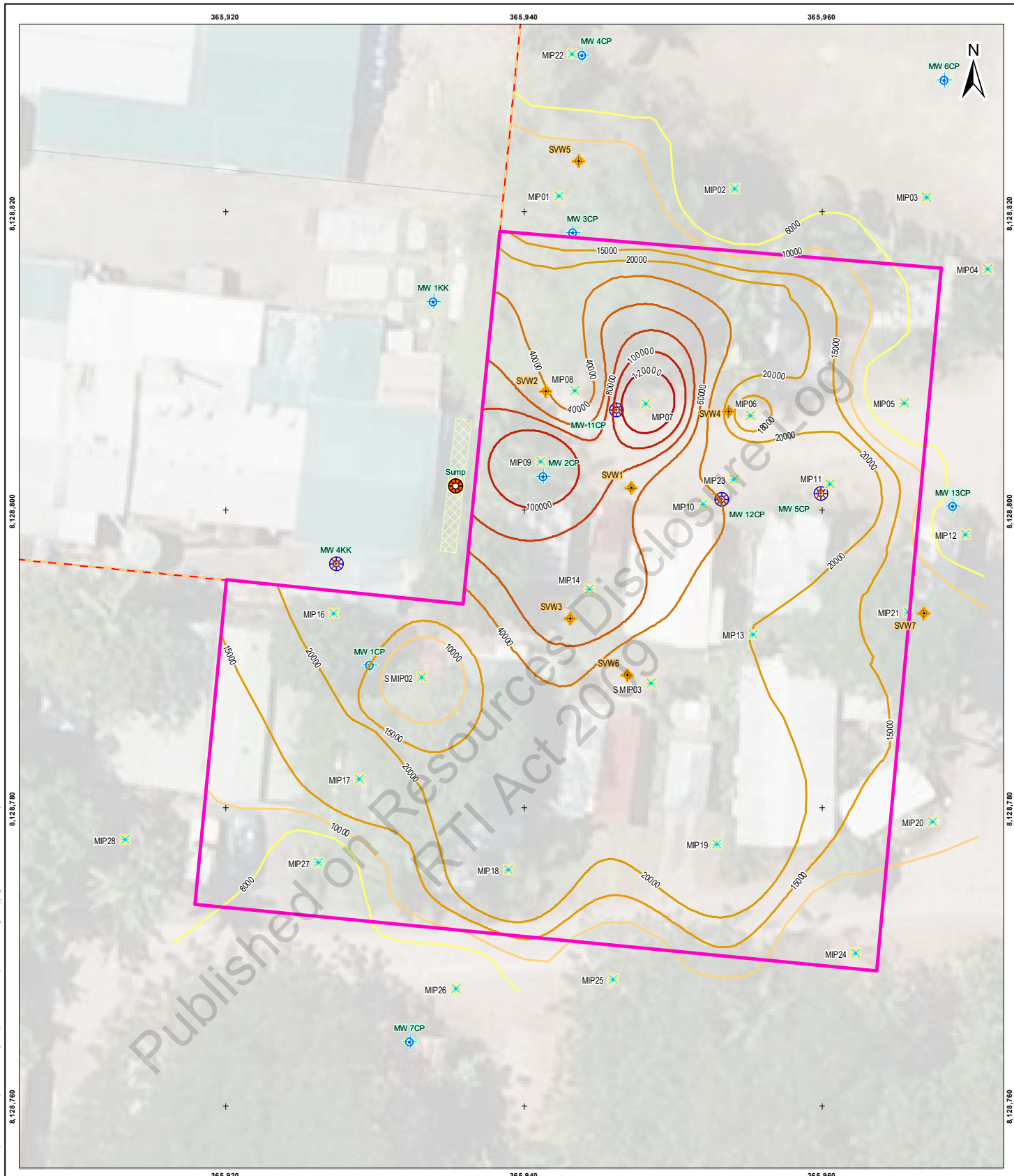
SCALE (at A3) 1:250

DATUM GDA94, PROJECTION MGA Zone 55

PROJECT: 087673045
DATE: 20 AUG 2012
DRAWN: SB
CHECKED: PKS

FIGURE 5





MIP CONTOURS MARINE CLAY LEVEL

MR sch4p4(6) Per



LEGEND

- + Soil Gas Wells
- Area of Concern
- x MIP Sample Locations
- Extraction Sump
- Extraction Well
- + Monitoring Well
- Inferred MIP Contours (µV)

NOTES

All locations derived via GPS & groundtruthed by Field staff.

COPYRIGHT

1. Base map data copyright Mapinfo Australia Pty Ltd.
2. DCDB copyright The State of Queensland (Department of Natural Resources, Mines and Water) 2011.

0 1 2 4 6 8 10 metres

SCALE (at A3) 1:250

DATUM GDA 94, PROJECTION MGA Zone 55

PROJECT: 087673045
DATE: 20 AUG 2012
DRAWN: SB
CHECKED: PKS

FIGURE 6





APPENDIX A

Groundwater Monitoring Results

Published on Resources Disclosure Log
RTI Act 2009

ChemName			cis-1,2-Dichloroethene	Trichloroethylene	Tetrachloroethene
output unit			µg/l	µg/l	µg/l
LOR			5	5	5
Field_ID	Sampled_Date	SDG			
MW1KK	30/04/2009	SE68964	5.1	26	8.5
MW1KK	28/09/2009	SE72570	44	500	90
MW1KK	9/02/2010	SE75787	36	400	400
MW1KK	17/06/2010	SE79195	30	340	53
MW1KK	14/07/2010	SE79866	24	360	86
MW1KK	18/08/2010	SE80754-R	21	360	55
MW1KK	21/09/2010	SE81613	34	460	80
MW1KK	21/10/2010	SE82422	25	330	27
MW1KK	23/11/2010	SE83518	26	340	33
MW1KK	6/01/2011	SE84456	9.5	280	28
MW1KK	17/02/2011	SE85555	9.7	92	8.8
MW1KK	17/03/2011	SE86297	6.4	120	12
MW1KK	30/05/2011	SE87927	15	160	15
MW1KK	29/06/2011	SE88590	16	200	13
MW1KK	29/07/2011	SE89143	6.1	44	4.8
MW1KK	31/08/2011	SE101504	6.5	33	2.8
MW1KK	30/09/2011	SE102344	16	130	8.5
MW1KK	31/10/2011	SE102988	12	100	9
MW1KK	25/11/2011	SE103639	14	120	7.5
MW1KK	13/12/2011	SE104058	<5	120	7.3
MW1KK	20/01/2012	SE104825	7.4	52	14
MW1KK	29/02/2012	SE105949	27	140	29
MW2KK	30/04/2009	SE68964	<5	<5	86
MW2KK	28/09/2009	SE72570	5.7	51	12
MW3KK	30/04/2009	SE68964	<5	<5	49
MW3KK	28/09/2009	SE72570	<5	8.8	150
MW3KK	9/02/2010	SE75787	1.3	6.8	120
MW4KK	30/04/2009	SE68964	640	550	1000
MW4KK	28/09/2009	SE72570	720	980	1300
MW4KK	16/10/2009	SE73085	660	970	2200
MW4KK	30/10/2009	SE73401-R2	700	1300	1900
MW4KK	1/12/2009	SE74208-R	1400	1700	3400
MW4KK	9/02/2010	SE75787	1300	1600	6700
MW4KK	19/05/2010	SE78399	1100	1300	11000
MW4KK	17/06/2010	SE79195	760	1100	13000
MW4KK	14/07/2010	SE79866	790	1100	14000
MW4KK	18/08/2010	SE80754-R	1200	1300	13000
MW4KK	21/09/2010	SE81613	1600	1300	14000
MW4KK	21/10/2010	SE82422	1300	540	11000
MW4KK	23/11/2010	SE83518	1800	560	6600
MW4KK	6/01/2011	SE84456	650	280	730
MW4KK	17/02/2011	SE85555	510	160	4700
MW4KK	17/03/2011	SE86297	330	62	510
MW4KK	30/05/2011	SE87927	2600	830	830
MW4KK	29/06/2011	SE88590	1100	610	21000
MW4KK	29/07/2011	SE89143	1000	310	2400
MW4KK	31/08/2011	SE101504	1200	220	2800
MW4KK	30/09/2011	SE102344	1800	650	14000
MW4KK	31/10/2011	SE102988	1000	460	10000
MW4KK	25/11/2011	SE103639	1000	680	11000
MW4KK	13/12/2011	SE104058	830	440	6800
MW4KK	20/01/2012	SE104825	1200	1000	8400
MW4KK	29/02/2012	SE105949	950	670	4600
MW1CP	Apr-07	Douglas Partners	20	63	520
MW1CP	Jul-07	Le Vert	68	95	785
MW1CP	Oct-07	Le Vert	52	225	329
MW1CP	Mar-08	Le Vert	11	8.7	8.2
MW1CP	30/04/2009	SE68964	120	170	160
MW1CP	28/09/2009	SE72570	100	160	170
MW1CP	16/10/2009	SE73085	190	290	240
MW1CP	30/10/2009	SE73401-R2	61	160	130
MW1CP	1/12/2009	SE74208-R	57	99	240
MW1CP	9/02/2010	SE75787	4.2	7.8	31
MW1CP	17/06/2010	SE79195	140	69	110
MW1CP	14/07/2010	SE79866	140	83	140
MW1CP	18/08/2010	SE80754-R	96	78	200
MW1CP	21/09/2010	SE81613	61	58	160
MW1CP	21/10/2010	SE82422	54	56	380
MW1CP	23/11/2010	SE83518	330	150	590
MW1CP	6/01/2011	SE84456	4.6	7.2	96
MW1CP	17/02/2011	SE85555	2.6	0.7	16
MW1CP	17/03/2011	SE86297	<0.5	<0.5	6
MW1CP	30/05/2011	SE87927	240	64	110
MW1CP	29/06/2011	SE88590	4	6.8	33
MW1CP	29/07/2011	SE89143	160	18	36
MW1CP	31/08/2011	SE101504	230	32	44
MW1CP	30/09/2011	SE102344	220	70	94
MW1CP	31/10/2011	SE102988	43	9.2	45
MW1CP	25/11/2011	SE103639	84	37	84
MW1CP	13/12/2011	SE104058	110	51	89
MW1CP	20/01/2012	SE104825	<5	<5	<5
MW1CP	29/02/2012	SE105949	<5	<5	2.1
MW1CP	09/07/12	SE109987-1	22	18	3.8

ChemName			cis-1,2-Dichloroethene	Trichloroethylene	Tetrachloroethene
output unit			µg/l	µg/l	µg/l
LOR			5	5	5
Field_ID	Sampled_Date	SDG			
MW2CP	Apr-07	Douglas Partners	31	110	360
MW2CP	Jul-07	Le Vert	222	170	526
MW2CP	Oct-07	Le Vert	291	814	2070
MW2CP	Mar-08	Le Vert	20	16	62
MW2CP	30/04/2009	SE68964	150	210	650
MW2CP	28/09/2009	SE72570	250	1400	650
MW2CP	16/10/2009	SE73085	130	610	1600
MW2CP	30/10/2009	SE73401-R2	69	410	970
MW2CP	1/12/2009	SE74208-R	200	440	3200
MW2CP	9/02/2010	SE75787	300	730	2600
MW2CP	5/05/2010	SE77981	140	830	4400
MW2CP	19/05/2010	SE78399	270	1600	3400
MW2CP	17/06/2010	SE79195	130	600	1900
MW2CP	14/07/2010	SE79866	150	580	2400
MW2CP	18/08/2010	SE80754-R	140	770	3400
MW2CP	21/09/2010	SE81613	200	410	7100
MW2CP	21/10/2010	SE82422	78	240	2600
MW2CP	23/11/2010	SE83518	80	200	2600
MW2CP	6/01/2011	SE84456	87	49	220
MW2CP	17/02/2011	SE85555	420	630	1700
MW2CP	17/03/2011	SE86297	150	64	180
MW2CP	30/05/2011	SE87927	190	900	3000
MW2CP	29/06/2011	SE88590	100	510	3100
MW2CP	29/07/2011	SE89143	79	120	800
MW2CP	31/08/2011	SE101504	58	200	610
MW2CP	30/09/2011	SE102344	110	440	2100
MW2CP	31/10/2011	SE102988	180	120	490
MW2CP	25/11/2011	SE103639	300	220	880
MW2CP	13/12/2011	SE104058	200	300	1300
MW2CP	20/01/2012	SE104825	110	1200	1900
MW2CP	29/02/2012	SE105949	180	1200	1200
MW2CP	09/07/12	SE109987-1	510	2000	3800
MW3CP	Apr-07	Douglas Partners	38	160	210
MW3CP	Jul-07	Le Vert	43	293	288
MW3CP	Oct-07	Le Vert	26	309	358
MW3CP	Mar-08	Le Vert	6.3	6.3	6.9
MW3CP	30/04/2009	SE68964	<50	210	110
MW3CP	28/09/2009	SE72570	28	170	86
MW3CP	9/02/2010	SE75787	27	95	75
MW3CP	09/07/12	SE109987-1	33	72	15
MW4CP	Apr-07	Douglas Partners	6	7	110
MW4CP	Jul-07	Le Vert	36	24	171
MW4CP	Oct-07	Le Vert	<0.5	<0.5	10
MW4CP	Mar-08	Le Vert	1.6	0.6	3.8
MW4CP	30/04/2009	SE68964	<5	<5	<5
MW4CP	28/09/2009	SE72570	DRY	DRY	DRY
MW5CP*	Apr-07	Douglas Partners	92	350	1000
MW5CP	Jul-07	Le Vert	80	462	1480
MW5CP	Oct-07	Le Vert	94	929	1980
MW5CP	Mar-08	Le Vert	63	39	73
MW5CP	30/04/2009	SE68964	<5	<5	<5
MW5CP	28/09/2009	SE72570	220	1700	1700
MW5CP	16/10/2009	SE73085	270	1800	1400
MW5CP	30/10/2009	SE73401-R2	110	1200	1000
MW5CP	1/12/2009	SE74208-R	320	1500	1800
MW5CP	9/02/2010	SE75787	250	700	1300
MW5CP	17/06/2010	SE79195	0.5	3.6	12
MW5CP	14/07/2010	SE79866	14	40	56
MW5CP	18/08/2010	SE80754-R	DRY	DRY	DRY
MW5CP	21/10/2010	SE82422	<0.5	3.6	13
MW5CP	23/11/2010	SE83518	1	4	10
MW5CP	6/01/2011	SE84456	8.9	93	240
MW5CP	17/02/2011	Could not be sampled	-	-	-
MW5CP	17/03/2011	SE86297	24	38.0	130
MW5CP	30/05/2011	SE87927	11	24.0	15
MW5CP	29/06/2011	SE88590	57	81.0	600
MW5CP	29/07/2011	SE89143	2.8	14.0	14
MW5CP	31/08/2011	SE101504	37	110.0	97
MW5CP	30/09/2011	SE102344	100	180.0	320
MW5CP	31/10/2011	SE102988	3.2	10	22
MW5CP	25/11/2011	SE103639	<0.5	27	69
MW5CP	13/12/2011	SE104058	1.3	8	29
MW5CP	20/01/2012	SE104825	44	44	1000
MW5CP	29/02/2012	SE105949	92	160	240
MW6CP*	Apr-07	Douglas Partners	<0.5	20	70
MW6CP	Jul-07	Le Vert	6	8	<5
MW6CP	Oct-07	Le Vert	DRY	DRY	DRY
MW6CP	Mar-08	Le Vert	<0.5	1	1
MW6CP	30/04/2009	SE68964	<5	7.5	6.6
MW6CP	28/09/2009	SE72570	DRY	DRY	DRY
MW7CP	Oct-07	Le Vert	<5	6	<5
MW7CP	Mar-08	Le Vert	1	2.1	11
MW7CP	30/04/2009	SE68964	<5	<5	<5
MW7CP	28/09/2009	SE72570	DRY	DRY	DRY

ChemName			cis-1,2-Dichloroethene	Trichloroethylene	Tetrachloroethene
output unit			µg/l	µg/l	µg/l
LOR			5	5	5
Field_ID	Sampled_Date	SDG			
MW8CP	Oct-07	Le Vert	<5	<5	<5
MW8CP	Mar-08	Le Vert	<0.5	<0.5	<0.5
MW8CP	30/04/2009	SE68964	<5	<5	<5
MW8CP	29/09/2009	SE72570	<5	<5	<5
MW9CP	Oct-07	Le Vert	<5	<5	<5
MW9CP	Mar-08	Le Vert	<0.5	<0.5	<0.5
MW9CP	30/04/2009	SE68964	<5	7.1	6.8
MW9CP	28/09/2009	SE72570	<5	<5	<5
MW10CP	Oct-07	Le Vert	<5	<5	<5
MW10CP	Mar-08	Le Vert	1300	<0.5	2.6
MW10CP	30/04/2009	SE68964	<5	<5	89
MW10CP	28/09/2009	SE72570	<5	<5	<5
MW11CP	5/05/2010	SE77981	140	630	2200
MW11CP	19/05/2010	SE78399	140	670	3000
MW11CP	17/06/2010	SE79195	110	670	2500
MW11CP	14/07/2010	SE79866	94	650	2500
MW11CP	18/08/2010	SE80754-R	61	740	3000
MW11CP	21/09/2010	SE81613	52	830	3400
MW11CP	21/10/2010	SE82422	47	460	1600
MW11CP	23/11/2010	SE83518	71	1000	2700
MW11CP	6/01/2011	SE84456	59	990	3100
MW11CP	17/02/2011	SE85555	65	530	1500
MW11CP	17/03/2011	SE86297	59	440	1100
MW11CP	30/05/2011	SE87927	100	650	840
MW11CP	29/06/2011	SE88590	64	680	1100
MW11CP	29/07/2011	SE89143	79	290	590
MW11CP	31/08/2011	SE101504	35	190	270
MW11CP	30/09/2011	SE102344	55	610	1100
MW11CP	31/10/2011	SE102988	31	250	390
MW11CP	25/11/2011	SE103639	<50	730	1100
MW11CP	13/12/2011	SE104058	51	690	1000
MW11CP	20/01/2012	SE104825	56	1200	1400
MW11CP	29/02/2012	SE105949	29	300	400
MW12CP	5/05/2010	SE77981	390	1600	3800
MW12CP	19/05/2010	SE78399	270	1600	4100
MW12CP	17/06/2010	SE79195	270	1200	2200
MW12CP	14/07/2010	SE79866	220	2000	2500
MW12CP	18/08/2010	SE80754-R	180	1100	2600
MW12CP	21/09/2010	SE81613	150	1200	3400
MW12CP	21/10/2010	SE82422	130	570	1200
MW12CP	23/11/2010	SE83518	110	790	1400
MW12CP	6/01/2011	SE84456	57	760	1500
MW12CP	17/02/2011	SE85555	300	370	3600
MW12CP	17/03/2011	SE86297	91	400	1000
MW12CP	30/05/2011	SE87927	140	620	3400
MW12CP	29/06/2011	SE88590	190	740	1700
MW12CP	31/08/2011	SE101504	120	240	420
MW12CP	30/09/2011	SE102344	140	700	1400
MW12CP	31/10/2011	SE102988	1.1	2	5.4
MW12CP	25/11/2011	SE103639	110	560	1400
MW12CP	13/12/2011	SE104058	82	430	1300
MW12CP	20/01/2012	SE104825	190	760	2100
MW12CP	29/02/2012	SE105949	580	450	1000
MW13CP	5/05/2010	SE77981	25	160	440
MW13CP	19/05/2010	SE78399	26	120	350
MW13CP	17/06/2010	SE79195	14	67	190
MW13CP	14/07/2010	SE79866	14	110	180
MW13CP	18/08/2010	SE80754-R	8.1	100	220
MW13CP	21/09/2010	SE81613	16	58	160
MW13CP	21/10/2010	SE82422	25	91	110
MW13CP	23/11/2010	SE83518	30	130	120
MW13CP	6/01/2011	SE84456	32	210	150
MW13CP	17/02/2011	SE85555	23	61	65
MW13CP	17/03/2011	SE86297	19	59	86
MW13CP	30/05/2011	SE87927	15	49	49
MW13CP	29/06/2011	SE88590	9.8	58	52
MW13CP	29/07/2011	SE89143	2.7	14	9.3
MW13CP	31/08/2011	SE101504	11	13	5.5
MW13CP	30/09/2011	SE102344	20	50	30
MW13CP	31/10/2011	SE102988	13	52	23
MW13CP	25/11/2011	SE103639	15	73	27
MW13CP	13/12/2011	SE104058	19	64	23
MW13CP	20/01/2012	SE104825	27	83	31
MW13CP	29/02/2012	SE105949	23	61	33
MW13CP	09/07/12	SE109987-1	0.6	70	110
Trench Pump	23/11/2010	SE83518	1100	1000	8600
Trench Pump	6/01/2011	SE84456	410	770	5500
Trench Pump	17/02/2011	Could not be sampled	-	-	-
Trench Pump	17/03/2011	SE86297	100	140	220
Trench Pump	30/05/2011	SE87927	960	740	14000
Trench Pump	29/06/2011	SE88590	160	190	1800
Trench Pump	29/07/2011	SE89143	100	140	790
Trench Pump	31/08/2011	SE101504	90	110	290
Trench Pump	30/09/2011	SE102344	150	270	650
Trench Pump	31/10/2011	SE102988	260	260	2000
Trench Pump	25/11/2011	SE103639	100	370	730
Trench Pump	13/12/2011	SE104058	32	110	230
Trench Pump	20/01/2012	SE104825	68	260	340
Trench Pump	29/02/2012	SE105949	110	140	590

Notes

All results are expressed as µg/L, unless otherwise specified.
Figures highlighted in orange represent the most recent set of results.

TABLE 1
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
HAC's - HALOGENATED ALIPHATIC COMPOUNDS

sch4n4(6)

Cairns Villa and Leisure Park - Delineation Investigation
087673045-033-R-Rev0

Field Duplicates (WATER)
Filter: SDG in('SE109987-1') and Site_ID IN('087673045','All')

SDG	SE109987-1	SE109987-1	
Field_ID	MW2CP	MWX	RPD
Sampled_Date-Time	9/07/2012	9/07/2012	

Chem_Group	ChemName	Units	EQL			
Halogenated Benzenes	1,2,3-Trichlorobenzene	µg/L	50	<50	<50	0
	1,2,4-Trichlorobenzene	µg/L	50	<50	<50	0
	1,2-Dichlorobenzene	µg/L	50	<50	<50	0
	1,3-Dichlorobenzene	µg/L	50	<50	<50	0
	1,4-Dichlorobenzene	µg/L	30	<30	<30	0
	2-Chlorotoluene	µg/L	50	<50	<50	0
	4-Chlorotoluene	µg/L	50	<50	<50	0
	Bromobenzene	µg/L	50	<50	<50	0
	Chlorobenzene	µg/L	50	<50	<50	0
Volatile Organic Compounds	1,1,1,2-Tetrachloroethane	µg/L	50	<50	<50	0
	1,1,2,2-Tetrachloroethane	µg/L	50	<50	<50	0
	1,1,1-Trichloroethane	µg/L	50	<50	<50	0
	1,1,2-Trichloroethane	µg/L	50	<50	<50	0
	1,2,3-Trichloropropane	µg/L	50	<50	<50	0
	1,2-Dibromo-3-chloropropane	µg/L	50	<50	<50	0
	1,2-Dibromoethane	µg/L	50	<50	<50	0
	1,1-Dichloroethane	µg/L	50	<50	<50	0
	1,2-Dichloroethane	µg/L	50	<50	<50	0
	1,1-Dichloroethene	µg/L	50	<50	<50	0
	cis-1,2-Dichloroethene	µg/L	50	510	630	21
	trans-1,2-dichloroethene	µg/L	50	<50	<50	0
	1,2-Dichloropropane	µg/L	50	<50	<50	0
	1,3-Dichloropropane	µg/L	50	<50	<50	0
	2,2-Dichloropropane	µg/L	50	<50	<50	0
	1,1-Dichloropropene	µg/L	50	<50	<50	0
	cis-1,3-Dichloropropene	µg/L	50	<50	<50	0
	trans-1,3-dichloropropene	µg/L	50	<50	<50	0
	Bromochloromethane	µg/L	50	<50	<50	0
	Bromodichloromethane	µg/L	50	<50	<50	0
	Bromoform	µg/L	50	<50	<50	0
	Bromomethane	µg/L	1000	<1000	<1000	0
	Carbon tetrachloride	µg/L	50	<50	<50	0
	Chlorodibromomethane	µg/L	50	<50	<50	0
	Chloroethane	µg/L	500	<500	<500	0
	Chloroform	µg/L	50	83	66	23
	Chloromethane	µg/L	500	<500	<500	0
	Dibromomethane	µg/L	50	<50	<50	0
	Dichlorodifluoromethane	µg/L	500	<500	<500	0
	Hexachlorobutadiene	µg/L	50	<50	<50	0
	Trichloroethene	µg/L	50	2000	2600	26
	Tetrachloroethene	µg/L	50	3800	4600	19
	Trichlorofluoromethane	µg/L	100	<100	<100	0
	Vinyl chloride	µg/L	30	<30	<30	0

*RPDs have only been considered where a concentration is greater than 0 times the EQL.

**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 50 (0-10 x EQL); 50 (10-30 x EQL); 50 (> 30 x EQL))

***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

ESDAT QA Checker

Project:087673045

Filter: SDG in('SE109987-1') and Site_ID IN('087673045','All')

Overview Summary

[Count of Samples](#)

[Count of Results](#)

Holding Times

Holding Time Errors (0)

Blanks

Field Blanks

Detects in Lab Blanks (0)

[SDG's without Storage Blanks \(1\)](#)

SDG's without Method Blanks (0)

Duplicates

[Field and Interlab Dupes](#)

Lab Duplicates with high RPDs (0)

Duplicate Samples with incorrect or missing Parent Samples (0)

Samples at the same Location/Depth/Time not specified as duplicates (0)

Surrogates

Surrogate Variation > 30% or outside lab LCL or UCL or outside lab LCL or UCL (0)

Lab Control Samples

SDG's without a Laboratory Control Sample (0)

Laboratory Control Samples, Error > 30% (0)

Certified and Standard Reference Materials

Certified Reference Materials - Error > 30% (0)

Matrix Spikes

SDG's without a Matrix Spike (0)

Trip Spikes with invalid Control Sample (0)

[Less than 1 matrix spike in 20 samples, or less than 1 matrix duplicate in 20 samples \(1\)](#)

Matrix Spike Recoveries less than 70% or greater than 130% or outside lab LCL or UCL (0)

Trip Spike Recoveries (70% - 130% is acceptable) (0)

Inorganic

Ionic Balance (0)

Na + CL > TDS (0)

BOD > COD (0)

BOD > COD (0)

Other

[Unit Conversion Problems \(3\)](#)

[OriginalChemNames Requiring Validation \(5\)](#)

Samples with no Results (0)

Aborted Analysis (0)



APPENDIX B

Soil Gas Vapour Results

Published on Resources Disclosure Log
RTI Act 2009

Field ID	SDG	Sampled Date	cis-1,2-Dichloroethene		Trichloroethene (TCE)		Tetrachloroethene (PCE)	
			ppbv	ug/m ³	ppbv	ug/m ³	ppbv	ug/m ³
SVW01	1112524	20/12/11	ND	ND	700	3700	25000	170000
	1202418	15/02/12	350	1400	1400	7800	12000	84000
	1207359	13/07/12	2000	7800	3900	21000	13000	86000
	1208098	30/07/12	950	3800	2200	12000	7800	53000
SVW02	1112524	20/12/11	290	1200	330	1800	12000	80000
	1202418	15/02/12	-	-	-	-	-	-
	1207359	13/07/12	240	953	1100	5800	3000	21000
	1208098	30/07/12	160	630	1400	7600	3900	27000
SVW03	1112524	20/12/11	200	810	190	1000	9600	65000
	1202418	15/02/12	91	360	260	1400	13000	91000
	1207359	13/07/12	630	2500	2800	15000	21000	140000
	1208098	30/07/12	200	810	1500	7900	17000	120000
SVW04	1112524	20/12/11	<38	<150	44	230	3600	24000
	1202418	15/02/12	ND	ND	220	1200	3400	23000
	1207359	13/07/12	30	120	170	920	1400	9400
	1208098	30/07/12	36	140	300	1600	1700	12000
SVW05	1207359	13/07/12	ND	ND	17	90	850	5800
	1208098	30/07/12	ND	ND	13	68	790	5400
SVW06	1207359	13/07/12	50	200	560	3000	3800	26000
	1208098	30/07/12	21	84	440	2300	4800	32000
SVW07	1207359	13/07/12	ND	ND	2	11	66	450
	1208098	30/07/12	ND	ND	2.6	14	79	530

Comments

ND denotes Non Detect

Figures highlighted in orange represent the most recent set of results.

TABLE 2
SUMMARY OF ANALYTICAL RESULTS - SOIL VAPOUR

sch4p4(6) Pers

Cairns Villa and Leisure Park - Delineation Investigation

087673045-033-R-Rev0

Input By: OS

20/08/2012

Checked By: PKS

20/08/2012

22-095

Field Duplicates (Soil Vapour)

SDG	1208098	1208098	
Field_ID	SWW4	REP001	RPD
Sampled_Date	30/07/2012	30/07/2012	

Chem_Group	ChemName	Units			
HACs	cis-1,2-Dichloroethene	ug/m ³	140	130	7
	Trichloroethene	ug/m ³	1600	1500	6
	Tetrachloroethene	ug/m ³	12000	11000	9

*RPDs have only been considered for contaminants of concern.

*High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 50 (0-10 x EQL); 50 (10-30 x EQL); 50 (> 30 x EQL))

Field Blanks (Soil Vapour)

SDG	1207359	1208098
Field_ID	FB01	FB001
Sampled_Date	13/07/2012	30/07/2012

Method_Type	ChemName	Units	EQL		
HACs	cis-1,2-Dichloroethene	ug/m ³	1	ND	ND
	Trichloroethene	ug/m ³	0.1	ND	ND
	Tetrachloroethene	ug/m ³	1	ND	ND

ND denotes that the concentration was below the limit of detection.



APPENDIX C

Field Investigation Results

Published on Resources Disclosure Log
RTI Act 2009

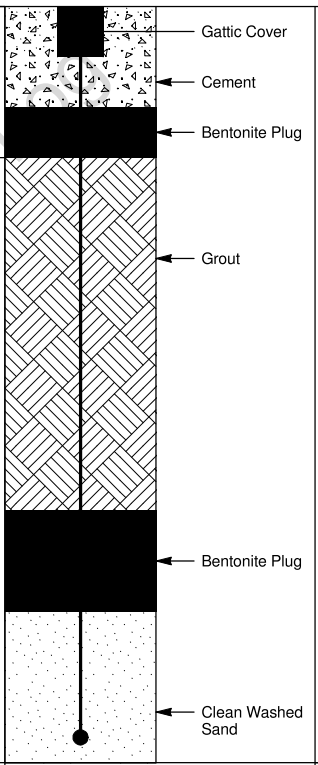


REPORT OF TEST PIT: SVW05

CLIENT:
PROJECT: GW monitoring wells
LOCATION: Pease St Manunda
JOB NO: 087673045

COORDS: MGA94 56
SURFACE RL: DATUM: AHD
PIT DEPTH: 1.50 m
BUCKET TYPE:

SHEET: 1 OF 1
MACHINE: Push Tube
CONTRACTOR:
LOGGED: EC DATE: 6/7/12
CHECKED: PKS DATE: 20/8/12

Excavation				Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	PIEZOMETER DETAILS ID Static Water Level SVW05 SVW05
PT	M-H	Groundwater Not Encountered	0.0					SAND medium to coarse grained, sub-angular, dark grey, with some clay, with rootlets in topsoil	D	VL	
			0.30					Sandy CLAY pale brown, with some silt			
			0.5								
			1.0								
			1.20					SAND medium grained, grey and brown			
			1.5					TEST PIT DISCONTINUED @ 1.50 m End of Soil Vapour Well			
			2.0								
			2.5								
			3.0								

This report of test pit must be read in conjunction with accompanying notes and abbreviations. It has been prepared for environmental purposes only, without attempt to consider geotechnical properties or the geotechnical significance of the materials encountered. As such it should not be relied upon for geotechnical purposes.

GAP gINT FN. F01e
RL3



REPORT OF TEST PIT: SVW06

CLIENT:
PROJECT: GW monitoring wells
LOCATION: Pease St Manunda
JOB NO: 087673045

COORDS: MGA94 56
SURFACE RL: DATUM: AHD
PIT DEPTH: 1.50 m
BUCKET TYPE:

SHEET: 1 OF 1
MACHINE: Push Tube
CONTRACTOR:
LOGGED: EC DATE: 6/7/12
CHECKED: PKS DATE: 20/8/12

Excavation			Sampling		Field Material Description						
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	PIEZOMETER DETAILS
											ID Static Water Level SVW05
											SVW05
PT	M-H	Groundwater Not Encountered	0.0					Clayey SILT dark brown, rootlets, grass, topsoil	D		Gattic Cover
			0.20					becoming brown			Cement
			0.5						M		Bentonite Plug
			0.90					SAND fine grained, sub-rounded, brown, with some clay			Grout
			1.0								Bentonite Plug
			1.5					TEST PIT DISCONTINUED @ 1.50 m End of Soil Vapour Well			Clean Washed Sand
			2.0								
			2.5								
			3.0								

This report of test pit must be read in conjunction with accompanying notes and abbreviations. It has been prepared for environmental purposes only, without attempt to consider geotechnical properties or the geotechnical significance of the materials encountered. As such it should not be relied upon for geotechnical purposes.

GAP gINT FN. F01e
RL3

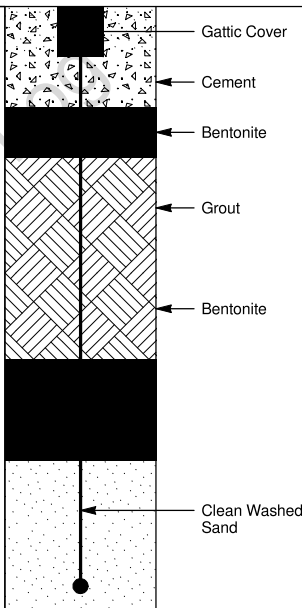


REPORT OF TEST PIT: SVW07

CLIENT:
PROJECT: GW monitoring wells
LOCATION: Pease St Manunda
JOB NO: 087673045

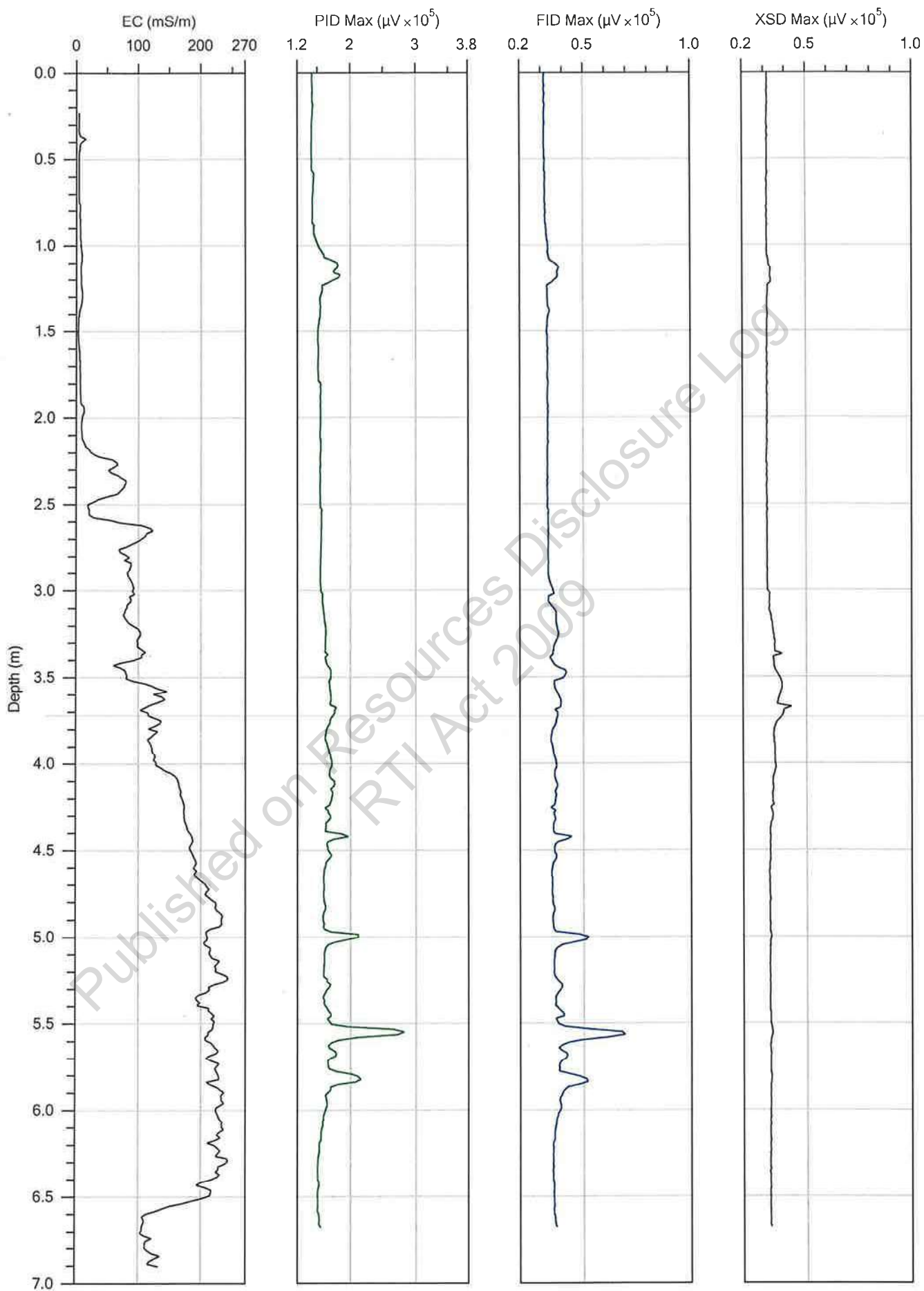
COORDS: MGA94 56
SURFACE RL: DATUM: AHD
PIT DEPTH: 1.50 m
BUCKET TYPE:

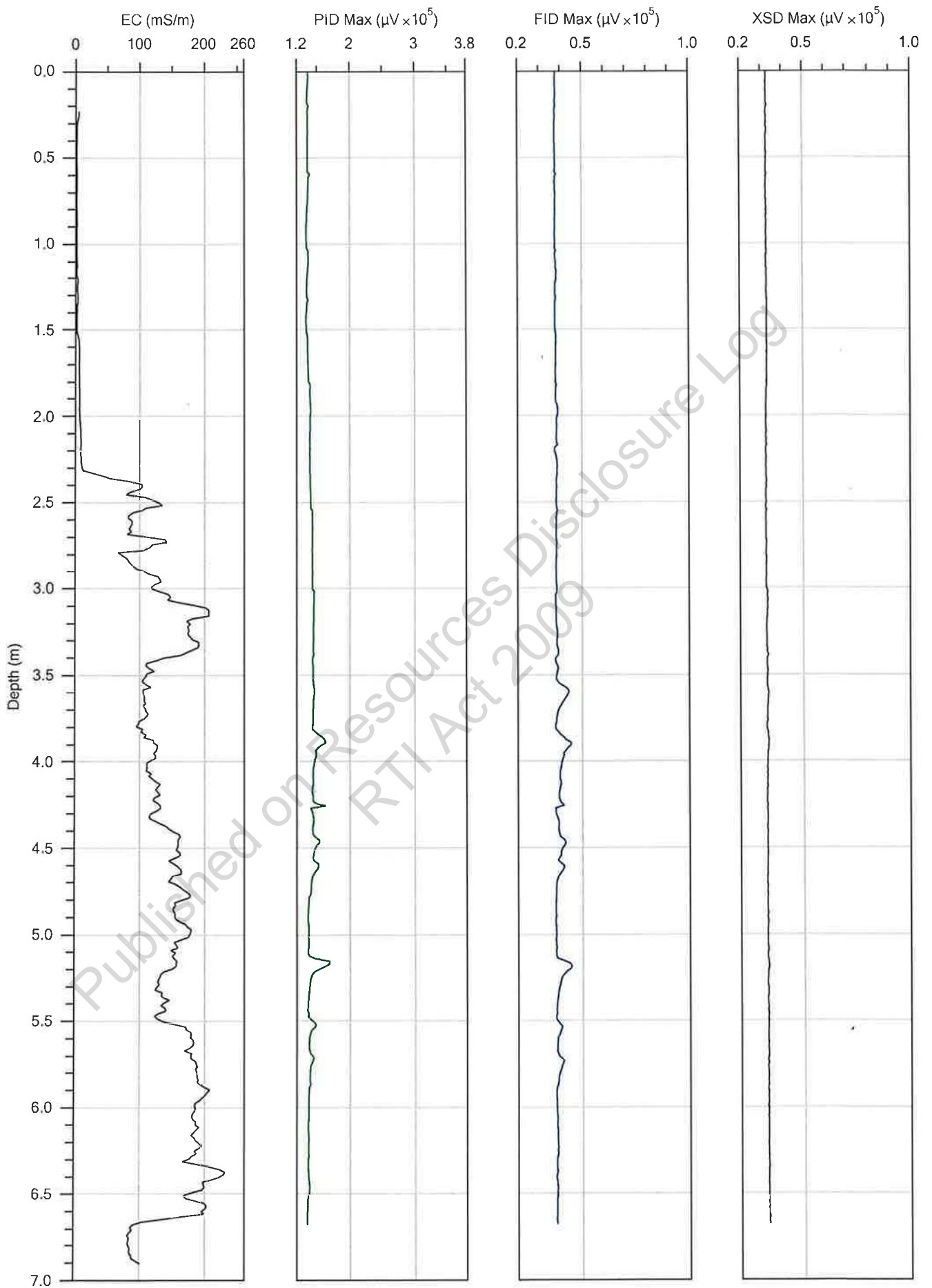
SHEET: 1 OF 1
MACHINE: Push Tube
CONTRACTOR:
LOGGED: EC
CHECKED: PKS
DATE: 6/7/12
DATE: 20/8/12

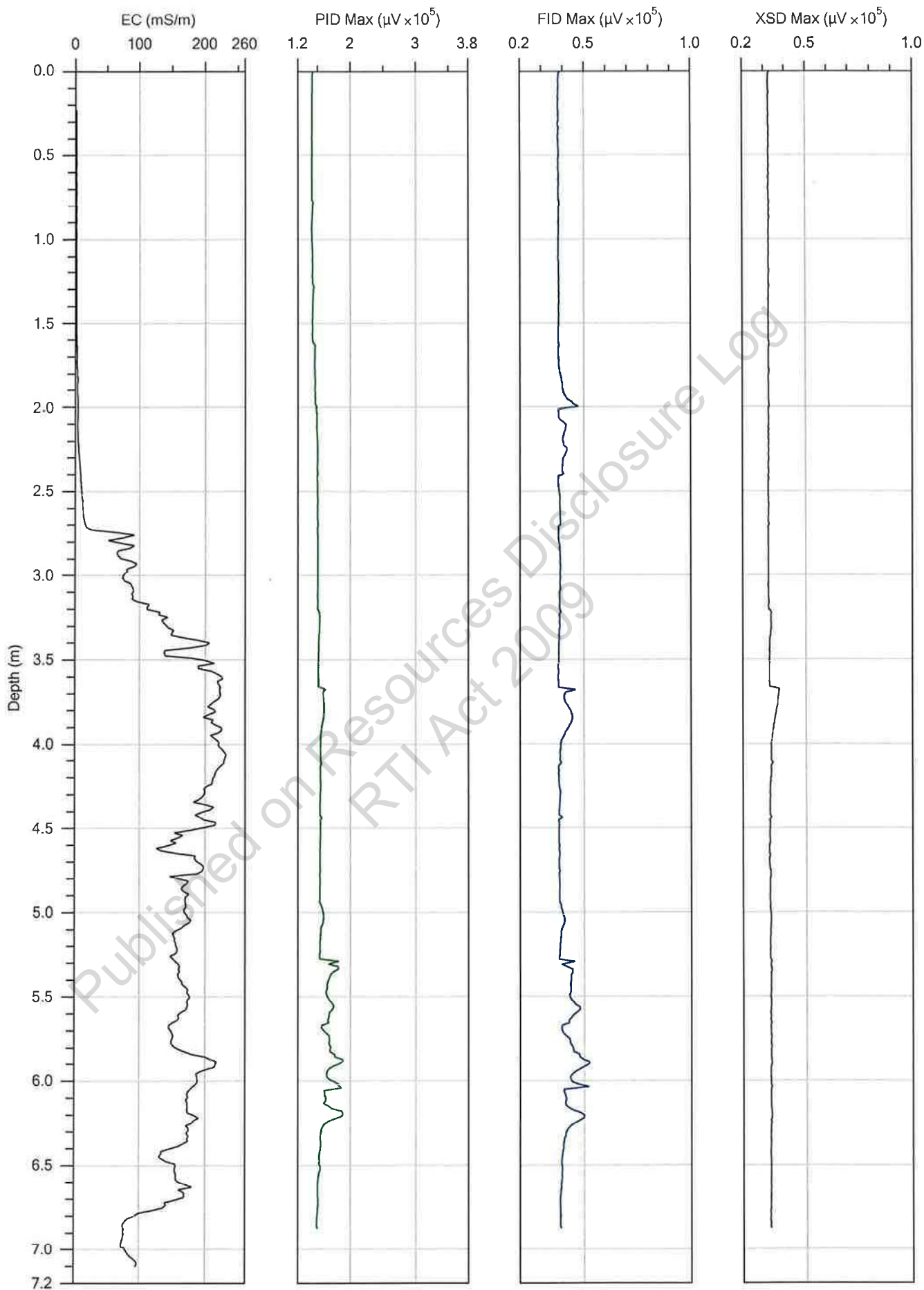
Excavation				Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	PIEZOMETER DETAILS
											ID Static Water Level SVW07 SVW07
PT	M-H	Groundwater Not Encountered	0.0					Sandy SILT medium liquid limit, dark brown, medium to coarse grained, subangular sand, with trace of gravel, grass, organic matter, rootlets	D		
			0.10					Clayey SILT dark brown, with some char	D		
			0.40					SAND fine to medium grained, rounded to sub-rounded, yellow brown			
			0.5								
			1.0						M		
			1.5					TEST PIT DISCONTINUED @ 1.50 m End of Soil Vapour Well			
			2.0								
			2.5								
			3.0								

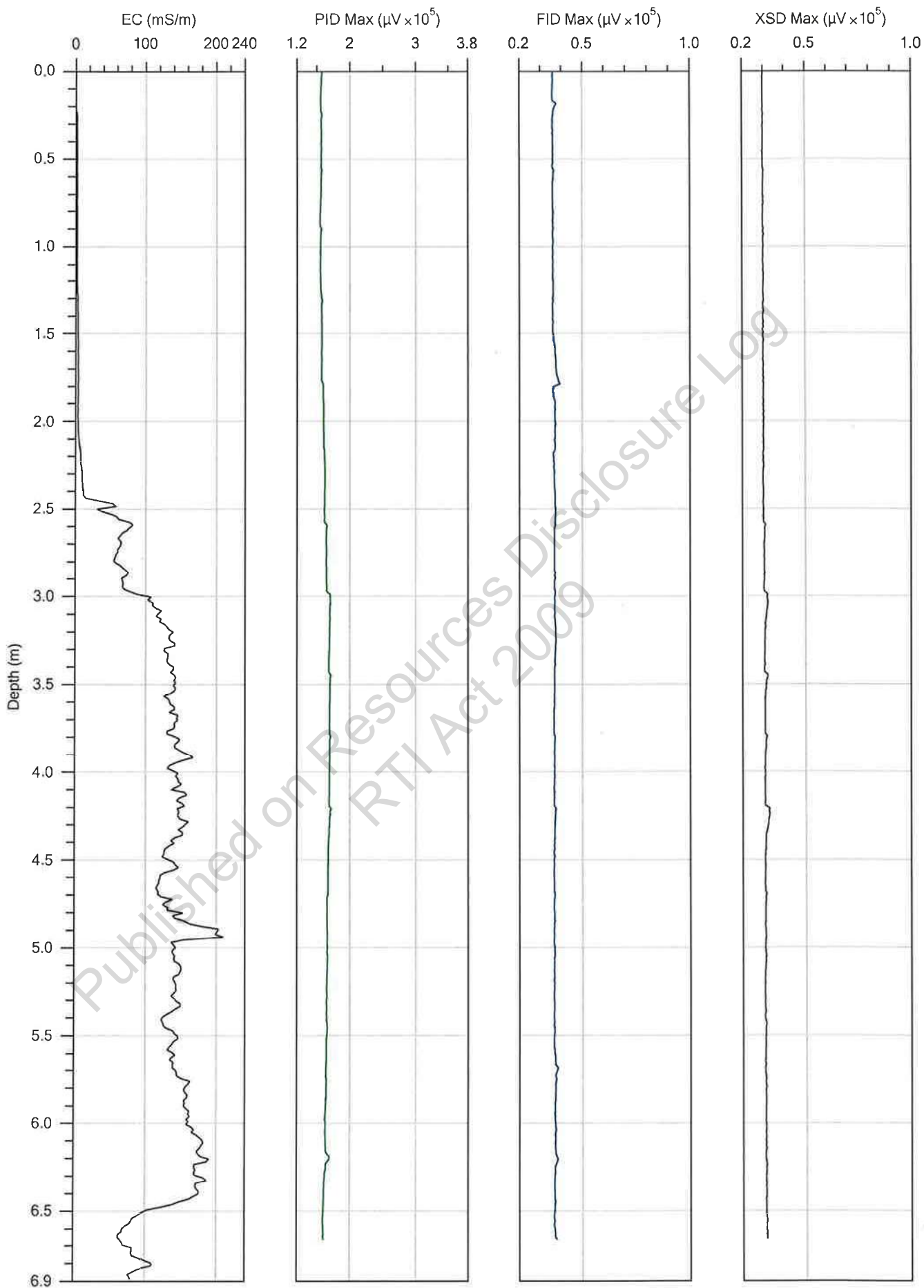
This report of test pit must be read in conjunction with accompanying notes and abbreviations. It has been prepared for environmental purposes only, without attempt to consider geotechnical properties or the geotechnical significance of the materials encountered. As such it should not be relied upon for geotechnical purposes.

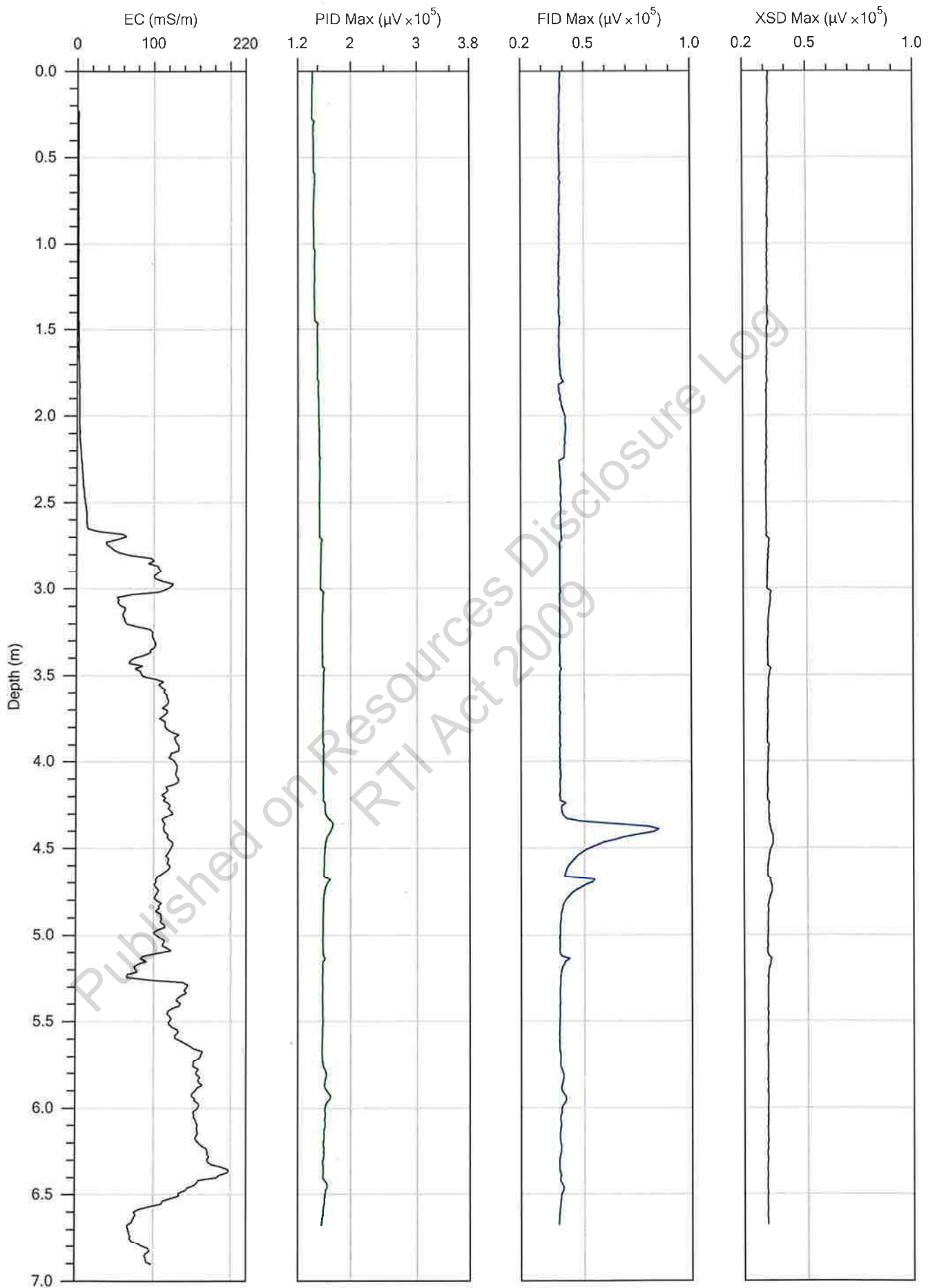
GAP gINT FN. F01e
RL3

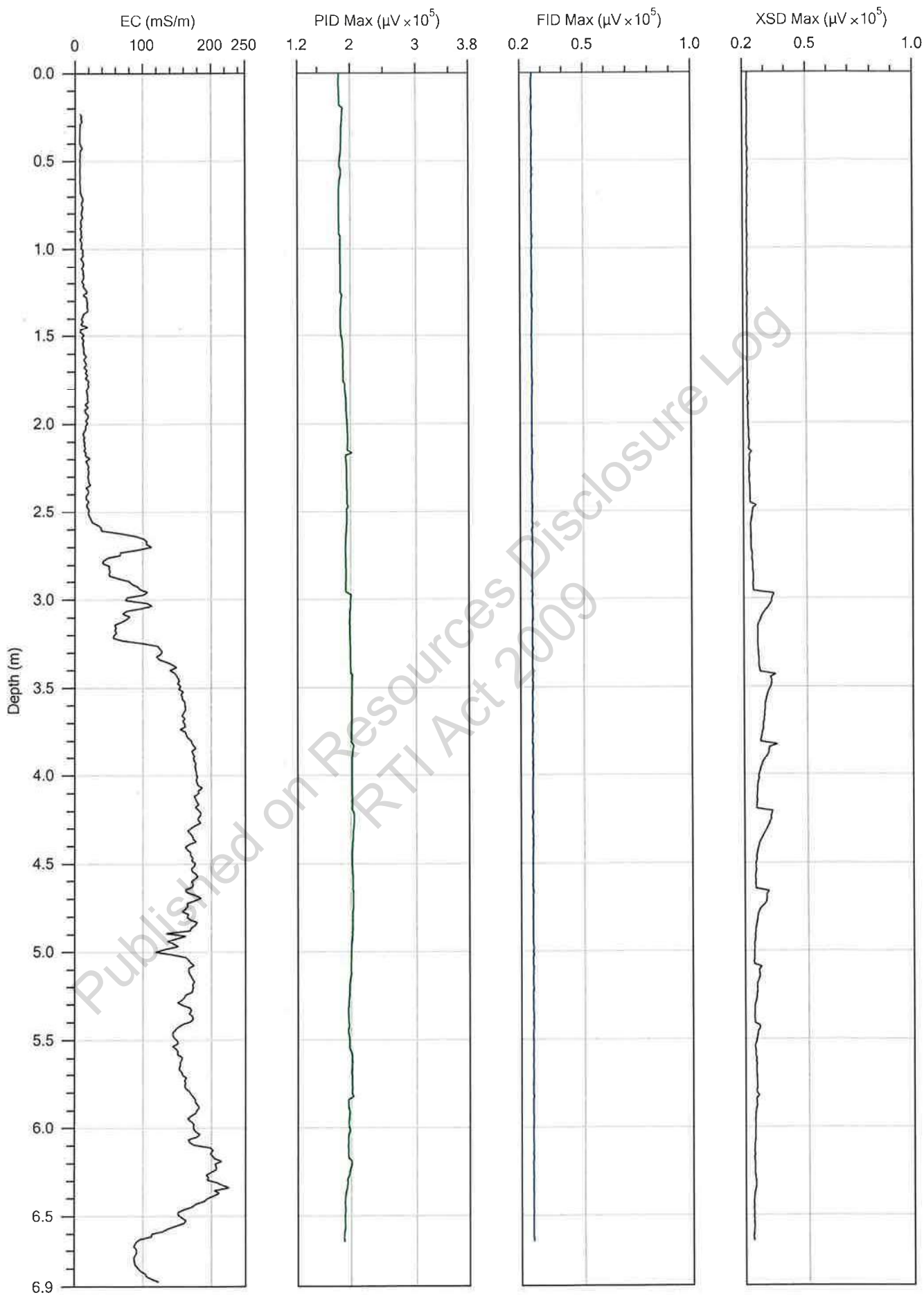


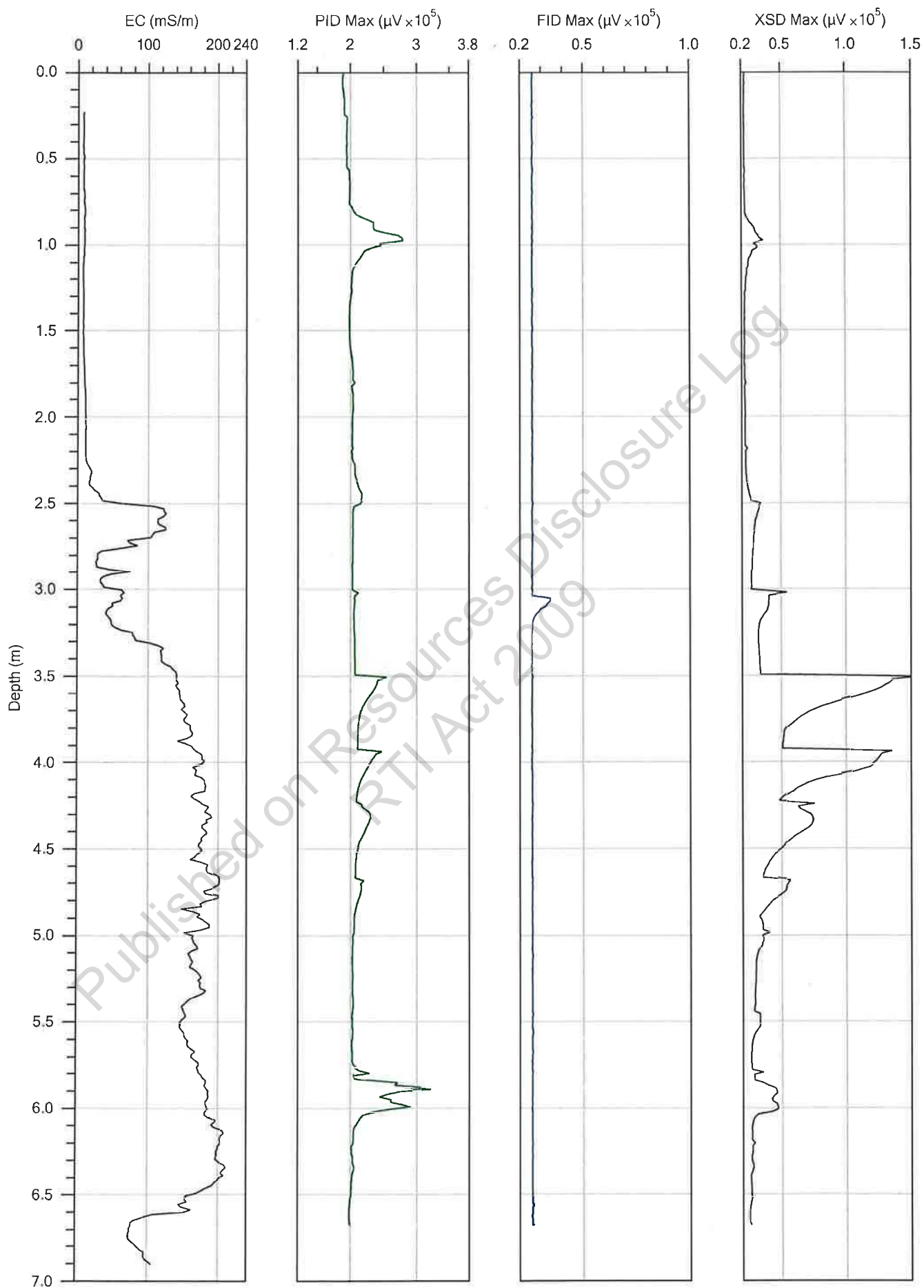


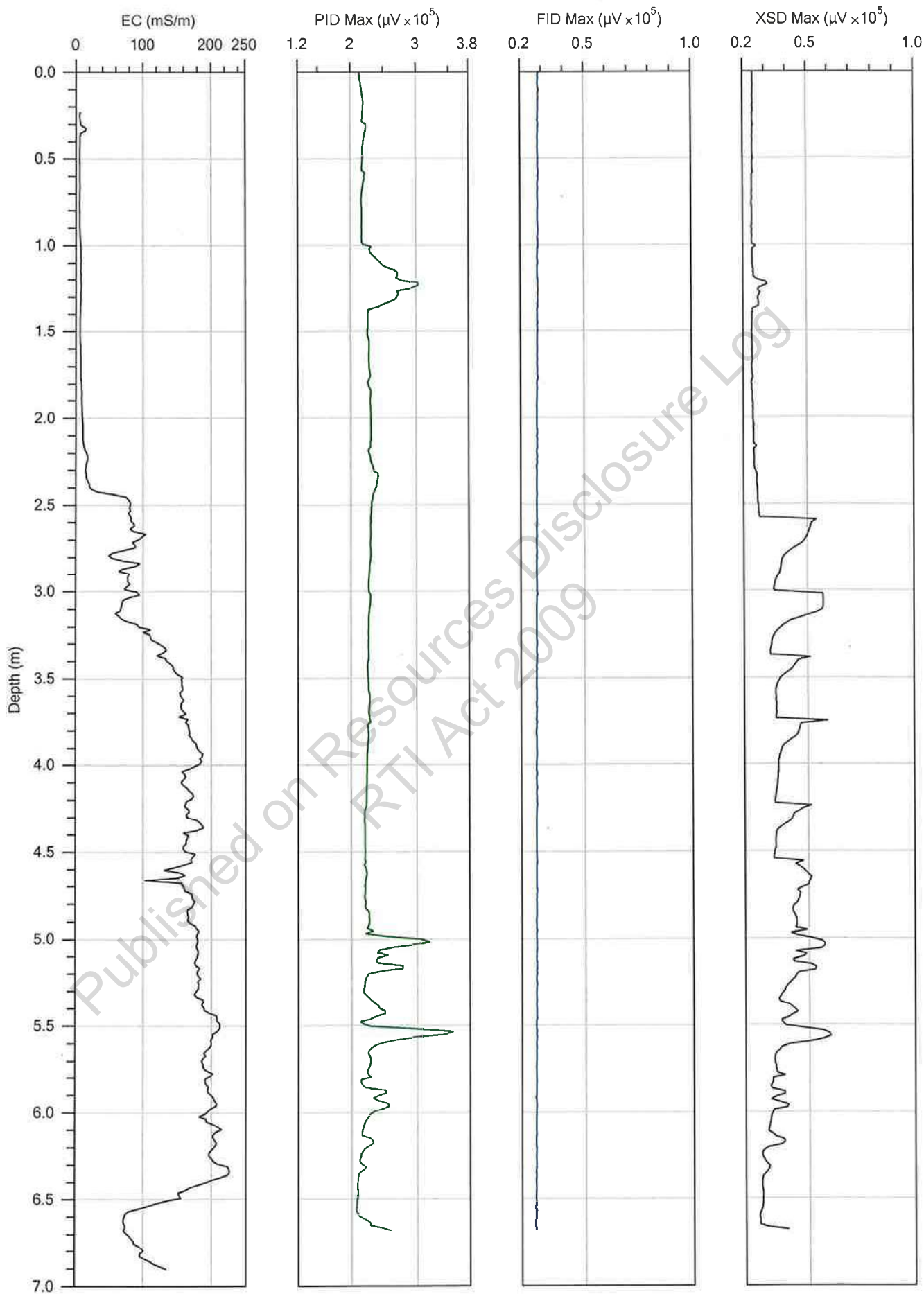


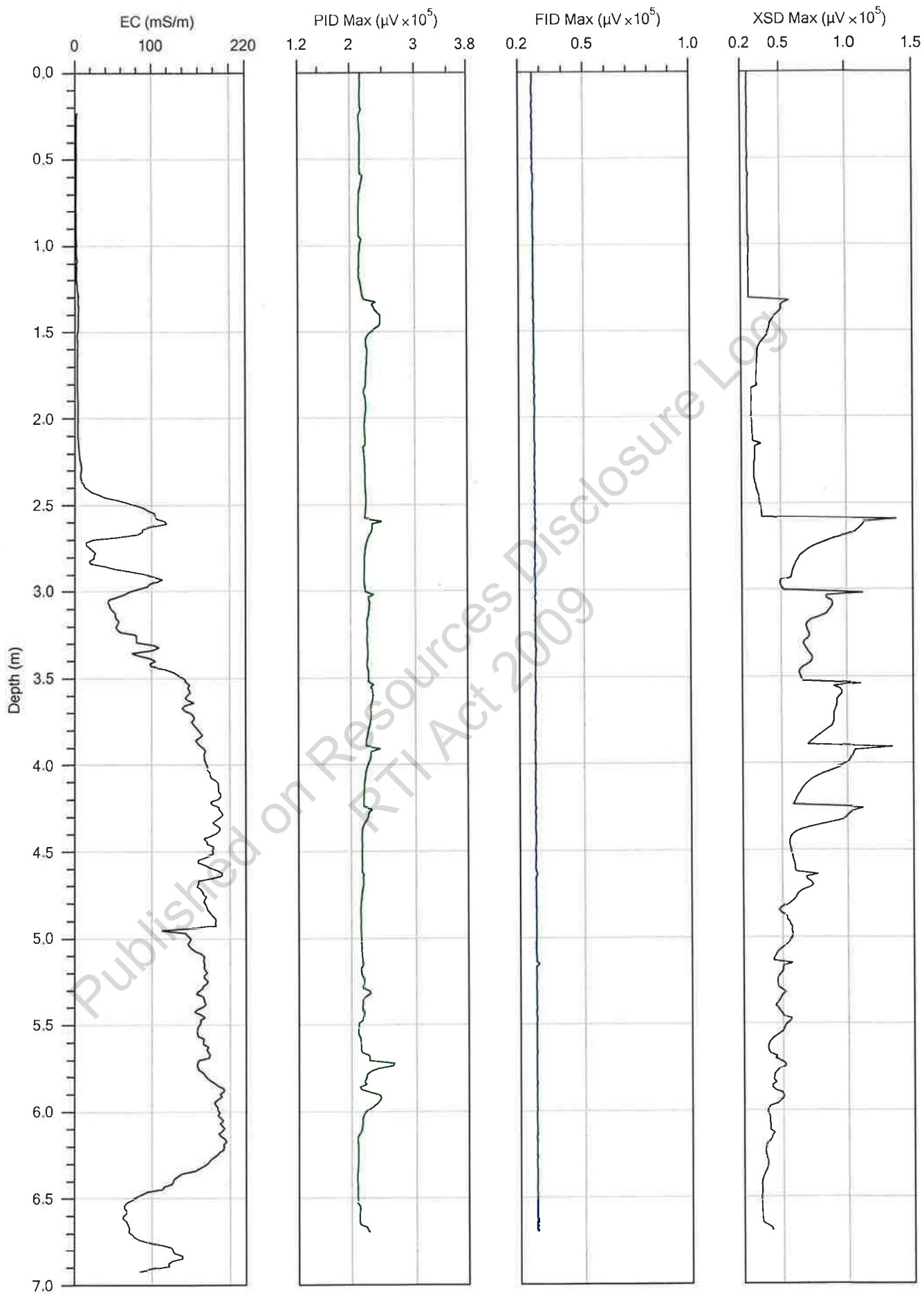








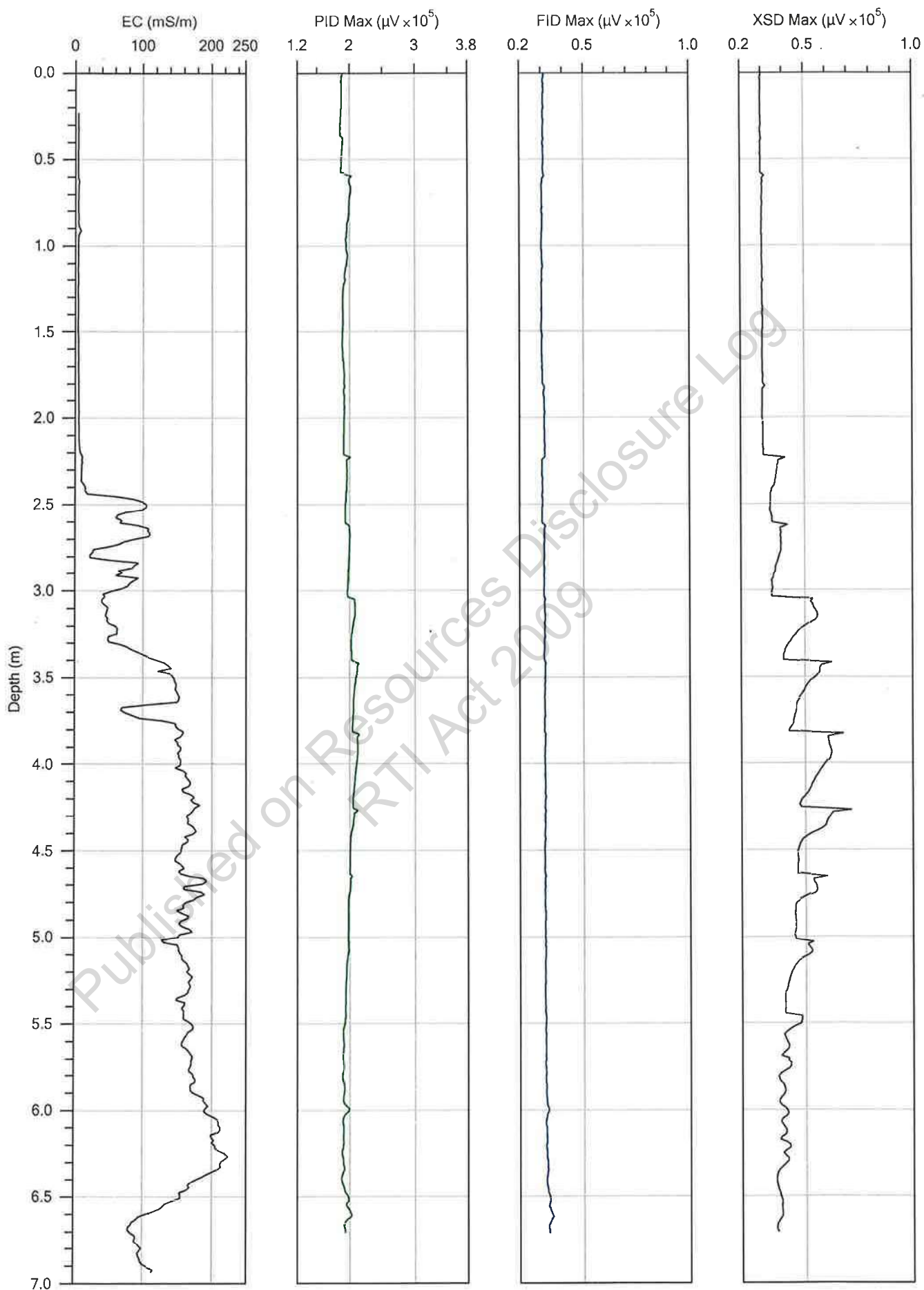


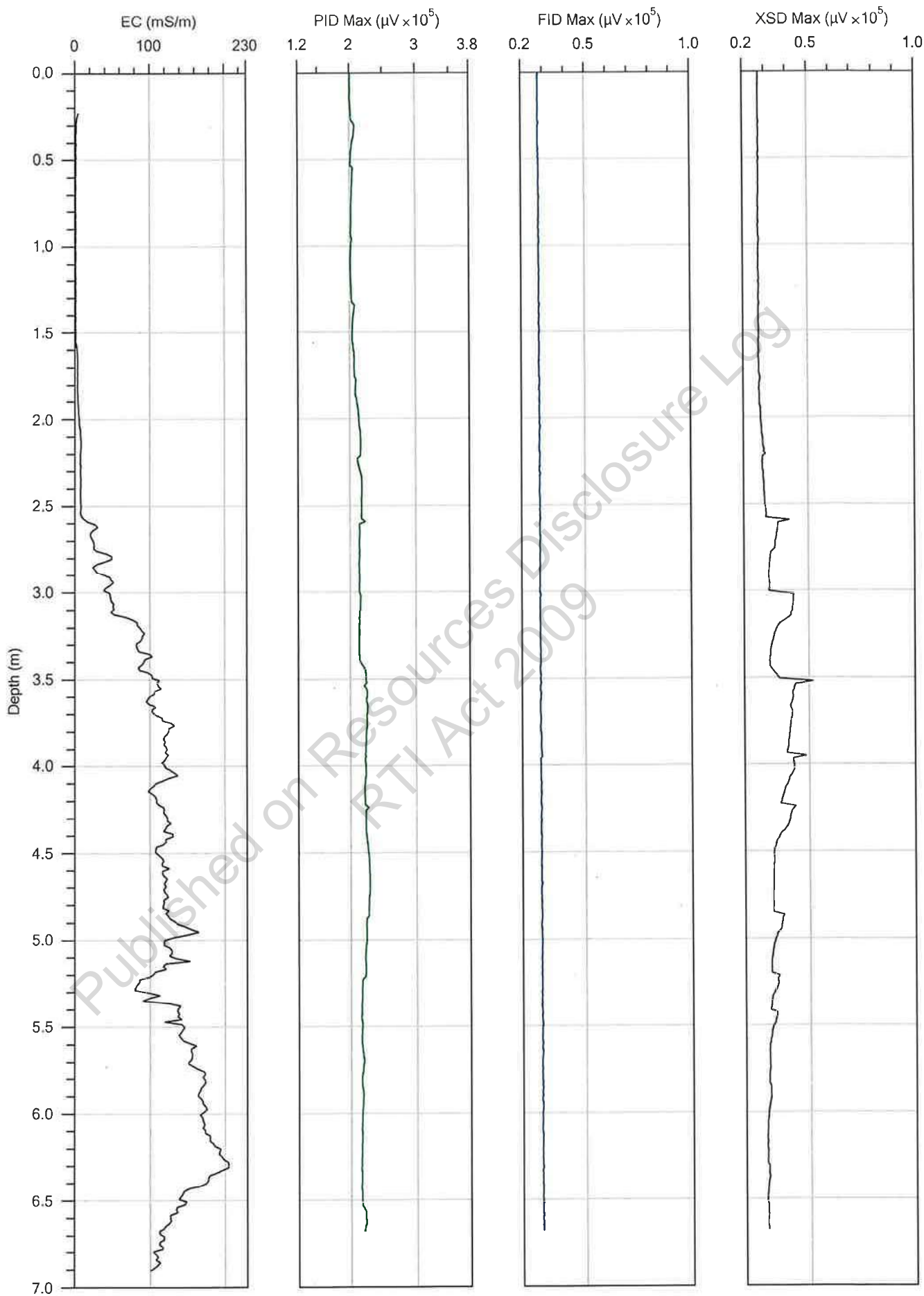


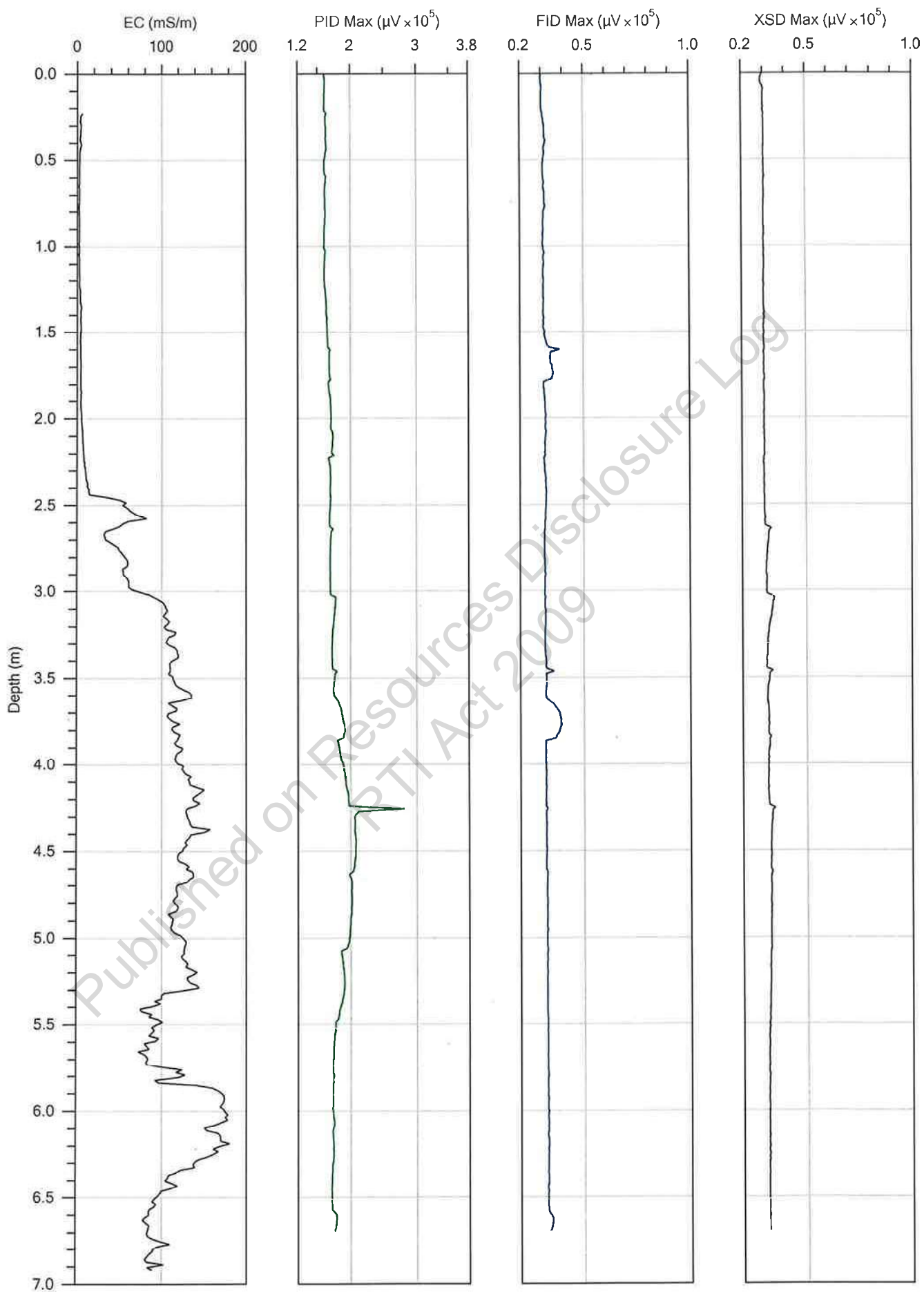
Company: Numac
Project ID: Cairns File A

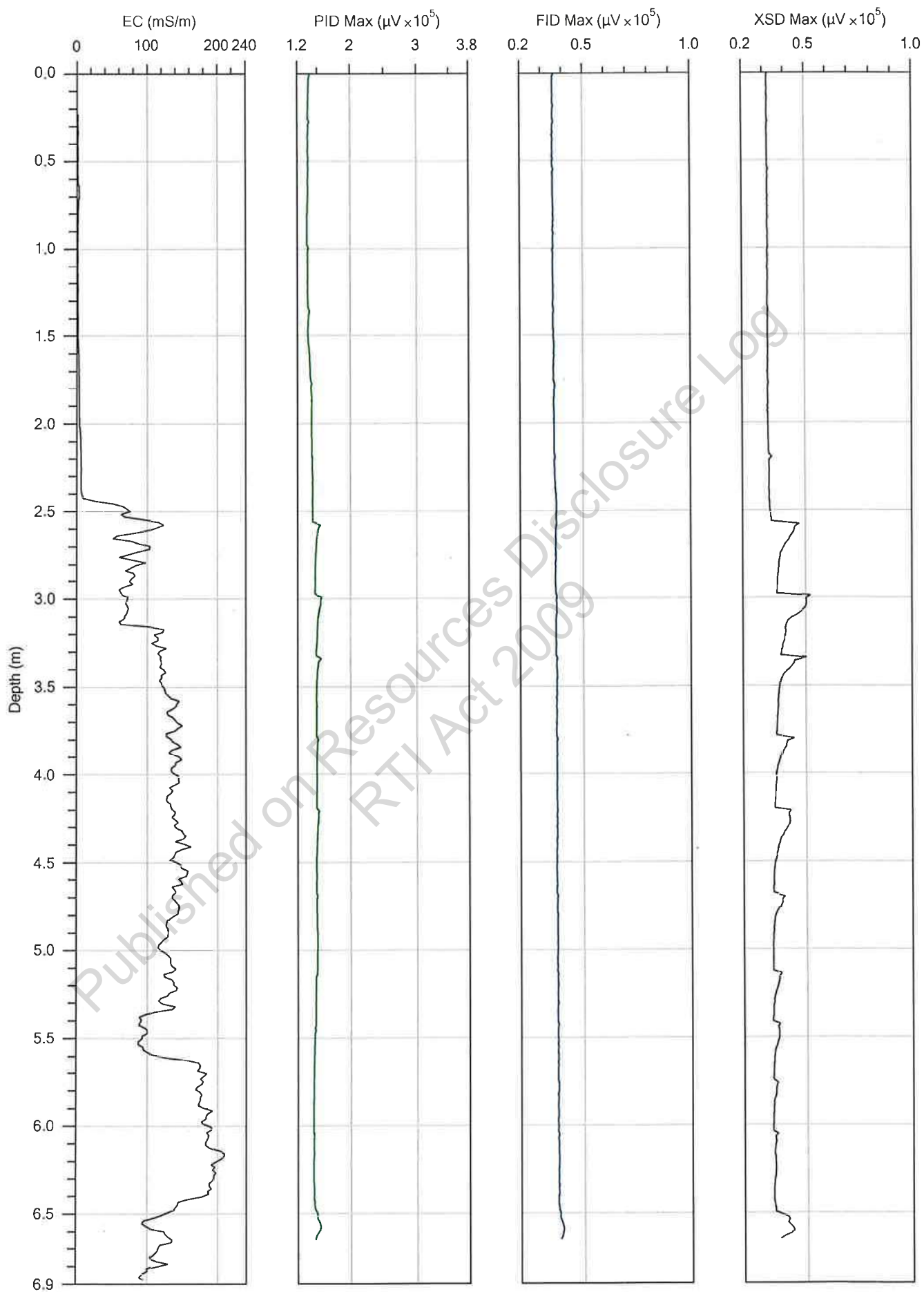
Operator: Heicher
Client: Golder

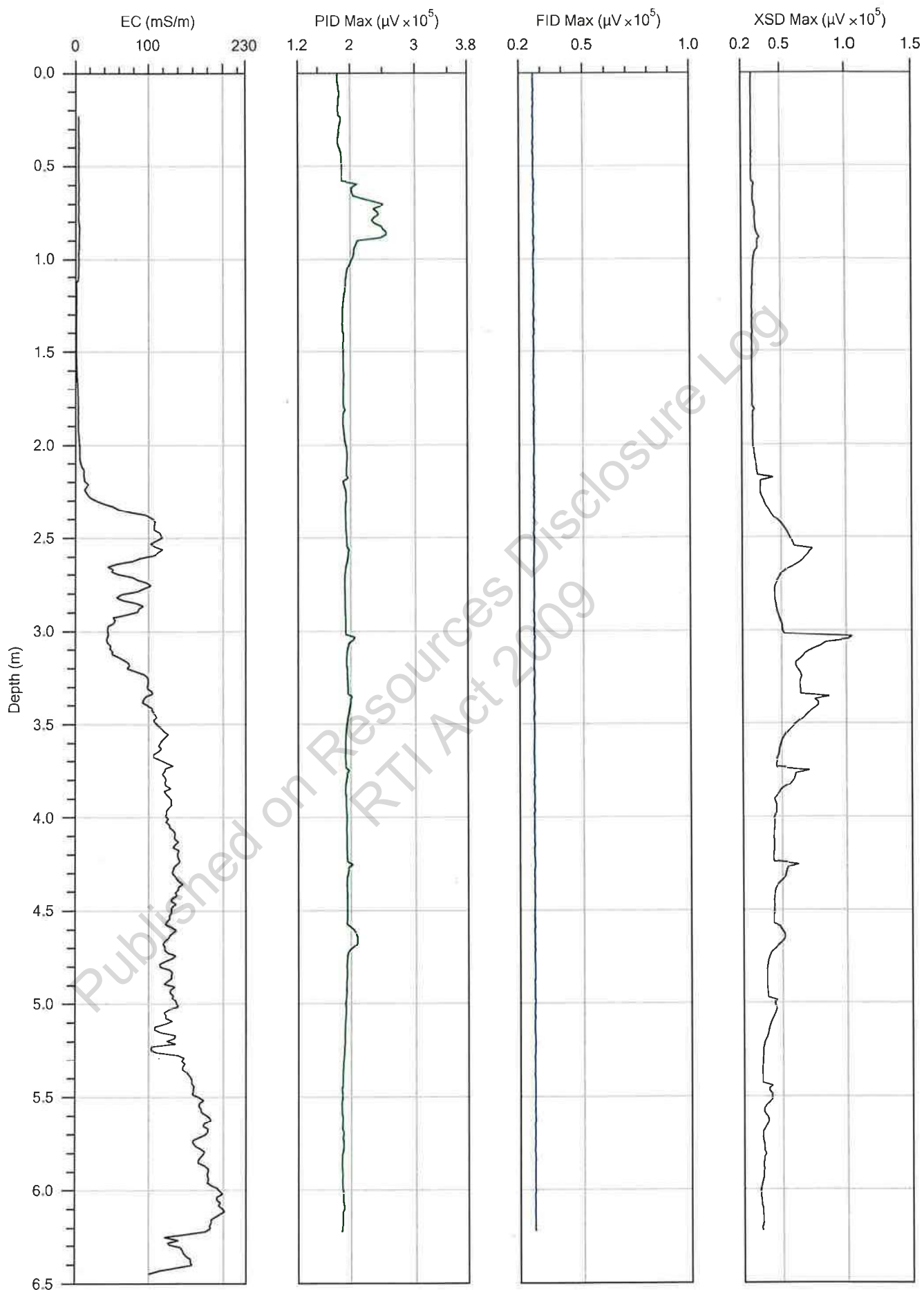
File: MIP09.MIP
Date: 2/07/2012
Location:

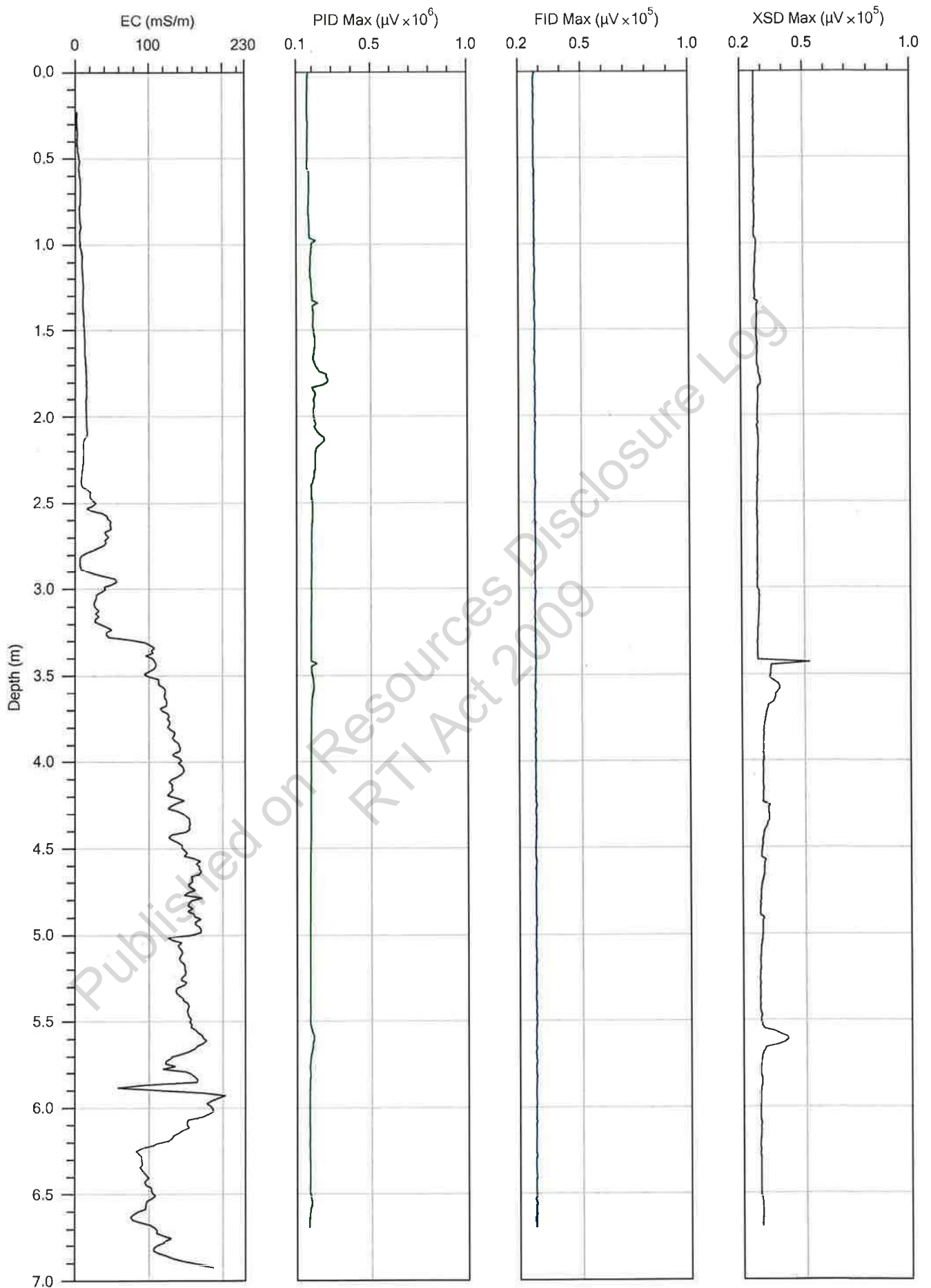


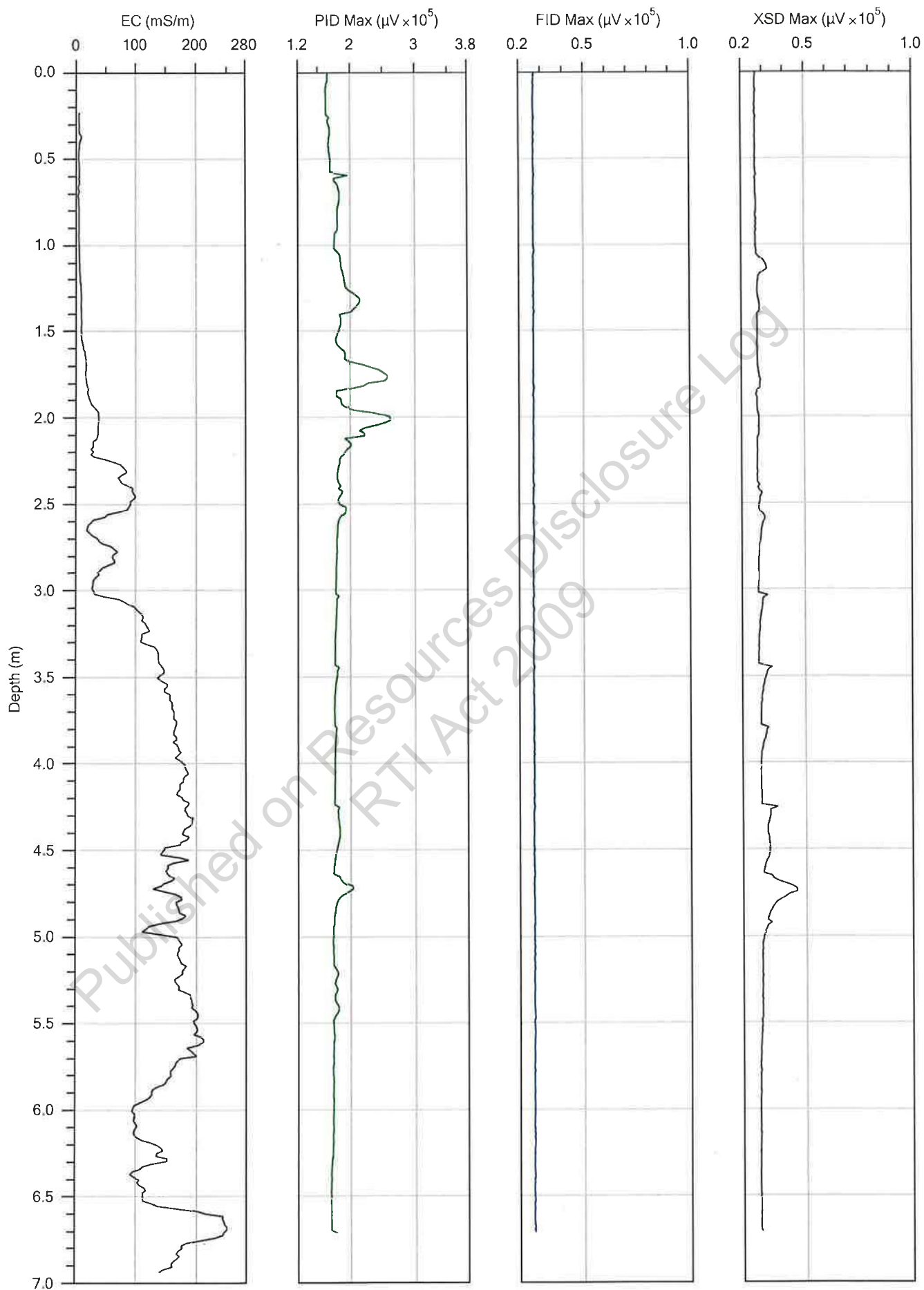


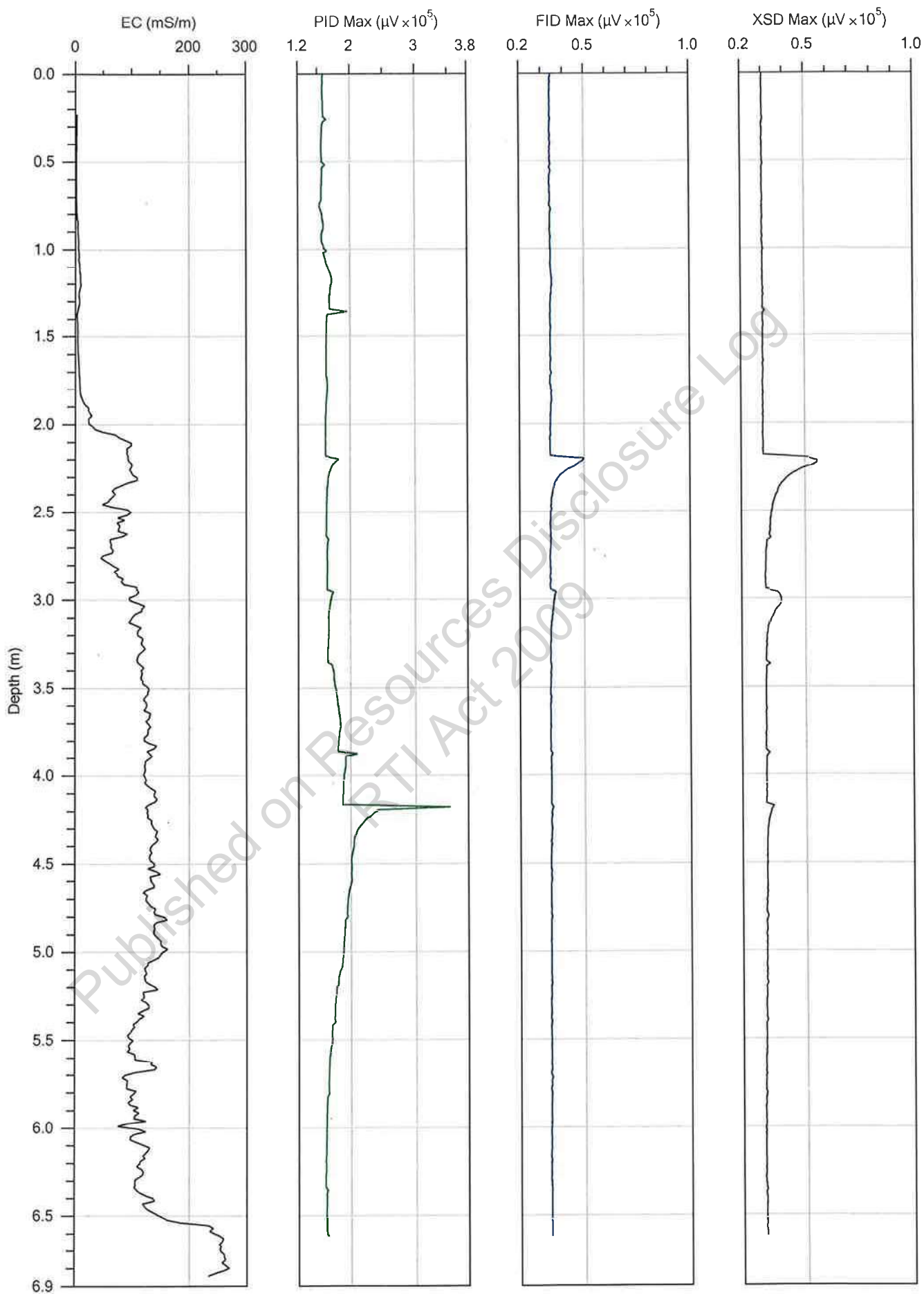


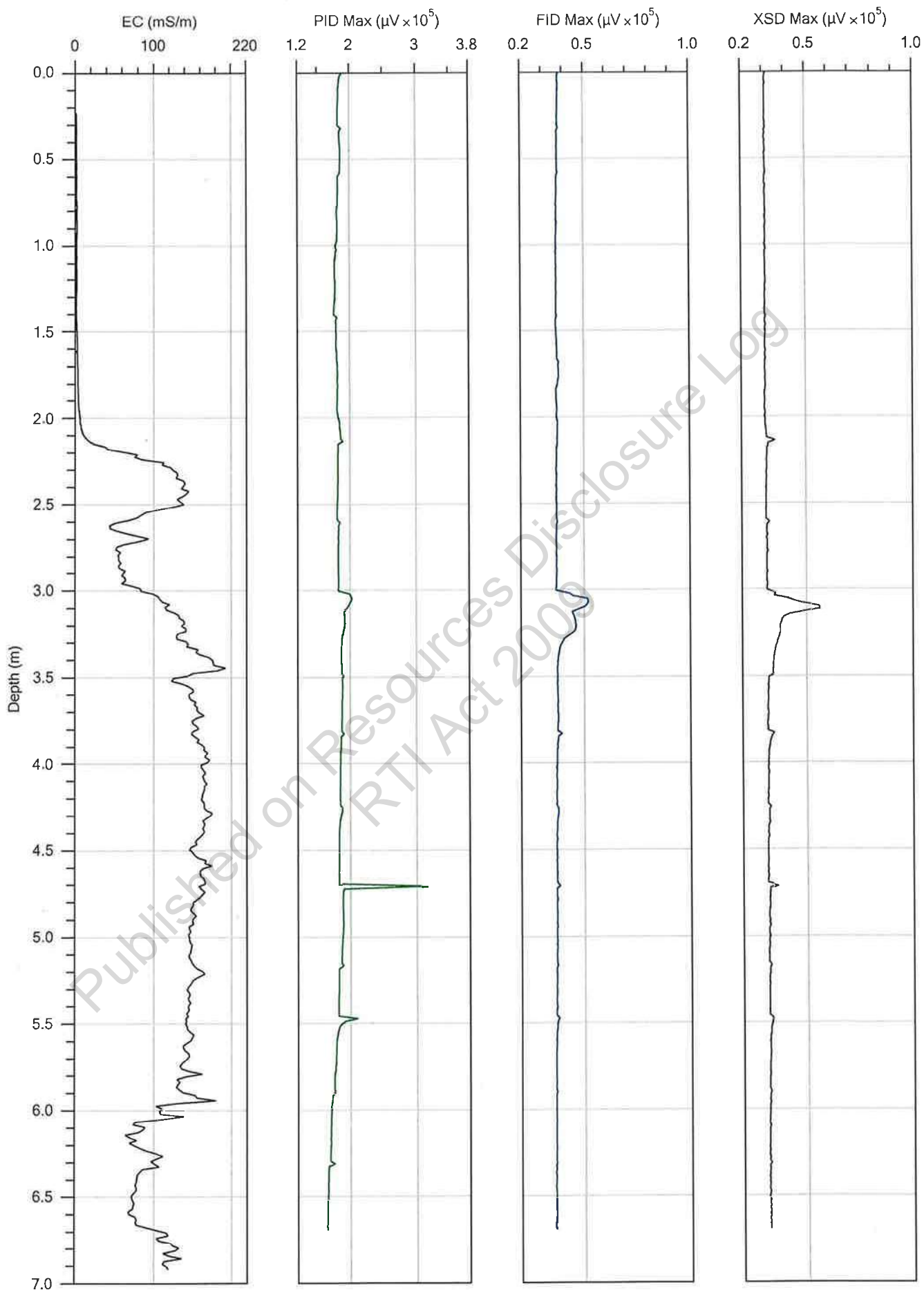


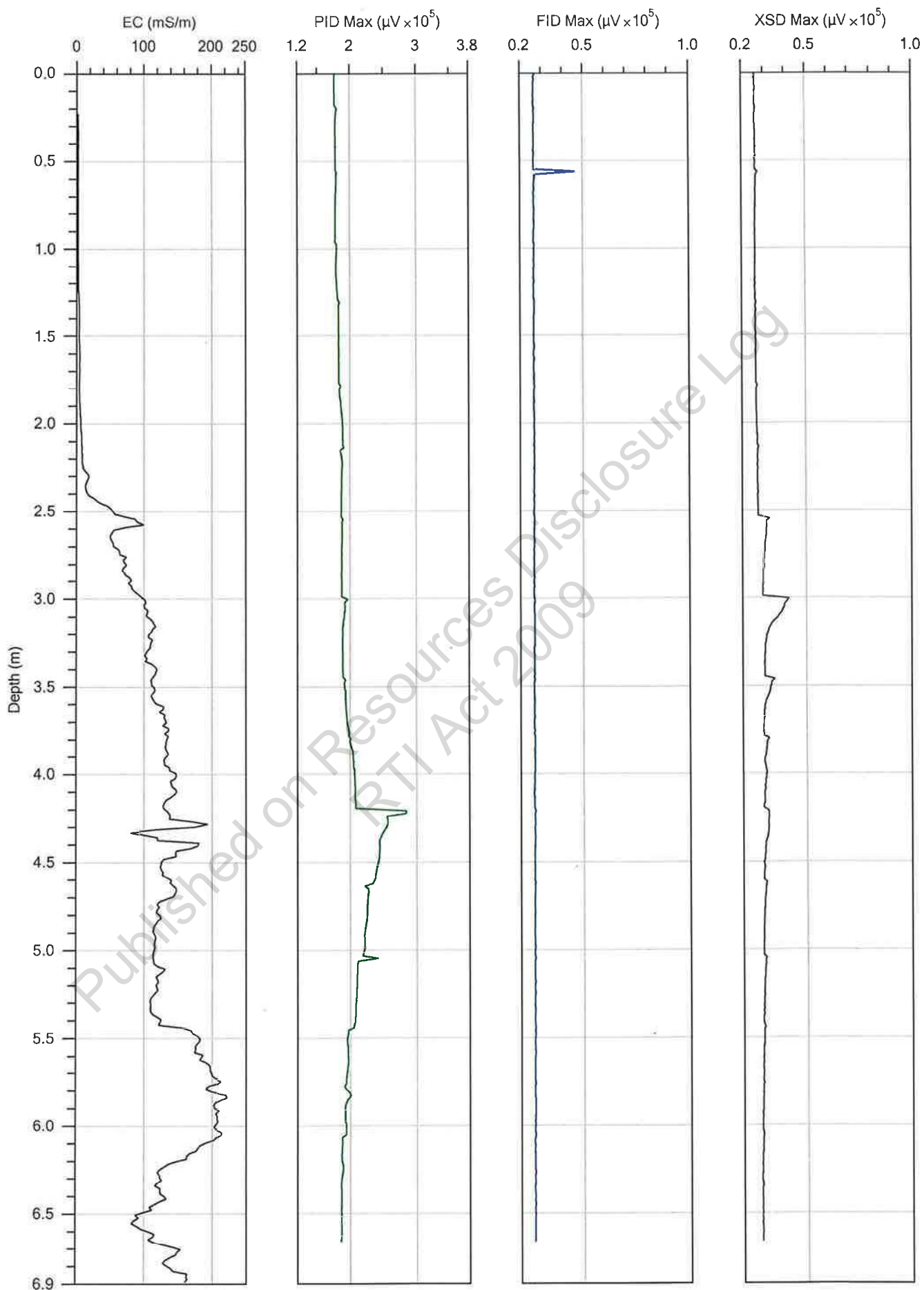


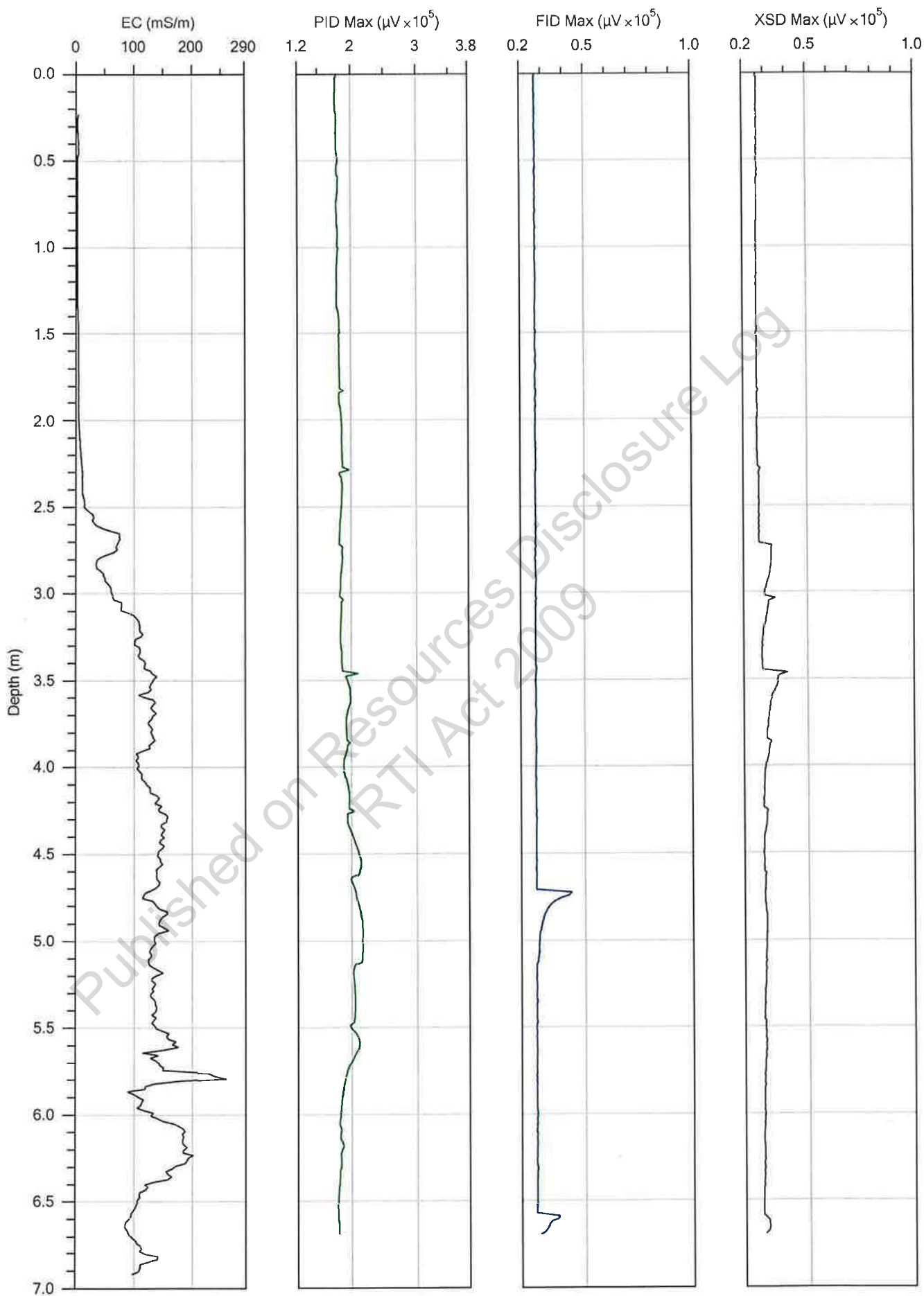


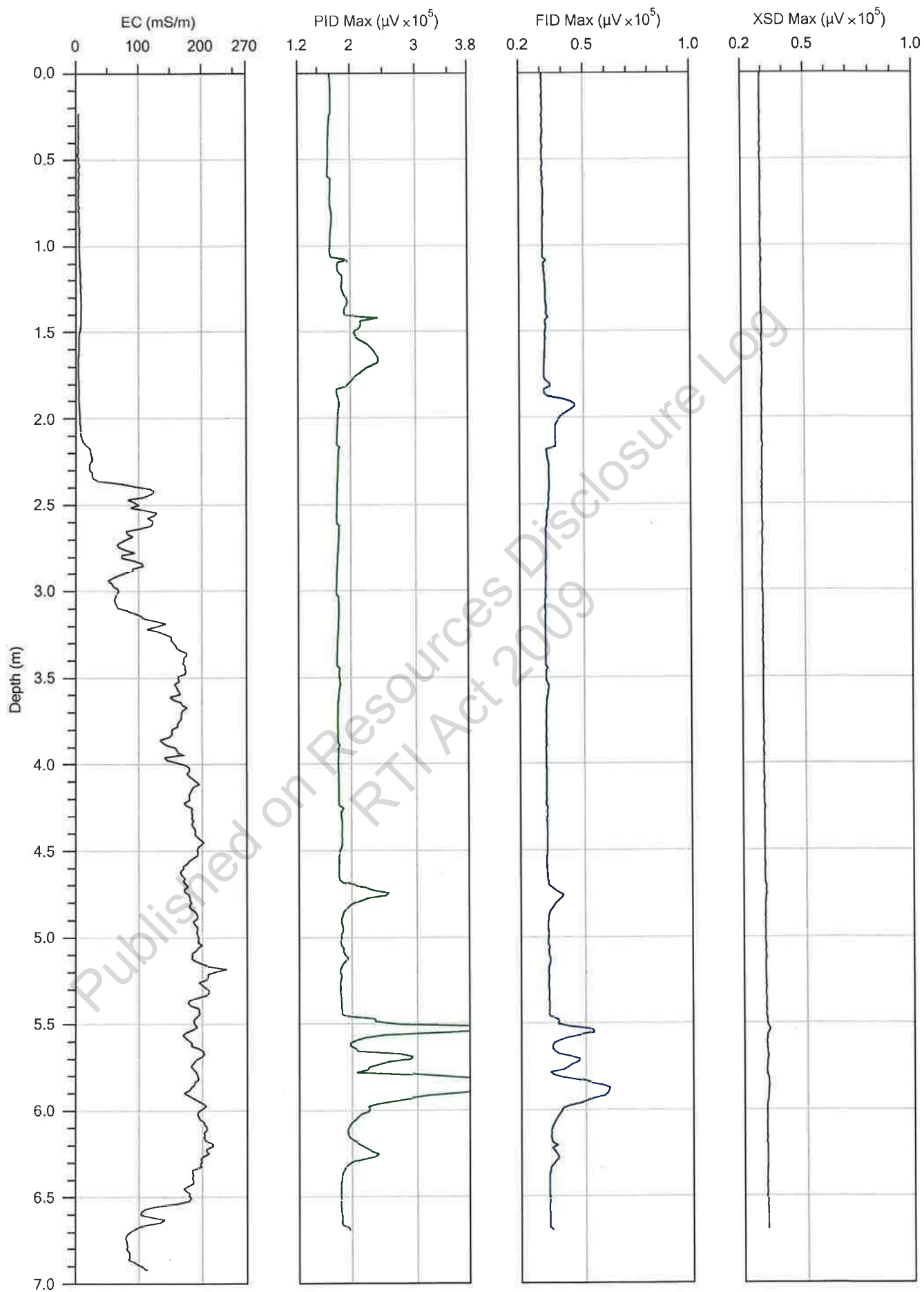


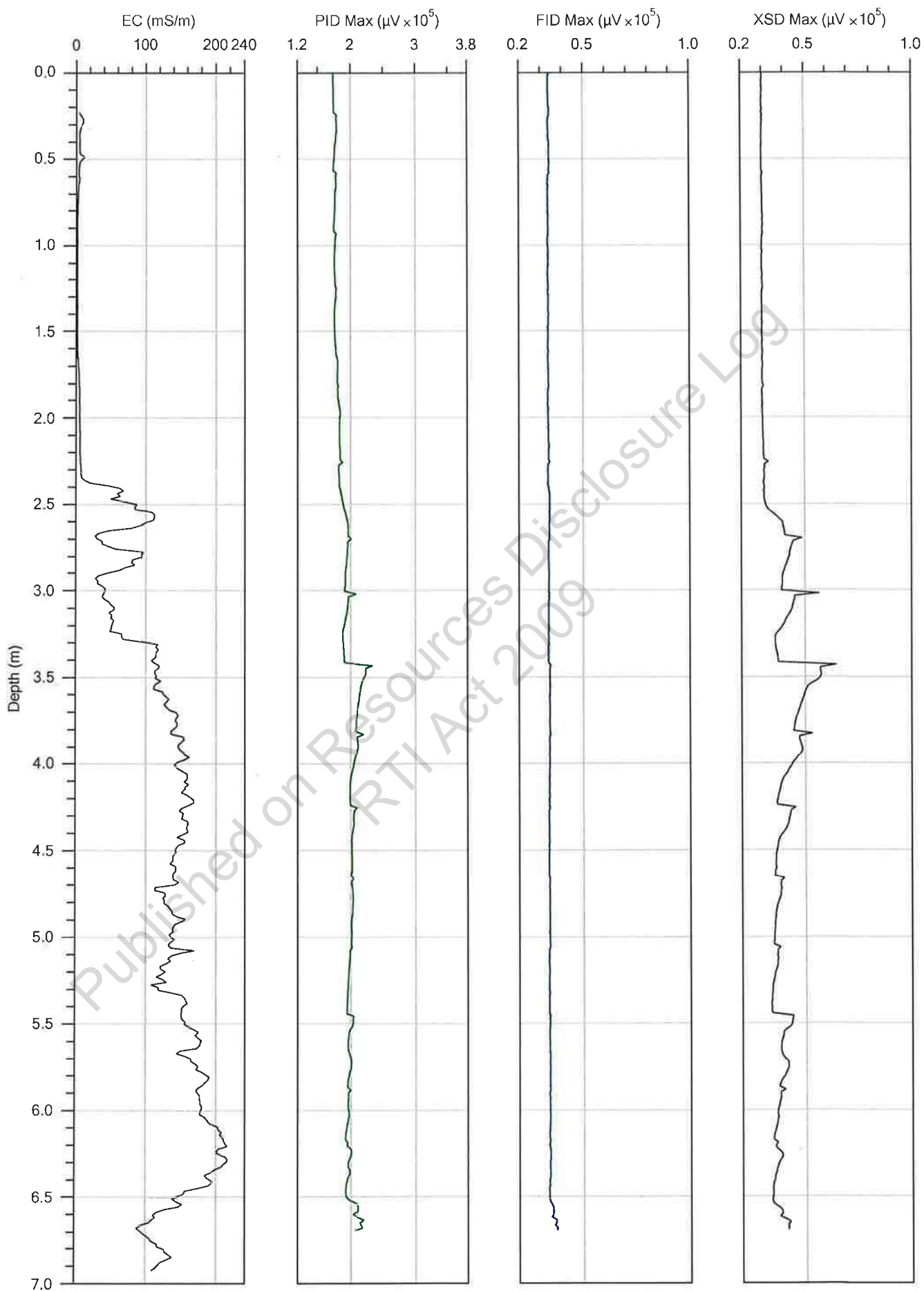


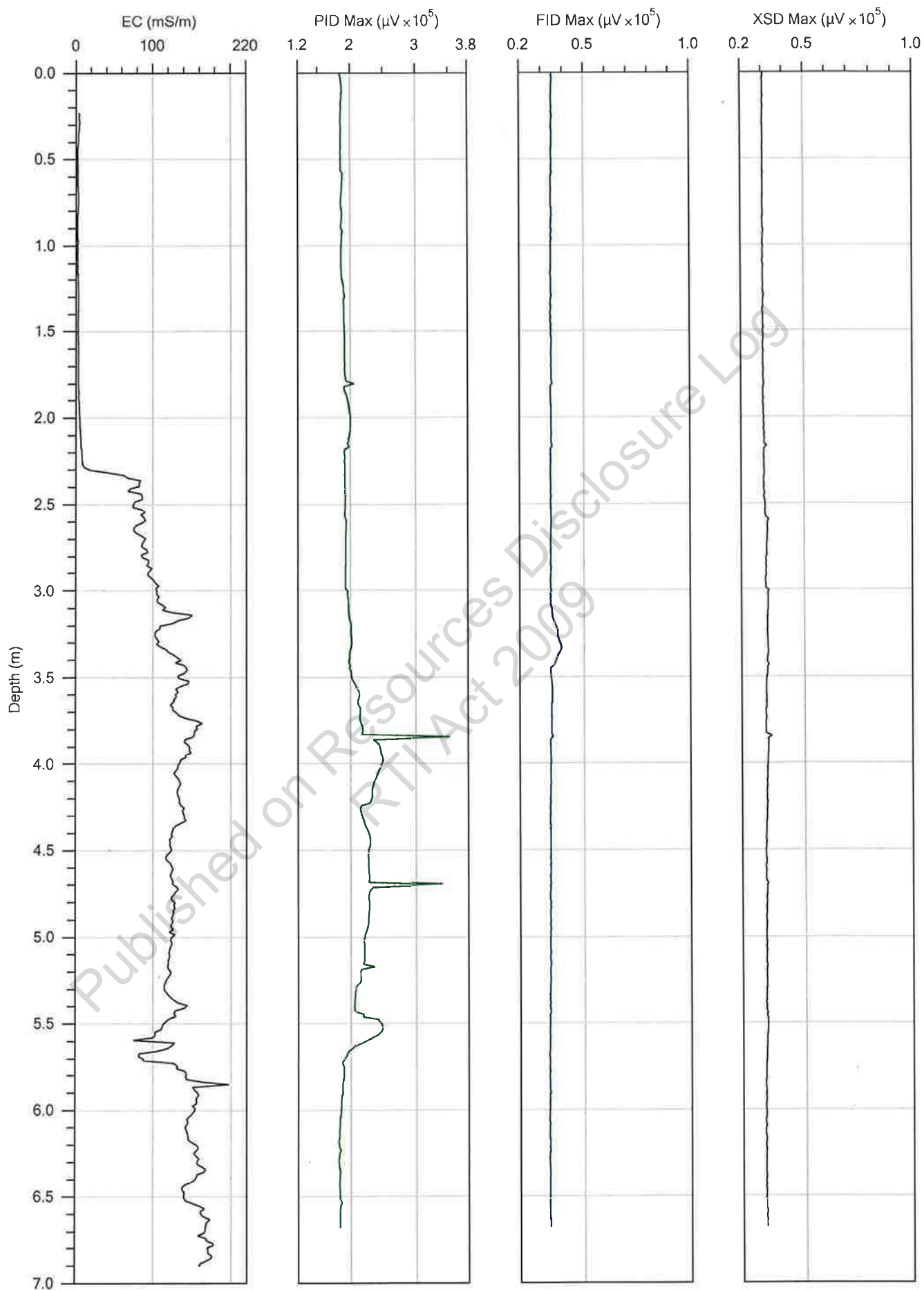


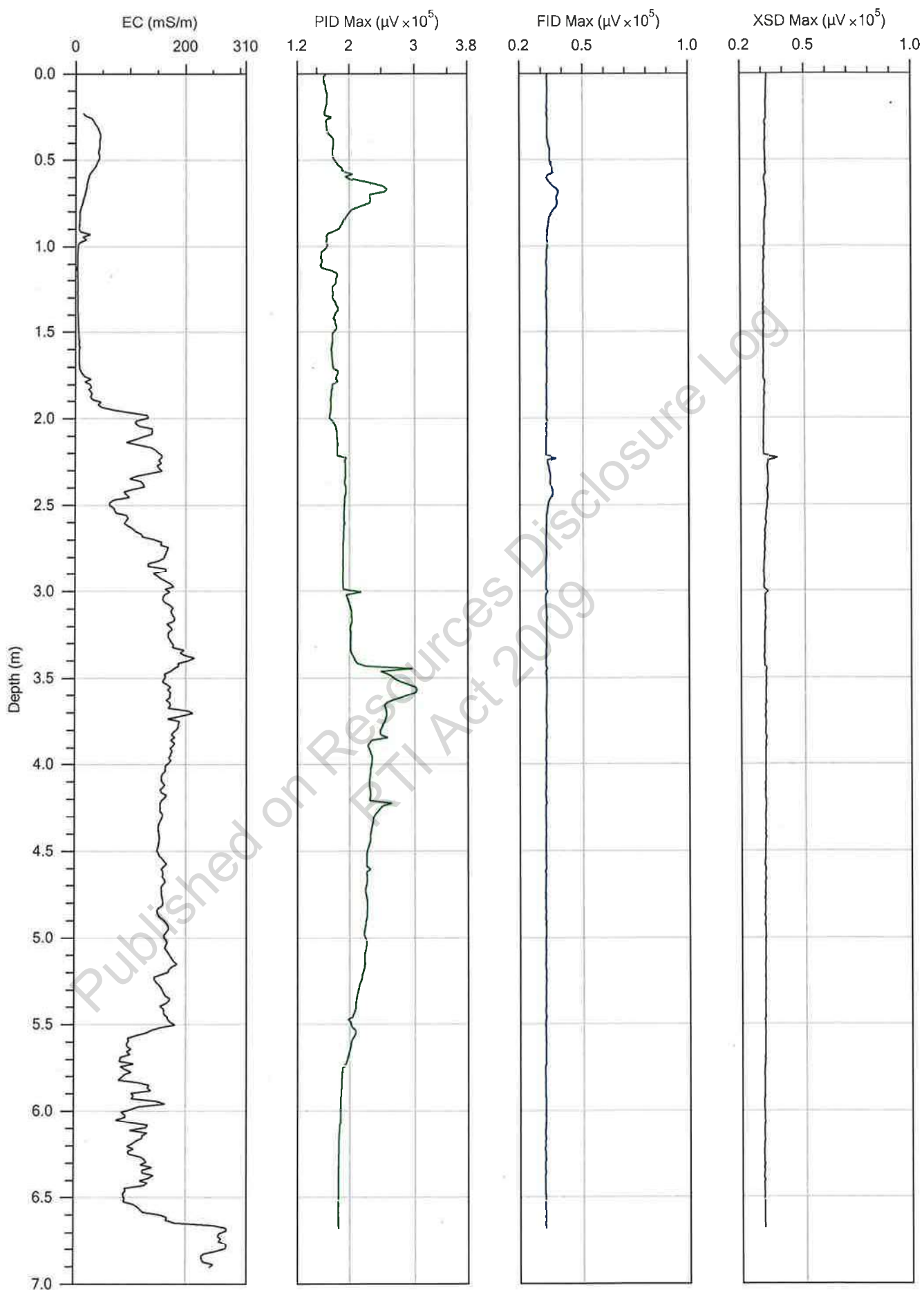


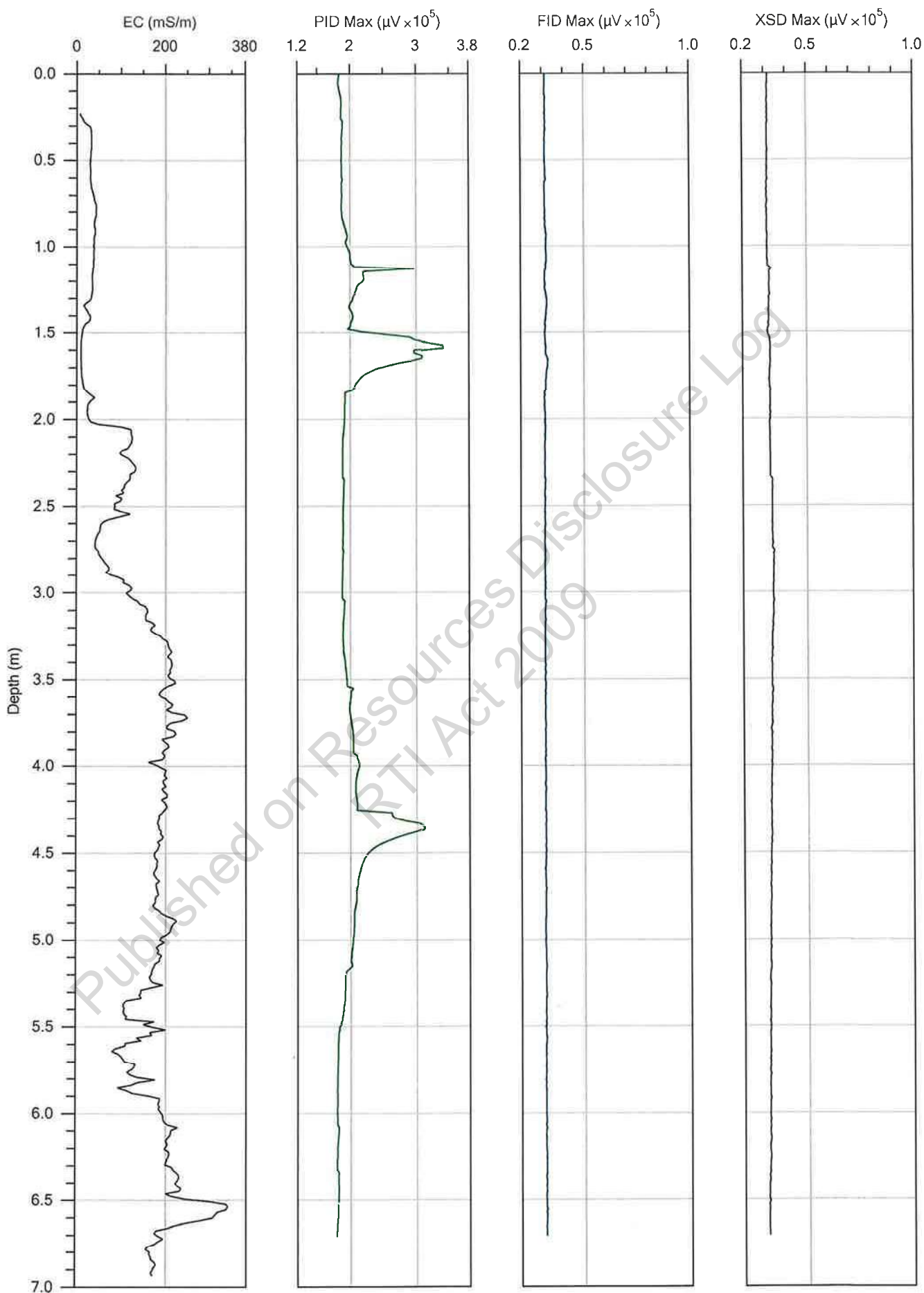


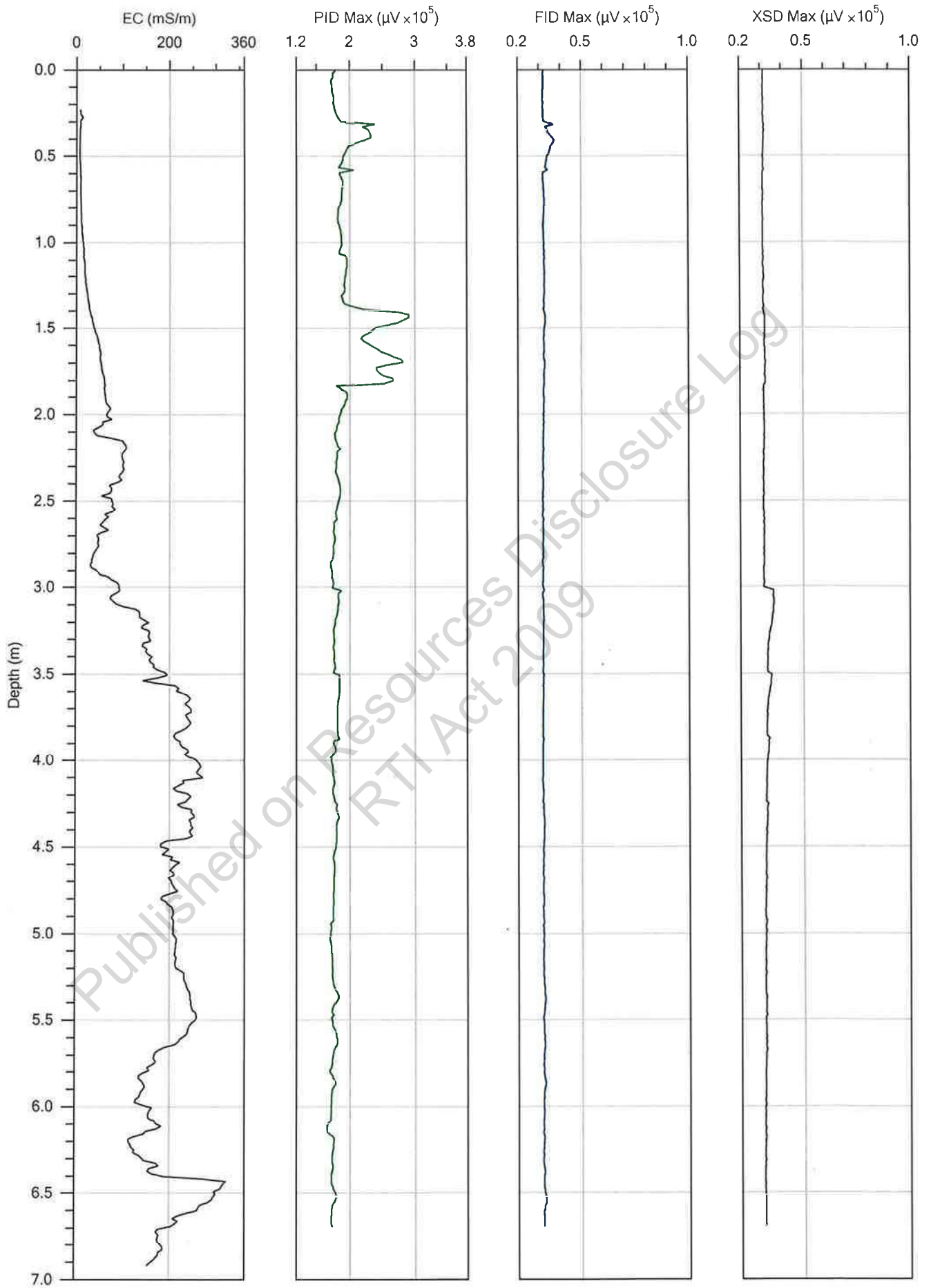


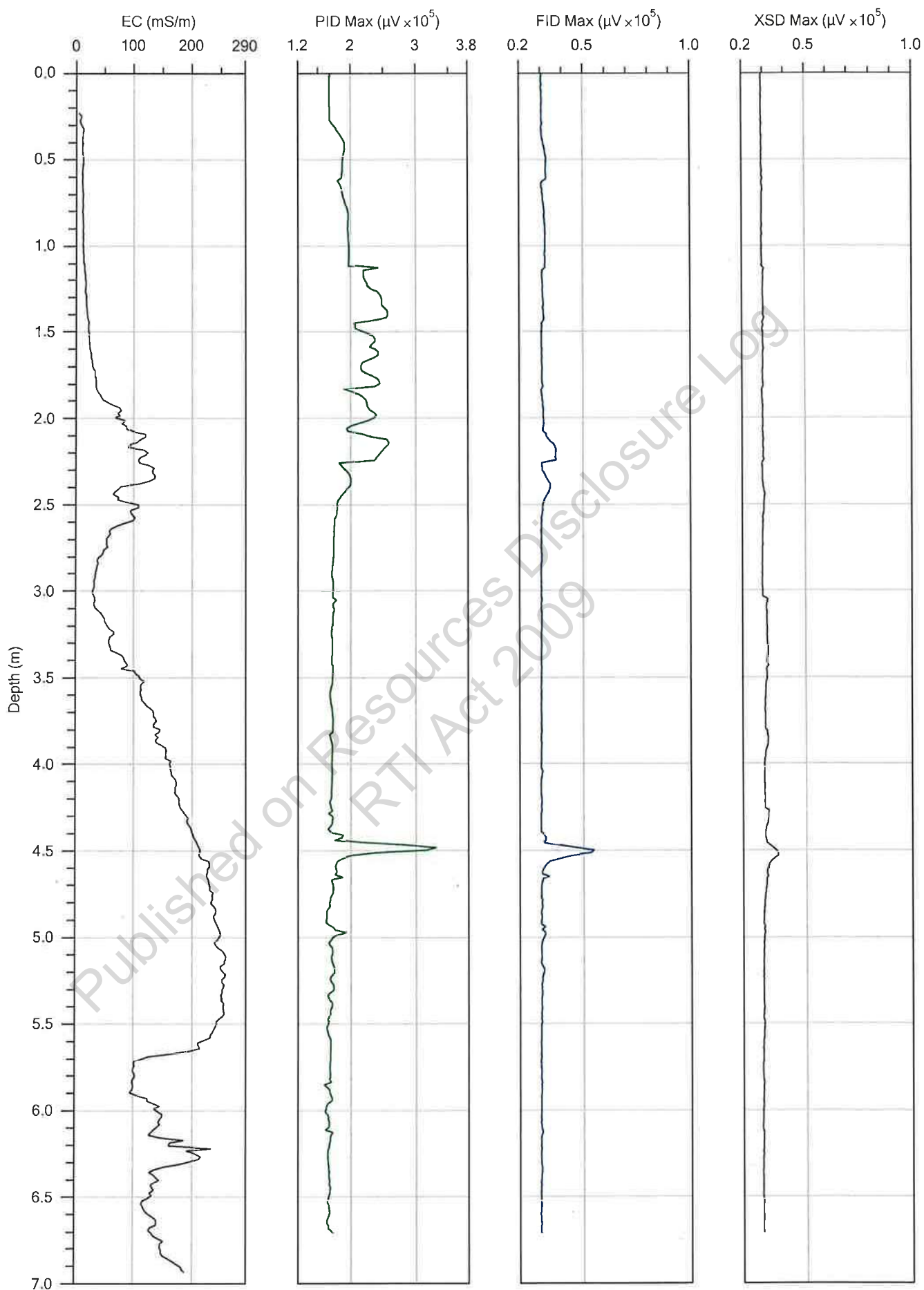


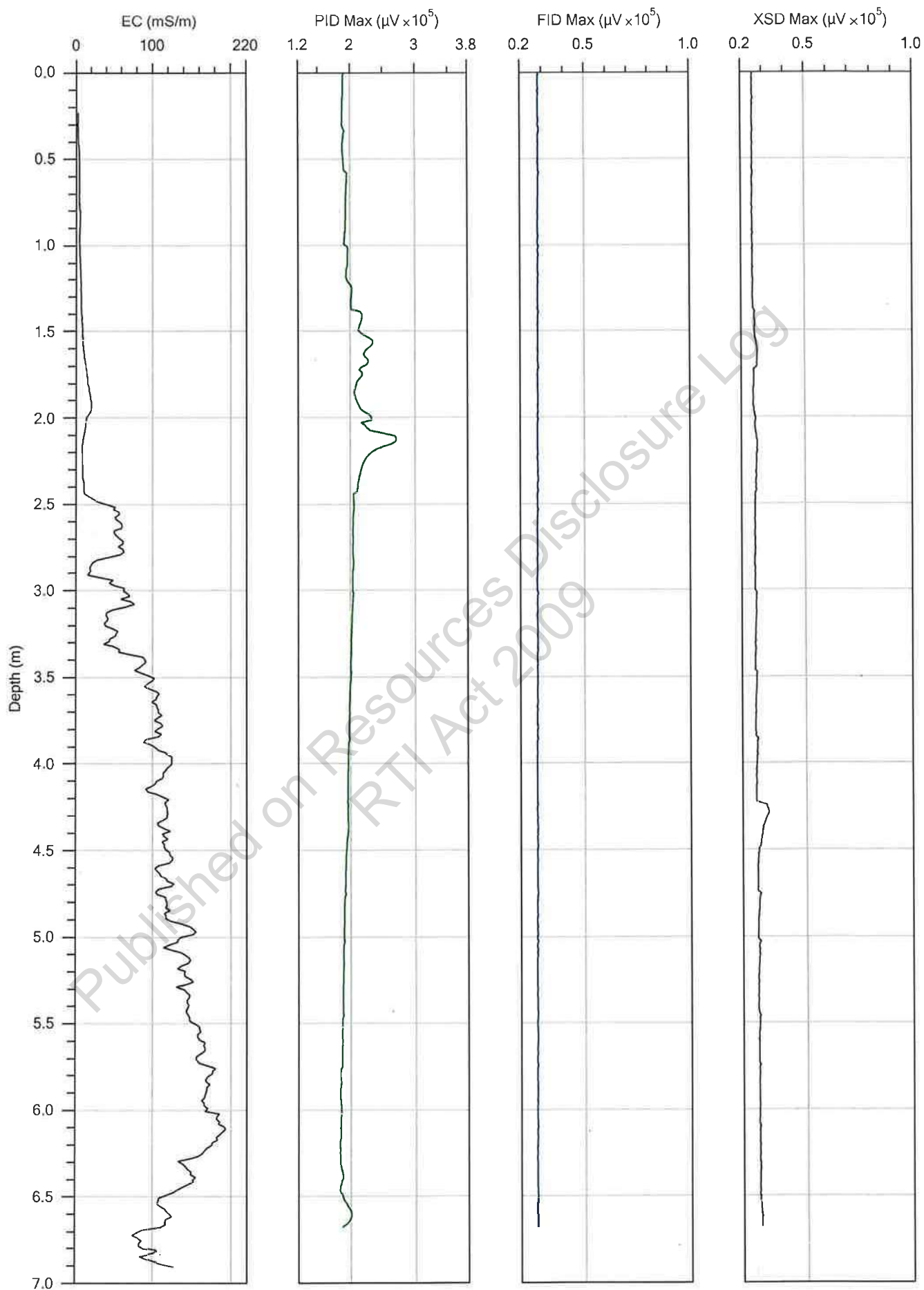


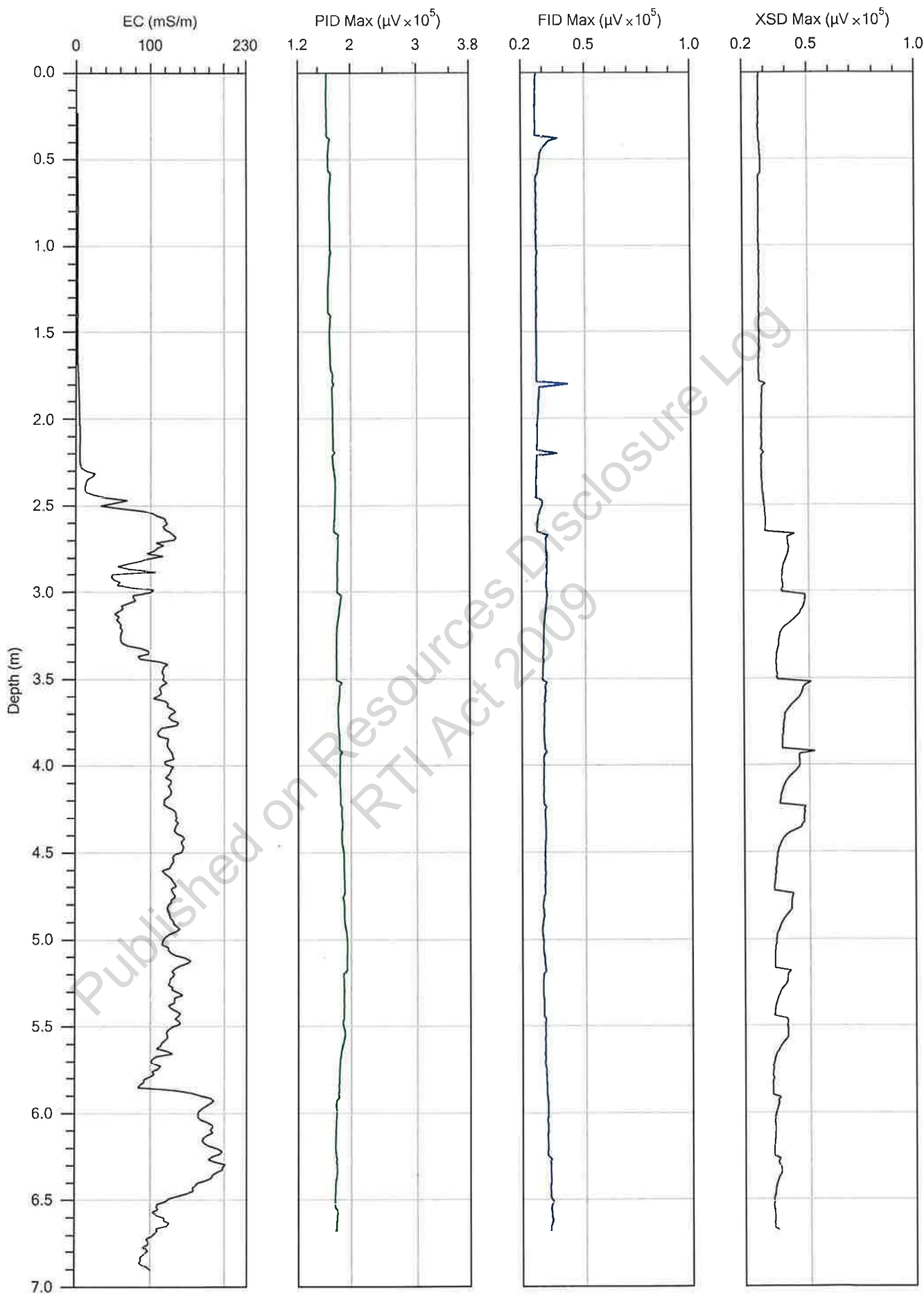














APPENDIX D

Laboratory Test Certificates

Published on Resources Disclosure Log
RTI Act 2009

CLIENT DETAILS

Contact **sch4p4(6) Pers**
 Client **GOLDER ASSOCIATES PTY LTD**
 Address **PO BOX 5823
CAIRNS QLD 4870**

Telephone **07 4035 5111**
 Facsimile **07 4035 5122**
 Email **sch4p4(@sgs.com**

Project **087673045- Kwikleen - Pease St - CE78770**
 Order Number **(Not specified)**
 Samples **5**

LABORATORY DETAILS

Manager **sch4p4(6) Pers**
 Laboratory **SGS Alexandria Environmental**
 Address **Unit 16, 33 Maddox St
Alexandria NSW 2015**

Telephone **+61 2 8594 0400**
 Facsimile **+61 2 8594 0499**
 Email **au.environmental.sydney@sgs.com**

SGS Reference **SE109987 R0**
 Report Number **0000034820**
 Date Reported **16 Jul 2012**
 Date Received **10 Jul 2012**

COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

VOC - The Limit of Reporting (LOR) has been raised due to interferences from the sample matrix.

SIGNATORIES



ANALYTICAL REPORT

SE109987 R0

Parameter	Units	LOR	Sample Number Sample Matrix Sample Date Sample Name	SE109987.001 Water 09 Jul 2012 MW1CP	SE109987.002 Water 09 Jul 2012 MW2CP	SE109987.003 Water 09 Jul 2012 MW3CP	SE109987.004 Water 09 Jul 2012 MW13CP	SE109987.005 Water 09 Jul 2012 MWX
-----------	-------	-----	--	---	---	---	--	---

VOCs in Water Method: AN433/AN434

Fumigants

2,2-dichloropropane	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
1,2-dichloropropane	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
trans-1,3-dichloropropene	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
cis-1,3-dichloropropene	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
1,2-dibromoethane (EDB)	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †

Halogenated Aliphatics

Dichlorodifluoromethane (CFC-12)	µg/L	5	<5	<500 †	<25 †	<5	<500 †
Chloromethane	µg/L	5	<5	<500 †	<25 †	<5	<500 †
Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3	<30 †	<1.5 †	<0.3	<30 †
Bromomethane	µg/L	10	<10	<1000 †	<50 †	<10	<1000 †
Chloroethane	µg/L	5	<5	<500 †	<25 †	<5	<500 †
Trichlorofluoromethane	µg/L	1	<1	<100 †	<5 †	<1	<100 †
1,1-dichloroethene	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
trans-1,2-dichloroethene	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
1,1-dichloroethane	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
cis-1,2-dichloroethene	µg/L	0.5	22	510	33	0.6	630
Bromochloromethane	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
1,2-dichloroethane	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
1,1,1-trichloroethane	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
1,1-dichloropropene	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
Carbon tetrachloride	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
Dibromomethane	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
Trichloroethene (Trichloroethylene, TCE)	µg/L	0.5	18	2000	72	70	2600
1,1,2-trichloroethane	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
1,3-dichloropropane	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
Tetrachloroethene (Perchloroethylene, PCE)	µg/L	0.5	3.8	3800	15	110	4600
1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
1,2,3-trichloropropane	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
Hexachlorobutadiene	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †

Halogenated Aromatics

Chlorobenzene	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
Bromobenzene	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
2-chlorotoluene	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
4-chlorotoluene	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
1,3-dichlorobenzene	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
1,4-dichlorobenzene	µg/L	0.3	<0.3	<30 †	<1.5 †	<0.3	<30 †
1,2-dichlorobenzene	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
1,2,4-trichlorobenzene	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
1,2,3-trichlorobenzene	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †

Surrogates

Dibromofluoromethane (Surrogate)	%	-	126	117	121	123	121
d4-1,2-dichloroethane (Surrogate)	%	-	120	120	116	121	128
d8-toluene (Surrogate)	%	-	95	97	98	93	94
Bromofluorobenzene (Surrogate)	%	-	103	104	103	103	102

Totals

Total Halogenated Hydrocarbons	µg/L	10	-	-	-	-	-
--------------------------------	------	----	---	---	---	---	---

Trihalomethanes

Chloroform (THM)	µg/L	0.5	<0.5	83	<2.5 †	0.6	66
Bromodichloromethane (THM)	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
Dibromochloromethane (THM)	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †
Bromoform (THM)	µg/L	0.5	<0.5	<50 †	<2.5 †	<0.5	<50 †

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA', the results are less than the LOR and thus the RPD is not applicable.

VOCs in Water Method: ME-(AU)-[ENV]AN433/AN434

Fumigants

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
2,2-dichloropropane	LB023133	µg/L	0.5	<0.5	0%	NA
1,2-dichloropropane	LB023133	µg/L	0.5	<0.5	0%	NA
trans-1,3-dichloropropene	LB023133	µg/L	0.5	<0.5	0%	NA
cis-1,3-dichloropropene	LB023133	µg/L	0.5	<0.5	0%	NA
1,2-dibromoethane (EDB)	LB023133	µg/L	0.5	<0.5	0%	NA

Halogenated Aliphatics

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Dichlorodifluoromethane (CFC-12)	LB023133	µg/L	5	<5	0%	NA
Chloromethane	LB023133	µg/L	5	<5	0%	NA
Vinyl chloride (Chloroethene)	LB023133	µg/L	0.3	<0.3	0%	NA
Bromomethane	LB023133	µg/L	10	<10	0%	NA
Chloroethane	LB023133	µg/L	5	<5	0%	NA
Trichlorofluoromethane	LB023133	µg/L	1	<1	0%	NA
1,1-dichloroethene	LB023133	µg/L	0.5	<0.5	0%	112%
trans-1,2-dichloroethene	LB023133	µg/L	0.5	<0.5	0%	NA
1,1-dichloroethane	LB023133	µg/L	0.5	<0.5	0%	NA
cis-1,2-dichloroethene	LB023133	µg/L	0.5	<0.5	23%	NA
Bromochloromethane	LB023133	µg/L	0.5	<0.5	0%	NA
1,2-dichloroethane	LB023133	µg/L	0.5	<0.5	0%	106%
1,1,1-trichloroethane	LB023133	µg/L	0.5	<0.5	0%	NA
1,1-dichloropropene	LB023133	µg/L	0.5	<0.5	0%	NA
Carbon tetrachloride	LB023133	µg/L	0.5	<0.5	0%	NA
Dibromomethane	LB023133	µg/L	0.5	<0.5	0%	NA
Trichloroethene (Trichloroethylene,TCE)	LB023133	µg/L	0.5	<0.5	4%	111%
1,1,2-trichloroethane	LB023133	µg/L	0.5	<0.5	0%	NA
1,3-dichloropropane	LB023133	µg/L	0.5	<0.5	0%	NA
Tetrachloroethene (Perchloroethylene,PCE)	LB023133	µg/L	0.5	<0.5	1%	NA
1,1,1,2-tetrachloroethane	LB023133	µg/L	0.5	<0.5	0%	NA
1,1,2,2-tetrachloroethane	LB023133	µg/L	0.5	<0.5	0%	NA
1,2,3-trichloropropane	LB023133	µg/L	0.5	<0.5	0%	NA
1,2-dibromo-3-chloropropane	LB023133	µg/L	0.5	<0.5	0%	NA
Hexachlorobutadiene	LB023133	µg/L	0.5	<0.5	0%	NA

Halogenated Aromatics

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Chlorobenzene	LB023133	µg/L	0.5	<0.5	0%	106%
Bromobenzene	LB023133	µg/L	0.5	<0.5	0%	NA
2-chlorotoluene	LB023133	µg/L	0.5	<0.5	0%	NA
4-chlorotoluene	LB023133	µg/L	0.5	<0.5	0%	NA
1,3-dichlorobenzene	LB023133	µg/L	0.5	<0.5	0%	NA
1,4-dichlorobenzene	LB023133	µg/L	0.3	<0.3	0%	NA
1,2-dichlorobenzene	LB023133	µg/L	0.5	<0.5	0%	NA
1,2,4-trichlorobenzene	LB023133	µg/L	0.5	<0.5	0%	NA
1,2,3-trichlorobenzene	LB023133	µg/L	0.5	<0.5	0%	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Dibromofluoromethane (Surrogate)	LB023133	%	-	122%	6%	81%
d4-1,2-dichloroethane (Surrogate)	LB023133	%	-	118%	9%	96%
d8-toluene (Surrogate)	LB023133	%	-	96%	0%	100%
Bromofluorobenzene (Surrogate)	LB023133	%	-	103%	0%	96%

Trihalomethanes

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

VOCs in Water Method: ME-(AU)-[ENV]AN433/AN434 (continued)

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Chloroform (THM)	LB023133	µg/L	0.5	<0.5	0%	97%
Bromodichloromethane (THM)	LB023133	µg/L	0.5	<0.5	0%	NA
Dibromochloromethane (THM)	LB023133	µg/L	0.5	<0.5	0%	NA
Bromoform (THM)	LB023133	µg/L	0.5	<0.5	0%	NA

Published on Resources Disclosure Log
RTI Act 2009

METHOD

AN433/AN434

METHODOLOGY SUMMARY

VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC's are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

FOOTNOTES

IS Insufficient sample for analysis.
 LNR Sample listed, but not received.
 * This analysis is not covered by the scope of accreditation.
 ^ Performed by outside laboratory.
 LOR Limit of Reporting
 ↑↓ Raised or Lowered Limit of Reporting

QFH QC result is above the upper tolerance
 QFL QC result is below the lower tolerance
 - The sample was not analysed for this analyte
 NVL Not Validated

Samples analysed as received.
 Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here:
<http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-11.pdf>

This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at http://www.au.sgs.com/terms_and_conditions_au. The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents.

This report must not be reproduced, except in full.



Page ____ of ____

[illegible]

Time:

CLIENT DETAILS

Contact **sch4p4(6) Perso**
 Client **GOLDER ASSOCIATES PTY LTD**
 Address **PO BOX 5823
 CAIRNS QLD 4870**

Telephone **07 4035 5111**
 Facsimile **07 4035 5122**
 Email **sch4p4(@sgs.com**

Project **087673045- Kwikleen - Pease St - CE78770**
 Order Number **(Not specified)**
 Samples **5**

LABORATORY DETAILS

Manager **sch4p4(6) Pers**
 Laboratory **SGS Alexandria Environmental**
 Address **Unit 16, 33 Maddox St
 Alexandria NSW 2015**

Telephone **+61 2 8594 0400**
 Facsimile **+61 2 8594 0499**
 Email **au.environmental.sydney@sgs.com**

SGS Reference **SE109987 R0**
 Report Number **0000034822**
 Date Reported **16 Jul 2012**

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS Environmental Services' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document and was supplied by the Client. This QA/QC Statement must be read in conjunction with the referenced Analytical Report. The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met.

SAMPLE SUMMARY

Sample counts by matrix	5 Waters	Type of documentation received	COC
Date documentation received	10/7/2012	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	2.5°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

VOCs in Water**Method: ME-(AU)-[ENV]AN433/AN434**

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
MW1CP	SE109987.001	LB023133	09 Jul 2012	10 Jul 2012	16 Jul 2012	12 Jul 2012	21 Aug 2012	16 Jul 2012
MW2CP	SE109987.002	LB023133	09 Jul 2012	10 Jul 2012	16 Jul 2012	12 Jul 2012	21 Aug 2012	16 Jul 2012
MW3CP	SE109987.003	LB023133	09 Jul 2012	10 Jul 2012	16 Jul 2012	12 Jul 2012	21 Aug 2012	16 Jul 2012
MW13CP	SE109987.004	LB023133	09 Jul 2012	10 Jul 2012	16 Jul 2012	12 Jul 2012	21 Aug 2012	16 Jul 2012
MWX	SE109987.005	LB023133	09 Jul 2012	10 Jul 2012	16 Jul 2012	12 Jul 2012	21 Aug 2012	16 Jul 2012

Published on Resources Disclosure
RTI Act 2009

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOCs in Water

Method: ME-(AU)-[ENV]AN433/AN434

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	MW1CP	SE109987.001	%	60 - 130%	103
	MW2CP	SE109987.002	%	60 - 130%	104
	MW3CP	SE109987.003	%	60 - 130%	103
	MW13CP	SE109987.004	%	60 - 130%	103
	MWX	SE109987.005	%	60 - 130%	102
d4-1,2-dichloroethane (Surrogate)	MW1CP	SE109987.001	%	40 - 130%	120
	MW2CP	SE109987.002	%	40 - 130%	120
	MW3CP	SE109987.003	%	40 - 130%	116
	MW13CP	SE109987.004	%	40 - 130%	121
	MWX	SE109987.005	%	40 - 130%	128
d8-toluene (Surrogate)	MW1CP	SE109987.001	%	60 - 130%	95
	MW2CP	SE109987.002	%	60 - 130%	97
	MW3CP	SE109987.003	%	60 - 130%	98
	MW13CP	SE109987.004	%	60 - 130%	93
	MWX	SE109987.005	%	60 - 130%	94
Dibromofluoromethane (Surrogate)	MW1CP	SE109987.001	%	60 - 130%	126
	MW2CP	SE109987.002	%	60 - 130%	117
	MW3CP	SE109987.003	%	60 - 130%	121
	MW13CP	SE109987.004	%	60 - 130%	123
	MWX	SE109987.005	%	60 - 130%	121

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOCs in Water

Method: ME-(AU)-ENV/JAN433/AN434

Sample Number		Parameter	Units	LOR	Result
LB023133.001	Fumigants	2,2-dichloropropane	µg/L	0.5	<0.5
		1,2-dichloropropane	µg/L	0.5	<0.5
		trans-1,3-dichloropropene	µg/L	0.5	<0.5
		cis-1,3-dichloropropene	µg/L	0.5	<0.5
		1,2-dibromoethane (EDB)	µg/L	0.5	<0.5
	Halogenated Aliphatics	Dichlorodifluoromethane (CFC-12)	µg/L	5	<5
		Chloromethane	µg/L	5	<5
		Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3
		Bromomethane	µg/L	10	<10
		Chloroethane	µg/L	5	<5
		Trichlorofluoromethane	µg/L	1	<1
		1,1-dichloroethene	µg/L	0.5	<0.5
		trans-1,2-dichloroethene	µg/L	0.5	<0.5
		1,1-dichloroethane	µg/L	0.5	<0.5
		cis-1,2-dichloroethene	µg/L	0.5	<0.5
		Bromochloromethane	µg/L	0.5	<0.5
		1,2-dichloroethane	µg/L	0.5	<0.5
		1,1,1-trichloroethane	µg/L	0.5	<0.5
		1,1-dichloropropene	µg/L	0.5	<0.5
		Carbon tetrachloride	µg/L	0.5	<0.5
		Dibromomethane	µg/L	0.5	<0.5
		Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5
		1,1,2-trichloroethane	µg/L	0.5	<0.5
		1,3-dichloropropane	µg/L	0.5	<0.5
		Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5
		1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5
		1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5
		1,2,3-trichloropropane	µg/L	0.5	<0.5
		1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5
		Hexachlorobutadiene	µg/L	0.5	<0.5
	Halogenated Aromatics	Chlorobenzene	µg/L	0.5	<0.5
		Bromobenzene	µg/L	0.5	<0.5
		2-chlorotoluene	µg/L	0.5	<0.5
		4-chlorotoluene	µg/L	0.5	<0.5
		1,3-dichlorobenzene	µg/L	0.5	<0.5
		1,4-dichlorobenzene	µg/L	0.3	<0.3
		1,2-dichlorobenzene	µg/L	0.5	<0.5
		1,2,4-trichlorobenzene	µg/L	0.5	<0.5
		1,2,3-trichlorobenzene	µg/L	0.5	<0.5
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	122
		d4-1,2-dichloroethane (Surrogate)	%	-	118
		d8-toluene (Surrogate)	%	-	96
		Bromofluorobenzene (Surrogate)	%	-	103
	Trihalomethanes	Chloroform (THM)	µg/L	0.5	<0.5
		Bromodichloromethane (THM)	µg/L	0.5	<0.5
		Dibromochloromethane (THM)	µg/L	0.5	<0.5
		Bromoform (THM)	µg/L	0.5	<0.5

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: $RPD = | \text{OriginalResult} - \text{ReplicateResult} | \times 100 / \text{Mean}$

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: $MAD = 100 \times \text{SDL} / \text{Mean} + \text{LR}$

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOCs in Water

Method: ME-(AU)-ENV/JAN433/AN434

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %	
SE109987.003	LB023133.006	Fumigants	2,2-dichloropropane	µg/L	0.5	<2.5	<2.5	200	0	
			1,2-dichloropropane	µg/L	0.5	<2.5	<2.5	200	0	
			trans-1,3-dichloropropene	µg/L	0.5	<2.5	<2.5	200	0	
			cis-1,3-dichloropropene	µg/L	0.5	<2.5	<2.5	200	0	
			1,2-dibromoethane (EDB)	µg/L	0.5	<2.5	<2.5	200	0	
		Halogenated	Dichlorodifluoromethane (CFC-12)	µg/L	5	<25	<25	200	0	
			Aliphatics	Chloromethane	µg/L	5	<25	<25	200	0
		Vinyl chloride (Chloroethene)		µg/L	0.3	<1.5	<1.5	200	0	
		Bromomethane		µg/L	10	<50	<50	200	0	
		Chloroethane		µg/L	5	<25	<25	200	0	
		Trichlorofluoromethane		µg/L	1	<5	<5	200	0	
		1,1-dichloroethene		µg/L	0.5	<2.5	<2.5	200	0	
		trans-1,2-dichloroethene		µg/L	0.5	<2.5	<2.5	200	0	
		1,1-dichloroethane		µg/L	0.5	<2.5	<2.5	200	0	
		cis-1,2-dichloroethene		µg/L	0.5	33	26	32	23	
		Bromochloromethane		µg/L	0.5	<2.5	<2.5	200	0	
		1,2-dichloroethane		µg/L	0.5	<2.5	<2.5	200	0	
		1,1,1-trichloroethane		µg/L	0.5	<2.5	<2.5	200	0	
		1,1-dichloropropene		µg/L	0.5	<2.5	<2.5	200	0	
		Carbon tetrachloride		µg/L	0.5	<2.5	<2.5	200	0	
		Dibromomethane		µg/L	0.5	<2.5	<2.5	200	0	
		Trichloroethene (Trichloroethylene,TCE)		µg/L	0.5	72	75	31	4	
		1,1,2-trichloroethane		µg/L	0.5	<2.5	<2.5	200	0	
		1,3-dichloropropane		µg/L	0.5	<2.5	<2.5	200	0	
		Tetrachloroethene (Perchloroethylene,PCE)		µg/L	0.5	15	15	33	1	
		1,1,1,2-tetrachloroethane		µg/L	0.5	<2.5	<2.5	200	0	
		1,1,2,2-tetrachloroethane		µg/L	0.5	<2.5	<2.5	200	0	
		1,2,3-trichloropropane		µg/L	0.5	<2.5	<2.5	200	0	
		1,2-dibromo-3-chloropropane		µg/L	0.5	<2.5	<2.5	200	0	
		Hexachlorobutadiene		µg/L	0.5	<2.5	<2.5	200	0	
		Halogenated		Chlorobenzene	µg/L	0.5	<2.5	<2.5	200	0
				Aromatics	Bromobenzene	µg/L	0.5	<2.5	<2.5	200
		2-chlorotoluene			µg/L	0.5	<2.5	<2.5	200	0
		4-chlorotoluene			µg/L	0.5	<2.5	<2.5	200	0
		1,3-dichlorobenzene			µg/L	0.5	<2.5	<2.5	200	0
		1,4-dichlorobenzene			µg/L	0.3	<1.5	<1.5	200	0
		1,2-dichlorobenzene			µg/L	0.5	<2.5	<2.5	200	0
		1,2,4-trichlorobenzene			µg/L	0.5	<2.5	<2.5	200	0
		1,2,3-trichlorobenzene			µg/L	0.5	<2.5	<2.5	200	0
		Surrogates		Dibromofluoromethane (Surrogate)	µg/L	-	121	114	30	6
			d4-1,2-dichloroethane (Surrogate)	µg/L	-	116	127	30	9	
			d8-toluene (Surrogate)	µg/L	-	98	98	30	0	
			Bromofluorobenzene (Surrogate)	µg/L	-	103	103	30	0	
		Trihalomethanes	Chloroform (THM)	µg/L	0.5	<2.5	<2.5	200	0	
			Bromodichloromethane (THM)	µg/L	0.5	<2.5	<2.5	200	0	
			Dibromochloromethane (THM)	µg/L	0.5	<2.5	<2.5	200	0	
Bromoform (THM)	µg/L		0.5	<2.5	<2.5	200	0			

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOCs in Water**Method: ME-(AU)-[ENV]AN433/AN434**

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB023133.002	Halogenated	1,1-dichloroethene	µg/L	51	45.45	60 - 140	112
	Aliphatics	1,2-dichloroethane	µg/L	48	45.45	60 - 140	106
		Trichloroethene (Trichloroethylene, TCE)	µg/L	50	45.45	60 - 140	111
	Halogenated	Chlorobenzene	µg/L	48	45.45	60 - 140	106
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	100	60 - 140	96
		d8-toluene (Surrogate)	%	-	100	60 - 140	100
		Bromofluorobenzene (Surrogate)	%	-	100	60 - 140	96
	Trihalomethan	Chloroform (THM)	µg/L	44	45.45	60 - 140	97

Published on Resources Disclosure Log
RTI Act 2009

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spikes were required for this job.

Published on Resources Disclosure Log
RTI Act 2009

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: $RPD = | \text{OriginalResult} - \text{ReplicateResult} | \times 100 / \text{Mean}$

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: $MAD = 100 \times \text{SDL} / \text{Mean} + \text{LR}$

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Published on Resources Disclosure Log
RTI Act 2009

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here:
<http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-11.pdf>

- * Non-accredited analysis.
- Sample not analysed for this analyte.
- ^ Analysis performed by external laboratory.

- IS Insufficient sample for analysis.
- LNR Sample listed, but not received.
- LOR Limit of reporting.
- QFH QC result is above the upper tolerance.
- QFL QC result is below the lower tolerance.

- ① At least 2 of 3 surrogates are within acceptance criteria.
- ② RPD failed acceptance criteria due to sample heterogeneity.
- ③ Results less than 5 times LOR preclude acceptance criteria for RPD.
- ④ Recovery failed acceptance criteria due to matrix interference.
- ⑤ Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
- ⑥ LOR was raised due to sample matrix interference.
- ⑦ LOR was raised due to dilution of significantly high concentration of analyte in sample.
- ⑧ Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
- ⑨ Recovery failed acceptance criteria due to sample heterogeneity.
- † Refer to Analytical Report comments for further information.

This document is issued, on the Client's behalf, by the Company under its General Conditions of Service, available on request and accessible at http://www.sgs.com/terms_and_conditions.htm. The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any other holder of this document is advised that information contained herein reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents.

This test report shall not be reproduced, except in full.

7/26/2012

Mr. [sch4p4(6) Persona]

Golder Associates, Australia

216 Draper Street

Cairns, Queensland 4870

Project Name: Kwikleen

Project #: 087673045

Workorder #: 1207359A

Dear Mr. [sch4p4(6) Person]

The following report includes the data for the above referenced project for sample(s) received on 7/19/2012 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: [sch4p4(6) Personal] at [sch4p4(6) Person] if you have any questions regarding the data in this report.

Regards,

[sch4p4(6) Personal information]

[sch4p4(6) Personal in]

Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.

180 Blue Ravine Road, Suite B
Folsom, CA 95630

T | 916-985-1000
F | 916-985-1020
www.airtoxics.com

WORK ORDER #: 1207359A

Work Order Summary

CLIENT:	Mr. sch4p4(6) Perso Golder Associates, Australia 216 Draper Street Cairns, Queensland 4870	BILL TO:	Accounts Payable Golder Associates, Australia PO BOX 6079 Hawthorne, Australia 3121
PHONE:	+61 7 4054 8200	P.O. #	CQ 3090
FAX:	+61 7 4054 8201	PROJECT #	087673045 Kwikleen
DATE RECEIVED:	07/19/2012	CONTACT:	sch4p4(6) Persona
DATE COMPLETED:	07/25/2012		

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	SVW1	Modified TO-15	9.0 "Hg	5 psi
02A	SVW2	Modified TO-15	9.0 "Hg	5 psi
03A	SVW3	Modified TO-15	9.5 "Hg	5 psi
04A	SVW4	Modified TO-15	9.0 "Hg	5 psi
05A	SVW5	Modified TO-15	8.5 "Hg	5 psi
06A	SVW6	Modified TO-15	8.5 "Hg	5 psi
07A	SVW7	Modified TO-15	9.0 "Hg	5 psi
08A	FB01	Modified TO-15	5.0 "Hg	5 psi
09A	Lab Blank	Modified TO-15	NA	NA
10A	CCV	Modified TO-15	NA	NA
11A	LCS	Modified TO-15	NA	NA
11AA	LCSD	Modified TO-15	NA	NA

CERTIFIED BY:

sch4p4(6) Personal information

Technical Director

DATE: 07/26/12

Certification numbers: AZ Licensure AZ0719, CA NELAP - 02110CA, LA NELAP - 02089,
NY NELAP - 11291, TX NELAP - T104704434-11-3, UT NELAP -CA009332011-1, WA NELAP - C935
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/11 , Expiration date: 06/30/12.

Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins | Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

**LABORATORY NARRATIVE
EPA Method TO-15
Golder Associates, Australia
Workorder# 1207359A**

Eight 1 Liter Summa Canister samples were received on July 19, 2012. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

Dilution was performed on samples SVW1, SVW2, SVW3, SVW4, SVW5, and SVW6 due to the presence of high level target species.

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page. Target compound non-detects in the samples that are associated with high bias in QC analyses have not been flagged.

The field blank sample FB01 has reportable levels of target compounds present.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

UJ- Non-detected compound associated with low bias in the CCV and/or LCS.

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

Summary of Detected Compounds EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SVW1

Lab ID#: 1207359A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	240	320	450	600
cis-1,2-Dichloroethene	60	2000	240	7800
Trichloroethene	60	3900	320	21000
Toluene	60	79	220	300
Tetrachloroethene	60	13000	400	86000

Client Sample ID: SVW2

Lab ID#: 1207359A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	9.6	240	38	950
Trichloroethene	9.6	1100	51	5800
Tetrachloroethene	9.6	3000	65	21000

Client Sample ID: SVW3

Lab ID#: 1207359A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	98	630	390	2500
Trichloroethene	98	2800	530	15000
Toluene	98	110	370	420
Tetrachloroethene	98	21000	660	140000

Client Sample ID: SVW4

Lab ID#: 1207359A-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	5.4	30	22	120
Trichloroethene	5.4	170	29	920
Tetrachloroethene	5.4	1400	37	9400

Summary of Detected Compounds

EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SVW5

Lab ID#: 1207359A-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Trichloroethene	3.1	17	17	90
Tetrachloroethene	3.1	850	21	5800

Client Sample ID: SVW6

Lab ID#: 1207359A-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	12	50	49	200
Trichloroethene	12	560	67	3000
Tetrachloroethene	12	3800	84	26000

Client Sample ID: SVW7

Lab ID#: 1207359A-07A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	3.8	3.9	7.2	7.3
Chloroform	0.96	1.3	4.7	6.2
Trichloroethene	0.96	2.0	5.1	11
Toluene	0.96	1.4	3.6	5.1
Tetrachloroethene	0.96	66	6.5	450
m,p-Xylene	0.96	1.3	4.1	5.7

Client Sample ID: FB01

Lab ID#: 1207359A-08A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Ethanol	4.6	37	8.7	70
Acetone	12	15	28	35
2-Propanol	4.6	5.7	11	14
Heptane	1.2	2.9	4.8	12
Toluene	1.2	4.5	4.4	17



Air Toxics

Client Sample ID: SVW1

Lab ID#: 1207359A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3072022	Date of Collection:	7/13/12 10:00:00 AM
Dil. Factor:	119	Date of Analysis:	7/20/12 10:02 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	60	Not Detected	290	Not Detected
Freon 114	60	Not Detected	420	Not Detected
Chloromethane	600	Not Detected	1200	Not Detected
Vinyl Chloride	60	Not Detected	150	Not Detected
1,3-Butadiene	60	Not Detected	130	Not Detected
Bromomethane	600	Not Detected	2300	Not Detected
Chloroethane	240	Not Detected	630	Not Detected
Freon 11	60	Not Detected	330	Not Detected
Ethanol	240	320	450	600
Freon 113	60	Not Detected	460	Not Detected
1,1-Dichloroethene	60	Not Detected	240	Not Detected
Acetone	600	Not Detected	1400	Not Detected
2-Propanol	240	Not Detected	580	Not Detected
Carbon Disulfide	240	Not Detected	740	Not Detected
3-Chloropropene	240	Not Detected	740	Not Detected
Methylene Chloride	600	Not Detected	2100	Not Detected
Methyl tert-butyl ether	60	Not Detected	210	Not Detected
trans-1,2-Dichloroethene	60	Not Detected	240	Not Detected
Hexane	60	Not Detected	210	Not Detected
1,1-Dichloroethane	60	Not Detected	240	Not Detected
2-Butanone (Methyl Ethyl Ketone)	240	Not Detected	700	Not Detected
cis-1,2-Dichloroethene	60	2000	240	7800
Tetrahydrofuran	60	Not Detected	180	Not Detected
Chloroform	60	Not Detected	290	Not Detected
1,1,1-Trichloroethane	60	Not Detected	320	Not Detected
Cyclohexane	60	Not Detected	200	Not Detected
Carbon Tetrachloride	60	Not Detected	370	Not Detected
2,2,4-Trimethylpentane	60	Not Detected	280	Not Detected
Benzene	60	Not Detected	190	Not Detected
1,2-Dichloroethane	60	Not Detected	240	Not Detected
Heptane	60	Not Detected	240	Not Detected
Trichloroethene	60	3900	320	21000
1,2-Dichloropropane	60	Not Detected	270	Not Detected
1,4-Dioxane	240	Not Detected	860	Not Detected
Bromodichloromethane	60	Not Detected	400	Not Detected
cis-1,3-Dichloropropene	60	Not Detected	270	Not Detected
4-Methyl-2-pentanone	60	Not Detected	240	Not Detected
Toluene	60	79	220	300
trans-1,3-Dichloropropene	60	Not Detected	270	Not Detected
1,1,2-Trichloroethane	60	Not Detected	320	Not Detected
Tetrachloroethene	60	13000	400	86000
2-Hexanone	240	Not Detected	970	Not Detected



Air Toxics

Client Sample ID: SVW1

Lab ID#: 1207359A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3072022	Date of Collection:	7/13/12 10:00:00 AM
Dil. Factor:	119	Date of Analysis:	7/20/12 10:02 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	60	Not Detected	510	Not Detected
1,2-Dibromoethane (EDB)	60	Not Detected	460	Not Detected
Chlorobenzene	60	Not Detected	270	Not Detected
Ethyl Benzene	60	Not Detected	260	Not Detected
m,p-Xylene	60	Not Detected	260	Not Detected
o-Xylene	60	Not Detected	260	Not Detected
Styrene	60	Not Detected	250	Not Detected
Bromoform	60	Not Detected	620	Not Detected
Cumene	60	Not Detected	290	Not Detected
1,1,2,2-Tetrachloroethane	60	Not Detected	410	Not Detected
Propylbenzene	60	Not Detected	290	Not Detected
4-Ethyltoluene	60	Not Detected	290	Not Detected
1,3,5-Trimethylbenzene	60	Not Detected	290	Not Detected
1,2,4-Trimethylbenzene	60	Not Detected	290	Not Detected
1,3-Dichlorobenzene	60	Not Detected	360	Not Detected
1,4-Dichlorobenzene	60	Not Detected	360	Not Detected
alpha-Chlorotoluene	60	Not Detected	310	Not Detected
1,2-Dichlorobenzene	60	Not Detected	360	Not Detected
1,2,4-Trichlorobenzene	240	Not Detected	1800	Not Detected
Hexachlorobutadiene	240	Not Detected	2500	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	89	70-130
1,2-Dichloroethane-d4	106	70-130
4-Bromofluorobenzene	93	70-130

Client Sample ID: SVW2

Lab ID#: 1207359A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3072020	Date of Collection: 7/13/12 11:00:00 AM
Dil. Factor:	19.1	Date of Analysis: 7/20/12 09:20 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	9.6	Not Detected	47	Not Detected
Freon 114	9.6	Not Detected	67	Not Detected
Chloromethane	96	Not Detected	200	Not Detected
Vinyl Chloride	9.6	Not Detected	24	Not Detected
1,3-Butadiene	9.6	Not Detected	21	Not Detected
Bromomethane	96	Not Detected	370	Not Detected
Chloroethane	38	Not Detected	100	Not Detected
Freon 11	9.6	Not Detected	54	Not Detected
Ethanol	38	Not Detected	72	Not Detected
Freon 113	9.6	Not Detected	73	Not Detected
1,1-Dichloroethene	9.6	Not Detected	38	Not Detected
Acetone	96	Not Detected	230	Not Detected
2-Propanol	38	Not Detected	94	Not Detected
Carbon Disulfide	38	Not Detected	120	Not Detected
3-Chloropropene	38	Not Detected	120	Not Detected
Methylene Chloride	96	Not Detected	330	Not Detected
Methyl tert-butyl ether	9.6	Not Detected	34	Not Detected
trans-1,2-Dichloroethene	9.6	Not Detected	38	Not Detected
Hexane	9.6	Not Detected	34	Not Detected
1,1-Dichloroethane	9.6	Not Detected	39	Not Detected
2-Butanone (Methyl Ethyl Ketone)	38	Not Detected	110	Not Detected
cis-1,2-Dichloroethene	9.6	240	38	950
Tetrahydrofuran	9.6	Not Detected	28	Not Detected
Chloroform	9.6	Not Detected	47	Not Detected
1,1,1-Trichloroethane	9.6	Not Detected	52	Not Detected
Cyclohexane	9.6	Not Detected	33	Not Detected
Carbon Tetrachloride	9.6	Not Detected	60	Not Detected
2,2,4-Trimethylpentane	9.6	Not Detected	45	Not Detected
Benzene	9.6	Not Detected	30	Not Detected
1,2-Dichloroethane	9.6	Not Detected	39	Not Detected
Heptane	9.6	Not Detected	39	Not Detected
Trichloroethene	9.6	1100	51	5800
1,2-Dichloropropane	9.6	Not Detected	44	Not Detected
1,4-Dioxane	38	Not Detected	140	Not Detected
Bromodichloromethane	9.6	Not Detected	64	Not Detected
cis-1,3-Dichloropropene	9.6	Not Detected	43	Not Detected
4-Methyl-2-pentanone	9.6	Not Detected	39	Not Detected
Toluene	9.6	Not Detected	36	Not Detected
trans-1,3-Dichloropropene	9.6	Not Detected	43	Not Detected
1,1,2-Trichloroethane	9.6	Not Detected	52	Not Detected
Tetrachloroethene	9.6	3000	65	21000
2-Hexanone	38	Not Detected	160	Not Detected

Client Sample ID: SVW2

Lab ID#: 1207359A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3072020	Date of Collection:	7/13/12 11:00:00 AM
Dil. Factor:	19.1	Date of Analysis:	7/20/12 09:20 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	9.6	Not Detected	81	Not Detected
1,2-Dibromoethane (EDB)	9.6	Not Detected	73	Not Detected
Chlorobenzene	9.6	Not Detected	44	Not Detected
Ethyl Benzene	9.6	Not Detected	41	Not Detected
m,p-Xylene	9.6	Not Detected	41	Not Detected
o-Xylene	9.6	Not Detected	41	Not Detected
Styrene	9.6	Not Detected	41	Not Detected
Bromoform	9.6	Not Detected	99	Not Detected
Cumene	9.6	Not Detected	47	Not Detected
1,1,2,2-Tetrachloroethane	9.6	Not Detected	66	Not Detected
Propylbenzene	9.6	Not Detected	47	Not Detected
4-Ethyltoluene	9.6	Not Detected	47	Not Detected
1,3,5-Trimethylbenzene	9.6	Not Detected	47	Not Detected
1,2,4-Trimethylbenzene	9.6	Not Detected	47	Not Detected
1,3-Dichlorobenzene	9.6	Not Detected	57	Not Detected
1,4-Dichlorobenzene	9.6	Not Detected	57	Not Detected
alpha-Chlorotoluene	9.6	Not Detected	49	Not Detected
1,2-Dichlorobenzene	9.6	Not Detected	57	Not Detected
1,2,4-Trichlorobenzene	38	Not Detected	280	Not Detected
Hexachlorobutadiene	38	Not Detected	410	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	87	70-130
1,2-Dichloroethane-d4	109	70-130
4-Bromofluorobenzene	90	70-130

Client Sample ID: SVW3

Lab ID#: 1207359A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

EPA METHOD 8215 GC/MS FULL SCAN				
File Name:	3072023	Date of Collection: 7/13/12 12:15:00 PM		
Dil. Factor:	196	Date of Analysis: 7/20/12 10:25 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	98	Not Detected	480	Not Detected
Freon 114	98	Not Detected	680	Not Detected
Chloromethane	980	Not Detected	2000	Not Detected
Vinyl Chloride	98	Not Detected	250	Not Detected
1,3-Butadiene	98	Not Detected	220	Not Detected
Bromomethane	980	Not Detected	3800	Not Detected
Chloroethane	390	Not Detected	1000	Not Detected
Freon 11	98	Not Detected	550	Not Detected
Ethanol	390	Not Detected	740	Not Detected
Freon 113	98	Not Detected	750	Not Detected
1,1-Dichloroethene	98	Not Detected	390	Not Detected
Acetone	980	Not Detected	2300	Not Detected
2-Propanol	390	Not Detected	960	Not Detected
Carbon Disulfide	390	Not Detected	1200	Not Detected
3-Chloropropene	390	Not Detected	1200	Not Detected
Methylene Chloride	980	Not Detected	3400	Not Detected
Methyl tert-butyl ether	98	Not Detected	350	Not Detected
trans-1,2-Dichloroethene	98	Not Detected	390	Not Detected
Hexane	98	Not Detected	340	Not Detected
1,1-Dichloroethane	98	Not Detected	400	Not Detected
2-Butanone (Methyl Ethyl Ketone)	390	Not Detected	1200	Not Detected
cis-1,2-Dichloroethene	98	630	390	2500
Tetrahydrofuran	98	Not Detected	290	Not Detected
Chloroform	98	Not Detected	480	Not Detected
1,1,1-Trichloroethane	98	Not Detected	530	Not Detected
Cyclohexane	98	Not Detected	340	Not Detected
Carbon Tetrachloride	98	Not Detected	620	Not Detected
2,2,4-Trimethylpentane	98	Not Detected	460	Not Detected
Benzene	98	Not Detected	310	Not Detected
1,2-Dichloroethane	98	Not Detected	400	Not Detected
Heptane	98	Not Detected	400	Not Detected
Trichloroethene	98	2800	530	15000
1,2-Dichloropropane	98	Not Detected	450	Not Detected
1,4-Dioxane	390	Not Detected	1400	Not Detected
Bromodichloromethane	98	Not Detected	660	Not Detected
cis-1,3-Dichloropropene	98	Not Detected	440	Not Detected
4-Methyl-2-pentanone	98	Not Detected	400	Not Detected
Toluene	98	110	370	420
trans-1,3-Dichloropropene	98	Not Detected	440	Not Detected
1,1,2-Trichloroethane	98	Not Detected	530	Not Detected
Tetrachloroethene	98	21000	660	140000
2-Hexanone	390	Not Detected	1600	Not Detected



Air Toxics

Client Sample ID: SVW3

Lab ID#: 1207359A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3072023	Date of Collection: 7/13/12 12:15:00 PM
Dil. Factor:	196	Date of Analysis: 7/20/12 10:25 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	98	Not Detected	830	Not Detected
1,2-Dibromoethane (EDB)	98	Not Detected	750	Not Detected
Chlorobenzene	98	Not Detected	450	Not Detected
Ethyl Benzene	98	Not Detected	420	Not Detected
m,p-Xylene	98	Not Detected	420	Not Detected
o-Xylene	98	Not Detected	420	Not Detected
Styrene	98	Not Detected	420	Not Detected
Bromoform	98	Not Detected	1000	Not Detected
Cumene	98	Not Detected	480	Not Detected
1,1,2,2-Tetrachloroethane	98	Not Detected	670	Not Detected
Propylbenzene	98	Not Detected	480	Not Detected
4-Ethyltoluene	98	Not Detected	480	Not Detected
1,3,5-Trimethylbenzene	98	Not Detected	480	Not Detected
1,2,4-Trimethylbenzene	98	Not Detected	480	Not Detected
1,3-Dichlorobenzene	98	Not Detected	590	Not Detected
1,4-Dichlorobenzene	98	Not Detected	590	Not Detected
alpha-Chlorotoluene	98	Not Detected	510	Not Detected
1,2-Dichlorobenzene	98	Not Detected	590	Not Detected
1,2,4-Trichlorobenzene	390	Not Detected	2900	Not Detected
Hexachlorobutadiene	390	Not Detected	4200	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	88	70-130
1,2-Dichloroethane-d4	108	70-130
4-Bromofluorobenzene	93	70-130

Client Sample ID: SVW4

Lab ID#: 1207359A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:		3072019	Date of Collection: 7/13/12 11:30:00 AM	
Dil. Factor:		10.9	Date of Analysis: 7/20/12 08:47 PM	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.4	Not Detected	27	Not Detected
Freon 114	5.4	Not Detected	38	Not Detected
Chloromethane	54	Not Detected	110	Not Detected
Vinyl Chloride	5.4	Not Detected	14	Not Detected
1,3-Butadiene	5.4	Not Detected	12	Not Detected
Bromomethane	54	Not Detected	210	Not Detected
Chloroethane	22	Not Detected	58	Not Detected
Freon 11	5.4	Not Detected	31	Not Detected
Ethanol	22	Not Detected	41	Not Detected
Freon 113	5.4	Not Detected	42	Not Detected
1,1-Dichloroethene	5.4	Not Detected	22	Not Detected
Acetone	54	Not Detected	130	Not Detected
2-Propanol	22	Not Detected	54	Not Detected
Carbon Disulfide	22	Not Detected	68	Not Detected
3-Chloropropene	22	Not Detected	68	Not Detected
Methylene Chloride	54	Not Detected	190	Not Detected
Methyl tert-butyl ether	5.4	Not Detected	20	Not Detected
trans-1,2-Dichloroethene	5.4	Not Detected	22	Not Detected
Hexane	5.4	Not Detected	19	Not Detected
1,1-Dichloroethane	5.4	Not Detected	22	Not Detected
2-Butanone (Methyl Ethyl Ketone)	22	Not Detected	64	Not Detected
cis-1,2-Dichloroethene	5.4	30	22	120
Tetrahydrofuran	5.4	Not Detected	16	Not Detected
Chloroform	5.4	Not Detected	27	Not Detected
1,1,1-Trichloroethane	5.4	Not Detected	30	Not Detected
Cyclohexane	5.4	Not Detected	19	Not Detected
Carbon Tetrachloride	5.4	Not Detected	34	Not Detected
2,2,4-Trimethylpentane	5.4	Not Detected	25	Not Detected
Benzene	5.4	Not Detected	17	Not Detected
1,2-Dichloroethane	5.4	Not Detected	22	Not Detected
Heptane	5.4	Not Detected	22	Not Detected
Trichloroethene	5.4	170	29	920
1,2-Dichloropropane	5.4	Not Detected	25	Not Detected
1,4-Dioxane	22	Not Detected	78	Not Detected
Bromodichloromethane	5.4	Not Detected	36	Not Detected
cis-1,3-Dichloropropene	5.4	Not Detected	25	Not Detected
4-Methyl-2-pentanone	5.4	Not Detected	22	Not Detected
Toluene	5.4	Not Detected	20	Not Detected
trans-1,3-Dichloropropene	5.4	Not Detected	25	Not Detected
1,1,2-Trichloroethane	5.4	Not Detected	30	Not Detected
Tetrachloroethene	5.4	1400	37	9400
2-Hexanone	22	Not Detected	89	Not Detected

Client Sample ID: SVW4

Lab ID#: 1207359A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3072019	Date of Collection:	7/13/12 11:30:00 AM
Dil. Factor:	10.9	Date of Analysis:	7/20/12 08:47 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5.4	Not Detected	46	Not Detected
1,2-Dibromoethane (EDB)	5.4	Not Detected	42	Not Detected
Chlorobenzene	5.4	Not Detected	25	Not Detected
Ethyl Benzene	5.4	Not Detected	24	Not Detected
m,p-Xylene	5.4	Not Detected	24	Not Detected
o-Xylene	5.4	Not Detected	24	Not Detected
Styrene	5.4	Not Detected	23	Not Detected
Bromoform	5.4	Not Detected	56	Not Detected
Cumene	5.4	Not Detected	27	Not Detected
1,1,2,2-Tetrachloroethane	5.4	Not Detected	37	Not Detected
Propylbenzene	5.4	Not Detected	27	Not Detected
4-Ethyltoluene	5.4	Not Detected	27	Not Detected
1,3,5-Trimethylbenzene	5.4	Not Detected	27	Not Detected
1,2,4-Trimethylbenzene	5.4	Not Detected	27	Not Detected
1,3-Dichlorobenzene	5.4	Not Detected	33	Not Detected
1,4-Dichlorobenzene	5.4	Not Detected	33	Not Detected
alpha-Chlorotoluene	5.4	Not Detected	28	Not Detected
1,2-Dichlorobenzene	5.4	Not Detected	33	Not Detected
1,2,4-Trichlorobenzene	22	Not Detected	160	Not Detected
Hexachlorobutadiene	22	Not Detected	230	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	87	70-130
1,2-Dichloroethane-d4	110	70-130
4-Bromofluorobenzene	88	70-130

Client Sample ID: SVW5

Lab ID#: 1207359A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3072017	Date of Collection:	7/13/12 3:00:00 PM	
Dil. Factor:	6.23	Date of Analysis:	7/20/12 06:42 PM	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	3.1	Not Detected	15	Not Detected
Freon 114	3.1	Not Detected	22	Not Detected
Chloromethane	31	Not Detected	64	Not Detected
Vinyl Chloride	3.1	Not Detected	8.0	Not Detected
1,3-Butadiene	3.1	Not Detected	6.9	Not Detected
Bromomethane	31	Not Detected	120	Not Detected
Chloroethane	12	Not Detected	33	Not Detected
Freon 11	3.1	Not Detected	18	Not Detected
Ethanol	12	Not Detected	23	Not Detected
Freon 113	3.1	Not Detected	24	Not Detected
1,1-Dichloroethene	3.1	Not Detected	12	Not Detected
Acetone	31	Not Detected	74	Not Detected
2-Propanol	12	Not Detected	31	Not Detected
Carbon Disulfide	12	Not Detected	39	Not Detected
3-Chloropropene	12	Not Detected	39	Not Detected
Methylene Chloride	31	Not Detected	110	Not Detected
Methyl tert-butyl ether	3.1	Not Detected	11	Not Detected
trans-1,2-Dichloroethene	3.1	Not Detected	12	Not Detected
Hexane	3.1	Not Detected	11	Not Detected
1,1-Dichloroethane	3.1	Not Detected	13	Not Detected
2-Butanone (Methyl Ethyl Ketone)	12	Not Detected	37	Not Detected
cis-1,2-Dichloroethene	3.1	Not Detected	12	Not Detected
Tetrahydrofuran	3.1	Not Detected	9.2	Not Detected
Chloroform	3.1	Not Detected	15	Not Detected
1,1,1-Trichloroethane	3.1	Not Detected	17	Not Detected
Cyclohexane	3.1	Not Detected	11	Not Detected
Carbon Tetrachloride	3.1	Not Detected	20	Not Detected
2,2,4-Trimethylpentane	3.1	Not Detected	14	Not Detected
Benzene	3.1	Not Detected	10	Not Detected
1,2-Dichloroethane	3.1	Not Detected	13	Not Detected
Heptane	3.1	Not Detected	13	Not Detected
Trichloroethene	3.1	17	17	90
1,2-Dichloropropane	3.1	Not Detected	14	Not Detected
1,4-Dioxane	12	Not Detected	45	Not Detected
Bromodichloromethane	3.1	Not Detected	21	Not Detected
cis-1,3-Dichloropropene	3.1	Not Detected	14	Not Detected
4-Methyl-2-pentanone	3.1	Not Detected	13	Not Detected
Toluene	3.1	Not Detected	12	Not Detected
trans-1,3-Dichloropropene	3.1	Not Detected	14	Not Detected
1,1,2-Trichloroethane	3.1	Not Detected	17	Not Detected
Tetrachloroethene	3.1	850	21	5800
2-Hexanone	12	Not Detected	51	Not Detected



Air Toxics

Client Sample ID: SVW5

Lab ID#: 1207359A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3072017	Date of Collection:	7/13/12 3:00:00 PM
Dil. Factor:	6.23	Date of Analysis:	7/20/12 06:42 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	3.1	Not Detected	26	Not Detected
1,2-Dibromoethane (EDB)	3.1	Not Detected	24	Not Detected
Chlorobenzene	3.1	Not Detected	14	Not Detected
Ethyl Benzene	3.1	Not Detected	14	Not Detected
m,p-Xylene	3.1	Not Detected	14	Not Detected
o-Xylene	3.1	Not Detected	14	Not Detected
Styrene	3.1	Not Detected	13	Not Detected
Bromoform	3.1	Not Detected	32	Not Detected
Cumene	3.1	Not Detected	15	Not Detected
1,1,2,2-Tetrachloroethane	3.1	Not Detected	21	Not Detected
Propylbenzene	3.1	Not Detected	15	Not Detected
4-Ethyltoluene	3.1	Not Detected	15	Not Detected
1,3,5-Trimethylbenzene	3.1	Not Detected	15	Not Detected
1,2,4-Trimethylbenzene	3.1	Not Detected	15	Not Detected
1,3-Dichlorobenzene	3.1	Not Detected	19	Not Detected
1,4-Dichlorobenzene	3.1	Not Detected	19	Not Detected
alpha-Chlorotoluene	3.1	Not Detected	16	Not Detected
1,2-Dichlorobenzene	3.1	Not Detected	19	Not Detected
1,2,4-Trichlorobenzene	12	Not Detected	92	Not Detected
Hexachlorobutadiene	12	Not Detected	130	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	89	70-130
1,2-Dichloroethane-d4	106	70-130
4-Bromofluorobenzene	89	70-130

Client Sample ID: SVW6

Lab ID#: 1207359A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

EPA METHOD TO-15 GC/MS FULL SCAN				
File Name:	3072021	Date of Collection: 7/13/12 1:00:00 PM		
Dil. Factor:	24.9	Date of Analysis: 7/20/12 09:39 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	12	Not Detected	62	Not Detected
Freon 114	12	Not Detected	87	Not Detected
Chloromethane	120	Not Detected	260	Not Detected
Vinyl Chloride	12	Not Detected	32	Not Detected
1,3-Butadiene	12	Not Detected	28	Not Detected
Bromomethane	120	Not Detected	480	Not Detected
Chloroethane	50	Not Detected	130	Not Detected
Freon 11	12	Not Detected	70	Not Detected
Ethanol	50	Not Detected	94	Not Detected
Freon 113	12	Not Detected	95	Not Detected
1,1-Dichloroethene	12	Not Detected	49	Not Detected
Acetone	120	Not Detected	300	Not Detected
2-Propanol	50	Not Detected	120	Not Detected
Carbon Disulfide	50	Not Detected	160	Not Detected
3-Chloropropene	50	Not Detected	160	Not Detected
Methylene Chloride	120	Not Detected	430	Not Detected
Methyl tert-butyl ether	12	Not Detected	45	Not Detected
trans-1,2-Dichloroethene	12	Not Detected	49	Not Detected
Hexane	12	Not Detected	44	Not Detected
1,1-Dichloroethane	12	Not Detected	50	Not Detected
2-Butanone (Methyl Ethyl Ketone)	50	Not Detected	150	Not Detected
cis-1,2-Dichloroethene	12	50	49	200
Tetrahydrofuran	12	Not Detected	37	Not Detected
Chloroform	12	Not Detected	61	Not Detected
1,1,1-Trichloroethane	12	Not Detected	68	Not Detected
Cyclohexane	12	Not Detected	43	Not Detected
Carbon Tetrachloride	12	Not Detected	78	Not Detected
2,2,4-Trimethylpentane	12	Not Detected	58	Not Detected
Benzene	12	Not Detected	40	Not Detected
1,2-Dichloroethane	12	Not Detected	50	Not Detected
Heptane	12	Not Detected	51	Not Detected
Trichloroethene	12	560	67	3000
1,2-Dichloropropane	12	Not Detected	58	Not Detected
1,4-Dioxane	50	Not Detected	180	Not Detected
Bromodichloromethane	12	Not Detected	83	Not Detected
cis-1,3-Dichloropropene	12	Not Detected	56	Not Detected
4-Methyl-2-pentanone	12	Not Detected	51	Not Detected
Toluene	12	Not Detected	47	Not Detected
trans-1,3-Dichloropropene	12	Not Detected	56	Not Detected
1,1,2-Trichloroethane	12	Not Detected	68	Not Detected
Tetrachloroethene	12	3800	84	26000
2-Hexanone	50	Not Detected	200	Not Detected

Client Sample ID: SVW6

Lab ID#: 1207359A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3072021	Date of Collection:	7/13/12 1:00:00 PM
Dil. Factor:	24.9	Date of Analysis:	7/20/12 09:39 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	12	Not Detected	110	Not Detected
1,2-Dibromoethane (EDB)	12	Not Detected	96	Not Detected
Chlorobenzene	12	Not Detected	57	Not Detected
Ethyl Benzene	12	Not Detected	54	Not Detected
m,p-Xylene	12	Not Detected	54	Not Detected
o-Xylene	12	Not Detected	54	Not Detected
Styrene	12	Not Detected	53	Not Detected
Bromoform	12	Not Detected	130	Not Detected
Cumene	12	Not Detected	61	Not Detected
1,1,2,2-Tetrachloroethane	12	Not Detected	85	Not Detected
Propylbenzene	12	Not Detected	61	Not Detected
4-Ethyltoluene	12	Not Detected	61	Not Detected
1,3,5-Trimethylbenzene	12	Not Detected	61	Not Detected
1,2,4-Trimethylbenzene	12	Not Detected	61	Not Detected
1,3-Dichlorobenzene	12	Not Detected	75	Not Detected
1,4-Dichlorobenzene	12	Not Detected	75	Not Detected
alpha-Chlorotoluene	12	Not Detected	64	Not Detected
1,2-Dichlorobenzene	12	Not Detected	75	Not Detected
1,2,4-Trichlorobenzene	50	Not Detected	370	Not Detected
Hexachlorobutadiene	50	Not Detected	530	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	88	70-130
1,2-Dichloroethane-d4	110	70-130
4-Bromofluorobenzene	87	70-130



Air Toxics

Client Sample ID: SVW7

Lab ID#: 1207359A-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3072015	Date of Collection: 7/13/12 2:00:00 PM		
Dil. Factor:	1.91	Date of Analysis: 7/20/12 05:38 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.96	Not Detected	4.7	Not Detected
Freon 114	0.96	Not Detected	6.7	Not Detected
Chloromethane	9.6	Not Detected	20	Not Detected
Vinyl Chloride	0.96	Not Detected	2.4	Not Detected
1,3-Butadiene	0.96	Not Detected	2.1	Not Detected
Bromomethane	9.6	Not Detected	37	Not Detected
Chloroethane	3.8	Not Detected	10	Not Detected
Freon 11	0.96	Not Detected	5.4	Not Detected
Ethanol	3.8	3.9	7.2	7.3
Freon 113	0.96	Not Detected	7.3	Not Detected
1,1-Dichloroethene	0.96	Not Detected	3.8	Not Detected
Acetone	9.6	Not Detected	23	Not Detected
2-Propanol	3.8	Not Detected	9.4	Not Detected
Carbon Disulfide	3.8	Not Detected	12	Not Detected
3-Chloropropene	3.8	Not Detected	12	Not Detected
Methylene Chloride	9.6	Not Detected	33	Not Detected
Methyl tert-butyl ether	0.96	Not Detected	3.4	Not Detected
trans-1,2-Dichloroethene	0.96	Not Detected	3.8	Not Detected
Hexane	0.96	Not Detected	3.4	Not Detected
1,1-Dichloroethane	0.96	Not Detected	3.9	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.8	Not Detected	11	Not Detected
cis-1,2-Dichloroethene	0.96	Not Detected	3.8	Not Detected
Tetrahydrofuran	0.96	Not Detected	2.8	Not Detected
Chloroform	0.96	1.3	4.7	6.2
1,1,1-Trichloroethane	0.96	Not Detected	5.2	Not Detected
Cyclohexane	0.96	Not Detected	3.3	Not Detected
Carbon Tetrachloride	0.96	Not Detected	6.0	Not Detected
2,2,4-Trimethylpentane	0.96	Not Detected	4.5	Not Detected
Benzene	0.96	Not Detected	3.0	Not Detected
1,2-Dichloroethane	0.96	Not Detected	3.9	Not Detected
Heptane	0.96	Not Detected	3.9	Not Detected
Trichloroethene	0.96	2.0	5.1	11
1,2-Dichloropropane	0.96	Not Detected	4.4	Not Detected
1,4-Dioxane	3.8	Not Detected	14	Not Detected
Bromodichloromethane	0.96	Not Detected	6.4	Not Detected
cis-1,3-Dichloropropene	0.96	Not Detected	4.3	Not Detected
4-Methyl-2-pentanone	0.96	Not Detected	3.9	Not Detected
Toluene	0.96	1.4	3.6	5.1
trans-1,3-Dichloropropene	0.96	Not Detected	4.3	Not Detected
1,1,2-Trichloroethane	0.96	Not Detected	5.2	Not Detected
Tetrachloroethene	0.96	66	6.5	450
2-Hexanone	3.8	Not Detected	16	Not Detected



Air Toxics

Client Sample ID: SVW7

Lab ID#: 1207359A-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3072015	Date of Collection:	7/13/12 2:00:00 PM
Dil. Factor:	1.91	Date of Analysis:	7/20/12 05:38 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.96	Not Detected	8.1	Not Detected
1,2-Dibromoethane (EDB)	0.96	Not Detected	7.3	Not Detected
Chlorobenzene	0.96	Not Detected	4.4	Not Detected
Ethyl Benzene	0.96	Not Detected	4.1	Not Detected
m,p-Xylene	0.96	1.3	4.1	5.7
o-Xylene	0.96	Not Detected	4.1	Not Detected
Styrene	0.96	Not Detected	4.1	Not Detected
Bromoform	0.96	Not Detected	9.9	Not Detected
Cumene	0.96	Not Detected	4.7	Not Detected
1,1,2,2-Tetrachloroethane	0.96	Not Detected	6.6	Not Detected
Propylbenzene	0.96	Not Detected	4.7	Not Detected
4-Ethyltoluene	0.96	Not Detected	4.7	Not Detected
1,3,5-Trimethylbenzene	0.96	Not Detected	4.7	Not Detected
1,2,4-Trimethylbenzene	0.96	Not Detected	4.7	Not Detected
1,3-Dichlorobenzene	0.96	Not Detected	5.7	Not Detected
1,4-Dichlorobenzene	0.96	Not Detected	5.7	Not Detected
alpha-Chlorotoluene	0.96	Not Detected	4.9	Not Detected
1,2-Dichlorobenzene	0.96	Not Detected	5.7	Not Detected
1,2,4-Trichlorobenzene	3.8	Not Detected	28	Not Detected
Hexachlorobutadiene	3.8	Not Detected	41	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	89	70-130
1,2-Dichloroethane-d4	105	70-130
4-Bromofluorobenzene	89	70-130

Client Sample ID: FB01

Lab ID#: 1207359A-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3072018	Date of Collection: 7/13/12 12:45:00 PM		
Dil. Factor:	2.32	Date of Analysis: 7/20/12 08:10 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	Not Detected	5.7	Not Detected
Freon 114	1.2	Not Detected	8.1	Not Detected
Chloromethane	12	Not Detected	24	Not Detected
Vinyl Chloride	1.2	Not Detected	3.0	Not Detected
1,3-Butadiene	1.2	Not Detected	2.6	Not Detected
Bromomethane	12	Not Detected	45	Not Detected
Chloroethane	4.6	Not Detected	12	Not Detected
Freon 11	1.2	Not Detected	6.5	Not Detected
Ethanol	4.6	37	8.7	70
Freon 113	1.2	Not Detected	8.9	Not Detected
1,1-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Acetone	12	15	28	35
2-Propanol	4.6	5.7	11	14
Carbon Disulfide	4.6	Not Detected	14	Not Detected
3-Chloropropene	4.6	Not Detected	14	Not Detected
Methylene Chloride	12	Not Detected	40	Not Detected
Methyl tert-butyl ether	1.2	Not Detected	4.2	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Hexane	1.2	Not Detected	4.1	Not Detected
1,1-Dichloroethane	1.2	Not Detected	4.7	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.6	Not Detected	14	Not Detected
cis-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Tetrahydrofuran	1.2	Not Detected	3.4	Not Detected
Chloroform	1.2	Not Detected	5.7	Not Detected
1,1,1-Trichloroethane	1.2	Not Detected	6.3	Not Detected
Cyclohexane	1.2	Not Detected	4.0	Not Detected
Carbon Tetrachloride	1.2	Not Detected	7.3	Not Detected
2,2,4-Trimethylpentane	1.2	Not Detected	5.4	Not Detected
Benzene	1.2	Not Detected	3.7	Not Detected
1,2-Dichloroethane	1.2	Not Detected	4.7	Not Detected
Heptane	1.2	2.9	4.8	12
Trichloroethene	1.2	Not Detected	6.2	Not Detected
1,2-Dichloropropane	1.2	Not Detected	5.4	Not Detected
1,4-Dioxane	4.6	Not Detected	17	Not Detected
Bromodichloromethane	1.2	Not Detected	7.8	Not Detected
cis-1,3-Dichloropropene	1.2	Not Detected	5.3	Not Detected
4-Methyl-2-pentanone	1.2	Not Detected	4.8	Not Detected
Toluene	1.2	4.5	4.4	17
trans-1,3-Dichloropropene	1.2	Not Detected	5.3	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.3	Not Detected
Tetrachloroethene	1.2	Not Detected	7.9	Not Detected
2-Hexanone	4.6	Not Detected	19	Not Detected



Air Toxics

Client Sample ID: FB01

Lab ID#: 1207359A-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3072018	Date of Collection: 7/13/12 12:45:00 PM
Dil. Factor:	2.32	Date of Analysis: 7/20/12 08:10 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.2	Not Detected	9.9	Not Detected
1,2-Dibromoethane (EDB)	1.2	Not Detected	8.9	Not Detected
Chlorobenzene	1.2	Not Detected	5.3	Not Detected
Ethyl Benzene	1.2	Not Detected	5.0	Not Detected
m,p-Xylene	1.2	Not Detected	5.0	Not Detected
o-Xylene	1.2	Not Detected	5.0	Not Detected
Styrene	1.2	Not Detected	4.9	Not Detected
Bromoform	1.2	Not Detected	12	Not Detected
Cumene	1.2	Not Detected	5.7	Not Detected
1,1,2,2-Tetrachloroethane	1.2	Not Detected	8.0	Not Detected
Propylbenzene	1.2	Not Detected	5.7	Not Detected
4-Ethyltoluene	1.2	Not Detected	5.7	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.7	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	5.7	Not Detected
1,3-Dichlorobenzene	1.2	Not Detected	7.0	Not Detected
1,4-Dichlorobenzene	1.2	Not Detected	7.0	Not Detected
alpha-Chlorotoluene	1.2	Not Detected	6.0	Not Detected
1,2-Dichlorobenzene	1.2	Not Detected	7.0	Not Detected
1,2,4-Trichlorobenzene	4.6	Not Detected	34	Not Detected
Hexachlorobutadiene	4.6	Not Detected	49	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	89	70-130
1,2-Dichloroethane-d4	108	70-130
4-Bromofluorobenzene	87	70-130

Client Sample ID: Lab Blank

Lab ID#: 1207359A-09A

EPA METHOD TO-15 GC/MS FULL SCAN

EPA METHOD TO-15 GC/MS FULL SCAN				
File Name:	3072013	Date of Collection: NA		
Dil. Factor:	1.00	Date of Analysis: 7/20/12 03:33 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
1,3-Butadiene	0.50	Not Detected	1.1	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Ethanol	2.0	Not Detected	3.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
2-Propanol	2.0	Not Detected	4.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
3-Chloropropene	2.0	Not Detected	6.3	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Cyclohexane	0.50	Not Detected	1.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Heptane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
1,4-Dioxane	2.0	Not Detected	7.2	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
2-Hexanone	2.0	Not Detected	8.2	Not Detected

Client Sample ID: Lab Blank

Lab ID#: 1207359A-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3072013	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 7/20/12 03:33 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	87	70-130
1,2-Dichloroethane-d4	107	70-130
4-Bromofluorobenzene	92	70-130

Client Sample ID: CCV

Lab ID#: 1207359A-10A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3072009	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 7/20/12 01:18 PM

Compound	%Recovery
Freon 12	118
Freon 114	110
Chloromethane	117
Vinyl Chloride	112
1,3-Butadiene	100
Bromomethane	132 Q
Chloroethane	106
Freon 11	125
Ethanol	116
Freon 113	104
1,1-Dichloroethene	100
Acetone	103
2-Propanol	105
Carbon Disulfide	99
3-Chloropropene	101
Methylene Chloride	114
Methyl tert-butyl ether	94
trans-1,2-Dichloroethene	104
Hexane	104
1,1-Dichloroethane	104
2-Butanone (Methyl Ethyl Ketone)	96
cis-1,2-Dichloroethene	96
Tetrahydrofuran	105
Chloroform	103
1,1,1-Trichloroethane	99
Cyclohexane	92
Carbon Tetrachloride	94
2,2,4-Trimethylpentane	98
Benzene	102
1,2-Dichloroethane	114
Heptane	99
Trichloroethene	101
1,2-Dichloropropane	97
1,4-Dioxane	86
Bromodichloromethane	94
cis-1,3-Dichloropropene	87
4-Methyl-2-pentanone	91
Toluene	90
trans-1,3-Dichloropropene	99
1,1,2-Trichloroethane	102
Tetrachloroethene	101
2-Hexanone	112

Client Sample ID: CCV

Lab ID#: 1207359A-10A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3072009	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 7/20/12 01:18 PM

Compound	%Recovery
Dibromochloromethane	102
1,2-Dibromoethane (EDB)	100
Chlorobenzene	98
Ethyl Benzene	96
m,p-Xylene	96
o-Xylene	96
Styrene	100
Bromoform	92
Cumene	96
1,1,2,2-Tetrachloroethane	95
Propylbenzene	97
4-Ethyltoluene	94
1,3,5-Trimethylbenzene	94
1,2,4-Trimethylbenzene	90
1,3-Dichlorobenzene	89
1,4-Dichlorobenzene	89
alpha-Chlorotoluene	78
1,2-Dichlorobenzene	89
1,2,4-Trichlorobenzene	82
Hexachlorobutadiene	81

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	92	70-130
1,2-Dichloroethane-d4	105	70-130
4-Bromofluorobenzene	91	70-130

Client Sample ID: LCS

Lab ID#: 1207359A-11A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3072010	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 7/20/12 02:10 PM

Compound	%Recovery
Freon 12	121
Freon 114	115
Chloromethane	121
Vinyl Chloride	118
1,3-Butadiene	110
Bromomethane	136 Q
Chloroethane	113
Freon 11	129
Ethanol	109
Freon 113	112
1,1-Dichloroethene	111
Acetone	107
2-Propanol	109
Carbon Disulfide	128
3-Chloropropene	118
Methylene Chloride	117
Methyl tert-butyl ether	101
trans-1,2-Dichloroethene	122
Hexane	108
1,1-Dichloroethane	112
2-Butanone (Methyl Ethyl Ketone)	104
cis-1,2-Dichloroethene	104
Tetrahydrofuran	107
Chloroform	110
1,1,1-Trichloroethane	108
Cyclohexane	98
Carbon Tetrachloride	102
2,2,4-Trimethylpentane	105
Benzene	110
1,2-Dichloroethane	122
Heptane	106
Trichloroethene	108
1,2-Dichloropropane	107
1,4-Dioxane	93
Bromodichloromethane	101
cis-1,3-Dichloropropene	94
4-Methyl-2-pentanone	96
Toluene	95
trans-1,3-Dichloropropene	107
1,1,2-Trichloroethane	111
Tetrachloroethene	109
2-Hexanone	121

Client Sample ID: LCS

Lab ID#: 1207359A-11A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name: 3072010
Dil. Factor: 1.00

Date of Collection: NA
Date of Analysis: 7/20/12 02:10 PM

Compound	%Recovery
Dibromochloromethane	110
1,2-Dibromoethane (EDB)	107
Chlorobenzene	107
Ethyl Benzene	104
m,p-Xylene	106
o-Xylene	103
Styrene	105
Bromoform	97
Cumene	105
1,1,2,2-Tetrachloroethane	104
Propylbenzene	106
4-Ethyltoluene	95
1,3,5-Trimethylbenzene	100
1,2,4-Trimethylbenzene	95
1,3-Dichlorobenzene	96
1,4-Dichlorobenzene	94
alpha-Chlorotoluene	80
1,2-Dichlorobenzene	96
1,2,4-Trichlorobenzene	88
Hexachlorobutadiene	86

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	90	70-130
1,2-Dichloroethane-d4	107	70-130
4-Bromofluorobenzene	92	70-130

Client Sample ID: LCSD

Lab ID#: 1207359A-11AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3072011	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 7/20/12 02:41 PM

Compound	%Recovery
Freon 12	119
Freon 114	115
Chloromethane	120
Vinyl Chloride	118
1,3-Butadiene	121
Bromomethane	136 Q
Chloroethane	112
Freon 11	129
Ethanol	113
Freon 113	112
1,1-Dichloroethene	110
Acetone	106
2-Propanol	112
Carbon Disulfide	130
3-Chloropropene	121
Methylene Chloride	118
Methyl tert-butyl ether	102
trans-1,2-Dichloroethene	120
Hexane	109
1,1-Dichloroethane	112
2-Butanone (Methyl Ethyl Ketone)	104
cis-1,2-Dichloroethene	104
Tetrahydrofuran	107
Chloroform	110
1,1,1-Trichloroethane	108
Cyclohexane	99
Carbon Tetrachloride	102
2,2,4-Trimethylpentane	106
Benzene	107
1,2-Dichloroethane	120
Heptane	106
Trichloroethene	108
1,2-Dichloropropane	105
1,4-Dioxane	91
Bromodichloromethane	100
cis-1,3-Dichloropropene	93
4-Methyl-2-pentanone	97
Toluene	95
trans-1,3-Dichloropropene	109
1,1,2-Trichloroethane	111
Tetrachloroethene	108
2-Hexanone	120

Client Sample ID: LCSD

Lab ID#: 1207359A-11AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	3072011	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 7/20/12 02:41 PM

Compound	%Recovery
Dibromochloromethane	109
1,2-Dibromoethane (EDB)	108
Chlorobenzene	108
Ethyl Benzene	102
m,p-Xylene	106
o-Xylene	103
Styrene	105
Bromoform	98
Cumene	104
1,1,2,2-Tetrachloroethane	104
Propylbenzene	104
4-Ethyltoluene	97
1,3,5-Trimethylbenzene	100
1,2,4-Trimethylbenzene	96
1,3-Dichlorobenzene	97
1,4-Dichlorobenzene	95
alpha-Chlorotoluene	81
1,2-Dichlorobenzene	96
1,2,4-Trichlorobenzene	91
Hexachlorobutadiene	88

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	91	70-130
1,2-Dichloroethane-d4	110	70-130
4-Bromofluorobenzene	92	70-130



CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice

Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Page ____ of ____

Project Manager sch4p4(6) Personal information
Collected by: (Print and Sign) sch4p4(6) Personal information
Company Golden Associates Email sch4p4(6) Personal information
Address 216 Draper St City Cairns State Qld Zip 4870
Phone +617 40548221 Fax _____

Project Info:

P.O. # CQ 3090
Project # 087673045
Project Name Kwikleen

Turn Around Time:

☒ Normal
☐ Rush

Lab Use Only

Pressurized by:

Date:

Pressurization Gas:

N₂ He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum			
						Initial	Final	Receipt	Final (psi)
01A	SVW 1	3026	13/07/12	10:00am	TO 15 + Helium	-27	-9		
02A	SVW 2	20775	13/07/12	11:00am	" "	-30	-11		
03A	SVW 3	36445	13/07/12	12:15pm	" "	-29	-7		
04A	SVW 4	33403	13/07/12	11:30am	" "	-27	-10		
05A	SVW 5	1026	13/07/12	3:00pm	" "	-30	-9		
06A	SVW 6	37309	13/07/12	1:00pm	" "	-28	-8		
07A	SVW 7	34616	13/07/12	2:00pm	" "	-29	-10		
08A	FB 01	31761	13/07/12	12:45	" "	-19	-5		

Relinquished by: (signature) Date/Time

sch4p4(6) Personal information sch4p4(6) Personal information

6/07/12 12:00pm

Received by: (signature) Date/Time

sch4p4(6) Personal information 7/19/12 0930

Notes:

Relinquished by: (signature) Date/Time

Received by: (signature) Date/Time

Relinquished by: (signature) Date/Time

Received by: (signature) Date/Time

Lab Use Only

Shipper Name

Air Bill #

Temp (°C)

Condition

Custody Seals Intact?

Work Order #

DHL

N/A

Good

Yes No None

1207359

Form 1293 rev.11

1757359



Analytical Request / Chain Of Custody

Golder Associates Pty. Ltd.

(Golder Associates Pty. Ltd. A.B.N. 64 006 107 857)

Building 7, Botanicca Corporate Park,
570 – 588 Swan Street,
Richmond, Victoria 3121
Ph: 03 8862 3500
Fax: 03 8862 3501

Order No

CQ3090

Date

16-Jul-12

Order By

sch4p4(6) Personal info

Project No

087673045

Service Provider**Air Toxics Ltd.**

180 Blue Ravine Road, Suite B
Folsom
CA, 95630

Attention:**Phone** 9169851000**Fax** 9169851020

Sample No	Sample Description	Analysis Required *
FB01	Summa Canister (31761)	T015 + Helium
SVW1	Summa Canister (3026)	T015 + Helium
SVW2	Summa Canister (20775)	T015 + Helium
SVW3	Summa Canister (36445)	T015 + Helium
SVW4	Summa Canister (33403)	T015 + Helium
SVW5	Summa Canister (1026)	T015 + Helium
SVW6	Summa Canister (37309)	T015 + Helium
SVW7	Summa Canister (34616)	T015 + Helium

Mondav. 16 Julv 2012 Page 1 of 2

Total Numberof Sample Submitted	8
Test Results Required By:	23-Jul-12

* Report all results as TOTAL MASS of analyte unless otherwise stated.
Report sample solution volumes.

Sample retention: 30 days after report date unless otherwise arranged.

Relinquished By _____ **Date** _____ **Received By** _____ **Date** _____
Relinquished By _____ **Date** _____ **Received By** _____ **Date** _____
Relinquished By _____ **Date** _____ **Received By** _____ **Date** _____

Samples submitted by: _____

7/30/2012

Mr. [sch4p4(6) Person]

Golder Associates, Australia

216 Draper Street

Cairns, Queensland 4870

Project Name: Kwikleen

Project #: 087673045

Workorder #: 1207359B

Dear Mr. [sch4p4(6) Person]

The following report includes the data for the above referenced project for sample(s) received on 7/19/2012 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Karen Stempson at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

[sch4p4(6) Personal information]

[sch4p4(6) Personal information]

Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.

180 Blue Ravine Road, Suite B
Folsom, CA 95630

T | 916-985-1000
F | 916-985-1020
www.airtoxics.com

WORK ORDER #: 1207359B

Work Order Summary

CLIENT: Mr. sch4p4(6) Perso Golder Associates, Australia 216 Draper Street Cairns, Queensland 4870	BILL TO: Accounts Payable Golder Associates, Australia PO BOX 6079 Hawthorne, Australia 3121
PHONE: +61 7 4054 8200 FAX: +61 7 4054 8201 DATE RECEIVED: 07/19/2012 DATE COMPLETED: 07/30/2012	P.O. # CQ 3090 PROJECT # 087673045 Kwikleen CONTACT: sch4p4(6) Perso

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	SVW1	Modified ASTM D-1946	9.0 "Hg	5 psi
02A	SVW2	Modified ASTM D-1946	9.0 "Hg	5 psi
03A	SVW3	Modified ASTM D-1946	9.5 "Hg	5 psi
04A	SVW4	Modified ASTM D-1946	9.0 "Hg	5 psi
05A	SVW5	Modified ASTM D-1946	8.5 "Hg	5 psi
06A	SVW6	Modified ASTM D-1946	8.5 "Hg	5 psi
07A	SVW7	Modified ASTM D-1946	9.0 "Hg	5 psi
08A	FB01	Modified ASTM D-1946	5.0 "Hg	5 psi
09A	Lab Blank	Modified ASTM D-1946	NA	NA
10A	LCS	Modified ASTM D-1946	NA	NA
10AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY:

sch4p4(6) Personal information

Technical Director

DATE: 07/30/12

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NY NELAP - 11291,
TX NELAP - T104704434-12-5, UT NELAP CA009332012-3, WA NELAP - C935

Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)

Accreditation number: CA300005, Effective date: 10/18/2011, Expiration date: 10/17/2012.

Eurofins Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins | Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified ASTM D-1946
Golder Associates, Australia
Workorder# 1207359B

Eight 1 Liter Summa Canister samples were received on July 19, 2012. The laboratory performed analysis via Modified ASTM Method D-1946 for Helium gas in air using GC/TCD. The method involves direct injection of 1.0 mL of sample.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

<i>Requirement</i>	<i>ASTM D-1946</i>	<i>ATL Modifications</i>
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A 3-point calibration curve is performed. Quantitation is based on a daily calibration standard which may or may not resemble the composition of the associated samples.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a $\geq 95\%$ accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections $> 5 \times$ the RL.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

B - Compound present in laboratory blank greater than reporting limit.

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the detection limit.

M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue



Air Toxics

Summary of Detected Compounds NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: SVW1

Lab ID#: 1207359B-01A

No Detections Were Found.

Client Sample ID: SVW2

Lab ID#: 1207359B-02A

No Detections Were Found.

Client Sample ID: SVW3

Lab ID#: 1207359B-03A

No Detections Were Found.

Client Sample ID: SVW4

Lab ID#: 1207359B-04A

No Detections Were Found.

Client Sample ID: SVW5

Lab ID#: 1207359B-05A

No Detections Were Found.

Client Sample ID: SVW6

Lab ID#: 1207359B-06A

No Detections Were Found.

Client Sample ID: SVW7

Lab ID#: 1207359B-07A

No Detections Were Found.

Client Sample ID: FB01

Lab ID#: 1207359B-08A

No Detections Were Found.



Air Toxics

Client Sample ID: SVW1

Lab ID#: 1207359B-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	9073011	Date of Collection: 7/13/12 10:00:00 AM
Dil. Factor:	1.91	Date of Analysis: 7/30/12 10:17 AM

Compound	Rpt. Limit (%)	Amount (%)
Helium	0.096	Not Detected

Container Type: 1 Liter Summa Canister

Published on Resources Disclosure Log
RTI Act 2009



Air Toxics

Client Sample ID: SVW2

Lab ID#: 1207359B-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	9073012	Date of Collection: 7/13/12 11:00:00 AM
Dil. Factor:	1.91	Date of Analysis: 7/30/12 10:27 AM

Compound	Rpt. Limit (%)	Amount (%)
Helium	0.096	Not Detected

Container Type: 1 Liter Summa Canister

Published on Resources Disclosure Log
RTI Act 2009



Air Toxics

Client Sample ID: SVW3

Lab ID#: 1207359B-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	9073013	Date of Collection: 7/13/12 12:15:00 PM
Dil. Factor:	1.96	Date of Analysis: 7/30/12 10:40 AM

Compound	Rpt. Limit (%)	Amount (%)
Helium	0.098	Not Detected

Container Type: 1 Liter Summa Canister

Published on Resources Disclosure Log
RTI Act 2009



Air Toxics

Client Sample ID: SVW4

Lab ID#: 1207359B-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	9073014	Date of Collection: 7/13/12 11:30:00 AM
Dil. Factor:	2.37	Date of Analysis: 7/30/12 10:49 AM

Compound	Rpt. Limit (%)	Amount (%)
Helium	0.12	Not Detected

Container Type: 1 Liter Summa Canister

Published on Resources Disclosure Log
RTI Act 2009



Air Toxics

Client Sample ID: SVW5

Lab ID#: 1207359B-05A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	9073015	Date of Collection: 7/13/12 3:00:00 PM
Dil. Factor:	1.87	Date of Analysis: 7/30/12 10:56 AM

Compound	Rpt. Limit (%)	Amount (%)
Helium	0.094	Not Detected

Container Type: 1 Liter Summa Canister

Published on Resources Disclosure Log
RTI Act 2009



Air Toxics

Client Sample ID: SVW6

Lab ID#: 1207359B-06A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	9073016	Date of Collection: 7/13/12 1:00:00 PM
Dil. Factor:	1.87	Date of Analysis: 7/30/12 11:18 AM

Compound	Rpt. Limit (%)	Amount (%)
Helium	0.094	Not Detected

Container Type: 1 Liter Summa Canister

Published on Resources Disclosure Log
RTI Act 2009



Air Toxics

Client Sample ID: SVW7

Lab ID#: 1207359B-07A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	9073017	Date of Collection: 7/13/12 2:00:00 PM
Dil. Factor:	2.60	Date of Analysis: 7/30/12 11:30 AM

Compound	Rpt. Limit (%)	Amount (%)
Helium	0.13	Not Detected

Container Type: 1 Liter Summa Canister

Published on Resources Disclosure Log
RTI Act 2009



Air Toxics

Client Sample ID: FB01

Lab ID#: 1207359B-08A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	9073018	Date of Collection: 7/13/12 12:45:00 PM
Dil. Factor:	2.32	Date of Analysis: 7/30/12 11:39 AM

Compound	Rpt. Limit (%)	Amount (%)
Helium	0.12	Not Detected

Container Type: 1 Liter Summa Canister

Published on Resources Disclosure Log
RTI Act 2009



Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 1207359B-09A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	9073003	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 7/30/12 08:59 AM

Compound	Rpt. Limit (%)	Amount (%)
Helium	0.050	Not Detected

Container Type: NA - Not Applicable

Published on Resources Disclosure Log
RTI Act 2009



Air Toxics

Client Sample ID: LCS

Lab ID#: 1207359B-10A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	9073002	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 7/30/12 08:49 AM

Compound	%Recovery
----------	-----------

Helium	101
--------	-----

Container Type: NA - Not Applicable

Published on Resources Disclosure Log
RTI Act 2009



Air Toxics

Client Sample ID: LCSD

Lab ID#: 1207359B-10AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	9073024	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 7/30/12 12:29 PM

Compound	%Recovery
----------	-----------

Helium	100
--------	-----

Container Type: NA - Not Applicable

Published on Resources Disclosure Log
RTI Act 2009

8/13/2012

Mr. [sch4p4(6) Perso]

Golder Associates, Australia
216 Draper Street

Cairns, Queensland 4870

Project Name: Kwikleen Dry Cleaners

Project #: 087673045

Workorder #: 1208098A

Dear Mr. [sch4p4(6) Person]

The following report includes the data for the above referenced project for sample(s) received on 8/6/2012 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: [sch4p4(6) Personal] at [sch4p4(6) Person] if you have any questions regarding the data in this report.

Regards,

[sch4p4(6) Personal information]

[sch4p4(6) Personal inform]

Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.

180 Blue Ravine Road, Suite B
Folsom, CA 95630

T | 916-985-1000
F | 916-985-1020
www.airtoxics.com

WORK ORDER #: 1208098A

Work Order Summary

CLIENT: PHONE: FAX: DATE RECEIVED: DATE COMPLETED:	Mr. sch4p4(6) Person Golder Associates, Australia 216 Draper Street Cairns, Queensland 4870 +61 7 4054 8200 +61 7 4054 8201 08/06/2012 08/13/2012	BILL TO: Accounts Payable Golder Associates, Australia PO BOX 6079 Hawthorne, Australia 3121 P.O. # CQ3105 PROJECT # 087673045 Kwikleen Dry Cleaners CONTACT: sch4p4(6) Person
---	---	--

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>	<u>FINAL PRESSURE</u>
01A	SVW1	Modified TO-15	8.0 "Hg	5.0 psi
02A	SVW2	Modified TO-15	8.0 "Hg	5.0 psi
03A	SVW3	Modified TO-15	9.5 "Hg	5.0 psi
04A	SVW4	Modified TO-15	8.0 "Hg	5.0 psi
05A	SVW5	Modified TO-15	9.0 "Hg	5.0 psi
06A	SVW6	Modified TO-15	7.0 "Hg	5.0 psi
07A	SVW7	Modified TO-15	8.5 "Hg	5.0 psi
08A	FB001	Modified TO-15	5.0 "Hg	5.0 psi
09A	REP001	Modified TO-15	8.0 "Hg	5.0 psi
10A	Lab Blank	Modified TO-15	NA	NA
11A	CCV	Modified TO-15	NA	NA
12A	LCS	Modified TO-15	NA	NA
12AA	LCSD	Modified TO-15	NA	NA

CERTIFIED BY:

sch4p4(6) Personal information

Technical Director

DATE: 08/13/12

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NY NELAP - 11291,
TX NELAP - T104704434-12-5, UT NELAP CA009332012-3, WA NELAP - C935

Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)

Accreditation number: CA300005, Effective date: 10/18/2011, Expiration date: 10/17/2012.

Eurofins Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

**LABORATORY NARRATIVE
EPA Method TO-15
Golder Associates, Australia
Workorder# 1208098A**

Nine 1 Liter Summa Canister samples were received on August 06, 2012. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There was a significant difference (greater than 5.0" Hg) between the measured canister receipt vacuum and that which was reported on the Chain of Custody (COC) for sample SVW3. A leak test indicated that the valve was functioning properly.

Analytical Notes

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page.

Dilution was performed on samples SVW1, SVW2, SVW3, SVW4, SVW5, SVW6 and REP001 due to the presence of high level target species.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

UJ- Non-detected compound associated with low bias in the CCV and/or LCS.

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

Summary of Detected Compounds EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SVW1

Lab ID#: 1208098A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	370	370	870	890
Carbon Disulfide	150	220	460	670
cis-1,2-Dichloroethene	37	950	140	3800
Trichloroethene	37	2200	200	12000
Toluene	37	120	140	460
Tetrachloroethene	37	7800	250	53000

Client Sample ID: SVW2

Lab ID#: 1208098A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	15	160	60	630
Trichloroethene	15	1400	82	7600
Toluene	15	21	57	78
Tetrachloroethene	15	3900	100	27000

Client Sample ID: SVW3

Lab ID#: 1208098A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	820	1100	1900	2500
Carbon Disulfide	330	460	1000	1400
cis-1,2-Dichloroethene	82	200	320	810
Trichloroethene	82	1500	440	7900
Toluene	82	180	310	690
Tetrachloroethene	82	17000	550	120000

Client Sample ID: SVW4

Lab ID#: 1208098A-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	4.6	36	18	140

Summary of Detected Compounds EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SVW4

Lab ID#: 1208098A-04A

Trichloroethene	4.6	300	24	1600
Tetrachloroethene	4.6	1700	31	12000

Client Sample ID: SVW5

Lab ID#: 1208098A-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Trichloroethene	3.8	13	20	68
Tetrachloroethene	3.8	790	26	5400

Client Sample ID: SVW6

Lab ID#: 1208098A-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	180	220	420	520
Carbon Disulfide	70	120	220	370
cis-1,2-Dichloroethene	18	21	69	84
Trichloroethene	18	440	94	2300
Toluene	18	46	66	170
Tetrachloroethene	18	4800	120	32000

Client Sample ID: SVW7

Lab ID#: 1208098A-07A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Chloroform	0.94	1.4	4.6	6.8
Trichloroethene	0.94	2.6	5.0	14
Toluene	0.94	1.0	3.5	3.8
Tetrachloroethene	0.94	79	6.3	530
m,p-Xylene	0.94	1.8	4.1	8.0
o-Xylene	0.94	1.1	4.1	4.6

Client Sample ID: FB001

Lab ID#: 1208098A-08A

Summary of Detected Compounds EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: FB001

Lab ID#: 1208098A-08A

No Detections Were Found.

Client Sample ID: REP001

Lab ID#: 1208098A-09A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	6.1	34	24	130
Trichloroethene	6.1	280	33	1500
Tetrachloroethene	6.1	1600	41	11000



Air Toxics

Client Sample ID: SVW1

Lab ID#: 1208098A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	p080826	Date of Collection: 7/30/12 10:00:00 AM
Dil. Factor:	73.2	Date of Analysis: 8/8/12 10:39 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	37	Not Detected	180	Not Detected
Freon 114	37	Not Detected	260	Not Detected
Chloromethane	370	Not Detected	760	Not Detected
Vinyl Chloride	37	Not Detected	94	Not Detected
1,3-Butadiene	37	Not Detected	81	Not Detected
Bromomethane	370	Not Detected	1400	Not Detected
Chloroethane	150	Not Detected	390	Not Detected
Freon 11	37	Not Detected	200	Not Detected
Ethanol	150	Not Detected	280	Not Detected
Freon 113	37	Not Detected	280	Not Detected
1,1-Dichloroethene	37	Not Detected	140	Not Detected
Acetone	370	370	870	890
2-Propanol	150	Not Detected	360	Not Detected
Carbon Disulfide	150	220	460	670
3-Chloropropene	150	Not Detected	460	Not Detected
Methylene Chloride	370	Not Detected	1300	Not Detected
Methyl tert-butyl ether	37	Not Detected	130	Not Detected
trans-1,2-Dichloroethene	37	Not Detected	140	Not Detected
Hexane	37	Not Detected	130	Not Detected
1,1-Dichloroethane	37	Not Detected	150	Not Detected
2-Butanone (Methyl Ethyl Ketone)	150	Not Detected	430	Not Detected
cis-1,2-Dichloroethene	37	950	140	3800
Tetrahydrofuran	37	Not Detected	110	Not Detected
Chloroform	37	Not Detected	180	Not Detected
1,1,1-Trichloroethane	37	Not Detected	200	Not Detected
Cyclohexane	37	Not Detected	120	Not Detected
Carbon Tetrachloride	37	Not Detected	230	Not Detected
2,2,4-Trimethylpentane	37	Not Detected	170	Not Detected
Benzene	37	Not Detected	120	Not Detected
1,2-Dichloroethane	37	Not Detected	150	Not Detected
Heptane	37	Not Detected	150	Not Detected
Trichloroethene	37	2200	200	12000
1,2-Dichloropropane	37	Not Detected	170	Not Detected
1,4-Dioxane	150	Not Detected	530	Not Detected
Bromodichloromethane	37	Not Detected	240	Not Detected
cis-1,3-Dichloropropene	37	Not Detected	170	Not Detected
4-Methyl-2-pentanone	37	Not Detected	150	Not Detected
Toluene	37	120	140	460
trans-1,3-Dichloropropene	37	Not Detected	170	Not Detected
1,1,2-Trichloroethane	37	Not Detected	200	Not Detected
Tetrachloroethene	37	7800	250	53000
2-Hexanone	150	Not Detected	600	Not Detected



Air Toxics

Client Sample ID: SVW1

Lab ID#: 1208098A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	p080826	Date of Collection: 7/30/12 10:00:00 AM
Dil. Factor:	73.2	Date of Analysis: 8/8/12 10:39 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	37	Not Detected	310	Not Detected
1,2-Dibromoethane (EDB)	37	Not Detected	280	Not Detected
Chlorobenzene	37	Not Detected	170	Not Detected
Ethyl Benzene	37	Not Detected	160	Not Detected
m,p-Xylene	37	Not Detected	160	Not Detected
o-Xylene	37	Not Detected	160	Not Detected
Styrene	37	Not Detected	160	Not Detected
Bromoform	37	Not Detected	380	Not Detected
Cumene	37	Not Detected	180	Not Detected
1,1,2,2-Tetrachloroethane	37	Not Detected	250	Not Detected
Propylbenzene	37	Not Detected	180	Not Detected
4-Ethyltoluene	37	Not Detected	180	Not Detected
1,3,5-Trimethylbenzene	37	Not Detected	180	Not Detected
1,2,4-Trimethylbenzene	37	Not Detected	180	Not Detected
1,3-Dichlorobenzene	37	Not Detected	220	Not Detected
1,4-Dichlorobenzene	37	Not Detected	220	Not Detected
alpha-Chlorotoluene	37	Not Detected	190	Not Detected
1,2-Dichlorobenzene	37	Not Detected	220	Not Detected
1,2,4-Trichlorobenzene	150	Not Detected	1100	Not Detected
Hexachlorobutadiene	150	Not Detected	1600	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	94	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	125	70-130

Client Sample ID: SVW2

Lab ID#: 1208098A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

EPA METHOD TO-15 GC/MS FULL SCAN				
File Name:	p080813	Date of Collection: 7/30/12 10:30:00 AM		
Dil. Factor:	30.5	Date of Analysis: 8/8/12 03:11 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	15	Not Detected	75	Not Detected
Freon 114	15	Not Detected	110	Not Detected
Chloromethane	150	Not Detected	310	Not Detected
Vinyl Chloride	15	Not Detected	39	Not Detected
1,3-Butadiene	15	Not Detected	34	Not Detected
Bromomethane	150	Not Detected	590	Not Detected
Chloroethane	61	Not Detected	160	Not Detected
Freon 11	15	Not Detected	86	Not Detected
Ethanol	61	Not Detected	110	Not Detected
Freon 113	15	Not Detected	120	Not Detected
1,1-Dichloroethene	15	Not Detected	60	Not Detected
Acetone	150	Not Detected	360	Not Detected
2-Propanol	61	Not Detected	150	Not Detected
Carbon Disulfide	61	Not Detected	190	Not Detected
3-Chloropropene	61	Not Detected	190	Not Detected
Methylene Chloride	150	Not Detected	530	Not Detected
Methyl tert-butyl ether	15	Not Detected	55	Not Detected
trans-1,2-Dichloroethene	15	Not Detected	60	Not Detected
Hexane	15	Not Detected	54	Not Detected
1,1-Dichloroethane	15	Not Detected	62	Not Detected
2-Butanone (Methyl Ethyl Ketone)	61	Not Detected	180	Not Detected
cis-1,2-Dichloroethene	15	160	60	630
Tetrahydrofuran	15	Not Detected	45	Not Detected
Chloroform	15	Not Detected	74	Not Detected
1,1,1-Trichloroethane	15	Not Detected	83	Not Detected
Cyclohexane	15	Not Detected	52	Not Detected
Carbon Tetrachloride	15	Not Detected	96	Not Detected
2,2,4-Trimethylpentane	15	Not Detected	71	Not Detected
Benzene	15	Not Detected	49	Not Detected
1,2-Dichloroethane	15	Not Detected	62	Not Detected
Heptane	15	Not Detected	62	Not Detected
Trichloroethene	15	1400	82	7600
1,2-Dichloropropane	15	Not Detected	70	Not Detected
1,4-Dioxane	61	Not Detected	220	Not Detected
Bromodichloromethane	15	Not Detected	100	Not Detected
cis-1,3-Dichloropropene	15	Not Detected	69	Not Detected
4-Methyl-2-pentanone	15	Not Detected	62	Not Detected
Toluene	15	21	57	78
trans-1,3-Dichloropropene	15	Not Detected	69	Not Detected
1,1,2-Trichloroethane	15	Not Detected	83	Not Detected
Tetrachloroethene	15	3900	100	27000
2-Hexanone	61	Not Detected	250	Not Detected



Air Toxics

Client Sample ID: SVW2

Lab ID#: 1208098A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	p080813	Date of Collection: 7/30/12 10:30:00 AM
Dil. Factor:	30.5	Date of Analysis: 8/8/12 03:11 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	15	Not Detected	130	Not Detected
1,2-Dibromoethane (EDB)	15	Not Detected	120	Not Detected
Chlorobenzene	15	Not Detected	70	Not Detected
Ethyl Benzene	15	Not Detected	66	Not Detected
m,p-Xylene	15	Not Detected	66	Not Detected
o-Xylene	15	Not Detected	66	Not Detected
Styrene	15	Not Detected	65	Not Detected
Bromoform	15	Not Detected	160	Not Detected
Cumene	15	Not Detected	75	Not Detected
1,1,2,2-Tetrachloroethane	15	Not Detected	100	Not Detected
Propylbenzene	15	Not Detected	75	Not Detected
4-Ethyltoluene	15	Not Detected	75	Not Detected
1,3,5-Trimethylbenzene	15	Not Detected	75	Not Detected
1,2,4-Trimethylbenzene	15	Not Detected	75	Not Detected
1,3-Dichlorobenzene	15	Not Detected	92	Not Detected
1,4-Dichlorobenzene	15	Not Detected	92	Not Detected
alpha-Chlorotoluene	15	Not Detected	79	Not Detected
1,2-Dichlorobenzene	15	Not Detected	92	Not Detected
1,2,4-Trichlorobenzene	61	Not Detected	450	Not Detected
Hexachlorobutadiene	61	Not Detected	650	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	96	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	125	70-130

Client Sample ID: SVW3

Lab ID#: 1208098A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

EPA METHOD 815-GC/MS FULL SCAN				
File Name:	p080827	Date of Collection: 7/30/12 12:00:00 PM		
Dil. Factor:	163	Date of Analysis: 8/8/12 11:13 PM		
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	82	Not Detected	400	Not Detected
Freon 114	82	Not Detected	570	Not Detected
Chloromethane	820	Not Detected	1700	Not Detected
Vinyl Chloride	82	Not Detected	210	Not Detected
1,3-Butadiene	82	Not Detected	180	Not Detected
Bromomethane	820	Not Detected	3200	Not Detected
Chloroethane	330	Not Detected	860	Not Detected
Freon 11	82	Not Detected	460	Not Detected
Ethanol	330	Not Detected	610	Not Detected
Freon 113	82	Not Detected	620	Not Detected
1,1-Dichloroethene	82	Not Detected	320	Not Detected
Acetone	820	1100	1900	2500
2-Propanol	330	Not Detected	800	Not Detected
Carbon Disulfide	330	460	1000	1400
3-Chloropropene	330	Not Detected	1000	Not Detected
Methylene Chloride	820	Not Detected	2800	Not Detected
Methyl tert-butyl ether	82	Not Detected	290	Not Detected
trans-1,2-Dichloroethene	82	Not Detected	320	Not Detected
Hexane	82	Not Detected	290	Not Detected
1,1-Dichloroethane	82	Not Detected	330	Not Detected
2-Butanone (Methyl Ethyl Ketone)	330	Not Detected	960	Not Detected
cis-1,2-Dichloroethene	82	200	320	810
Tetrahydrofuran	82	Not Detected	240	Not Detected
Chloroform	82	Not Detected	400	Not Detected
1,1,1-Trichloroethane	82	Not Detected	440	Not Detected
Cyclohexane	82	Not Detected	280	Not Detected
Carbon Tetrachloride	82	Not Detected	510	Not Detected
2,2,4-Trimethylpentane	82	Not Detected	380	Not Detected
Benzene	82	Not Detected	260	Not Detected
1,2-Dichloroethane	82	Not Detected	330	Not Detected
Heptane	82	Not Detected	330	Not Detected
Trichloroethene	82	1500	440	7900
1,2-Dichloropropane	82	Not Detected	380	Not Detected
1,4-Dioxane	330	Not Detected	1200	Not Detected
Bromodichloromethane	82	Not Detected	550	Not Detected
cis-1,3-Dichloropropene	82	Not Detected	370	Not Detected
4-Methyl-2-pentanone	82	Not Detected	330	Not Detected
Toluene	82	180	310	690
trans-1,3-Dichloropropene	82	Not Detected	370	Not Detected
1,1,2-Trichloroethane	82	Not Detected	440	Not Detected
Tetrachloroethene	82	17000	550	120000
2-Hexanone	330	Not Detected	1300	Not Detected



Air Toxics

Client Sample ID: SVW3

Lab ID#: 1208098A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	p080827	Date of Collection: 7/30/12 12:00:00 PM
Dil. Factor:	163	Date of Analysis: 8/8/12 11:13 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	82	Not Detected	690	Not Detected
1,2-Dibromoethane (EDB)	82	Not Detected	630	Not Detected
Chlorobenzene	82	Not Detected	380	Not Detected
Ethyl Benzene	82	Not Detected	350	Not Detected
m,p-Xylene	82	Not Detected	350	Not Detected
o-Xylene	82	Not Detected	350	Not Detected
Styrene	82	Not Detected	350	Not Detected
Bromoform	82	Not Detected	840	Not Detected
Cumene	82	Not Detected	400	Not Detected
1,1,2,2-Tetrachloroethane	82	Not Detected	560	Not Detected
Propylbenzene	82	Not Detected	400	Not Detected
4-Ethyltoluene	82	Not Detected	400	Not Detected
1,3,5-Trimethylbenzene	82	Not Detected	400	Not Detected
1,2,4-Trimethylbenzene	82	Not Detected	400	Not Detected
1,3-Dichlorobenzene	82	Not Detected	490	Not Detected
1,4-Dichlorobenzene	82	Not Detected	490	Not Detected
alpha-Chlorotoluene	82	Not Detected	420	Not Detected
1,2-Dichlorobenzene	82	Not Detected	490	Not Detected
1,2,4-Trichlorobenzene	330	Not Detected	2400	Not Detected
Hexachlorobutadiene	330	Not Detected	3500	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	93	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	128	70-130



Air Toxics

Client Sample ID: SVW4

Lab ID#: 1208098A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	p080819	Date of Collection:	7/30/12 11:00:00 AM	
Dil. Factor:	9.15	Date of Analysis:	8/8/12 06:54 PM	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	4.6	Not Detected	23	Not Detected
Freon 114	4.6	Not Detected	32	Not Detected
Chloromethane	46	Not Detected	94	Not Detected
Vinyl Chloride	4.6	Not Detected	12	Not Detected
1,3-Butadiene	4.6	Not Detected	10	Not Detected
Bromomethane	46	Not Detected	180	Not Detected
Chloroethane	18	Not Detected	48	Not Detected
Freon 11	4.6	Not Detected	26	Not Detected
Ethanol	18	Not Detected	34	Not Detected
Freon 113	4.6	Not Detected	35	Not Detected
1,1-Dichloroethene	4.6	Not Detected	18	Not Detected
Acetone	46	Not Detected	110	Not Detected
2-Propanol	18	Not Detected	45	Not Detected
Carbon Disulfide	18	Not Detected	57	Not Detected
3-Chloropropene	18	Not Detected	57	Not Detected
Methylene Chloride	46	Not Detected	160	Not Detected
Methyl tert-butyl ether	4.6	Not Detected	16	Not Detected
trans-1,2-Dichloroethene	4.6	Not Detected	18	Not Detected
Hexane	4.6	Not Detected	16	Not Detected
1,1-Dichloroethane	4.6	Not Detected	18	Not Detected
2-Butanone (Methyl Ethyl Ketone)	18	Not Detected	54	Not Detected
cis-1,2-Dichloroethene	4.6	36	18	140
Tetrahydrofuran	4.6	Not Detected	13	Not Detected
Chloroform	4.6	Not Detected	22	Not Detected
1,1,1-Trichloroethane	4.6	Not Detected	25	Not Detected
Cyclohexane	4.6	Not Detected	16	Not Detected
Carbon Tetrachloride	4.6	Not Detected	29	Not Detected
2,2,4-Trimethylpentane	4.6	Not Detected	21	Not Detected
Benzene	4.6	Not Detected	15	Not Detected
1,2-Dichloroethane	4.6	Not Detected	18	Not Detected
Heptane	4.6	Not Detected	19	Not Detected
Trichloroethene	4.6	300	24	1600
1,2-Dichloropropane	4.6	Not Detected	21	Not Detected
1,4-Dioxane	18	Not Detected	66	Not Detected
Bromodichloromethane	4.6	Not Detected	31	Not Detected
cis-1,3-Dichloropropene	4.6	Not Detected	21	Not Detected
4-Methyl-2-pentanone	4.6	Not Detected	19	Not Detected
Toluene	4.6	Not Detected	17	Not Detected
trans-1,3-Dichloropropene	4.6	Not Detected	21	Not Detected
1,1,2-Trichloroethane	4.6	Not Detected	25	Not Detected
Tetrachloroethene	4.6	1700	31	12000
2-Hexanone	18	Not Detected	75	Not Detected



Air Toxics

Client Sample ID: SVW4

Lab ID#: 1208098A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	p080819	Date of Collection: 7/30/12 11:00:00 AM
Dil. Factor:	9.15	Date of Analysis: 8/8/12 06:54 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	4.6	Not Detected	39	Not Detected
1,2-Dibromoethane (EDB)	4.6	Not Detected	35	Not Detected
Chlorobenzene	4.6	Not Detected	21	Not Detected
Ethyl Benzene	4.6	Not Detected	20	Not Detected
m,p-Xylene	4.6	Not Detected	20	Not Detected
o-Xylene	4.6	Not Detected	20	Not Detected
Styrene	4.6	Not Detected	19	Not Detected
Bromoform	4.6	Not Detected	47	Not Detected
Cumene	4.6	Not Detected	22	Not Detected
1,1,2,2-Tetrachloroethane	4.6	Not Detected	31	Not Detected
Propylbenzene	4.6	Not Detected	22	Not Detected
4-Ethyltoluene	4.6	Not Detected	22	Not Detected
1,3,5-Trimethylbenzene	4.6	Not Detected	22	Not Detected
1,2,4-Trimethylbenzene	4.6	Not Detected	22	Not Detected
1,3-Dichlorobenzene	4.6	Not Detected	28	Not Detected
1,4-Dichlorobenzene	4.6	Not Detected	28	Not Detected
alpha-Chlorotoluene	4.6	Not Detected	24	Not Detected
1,2-Dichlorobenzene	4.6	Not Detected	28	Not Detected
1,2,4-Trichlorobenzene	18	Not Detected	140	Not Detected
Hexachlorobutadiene	18	Not Detected	200	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	106	70-130

Client Sample ID: SVW5

Lab ID#: 1208098A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	p080818	Date of Collection:	7/30/12 2:30:00 PM	
Dil. Factor:	7.64	Date of Analysis:	8/8/12 06:20 PM	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	3.8	Not Detected	19	Not Detected
Freon 114	3.8	Not Detected	27	Not Detected
Chloromethane	38	Not Detected	79	Not Detected
Vinyl Chloride	3.8	Not Detected	9.8	Not Detected
1,3-Butadiene	3.8	Not Detected	8.4	Not Detected
Bromomethane	38	Not Detected	150	Not Detected
Chloroethane	15	Not Detected	40	Not Detected
Freon 11	3.8	Not Detected	21	Not Detected
Ethanol	15	Not Detected	29	Not Detected
Freon 113	3.8	Not Detected	29	Not Detected
1,1-Dichloroethene	3.8	Not Detected	15	Not Detected
Acetone	38	Not Detected	91	Not Detected
2-Propanol	15	Not Detected	38	Not Detected
Carbon Disulfide	15	Not Detected	48	Not Detected
3-Chloropropene	15	Not Detected	48	Not Detected
Methylene Chloride	38	Not Detected	130	Not Detected
Methyl tert-butyl ether	3.8	Not Detected	14	Not Detected
trans-1,2-Dichloroethene	3.8	Not Detected	15	Not Detected
Hexane	3.8	Not Detected	13	Not Detected
1,1-Dichloroethane	3.8	Not Detected	15	Not Detected
2-Butanone (Methyl Ethyl Ketone)	15	Not Detected	45	Not Detected
cis-1,2-Dichloroethene	3.8	Not Detected	15	Not Detected
Tetrahydrofuran	3.8	Not Detected	11	Not Detected
Chloroform	3.8	Not Detected	19	Not Detected
1,1,1-Trichloroethane	3.8	Not Detected	21	Not Detected
Cyclohexane	3.8	Not Detected	13	Not Detected
Carbon Tetrachloride	3.8	Not Detected	24	Not Detected
2,2,4-Trimethylpentane	3.8	Not Detected	18	Not Detected
Benzene	3.8	Not Detected	12	Not Detected
1,2-Dichloroethane	3.8	Not Detected	15	Not Detected
Heptane	3.8	Not Detected	16	Not Detected
Trichloroethene	3.8	13	20	68
1,2-Dichloropropane	3.8	Not Detected	18	Not Detected
1,4-Dioxane	15	Not Detected	55	Not Detected
Bromodichloromethane	3.8	Not Detected	26	Not Detected
cis-1,3-Dichloropropene	3.8	Not Detected	17	Not Detected
4-Methyl-2-pentanone	3.8	Not Detected	16	Not Detected
Toluene	3.8	Not Detected	14	Not Detected
trans-1,3-Dichloropropene	3.8	Not Detected	17	Not Detected
1,1,2-Trichloroethane	3.8	Not Detected	21	Not Detected
Tetrachloroethene	3.8	790	26	5400
2-Hexanone	15	Not Detected	62	Not Detected



Air Toxics

Client Sample ID: SVW5

Lab ID#: 1208098A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	p080818	Date of Collection: 7/30/12 2:30:00 PM
Dil. Factor:	7.64	Date of Analysis: 8/8/12 06:20 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	3.8	Not Detected	32	Not Detected
1,2-Dibromoethane (EDB)	3.8	Not Detected	29	Not Detected
Chlorobenzene	3.8	Not Detected	18	Not Detected
Ethyl Benzene	3.8	Not Detected	16	Not Detected
m,p-Xylene	3.8	Not Detected	16	Not Detected
o-Xylene	3.8	Not Detected	16	Not Detected
Styrene	3.8	Not Detected	16	Not Detected
Bromoform	3.8	Not Detected	39	Not Detected
Cumene	3.8	Not Detected	19	Not Detected
1,1,2,2-Tetrachloroethane	3.8	Not Detected	26	Not Detected
Propylbenzene	3.8	Not Detected	19	Not Detected
4-Ethyltoluene	3.8	Not Detected	19	Not Detected
1,3,5-Trimethylbenzene	3.8	Not Detected	19	Not Detected
1,2,4-Trimethylbenzene	3.8	Not Detected	19	Not Detected
1,3-Dichlorobenzene	3.8	Not Detected	23	Not Detected
1,4-Dichlorobenzene	3.8	Not Detected	23	Not Detected
alpha-Chlorotoluene	3.8	Not Detected	20	Not Detected
1,2-Dichlorobenzene	3.8	Not Detected	23	Not Detected
1,2,4-Trichlorobenzene	15	Not Detected	110	Not Detected
Hexachlorobutadiene	15	Not Detected	160	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	96	70-130
1,2-Dichloroethane-d4	96	70-130
4-Bromofluorobenzene	117	70-130

Client Sample ID: SVW6

Lab ID#: 1208098A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	p080816	Date of Collection:	7/30/12 12:45:00 PM	
Dil. Factor:	35.0	Date of Analysis:	8/8/12 05:08 PM	
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	18	Not Detected	86	Not Detected
Freon 114	18	Not Detected	120	Not Detected
Chloromethane	180	Not Detected	360	Not Detected
Vinyl Chloride	18	Not Detected	45	Not Detected
1,3-Butadiene	18	Not Detected	39	Not Detected
Bromomethane	180	Not Detected	680	Not Detected
Chloroethane	70	Not Detected	180	Not Detected
Freon 11	18	Not Detected	98	Not Detected
Ethanol	70	Not Detected	130	Not Detected
Freon 113	18	Not Detected	130	Not Detected
1,1-Dichloroethene	18	Not Detected	69	Not Detected
Acetone	180	220	420	520
2-Propanol	70	Not Detected	170	Not Detected
Carbon Disulfide	70	120	220	370
3-Chloropropene	70	Not Detected	220	Not Detected
Methylene Chloride	180	Not Detected	610	Not Detected
Methyl tert-butyl ether	18	Not Detected	63	Not Detected
trans-1,2-Dichloroethene	18	Not Detected	69	Not Detected
Hexane	18	Not Detected	62	Not Detected
1,1-Dichloroethane	18	Not Detected	71	Not Detected
2-Butanone (Methyl Ethyl Ketone)	70	Not Detected	210	Not Detected
cis-1,2-Dichloroethene	18	21	69	84
Tetrahydrofuran	18	Not Detected	52	Not Detected
Chloroform	18	Not Detected	85	Not Detected
1,1,1-Trichloroethane	18	Not Detected	95	Not Detected
Cyclohexane	18	Not Detected	60	Not Detected
Carbon Tetrachloride	18	Not Detected	110	Not Detected
2,2,4-Trimethylpentane	18	Not Detected	82	Not Detected
Benzene	18	Not Detected	56	Not Detected
1,2-Dichloroethane	18	Not Detected	71	Not Detected
Heptane	18	Not Detected	72	Not Detected
Trichloroethene	18	440	94	2300
1,2-Dichloropropane	18	Not Detected	81	Not Detected
1,4-Dioxane	70	Not Detected	250	Not Detected
Bromodichloromethane	18	Not Detected	120	Not Detected
cis-1,3-Dichloropropene	18	Not Detected	79	Not Detected
4-Methyl-2-pentanone	18	Not Detected	72	Not Detected
Toluene	18	46	66	170
trans-1,3-Dichloropropene	18	Not Detected	79	Not Detected
1,1,2-Trichloroethane	18	Not Detected	95	Not Detected
Tetrachloroethene	18	4800	120	32000
2-Hexanone	70	Not Detected	290	Not Detected



Air Toxics

Client Sample ID: SVW6

Lab ID#: 1208098A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	p080816	Date of Collection: 7/30/12 12:45:00 PM
Dil. Factor:	35.0	Date of Analysis: 8/8/12 05:08 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	18	Not Detected	150	Not Detected
1,2-Dibromoethane (EDB)	18	Not Detected	130	Not Detected
Chlorobenzene	18	Not Detected	80	Not Detected
Ethyl Benzene	18	Not Detected	76	Not Detected
m,p-Xylene	18	Not Detected	76	Not Detected
o-Xylene	18	Not Detected	76	Not Detected
Styrene	18	Not Detected	74	Not Detected
Bromoform	18	Not Detected	180	Not Detected
Cumene	18	Not Detected	86	Not Detected
1,1,2,2-Tetrachloroethane	18	Not Detected	120	Not Detected
Propylbenzene	18	Not Detected	86	Not Detected
4-Ethyltoluene	18	Not Detected	86	Not Detected
1,3,5-Trimethylbenzene	18	Not Detected	86	Not Detected
1,2,4-Trimethylbenzene	18	Not Detected	86	Not Detected
1,3-Dichlorobenzene	18	Not Detected	100	Not Detected
1,4-Dichlorobenzene	18	Not Detected	100	Not Detected
alpha-Chlorotoluene	18	Not Detected	90	Not Detected
1,2-Dichlorobenzene	18	Not Detected	100	Not Detected
1,2,4-Trichlorobenzene	70	Not Detected	520	Not Detected
Hexachlorobutadiene	70	Not Detected	750	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	94	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	130	70-130