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Soil Vapour Assessment

12-14 Zouch Road, Denham Court NSW

Prepared for Watchtower Bible & Tract Society of Australia

25 July 2019

Version 2

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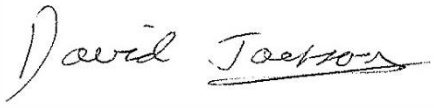
Reviewer & Approver:	**David Jackson** Principal Hydrogeologist (CEnvP SCP: SC40989)	

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Executive Summary

Reditus Consulting Pty Ltd (Reditus) was engaged by Watchtower Bible & Tract Society of Australia to complete a Soil Vapour Assessment (SVA) in the former printery area, 12-14 Zouch Road, Denham Court NSW (the site).

The site is located within a rural residential precinct within Denham Court, NSW. The site is identified as Lot 2 in DP111131 and currently comprises the Jehovah's Witness Australian head office on a large rural block.

It is understood that there has been a soil and groundwater investigation to date conducted by Airsafe OHC Pty Ltd. However, the location of the former printing press was identified as an area of environmental concern. Recommendations for a sub-slab soil vapour assessment within the former printery area located to the south of the vehicle workshop and fuel station is required to meet anticipated Council requirements for a Development Application (DA).

The primary objectives of the SVA were to:

- Establish representative soil vapour concentrations within the footprint of the former printery;
- Determine if measured soil vapour concentrations pose an unacceptable vapour intrusion risk to human health for the proposed development; and
- Establish if vapour mitigation measures are required to render the area suitable for the proposed development.

Based on a review of the PSI (Airsafe, 2019), observations made during fieldwork, results of laboratory analysis, and the proposed land use scenario (commercial/industrial), Reditus concludes the following:

- Three (3) soil vapour monitoring points (SV1, SV2 and SV3) were installed and sampled during July 2019;
- All soil vapour samples collected from SV1, SV2 and SV3 reported concentrations of benzene, toluene, ethyl benzene, xylenes and naphthalene (BTEXN), total recoverable hydrocarbons (TRH F1/F2 and volatile organic compounds (VOCs) either below the laboratory limit of reporting (LOR) or below the adopted NEPC (2013) NEPM HSL-D and interim HIL-D assessment criteria and the adopted screening criteria; and
- The results indicate that the historical printing operations have not impacted the vapour phase within the former printery building of the subject site.

Based on the above key findings, Reditus consider that potential contaminants associated with the former printing press operations do not pose an unacceptable vapour intrusion risk for the proposed development. Therefore, vapour mitigation measures (such as a vapour membrane) are not required to render the site suitable from a vapour intrusion perspective.

Based on the above, and the conclusions made in the Airsafe (2019) PSI, Reditus considers that **there is no unacceptable vapour risk to the proposed development** (as a film studio consistent with commercial/industrial land use).

1. Introduction

Reditus Consulting Pty Ltd (Reditus) was engaged by Watchtower Bible & Tract Society of Australia to complete a Soil Vapour Assessment (SVA) of the former printery area of 12-14 Zouch Road, Denham Court NSW (the site). The site location is provided in **Figure 1, Appendix A.**

1.1. Background

The site is located within a rural residential precinct within Denham Court, NSW. The site is identified as Lot 2 in DP111131 and currently comprises the Jehovah's Witness Australian head office on a large rural block.

It is understood that there has been a soil and groundwater investigation to date conducted by Airsafe OHC Pty Ltd. However, the former printing press location was identified as an area of environmental concern. Recommendations for a sub-slab soil vapour assessment within the former printery area to the south of the vehicle workshop and fuel station is required to meet anticipated Council requirements for a Development Application (DA).

This report documents the results of the soil vapour assessment conducted within the printing press footprint (12-14 Zouch Road, Denham Court NSW).

1.2. Objectives

The primary objectives of the SVA were to:

- Establish representative soil vapour concentrations within the footprint of the former printery;
- Determine if measured soil vapour concentrations pose an unacceptable vapour intrusion risk to human health for the proposed development; and
- Establish if vapour mitigation measures are required to render the area suitable for the proposed development.

The SVA was focused on assessing whether there was potential for soil vapour contamination issues associated with the former operation of a printery. A detailed soil and groundwater site assessment was beyond the scope of this investigation and as indicated in the PSI prepared by Airsafe (2019), apart from potential soil vapour migration issues from the former printing press (and the groundwater sampling required downgradient – reported separately), no other areas of potential environmental concern were noted. The results of groundwater monitoring event conducted around the underground storage tanks at the east of the site have been provided in a separate report.

1.3. Scope of Works

The following scope of works was completed by Reditus:

- Review of previous environmental assessment reports and proposed development description to identify representative soil vapour assessment locations;
- Installation of three (3) soil vapour monitoring points to depths of 0.5m below the concrete slab surface (i.e ground level (bgl));
- Completion of field quality assurance procedures including sampling train shut-out test and helium shroud test;
- Purging of sampling trains prior to sampling;
- Sampling of each soil vapour monitoring point using laboratory a supplied 1L evacuated canisters and submitted to NATA accredited laboratory Envirolab for the following analytes:
  - Volatile Organic Compounds (VOCs);
  - Total Recoverable Hydrocarbons (TRH); and
  - Bulk gases (helium and oxygen).
- Collection of an intra-laboratory duplicate sample for Quality Analysis/ Quality Control purposes, submitted to primary laboratory for the above vapour analytical suite;
- Comparison of soil vapour results against the relevant NEPC (2013) NEPM vapour intrusion guidelines:
  - HSL-D: Soil vapour health screening levels for vapour intrusion, commercial/industrial land-use for a SAND profile.
  - Interim Soil Vapour HIL-D: Interim soil vapour health investigation levels for volatile organic chlorinated compounds for commercial/industrial land-use.
- Completion of a soil vapour assessment report in general accordance with the NSW OEH (2011) *Guidelines for Consultants Reporting on Contaminated Sites*, detailing the findings of the works completed and determine if measured soil vapour concentrations pose an unacceptable vapour intrusion risk to human health for the proposed development and if vapour mitigation is required to render the former printery area suitable for the proposed development.

2. Site Identification

The location of the site and site layout is shown in **Figure 1, Appendix A.** A summary of the site identification details are provided in Table 2-1 below.

Table 2-1: Site Summary Details

Site Characteristics	Details
Street Address	12-14 Zouch Road, Denham Court NSW 2565
Lot & Deposited Plan	Lot 2 of DP 1111318
Local Government Area	City of Liverpool
Zoning	'RU2 – Rural Landscape' as specified in the Liverpool Local Environmental Plan 2008
Site Coordinates to the approximate centre of the site (MGA56)	Easting: 301205 Northing: 6238431
Site Area	Approximately 40.6ha
Former Printing Press Area	Approximately 30m^2

2.1. Site Description

At the time of the soil vapour assessment, the former printery had all partition walls and printing presses removed and only the drying oven remained. Minor dye staining was visible on the concrete floor, otherwise the concrete slab was in good condition. All services had been terminated at slab level, although some services still remained in the concrete service trenches. The remainder of the former printery building was used to store pallets of building materials intended for shipment overseas. The former printery building was of brick construction and was approximately two or more storeys in height.

3. Site Setting and Surrounding Environment

3.1. Topography and Hydrology

Review of Airsafe (2019) indicates that the site is located on a medium slope facing northwest in the area occupied by the vehicle workshop and refuelling area. The southeast corner of the property is located on at an approximate elevation of 98 metre Australian Height Datum (m AHD) with a low point and dam at the centre of the property (part of Cabramatta Creek) on the 66 m AHD.

3.2. Regional Geology and Soils

Review of Airsafe (2019) indicates the following:

Soil Landscapes:

Soils Landscapes Data Source: NSW Office of Environment and Heritage. Creative Commons 3.0 © Commonwealth of Australia: http://creativecommons.org/licenses/by/3.0/au/deed.en.

Luddenham Soil Landscape Group (ERlu)

- The majority of the property is located within the Luddenham Soil Landscape consists of undulating low hills on Wianamatta Group shales. Soils in this type of geology are typically shallow to moderately deep topsoils existing as a friable dark brown loam. These overlie medium reddish brown silty to heavy clay (Hazelton & Bannerman 1990: 64). Soils are generally deep and have a high clay content.
- The dominant shallow soils of this landscape consist of a dark brown sandy loam, which occurs as topsoil, and a brown apedal sandy clay loam that occurs below. This is generally underlain by a brown sandy clay with up to 20% ironstone nodules and a high chroma clay with up to 90% stones (Bannerman & Hazelton 1990: 82). Very little natural vegetation survives on this soil landscape, with most areas having been cleared and used for small farms. Topsoils have a low erodibility due to their flat grade and low organic content (Bannerman & Hazelton 1990: 82, 84).

Blacktown Soil Landscape Group (REbt)

- The south west corner of the property lies with the Blacktown Soil Landscape.
- Landscape: gently undulating rises on Wianamatta Group shales and Hawkesbury shale. Local relief to 30m, slopes are within <5%. Broad rounded crests and ridges with gently inclined slopes. Cleared eucalypt woodland and tall open-forest.
- Soil: shallow to moderately deep (<100cm) red & brown podsolic soils on crests, upper slopes and well-drained areas, deep yellow podsolic soils on soloths (possibly saline) on lower slopes in areas of poor drainage.

Sydney – Soil Landscape Series – Sheet 9130 (4th Edition) – DECCW NSW (Soil Landscapes of the Sydney 1:100 000 sheet, Chapman, G.A and Murphy, C.L (1989). Soil Conservation Service of NSW, Sydney).

Geology:

Geological Data Source: NSW Department of Industry, Resources & Energy
The site is located within the Bringelly Shale (Rwb) of the Wianamatta Group, geological : Shale, carbonaceous claystone, claystone, laminate, fine to medium-grained lithic sandstone, rare coal and tuff. The Bringelly Shale of Triassic age, and sit conformably above the Hawkesbury Sandstone.

3.3. Regional Hydrogeology

The PSI (Airsafe, 2019) states that based on the regional topography, groundwater is anticipated to flow in a north westerly direction towards Cabramatta Creek (which intersects the middle of the site).

3.4. Acid Sulfate Soils

The PSI (Airsafe, 2019) states that the site is not within an acid sulfate soils (ASS) area and that potential ASS shall not be an issue affecting the site. Refer to the PSI for further details.

4. Conceptual Site Vapour Model

Based on the information presented in the PSI (Airsafe, 2019) the following preliminary conceptual site model (CSM) has been prepared. The CSM identifies complete and potential pathways between the former printing press and the on-site receptor(s) within the former printery building only.

4.1. Potential Contamination Sources

Potential sources of contamination (specifically related the proposed development area) and the associated contaminants of potential concern (CoPC) are listed in Table 4-1 below.

Table 4-1: Potential Contaminant Sources

Source	Associated Chemicals	COPC
Vapour: A small area within the former printery building was formerly used as a printing press for the printing of monthly newsletters/magazines. Historical printing inks and chemicals included Perchloroethylene a volatile compound that can impact soil, soil vapour and groundwater.	Trichloroethylene and daughter products, , cis,1-2 dichloroethylene and vinyl chloride.	VOCs, TRH, BTEXN

4.2. Potentially Affected Media

Potentially affected media at the site include:

- Soil vapour

4.3. Potential Receptors and Pathways

4.3.1. Proposed Land Use Scenario and Potential Receptors

The proposed development of the site is considered commercial/industrial land use, which includes the following:

- A film studio for commercial purposes within the former printery building.

Based on the above, the potential on site receptors include the following:

- Demolition/Construction/Maintenance Workers; and
- Future occupants.

4.3.2. Human Health – Direction Contact Pathway

It is not considered appropriate to assess whether a direct contact source may be present on the site for future occupants and maintenance workers as any leaks associated with the former printing press are located under a thick (>0.4m) concrete slab and the main exposure pathway for volatile contaminants is vapour inhalation.

4.3.3. Human Health – Inhalation / Vapour Intrusion Pathway

It is considered appropriate to assess whether a vapour source may be present on the site for future occupants and maintenance workers.

4.3.4. Ecological – Terrestrial Ecosystems

The NEPC (2013) NEPM requires a pragmatic risk-based approach should be taken in applying ecological investigation and screening levels in residential and commercial / industrial land use settings.

The EIL and ESL guidelines are considered by Reditus to only be applicable to proposed garden bed areas or deep soil areas for the proposed development. It is noted that the proposed development will include maintaining the existing structure and concrete slab. It is considered that this limits the environmental values that require consideration (i.e. support of plant growth).

4.3.5. Beneficial Drinking Water Use of Groundwater Resource and Potential Ecological Groundwater and Recreational Receptors

Assessment of groundwater was not considered warranted based on the limited identified potential sources of contaminants. Should results of the soil vapour assessment indicate the potential for gross groundwater contamination, further assessment of groundwater may be warranted.

4.4. Potential Exposure Pathway Assessment

The potential contaminants in soil sourced from the former printing press operation were identified as the main source for potential vapour intrusion.

Given the proposed building design, the most significant and likely exposure pathway is the inhalation of vapours through volatilisation and atmospheric dispersion from soil source into the ground floor of the proposed development within the former printery building.

Based on the proposed redevelopment of the former printery building, the on-site human receptors with the highest potential to be exposed to identified CoPC are considered to be:

- Commercial workers – film studio and Jehovah's Witness workers; and
- Site visitors.

5. Data Quality Objectives

The Data Quality Objective (DQO) process is a systematic planning tool based on the scientific method for establishing criteria for data quality and for developing data collection designs. The DQO defines the experimental process required to test a hypothesis. The DQO process has been developed to ensure that efforts relating to data collection are cost effective, by eliminating unnecessary, duplicative or overly precise data whilst at the same time, ensuring the data collected is of sufficient quality and quantity to support defensible decision making.

It is recognised that the most efficient way to accomplish these goals is to establish criteria for defensible decision making before data collection begins and develop a data collection design based on these criteria. By using the DQO process to plan the investigation effort, the relevant parties can improve the effectiveness, efficiency and defensibility of a decision in a resource and cost-effective manner.

The DQO process consists of seven steps, which are designed to clarify the study objectives, define the appropriate type of data and specify tolerable levels of potential decision errors. The seven-step DQO process adopted for this SVA can be summarised as:

- Step 1: State the Problem – concisely describe the problem to be studied. Review prior studies and existing information to gain a sufficient understanding to define the problem;
- Step 2: Identify the Decision – identify what questions the study will attempt to resolve, and what actions may result;
- Step 3: Identify the Inputs to the Decision – identify the information that needs to be obtained and the measurements that need to be taken to resolve the decision statement;
- Step 4: Define the Study Boundaries – specify the time periods and spatial area to which decisions will apply. Determine when and where data should be collected;
- Step 5: Develop a Decision Rule – define the statistical parameter of interest, specify the action level, and integrate the previous DQO outputs into a single statement that describes the logical basis for choosing among alternative actions;
- Step 6: Specify Tolerable Limits on Decision Errors – define the decision maker's tolerable decision error rates based on a consideration of the consequences of making an incorrect decision; and
- Step 7: Optimise the Design –evaluate information from the previous steps and generate alternative data collection designs. Choose the most resource-effective design that meets all DQOs.

The DQOs are provided in Table 5-1 below and were derived in accordance with Australian Standard 4482.1-2005 'Guide to the investigation and sampling of sites with potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds' (AS 4482.1-1997).

Table 5-1: Data Quality Objectives

Step	Discussion
1. State the Problem	Previous assessment completed by Airsafe (2019) identified potential contaminant sources around the footprint of the former printing press which may cause unacceptable human health exposure concentrations of vapour within soil. In summary, the problem can be defined as: "Do the potential chlorinated solvent sources within soil within the footprint of the former printing press pose an unacceptable vapour intrusion risk for the proposed development and is vapour mitigation required to render the site suitable for the proposed development?"
2: Identify the decision/goal of the study	The key decisions forming this assessment were as follows. If soil vapour contaminant concentrations are reported below the relevant NEPC (2013) NEPM HSL/HIL-D (generic or adjusted), it will be considered that: ▪ there is not an unacceptable vapour intrusion risk to human health for the proposed development. If soil vapour contaminant concentrations are reported exceeding the relevant NEPC (2013) NEPM HSL/HIL-D (generic or adjusted), it will be considered that: ▪ Further site-specific human health risk assessment or further soil vapour assessment is required; or, ▪ That there is an unacceptable vapour intrusion risk to human health for the proposed development and that further remediation will be required to render the site suitable for the proposed development.
Step 3: Identify the information inputs	Key data required to resolve the project problem included concentrations of CoPCs in soil vapour collected on site. The CoPC selected in Section 5.1 were based on previous reported investigations. The guidelines adopted by Reditus for soil vapour are as follows: ▪ NEPC (2013) NEPM, Interim Soil Vapour HILs for Volatile organic chlorinated compounds; and ▪ NEPC (2013) NEPM, Health Screening Level, Commercial/Industrial D, Sand, 0-1m. Further explanation for the selection of these criteria is provided below in Section 7 below.
Step 4: Define the boundaries of the study	The soil vapour points were installed to target the footprint of the former printing press. The vertical extent of the study boundary was limited to a maximum depth 0.5m bgl.

	Boundaries of the study and sample locations are found within Figure 1, **Appendix A.** The temporal boundaries of the study were limited to the date that the investigations were completed.
Step 5: Develop a Decision Rule	If the concentrations of CoPC within the soil vapour analysed are reported below adopted adjusted Health Screening Levels for commercial/industrial land use, a vapour membrane barrier (or similar remedial options) will not be required. If, however the concentration of one or more CoPCs are greater than the guidelines, then either further investigation will be required to laterally and vertically delineate the extent of the impact and/or advancing with proposed installation of vapour membrane barrier as a mitigation method will be recommended.
Step 6: Specify Tolerable Limits on Decision Errors	The acceptable limits for samples are as follows: ▪ % RPD for laboratory duplicates for VOC and TRH is less than 60%; and ▪ Recovery of matrix spikes and surrogate spikes is as per the laboratory's Quality Assurance targets accepted under their National Association of Testing Authorities (NATA) accreditation. Precision is measured using the standard deviation 'SD' or Relative Percent Difference '%RPD'. Replicate data for field duplicates of organics is expected to be as follows: ▪ RPD criteria of 50% or less, for concentrations > or = 10 times practical quantitation limits (PQL); ▪ RPD criteria of 75% or less, for concentrations between 5 and 10 times the EQL; and ▪ RPD criteria of 100% or less, for concentrations < 5 times PQL. Where acceptable limits for field duplicates were not met, a discussion on low biased error will be provided. For this investigation, a decision error of 5% will be considered acceptable This error rate is in accordance with Appendix B of Schedule B(2) of the ASC NEPM. In order to achieve this level of confidence, the investigation has been designed as described below.
Step 7: Optimise the Design	Soil vapour assessment will be conducted in areas where a potential vapour intrusion risk may exist. All media sampled will be conducted in accordance with Reditus standard operating procedures (SOPs) and relevant industry guidelines

6. Tier 1 Assessment Criteria

Tier 1 assessment involves the comparison of monitoring data to published guideline criteria (typically presented as screening levels). Relevant criteria are selected based on the identified viable exposure routes and the available data. Where site data exceeds the screening levels or suitable screening levels cannot be identified, further consideration (Tier 2 assessment) is required.

The tier 1 assessment criteria were adopted from:

- National Environment Protection Council (NEPC) 1999, 'Schedule B(1) Guideline on Investigation Levels for Soil and Groundwater, National Environment Protection (Assessment of Site Contamination) Measure (NEPM), as amended in 2013'.

Health Screening Levels (HSLs) have been adopted to evaluate the risk posed from vapour intrusion. The soil vapour HSLs are based on depth of impacts, overlying soil type and land use.

In accordance with the NEPC (2013) NEPM, the relevant HSLs are applicable to ground floor land use. If the vapour exposure is acceptable at ground level, it can be assumed that it is also acceptable for floors above ground level (if applicable). For multistorey buildings where non-residential uses (e.g. car parking or commercial use) exist in a basement or at ground level, then land use category D (commercial/industrial) should be applied. Therefore, based on the propose development design of a slab on grade development, land-use category D (commercial/industrial) was adopted.

After a review of subsurface conditions, the predominant soil type is likely to be clayey sand. Therefore, the SAND profile type HSLs have been adopted as a conservative approach.

Interim Soil Vapour Health Investigation Levels for volatile organic chlorinated compounds for residential land use have been adopted as soil vapour assessment criteria for the site.

Soil vapour analytical results are tabulated in **Table 1, Appendix B** and guideline criteria are presented in Table 6.1 below.

Table 6-1: Soil Vapour Assessment Criteria (ug/m^3)

Analyte	EQL (µg/m^3)	NEPC (2013) NEPM HSL-D, 0m to <1m, SAND (µg/m^3)	NEPC (2013) NEPM Interim Soil Vapour HIL-D (µg/m^3)	US EPA (May 2019) Regional Screening Levels Commercial/Industrial (µg/m^3) *
Benzene	1.6	4,000	-	
Ethylbenzene	2.2	1,300,000	-	
Xylene	4.3	840,000	-	
Toluene	1.9	4,800,000	-	
Naphthalene	2.6	3,000	-	
F1	0.2	680,000	-	
F2	40	500,000	-	
Trichloroethylene	2.7	-	80	
1,1,1-TCA	2.7	-	230,000	
Tetrachloroethene	3.4	-	8,000	
Cis-1,2-dichloroethene	2	-	300	
Vinyl Chloride	1.3	-	100	
MIBK	20	-	-	13,000
Methyl Ethyl Ketone	15	-	-	22,000
Carbon Disulphide	16	-	-	3,100
Isopropyl Alcohol	12	-	-	880
Ethanol	9	-	-	-
Acetone	11.9	-	-	140,000

* USEPA Regional Screening Levels – Composite Worker, Air – adopted in the absence of Published Australian Guidance

7. Methodology

The methods used for the collection of data for this SVA are presented in the following sections.

7.1. Sample Location Rationale

The soil vapour sampling location rationale was based on review of the previous environmental assessments and with consideration of the proposed development design. The sample location rational is provided in Table 7-1 below.

Table 7-1: Sample Location Rationale

Location ID	Rationale of Location	Known CoPC
SV1	Beneath paper feed and preparation area immediately east of the former press enclosure	Petroleum Hydrocarbons VOCs
SV2	Beneath former presses within the former press enclosure.	
SV3	Beneath former presses within the former press enclosure.	

7.2. Schedule of Work

Fieldworks including site inspection, soil vapour point installation and soil vapour sampling were conducted by Reditus Principal Environmental Scientist, Dean Stafford on 17 July 2019.

7.3. Soil Vapour Monitoring Point Installation and Construction

The soil vapour points were installed using an impact/hammer drill with a 16mm diameter SDS max drill rod to penetrate the slab and install the vapour well to a depth of 0.5m below ground surface.

A stainless-steel sub-slab vapour pin was sealed into the surface concrete slab, ensuring the connection was airtight. Special caution was taken to ensure that water or signs of water were not encountered during the installation.

The stainless-steel vapour pin cap was left flush with the surface and sealed from the atmosphere.

7.3.1. Soil Vapour Sampling Methodology

Prior to sampling, the evacuated canister and flow regulator serial numbers were recorded.

A laboratory cleaned and calibrated flow regulator was connected to the top of the laboratory supplied evacuated canister. Each sub-slab vapour evacuated canister's regulator and initial negative vacuum pressure were calibrated by the laboratory (Envirolab) as per the DECCW (2010) Vapour Intrusion: Technical Practice Note. A vacuum of approximately -30Hg was applied to each summa canister.

The regulator was laboratory calibrated to allow an air flow of approximately 40mL/min into the Summa canister.

The flow controller was connected to the tubing of the soil gas sampling point via a sampling train.

The flow valve was opened for a period of approximately 20 minutes for primary samples.

The evacuated canister vacuum was recorded prior to and following the sampling period.

All canisters were allowed to run until a pressure of -7 to -8mm Hg" was obtained.

Sampling field sheets are found in **Appendix C**.

7.3.2. Shut-out Test

Immediately before completing soil vapour sampling, a shut-out test was performed to ensure the sampling train had no leaks. The shut-out test was assessed by creating a vacuum within the vapour train and monitoring vacuum changes over a five-minute period. The vapour sampling train was considered suitable if there was no reported change in vacuum over the period of vacuum applied. The shutout tests completed by Reditus shows a vacuum of -12 KPa was held for five minutes, indicating that the sampling train had no leaks prior to sampling. Please refer to **Appendix C** for field purging sheets and shut out test results.

7.3.3. Shroud Test

A helium shroud test was performed to determine the presence of short circuiting (connection) between the ground surface and the soil vapour sampling zone. A shroud was placed over the soil vapour well annulus and continuously filled with helium to ensure displacement of the ambient atmosphere within the shroud.

During the shroud test, the sub-slab vapour sampling point was purged with helium measurements recorded during purging of the soil vapour monitoring points. The helium shroud was also left in place over the sampling monitoring point during sample collection.

All soil vapour monitoring points were purged using a syringe.

Purging of the vapour line included removing at least one volume or approximately 300mL, during the purging procedure a vacuum gauge was used to determine any vacuum within the well. There was no vacuum observed.

The concentration of helium within the shroud test for each soil vapour monitoring point was approximately 80%v/v with minimal fluctuation of concentrations throughout the test.

7.3.4. Sample Collection

During sampling, vacuum within the sampling train was monitored with a magna helix pressure gauge to ensure that no scavenging occurred. No excessive vacuum was observed within the sampling train, indicating that there was no restriction of soil

vapour through the soil matrix. At the completion of the sampling period, the evacuated canister valve was closed, disconnected from the flow regulator, and a brass cap was placed over the inlet to prevent dust contamination.

A chain of custody was completed for all samples which were submitted to the laboratory for analysis of volatile organic compounds (VOCs) using TO-15, TRH and bulk gases (oxygen and helium).

A duplicate sample was collected (DUP 1) from primary sampling location SV2. The intra-laboratory duplicate sample was collected simultaneously in parallel with the primary sample.

Soil vapour sampling field sheets are found in **Appendix C**.

8. Quality Assurance and Quality Control (QA/QC)

8.1. Field Quality Assurance

8.1.1. Details of Sampling Team

Soil vapour sampling was conducted by Principal Environmental Scientist Dean Stafford, who is suitably qualified and experienced in the collection of environmental samples.

8.1.2. Decontamination Procedures Carried out Between Sampling Events

The only item reused between soil vapour installations was the 2-inch drill bit. The drill bit was sprayed with a mix of 'Decon 90' and water, then rinsed using potable water after every installation event to ensure no cross contamination.

8.1.3. Chain of Custody Details

Soil vapour samples were transported to the laboratory under a chain of custody (CoC). Information on the CoC included the sampler, sample identifier, sample matrix, collection date, analyses to be performed, sample preservation method, sample release date and sample received date. COCs are provided in **Appendix D** along with the laboratory reports.

8.1.4. Sampling Splitting Techniques

Soil vapour duplicates (DUP1) were collected simultaneously to the primary sample. Both evacuated canisters were attached to a dual manifold with regulated inflow of 40mL/min each.

8.1.5. Statement of Duplicate Frequency

All primary and intra-laboratory duplicates were sent to NATA Accredited laboratory Envirolab.

For this project the following soil vapour QA/QC was collected:

- Soil vapour intra-laboratory duplicate (Cannister:2529, Regulator:1557) were collected from parent sample SV1(Cannister:2531, Regulator:1985).

8.1.6. Soil Vapour QA/QC

Shutout Test

The shut-out test was assessed by creating a vacuum within the vapour train and monitoring vacuum changes for approximately 5 minutes. The vapour sampling train was considered suitable if there was no reported change in vacuum over the period

vacuum applied. The shutout tests completed by Reditus demonstrated a vacuum of at least -12 mm Hg was held for 5 minutes, therefore indicating that the sampling train had no leaks prior to sampling.

Shutout test information is detailed in the field sheets found in **Appendix C.**

Shroud Test

Prior to sampling, a helium shroud test was also performed to determine the presence of short circuiting (connection) between the ground surface and the soil slab vapour monitoring point. A shroud was placed over the vapour well annulus and continuously filled with helium to ensure displacement of the ambient atmosphere within the shroud. Purging of the vapour line included removing one volume and until stabilisation of the bulk air quality measurements had occurred. No helium was detected in the sampling train during the shroud test.

All work was conducted in accordance with industry-accepted standards and quality assured procedures. Field quality control included rigorous sample collection, sampling apparatus inspection and sample documentation. Results of the helium shroud tests are presented in Table 8-1.

Table 8-1: Helium Shroud Concentrations

Soil Vapour ID	He Concentration at start of Test	He Concentration at End of Test	Average Helium Concentration	Helium Detected within Cannister
SV1	80%	80%	80%	0.4%
SV2	80%	80%	80%	0.02%
SV3	80%	80%	80%	0.08%

As only minor helium (i.e less than 10% of the shroud concentration - *New Jersey Department of Environmental Protection Site Remediation Program (2013) Vapor Intrusion Technical Guidance*) was detected within the evacuated canisters during laboratory analyses, Reditus are confident that analytical results are representative of sub surface soil vapour conditions.

Helium concentration during field works are detailed on the field sheets found in **Appendix D.**

Sample Integrity

All evacuated Canisters were calibrated by Envirolab prior to use. At the completion of sampling each canister recorded a negative pressure of between -6 and -8 Hg" using the laboratory supplied canister gauge. Prior to laboratory analysis each sampling canister recorded a negative pressure between of -6 to -8 Hg" using a

laboratory certified gauge. The evacuated canister pressure results are presented in Table 8-2 below.

Table 8-2: Suma Canister Pressure Readings

Soil Vapour ID	Vacuum Prior to Sampling (From Laboratory Supplied Pressure Gauge) (Inches Hg)	Vacuum after field sampling (From Laboratory Supplied Pressure Gauge) (Inches Hg)	Vacuum prior to analysis (Laboratory tested) (Inches Hg)
SV1	-29	-8	-8
SV2	-29	-8	-8
SV3	-30	-6	-6
DUP	-29	-7	-7

The negative pressures recorded by Reditus and the laboratory are completed to ensure no loss of vacuum has occurred between the completion of sampling and laboratory analysis. A constant pressure indicates that there has been no loss of vacuum and the therefore it is unlikely that additional ambient air has entered the canister between sampling and analysis. If there had been a major change in pressure or if no negative pressure remaining in the canister after sampling when received by the laboratory there is the potential ambient air has entered the sample.

The vacuum recordings between each stage of the sampling, indicated that the samples were suitably sealed and transported to the laboratory. Pressure readings at the laboratory are reported in absolute pressure, all submitted samples reported pressures less then atmospheric pressure of the laboratory, indicating that a vacuum was present in all samples when received by the laboratory.

All material supplied by the laboratory were certified as clean and calibrated where relevant. All laboratory verification reports are provided in **Appendix D.**

8.2. Laboratory QA/QC

8.2.1. Sample Technical Holding Times

All holding times were reported as being within specified ranges.

8.2.2. Laboratory Accreditation and Analytical Methods Used

The primary laboratory used for groundwater samples was Envirolab Services Pty Ltd (Envirolab).

Envirolab is accredited by NATA to ISO 17025, accreditation number 2901.

Laboratory QA/QC is provided on the laboratory reports in **Appendix D**.

8.2.3. Laboratory Control Samples

Laboratory control samples were in acceptable ranges.

Detailed laboratory QA/QC are found in the laboratory report in **Appendix D**.

8.3. Evaluation of the QA/QC Information Compared to the DQOs

- Documentation completeness:
  - Chain-of-custody forms, calibration was complete and appropriate.
- Data completeness:
  - All samples were received by the laboratories and analytical results reported including laboratory QA/QC.
- Data comparability:
  - Reditus standard operating procedures, Australian Standards and industry best practice were followed during sampling;
  - Consistent field conditions and similarly trained staff were used during sampling;
  - The limits of reporting are appropriate and generally consistent from each laboratory.
- Data representativeness:
  - Reditus is confident that cross contamination has not occurred, and primary samples are representative of actual soil conditions.
  - The frequency of laboratory blanks was acceptable, and the results were within specified ranges.
- Precision:
  - Intra-laboratory and inter-laboratory duplicates were collected at the following rates:
    - Soil vapour Intra-laboratory duplicates frequency were collected at least 1:20.
  - QA/QC sample collection rate follows the guidance provided in the Australian Standard Field procedures (AS1482.1 1997);

8.3.1. Relative Percent Difference

Refer to **Table 2, Appendix B** for Relative Percent Differences (RPDs) calculations. Reditus notes that RPDs were only calculated for groups of compounds with detections above the laboratory detection limits.

RPDs for soil vapour were reported within acceptable ranges.

9. Results

9.1. Bulk Gas Results

Evacuated canisters were submitted to the NATA accredited laboratory Envirolab for analyses of bulk gases (helium and oxygen). A summary of bulk gas results are provided in Table 9-1 below.

Table 9-1: Bulk Gas Analytical Results

Soil Vapour ID	Helium (%)	Oxygen (%)	Carbon Dioxide (%)	Carbon Monoxide (%)
SV1	0.40	15	1.0	<0.01
SV2	0.02	15	0.96	<0.01
SV3	0.08	16	0.32	<0.01
DUP1	0.02	15	0.99	<0.01

9.2. Soil Vapour Analytical Results

Soil vapor analytical results have been summarised in Table 1, **Appendix B.**

All soil vapour samples reported concentrations of BTEX, TRH F1/F2 and VOCs either below the laboratory limit of reporting (LOR) or below the adopted HSL-D and HIL-D assessment criteria and adopted screening criteria.

As all chlorinated solvents were reported below laboratory detection limits, it appears the printing press chemicals formerly used at the site were alcohol based and are suitable for the adopted land use.

10. Conclusions

Based on a review of the PSI (Airsafe, 2019), observations made during fieldwork, results of laboratory analysis, and the proposed land use scenario (commercial/industrial), Reditus concludes the following:

- Three (3) soil vapour monitoring points (SV1, SV2 and SV3) were installed and sampled within the former printery area of the site located at 12-14 Zouch Road, Denham Court NSW during July 2019;
- All soil vapour samples collected from SV1, SV2 and SV3 reported concentrations of BTEXN, TRH F1/F2 and VOCs either below the laboratory limit of reporting (LOR) or below the adopted NEPC (2013) NEPM HSL-D and HIL-D assessment criteria and the adopted screening criteria; and
- The results indicate that the historical printing operations have not impacted vapour phase within the former printery building of the subject site.

Based on the above key findings, Reditus consider that potential contaminants associated with the former printing press operations do not pose an unacceptable vapour intrusion risk for the proposed development. Therefore, vapour mitigation measures (such as a vapour membrane) are not required to render the site suitable from a vapour intrusion perspective.

Based on the above, and the conclusions made in the Airsafe (2019) PSI, Reditus considers that **there is no unacceptable vapour risk to the proposed development** (as a film studio consistent with commercial/industrial land use).

10.1. Extent of Uncertainties in the Results

The sampling methodologies used by Reditus during this investigation have been designed to limit uncertainty in the results. Reditus is confident that the results of this investigation give an accurate representation of the current status of the site but note that in all subsurface investigations the potential remains for variability between sampling points and for conditions to be different on site from the conditions reported herein.

11. Limitations

This report has been prepared in accordance with the scope of services described in the Section 1.3. The report has been prepared for the sole use of the client and has been prepared in accordance with a scope of work agreed by the client.

The report or document does not purport to provide legal advice and any conclusions or recommendations made should not be relied upon as a substitute for such advice.

The report does not constitute a recommendation by Reditus for the client or any other party to engage in any commercial or financial transaction and any decision by the client or other party to engage in such activities is strictly a matter for the client.

The report relies upon data, surveys, measurements and results taken at or under the site at particular times and conditions specified herein. Any findings, conclusions or recommendations only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by the client. Furthermore, the report has been prepared solely for use by the client and Reditus accepts no responsibility for its use by other parties. The client agrees that Reditus' report or associated correspondence will not be used or reproduced in full or in part for promotional purposes and cannot be used or relied upon by any other individual, party, group or company in any prospectus or offering. Any individual, party, group or company seeking to rely this report cannot do so and should seek their own independent advice.

No warranties, express or implied, are made. Subject to the scope of work undertaken, Reditus assessment is limited strictly to identifying typical environmental conditions associated with the subject property based on the scope of work and testing undertaken and does not include and evaluation of the structural conditions of any buildings on the subject property or any other issues that relate to the operation of the site and operational compliance of the site with state or federal laws, guidelines, standards or other industry recommendations or best practice. Scope of work undertaken for assessments are agreed in advance with the client and may not necessarily comply with state or federal laws or industry guidelines for the type of assessment conducted.

Additionally, unless otherwise stated Reditus did not conduct soil, air or wastewater analyses including asbestos or perform contaminated sampling of any kind. Nor did Reditus investigate any waste material from the property that may have been disposed off the site, or undertake and assessment or review of related site waste management practices.

The results of this assessment are based upon (if undertaken as part of the scope work) a site inspection conducted by Reditus personnel and/or information from interviews with people who have knowledge of site conditions and/or information provided by regulatory agencies. All conclusions and recommendations regarding the property are the professional opinions of the Reditus personnel involved with the project, subject to the qualifications made above.

While normal assessments of data reliability have been made, Reditus assumes no responsibility or liability for errors in any data obtained from regulatory agencies,

statements from sources outside of Reditus, or developments resulting from situations outside the scope of this project/assessment.

Reditus is not engaged in environmental auditing and/or reporting of any kind for the purpose of advertising sales promoting, or endorsement of any client's interests, including raising investment capital, recommending investment decisions, or other publicity purposes. Reditus assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements from sources outside of Reditus, or developments resulting from situations outside the scope of this project.

In relation the conduct of Asbestos inspections or the preparation of hazardous materials reports Reditus has conducted inspections and the identification of hazardous material within the constraints presented by the property. Whist efforts are made to access areas not normally accessed during normal use of the site to identify the presence of asbestos or other hazardous material, unless explicitly tested no guarantee can be provided that such material is or is not present.

Reditus' professional opinions are based upon its professional judgment, experience, and training. These opinions are also based upon data derived from the limited testing and analysis described in this report or reports reviewed. It is possible that additional testing and analysis might produce different results and/or different opinions or other opinions. Reditus has limited its investigation(s) to the scope agreed upon with its client. Reditus believes that its opinions are reasonably supported by the testing and analysis that has been undertaken (if any), and that those opinions have been developed according to the professional standard of care for the environmental consulting profession in this area at this time. Other opinions and interpretations may be possible. That standard of care may change and new methods and practices of exploration, testing and analysis may develop in the future, which might produce different results.

Appendix A - Figures

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FIGURE 1

Site Location
12-14 Zouch Road, Denham Court NSW
Soil Vapour Assessment

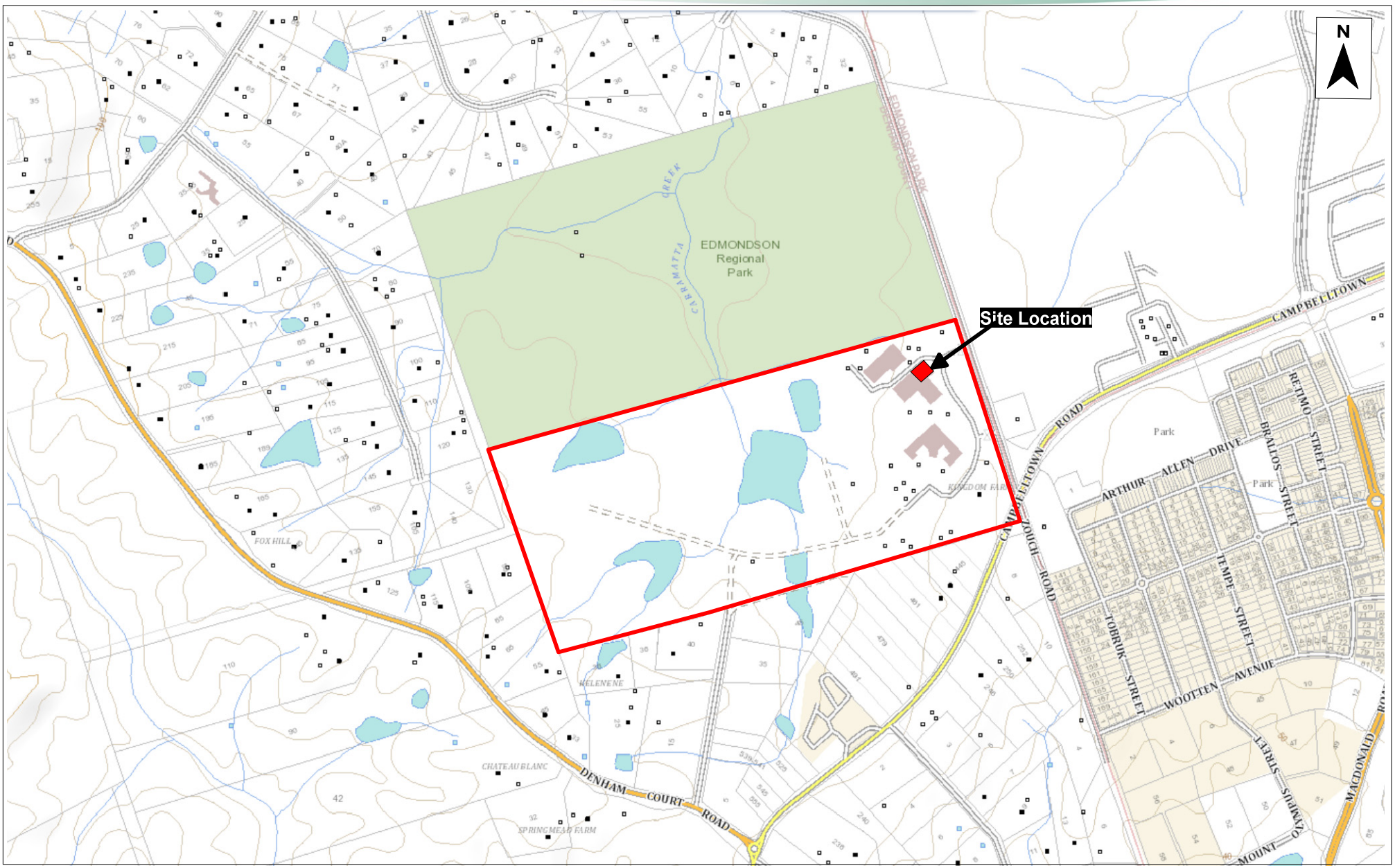

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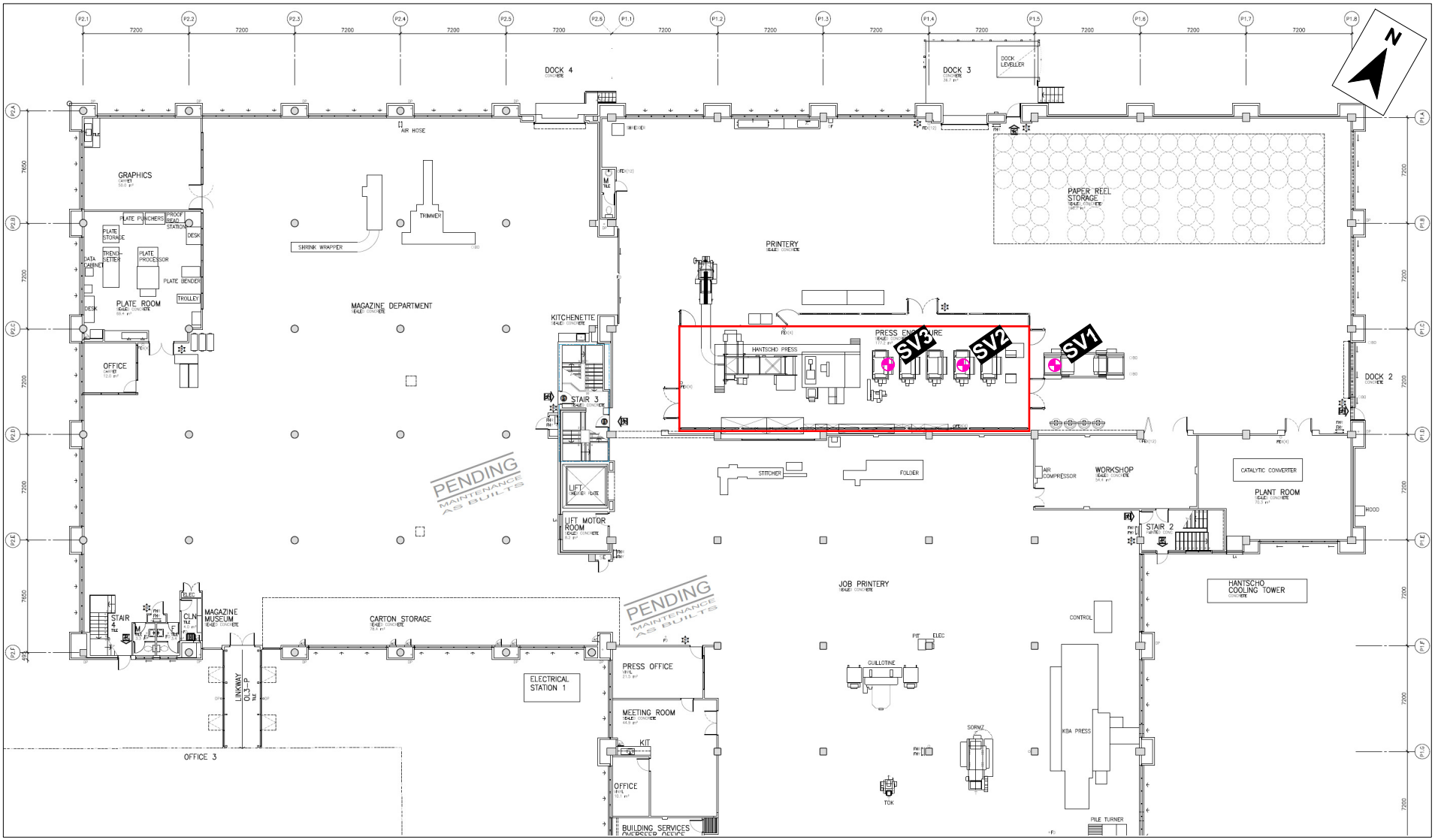
FIGURE 2

Sample Locations
12-14 Zouch Road, Denham Court NSW
Soil Vapour Assessment

Soil Vapour Point

Former Printing Press Area



Appendix B – Summary Result Tables

Appendix B
Table 1 - Summary Soil Vapour Results

		Propylene	Dichlorodifluoromethane	Chloromethane	1,2-Dichlorotetrafluoroethane	Vinyl chloride	1,3-Butadiene	Bromomethane	Chloroethane	Ethanol	Acrolein	Trichlorofluoromethane(Freon 11)	Acetone	Isopropyl Alcohol	1,1-Dichloroethene	1,1,2-Trichlorotrifluoroethane	Methylene chloride(Dichloromethane)	Carbon Disulfide	trans-1,2-dichloroethene	MTBE	1,1- Dichloroethane	Vinyl Acetate	MEK	Hexane	cis-1,2-Dichloroethene	Ethyl Acetate
		µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3
EQL		0.9	2.5	1.0	2.5	1.3	1.1	1.9	1.3	9	1.1	2.8	11.9	12	2.0	3.8	17	1.6	2.0	1.8	2.0	1.8	1.5	1.8	2.0	1.8
NEPM 2013 Table 1A(2) Commercial/Industrial D Soil Vap VOCC HILs						100																			300	
NEPM 2013 Table 1A(5) Commercial/Industrial D Soil Vapour HSL for Vapour Intrusion, Sand																										
0-1m																										
USEPA Regional Screening Levels (2019) Commercial/Industrial													140,000	880				3100					22,000			
Field_ID	**Sample Date**																									
SV1	19/07/2019	<0.9	3	<1	<2.5	<1.3	<1.1	<1.9	<1.3	390	<11	<2.8	360	30	<2	<3.8	<17	80	<2	<1.8	<2	<1.8	55	3	<2	<1.8
SV2	19/07/2019	<0.9	3	<1	<2.5	<1.3	<1.1	<1.9	<1.3	460	<11	<2.8	1800	100	<2	<3.8	<17	60	<2	<1.8	<2	<1.8	68	2	<2	<1.8
SV3	19/07/2019	62	3	<1	<2.5	<1.3	<1.1	<1.9	<1.3	770	<11	<2.8	1800	130	<2	<3.8	<17	90	<2	<1.8	<2	<1.8	200	29	<2	<1.8
DUP	19/07/2019	<0.9	3	<1	<2.5	<1.3	<1.1	<1.9	<1.3	470	<11	<2.8	1800	90	<2	<3.8	<17	60	<2	<1.8	<2	<1.8	54	3	<2	<1.8

		Chloroform	Tetrahydrofuran	1,1,1-Trichloroethane	1,2-Dichloroethane	Benzene	Carbon tetrachloride	Cyclohexane	Heptane	Trichloroethene	1,2-Dichloropropane	1,4-Dioxane	Bromodichloromethane	Methyl Methacrylate	MIBK	cis-1,3-Dichloropropene	trans-1,3-Dichloropropene	Toluene	1,1,2-Trichloroethane	Methyl Butyl Ketone	Dibromochloromethane	Tetrachloroethene	1,2-Dibromoethane	Chlorobenzene	m-& p-Xylene	o-Xylene
		µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3
EQL		2.4	1.5	2.7	2.0	1.6	3.1	1.7	2.0	2.7	2.3	1.8	3.4	2.0	2.0	2.3	2.3	1.9	2.7	2.0	1.6	3.4	3.8	2.3	4.3	2.2
NEPM 2013 Table 1A(2) Commercial/Industrial D Soil Vap VOCC HILs				230,000						80												8000				
NEPM 2013 Table 1A(5) Commercial/Industrial D Soil Vapour HSL for Vapour Intrusion, Sand																										
0-1m						4000												4,800,000							840,000	
USEPA Regional Screening Levels (2019) Commercial/Industrial															13,000											
Field_ID	**Sample Date**																									
SV1	19/07/2019	3	<1.5	<2.7	<2	2	<3.1	<1.7	<2	<2.7	<2.3	<1.8	<3.4	<2	<20	<2.3	<2.3	20	<2.7	<2	<1.6	<3.4	<3.8	<2.3	20	4
SV2	19/07/2019	<2.4	<1.5	<2.7	<2	<1.6	<3.1	<1.7	2	<2.7	<2.3	<1.8	<3.4	<2	40	<2.3	<2.3	9	<2.7	<2	<1.6	<3.4	<3.8	<2.3	70	20
SV3	19/07/2019	3	<1.5	<2.7	<2	5	<3.1	6	10	<2.7	<2.3	<1.8	<3.4	<2	2600	<2.3	<2.3	67	<2.7	10	<1.6	<3.4	<3.8	<2.3	430	120
DUP	19/07/2019	<2.4	<1.5	<2.7	<2	<1.6	<3.1	<1.7	3	<2.7	<2.3	<1.8	<3.4	<2	40	<2.3	<2.3	9	<2.7	<2	<1.6	<3.4	<3.8	<2.3	70	20

		Ethylbenzene	Styrene	Bromoform	1,1,2,2-Tetrachloroethane	4-ethyl toluene	1,3,5-Trimethylbenzene	1,2,4-Trimethylbenzene	1,3-Dichlorobenzene	Benzyl chloride	1,4-Dichlorobenzene	1,2-Dichlorobenzene	1,2,4-Trichlorobenzene	Naphthalene	Hexachloro-1,3-butadiene	TPH C5 - C8 Aliphatic	TPH C9 - C12 Aliphatic	TPH C9 - C10 Aromatic	TPH C6 - C10 - BTEX (F1)	TPH >C10 - C12 - Naphthalene (F2)	Methane (CH4)	Carbon Dioxide (CO2)	Carbon Monoxide (CO)	Oxygen (O2)	Helium (He)	Hydrogen (H2)
		µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	%	%	%	%	%	%
EQL		2.2	2.1	5.2	3.4	2.5	2.5	2.5	3.0	2.6	3.0	3.0	3.7	2.6	5.3	200	50	100	200	40	0.01	0.01	0.01	0.01	0.01	0.01
NEPM 2013 Table 1A(2) Commercial/Industrial D Soil Vap VOCC HILs																										
NEPM 2013 Table 1A(5) Commercial/Industrial D Soil Vapour HSL for Vapour Intrusion, Sand																										
0-1m		1,300,000																	680,000	500,000						
USEPA Regional Screening Levels (2019) Commercial/Industrial																										
Field_ID	**Sample Date**																									
SV1	19/07/2019	4	<2.1	<5.2	<3.4	<2.5	<2.5	4	<3	<2.6	<3	<3	<3.7	<2.6	<5.3	<200	<50	<100	<200	<40	<0.01	1	<0.01	15	0.4	<0.01
SV2	19/07/2019	10	<2.1	<5.2	<3.4	<2.5	<2.5	4	<3	<2.6	<3	<3	<3.7	<2.6	<5.3	1000	<50	<100	<200	<40	<0.01	0.96	<0.01	15	0.02	<0.01
SV3	19/07/2019	98	<2.1	<5.2	<3.4	8	10	27	<3	<2.6	<3	<3	<3.7	3	<5.3	3500	<50	220	2700	100	<0.01	0.32	<0.01	16	0.08	<0.01
DUP	19/07/2019	10	<2.1	<5.2	<3.4	<2.5	<2.5	4	<3	<2.6	<3	<3	<3.7	<2.6	<5.3	990	<50	<100	<200	<40	<0.01	0.99	<0.01	15	0.02	<0.01

Appendix B
Table 2 - RPD Results

		Propylene	Dichlorodifluoromethane	Chloromethane	1,2-Dichlorotetrafluoroethane	Vinyl chloride	1,3-Butadiene	Bromomethane	Chloroethane	Ethanol	Acrolein	Trichlorofluoromethane(Freon 11)	Acetone	Isopropyl Alcohol	1,1-Dichloroethene	1,1,2-Trichlorotrifluoroethane	Methylene chloride(Dichloromethane)	Carbon Disulfide	trans-1,2-dichloroethene	MTBE	1,1- Dichloroethane	Vinyl Acetate	MEK	Hexane	cis-1,2-Dichloroethene	Ethyl Acetate
		µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3
EQL		0.9	2.5	1.0	2.5	1.3	1.1	1.9	1.3	9	1.1	2.8	11.9	12	2.0	3.8	17	1.6	2.0	1.8	2.0	1.8	1.5	1.8	2.0	1.8
Field_ID	**Sample Date**																									
SV1	25/02/2019	<0.9	3	<1	<2.5	<1.3	<1.1	<1.9	<1.3	460	<11	<2.8	1800	100	<2	<3.8	<17	60	<2	<1.8	<2	<1.8	68	2	<2	<1.8
DUP	25/02/2019	<0.9	3	<1	<2.5	<1.3	<1.1	<1.9	<1.3	470	<11	<2.8	1800	90	<2	<3.8	<17	60	<2	<1.8	<2	<1.8	54	3	<2	<1.8
%RPD		0	0	0	0	0	0	0	0	2.1	0	0	0	11.1	0	0	0	0	0	0	0	0	25.9	0	0	0

		Chloroform	Tetrahydrofuran	1,1,1-Trichloroethane	1,2-Dichloroethane	Benzene	Carbon tetrachloride	Cyclohexane	Heptane	Trichloroethene	1,2-Dichloropropane	1,4-Dioxane	Bromodichloromethane	Methyl Methacrylate	MIBK	cis-1,3-Dichloropropene	trans-1,3-Dichloropropene	Toluene	1,1,2-Trichloroethane	Methyl Butyl Ketone	Dibromochloromethane	Tetrachloroethene	1,2-Dibromoethane	Chlorobenzene	m-& p-Xylene	o-Xylene
		µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3
EQL		2.4	1.5	2.7	2.0	1.6	3.1	1.7	2.0	2.7	2.3	1.8	3.4	2.0	2.0	2.3	2.3	1.9	2.7	2.0	1.6	3.4	3.8	2.3	4.3	2.2
Field_ID	**Sample Date**																									
SV1	25/02/2019	<2.4	<1.5	<2.7	<2	<1.6	<3.1	<1.7	2	<2.7	<2.3	<1.8	<3.4	<2	40	<2.3	<2.3	9	<2.7	<2	<1.6	<3.4	<3.8	<2.3	70	20
DUP	25/02/2019	<2.4	<1.5	<2.7	<2	<1.6	<3.1	<1.7	3	<2.7	<2.3	<1.8	<3.4	<2	40	<2.3	<2.3	9	<2.7	<2	<1.6	<3.4	<3.8	<2.3	70	20
%RPD		0	0	0	0	0	0	0	33.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

		Ethylbenzene	Styrene	Bromoform	1,1,2,2-Tetrachloroethane	4-ethyl toluene	1,3,5-Trimethylbenzene	1,2,4-Trimethylbenzene	1,3-Dichlorobenzene	Benzyl chloride	1,4-Dichlorobenzene	1,2-Dichlorobenzene	1,2,4-Trichlorobenzene	Naphthalene	Hexachloro-1,3-butadiene	TPH C5 - C8 Aliphatic	TPH C9 - C12 Aliphatic	TPH C9 - C10 Aromatic	TPH C6 - C10 - BTEX (F1)	TPH >C10 - C12 - Naphthalene (F2)	Methane (CH4)	Carbon Dioxide (CO2)	Carbon Monoxide (CO)	Oxygen (O2)	Helium (He)	Hydrogen (H2)
		µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	%	%	%	%	(	(
EQL		2.2	2.1	5.2	3.4	2.5	2.5	2.5	3.0	2.6	3.0	3.0	3.7	2.6	5.3	200	50	100	200	40	0.01	0.01	0.01	0.01	0.01	0.01
Field_ID	**Sample Date**																									
SV1	25/02/2019	10	<2.1	<5.2	<3.4	<2.5	<2.5	4	<3	<2.6	<3	<3	<3.7	<2.6	<5.3	1000	<50	<100	<200	<40	<0.01	0.96	<0.01	15	0.02	<0.01
DUP	25/02/2019	10	<2.1	<5.2	<3.4	<2.5	<2.5	4	<3	<2.6	<3	<3	<3.7	<2.6	<5.3	990	<50	<100	<200	<40	<0.01	0.99	<0.01	15	0.02	<0.01
%RPD		0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	3.0	0	0	0	0

Appendix C – Field Sheets

Bulk Gas Sampling

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Well ID	SV1	Date	17/7/19

Shut out test	Start Vacuum	Duration Vacuum Held	After Vacuum	% Change	Acceptable	
	-12	5Min	-12	0.	Pass	Fail

He Shroud Concentration start of test	80%

Bulk Soil Gas/Purging								
Fresh air	NA							
	Purge Time	CH_4 ppm	CO_2 ppm	O_2 %	LEL %	H_2S ppm	CO ppm	He ppm
Units								
Purge	volume with syringe			300mL				
Fresh air								
Meter flow rate		Volume purged		300mL		Parameters stabilised ?		

He shroud Concentrations end of test	80%	Average Shroud Concentration	80%	Shroud test passed?	✓

DUP

		vacuum	Time		
Soil Vapour Sampling	Start Suma Canister Vacuum	-29	12:25	Suma Regulator No#	829
	Finish Suma Canister Vacuum	-8	1:00	Suma Bottle No#	2292.
	Regulator Flow Rate	40mL/min		PID ppm	
	Duration (minutes)	35			

Notes:

Sand pack Volume (radius^2 x π x height of sand pack) x 0.3(Sand Porosity)

20cm sand pack x 100mm anulus= **471mL**

He concentration in vapour line can not exceed 10% of shroud concentration: **1%= 10000PPM**

Meter flow rates

MDG2000 flow rate **1=390mL/min 2= 550mL/min, 3=730mL/Min, 4=860mL/min**

Tiger PID = **220Ml/min**

Gem 2000 land fill gas analyser= **300ml/min**

Soil Vapour and Bulk Gas Sampling

REDITUS

Well ID	SV2	Date	17/7/19

Shut out test	Start Vacuum	Duration Vacuum Held	After Vacuum	% Change	Acceptable	
	-12	5mi	-12	0	Pass	Fail

He Shroud Concentration start of test	80%

Bulk Soil Gas/Purging								
Fresh air	NA							
	Purge Time	CH_4 ppm	CO_2 ppm	O_2 %	LEL %	H_2S ppm	CO ppm	He ppm
Units								
	purge volume		300mL.					
	with	Syringe						
Fresh air								
Meter flow rate		Volume purged		300mL		Parameters stabilised ?		

He shroud Concentrations end of test	80%	Average Shroud Concentration	80%	Shroud test passed?	✓

		vacuum	Time		
Soil Vapour Sampling	Start Suma Canister Vacuum	~~-29~~ / -29	1.09	Suma Regulator No#	1985
	Finish Suma Canister Vacuum	~~-8~~ / ~~-7~~	1.29	Suma Bottle No#	2531
	Regulator Flow Rate	40mL/min		PID ppm	
	Duration (minutes)	20min			

DUP
1557
2529

Notes:

Sand pack Volume (radius^2 x π x height of sand pack) x 0.3(Sand Porosity)

20cm sand pack x 100mm anulus= **471mL**

He concentration in vapour line can not exceed 10% of shroud concentration: **1%= 10000PPM**

Meter flow rates

MDG2000 flow rate **1=390mL/min 2= 550mL/min, 3=730mL/Min, 4=860mL/min**

Tiger PID = **220Ml/min**

Gem 2000 land fill gas analyser= **300ml/min**

Soil Vapour and Bulk Gas Sampling

REDITUS

Well ID	SV3	Date	17/7/19

Shut out test	Start Vacuum	Duration Vacuum Held	After Vacuum	% Change	Acceptable	
	-12	5min	-12	0	Pass	Fail

He Shroud Concentration start of test	80%

Bulk Soil Gas/Purging								
Fresh air	NA							
	Purge Time	CH_4 ppm	CO_2 ppm	O_2 %	LEL %	H_2S ppm	CO ppm	He ppm
Units								
	Purged with syringe							
Fresh air								
Meter flow rate		Volume purged		300mL		Parameters stabilised ?		

He shroud Concentrations end of test	80%	Average Shroud Concentration	80%	Shroud test passed?	✓

		vacuum	Time		
Soil Vapour Sampling	Start Suma Canister Vacuum	-30	1.39	Suma Regulator No#	630
	Finish Suma Canister Vacuum	-0	2.01	Suma Bottle No#	2284
	Regulator Flow Rate	40mL/min		PID ppm	
	Duration (minutes)	22 min			

Notes:

Sand pack Volume (radius^2 x π x height of sand pack) x 0.3(Sand Porosity)

20cm sand pack x 100mm anulus= **471mL**

He concentration in vapour line can not exceed 10% of shroud concentration: **1%= 10000PPM**

Meter flow rates

MDG2000 flow rate **1=390mL/min 2= 550mL/min, 3=730mL/Min, 4=860mL/min**

Tiger PID = **220Ml/min**

Gem 2000 land fill gas analyser= **300ml/min**

Appendix D – Laboratory Reports

Envirolab Services Pty Ltd
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CERTIFICATE OF ANALYSIS 221838

Client Details

Client	Reditus Consulting
Attention	Dean Stafford
Address	102 Railway Cres, JANNALI, NSW, 2226

Sample Details

Your Reference	**19113 WATCHTOWER**
Number of Samples	4xAir
Date samples received	17/07/2019
Date completed instructions received	17/07/2019

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	23/07/2019
Date of Issue	22/07/2019

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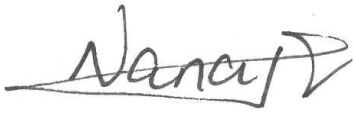
Results Approved By
Chris Guo, Senior Chemist, Air

Authorised By



Nancy Zhang, Laboratory Manager

TO15 in Canisters/Bags					
Our Reference		221838-1	221838-2	221838-3	221838-4
Your Reference	UNITS	SV1	SV2	SV3	dup1
Date Sampled		17/07/2019	17/07/2019	17/07/2019	17/07/2019
Type of sample		Air	Air	Air	Air
Air Kit Security No.		2292	2531	2284	2529
Vacuum before Shipment	Hg"	-30	-30	-30	-30
Vacuum before Analysis	Hg"	-8	-8	-6	-7
Date prepared	-	18/07/2019	18/07/2019	18/07/2019	18/07/2019
Date analysed	-	19/07/2019	19/07/2019	19/07/2019	19/07/2019
Propylene	ppbv	<0.5	<0.5	36	<0.5
Dichlorodifluoromethane	ppbv	0.7	0.7	0.6	0.6
Chloromethane	ppbv	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorotetrafluoroethane	ppbv	<0.5	<0.5	<0.5	<0.5
Vinyl chloride	ppbv	<0.5	<0.5	<0.5	<0.5
1,3-Butadiene	ppbv	<0.5	<0.5	<0.5	<0.5
Bromomethane	ppbv	<0.5	<0.5	<0.5	<0.5
Chloroethane	ppbv	<0.5	<0.5	<0.5	<0.5
Ethanol	ppbv	210	240	410	250
Acrolein	ppbv	<5	<5	<5	<5
Trichlorofluoromethane (Freon 11)	ppbv	<0.5	<0.5	<0.5	<0.5
Acetone	ppbv	150	750	760	750
Isopropyl Alcohol	ppbv	10	40	54	40
1,1-Dichloroethene	ppbv	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorotrifluoroethane	ppbv	<0.5	<0.5	<0.5	<0.5
Methylene chloride (Dichloromethane)	ppbv	<5	<5	<5	<5
Carbon Disulfide	ppbv	30	20	30	20
trans-1,2-dichloroethene	ppbv	<0.5	<0.5	<0.5	<0.5
MTBE	ppbv	<0.5	<0.5	<0.5	<0.5
1,1- Dichloroethane	ppbv	<0.5	<0.5	<0.5	<0.5
Vinyl Acetate	ppbv	<0.5	<0.5	<0.5	<0.5
MEK	ppbv	20	20	67	20
Hexane	ppbv	0.7	0.7	8.1	0.9
cis-1,2-Dichloroethene	ppbv	<0.5	<0.5	<0.5	<0.5
Ethyl Acetate	ppbv	<0.5	<0.5	<0.5	<0.5
Chloroform	ppbv	0.6	<0.5	0.5	<0.5
Tetrahydrofuran	ppbv	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	ppbv	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	ppbv	<0.5	<0.5	<0.5	<0.5
Benzene	ppbv	0.6	<0.5	2	<0.5
Carbon tetrachloride	ppbv	<0.5	<0.5	<0.5	<0.5

TO15 in Canisters/Bags					
Our Reference		221838-1	221838-2	221838-3	221838-4
Your Reference	UNITS	SV1	SV2	SV3	dup1
Date Sampled		17/07/2019	17/07/2019	17/07/2019	17/07/2019
Type of sample		Air	Air	Air	Air
Air Kit Security No.		2292	2531	2284	2529
Cyclohexane	ppbv	<0.5	<0.5	2	<0.5
Heptane	ppbv	<0.5	0.5	3	0.6
Trichloroethene	ppbv	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	ppbv	<0.5	<0.5	<0.5	<0.5
1,4-Dioxane	ppbv	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	ppbv	<0.5	<0.5	<0.5	<0.5
Methyl Methacrylate	ppbv	<0.5	<0.5	<0.5	<0.5
MIBK	ppbv	<5	10	630	10
cis-1,3-Dichloropropene	ppbv	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropene	ppbv	<0.5	<0.5	<0.5	<0.5
Toluene	ppbv	4	2	18	2
1,1,2-Trichloroethane	ppbv	<0.5	<0.5	<0.5	<0.5
Methyl Butyl Ketone	ppbv	<0.5	<0.5	3	<0.5
Dibromochloromethane	ppbv	<0.5	<0.5	<0.5	<0.5
Tetrachloroethene	ppbv	<0.5	<0.5	<0.5	<0.5
1,2-Dibromoethane	ppbv	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	ppbv	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	ppbv	0.9	3	23	3
m-& p-Xylene	ppbv	4	16	100	16
Styrene	ppbv	<0.5	<0.5	<0.5	<0.5
o-Xylene	ppbv	1	4	28	4
Bromoform	ppbv	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	ppbv	<0.5	<0.5	<0.5	<0.5
4-ethyl toluene	ppbv	<0.5	<0.5	2	<0.5
1,3,5-Trimethylbenzene	ppbv	<0.5	<0.5	3	<0.5
1,2,4-Trimethylbenzene	ppbv	0.8	0.9	5.6	0.8
1,3-Dichlorobenzene	ppbv	<0.5	<0.5	<0.5	<0.5
Benzyl chloride	ppbv	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ppbv	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	ppbv	<0.5	<0.5	<0.5	<0.5
1,2,4-Trichlorobenzene	ppbv	<0.5	<0.5	<0.5	<0.5
Naphthalene	ppbv	<0.5	<0.5	0.7	<0.5
Hexachloro- 1,3-butadiene	ppbv	<0.5	<0.5	<0.5	<0.5
Surrogate-Bromochloromethane	% rec	107	101	105	99
Surrogate -1,4-Difluorobenzene	% rec	97	97	99	98
Surrogate-Chlorobenzene-D5	% rec	95	95	97	95

TO15 in Canisters ug/m3					
Our Reference		221838-1	221838-2	221838-3	221838-4
Your Reference	UNITS	SV1	SV2	SV3	dup1
Date Sampled		17/07/2019	17/07/2019	17/07/2019	17/07/2019
Type of sample		Air	Air	Air	Air
Air Kit Security No.		2292	2531	2284	2529
Vacuum before Shipment	Hg"	-30	-30	-30	-30
Vacuum before Analysis	Hg"	-8	-8	-6	-7
Date prepared	-	18/07/2019	18/07/2019	18/07/2019	18/07/2019
Date analysed	-	19/07/2019	19/07/2019	19/07/2019	19/07/2019
Propylene	µg/m³	<0.9	<0.9	62	<0.9
Dichlorodifluoromethane	µg/m³	3	3	3	3
Chloromethane	µg/m³	<1	<1	<1	<1
1,2-Dichlorotetrafluoroethane	µg/m³	<2.5	<2.5	<2.5	<2.5
Vinyl chloride	µg/m³	<1.3	<1.3	<1.3	<1.3
1,3-Butadiene	µg/m³	<1.1	<1.1	<1.1	<1.1
Bromomethane	µg/m³	<1.9	<1.9	<1.9	<1.9
Chloroethane	µg/m³	<1.3	<1.3	<1.3	<1.3
Ethanol	µg/m³	390	460	770	470
Acrolein	µg/m³	<11	<11	<11	<11
Trichlorofluoromethane (Freon 11)	µg/m³	<2.8	<2.8	<2.8	<2.8
Acetone	µg/m³	360	1,800	1,800	1,800
Isopropyl Alcohol	µg/m³	30	100	130	90
1,1-Dichloroethene	µg/m³	<2	<2	<2	<2
1,1,2-Trichlorotrifluoroethane	µg/m³	<3.8	<3.8	<3.8	<3.8
Methylene chloride (Dichloromethane)	µg/m³	<17	<17	<17	<17
Carbon Disulfide	µg/m³	80	60	90	60
trans-1,2-dichloroethene	µg/m³	<2	<2	<2	<2
MTBE	µg/m³	<1.8	<1.8	<1.8	<1.8
1,1- Dichloroethane	µg/m³	<2	<2	<2	<2
Vinyl Acetate	µg/m³	<1.8	<1.8	<1.8	<1.8
MEK	µg/m³	55	68	200	54
Hexane	µg/m³	3	2	29	3
cis-1,2-Dichloroethene	µg/m³	<2	<2	<2	<2
Ethyl Acetate	µg/m³	<1.8	<1.8	<1.8	<1.8
Chloroform	µg/m³	3	<2.4	3	<2.4
Tetrahydrofuran	µg/m³	<1.5	<1.5	<1.5	<1.5
1,1,1-Trichloroethane	µg/m³	<2.7	<2.7	<2.7	<2.7
1,2-Dichloroethane	µg/m³	<2	<2	<2	<2
Benzene	µg/m³	2	<1.6	5	<1.6
Carbon tetrachloride	µg/m³	<3.1	<3.1	<3.1	<3.1

TO15 in Canisters ug/m3					
Our Reference		221838-1	221838-2	221838-3	221838-4
Your Reference	UNITS	SV1	SV2	SV3	dup1
Date Sampled		17/07/2019	17/07/2019	17/07/2019	17/07/2019
Type of sample		Air	Air	Air	Air
Air Kit Security No.		2292	2531	2284	2529
Cyclohexane	µg/m³	<1.7	<1.7	6	<1.7
Heptane	µg/m³	<2	2	10	3
Trichloroethene	µg/m³	<2.7	<2.7	<2.7	<2.7
1,2-Dichloropropane	µg/m³	<2.3	<2.3	<2.3	<2.3
1,4-Dioxane	µg/m³	<1.8	<1.8	<1.8	<1.8
Bromodichloromethane	µg/m³	<3.4	<3.4	<3.4	<3.4
Methyl Methacrylate	µg/m³	<2	<2	<2	<2
MIBK	µg/m³	<20	40	2,600	40
cis-1,3-Dichloropropene	µg/m³	<2.3	<2.3	<2.3	<2.3
trans-1,3-Dichloropropene	µg/m³	<2.3	<2.3	<2.3	<2.3
Toluene	µg/m³	20	9	67	9
1,1,2-Trichloroethane	µg/m³	<2.7	<2.7	<2.7	<2.7
Methyl Butyl Ketone	µg/m³	<2	<2	10	<2
Dibromochloromethane	µg/m³	<1.6	<1.6	<1.6	<1.6
Tetrachloroethene	µg/m³	<3.4	<3.4	<3.4	<3.4
1,2-Dibromoethane	µg/m³	<3.8	<3.8	<3.8	<3.8
Chlorobenzene	µg/m³	<2.3	<2.3	<2.3	<2.3
Ethylbenzene	µg/m³	4	10	98	10
m-& p-Xylene	µg/m³	20	70	430	70
Styrene	µg/m³	<2.1	<2.1	<2.1	<2.1
o-Xylene	µg/m³	4	20	120	20
Bromoform	µg/m³	<5.2	<5.2	<5.2	<5.2
1,1,2,2-Tetrachloroethane	µg/m³	<3.4	<3.4	<3.4	<3.4
4-ethyl toluene	µg/m³	<2.5	<2.5	8	<2.5
1,3,5-Trimethylbenzene	µg/m³	<2.5	<2.5	10	<2.5
1,2,4-Trimethylbenzene	µg/m³	4	4	27	4
1,3-Dichlorobenzene	µg/m³	<3	<3	<3	<3
Benzyl chloride	µg/m³	<2.6	<2.6	<2.6	<2.6
1,4-Dichlorobenzene	µg/m³	<3	<3	<3	<3
1,2-Dichlorobenzene	µg/m³	<3	<3	<3	<3
1,2,4-Trichlorobenzene	µg/m³	<3.7	<3.7	<3.7	<3.7
Naphthalene	µg/m³	<2.6	<2.6	3	<2.6
Hexachloro- 1,3-butadiene	µg/m³	<5.3	<5.3	<5.3	<5.3
Surrogate-Bromochloromethane	% rec	107	101	105	99
Surrogate -1,4-Difluorobenzene	% rec	97	97	99	98
Surrogate-Chlorobenzene-D5	% rec	95	95	97	95

TPH Air/ Air Phase Hydrocarbon					
Our Reference		221838-1	221838-2	221838-3	221838-4
Your Reference	UNITS	SV1	SV2	SV3	dup1
Date Sampled		17/07/2019	17/07/2019	17/07/2019	17/07/2019
Type of sample		Air	Air	Air	Air
Air Kit Security No.		2292	2531	2284	2529
Date prepared	-	18/07/2019	18/07/2019	18/07/2019	18/07/2019
Date analysed	-	19/07/2019	19/07/2019	19/07/2019	19/07/2019
TPH C_5 - C_8 Aliphatic	µg/m³	<200	1,000	3,500	990
TPH C_9 - C_{12} Aliphatic	µg/m³	<50	<50	<50	<50
TPH C_9 - C_{10} Aromatic	µg/m³	<100	<100	220	<100
TPH C_6 - C_{10} - BTEX (F1)	µg/m³	<200	<200	2,700	<200
TPH >C_{10} - C_{12} - Naphthalene (F2)	µg/m³	<40	<40	100	<40

Permanent Gas analysis					
Our Reference		221838-1	221838-2	221838-3	221838-4
Your Reference	UNITS	SV1	SV2	SV3	dup1
Date Sampled		17/07/2019	17/07/2019	17/07/2019	17/07/2019
Type of sample		Air	Air	Air	Air
Air Kit Security No.		2292	2531	2284	2529
Date prepared	-	18/07/2019	18/07/2019	18/07/2019	18/07/2019
Date analysed	-	18/07/2019	18/07/2019	18/07/2019	18/07/2019
Methane (CH_4)	%	<0.01	<0.01	<0.01	<0.01
Carbon Dioxide (CO_2)	%	1.0	0.96	0.32	0.99
Carbon Monoxide (CO)	%	<0.01	<0.01	<0.01	<0.01
Oxygen (O_2)	%	15	15	16	15
Helium (He)	%	0.40	0.02	0.08	0.02
Hydrogen (H_2)	%	<0.01	<0.01	<0.01	<0.01

Method ID	Methodology Summary
AT-003	Gases determined by GC-FID/TCD using methods ASTM 1945, 1946 and USEPA 3C.
AT-005	Measurement of Air-Phase Petroleum Hydrocarbons and Ozone Precursors by GC/MS
TO15	USEPA TO15 - Analysis of VOC's in air following USEPA TO15 protocols
USEPA 18	Measurement of Gaseous Organic Compound Emissions by Gas Chromatography using USEPA m18.

QUALITY CONTROL: TO15 in Canisters/Bags						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Vacuum before Shipment	Hg"			[NT]	1	-30	-30	0	[NT]	[NT]
Vacuum before Analysis	Hg"			[NT]	1	-8	-8	0	[NT]	[NT]
Date prepared	-			18/07/2019	1	18/07/2019	18/07/2019		18/07/2019	[NT]
Date analysed	-			19/07/2019	1	19/07/2019	19/07/2019		19/07/2019	[NT]
Propylene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	108	[NT]
Dichlorodifluoromethane	ppbv	0.5	TO15	<0.5	1	0.7	0.7	0	[NT]	[NT]
Chloromethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,2-Dichlorotetrafluoroethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Vinyl chloride	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,3-Butadiene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Bromomethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Chloroethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Ethanol	ppbv	5	TO15	<5	1	210	210	0	[NT]	[NT]
Acrolein	ppbv	5	TO15	<5	1	<5	<5	0	[NT]	[NT]
Trichlorofluoromethane (Freon 11)	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Acetone	ppbv	5	TO15	<5	1	150	150	0	[NT]	[NT]
Isopropyl Alcohol	ppbv	5	TO15	<5	1	10	10	0	[NT]	[NT]
1,1-Dichloroethene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,1,2-Trichlorotrifluoroethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Methylene chloride (Dichloromethane)	ppbv	5	TO15	<5	1	<5	<5	0	[NT]	[NT]
Carbon Disulfide	ppbv	5	TO15	<5	1	30	30	0	[NT]	[NT]
trans-1,2-dichloroethene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
MTBE	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,1- Dichloroethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Vinyl Acetate	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
MEK	ppbv	5	TO15	<5	1	20	20	0	[NT]	[NT]
Hexane	ppbv	0.5	TO15	<0.5	1	0.7	0.8	13	119	[NT]
cis-1,2-Dichloroethene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Ethyl Acetate	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Chloroform	ppbv	0.5	TO15	<0.5	1	0.6	0.6	0	[NT]	[NT]
Tetrahydrofuran	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,1,1-Trichloroethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,2-Dichloroethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Benzene	ppbv	0.5	TO15	<0.5	1	0.6	0.6	0	111	[NT]
Carbon tetrachloride	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Cyclohexane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	106	[NT]
Heptane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	107	[NT]

QUALITY CONTROL: TO15 in Canisters/Bags						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Trichloroethene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,2-Dichloropropane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,4-Dioxane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Bromodichloromethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Methyl Methacrylate	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
MIBK	ppbv	5	TO15	<5	1	<5	<5	0	[NT]	[NT]
cis-1,3-Dichloropropene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
trans-1,3-Dichloropropene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Toluene	ppbv	0.5	TO15	<0.5	1	4	4	0	113	[NT]
1,1,2-Trichloroethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Methyl Butyl Ketone	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Dibromochloromethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Tetrachloroethene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,2-Dibromoethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Chlorobenzene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	ppbv	0.5	TO15	<0.5	1	0.9	0.8	12	111	[NT]
m-& p-Xylene	ppbv	1	TO15	<1	1	4	4	0	116	[NT]
Styrene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	90	[NT]
o-Xylene	ppbv	0.5	TO15	<0.5	1	1	1	0	105	[NT]
Bromoform	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,1,2,2-Tetrachloroethane	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
4-ethyl toluene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	113	[NT]
1,3,5-Trimethylbenzene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	105	[NT]
1,2,4-Trimethylbenzene	ppbv	0.5	TO15	<0.5	1	0.8	0.8	0	95	[NT]
1,3-Dichlorobenzene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Benzyl chloride	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,4-Dichlorobenzene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,2-Dichlorobenzene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
1,2,4-Trichlorobenzene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Naphthalene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Hexachloro- 1,3-butadiene	ppbv	0.5	TO15	<0.5	1	<0.5	<0.5	0	[NT]	[NT]
Surrogate-Bromochloromethane	% rec		TO15	99	1	107	106	1	102	[NT]
Surrogate -1,4-Difluorobenzene	% rec		TO15	96	1	97	97	0	92	[NT]
Surrogate-Chlorobenzene-D5	% rec		TO15	93	1	95	93	2	97	[NT]

QUALITY CONTROL: TO15 in Canisters ug/m3						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Vacuum before Shipment	Hg"			[NT]	1	-30	-30	0	[NT]	[NT]
Vacuum before Analysis	Hg"			[NT]	1	-8	-8	0	[NT]	[NT]
Date prepared	-			18/07/2019	1	18/07/2019	18/07/2019		[NT]	[NT]
Date analysed	-			19/07/2019	1	19/07/2019	19/07/2019		[NT]	[NT]
Propylene	µg/m³	0.9	TO15	<0.9	1	<0.9	<0.9	0	[NT]	[NT]
Dichlorodifluoromethane	µg/m³	2.5	TO15	<2.5	1	3	4	29	[NT]	[NT]
Chloromethane	µg/m³	1.0	TO15	<1.0	1	<1	<1	0	[NT]	[NT]
1,2-Dichlorotetrafluoroethane	µg/m³	2.5	TO15	<2.5	1	<2.5	<2.5	0	[NT]	[NT]
Vinyl chloride	µg/m³	1.3	TO15	<1.3	1	<1.3	<1.3	0	[NT]	[NT]
1,3-Butadiene	µg/m³	1.1	TO15	<1.1	1	<1.1	<1.1	0	[NT]	[NT]
Bromomethane	µg/m³	1.9	TO15	<1.9	1	<1.9	<1.9	0	[NT]	[NT]
Chloroethane	µg/m³	1.3	TO15	<1.3	1	<1.3	<1.3	0	[NT]	[NT]
Ethanol	µg/m³	9	TO15	<9	1	390	400	3	[NT]	[NT]
Acrolein	µg/m³	11	TO15	<11	1	<11	<11	0	[NT]	[NT]
Trichlorofluoromethane (Freon 11)	µg/m³	2.8	TO15	<2.8	1	<2.8	<2.8	0	[NT]	[NT]
Acetone	µg/m³	11.9	TO15	<11.9	1	360	360	0	[NT]	[NT]
Isopropyl Alcohol	µg/m³	12	TO15	<12	1	30	30	0	[NT]	[NT]
1,1-Dichloroethene	µg/m³	2.0	TO15	<2.0	1	<2	<2	0	[NT]	[NT]
1,1,2-Trichlorotrifluoroethane	µg/m³	3.8	TO15	<3.8	1	<3.8	<3.8	0	[NT]	[NT]
Methylene chloride (Dichloromethane)	µg/m³	17	USEPA 18	<17	1	<17	<17	0	[NT]	[NT]
Carbon Disulfide	µg/m³	16	TO15	<16	1	80	80	0	[NT]	[NT]
trans-1,2-dichloroethene	µg/m³	2.0	TO15	<2.0	1	<2	<2	0	[NT]	[NT]
MTBE	µg/m³	1.8	TO15	<1.8	1	<1.8	<1.8	0	[NT]	[NT]
1,1- Dichloroethane	µg/m³	2.0	TO15	<2.0	1	<2	<2	0	[NT]	[NT]
Vinyl Acetate	µg/m³	1.8	TO15	<1.8	1	<1.8	<1.8	0	[NT]	[NT]
MEK	µg/m³	15	TO15	<15	1	55	52	6	[NT]	[NT]
Hexane	µg/m³	1.8	TO15	<1.8	1	3	3	0	[NT]	[NT]
cis-1,2-Dichloroethene	µg/m³	2.0	TO15	<2.0	1	<2	<2	0	[NT]	[NT]
Ethyl Acetate	µg/m³	1.8	TO15	<1.8	1	<1.8	<1.8	0	[NT]	[NT]
Chloroform	µg/m³	2.4	TO15	<2.4	1	3	3	0	[NT]	[NT]
Tetrahydrofuran	µg/m³	1.5	TO15	<1.5	1	<1.5	<1.5	0	[NT]	[NT]
1,1,1-Trichloroethane	µg/m³	2.7	TO15	<2.7	1	<2.7	<2.7	0	[NT]	[NT]
1,2-Dichloroethane	µg/m³	2.0	TO15	<2.0	1	<2	<2	0	[NT]	[NT]
Benzene	µg/m³	1.6	TO15	<1.6	1	2	2	0	[NT]	[NT]
Carbon tetrachloride	µg/m³	3.1	TO15	<3.1	1	<3.1	<3.1	0	[NT]	[NT]
Cyclohexane	µg/m³	1.7	TO15	<1.7	1	<1.7	<1.7	0	[NT]	[NT]
Heptane	µg/m³	2.0	TO15	<2.0	1	<2	<2	0	[NT]	[NT]

QUALITY CONTROL: TO15 in Canisters ug/m3						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Trichloroethene	µg/m³	2.7	TO15	<2.7	1	<2.7	<2.7	0	[NT]	[NT]
1,2-Dichloropropane	µg/m³	2.3	TO15	<2.3	1	<2.3	<2.3	0	[NT]	[NT]
1,4-Dioxane	µg/m³	1.8	TO15	<1.8	1	<1.8	<1.8	0	[NT]	[NT]
Bromodichloromethane	µg/m³	3.4	TO15	<3.4	1	<3.4	<3.4	0	[NT]	[NT]
Methyl Methacrylate	µg/m³	2.0	TO15	<2.0	1	<2	<2	0	[NT]	[NT]
MIBK	µg/m³	20	TO15	<20	1	<20	<20	0	[NT]	[NT]
cis-1,3-Dichloropropene	µg/m³	2.3	TO15	<2.3	1	<2.3	<2.3	0	[NT]	[NT]
trans-1,3-Dichloropropene	µg/m³	2.3	TO15	<2.3	1	<2.3	<2.3	0	[NT]	[NT]
Toluene	µg/m³	1.9	TO15	<1.9	1	20	20	0	[NT]	[NT]
1,1,2-Trichloroethane	µg/m³	2.7	TO15	<2.7	1	<2.7	<2.7	0	[NT]	[NT]
Methyl Butyl Ketone	µg/m³	2.0	TO15	<2.0	1	<2	<2	0	[NT]	[NT]
Dibromochloromethane	µg/m³	1.6	TO15	<1.6	1	<1.6	<1.6	0	[NT]	[NT]
Tetrachloroethene	µg/m³	3.4	TO15	<3.4	1	<3.4	<3.4	0	[NT]	[NT]
1,2-Dibromoethane	µg/m³	3.8	TO15	<3.8	1	<3.8	<3.8	0	[NT]	[NT]
Chlorobenzene	µg/m³	2.3	TO15	<2.3	1	<2.3	<2.3	0	[NT]	[NT]
Ethylbenzene	µg/m³	2.2	TO15	<2.2	1	4	4	0	[NT]	[NT]
m-& p-Xylene	µg/m³	4.3	TO15	<4.3	1	20	20	0	[NT]	[NT]
Styrene	µg/m³	2.1	TO15	<2.1	1	<2.1	<2.1	0	[NT]	[NT]
o-Xylene	µg/m³	2.2	TO15	<2.2	1	4	4	0	[NT]	[NT]
Bromoform	µg/m³	5.2	TO15	<5.2	1	<5.2	<5.2	0	[NT]	[NT]
1,1,2,2-Tetrachloroethane	µg/m³	3.4	TO15	<3.4	1	<3.4	<3.4	0	[NT]	[NT]
4-ethyl toluene	µg/m³	2.5	TO15	<2.5	1	<2.5	<2.5	0	[NT]	[NT]
1,3,5-Trimethylbenzene	µg/m³	2.5	TO15	<2.5	1	<2.5	<2.5	0	[NT]	[NT]
1,2,4-Trimethylbenzene	µg/m³	2.5	TO15	<2.5	1	4	4	0	[NT]	[NT]
1,3-Dichlorobenzene	µg/m³	3.0	TO15	<3.0	1	<3	<3	0	[NT]	[NT]
Benzyl chloride	µg/m³	2.6	TO15	<2.6	1	<2.6	<2.6	0	[NT]	[NT]
1,4-Dichlorobenzene	µg/m³	3.0	TO15	<3.0	1	<3	<3	0	[NT]	[NT]
1,2-Dichlorobenzene	µg/m³	3.0	TO15	<3.0	1	<3	<3	0	[NT]	[NT]
1,2,4-Trichlorobenzene	µg/m³	3.7	TO15	<3.7	1	<3.7	<3.7	0	[NT]	[NT]
Naphthalene	µg/m³	2.6	TO15	<2.6	1	<2.6	<2.6	0	[NT]	[NT]
Hexachloro- 1,3-butadiene	µg/m³	5.3	TO15	<5.3	1	<5.3	<5.3	0	[NT]	[NT]
Surrogate-Bromochloromethane	% rec		TO15	99	1	107	106	1	[NT]	[NT]
Surrogate -1,4-Difluorobenzene	% rec		TO15	96	1	97	97	0	[NT]	[NT]
Surrogate-Chlorobenzene-D5	% rec		TO15	93	1	95	93	2	[NT]	[NT]

QUALITY CONTROL: TPH Air/ Air Phase Hydrocarbon						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			18/07/2019	1	18/07/2019	18/07/2019		18/07/2019	[NT]
Date analysed	-			19/07/2019	1	19/07/2019	19/07/2019		19/07/2019	[NT]
TPH C_5 - C_8 Aliphatic	µg/m^3	200	AT-005	<200	1	<200	<200	0	93	[NT]
TPH C_9 - C_{12} Aliphatic	µg/m^3	50	AT-005	<50	1	<50	<50	0	[NT]	[NT]
TPH C_9 - C_{10} Aromatic	µg/m^3	100	AT-005	<100	1	<100	<100	0	90	[NT]
TPH C_6 - C_{10} - BTEX (F1)	µg/m^3	200	TO15	<200	1	<200	<200	0	93	[NT]
TPH >C_{10} - C_{12} - Naphthalene (F2)	µg/m^3	40	TO15	<40	1	<40	<40	0	98	[NT]

QUALITY CONTROL: Permanent Gas analysis						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			18/07/2019	1	18/07/2019	18/07/2019		18/07/2019	[NT]
Date analysed	-			18/07/2019	1	18/07/2019	18/07/2019		18/07/2019	[NT]
Methane (CH_4)	%	0.01	AT-003	<0.01	1	<0.01	<0.01	0	105	[NT]
Carbon Dioxide (CO_2)	%	0.01	AT-003	<0.01	1	1.0	1.0	0	102	[NT]
Carbon Monoxide (CO)	%	0.01	AT-003	<0.01	1	<0.01	<0.01	0	106	[NT]
Oxygen (O_2)	%	0.01	AT-003	<0.01	1	15	15	0	100	[NT]
Helium (He)	%	0.01	AT-003	<0.01	1	0.40	0.40	0	93	[NT]
Hydrogen (H_2)	%	0.01	AT-003	<0.01	1	<0.01	<0.01	0	102	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

CHAIN OF CUSTODY - CANISTERS / BAGS / TD TUBES

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Client: REDFLEX CONSULTING	Client Project Name / Number / Site etc. (I.e. report title): 19113 WATCHTOWER
Contact Person: DEAN STAFFORD	PO No.: 19113
Project Mgr: "	Envirolab Quote No. :
Sampler: "	Date results required: 24/7/19
Address: 102 RAILWAY CRES JANNALI NSW	Or choose: standard / same day / 1 day / 2 day / 3 day
	Note: Inform lab in advance if urgent turnaround is required - surcharges apply
Phone: Mob: 0434 657 155	Additional report format: esdat / equis /
Email: deanstafford@redflexconsulting.com accounts@redflexconsulting.com	Lab Comments:

Sample Information											Tests Required						Comments
Envirolab Sample ID	Client Sample ID (Field Location)	Canister / TD Tube #	Soil Gas Train / Mass Flow Controller #	Leak Test Passed (Y/N)	PID Reading (ppmv)	Date of Collection	Collection Time: Time On	Collection Time: Time Off	Canister Vacuum (Hg"): Initial	Canister Vacuum (Hg"): Final	Flow Rate (Bags/TD Tubes only)	TO-15 (Cans/Bags) / TO-17 (Tubes)	TPH	5 Sulphides (Cans/Bags only)	Ozone Precursors	General Gases* (Cans/Bags only)	RGA Full List (Cans/Bags only)	
1	SV1	2292	829	Y		17/7/19	12:25	1:00	-29	-8		X	X			X		
2	SV2	2531	1985	Y		↓	1:09	1:29	-28	-7		X	X			X		
3	SV3	2284	630	Y			1:39	2:01	-30	-7		X	X			X		
4	DUP1	2529	1557	Y			1:09	1:29	-29	-7		X	X			X		

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 221898

Date Received: 17/7/19
Time Received: 15:45
Received by: DF
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

* General Gases - Please tick one:
1) Methane, Oxygen, Carbon dioxide, Carbon monoxide, Nitrogen
2) Methane, Oxygen, Carbon dioxide, Carbon monoxide, Helium, Hydrogen
3) Specify analytes (NB: If both Nitrogen and Helium/Hydrogen are require, please contact the laboratory

Relinquished by (Company): REDFLEX	Received by (Company):	*Lab Use Only:*
Print Name: DEAN STAFFORD	Print Name:	Job number:
Date & Time: 17/7/19 3:45	Date & Time:	Security seal: Intact / Broken / None
Signature:	Signature:	TAT Req - SAME day / 1 / 2 / 3 / 4 / STD