

TECHNICAL MEMORANDUM

DATE 7 February 2020

Reference No. 19130799-004-TM-Rev0

TO Sean Gilchrist, Starryland NSW Pty Ltd C/O PDS Pty Ltd

CC

FROM Shane Doyle

EMAIL sdoyle@golder.com.au

SOIL VAPOUR SAMPLING AND ANALYSIS, GRAN CENTRAL DEVELOPMENT, GRANVILLE

1.0 INTRODUCTION

Property Development Solutions Pty Ltd (PDS) on behalf of Starryland NSW Pty Ltd (Starryland) engaged Golder Associates Pty Ltd to perform geotechnical and environmental investigations of the proposed Gran Central building development located at 134-142 Parramatta Road, 26-38 Good Street and 59-61 Cowper Street, Granville (the site).

This technical memorandum documents the soil vapour sampling and analysis performed as part of ongoing site investigations, and provides a preliminary assessment of risk posed by migration of hydrocarbon vapours from the adjacent Caltex service station onto the site.

2.0 BACKGROUND

Golder performed a preliminary environmental assessment of the site (Golder 2019a) which included a desk-top assessment and the results of opportunistic soil and groundwater sampling analysis performed during a geotechnical assessment of the site.

The environmental investigation report noted that there was the potential for hydrocarbon vapours to migrate from the adjacent Caltex service station onto the site and enter future building basements, and recommended that a detailed site investigation (DSI) be performed. The DSI was to include an assessment of the potential presence of soil vapour from the adjacent Caltex service station to be present on the site.

Golder provided a proposal to perform additional staged investigations to Starryland in September 2019 (Golder 2019b). The proposed investigations were performed in November 2019.

This technical memorandum has been prepared to provide Starryland with the results of the soil vapour investigation prior to completion of the DSI. The discussion and results of the soil vapour investigation will be expanded and included in the DSI recommended by Golder and required by the City of Parramatta Council's document dated 22 January 2020 (reference DA/655/2019).

3.0 FIELDWORK

Soil vapour wells were installed in boreholes BH104 and BH105 located in the north western corner of the site near the boundary of the Caltex service station on 15 November 2019. Borelogs and a site location plan are presented in **APPENDIX A**.

A stainless steel soil vapour implant, with an approximate 22 cm screen interval, connected to Teflon tubing, was installed at the base of each borehole. Approximately 40 cm of graded sand was then placed into the

borehole and the remainder of the borehole filled with bentonite to provide a seal. Each soil vapour well was finished with a gatic cover flush with the surface. Details of the soil vapour installations are provided in **Table 1** below.

Table 1: Soil vapour well installations

Location	Elevation (m AHD)	Depth (m)	Screen interval (m AHD)	Top of sand (m AHD)
BH104	10.80	1.50	9.32 - 9.54	9.70
BH105	11.00	1.32	9.70 - 9.92	10.05

Soil vapour samples were collected on 27 November 2019, and sent to SGS Environmental (SGS) under sample chain of custody conditions. Copies of the chain of custody documentation and the sample receipt notification are presented in **APPENDIX B**.

4.0 ADOPTED CRITERIA

4.1 Australian Guidance

4.1.1 Petroleum Hydrocarbon Compounds

Health screening levels (HSLs) for petroleum hydrocarbons fractions and a limited number of aromatic compounds are documented in *Schedule B1 Guideline on Investigation Levels for Soil and Groundwater of the National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPC 2013) for a range of soil depths and types. The most conservative soil vapour HSLs for residential land use, i.e. for soil vapour from 0 to <1m below a building slab in sand soil, have been adopted as screening criteria for the assessment of aromatic compounds. The soil vapour HILs for residential with accessible soil (HSL-A) and residential with minimal soil access e.g. high-rise buildings and flats (HSL-B) are numerically equivalent as they are based on the same exposure conditions for vapour inhalation. The sub-slab HSLs for benzene, toluene, ethylbenzene, xylene and naphthalene (BTEXN) have been adopted for the assessment of the soil vapour to potentially migrating from the Caltex service station into the proposed building basement.

4.1.2 Chlorinated Compounds

Interim health investigation levels (HILs) for a limited number of volatile organic chlorinated compounds are also documented in NEPC 2013. NEPC 2013 documents interim soil vapour HILs for trichloroethene (TCE); 1,1,1-trichloroethane (1,1,1-TCA); tetrachloroethene (PCE); cis-1,2-dichloroethene (cis-1,2-DCE) and vinyl chloride for the residential land use exposure scenarios. The interim HILs apply to soil within 1 m of the base of a building floor slab and are independent of soil type. As for BTEXN, the interim soil vapour HIL-A and HIL-B) are numerically equivalent as they are based on the same exposure conditions for vapour inhalation.

4.1.3 International Guidance

Where volatile analytes other than those identified above were detected, and recognised Australian guidelines were not available, international guidelines were referenced to assess the detected values.

5.0 ANALYSIS

Two primary soil vapour samples and one replicate soil vapour sample were analysed by SGS at their Notting Hill, Victoria laboratory. SGS is accredited by the National Association of Testing Authorities, Australia (NATA) for the analyses performed. The soil vapour samples were analysed to US EPA method TO-15. The certificate of analysis is presented in **APPENDIX B**.

The analytical results are summarised in **Table 2** below.

Table 2: Soil vapour analysis results summary

Analyte	HSL / HIL A & B	International guidance	Maximum reported concentration
Benzene	1,000	-	38
Toluene	1,300,000	-	2,900
Ethyl benzene	330,000	-	250
Xylene	220,000	-	730
Naphthalene	800	-	<24
TCE	20	-	13
1,1,1-TCA	60,000	-	<9.1
PCE	2,000	-	37
<i>cis</i> -1,2-DCE	80	-	<9.1
Vinyl chloride	30	-	<4.5
Methyl ethyl ketone	-	52,000 ¹	1000
Chloroform	-	1,400 ²	87
2-propanol	-	2,100 ¹	790
1,2,4-trimethylbenzene	-	630 ¹	39
1,3,5-trimethylbenzene	-	630 ¹	17

Note: all concentrations reported in µg/m³.

¹ USEPA residential air criteria, 10X factor applied for soil vapour assessment.

² WHO 2004 tolerable concentration, 10X factor applied for soil vapour assessment.

6.0 DISCUSSION OF RESULTS

The concentrations of volatile organic compounds detected were generally one to three orders of magnitude below the adopted criteria. TCE, detected in one soil vapour sample¹ at a concentration of 13 µg/m³, was also below the adopted criterion of 20 µg/m³.

Based on the results of the sampling and analysis performed in November 2019 it is considered there is a low potential for hydrocarbon soil vapours from the adjacent Caltex service station to accumulate in the proposed building basement on the site.

As noted above, the results of the soil vapour investigation will be further discussed in the DSI recommended by Golder and required by the City of Parramatta Council. The discussion of risk posed from soil vapour will

¹ TCE was not detected in the second soil vapour sample or replicate sample.

also consider the results of soil and groundwater analysis across the site and the size, location and proposed construction methodology for the proposed building basement.

7.0 REFERENCES

- Golder 2019a *Proposed Gran Central Development Preliminary Environmental Investigation Report*, Golder Associates Pty Ltd, reference 19122955-001-R-Rev0, 1 November 2019.
- Golder 2019b *Proposal Geotechnical and Environmental Engineering Consultant Services - Second Stage of Investigation Gran Central Development*, Golder Associates Pty Ltd, reference 19122955-004-P-Rev0, 23 September 2019.
- NEPC 2013 *National Environment Protection (Assessment of Site Contamination) Measure 1999*, National Environment Protection Council, 2013.
- US EPA 2019 *US Environment Protection Agency Regional Screening Levels*, November 2019. Accessed 5 February 2020. <https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables>.
- WHO 2004 *Chloroform (Concise International Chemical Assessment Document; 58)*, World Health Organisation, 2004.

8.0 LIMITATIONS

Your attention is drawn to the document titled - "Important Information Relating to this Report", which is included in Appendix C of this report. The statements presented in that document are intended to inform a reader of the report about its proper use. There are important limitations as to who can use the report and how it can be used. It is important that a reader of the report understands and has realistic expectations about those matters. The Important Information document does not alter the obligations Golder Associates has under the contract between it and its client.



Shane Doyle
Principal Environmental Scientist

SPD/GB/spd

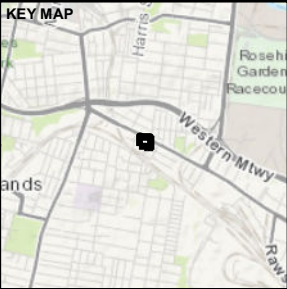


Gavan Butterfield
Associate

[https://golderassociates.sharepoint.com/sites/117062/project files/6 deliverables/19130799-004-sv/19130799-004-tm-rev0.docx](https://golderassociates.sharepoint.com/sites/117062/project%20files/6%20deliverables/19130799-004-sv/19130799-004-tm-rev0.docx)

APPENDIX A

Site Plan and Borelogs



- LEGEND
- Borehole
 - Site boundary



NOTE(S)
1. COORDINATE SYSTEM: GDA 1994 MGA ZONE 56

REFERENCE(S)
1. AERIAL PHOTO (C) NEARMAP
2. KEYMAP SOURCED FROM ESRI ONLINE BASEMAPS

CLIENT
STARRYLAND NSW PTY LTD C/O PDS GROUP

PROJECT
GRAN CENTRAL DEVELOPMENT

TITLE
BOREHOLE LOCATION PLAN

	CONSULTANT	DD-MM-YYYY	09-01-2020
	DESIGNED	EAA	
	PREPARED	EAA	
	REVIEWED	-	
	APPROVED	-	

PROJECT NO. 19130799	CONTROL -	REV. -	FIGURE
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GOLDER

REPORT OF BOREHOLE: BH104

SHEET: 1 OF 1

CLIENT: Starryland
PROJECT: Starrylands - Gran Central
LOCATION: 134-142 Parramatta Road, Granville
JOB NO: 19130799

COORDS: 315966 m 6254859 m (hhGPS)
SURFACE RL: 10.8 m DATUM: AHD (MAP)
INCLINATION: -90°
HOLE DEPTH: 1.65 m

DRILL RIG: Komatsu 05
CONTRACTOR: Nealings
LOGGED: CW DATE: 15/11/19
CHECKED: BC DATE: 29/11/19

Drilling				Sampling		Field Material Description						
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
DTC	-		0		DS 0.50-0.58 m			-	CONCRETE: pale grey with red and dark grey aggregates	-	-	ROAD SURFACE
			0.15					-	FILL: Clayey GRAVEL	M	-	FILL
HA	M-H	GWNE during and immediately after auger drilling	0.30					CH	sub-angular to angular, brown, medium plasticity clay			RESIDUAL SOIL
			10.45						Gravelly CLAY			
			0.55						medium to high plasticity, grey mottled brown, sub-rounded to sub-angular gravel			
			0.65						red mottled grey, trace gravel			
			10.10									
			10.03									
			1.00									
			1	9.75					Silty CLAY			
			9.60					high plasticity, red mottled brown				
			1.45					with fine, sub-rounded to sub-angular gravel				
9.30					trace gravel							
			9.10		DS 1.45-1.50 m				no gravel, red mottled grey			
			2					trace fine, sub-angular gravel				
								END OF BOREHOLE @ 1.65 m				
								TARGET DEPTH				
								PRODUCTION WELL				
			3									
			4									
			5									
			6									
			7									
8												
9												

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. F01a
RL3



GOLDER

REPORT OF BOREHOLE: BH105

CLIENT: Starryland
PROJECT: Starrylands - Gran Central
LOCATION: 134-142 Parramatta Road, Granville
JOB NO: 19130799

COORDS: 315961 m 6254851 m (hhGPS)
SURFACE RL: 11.0 m DATUM: AHD (MAP)
INCLINATION: -90°
HOLE DEPTH: 1.47 m

SHEET: 1 OF 1
DRILL RIG: Komatsu 05
CONTRACTOR: Nealings
LOGGED: CW DATE: 15/11/19
CHECKED: BC DATE: 29/11/19

Drilling				Sampling		Field Material Description						
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
DTC	-	-	0	0.15	DS 0.42-0.49 m			-	CONCRETE: pale grey with red and dark grey aggregates	-	-	ROAD SURFACE
			0.25				-		-			
HA	M-H	GWNE during and immediately after auger drilling	10.75					CH	FILL: Gravelly CLAY low to medium plasticity, grey mottled brown, sub-rounded to sub-angular gravel			FILL
			0.45									
			10.55									
			1	1.15								
			9.85									
					DS 1.30-1.32 m							
			9.53						END OF BOREHOLE @ 1.47 m REFUSAL ON WEATHERED ROCK PRODUCTION WELL			
			2									
			3									
			4									
			5									
			6									
			7									
			8									
			9									
			10									

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. F01a
RL3

APPENDIX B

Laboratory Documentation

TO-15 Canister Chain of Custody Record

Dispatch samples to: Unit 10/585 Blackburn Road, Notting Hill, Victoria 3168, Australia

Attn: Sample Reception - Contact Ph: +613 9574 3311

Email: au.samplerreceipt.melbourne@sgs.com

CLIENT NAME: GOLDER ASSOCIATES
CLIENT ADDRESS: 40 Mount Street, North Sydney

CONTACT PHONE No: *Shane Doyle (0412 068 218)*

PAGE / OF

CONTACT FAX No: NA

RESULTS REQUIRED BY: *Standert TAT*

ABN: 64 006 107 857

EMAIL ADDRESS: *alemenager@golder.com.cn*

CONTACT: 0491055169

sdoyle@golder.com.au

SAMPLED BY: Alex L.

LAB QUOTE NUMBER: AQ219 11/30/.KH

PROJECT REF: 19103799

PURCHASE ORDER NUMBER: P023977

[illegible]

RELEASED BY: (Name) (Signature) (Date / Time)

Notes:

RECEIVED BY: (Name) (Signature) (Date / Time)

N. Sander N.S. und 3/12/19

11:00am

Sample Receipt Acknowledgement

To:	Alex Lemenager	From:	Sample Reception
Fax:	02 9478 3901	Pages:	(1) including this page
Co:	Golder Associates	Date:	3/12/2019
Email	ALemenager@golder.com	Ref:	M191739

SGS has received your samples from the project listed below. If you have any enquiries please contact us quoting our reference number.

Project/Reference No.: 19103799
Our Reference Number: M191739
 Date Received: 03-Dec-2019
 Estimated date of report: 12-Dec-2019

Additional Information:

Samples received after 4 pm are considered as received on the next working day for turnaround purposes.
 Samples with a 24hr or 48hr TAT are considered as received on the next working day if received after 2:30pm.
 Surcharges for urgent turnaround requests may apply.
 All analytical work is conducted at our Melbourne office.
Sample Storage - All aqueous samples are stored for **two weeks** after reporting.
 - All soils and other samples are stored for **one month** after reporting.
 Please direct any technical or turnaround queries to Adam Atkinson at our Melbourne office.



SGS

Specialist Laboratory Services

To the extent not inconsistent with the other provisions of this document and unless specifically agreed otherwise in writing by SGS, all SGS services are rendered in accordance with the applicable SGS General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions/General-Conditions-of-Services-English.aspx> as at the date of this document.

Attention is drawn to the limitations of liability and to the clauses of indemnification.

Website: www.sgs.com.au
Email: AU.SampleReceipt.Melbourne@sgs.com

Chartered Chemists

9-Dec-2019

Golder Associates

PO Box 1302
Crows Nest
NSW 1585
Attention: Alex Lemenager

REPORT NUMBER: M191739

Site/Client Ref: 19103799

Order No: PO23977

CERTIFICATE OF ANALYSIS

SAMPLES: Three samples were received for analysis
DATE RECEIVED: 3-Dec-2019
DATE COMMENCED: 3-Dec-2019
METHODS: See Attached Results

RESULTS: Please refer to attached pages for results.

Note: Results are based on samples as received at SGS laboratories

REPORTED BY:



Adam Atkinson

Australian Chemistry Manager



NATA Accredited Laboratory Number: 2562
Corporate Site Number: 14420
Accredited for compliance
with ISO/IEC 17025 - Testing.



Report N°: M191739

ANALYTICAL RESULTS

Matrix: Canister

Method: TO-15.04 Receipt Vacuum / Pressure

Units as Listed - ^^ Vacuum reported as inches of Mercury below standard atmospheric pressure

Test Started: 03-Dec-19

Analyte Name	Sampled Date	Leeder ID	2019026183	2019026184	2019026185
		Client ID	SV_BH105 SC1121	SV_BH104 SC1028	SV_Replicate SC1049
		PQL	27-Nov-19	27-Nov-19	27-Nov-19
Receipt Pressure (PSIA)			5.90	7.70	7.40
Receipt Vacuum (inch Hg) ^^			17.7	14.1	14.7

ANALYTICAL RESULTS

Matrix: Canister

Method: TO-15.02 Volatile Organics (w/v)

Sample units are expressed in µg/m³

Test Started: 03-Dec-19

Analyte Name	Sampled Date PQL	Leeder ID Client ID	2019026183 SV_BH105 SC1121 27-Nov-19	2019026184 SV_BH104 SC1028 27-Nov-19	2019026185 SV_Replicate SC1049 27-Nov-19	2019026187 Method Blank
Acrolein			<7.9	<5.2	<5.4	<1.4
Acrylonitrile			<20	<13	<14	<3.6
tert-Amyl Methyl Ether			<6.8	<4.5	<4.7	<1.2
Benzene			38	17	14	<1
Bromodichloromethane			<11	<7.5	<7.8	<2
Bromoform			<14	<9	<9.3	<2.4
Bromomethane			<10	<6.7	<7	<1.8
1,3-Butadiene			<3.4	<2.2	<2.3	<0.6
2-Butanone (Methyl Ethyl Ketone)			<5.7	920	1000	<1
tert-Butyl Alcohol			<5.7	<3.7	<3.9	<1
n-Butylbenzene			<9.1	<6	<6.2	<1.6
sec-Butylbenzene			<9.1	<6	<6.2	<1.6
tert-Butylbenzene			<9.1	<6	<6.2	<1.6
Carbon Tetrachloride			<11	<7.5	<7.8	<2
Chlorobenzene			<6.8	<4.5	<4.7	<1.2
Chloroethane			<6.8	<4.5	<4.7	<1.2
Chloroform			80	87	63	<1.8
Chloromethane			<7.9	<5.2	<5.4	<1.4
2-Chloroprene			<12	<8.2	<8.6	<2.2
3-Chloropropene			<7.9	<5.2	<5.4	<1.4
2-Chlorotoluene			<10	<6.7	<7	<1.8
alpha-Chlorotoluene			<7.9	<5.2	<5.4	<1.4
Cumene			<9.1	<6	<6.2	<1.6
Cyclohexane			<4.5	<3	<3.1	<0.8
o-Cymene			<9.1	<6	<6.2	<1.6
Dibromochloromethane			<14	<9	<9.3	<2.4
1,2-Dibromoethane (EDB)			<14	<9	<9.3	<2.4
1,2-Dichlorobenzene			<15	<9.7	<10	<2.6
1,3-Dichlorobenzene			<15	<9.7	<10	<2.6
1,4-Dichlorobenzene			<15	<9.7	<10	<2.6
1,1-Dichloroethane			<7.9	<5.2	<5.4	<1.4
1,2-Dichloroethane			<11	<7.5	<7.8	<2
1,1-Dichloroethene			<6.8	<4.5	<4.7	<1.2
cis-1,2-Dichloroethene			<9.1	<6	<6.2	<1.6
trans-1,2-Dichloroethene			<6.8	<4.5	<4.7	<1.2
1,2-Dichloropropane			<20	<13	<14	<3.6
cis-1,3-Dichloropropene			<6.8	<4.5	<4.7	<1.2
trans-1,3-Dichloropropene			<7.9	<5.2	<5.4	<1.4
Diisopropyl Ether			<7.9	<5.2	<5.4	<1.4
1,4-Dioxane			<6.8	<4.5	<4.7	<1.2

ANALYTICAL RESULTS

Matrix: Canister

Method: TO-15.02 Volatile Organics (w/v)

Sample units are expressed in µg/m³

Test Started: 03-Dec-19

Analyte Name	Sampled Date	PQL	Leeder ID	2019026183	2019026184	2019026185	2019026187
			Client ID	SV_BH105 SC1121	SV_BH104 SC1028	SV_Replicate SC1049	Method
				27-Nov-19	27-Nov-19	27-Nov-19	
							Blank
Ethyl Acetate				<9.1	<6	<6.2	<1.6
Ethyl Benzene				57	250	180	<1.2
Ethyl tert-Butyl Ether				<5.7	<3.7	<3.9	<1
4-Ethyltoluene				<6.8	<4.5	<4.7	<1.2
Freon 11				<3.4	<2.2	<2.3	<0.6
Freon 113				<11	<7.5	<7.8	<2
Freon 114				<3.4	<2.2	<2.3	<0.6
Freon 12				<4.5	<3	<3.1	<0.8
Heptane				<7.9	<5.2	<5.4	<1.4
Hexachlorobutadiene				<23	<15	<16	<4
Hexane				<6.8	<4.5	<4.7	<1.2
2-Hexanone				<6.8	<4.5	<4.7	<1.2
m,p-Xylene				88	450	330	<2.6
Methyl Methacrylate				<7.9	<5.2	<5.4	<1.4
Methyl tert-butyl ether				<6.8	<4.5	<4.7	<1.2
4-Methyl-2-pentanone				<6.8	<4.5	<4.7	<1.2
Naphthalene				<24	<16	<16	<4.2
2-Propanol				<110	790	<78	<20
Propene				<11	<7.5	<7.8	<2
Propylbenzene				<7.9	<5.2	<5.4	<1.4
Styrene				<6.8	<4.5	<4.7	<1.2
1,1,1,2-Tetrachloroethane				<11	<7.5	<7.8	<2
1,1,2,2-Tetrachloroethane				<7.9	<5.2	<5.4	<1.4
Tetrachloroethene				37	<8.2	13	<2.2
Tetrahydrofuran				<4.5	<3	<3.1	<0.8
Toluene				100	2900	1700	<1.2
1,2,4-Trichlorobenzene				<41	<27	<28	<7.2
1,1,1-Trichloroethane				<9.1	<6	<6.2	<1.6
1,1,2-Trichloroethane				<9.1	<6	<6.2	<1.6
Trichloroethene				13	<6.7	<7	<1.8
1,2,4-Trimethylbenzene				13	39	24	<1.6
1,3,5-Trimethylbenzene				8.8	17	15	<1.2
2,2,4-Trimethylpentane				<10	<6.7	<7	<1.8
Vinyl Acetate				<7.9	<5.2	<5.4	<1.4
Vinyl Bromide				<9.1	<6	<6.2	<1.6
Vinyl Chloride				<4.5	<3	<3.1	<0.8
o-Xylene				45	280	210	<1.2

ANALYTICAL RESULTS

Matrix: Canister

Method: MA-1105.AIR.01 General Gases

Sample units are expressed in % by Vol

Test Started: 06-Dec-19

Analyte Name	Sampled Date	Leeder ID	2019026183	2019026184	2019026185
		Client ID	SV_BH105 SC1121	SV_BH104 SC1028	SV_Replicate SC1049
		PQL	27-Nov-19	27-Nov-19	27-Nov-19
Helium	0.01		nd	nd	0.03
Oxygen	0.5		3.8	15	20
Carbon Dioxide	0.01		18	9.0	4.6

QA/QC RESULTS

Matrix: Canister

Method: TO-15.02 Volatile Organics (w/v)

Quality Control Results are expressed in Percent Recovery of expected result

Test Started: 03-Dec-19

Analyte Name	Sampled Date	Leeder ID
		Client ID
		2019026188
		Method
		PQL
		Spike
Benzene		103
1,3-Butadiene		122
Chloroform		106

Matrix: Canister

Method: TO-15.02 Volatile Organics (w/v)

Quality Control Results are expressed in Percent Recovery of expected result

Test Started: 03-Dec-19

Analyte Name	Sampled Date	Leeder ID
		Client ID
		2019026188
		Method
		PQL
		Spike
Tetrachloroethene		99
Trichloroethene		106
Vinyl Chloride		112

Matrix: Canister

Method: MA-1105.AIR.01 General Gases

Quality Control Results are expressed in Percent Recovery of expected result

Test Started: 06-Dec-19

Analyte Name	Sampled Date	Leeder ID	2019026188
		Client ID	2019026189
			Method
			Method
			PQL
			Spike
			Spike Dup
Oxygen			102
			101

QUALIFIERS / NOTES FOR REPORTED RESULTS

PQL	Practical Quantitation Limit
nd	Not Detected – The analyte was not detected above the reported PQL.
is	Insufficient Sample to perform this analysis.
T	Tentative identification based on computer library search of mass spectra.
NC	Not calculated and/or Results below PQL
NV	No Vacuum, Canister received above standard atmospheric pressure
nr	Not Requested for analysis.
R	Rejected Result – results for this analysis failed QC checks.
SQ	Semi-Quantitative result – quantitation based on a generic response factor for this class of analyte.
IM	Inappropriate method of analysis for this compound
U	Unable to provide Quality Control data – high levels of compounds in sample interfered with analysis of QC results.
UF	Unable to provide Quality Control data- Surrogates failed QC checks due to sample matrix effects
L	Analyte detected at a level above the linear response of calibration curve.
E	Estimated result. NATA accreditation does not cover estimated results.
C1	These compounds co-elute.
--	Parameter Not Determined
CT	Elevated concentration. Results reported from carbon tube analysis
**	Sample shows non-petroleum hydrocarbon profile

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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

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APPENDIX ONE.

CHAIN OF CUSTODY DOCUMENT

APPENDIX C

Limitations

The document ("Report") to which this page is attached and which this page forms a part of, has been issued by Golder Associates Pty Ltd ("Golder") subject to the important limitations and other qualifications set out below.

This Report constitutes or is part of services ("Services") provided by Golder to its client ("Client") under and subject to a contract between Golder and its Client ("Contract"). The contents of this page are not intended to and do not alter Golder's obligations (including any limits on those obligations) to its Client under the Contract.

This Report is provided for use solely by Golder's Client and persons acting on the Client's behalf, such as its professional advisers. Golder is responsible only to its Client for this Report. Golder has no responsibility to any other person who relies or makes decisions based upon this Report or who makes any other use of this Report. Golder accepts no responsibility for any loss or damage suffered by any person other than its Client as a result of any reliance upon any part of this Report, decisions made based upon this Report or any other use of it.

This Report has been prepared in the context of the circumstances and purposes referred to in, or derived from, the Contract and Golder accepts no responsibility for use of the Report, in whole or in part, in any other context or circumstance or for any other purpose.

The scope of Golder's Services and the period of time they relate to are determined by the Contract and are subject to restrictions and limitations set out in the Contract. If a service or other work is not expressly referred to in this Report, do not assume that it has been provided or performed. If a matter is not addressed in this Report, do not assume that any determination has been made by Golder in regards to it.

At any location relevant to the Services conditions may exist which were not detected by Golder, in particular due to the specific scope of the investigation Golder has been engaged to undertake. Conditions can only be verified at the exact location of any tests undertaken. Variations in conditions may occur between tested locations and there may be conditions which have not been revealed by the investigation and which have not therefore been taken into account in this Report.

Golder accepts no responsibility for and makes no representation as to the accuracy or completeness of the information provided to it by or on behalf of the Client or sourced from any third party. Golder has assumed that such information is correct unless otherwise stated and no responsibility is accepted by Golder for incomplete or inaccurate data supplied by its Client or any other person for whom Golder is not responsible. Golder has not taken account of matters that may have existed when the Report was prepared but which were only later disclosed to Golder.

Having regard to the matters referred to in the previous paragraphs on this page in particular, carrying out the Services has allowed Golder to form no more than an opinion as to the actual conditions at any relevant location. That opinion is necessarily constrained by the extent of the information collected by Golder or otherwise made available to Golder. Further, the passage of time may affect the accuracy, applicability or usefulness of the opinions, assessments or other information in this Report. This Report is based upon the information and other circumstances that existed and were known to Golder when the Services were performed and this Report was prepared. Golder has not considered the effect of any possible future developments including physical changes to any relevant location or changes to any laws or regulations relevant to such location.

Where permitted by the Contract, Golder may have retained subconsultants affiliated with Golder to provide some or all of the Services. However, it is Golder which remains solely responsible for the Services and there is no legal recourse against any of Golder's affiliated companies or the employees, officers or directors of any of them.

By date, or revision, the Report supersedes any prior report or other document issued by Golder dealing with any matter that is addressed in the Report.

Any uncertainty as to the extent to which this Report can be used or relied upon in any respect should be referred to Golder for clarification