

15 July 2024

Cobbold Building Design  
25 Fingal Street, Unit 3  
Brunswick Heads, NSW

**Attn:** Sean Cobbold

**Re:** Sub-Slab Vapour Assessment; 38 Tweed Street, Brunswick Heads, NSW

## **Introduction/ Background**

ENV Services Pty Ltd (ENV) has been engaged by Cobbold Building Design (Builder) to prepare a sub-slab vapour assessment to support ongoing commercial landuse at the site located at 38 Tweed Street, Brunswick Heads, NSW (hereon referred to as the site).

It is understood that the works have been requested in response to a request by council following redevelopment works being undertaken at the site. The site currently supports two commercial businesses (retail and food and beverage). The area at the west of the site, has previously operated as an automobile servicing garage, however is now being redeveloped into a gym.

Historically, the site was previously operated as a service station with numerous underground service tanks and associated infrastructure (bowser, lines, vents etc.) located in the eastern portion of the site. In light of this historic operation, as well as the recent use as a car garage, council has requested a report be prepared that addresses potential risks associated with contamination that may be present as a result of these historic land-uses.

## **Previous Investigations**

A previous contaminated land investigation has been conducted on the site, by Australian Soil and Concrete Testing (ASCT). The investigation and associated report was prepared in July 1998 and was undertaken following the removal of the Underground Petroleum Storage System (UPSS) infrastructure, including underground storage tanks (USTs), lines, and bowzers.

Analytical results from the investigation found that concentrations of all chemicals of potential concern (COPC) were reported below all relevant site assessment criteria. Following the removal of the tanks and associated infrastructure, the tank pits were backfilled and concrete reinstated.

## Conceptual Site Model

The site is entirely covered by concrete hardstand. As such, all direct contact exposure pathways associated with dermal, dust inhalation and ingestion are considered to be incomplete (from an on-site exposure perspective). On this basis, vapour intrusion through the slab is the only plausible exposure pathway for future site users, should contamination be present in the soil or groundwater beneath the site. As such, a sub-slab vapour assessment has been conducted to most accurately assess this potential pathway.

## Contaminants of Potential Concern

For the vapour intrusion pathway, the Contaminants of potential concern (COPC) associated with the historic land-use of the site (service station and garage) are:

- Total Recoverable hydrocarbons (TRH) – specifically fractions F1 and F2.
- Monocyclic Aromatic Hydrocarbons (Benzene, Toluene, Ethylbenzene, Xylene, Naphthalene).

Other COPC typically associated with service station and garage land use, including metals (lead) and polycyclic aromatic hydrocarbons (PAH), are not volatile and were not included in the vapour assessment.

## Investigation Methodology

Two temporary vapour pins were installed through the slab of the on-site building. One was placed in the western portion of the site (proposed gym) and the other in the eastern portion of the site (adjacent to retail and hospitality areas). The location of the vapour pins was chosen with consideration of; the use of different areas and potential exposure associated with their uses, the condition of the sealed surface (i.e., staining, cracking etc.), the location of the historic UPSS infrastructure on the site and the potential exposure points over the site. The locations of the sampling pins are presented in Figure 3, Attachment 1. A duplicate sample was collected at one of the sampling locations for quality assurance purposes.

## Laboratory Analysis

Primary samples were submitted to a National Association of Testing Authority (NATA) accredited laboratory (SGS) for analysis of the COPC. The results were compared to tier 1 (generic) assessment criteria for vapour intrusion, through a sand matrix at a depth interval of 0-<1 m (sub-slab probes), at a site with commercial/industrial use. These criteria were adopted from the National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013).

## Results

### Site Observations

During the drilling through the slab, it was noted that the slab in the western portion of the site (SV01) was approximately 150 mm thick, while the slab in the eastern portion, was noted to be approximately 250 mm thick. Additionally, there was noted to be a step from the eastern portion (café and retail shop) down to the western portion of the shed. Considering these observations, it is considered likely

that the slab in the eastern portion of the site is a 'double slab' where a second slab has been poured over the original slab. Furthermore, numerous attempts were made to install SV02, with the oxygen concentration recorded during purging of the pin not dropping enough to provide confidence in its seal. As such, the probe was relocated to an area as far from all concrete joins as possible. Key parameters noted during the sampling of each temporary pin are provided in Table 1.

**Table 1: Key Sampling Parameters**

Parameter	SV01	SV02	QA (duplicate sample)
O <sub>2</sub> (%v/v)	17.1	19.1	
VOC (ppm)	20	0	
VOC Under Shroud	200	208	
Start Time	11:42 Am	2:02 Pm	
Start pressure	-24	-26	-26
Finish Time	11:47 Am	2:08 Pm	
Finish Pressure	-6	-6	-6
Pressure Difference	18	20	20
Pressure on receipt at lab	-6.73	-6.12	-5.51

### Analytical Results

Analytical results from the canisters reported all concentration of COPCs below the limit of reporting. For all COPCs except naphthalene, this LOR was below the adopted assessment criteria for commercial/industrial landuse above a sand matrix. For naphthalene, concentrations of <7,200 µg/m<sup>3</sup>, <7,200 µg/m<sup>3</sup> and <7,400 µg/m<sup>3</sup> were reported, with the adopted assessment criteria being 3,000 µg/m<sup>3</sup>. While the LOR is greater than the assessment criteria, with consideration of the magnitude of the other results (no detections), it is considered likely that actual naphthalene concentrations are low and acceptable for the proposed land-use.

Laboratory documents and a summary table of results are attached to this letter (Attachment 3).

### Quality Assurance Results

#### Reproducibility

Relative percentage differences (RPDs) have been calculated for all COPCs between the primary (SV02) and field duplicate sample (QA). For all analytes, the RPDs were either 0 or 4% (2-propanol). Overall, the RPDs provide sufficient confidence in the reproducibility of the sampling program.

### Representativeness (Probe Integrity)

An IPA shroud was used to assess the representativeness of the sampling program, through a probe integrity assessment. An IPA soaked rag was placed under a shroud surrounding the vapour pin and sampling train. A carbon tube was used to sample 1.5 L of vapour from beneath the shroud. The concentration from within the cannister and within the carbon tube are compared to determine an IPA concentration ratio. The IPA ratios were 2,166% (SV02/QA) and 8,333 % (SV01). These concentrations greatly exceed the acceptance threshold of 5%.

In addition to the IPA concentration ratio, the oxygen concentration during purging can be used to assess the integrity of the sampling pin. For both SV01 and SV02, the oxygen was noted to drop during purging, which provides confidence in the seal created in the installation of the temporary pin.

Additionally, the results of the sampling program reported all concentrations below the adopted LOR and far below the adopted assessment criteria for the majority of analytes (except naphthalene).

Considering the above discussion points, there is sufficient confidence in the results provided by the sampling program for interpretative purposes.

### Conclusions

All reported concentrations of COPCs in the soil vapour beneath the site fall below the relevant adopted tier 1 (NEPM) assessment criteria (with the exception of naphthalene, attributable to an elevated LOR). Furthermore, the entire site is covered by hardstand, as such, all other plausible exposure pathways to human or ecological receptors on-site are incomplete.

**As such, the site is considered suitable for ongoing commercial land use (from a chemical perspective), as there is considered to be a negligible risk of exposure to potential volatile contaminants from the former site uses (including fuel storage).**

However, should the nature of the site change (i.e., removal of concrete hardstand occur, or use be changed to residential), further investigation of soils and/or groundwater may be required.

### Limitations

This report has been prepared by ENV for the purpose of a sub-slab soil vapour assessment and is not to be used for any other purpose than this. No parties may rely on the contents of this report for any purposes except those stated above.

This report has been prepared based on the information provided to us and from other information obtained as a result of enquiries made by us. ENV accepts no responsibility for any loss or damage suffered howsoever arising to any person or corporation who may use or rely on this document for a purpose other than that described above.

No part of this report may be reproduced, stored or transmitted in any form without the prior consent of ENV.

ENV declares that it does not have, nor expects to have, a beneficial interest in the subject project.



To avoid this advice being used inappropriately, it is recommended that you consult with ENV before conveying the information to another party who may not fully understand the objectives of the report. This report is meant only for the subject site/project and should not be applied to any other.

## Closure

If you have any queries regarding the provided information, please feel free to contact me at the office.

Yours faithfully

**Declan Campey**

Environmental Scientist

ENV Services Pty Ltd

## Attachments:

1. Figures
2. Photolog
3. Laboratory Documents

## 1 FIGURES

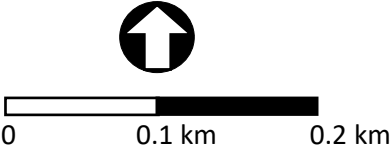
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**LEGEND**

 Site Location



**Figure 1 – Site Location**  
38 Tweed Street, Brunswick Heads, NSW

**Project:** Sub-slab Soil Vapour Assessment  
**Client:** Cobbold Building Design  
**ENV Project Number:** 240402

Image source: Google Maps (2023)





**LEGEND**



Site Boundary (Approximate)



Historic Garage and Proposed Gym (Approximate)



Current Retail (Approximate)



Current Cafe (Approximate)



Historic Location of Bowser (Approximate)



Historic Tank 3 (Approximate)



Historic Tank 2 (Approximate)



Historic tank 1 (Approximate)



**Figure 2 – Site Layout**  
38 Tweed Street, Brunswick Heads, NSW

**Project:** Sub-slab Soil Vapour Assessment  
**Client:** Cobbold Building Design  
**ENV Project Number:** 240402





**LEGEND**



Site Boundary (Approximate)



Monitoring Well Locations (Approximate)



**Figure 3 – Temporary Soil Vapour Pin Locations**  
38 Tweed Street, Brunswick Heads, NSW

**Project:** Sub-slab Soil Vapour Assessment  
**Client:** Cobbold Building Design  
**ENV Project Number:** 240402

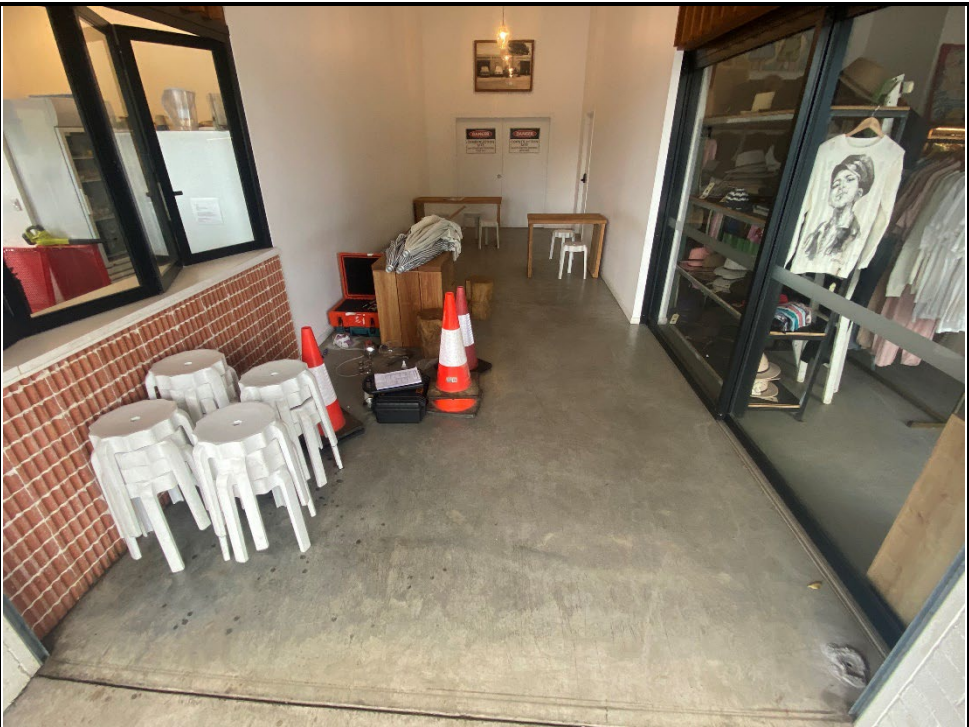
Image source: Google Maps (2023)


## 2 PHOTOLOG

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<b>Client Name</b> Sean Cobbold	<b>Site Location</b> 38 Tweed Street, Brunswick Heads, NSW	<b>Project</b> Sub-slab Vapour Assessment
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<b>Photo No.</b> 1	<b>Date</b> 27/06/2024	
<b>Description</b> Image showing sampling location of SV02, with respect to café and retail areas.		

<b>Photo No.</b> 2	<b>Date</b> 27/06/2024	
<b>Description</b> Image looking west from the entrance door to the proposed gym.  Entirety of area is visibly covered by concrete hardstand.		



<b>Client Name</b> Sean Cobbold	<b>Site Location</b> 38 Tweed Street, Brunswick Heads, NSW	<b>Project</b> Sub-slab Vapour Assessment
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<b>Photo No.</b> 3	<b>Date</b> 27/06/2024	
<b>Description</b> <p>Image area cut out for installation of services in proposed gym location.</p> <p>Thickness of the slab is evident (approximately 150 mm), as well as the coarse sand nature of the sub-soils.</p>		


<b>Photo No.</b> 4	<b>Date</b> 27/06/2024	
<b>Description</b> <p>Image showing the front façade of the site. Image shows the entire front being covered by hardstand.</p> <p>It should be noted, that the western portion of the site is entirely covered by the shed structure, that supports a hardstand.</p> <p>Thus, there are no areas of accessible soils present across the entire site.</p>		



## PHOTOGRAPHIC LOG

<b>Client Name</b> Sean Cobbold	<b>Site Location</b> 38 Tweed Street, Brunswick Heads, NSW	<b>Project</b> Sub-slab Vapour Assessment
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<b>Photo No.</b>	<b>Date</b>	
5	27/06/2024	
<b>Description</b> Image showing the sampling train that was utilised as sample location SV01		

<b>Photo No.</b>	<b>Date</b>	
6	27/06/2024	
<b>Description</b>		
Image showing sampling train set for collection of primary sample SV02 and duplicate sample QA.		

### 3 TABULATED RESULTS AND LAB DOCUMENTS

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	BTEX					TRH			Pressure		PAH	Solvents		TPH
	Benzene µg/m3	Toluene µg/m3	Ethylbenzene µg/m3	Xylene (m & p) µg/m3	Xylene (o) µg/m3	C6-C10 Fraction mg/m3	F1 (C6-C10 minus BTEX) mg/m3	F2 (>C10-C16 minus Naphthalene) µg/m3	Pressure - As received No unit	Vacuum before Analysis No unit	Naphthalene µg/m3	2-Propanol mg/m³	2-Propanol µg/m3	C10-C12 Fraction µg/m3
EQL	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NEPM 2013 Table 1A(5) Comm/Ind D Soil Vapour HSL for Vapour Intrusion, Sand >=0m, <1m >=1m, <2m >=2m, <4m >=4m, <8m >=8m	4,000	4,800,000	1,300,000				680	500,000   2,400,000			3,000			
	10,000	16,000,000	4,600,000				2,800	2,400,000			15,000			
	30,000	39,000,000	11,000,000				7,000				35,000			
	65,000	84,000,000	25,000,000				15,000				75,000			
	130,000		53,000,000				32,000				150,000			

Field ID	Location Code	Date													
CT		27 Jun 2024											24		
QA		27 Jun 2024	<1,700	<2,100	<2,100	<4,500	<2,100	<69	<69	<69,000	11.9	5.51	<7,200	520,000	<69,000
SV01		27 Jun 2024	<1,800	<2,200	<2,200	<4,800	<2,200	<73	<73	<73,000	11.3	6.73	<7,700	2,000,000	<73,000
SV02		27 Jun 2024	<1,800	<2,100	<2,100	<4,600	<2,100	<70	<70	<70,000	11.6	6.12	<7,400	500,000	<70,000

Statistics														
Maximum Concentration	<1,800	<2,200	<2,200	<4,800	<2,200	<73	<73	<73,000	11.9	6.73	<7,700	24	2,000,000	<73,000
Average Concentration *	883	1,067	1,067	2,317	1,067	35	35	35,333	12	6.1	3,717		1,006,667	35,333
Median Concentration *	900	1,050	1,050	2,300	1,050	35	35	35,000	11.6	6.12	3,700	24	520,000	35,000
Standard Deviation *	29	29	29	76	29	1	1	1,041	0.3	0.61	126		860,310	1,041
95% UCL (Student's-t) *	932	1,115	1,115	2,445	1,115	37.09	37.09	37,088	12.11	7.148	3,929		2,457,024	37,088

\* A Non Detect Multiplier of 0.5 has been applied.

Table 2: RPD Table

				BTEX					TRH			Pressure		PAH	Solvents	TPH	
				Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	C6-C10 Fraction	F1 (C6-C10 minus BTEX)	F2 (>C10-C16 minus Naphthalene)	Pressure - As received	Vacuum before Analysis	Naphthalene	2-Propanol	C10-C12 Fraction	
EQL				µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	mg/m3	mg/m3	µg/m3	No unit	No unit	µg/m3	µg/m3	µg/m3	
				0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lab Report Number	Field ID	Date	Matrix Type														
ME353793	SV02	27 Jun 2024	SoilGas	<1,800	<2,100	<2,100	<4,600	<2,100	<70	<70	<70,000	11.6	6.12	<7,400	500,000	<70,000	
ME353793	QA	27 Jun 2024	SoilGas	<1,700	<2,100	<2,100	<4,500	<2,100	<69	<69	<69,000	11.9	5.51	<7,200	520,000	<69,000	
RPD				0	0	0	0	0	0	0	0	3	10	0	4	0	

\*RPDs have only been considered where a concentration is greater than 1 times the EQL.

\*\*Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range are: 81 (1 - 10 x EQL); 50 (10 - 30 x EQL); 30 ( > 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





SGS Notting Hill Bottle Map for Air Samples																	
Temperature	Ambient	Ice Brick	Ice	Ice Pack	Esky	Bag	Box	Orange Case									
Name + Date		Sample Type															
M-A1615 - 04/02/24																	
Sample ID	Tray #	Canister	Tube	Other	Gas Bag	Isocyanate Tube	1.4 Canister (TO15)	6L Canister (TO15)	Thermal Radiello Tube (TO17_RAD)	ATD Tube (TO17)	Radiello Tube (MA5_RAD)	Waterloo Sampler (MA5_WL_LU)	Carbon Tube (MA5_ST)	XAD Tube (MA5_ST)	Silica Gel Tube (MA5_ST)	Puffs (TO13)	Number of labels to be printed per sample ID
1	SC3668	VOC	X				/										/
2	SC4227	VOC	X				/										/
3	SC3417	VOC	X				/										/
4	653825968	Svoc	X										/				/
5																	
6																	
7																	
8																	
9																	
10																	

Comments:



## SAMPLE RECEIPT ADVICE

ME353793

### CLIENT DETAILS

Contact Declan Campey  
Client ENV Services Pty Ltd  
Address PO BOX 248  
BALLINA NSW 2478

Telephone 61 3 00861325  
Facsimile (Not specified)  
Email Declan.Campey@envsolutions.com.au

Project **240402**  
Order Number **240402**  
Samples 4

### LABORATORY DETAILS

Manager Adam Atkinson  
Laboratory SGS Melbourne EH&S  
Address 10/585 Blackburn Road  
Notting Hill Victoria 3168

Telephone +61395743200  
Facsimile +61395743399  
Email Au.SampleReceipt.Melbourne@sgs.com

Samples Received Wed 3/7/2024  
Report Due Wed 10/7/2024  
SGS Reference **ME353793**

### SUBMISSION DETAILS

This is to confirm that 4 samples were received on Wednesday 3/7/2024. Results are expected to be ready by COB Wednesday 10/7/2024. Please quote SGS reference ME353793 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	3 Canister, 1 Carbon Tube	Type of documentation received	COC
Date documentation received	3/7/2024	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	Ambient
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	N/A	Samples clearly labelled	Yes
Complete documentation received	Yes	Number of eskies/boxes received	1 orange Case

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

### COMMENTS

This document is issued by the Company under its General Conditions of Service accessible at [www.sgs.com/en/Terms-and-Conditions.aspx](http://www.sgs.com/en/Terms-and-Conditions.aspx). Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.



## SAMPLE RECEIPT ADVICE

ME353793

### CLIENT DETAILS

Client **ENV Services Pty Ltd**

Project **240402**

### SUMMARY OF ANALYSIS

No.	Sample ID	Isopropanol in Sorbent Tubes	Receipt Pressure/Vacuum of Canisters	TO-15 in Air	TO-15 TPH
001	SV01	-	2	7	4
002	SV02	-	2	7	4
003	QA	-	2	7	4
004	CT	1	-	-	-

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.

The numbers shown in the table indicate the number of results requested in each package.

Please indicate as soon as possible should your request differ from these details .

Testing as per this table shall commence immediately unless the client intervenes with a correction .



## CLIENT DETAILS

Contact Declan Campey  
 Client ENV Services Pty Ltd  
 Address PO BOX 248  
 BALLINA NSW 2478

Telephone 61 3 00861325  
 Facsimile (Not specified)  
 Email Declan.Campey@envsolutions.com.au

Project **240402**  
 Order Number **240402**  
 Samples 4

## LABORATORY DETAILS

Manager Adam Atkinson  
 Laboratory SGS Melbourne EH&S  
 Address 10/585 Blackburn Road  
 Notting Hill Victoria 3168

Telephone +61395743200  
 Facsimile +61395743399  
 Email Au.SampleReceipt.Melbourne@sgs.com

SGS Reference **ME353793 R0**  
 Date Received 3/7/2024  
 Date Reported 8/7/2024

## COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562 (14420/22793/24472).

Sampling performed by client

Client confirmed via email on 3/7/24 that the correct canister IDs for SV02 & QA are SC363717 & SC4227. The canisters listed on the COC, SC1079 & SC1075, were not correct

## SIGNATORIES



**Susan WAN**  
 Senior Chemist



**Vanessa PALAMARA**  
 Senior Chemist



## ANALYTICAL RESULTS

ME353793 R0

Receipt Pressure/Vacuum of Canisters [TO-15]    Tested: 4/7/2024

			SV01	SV02	QA
			CANISTER	CANISTER	CANISTER
			-	-	-
			27/6/24 11:47	27/6/24 14:08	27/6/24 14:08
			ME353793.001	ME353793.002	ME353793.003
PARAMETER	UOM	LOR			
Receipt Pressure (PSIA)*	No unit	-	<b>11.3</b>	<b>11.6</b>	<b>11.9</b>
Receipt Vacuum (inch Hg below std atmospheric)	No unit	-	<b>6.73</b>	<b>6.12</b>	<b>5.51</b>



## ANALYTICAL RESULTS

ME353793 R0

TO-15 in Air [TO15] Tested: 4/7/2024

			SV01	SV02	QA
			CANISTER	CANISTER	CANISTER
			-	-	-
			27/6/24 11:47	27/6/24 14:08	27/6/24 14:08
			ME353793.001	ME353793.002	ME353793.003
PARAMETER	UOM	LOR			
Benzene	µg/m³	-	<1800	<1800	<1700
Toluene	µg/m³	-	<2200	<2100	<2100
Ethyl Benzene	µg/m³	-	<2200	<2100	<2100
m,p-Xylene	µg/m³	-	<4800	<4600	<4500
o-Xylene	µg/m³	-	<2200	<2100	<2100
Naphthalene	µg/m³	-	<7700	<7400	<7200
Isopropanol	µg/m³	-	2000000	500000	520000



ANALYTICAL RESULTS

ME353793 R0

TO-15 TPH [TO15\_TPH]    Tested: 4/7/2024

			SV01	SV02	QA
			CANISTER	CANISTER	CANISTER
			-	-	-
			27/6/24 11:47	27/6/24 14:08	27/6/24 14:08
			ME353793.001	ME353793.002	ME353793.003
PARAMETER	UOM	LOR			
C6-C10	mg/m³	-	<73	<70	<69
C6-C10 (less BTEX)	mg/m³	-	<73	<70	<69
>C10-C12	mg/m³	-	<73	<70	<69
>C10-C12 (less naphthalene)	mg/m³	-	<73	<70	<69



ANALYTICAL RESULTS

ME353793 R0

Isopropanol in Sorbent Tubes [MA5]    Tested: 5/7/2024

			CT
			CARBON TUBE
			-
			27/6/2024
			ME353793.004
PARAMETER	UOM	LOR	
Isopropanol	mg/m³	-	<b>24</b>



## METHOD

## METHODOLOGY SUMMARY

### MA5-ST

This method is used for the analysis of additional volatile organic compounds which have been sampled from air by the use of solvent desorption tube. Extraction of analytes is achieved by desorption in carbon disulfide which is, in turn, analysed by GC/MS using direct injection.

### TO-15

"This method is intended for the analysis of Volatile Organic Compounds (VOCs) for ambient air or soil gas, sampled onto canisters and analysed by gas chromatography mass spectrometry (GCMS) coupled with the Markes sample introduction units. This method is based on the USEPA Method TO-15.

### TO-15

This method involves GC-MS analysis of the air sample collected in evacuated canisters. In the lab, a portion of sample is pre-screened if from an unknown source or is suspected to be high. Once the pre-screening is complete the sample is passed onto a sorbent trap, and is desorbed to the GC where the analytes are separated, and are then passed into the MS where fragmentation of the molecules occurs, to produce mass spectra of each analyte. The data is recorded on a Total Ion Chromatogram (TIC) from which each analyte detected can be individually identified (using the Mass Spectra) and quantitated against standards.

### TO15-TPH

This method is intended for the analysis of total petroleum hydrocarbon (TPH) fractions for ambient air or soil gas, sampled onto canisters and analysed by gas chromatography mass spectrometry (GCMS) coupled with the Markes sample introduction units. This method is based on the USEPA Method TO-15.

### TO15-TPH

This method involves GC-MS analysis of the air sample collected in evacuated canisters. In the lab, a portion of sample is pre-screened if from an unknown source or is suspected to be high. Once the pre-screening is complete the sample is passed onto a sorbent trap, and is desorbed to the GC where the analytes are separated, and are then passed into the MS where fragmentation of the molecules occurs, to produce mass spectra of each analyte. The data is recorded on a Total Ion Chromatogram (TIC) from which each analyte detected can be individually identified (using the Mass Spectra) and quantitated against standards.

### TO15-Vacuum

Canisters returned containing samples have the receipt pressure measured using Model 4600A Dynamic Diluter.

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
**	Indicative data, theoretical holding time exceeded.	NVL	Not validated.	LOR	Limit of Reporting.
***	Indicates that both * and ** apply.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.  
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the "Total" LOR will be the sum of those two LORs.

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

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.

Note that in terms of units of radioactivity:

- 1 Bq is equivalent to 27 pCi
- 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: [www.sgs.com.au/en-gb/environment-health-and-safety](http://www.sgs.com.au/en-gb/environment-health-and-safety).

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## STATEMENT OF QA/QC PERFORMANCE

ME353793 R0

### CLIENT DETAILS

Contact Declan Campey  
Client ENV Services Pty Ltd  
Address PO BOX 248  
BALLINA NSW 2478

Telephone 61 3 00861325  
Facsimile (Not specified)  
Email Declan.Campey@envsolutions.com.au

Project **240402**  
Order Number **240402**  
Samples 4

### LABORATORY DETAILS

Manager Adam Atkinson  
Laboratory SGS Melbourne EH&S  
Address 10/585 Blackburn Road  
Notting Hill Victoria 3168

Telephone +61395743200  
Facsimile +61395743399  
Email Au.SampleReceipt.Melbourne@sgs.com

SGS Reference **ME353793 R0**  
Date Received 03 Jul 2024  
Date Reported 08 Jul 2024

### COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' 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.  
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 (within the SGS Melbourne EH&S laboratory).

### SAMPLE SUMMARY

Sample counts by matrix	3 Canister, 1 Carbor	Type of documentation received	COC
Date documentation received	3/7/2024	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	Ambient
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	N/A	Samples clearly labelled	Yes
Complete documentation received	Yes	Number of eskies/boxes received	1 orange Case

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.

## Isopropanol in Sorbent Tubes

Method: MA5

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
CT	ME353793.004	LB077465	27 Jun 2024	03 Jul 2024	27 Jul 2024	05 Jul 2024	27 Jul 2024	08 Jul 2024

## TO-15 in Air

Method: TO15

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SV01	ME353793.001	LB077424	27 Jun 2024	03 Jul 2024	27 Jul 2024	04 Jul 2024	27 Jul 2024	05 Jul 2024
SV02	ME353793.002	LB077424	27 Jun 2024	03 Jul 2024	27 Jul 2024	04 Jul 2024	27 Jul 2024	05 Jul 2024
QA	ME353793.003	LB077424	27 Jun 2024	03 Jul 2024	27 Jul 2024	04 Jul 2024	27 Jul 2024	05 Jul 2024

## TO-15 TPH

Method: TO15\_TPH

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SV01	ME353793.001	LB077424	27 Jun 2024	03 Jul 2024	27 Jul 2024	04 Jul 2024	27 Jul 2024	05 Jul 2024
SV02	ME353793.002	LB077424	27 Jun 2024	03 Jul 2024	27 Jul 2024	04 Jul 2024	27 Jul 2024	05 Jul 2024
QA	ME353793.003	LB077424	27 Jun 2024	03 Jul 2024	27 Jul 2024	04 Jul 2024	27 Jul 2024	05 Jul 2024

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.

No surrogates were required for this job.





## METHOD BLANKS

ME353793 R0

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.

### Isopropanol in Sorbent Tubes

Method: MA5

Sample Number	Parameter	Units	LOR	Result
LB077465.001	Isopropanol	mg/m <sup>3</sup>	-	<1.3

### TO-15 in Air

Method: TO15

Sample Number	Parameter	Units	LOR	Result
LB077424.001	Benzene	µg/m <sup>3</sup>	-	<1.0
	Ethyl Benzene	µg/m <sup>3</sup>	-	<1.2
	m,p-Xylene	µg/m <sup>3</sup>	-	<2.6
	Naphthalene	µg/m <sup>3</sup>	-	<4.2
	Isopropanol	µg/m <sup>3</sup>	-	<20
	Toluene	µg/m <sup>3</sup>	-	<1.2
	o-Xylene	µg/m <sup>3</sup>	-	<1.2

### TO-15 TPH

Method: TO15\_TPH

Sample Number	Parameter	Units	LOR	Result
LB077424.001	C6-C10	mg/m <sup>3</sup>	-	<0.040
	C6-C10 (less BTEX)	mg/m <sup>3</sup>	-	<0.040
	>C10-C12	mg/m <sup>3</sup>	-	<0.040
	>C10-C12 (less naphthalene)	mg/m <sup>3</sup>	-	<0.040



## DUPLICATES

ME353793 R0

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.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may give a different calculated RPD.

### TO-15 in Air

Method: TO15

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
ME353793.001	LB077424.004	Isopropanol	µg/m³	-	2000000	1900000	30	5



## LABORATORY CONTROL SAMPLES

ME353793 R0

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.

### Isopropanol in Sorbent Tubes

Method: MA5

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB077465.002	Isopropanol	mg/m <sup>3</sup>	-	20	20	60 - 140	100

### TO-15 in Air

Method: TO15

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB077424.002	Benzene	µg/m <sup>3</sup>	-	28	32.4	60 - 140	86

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.

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.



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 : <https://www.sgs.com.au/~media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf>

- \* NATA accreditation does not cover the performance of this service .
- \*\* Indicative data, theoretical holding time exceeded.
- \*\*\* Indicates that both \* and \*\* apply.
- Sample not analysed for this analyte.
- 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 Majority of surrogate recoveries 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.
- ⑩ LOR was raised due to high conductivity of the sample (required dilution).
- ⑪ Majority of spike recoveries are within acceptance criteria.
- † Refer to relevant report comments for further information.

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