Information sheet for environmental audits and preliminary risk screen assessments (PRSAs)

Publication 2009 June 2021

Victoria's audit system

An environmental audit system has operated in Victoria since 1989. The *Environment Protection Act 2017* (the Act) provides for the appointment of environmental auditors. It also provides for Environment Protection Authority (EPA or the Authority) to have a system of preliminary risk screen assessments (PRSAs) and environmental audits. These are used in the planning, approval, regulation and management of activities, and in protection of human health and the environment.

Under the Act, the functions of an environmental auditor include to:

- conduct PRSAs and environmental audits
- prepare and issue PRSA statements and reports, and environmental audit statements and reports.

The purpose of a PRSA is to:

- assess the likelihood of the presence of contaminated land
- determine if an environmental audit is required
- recommend a scope for the environmental audit if an environmental audit is required.

The purpose of an environmental audit is to:

- assess the nature and extent of the risk of harm to human health or the environment from contaminated land, waste, pollution, or any activity
- recommend measures to manage the risk of harm to human health or the environment from contaminated land, waste, pollution, or any activity
- make recommendations to manage any contaminated land, waste, pollution or activity.

Upon completion, all PRSAs and environmental audits require preparation of either a PRSA statement, accompanied by a PRSA report, or an environmental audit statement, accompanied by an environmental audit report.

A person may engage an environmental auditor to conduct a PRSA or an environmental audit.

EPA administers the environmental audit system and ensures an acceptable quality of environmental auditing is maintained. This is achieved by assessing auditor applications and conducting a quality assurance program. These measures ensure that PRSAs and environmental audits that environmental auditors undertake are completed in accordance with the relevant sections of the Act or any other Act, and with the guidelines the Authority or other government agencies have published.

File structures

EPA stores digital statements and reports from PRSAs and environmental audits in three parts:

- Part A, the PRSA or environmental audit report
- Part B, report appendices
- Part C, the PRSA statement and executive summary or environmental audit statement and executive summary.

Report executive summaries, findings and recommendations should be read and relied upon only in the context of the whole document, including any appendices and the PRSA statement or environmental audit statement.

Currency of PRSAs and environmental audits

PRSAs and environmental audits are based on the conditions encountered and information reviewed at the time of preparation. They don't represent any changes that may have occurred since the completion date. As it's not possible for the PRSA or audit report to present all data that could be of interest to all readers, consideration should be made to any appendices or referenced documentation for further information.

When information about the site changes from what was available at the time the PRSA or environmental audit was completed, or where an administrative error is identified, an environmental auditor may amend or withdraw PRSA or environmental audit statements and/or reports. Users are advised to check EPA's website to ensure documents' currency.

PDF searchability and printing

EPA can only provide PRSAs and environmental audit statements, reports and appendices that the environmental auditor provided to EPA via the EPA portal on the EPA website.

All statements and reports should be in a Portable Document Format (PDF) and searchable; however at times some appendices may be provided as image-only PDFs, which can affect searchability.

The PDF is compatible with Adobe Acrobat Reader, which is downloadable free from Adobe's Website (www.adobe.com).

Further information

For more information on Victoria's environmental audit system, visit EPA's website or contact EPA's Environmental Audit Unit.

Web: www.epa.vic.gov.au

Email: environmental.audit@epa.vic.gov.au

PRELIMINARY RISK SCREEN ASSESSMENT (PRSA)

87-91 South Street, Hadfield VIC

PRSA ID: PRSA001011

South Street Property Holdings Pty Ltd

Date: March 2023

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DOCUMENT CONTROL

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Approved by	23 March 2023  **Steven Jon Kirsanovs** Environmental Auditor (appointed pursuant to the Environment Protection Act 2017)	

Rev No	Status	Date	Author	Reviewer
0	FINAL	23 March 2023	SJK / RKH	SJK

Rev No	Copies	Recipient
0	1 x Electronic / PDF	Mr Stephen Coleiro of G2 Urban Planning (acting for South Street Property Holdings Pty Ltd)
0	1 x Electronic / PDF	Manager – Environmental Audit EPA Victoria
0	1 x Electronic / PDF	Manager – City Development Merri-bek City Council

EXECUTIVE SUMMARY

This Preliminary Risk Screening Assessment (PRSA) Report and resulting PRSA Statement were prepared for the site located at 87 – 91 South Street, Hadfield, Victoria (the 'Site'), by Mr. Steven Kirsanovs of Kirsa Environmental, in his capacity as an environmental auditor (contaminated land) appointed by the Environment Protection Authority Victoria ('EPA') pursuant to the *Environment Protection Act 2017.*

Table 1: Summary of PRSA information

Auditor	Steven Kirsanovs
Auditor account number	EXT001154
Name of person requesting PRSA	Mr Stephen Coleiro
Relationship of person requesting PRSA to site	Authorised representative of developer South Street Property Holdings Pty Ltd c/- G2 Urban Planning, 670 Mt Alexander Road, Moonee Ponds, Vic 3039
Name of site owner	South Street Property Holdings Pty Ltd Suite 224, 23 Milton Parade, Malvern, Vic 3144
Date of auditor engagement	17 November 2022
Completion date of the PRSA	2 March 2023
Reason for PRSA	Planning system
Elements of the Environment Assessed	Land Surface Water. Groundwater
Planning permit number or requirement detail if applicable	MPS/2022/275
EPA Region	Metropolitan
Municipality	Merri-bek City Council
Dominant - lot on plan	Lot 10 / LP20111
Additional - lot on plan(s)	Lot 9 / LP20111 Lots 1 & 2 / LP58440

Site/premises name	-
Building/complex sub-unit/lot No.	-
Street/Lot – Lower No.	87
Street/Lot – Upper No.	91
Street Name	South
Street type (for example road, court)	Street
Street suffix (for example, North, South	-
Suburb	Hadfield
Postcode	3046
Site area (in square metres)	1,596m^2
Plan of site/premises/location showing the PRSA boundary attached	Yes
Members and categories of support team utilised	None

Further works or requirements	Not applicable
Nature and extent of continuing risk of harm	Negligible. It is concluded the site condition is not likely to have any significant impact on the environmental values associated with the proposed future use.
Outcome of PRSA report	It is unlikely that contaminated land is present, and no environmental audit is required. The reasoning for this outcome has been detailed in this PRSA report.

Table 2: Physical Site information

Historical land use	Residential
Current land use	Vacant cleared land (no buildings), surface cover bare earth
Proposed land use	Child care centre
Current land use zoning	Neighbourhood Residential Zone (NRZ1)
Proposed land use zoning	Neighbourhood Residential Zone (NRZ1)
Surrounding land use – north (if applicable)	South Street footpaths and roadway. Low and medium density residences to the north. Ice cream manufacturing facility to the northeast and Merri-Bek Council Operations Centre further east.
Surrounding land use – south (if applicable)	Craig Care aged care facility, low and medium density residential.
Surrounding land use – east (if applicable)	Commercial fronting South Street (construction circa 1990s), including vacant buildings, food warehousing, automotive parts trading.
Surrounding land use – west (if applicable)	Low density residential
Has EPA been notified about the site under Section 40 of the Environment Protection Act 2017? [1]	No
Nearest surface water receptor – name	Merlynston Creek
Nearest surface water receptor – direction	730m south east
Site aquifer formation	Brighton Group
Groundwater Segment	C

[1] Section 40 refers to a duty to notify EPA of notifiable contamination. Further information in relation to this can be found in EPA Publication 2008: Notifiable contamination guideline: Duty to notify of contaminated land.

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PRELIMINARY RISK SCREENING ASSESSMENT

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LIST OF ABBREVIATIONS / TERMS

ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
ASC NEPM	National Environment Protection (Assessment of Site Contamination) Measure
ASS	Acid sulfate soils
BTEX	Benzene, toluene, ethylbenzene and xylene compounds
CRC CARE	Co-Operative Research Centre for Contamination and Remediation of the Environment
CSM	Conceptual site model
EAO	Environmental audit overlay
EP Act	Environment Protection Act 2017
EPA	Victorian Environment Protection Authority
EIL	Ecological investigation Level
ERS	Environment Reference Standard
ESA	Environmental site assessment
EV	Environmental value
GED	General Environmental Duty
GQRUZ	Groundwater quality restricted use zone
HIL	Health investigation level
HSL	Health screening level
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
OCP	Organochlorine pesticide
OPP	Organophosphate pesticide
PAH	Polycyclic aromatic hydrocarbon
PASS	Potential acid sulfate soils
PID	Photoionisation detector
PRSA	Preliminary Risk Screening Assessment
PSI	Preliminary Site Investigation
SPOCAS	Suspension peroxide oxidation combined acidity and sulfur
TDS	Total dissolved solids
TPH / TRH	Total petroleum hydrocarbons / Total recoverable hydrocarbons
UST	Underground storage tank
VOC	Volatile organic compound
WHO	World Health Organization

1. INTRODUCTION

1.1 Background

This Preliminary Risk Screening Assessment (PRSA) report has been prepared for the site located at 87-91 South Street, Hadfield, Victoria (the 'Site'). The work was commissioned by Stephen Coleiro of G2 Urban Planning on behalf of South Street Property Holdings Pty Ltd, and was completed by Mr Steven Kirsanovs of Kirsa Environmental, in his capacity as an environmental auditor (contaminated land) appointed by the Environment Protection Authority Victoria ('EPA') pursuant to the *Environment Protection Act 2017* ('the Act').

South Street Property Holdings Pty Ltd propose to redevelop the Site for a child care centre. The planning permit issued by the Merri-bek City Council (reference MPS/2022/275) is conditional on the provision of either a PRSA stating an environmental audit is not required, or provision of an environmental audit statement confirming suitability of the land for the development. This PRSA is intended to address the environmental audit requirements of the planning permit.

Further details of the assessment works and review outcomes are provided in later sections of this PRSA.

1.2 PRSA Purpose and Scope

The '*Guidelines for preparing preliminary risk screening assessments'* (EPA Publication 2021, Feb 2022) notes that a PRSA is a screening assessment that reviews information regarding past use and activities on undertaken at a site to consider the likelihood of the presence of contaminated land[2]. Section 204(2) of the Act defines the purpose of a PRSA is:-

a) to assess the likelihood of the presence of contaminated land; and

b) to determine if an environmental audit is required; and

c) if an environmental audit is required, to recommend a scope for the environmental audit.

A PRSA will often be used to inform a planning decision under relevant Victorian Planning Provisions (VPPs), which include the cl.45.03 (the Environmental Audit Overlay) and cl 13-04-1S (Contaminated and potentially contaminated land); and MD No.1[3]. As noted previously, this particular PRSA has been triggered as part of a planning application process for a proposed child care centre.

Although a PRSA may only be conducted by an EPA appointed environmental auditor, it is important to note that a PRSA is not the same as an environmental audit or an environmental audit statement that describes the suitability of land for particular use/s. A PRSA serves a different purpose consistent with its name – i.e. it is a screening assessment completed in accordance with the guidance and legislative framework and context as described here. The following table provides details of the scope of the PRSA.

[2] 'Contaminated land' is defined in section 35 of the Act. Land is 'contaminated' if waste, a chemical substance, or a prescribed substance is present on or under the surface of the land, and is above the background level and creates a risk of harm to human health or the environment. Refer to section 1.4 for further definitions relating to land and groundwater.

[3] Ministerial Direction No.1 – Potentially Contaminated Land 2021.

Table 3: PRSA Scope

Scope aspect	Site Details
The site in respect of which the assessment was conducted	○ Site address: 87-91 South Street, Hadfield ○ Municipality: Merri-bek City Council ○ Standard parcel identifiers: ○ 87 South Street. Lot 10 on Plan LP20111. ○ 89 South Street. Lot 9 on Plan LP20111. ○ 91 South Street. Lots 1 & 2 on Plan LP58440. ○ Site area: approximately 1,596m2 ○ Site zoning: Neighbourhood Residential Zone (NRZ1) ○ Environmental audit overlays: there is an EAO covering portion of the site (87 South Street only).
The use or proposed use for which the site is being assessed	Child care centre.
The elements of the environment assessed	Land. Surface Water. Groundwater.
The standards considered in the assessment	Environment Reference Standard (Victoria Government Gazette No. S 245, 26 May 2021) ("the ERS") National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended in 2013) ("the ASC NEPM")
Any assumptions made by the environmental auditor during the assessment	Proposed use and in particular building construction, layout and surface cover for this proposed land use scenario are assumed to be consistent with the plans provided by the developer and included in this PRSA.
Any limitations in the environmental auditor's assessment	None
Any exclusions from the assessment and the rationale for these exclusions	The following elements of the environment were not considered as part of the auditor's assessment – Ambient air. Water (surface water) assessment was confined to the following:- ○ As no surface water bodies exist either onsite or in the vicinity of the site, surface water was considered in the context of receiving waters (defined as surface waters which receive discharges from groundwater, pursuant to section 4, Environment Reference Standard 2021).

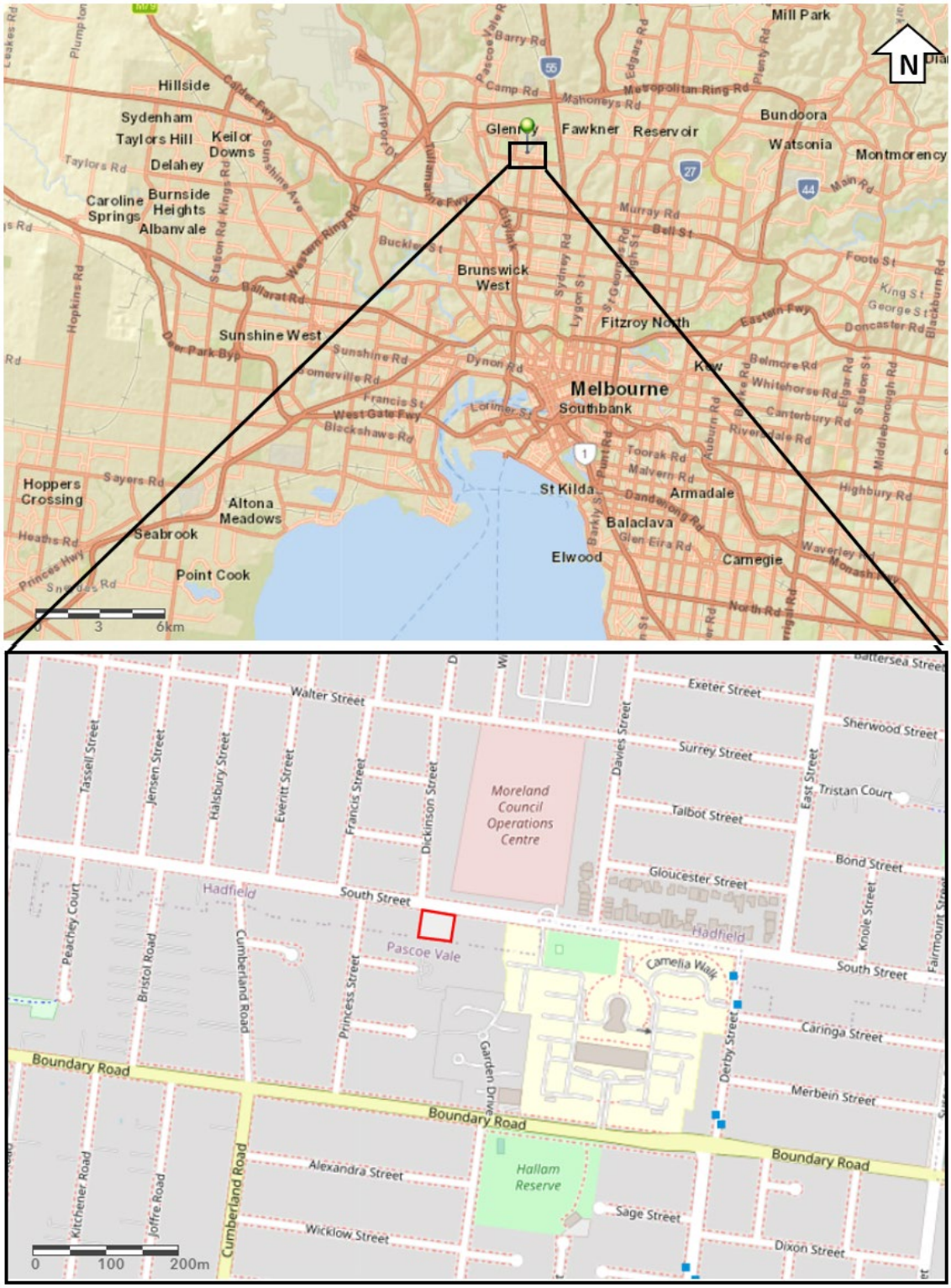


Figure 1. PRSA Site Location
(plan generated using ArcGIS)

1.3 PRSA Activities / Approach

The PRSA has been prepared with regard to '*Guidelines for preparing preliminary risk screening assessments'* (EPA Publication 2021, Feb 2022). Relevant current legislation, guidelines and standards are referenced in Section 8. The main activities and approach for this PRSA are summarised below: -

- The Auditor accepted the PRSA commission on 17 November 2022.
- The Auditor reviewed assessment reports and plans made available by the client's representative and Compass Environmental as listed below
  - Development plans provided by the site owner / developer (copies are provided in Appendix B).
  - Phase 1 Site History Assessment: 77 and 87 South Street Hadfield VIC (Compass Environmental, March 2020);
  - Further Site History Assessment: 87-91 South Street Hadfield VIC (Compass Environmental, Feb 2023)
  - Soil and Soil Vapour Sampling / Analyses (Compass Environmental, March 2023)
- The Auditor reviewed a range of additional information from private and government sources, as detailed in this PRSA.
- Inspections were carried out by a member of the Auditor's team on 8 December 2022, and again on 1 March 2023.
- The Auditor prepared and refined a Conceptual Site Model (CSM) to inform the outcomes of the PRSA.
- The PRSA report and subsequent PRSA Statement was completed on 2 March 2023. Copies have been provided to the EPA, the client, and the Merri-bek City Council.

1.4 Environmental Values, Indicators and Objectives

The indicators and objectives for assessing the significance of impacts from contamination, waste and pollution[4] were selected using the ERS as the primary source of screening criteria. Those indicators and objectives were then used to assess the risk of harm or detriment to environmental values[5] for the various elements of the environment considered. Tables on the following pages provide a summary of the various elements of the environment, indicators and objectives.

The primary reference for assessing the adequacy of the assessment works was the National Environment Protection (Assessment of Site Contamination) Measure ("the ASC NEPM'), which has been adopted into the legislative framework in all states and territories of Australia. These were supplemented as necessary by use of other documents that form the basis of what the EPA guideline terms "best practice and the state of knowledge". The adopted screening values and sources are discussed later in the PRSA report.

[4] 'Pollution' is defined in section 3(1) of the Act as any emission, discharge, deposit, disturbance or escape of a solution, liquid, or gas, or a combination of a solid, liquid or gas, including, but not limited to smoke, dust, fumes or odour, or noise, or heat. In describing the difference between 'contamination' and 'pollution' under the current legislative and regulatory framework in Victoria, EPA Publication 668.1 [Hydrogeological assessment (groundwater quality) guidelines] notes that pollution is an action that may, as a consequence, lead to a state of 'contamination'.

[5] The Act defines an environmental value as "a use, attribute or a function of the environment". Examples include broad concepts such as "life, health and well being of humans" and more specific items such as visibility, aesthetics, land and water dependent ecosystems, and uses of water such as irrigation, stock water, and potable.

Ambient Air Environmental Values, Indicators and Objectives

The following table lists the environmental values, indicators and objectives adopted for ambient air. It is noted ambient air' is defined in the ERS as "the external air environment". It does not include the air environment inside buildings or structures. In this context of this audit ambient air was limited to potential impacts from volatile organic compounds (VOCs) that construction or other intrusive maintenance workers might be exposed to whilst working in shallow utility trenches.

Table 4. Environmental values, indicators and objectives for ambient air

Environmental Values	Description	Indicators	Objectives	Relevance to this audit
Life, health and wellbeing of humans	Air quality objectives that sustain life, health and well-being of humans	The ERS lists general air quality indicators including carbon monoxide, nitrogen dioxide, photochemical oxidants, sulphur dioxide, lead, particles as PM10, particles as PM2.5. These were not considered relevant for this particular audit. Because the primary concern with this audit was impacts from volatile organic compounds (VOCs), an alternative source was considered with the indicators being selected as various VOCs measured in subsoil vapour which could in theory be encountered by intrusive maintenance workers in shallow utility trenches.	Various values for general air quality as specified in the Table 2.2 of the ERS. Not considered further. Objectives for VOCs were sourced from the ASC NEPM (petroleum hydrocarbon HSLs for intrusive maintenance workers) and were supplemented by further site specific risk assessment for other VOCs that did not have values specified in the ASC NEPM or CRC CARE Technical Report 10[6].	Relevant in the context of potential impacts from volatile organic chemicals on intrusive maintenance workers either during construction or future land use.
Local amenity and aesthetic enjoyment	Air quality that supports lifestyle, recreation and leisure	Odour	An air environment that is free from offensive odours from commercial, industrial, trade and domestic activities.	Relevant in the context of potential odour impacts to off-site properties during construction / redevelopment, and also future occupants of the site.
Visibility	Air quality with low levels of particulate matter and very good visible range	Visibility reducing particles.	Minimum visible distance 20km (averaging period 1hr, and max. exceedance 3 days per year).	Relevant in the context of potential dust impacts during construction / redevelopment.

[6] Friebel.E, & Nadebaum.P, 2011. Health screening levels for petroleum hydrocarbons in soil and groundwater. Part 2: Application document, CRC CARE Technical Report no. 10. CRC for Contamination Assessment and Remediation of the Environment, Adelaide, Australia.

Land Use Categories, Environmental Values, Indicators and Objectives

Environmental values of land as set out in the ERS are reproduced in the following table. These are based on various land use categories which are broadly consistent in the ASC NEPM and the Victorian Planning Provisions. Based on the proposed redevelopment plans, the land use categories considered for the PRSA included 'commercial', 'sensitive use (high density' and 'sensitive use other (lower density)'. Note although other land use categories were not relevant for the proposed land use, environmental values for other categories (especially other sensitive land uses – high density) were still considered in the determinations regarding whether or not the land is contaminated, consistent with the approach outlined in EPA Publication 1940[7], which notes that "*in referring to the ERS to assess if a chemical substance may create a risk of harm, all reasonable uses of land and groundwater and the ecological functioning of the location (including potential for offsite impacts) must be considered. This may require consideration of a range of appropriate exposure scenarios, not simply the current land use.*" It is also noted that although groundwater is included in the definition of land within the ERS[8] and also within the Act[9], the ERS also addresses groundwater and lists environmental values for groundwater as part of the water environment, and this is considered in the following section.

[7] Contaminated land: understanding section 35 of the Environment Protection Act 2017. EPA Publication 1940, Feb 2021.

[8] The ERS defines the "land environment" as including soil, fill, rock, weathered rock, and sand, the vapour and liquids within the interstitial spaces in the unsaturated zone, and sub-aqueous sediment.

[9] Section 3(1) of the Environment Protection Act 2017 defines land as "…any land, whether publicly or privately owned, and includes (a) any buildings or structures permanently fixed to the land; and (b) groundwater."

Table 5. Environmental values, indicators and objectives for land

Environmental values of the land environment	Description	Land use categories (Shaded categories were considered for this PRSA)							Indicators	Objectives
		Parks and Reserves	Agricultural	Sensitive Use (High Density)	Sensitive Use Other (lower density)	Recreation / Open space	Commercial	Industrial		
Land dependent ecosystems and species – natural ecosystems	Land quality that is suitable to protect soil health and the integrity and biodiversity of natural ecosystems, modified ecosystems and highly modified ecosystems	✓							Inorganic and organic contaminants set out in Appendix A of Schedule B2 of the NEPM (ASC), and any other contaminants present at the site as determined by the current use or site history assessed in accordance with the NEPM (ASC)	Ecological and health based investigation or screening level in the NEPM (ASC), unless – (a) there is no such investigation or screening level; or (b) due to site specific characteristics the more appropriate objective is: (i) the level derived using the risk assessment methodology described in the NEPM (ASC); or (ii) the background level determined in accordance with section 36 of the Act, in which case the objective for the indicator is (i) or (ii), as applicable.
- modified ecosystems		✓	✓		✓	✓				
- highly modified ecosystems			✓	✓	✓	✓	✓	✓		
Human health	Land quality that is suitable for the specific land use and safe for the human use of that land	✓	✓	✓	✓	✓	✓	✓		
Buildings & structures	Land quality that is not corrosive to buildings, structures, property and materials	✓	✓	✓	✓	✓	✓	✓	pH, sulphate, chloride, redox potential, salinity or any chemical substance or waste that may have a detrimental impact on the structural integrity of buildings or other structures	Land that is not corrosive to or otherwise adversely affecting the integrity of structures or building materials

Environmental values of the land environment	Description	Land use categories (Shaded categories were considered for this PRSA)							Indicators	Objectives
		Parks and Reserves	Agricultural	Sensitive Use (High Density)	Sensitive Use Other (lower density)	Recreation / Open space	Commercial	Industrial		
Aesthetics	Aesthetic issues do not adversely impact the use of land. Aesthetic issues include the quantity, type and distribution of foreign material or odours in relation to the specific land use and its sensitivity	✓		✓	✓	✓	✓		Any chemical substance or waste that may be offensive to the senses	Land that is not offensive to the senses of human beings
Production of food, flora and fibre	Land quality that is suitable for the safe human consumption of food, flora and fibre and that does not adversely affect produce quality or yield	✓	✓		✓				Inorganic and organic contaminants set out in Appendix A of Schedule B2 of the NEPM (ASC), and any other contaminants present at the site as determined by the site history assessed in accordance with the NEPM (ASC)	The levels specified in the Food Standards Code detected in any food, flora or fibre produced at the site. Levels that do not adversely affect produce quality or yield

The ERS defines “sensitive use” to include land residential use, a childcare centre, pre-school, or primary school being either high density where there is minimal access to soils, and other (lower density) where there is generally substantial access to soil.

Waters – Surface Water and Groundwater - Environmental Values, Indicators and Objectives

The following table lists the environmental values, indicators and objectives adopted for waters. Because there are no surface water bodies either on or in close proximity to the Site, groundwater was the main focus of this environmental audit and the environmental value 'water dependent ecosystems and species' was only considered in the context of potential impacts to surface water associated with discharge of contaminated groundwater arising from the Site. As will be discussed later in the PRSA report, groundwater has been interpreted to be in segment C as defined in the ERS (background TDS 3,101-5,400 mg/L TDS).

Table 6. Environmental values, indicators and objectives for waters (groundwater)

Environmental values	**Protected in this groundwater segment?**	**Indicators (As specified in the ERS)**	**Objectives (As specified in the ERS unless noted otherwise)**	**Relevance to this audit**
Water dependent ecosystems and species (Including surface waters and subterranean waters with a hydrogeological setting conducive to the presence of troglofaunal and stygofauna)	Y	For groundwater that discharges to surface water, the indicators are the indicators applicable to the relevant surface water as specified in Division 3 of Part 5 of the ERS. Indicators that are relevant to the subterranean species of troglofauna and stygofauna, which may include TSS, salinity, toxicants in water, toxicants in sediment and dissolved oxygen	Objectives specified in the ERS:- Values specified either in the ERS for some general water pollutants, and otherwise values listed in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG) (available on the webpage www.waterquality.gov.au/anz-guidelines). The ERS also notes the groundwater quality should not adversely affect the troglofauna and stygofauna that depend on the groundwater.	Relevant, although not likely to be realised given the distances to surface water. The nearest waterway where groundwater could in theory discharge is Merlynston Creek (approx. 730m E/SE). The applicable segment for surface waters for all waterways within the Melbourne metropolitan area is the 'urban' segment, with the exception of the Yarra River which is within the 'central foothills and coastal plains' segment. For the 'urban' segment, the ERS specifies for water quality criteria to be based on 90% level species protection (as a highly modified ecosystem), whilst for the 'central foothills and plains' segment. the criteria are to be based on 95% level of protection (ie. slightly to moderately modified ecosystem). The current version of the Groundwater Dependent Ecosystems Atlas[10] indicates there have been no subterranean GDEs analysed within Victoria, so this is of limited use at this point in time in identifying potential for subterranean GDEs to exist in specific areas of Victoria. Troglofauna can be ruled out as being of significance for this geological setting (i.e. aquifers associated with Tertiary Age Brighton Group sediments not generally associated with caves or large voids), but there is no readily available information for the Melbourne area on the potential occurrence of stygofauna. A CSIRO report by Hose et al (2015)[11] notes "*stygofauna are found in aquifers across Australia, predominantly in aquifers with large (mm or greater) pore spaces,*

[10] Groundwater Dependent Ecosystems Atlas. Australian Government, Bureau of Meteorology. http://www.bom.gov.au/water/groundwater/gde/

[11] Hose GC, J Sreekanth, Barron O, Pollino C (2015) Stygofauna in Australian Groundwater Systems: Extent of knowledge. CSIRO, Australia.

Environmental values	Protected in this groundwater segment?	Indicators (As specified in the ERS)	Objectives (As specified in the ERS unless noted otherwise)	Relevance to this audit
				especially alluvial, karstic and some fractured rock aquifers. The size of the pore spaces is a key determinant of the suitability of an aquifer as stygofauna habitat." This CSIRO publication also noted that stygofauna are found across a range of water quality conditions (from fresh to saline) but most common in fresh and brackish water (with EC of less than 500 uS/cm) (3,200 mg/L TDS). It is noted the background TDS of groundwater at this site is above this range. In the absence of any definitive information otherwise, this audit has taken a conservative approach and assumed there could be at least some stygofauna present, even if it might not be of any recognised importance at this point in time. Impacts on this environmental value will be assumed to include ecosystems in both surface waters and subterranean waters.
Potable water supply (desirable)	N	Indicators specified in the ADWG	Health-related guideline value for each indicator specified in the ADWG. Aesthetic guideline value for each indicator specified in the ADWG.	Not protected in this groundwater segment.
Potable water supply (acceptable)	N	Indicators specified in the ADWG	Health-related guideline value for each indicator specified in the current version of the Australian Drinking Water Guidelines (ADWG). Aesthetic guideline value for each indicator specified in the ADWG.	Not protected in this groundwater segment.
Potable mineral water supply	Y	Indicators specified in the ADWG	Health guideline values for each indicator specified in the ADWG. Aesthetic guideline values for each indicator set out in the ADWG.	Not relevant. The site is not in a recognised mineral water producing area.
Agriculture and irrigation (irrigation)	N	Indicators specified for irrigation and water for general on-farm use in the ANZG	Level of that indicator specified in the ANZG	Not protected in this groundwater segment.
Agriculture and irrigation (stock watering)	Y	Indicators specified for livestock drinking water quality in the ANZG	Level of that indicator specified in the ANZG	Not relevant. This environmental value is not compatible and is unlikely to be realised within this urban setting.
Industrial and commercial use	Y	Indicators specific to the particular industrial or commercial activity and their use of water	Groundwater quality that is suitable for its industrial or commercial use	Not relevant. No / limited current use for this purpose. Not likely to be realised due to relatively high cost of bore establishment, variable aquifer yield and available reticulated supply of high quality water.

Environmental values	Protected in this groundwater segment?	Indicators (As specified in the ERS)	Objectives (As specified in the ERS unless noted otherwise)	Relevance to this audit
Water-based recreation (primary contact recreation)	Y	E.coli Chemical hazards, aesthetic effects	10 E. coli/100mL (if no human faecal contamination sources identified) 0 E. coli/100 mL (if human faecal contamination sources identified) Level of indicators (where specified) and descriptions in applicable guidance, in the Guidelines for Managing Risks in Recreational Water, published by the National Health and Medical Research Council in 2008	Not relevant. No current use for this purpose evident. Not likely to be realised due to relatively high cost of bore establishment, variable aquifer yield and available reticulated supply of high quality water.
Traditional owner cultural values	Y	Same as for 'water dependent ecosystems and species'.	Same as for 'water dependent ecosystems and species'.	Relevant. The ERS indicates there are no specific environmental quality objectives for these protected environmental values of surface water, other environmental values such as water dependent ecosystems and species are also likely to protect this potential environmental value at the location of any receiving surface water body.
Buildings and structures	Y	pH, sulphate, chloride, redox potential, salinity or any chemical substance or waste that may have a detrimental impact on the structural integrity of buildings or other structures	Groundwater that is not corrosive to or otherwise adversely affecting structures or building. Results were considered with regard to Section 6 of the Australian Piling Code (AS2159) for groundwater conditions and potential adverse effects on buildings and structures.	Relevant. Depth to groundwater is approximately within 5m of ground surface. In theory, building structures including could come into contact with groundwater, but this is considered unlikely for this specific development which is a building at grade with shallow footings, and no basement.
Geothermal properties	Y	Temperature between 30 and 70 degrees Celsius	Geothermal properties of groundwater to be maintained for current and future users of the resource	Not relevant. Background water quality (temperature) is not within the range that could support geothermal applications.

1.5 Audit Team

The PRSA was completed using the following personnel:-

- Steven Kirsanovs of Kirsa Environmental. Victorian EPA appointed environmental auditor. Consulted during scoping and reviews completed for PRSA. Drafting and final review of PRSA.
- Rachael Harmans of Kirsa Environmental. Rachael assisted with information reviews, the site inspection and drafting of the PRSA.

The Auditor did not need to consult with any members of his expert support team for this PRSA.

2. SITE INFORMATION

2.1 Site Address, Title / Ownership Details and Zoning

The Site address is 87-91 South Street, Hadfield. It is within a Neighborhood Residential Zone (NRZ1) within the Merri-bek City Council municipality and the property identifiers are listed below:-

- Lots 1-6 on PS307369 (CT Vols 10035 Fols 993-998)
- Lot 1 on TP645707 (CT Vol 9820 Fol 138)
- 87 South Street. Lot 10 on Plan LP20111 (CT Vol 7505 Fol 016).
- 89 South Street. Lot 9 on Plan LP20111 (CT Vol 7573 Fol 163).
- 91 South Street. Lots 1 & 2 on Plan LP58440 (CT Vol 10972 Fol 790).

The registered owner on all the above titles is South Street Property Holdings Pty Ltd.

Planning overlays indicated on the relevant planning and property reports include:-

- Environmental audit overlay (EAO) (covers no. 87 South Street only and adjacent properties to the south east)

Copies of the property titles are included in Appendix A of this PRSA.

2.2 Site Layout and Condition

The Site is an approximately rectangular shaped land parcel covering an area of 1,596m^2. At the time of completion of this PRSA the site was a vacant lot. Further details are provided in the inspection notes below.

2.3 Site Inspection Observations

As will be discussed later, until late 2022 the subject land comprised three individual lots each covering approximately 500m^2. There is limited detail provided in the reporting reviewed in relation to the building types and former site usage. Review of street view images on Google Earth dated October 2022 show pre 1960s era residences at 87 and 89 South Street (cream brick at 87 and timber cladding / weatherboard at 89), with 91 occupied by a commercial building with two steel roller doors on the South Street frontage and signage reading “Loui’s Pizza / Pasta”. The street frontage did not appear to be a shop front but more of a distribution outlet (i.e. roller door frontage).

Two inspections of the property have been documented by Compass Environmental, with a summary of conditions provided below.

December 2020. 87 South Street inspected.

Compass reported there was a residential building and adjoining garage on the property. The front yard contained a grassed area with some small mature shrubs and trees. The grass was overgrown and there was rubbish strewn across the yard.

The backyard comprised a concreted entertainment area directly behind the residence, and there was a grassed area along the southern boundary (also overgrown). There was

a small shed and outside toilet which were noted to be empty, and some car tyres and rubbish were being stored in the garage.

The Auditor notes that Google Earth imagery from this time shows residential buildings on all three lots (no's 87, 89 and 91) at this time, and that the residences were still present in November 2022 (the most recent Google Earth image).

2 February 2023. 87, 89 and 91 South Street inspected.

Compass reported the property had been completely cleared and was a vacant lot at the time of this inspection. It was noted the buildings across the three properties had been demolished and cleared, with the surface across the previous building footprints comprising disturbed material with minor inclusions of concrete and brick fragments, likely associated with the recent demolition works.

No odours or staining were observed across the three properties. Limited vegetation was observed around the boundary of the site.

Two inspections were completed by the Auditor's representative on 8 December 2022 and 1 March 2023. Both of these inspections found the property to be a cleared vacant land parcel. Minor surface concrete remained during the December 2022 inspection and some demolition materials were yet to be cleared (i.e. former building windows and stumps from tree removal). A skip bin was present onsite.

Observations have been recorded based on the general Site inspection procedure of the relevant Australian Standard AS4482.1[12] with the main observations on 1 March 2023 noted below:-

- All surface material had been removed, with surface soils exposed across the entirety of the property, with the exception of minor retained concrete adjacent to the footpath on the northern boundary, used as a support for the front hoarding wall.
- No demolition / inert material was observed on the surface, with the exception of minor gravels.
- There were no areas of discoloured soil or chemical storage noted.
- There was no evidence of filled areas, ground disturbance or subsidence.
- No standing water or water bodies/drains were identified on the site or in the surrounding area. Kerbside drains were noted along the surrounding streets and roads.
- No visible evidence of asbestos containing materials were noted on the site's surface.

2.4 Proposed Future Use

The reporting indicates that the proposed redevelopment comprises a child care centre. The plans indicate a single level building at grade, with external areas to include car parking and landscaped play / activity areas. The plans indicate the external play areas will be predominantly covered with some form of soft fall or other all weather surface, with areas of exposed / accessible soils limited to strips of garden beds. A copy of the development plans is included in Appendix B.

[12] AS4482.1-2005.

3. ENVIRONMENTAL SETTING

3.1 Location and Proximity of Sensitive Receptors

The Site is approximately 11km north of the Melbourne Central Business District (CBD). There are no water bodies or other sensitive environmental receptors on or in proximity to the Site. The nearest watercourse is Merlynston Creek, approximately 730m to the east / south east. The local area is serviced by a kerbside stormwater drainage system. The land in the area is relatively flat. Current surrounding land uses are noted below: -

- North: South Street roadway, with residential and commercial / industrial buildings to the northeast (Harry and Larry's ice cream manufacture facility and Council operations facility).
- South: Residential.
- West: Residential.
- East: Industrial / commercial units (construction circa 1990s).

The reporting by Compass Environmental simply noted the surrounding land to be zoned residential and did not note the presence of the industrial units to the east. The proximity of these industrial units is however considered notable in terms of potential for contamination compared to residential land.

3.2 Regional Geology & Hydrogeology

The reporting by Compass Environmental has referenced the Geological Survey of Victoria mapping which indicates the Site is underlain by Brighton Group sediments of Tertiary Age. The reporting notes the lithology typically comprises marine and on-marine clays, ferruginous sandstones and gravels. The Auditor notes these sediments would likely be underlain by sedimentary deposits of the Silurian age, which are locally referred to as the 'Dargile Formation'. The Dargile Formation comprises sandstone, siltstone and shale and forms the basement rock across most of the Melbourne metropolitan area.

The reporting by Compass has assessed groundwater was likely to be present within the Brighton Group sediments, with the Visualising Victoria's Groundwater website (http://maps.ubspatial.com.au/vvg) indicating the depth of the ground water table in the area to be less than 5 metres below the ground surface and with a TDS in the range 1,001-3,500 mg/L. The Auditor has reviewed available audit reports in the area and notes there was a site approximately 200m north in the same geological setting which reported that groundwater was encountered at approximately 8.5m depth and TDS ranged from 4,000-9,200 mg/L. Based on the area specific information in that audit report this PRSA has determined groundwater is likely in segment C (3,101-5,400 mg/L TDS) as defined in the ERS.

3.3 Groundwater Quality and Usage

There was no review documented of groundwater quality and usage in the initial desktop information review provided in the supporting information. A search was requested but the additional information review provided in February 2022 was limited to a generic groundwater resource report which includes basic information on groundwater occurrence, depth and quality for the locality (but not usage). The Auditor completed a search of registered bores using DWELP

online tools which identified 38 registered groundwater wells, with the majority (33) being either investigation or observation bores. There were five irrigation bores listed, but it is noted these are indicated to be installed to depths varying from 85m to 140m so are not installed within the water table aquifer in the area which is more relevant in terms of potential contamination for this PRSA. Overall, the information indicates there is very limited if any active extraction and use of groundwater in the general area. A copy of the search information is included with the other auditor reviews in the PRSA report appendices.

4. HISTORY OF LAND USE AND POTENTIAL CONTAMINATION

4.1 Desktop Information Review

A historical / desktop information review was completed by Compass Environmental – initially in a PSI Report dated March 2020, and supplemented with additional historical / desktop review dated February 2023. Sources of information used included the following:-

- Historical aerial photographs. Photographs from 1945 to present were reviewed. It was reported the photographs showed the three lots had buildings established on them (likely sometime between 1945 and 1958. There was progressive residential development all around the west, south and north during the 1950s and 1960s. There was no discernable change to the buildings or layout of number 87 and 89 since 1968. Building alterations or construction is suspected to have taken place at number 91 sometime in the 1960s. The Auditor notes the review doesn't make mention of industrial development apparent on land to the east and north east from the 1960s.
- Sands and McDougall Street & Business Directories. The Compass reporting indicates this was conducted via the layers included in the Victoria Unearthed online mapping tools. The records on Victoria Unearthed indicated the following uses of surrounding / nearby land – pipe manufacturer at an unknown address on South Street (1965 and 1974), builders suppliers (machinery & equipment wholesaling) at 40 South Street (1965), cabinet maker at 79 South Street (1974), and a contractor at 48 South Street (1974). The Auditor reviewed the online version of the 1965 directory which provided further detail of adjacent / nearby land occupancy. This showed a large property to the east extending from South Street to Boundary Road that was used by Humes Ltd (address listed as approximately 136 to 196 Boundary Road, Pascoe Vale). This directory also listed the occupant of the adjacent property at 85 South Street as 'Hoadley's Industries Pty Ltd, Engineers'. There were also listing for the industrial premises on the north side of South Street opposite / northeast of the subject land which included sand depot, engineers, and builders.
- Historical property titles. The title records indicated prior to 1951 the subject land was part of a larger property that extend from South Street south to Boundary Road. This large property was subdivided with the smaller lots along South Street created, and the properties have since been under various private owners. Number 91 ownership since the 1960s has diverged from simple private ownership to what appear to be some forms of commercial and or retail / shop use. The Auditor notes the title records include a plan showing the eventual subdivision from the 1950s, and appear to show a large portion of land covering the south and east of the original large property – this appears to coincide with the aerial photographs and directory listings for the Humes factory. It is also noted one of the parties listed as having acquired one of the lots in that 1950s subdivision was 'WH Hume'.
- EPA records of previous environmental audits completed in area. These identified five previously completed audits on sites within 1km of the subject land, with one groundwater quality restricted use zone (GQRUZ) approximately 285m to the northeast. Further review of the available audit reports is provided in the following section.
- EPA priority sites register. This found there are no sites within 1km of the subject land listed on this Register.

- Victorian Landfills Register. This found no records of sites on this Register within 1km of the subject land.

In summary, the land in the area was formerly broad acre farmland until it was subdivided in the 1950s. Land to the east and south because industrial, whilst the subject land becoming three individual lots each of about 500m2 area. Land on the north side of South Street has also bene a mix of residential and industrial since the 1950s. Aerial photographs and titles indicate all three lots were probably residential, with the western most lot (no.91) being converted to a commercial premises sometime in the 1960s. The three lots have been recently cleared of all former buildings in preparation for redevelopment as a single development lot. Notable adjacent land uses have included an engineering works on the land immediately to the east, and a former large concrete pipe manufacturer and testing operations (Humes Pipes) on land to the east and south.

4.2 Environmental audit reports in locality

Compass provided a summary of the closest environmental audit reports in section 3.5 (within 1km of the site). These are included below:

- **69 South Street, Glenroy (CARMS 41564-1, 2002). A**pproximately 130m to the east. The audit report indicates the site was occupied by Humes Pipes from the 1950s to 1990s, and used the property for storage of building materials, and manufacturing and testing of larger diameter concrete pipes. There is mention there was a coal fired furnace that was later converted to fuel oil. Soils / filling were found to be impacted by PAHs and metals (lead, chromium, copper, nickel and zinc). The fill layer was completely removed, natural soil sample results were reported below adopted guideline values. A groundwater well was installed to 8m, however groundwater was not encountered. A Certificate of Environmental Audit was issued for the site (pursuant to the now superseded *Environment Protection Act* (1970) Vic).
- **2 - 6 Walter Street, Hadfield (CARMS, 73925-1, 2016).** Approximately 290m north - northeast. Formerly a timber veneer manufacturer until 2015. The soil assessment conducted across the site identified a layer of filling soils which reported elevated concentrations of metals (barium, manganese, nickel and vanadium). Groundwater assessment indicated groundwater depths of 8.4 to 10.5m with reported elevated concentrations of metals (aluminium), TCE above adopted investigation levels as well as PCE and 1,1,2-TCA that would indicate site related impacts (although not necessarily exceeding adopted screening guidelines). The site was considered to be the source of the TCE in groundwater and related impacts Concentrations of boron, copper, selenium, arsenic and sulphate were considered to be consistent with regional background conditions. Concentrations of nitrate were considered representative of historical regional contamination. A Statement of Environmental Audit (with conditions) was issued for the site for the beneficial uses associated with sensitive (high-density), recreation/open space and commercial/industrial uses.
- **11 – 19 West Street, Glenroy (CARMS 21308-1, 1994).** Approximately 635m west to southwest. Former timber retailing and manufacturing business (1940s to 1993) and automotive repair shop, with decommissioned USTs present in the east of the site. Proposed for low density residential housing. Soils were reportedly remediated and reporting noted that on average the upper 0.5m of soils at each proposed house block onsite did not contain contaminants above clean fill guidelines. No groundwater

assessment was undertaken at the site. A Certificate of Environmental Audit was issued for the site.

- **Former Hadfield Primary School (CARMS 32616-1, 1997).** Approximately 400m north - northeast. Site was historically a primary school from the 1960s with three underground heating oil tanks onsite. Soil assessment found a shallow layer of fill material was impacted by elevated concentrations of metals (arsenic, chromium, copper, nickel, lead and zinc) and natural soils in the vicinity of the USTs impacted by TEX and TPH. A groundwater assessment reported elevated concentrations of petroleum hydrocarbons above one or more adopted screening criteria. A statement of environmental audit was issued with conditions requiring management of soils excavated from depths below 1m, and preclusion of the use of groundwater from industrial or stock watering beneficial uses.

4.3 Potential contamination

The following table presents the main potential onsite and offsite sources of contamination as identified in the PSI Report (Compass, 202), and including considerations of the Auditor based on the independent review of historical information.

Table 7: Potential historical contamination

Potential Contamination Sources (identified by assessor)	**Potential Contaminants (as identified by assessor and further consideration by auditor)**	**Likelihood of impact in various media (Auditor's opinion)**
On-site sources		
Importation of fill (no date specified potentially present)	The assessor identified metals, PAH, TPH, BTEX, and asbestos. The Auditor notes In older urban areas such as this the contaminants in imported fill can typically include metals, petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAH) and asbestos containing material (ACM). Potential for additional aesthetically displeasing inert material such as surficial or buried bricks, concrete, general waste. Could also include various other inorganic and organic contaminants could be present depending on the source of the fill and any associated industrial processes and / or wastes.	Soil – possible but only if fill is found to be present.
Potential use of the site for agricultural and grazing purposes.	The assessor identified metals and organochlorine pesticides.	Soil – unlikely based on the dates and nature of activities carried out at site. Impacts in groundwater and / or soil gas / vapour – highly unlikely.
Historical building materials left after demolition of former buildings (pre 1980s).	Asbestos containing materials (ACM), lead	Soil – possible but likely limited to shallow soils. Impacts in groundwater and / or soil gas / vapour – highly unlikely.
Off-site sources		
Past industrial land uses – including vehicle maintenance / repairs, engineering and manufacturing, sand mining, Council depot.	Various chemicals associated with petroleum fuels and/or chlorinated solvents.	Soil – highly unlikely. Groundwater – possible. Ground gas / soil vapour – possible.
Contaminants typically associated with older urban areas.	Typically includes nutrients such as nitrate.	Soil – Unlikely Groundwater – possible.

Auditor Comments:-

The Auditor's review of the desktop / historical information is presented in Appendix F. The Auditor is satisfied the historical review utilised a suitable range of lines of enquiry and information sources, and now that this has been supplemented with additional information by the auditor's team, this should be sufficient to identify potential onsite and offsite sources of land contamination.

5. REVIEW OF ASSESSMENTS COMPLETED

5.1 Scope / Purpose of Assessments

The following table provides an outline of the intrusive assessments and sampling / analysis programs completed and considered as part of this PRSA. Results are discussed further in the section that follow.

Table 8. Intrusive Assessments

Date	Works Scope	Purpose	Report Reference
9 March 2023	Soil sampling / analysis program (Compass, 2023). Comprise drilling of eight soil bores (B1 to B7, SV1) across the site area in a general grid-like formation. Bores were drilled using geoprobe (push tube sampler), and were extended to a target depth of at least 1m, with each advancing into natural soil. At least one sample of fill material and underlying natural soil was collected from each location, with samples submitted to a laboratory for analyses for a range of contaminants of interest. A photoionisation detector (PID) was used to screen all samples in the field for the presence of volatiles. Soil samples were submitted to a laboratory for analyses for a suite of contaminants of interest. Samples were submitted to a laboratory for analyses for: o EPA Screen^ (2 sample); o Metals*, PAH, TRH, BTEXN, HVOLs (5 samples); o Metals** (13 samples); and o PFAS and sulphate (2 samples).	Preliminary assessment of shallow soils across the site for potential contamination	Environmental Consulting Services:87 – 91 South Street, Hadfield VIC (Compass Environmental, March 2023)
16 March 2023	Passive soil vapour sampling / analysis program (Compass, 2023). Comprise drilling of soil bore (SV1), in the area targeting the western site boundary closest to the neighbouring commercial / industrial properties. SV1 was drilled (on 9 March 2023) using push tube, and was extended 1m into natural soil. A low uptake Waterloo Membrane Sampler was deployed in this bore and retrieved on 16 March 2023. The vapour sample was submitted to a laboratory for analyses for a suite of TRH and VOCs, to cover a range of common volatile organic compounds.	Preliminary assessment of potential vapour impacts beneath the western site boundary (adjacent to a current commercial which was formerly industrial property).	Environmental Consulting Services:87 – 91 South Street, Hadfield VIC (Compass Environmental, March 2023)

^ EPA Publication 1828.2 Screen: metals (antimony, arsenic, barium, beryllium, boron, cadmium, chromium (VI), hexavalent chromium, cobalt, copper, lead, mercury, molybdenum, nickel, tin, selenium, silver and zinc), TBT, TRH, PAH, MAH, CHC, phenols (halogenated and non-halogenated, including cresols), OC, PCB, amenable and total cyanide, Di(2-ethyl-hexyl)phthalate, 2,4-DNT, hexachlorobutadiene, VOCs (incl TCB), formaldehyde, MEK, styrene, nitrobenzene, pH (as CaCl2) and fluoride.

* metals (arsenic, cadmium, chromium (III+VI), copper, lead, mercury, nickel and zinc).

** metals (arsenic, barium, beryllium, boron, cadmium, chromium (VI), cobalt, copper, lead, manganese, mercury, nickel, selenium and zinc).

PAH Polycyclic Aromatic Hydrocarbons

TRH Total Recoverable Hydrocarbons

BTEXN Benzene, toluene, ethylbenzene, xylenes, naphthalene

PFAS per- and poly-fluoroalkyl substances

VOC Volatile Organic Compounds

5.2 Adopted Screening Criteria

Soil Screening Values

The soil assessment results were assessed against screening criteria generally in accordance with the sources specified in the ERS.

- For assessing potential impacts on ecological receptors, the assessment report and this PRSA adopted values from the prevailing Australian guidance (primary source = EILs and ESLs from the ASC NEPM), supplemented with international values where there were no such Australian investigation or screening value is available. In the absence of any site specific soil properties data (with the exception of pH), the assessor took a very conservative approach of using the lowest EIL values from relevant tables from Schedule B1 of the ASC NEPM.to calculate EILs for metals (Cu, Cr, Ni, Zn). These are likely to be over conservative but are suitable for initial screening purposes. Alternative sources were used for EILs for other metals where values are not specified in the ASC NEPM. The ASC NEPM notes the EILs and ESLs are intended to be applied for soils in the top 2m of the soil profile and to be protective of the following receptors – biota supporting ecological processes (microorganisms and soil invertebrates), flora and fauna (native and introduced), wildlife (secondary poisoning in birds and small rodents). It is questionable whether the EILs / ESLs were relevant for this particular development scenario and limited areas of accessible soils but this is discussed further in the review of the results.
- In terms of the protection of human health, the assessment reporting and this PRSA adopted values from the prevailing Australian guidance, supplemented with international values where there were no applicable values in the Australian guidance. The assessment reporting and this PRSA have adopted health-based investigation indicators using Appendix A, Schedule B2 of the ASC NEPM as their primary source. The Auditor also considered some additional screening values for TPH and BTEX from CRC CARE Technical Report 10. Values adopted included residential (HIL/HSL A and HIL / HSL B), commercial and industrial land use (HIL/HSL D).
- For the environmental value ‘aesthetics’, the assessment reporting and this PRSA had regard to the ERS which notes that any chemical substance or waste must not cause the land to be offensive to the senses of human beings. The auditor also referred to general guidance re aesthetics in Section 3.6 in Schedule B1 in the ASC NEPM.
- For the environmental value ‘buildings and structures’, the assessment reporting and this PRSA had regard for the ERS objective that land is not to be corrosive or to otherwise adversely affect the integrity of building material and structures. Particular indicators for the ‘Building and Structures’ environmental value include pH, sulfate, chloride, redox potential, salinity or any chemical substance or waste that may have a detrimental impact on the structural integrity of buildings or other structures. Section 6 of the *Australian Piling Code (AS2159-2009)* was referred to by the assessor as a general assessment of the presence of any other impacts that might potentially affect the integrity of buildings and structures.
- For the environmental value ‘production of food, flora and fibre’, the ERS objectives require that contamination of land must not adversely affect produce quality or yield, or affect the level of any indicator in food, flora and fibre produced at the site such that the level of that indicator is greater than that specified by the *Australia New Zealand Food Authority, Food Standards Code*. In this case the PRSA did not require any site-specific assessment because the land is not intended for food production.

The ASC NEPM notes investigation and screening levels are not clean-up or response levels, nor are they desirable soil quality criteria. They are intended to be used for assessing existing contamination, and trigger consideration of an appropriate site-specific risk-based approach or risk management options when exceeded.

The ERS provides direction in relation to objectives for clean-up of land. Under the ERS, objectives for assessment and remediation can be based on the relevant objectives specified in Table 4.3, clause 12, for the protection of the defined environmental values for land. Alternatively, clean up objectives derived via a site-specific risk assessment can be undertaken, where appropriate, in accordance with the ASC NEPM.

The following table provides a selection of the ecological and health-based investigation levels adopted for the main contaminants of interest at the Site. The Auditor broadly agreed with the screening values adopted by the consultant, with some occasional exceptions as noted.

Table 9. Screening Criteria for Main Contaminants of Interest in Soil

Screening values	**Ecological investigation and screening levels**	**Health investigation and screening levels**			
Land use category	**'Urban residential and public open space'**	**Residential A. Residential with garden / accessible soil (<10% intake of fruit and vegetables from home grown produce, no poultry)**	**Residential B. Residential with minimal opportunity for soil access (including apartments)**	**HIL C Public open space such as parks, playgrounds , playing fields, secondary schools and footpaths**	**Commercial / industrial D**
Default source (unless alternative values are adopted)	**NEPM EIL and ESL Values [1]**	**NEPM HIL A [2]**	**NEPM HIL B [2]**	**NEPM HIL C [2]**	**NEPM HIL D [2]**
Metals / metalloids					
Arsenic	100	100	500	300	3,000
Boron	-	4,500	40,000	20,000	300,000
Cadmium	-	20	150	90	900
Chromium (III)	200 [3]	-	-	-	-
Chromium (VI)	-	100	500	300	3,600
Cobalt	-	100	600	300	4,000
Copper	70 [3]	6,000	30,000	17,000	240,000
Lead	1,100	300	1,200	600	1,500
Manganese	-	3,800	14,000	19,000	60,000
Mercury (inorganic)	-	40	120	80	730
Nickel	35 [3]	400	1,200	1,200	6,000
Selenium	-	200	1,400	700	10,000
Zinc	110 [3]	7,400	60,000	30,000	400,000
TPH / BTEX					
C6-C10 TPH	180	50	50	NL	310
>C10-C16 TPH	120	280	280	NL	NL
>C16-C34 TPH	1,300	4,500	5,800	5,300	27,000
>C34-C40 TPH	5,600	6,300	8,100	7,400	38,000
Benzene	65	0.7	0.7	NL	4
Toluene	105	480	480	NL	NL
Ethyl benzene	125	NL	NL	NL	NL

Screening values	Ecological investigation and screening levels	Health investigation and screening levels			
Land use category	**'Urban residential and public open space'**	**Residential A. Residential with garden / accessible soil (<10% intake of fruit and vegetables from home grown produce, no poultry)**	**Residential B. Residential with minimal opportunity for soil access (including apartments)**	**HIL C Public open space such as parks, playgrounds , playing fields, secondary schools and footpaths**	**Commercial / industrial D**
Default source (unless alternative values are adopted)	**NEPM EIL and ESL Values [1]**	**NEPM HIL A [2]**	**NEPM HIL B [2]**	**NEPM HIL C [2]**	**NEPM HIL D [2]**
Xylenes	45	110	110	NL	NL
Naphthalene	170	-	-	-	-
OC Pesticides					
DDT	180	-	-	-	-
DDD/DDE/DDT (total)	-	240	600	400	3,600
Aldrin / Dieldrin (total)	-	6	10	10	45
Chlordane	-	50	90	70	530
Endosulfan	-	270	400	340	2,000
Heptachlor	-	6	10	10	50
Others					
Benzo(a)pyrene	See note 4 below	-	-	-	-
Carcinogenic PAHs (BaP TEQ)	See note 4 below	3	4	3	40
Total PAHs	See note 4 below	300	400	300	4,000
PCBs	-	1	1	1	7

Unless specified otherwise, all values are in milligrams per kilogram (mg/kg). NL denotes non-limiting.

1. Refer Tables 1 B(1) to 1 B(7) in Schedule B(1) of the ASC NEPM. All values assume aged (not fresh) contamination in soil. Compass Environmental compared results against EIL / ESL values based on 'urban residential and open space' land use. The Auditor considers the values were generally reasonable and defensible.
2. Refer Tables 1 A(1) to 1 A(3) in Schedule B(1) of the ASC NEPM. For TPH / BTEX, HSLs for volatile fractions were sourced from the ASC NEPM, vapour intrusion HSLS using the most conservative assumptions re exposure and soil properties i.e., building with source in soil 0-1m depth, and clay soil. For the non-volatile fractions (>C16 TPH), the health screening values were the HSLs for direct contact as listed in CRC CARE Technical Report10 (again using the most conservative assumptions re soil type).
3. The assessment consultant Compass Environmental adopted generic EILs and ESLs for arsenic, lead, DDT, naphthalene, benzene, toluene, ethyl benzene, xylene and benzo(a)pyrene, applicable to residential land use (as per Tables 1B(4), 1B(5) and 1B(6) of Schedule B1 of the ASC NEPM. For these other metals (Cu, Cr, Ni, Zn), in the absence of site specific cation exchange capacity data the most conservative EIL values were adopted from Schedule B1 of the ASC NEPM based on pH values reported for soils on the site.
4. There is more recent information that represents the current state of knowledge in relation to benzo(a)pyrene and PAHs in soils. According to CRC CARE Technical Report 39[13], the ESLs in the ASC NEPM for benzo(a)pyrene (1.4 mg/kg for both coarse and fine textured soils) are based on an older set of Canadian soil quality guidelines, which have been subsequently revised. This Technical Report developed a higher reliability ESL of 20 mg/kg for BaP in urban residential and public open space areas. This value was developed using additional and more recent information following the NEPM methodology, whilst also assuming (conservatively) the contamination is 'fresh' and not taking into account changing bioavailability associated with ageing and. Organic carbon content in soil. The derived screening levels are considered to be conservative and of higher reliability compared to the current NEPM values. The Technical Report notes the higher reliability ESL values are more than an order of magnitude greater than the ESLs previously listed in the NEPM, and more generally accord with the revised Canadian guideline levels. In the case of urban land, the revised ESLs are considerably higher than the corresponding HSLs, and are not likely to determine the requirements for remediation. This PRSA has not adopted any ecological screening values for BaP, but has considered any results above health based screening values would also likely be indicative of potential adverse ecological effects. This is still considered to be conservative and reflective of the current state of knowledge.

[13] CRC CARE 2017, Risk-based management and remediation guidance for benzo(a)pyrene, CRC CARE Technical Report no. 39, CRC for Contamination Assessment and Remediation of the Environment, Newcastle, Australia.

Table 10. Auditor Screening Criteria – Soil Health Screening Levels for Direct Contact

Chemical	Health based screening levels for direct contact exposure (where relevant)				
	HSL-A (low density residential)	HSL-B (high density residential)	HSL-C (recreation / open space)	HSL-D (commercial / industrial)	Intrusive maintenance worker – shallow trench
Benzene	100	140	120	430	1,100
Toluene	14,000	21,000	18,000	99,000	120,000
Ethylbenzene	4,500	5,900	5,300	27,000	85,000
Xylenes	12,000	17,000	15,000	81,000	130,000
Naphthalene	1,400	2,200	1,900	11,000	29,000
TPH C6-C10	4,400	5,600	5,100	26,000	82,000
TPH >C10-C16	3,300	4,200	3,800	20,000	62,000
TPH >C16-C34	4,500	5,800	5,300	27,000	85,000
TPH>C34-C40	6,300	8,100	7,400	38,000	120,000

Source:- Health screening levels for petroleum hydrocarbons in soil and groundwater (CRC CARE Tech Report 10, Authors – Friebel & Nadebaum, 2011)
Unless specified otherwise, all values are in milligrams per kilogram (mg/kg).

Soil Vapour Screening Values

The following sources were used for screening values for volatile chemicals of interest by the assessment consultant and Auditor.

- NEPM 1999 (as amended) health screening levels (HSL) for TPH, BTEX and naphthalene. These are derived using current accepted air quality guidelines and using an attenuation factor (AF) of 0.005 from subsurface vapour to indoor air (Friebel and Nadebaum, 2011)[14].
- NEPM 1999 (as amended) interim health investigation levels (iHIL) for chlorinated hydrocarbons including 111 TCA, PCE, TCE, DCE, VC.

Table 11. Summary of Vapour Screening Criteria

Chemicals	Soil Vapour Screening Values Adopted by Consultant (μg/m³)		Comments
	Residential and other 'sensitive' land uses	Commercial	
Benzene*	1,000	4,000	Soil vapour HSLs from the ASC NEPM (as amended 2013). Considered reasonable and justifiable. Assumed sand soil and depth to source <1m (for slab on ground buildings).
Toluene*	1,300,000	4,800,000	
Ethylbenzene*	330,000	1,300,000	
Xylenes*	220,000	840,000	
Tetrachloroethene (PCE)	2,000	8,000	Interim soil vapour HILs for VOCs from the ASC NEPM (as amended 2013). Values are independent of depth or soil type.
Trichloroethene (TCE)	20	80	
cis-1-2-dichloroethene (DCE)	80	300	
vinyl chloride (VC)	30	100	

NL = Non Limiting.

[14] Friebel, E & Nadebaum, P 2011. *Health screening levels for petroleum hydrocarbons in soil and groundwater. Part 1: Technical development document,* CRC CARE Technical Report no. 10., CRC for Contamination Assessment and Remediation of the Environment, Adelaide, Australia.

5.3 Ground Conditions, Lithology, Wastes

The assessment consultant Compass Environmental reported the soil conditions comprised a thin layer of fill material typically 0.3m or less, comprising gravel, sand and clays, with no odour or staining and with limited secondary constituents or waste inclusions, except for some minor brick fragments at B2, B3 and B4, and some timber fragments at B6. There was no visible asbestos fragments noted across the site or at the sampled locations. The underlying natural soils comprised brown silty clay with no associated odour or staining.

5.4 Chemical Analyses of Soils

Compass Environmental reported there were limited impacts evident in the soil analyses result as noted below:-

- Soil pH ranged from 7.2 (fill) to 7.4 (natural).
- Metals. Majority of results were below adopted screening values. Isolated exceptions included a copper results in one duplicate above the adopted EIL. All results well below adopted health based screening values.
- Organics (TPH, phenols, PAHs, PCBs, OC pesticides). No elevatd results. All results below adopted ecological and health based screening values.

Compass has reported the soils results indicate the soils meet the classification of 'fill material' as defined in the current Victorian regulatory framework, and there would be no restrictions in terms of these soils being disposed or reused off-site.

5.5 Soil Vapour Results

Compass Environmental reported there were no elevated results reported in the soil vapour sample collected from the western site boundary, and the results were well below the adopted screening levels.

5.6 Overall Quality and Adequacy of Information

The Auditor has completed reviews of the various reports / information and submitted comments and queries to the assessor. Copies of the review information are provided in Appendix G of this PRSA. The Auditor's review of the assessment data and interpretation has found that the datasets are of suitable quality to be relied upon for an initial assessment of the condition of the Site and to make a determination regarding the likelihood of land at the Site being contaminated.

6. CONCEPTUAL SITE MODEL

Physical & Environmental Setting

The Site is located in the urbanised suburb of Hadfield, with the area having been urbanized since about the 1950s. region characterised by pastoral land with commercial/industrial and residential activities from the mid-1900s. The land in the area is relatively level and with major topographic features.

The northern boundary of the Site abuts South Street, with a mixture of low and medium density residential properties and industrial (confectionary manufacture and Council depot) to the north, commercial / light industrial properties to the east, aged care residential living to the south and low density residential to the west.

The nearest watercourse is Merlynston Creek, approximately 730m to the east / south east.

Site History

The land in the area was formerly broad acre farmland until it was subdivided in the 1950s. Land to the east and south because industrial, whilst the subject land becoming three individual lots each of about 500m2 area. Land on the north side of South Street has also bene a mix of residential and industrial since the 1950s. Aerial photographs and titles indicate all three lots were probably residential, with the western most lot (no.91) being converted to a commercial premises sometime in the 1960s. The three lots have been recently cleared of all former buildings in preparation for redevelopment as a single development lot. Notable adjacent land uses have included an engineering works on the land immediately to the east, and a former large concrete pipe manufacturer and testing operations (Humes Pipes) on land to the east and south.

Current and Proposed Land Use

The Site is currently a vacant cleared land parcel. The reporting indicates that the proposed redevelopment comprises a child care centre. The plans indicate a single level building at grade, with external areas to include car parking and landscaped play / activity areas. The plans indicate the external play areas will be predominantly covered with some form of soft fall or other all weather surface, with areas of exposed / accessible soils limited to strips of garden beds

Geology & Hydrogeology

The Geological Survey of Victoria mapping which indicates the surface geology in the area is Brighton Group sediments of Tertiary Age. The reporting notes the lithology typically comprises marine and on-marine clays, ferruginous sandstones and gravels. Groundwater is likely to be present within the Brighton Group sediments, with the Visualising Victoria's Groundwater website (http://maps.ubspatial.com.au/vvg) indicating the depth of the water table in the area to be less than 5 metres below the ground surface and with a TDS in the range 1,001-3,500 mg/L. The Auditor has reviewed available audit reports in the area and notes there was a site approximately 200m north in the same geological setting which reported that groundwater was encountered at approximately 8.5m depth and TDS ranged from 4,000-9,200 mg/L. Based on the area specific information in that audit report this PRSA has determined groundwater is likely in segment C (3,101-5,400 mg/L TDS) as defined in the ERS.

Potential Sources of Contamination, Waste and/or Pollution

Potential on-site sources of contamination are likely limited to chemical impacts in the shallow fill layer and possible remnant building / demolition waste. These are considered relatively benign in the overall range of potentially contaminating land uses and activities, and overall it is considered

the likelihood of the land at the site being impacted by pollution, waste or prescribed substances with resulting harm to human health or the environment (i.e. meeting the definition of contaminated land) from past on-site land usage and activities was considered low.

Potential off-site sources of contamination include the former industrial operations and ancillary activities that have occurred within the vicinity of the Site, in particular the former engineering works which was located on the adjacent land to the east. Another possible source of impact are those associated with older urbanised areas such as nutrients relating to sewerage infrastructure. Overall it is considered the likelihood of the land at the site being impacted by pollution, waste or prescribed substances with resulting harm to human health or the environment (ie. meeting the definition of contaminated land) from past off-site land usage and activities was considered moderate.

There has been some direct sampling and analysis of soil and soil vapour completed at the Site as discussed elsewhere in the PRSA. There have been no chemical impacts or wastes found in soils beneath the Site, and no impacts from volatile organic compounds (VOCs). were reported in the soil vapour sampling / analysis. It is considered those results provide further support for the Auditor's assessment of the potential for contamination from on-site and off-site sources as noted above.

Groundwater has not been directly assessed but the main concern with groundwater would be off-site sourced VOCs, and that aspect was addressed via the soil vapour sampling / analysis.

Migration / Exposure Pathways and Receptors (onsite)

Future receptors that could be at some risk from contamination at the Site include workers involved in the construction / redevelopment, future occupants (workers and children at the child care centre), and future intrusive maintenance works.

For soils, there have not been any impacts identified in soils beneath the Site. In the absence of a suspected or known source there is negligible potential for any migration or exposure pathways to pose a threat to the above receptors.

For groundwater, there are no suspected exposure pathways of concern in relation to the extraction and use of groundwater for uses protected in this groundwater segment. There is no current use of groundwater either on site or in the surrounding area and future use is also considered unlikely. The potential for indirect exposures to volatile chemicals via vapour intrusion from volatile chemical impacts in groundwater has also been assessed to be a negligible risk based on the preliminary soil vapour sampling / analysis completed.

The nearest surface water receptor (Merlynston Creek) is considered sufficiently distant from the Site for any impacts in groundwater that might pose a threat of adverse impacts to water quality in that water course.

7. SITE CONDITION AND PRSA OUTCOME

7.1 Likelihood of Contamination and Associated Risks

In accordance with relevant EPA guidance[15], at the completion of the assessment phase the Auditor is required to conclude whether contamination is present at the site, and if present, what consequence the contamination would have on the proposed use of the site, and finally whether or not an environmental audit is required. If an audit is required, the Auditor also expected to set out the proposed scope of the audit. The following points are considered relevant for the outcomes of this PRSA:-

- The history of the site is relatively benign in terms of potentially contaminating land uses. It was comprised of three individual lots from the 1950s until recently, with two being residential and one having a commercial use.
- The history of surrounding land use is a mix of industrial, commercial and residential. Some of those uses have a moderate to high potential for contamination, and there was also considered some possibility that impacts in groundwater and soil vapour from one or more of these surrounding properties could have migrated beneath the subject site.
- Soils beneath the Site have been sampled and analysed. The range of results reported were below all adopted screening criteria, and in the context of the proposed redevelopment the degree of impact found in soils beneath the Site is deemed to be trivial from a human health and ecological viewpoint.
- No evidence of any other wastes or pollution that might be of concern from a health risk or aesthetic viewpoint were identified.
- Based on the reported soil assessment results it is considered there is negligible risk of any soil contamination being present that might be of potential concern in the context of the proposed redevelopment.
- Analysis of soil vapour has been completed from near the eastern boundary, which is adjacent to former industrial and current commercial land. No detects of any volatile organic compounds (VOCs) were reported. Based on the historical desktop information review and these vapour assessment results, the risks of any impacts from volatile chemicals from subsurface sources including soil and/or groundwater posing a threat to the future redevelopment are considered to be negligible.

Table 12. Summary of assessment phase of works and outcomes

Aspect	Auditor conclusion
Is the Site likely to be contaminated land?	No. The assessment has found it unlikely that the site is contaminated land.
If contamination is likely, does it prevent or restrict the use and or proposed use?	Not applicable. As noted above, the assessment has found contamination is unlikely.
Is an environmental audit required?	No. Based on the above outcomes an environmental audit is not required.
If an environmental audit is required, set out the proposed scope of this audit.	Not applicable.

[15] Guideline for conducting preliminary risk screening assessments. EPA Publication 2021, February 2022.

7.2 PRSA Conclusion

Under the current EPA guidelines for conducting PRSA's, there are three possible outcomes for a PRSA:-

1. Unlikely that contaminated land is present, and no environmental audit is required.
2. Likely that contaminated land is present, but no environmental audit is required.
3. Likely that contaminated land is present, and an environmental audit is required.

For this particular PRSA the outcome is scenario 1 (i.e. unlikely that contaminated land is present, and no environmental audit is required). The reasoning for this outcome has been detailed in this PRSA report. A copy of the PRSA Statement is included in the report annexures.

8 REFERENCES

- *Environment Protection Act* 2017 (Vic).
- *Planning and Environment Act* 1987 (Vic).
- Environment Reference Standard, Victoria Government Gazette No. S245 (26 May 2021)
- National Environment Protection (Assessment of Site Contamination) Measure (NEPC, 1999) (as amended April 2013)
- Department of Environment, Land, Water and Planning (2021) Potentially Contaminated Land, Planning Practice Note 30, July 2021.
- Environment Protection Authority Victoria, Guide to the Environment Protection Regulations, Publication 1753.2, Environment Protection Authority Victoria, 2021.
- Environment Protection Authority Victoria, Contaminated Land Policy, Publication 1915, Environment Protection Authority Victoria, 2021.
- Environment Protection Authority Victoria, Contaminated Land: Understanding Section 35 of the Environment Protection Act 2017, Publication 1940, 2021.
- Environment Protection Authority Victoria. Guide to the Environment Reference Standard, Publication 1992, 2021.
- Environment Protection Authority Victoria, Guidance for the Cleanup and Management of Contaminated Groundwater, Publication 2001.1, 2021.
- Environment Protection Authority Victoria, Guideline for Conducting of Preliminary Risk Screen Assessments, EPA Publication 2021, February 2022.
- Ministerial Direction No. 1 – Potentially Contaminated Land 2021.
- Australian Standard, Guide to the investigation and sampling of sites with potentially contaminated soil, Part 1: Non-volatile and semi-volatile compounds. AS4482.1-2005.
- Australian Standard, Guide to the investigation and sampling of sites with potentially contaminated soil, Part 2: Volatile compounds. AS4482.2-1999.
- Australian Standard, Piling - Design and Installation, Australian Standard: AS2159-2009.
- Various guidance provided to auditors (unpublished) prior to the date of this PRSA.

PRELIMINARY RISK SCREENING ASSESSMENT

Annexure 1 Preliminary Risk Screening Assessment Statement

Preliminary risk screen assessment statement

Under Part 8.3 of the *Environment Protection Act 2017*

Publication F1031.1 published February 2022

The purpose of a preliminary risk screen assessment is:

(a) to assess the likelihood of the presence of contaminated land; and

(b) to determine if an environmental audit is required; and

(c) if an environmental audit is required, to recommend a scope for the environmental audit.

It is important to note that a PRSA statement is not an environmental audit statement or an environmental audit report. It should not be construed as an environmental audit conducted to assess the suitability of land use.

This statement is a summary of the findings of a preliminary risk screen assessment conducted under Part 8.3 of the *Environment Protection Act 2017* for:

87 - 91 South Street, Hadfield, Victoria 3046

(Certificates of Title Volume 07505 / Folio 016; Volume 07573 / Folio 163; Volume 08076 / Folio 264)

Further details are provided in the preliminary risk screen assessment report that accompanies this statement.

Section 1: Preliminary risk screen assessment overview

Environmental auditor details

Name:	Steven Kirsanovs
Company:	Kirsa Environmental
Address:	PO Box 1221 Carlton, Victoria 3053
Phone:	0412 944 411
Email:	stevenk@kirsaenv.com.au

Site owner/occupant

Name:	-
Company:	South Street Property Holdings Pty Ltd

Environmental auditor engaged by

Name:	Mr Stephen Coleiro
Company:	G2 Urban Planning
Relationship to site owner:	Authorised representative of owner / developer

Reason for preliminary risk screen assessment

Planning scheme:	Merri-bek City Council

Permit details (if applicable):	MPS/2022/275
Other:	
☐ Permit is attached (if applicable):	

Section 2: Assessment scope

Site details

Address:	87 - 91 South Street, Hadfield, Victoria 3046
Title details:	Volume 07505 / Folio 016; Volume 07573 / Folio 163; Volume 08076 / Folio 264 (three titles)
Area (m^2):	1,596m^2

☒ a plan of the site is attached

Use or proposed use assessed

The below section details which land uses (current and proposed) the PRSA has assessed. Note, this is not a suitability of land use audit, rather an assessment to determine if an environmental audit is required for the land uses that apply to the specific PRSA.

Sensitive land use categories

Note that sensitive land uses in the *Environment Reference Standard 2021* (ERS 2021) are categorised as lower and high density. Lower density is where there is generally substantial access to soil and high density is restricted to developments that make maximum use of available land space, and there is minimal access to soil. For planning purposes, the *Ministerial Direction No. 1* (MD No.1) considers secondary schools and children's playgrounds to be sensitive land uses.

☒ High density

☒ Other (lower density)

- ☐ Residential land use
- ☒ Child care centre
- ☐ Pre-school
- ☐ Primary school
- ☐ Secondary school

☐ Children's playground (indoor)

☐ Children's playground (outdoor)

Other land use categories

☐ Recreation/open space

☐ Parks and reserves

☐ Agricultural

☐ Commercial

☐ Industrial

☐ Other land uses not captured by the above as described here:

Environmental elements assessed

☒ Land

- ☒ all environmental values that apply to the land use category were considered **OR**
- ☐ all environmental values that apply to the land use category, other than the following, were considered:

Preliminary risk screen assessment statement

☒ Water

☒ Surface water

☒ all environmental values that apply to the applicable segment were considered **OR**

☐ all environmental values that apply to the applicable segment, other than the following, were considered:

☒ Groundwater

☒ all environmental values that apply to the applicable segment were considered **OR**

☐ all environmental values that apply to the applicable segment, other than the following, were considered:

Standards considered

Environment Reference Standard 2021
National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended from time to time

Assumptions made during the assessment or any limitations

Proposed use and in particular building construction, layout and surface cover for this proposed development are assumed to be consistent with the plans provided by the developer and included in this PRSA.

Exclusions from the assessment and the rationale for these

The following elements of the environment were not considered as part of the auditor's assessment –

Ambient air.

Water (surface water) assessment was confined to the following:-

- As no surface water bodies exist either onsite or in the vicinity of the site, surface water was considered in the context of receiving waters (defined as surface waters which receive discharges from groundwater, pursuant to section 4, Environment Reference Standard 2021).

This statement is accompanied by the following preliminary risk screen assessment report

Title:	*Preliminary Risk Screening Assessment, 87- 91 South Street, Hadfield VIC.*
Report no:	7004
Date:	23 March 2023

Section 3: Assessment outcome

Based on my assessment, I am of the opinion that an environmental audit is **not required** for the following land uses, **including** the use or proposed use for which the site has been assessed:

Sensitive land use categories

Note that sensitive land uses in the ERS 2021 are categorised as lower and high density. Lower density is where there is generally substantial access to soil and high density is restricted to developments that make maximum use of available land space, and there is minimal access to soil. For planning purposes, the MD No.1 considers secondary schools and children's playgrounds to be sensitive land uses.

☒ High density

☒ Other (lower density)

☒ Residential land use
☒ Child care centre
☒ Pre-school
☒ Primary school
☒ Secondary school

☒ Children's playground (indoor)
☒ Children's playground (outdoor)

Other land use categories

☒ Recreation/open space
☒ Parks and reserves
☐ Agricultural
☒ Commercial
☒ Industrial
☐ Other land uses not captured by the above as described here:

Note: An assessment that an environmental audit is not required does not include any comment on as to whether responsibilities under section 39 of the *Environment Protection Act 2017* (duty to manage contaminated land) exist for the person in management or control of the land. Please refer to EPA publication 1977, *Assessing and controlling contaminated land risks: A guide to meeting the duty to manage for those in management or control of land* (https://www.epa.vic.gov.au/about-epa/publications/1977*)*.

Section 4: Environmental auditor's declaration

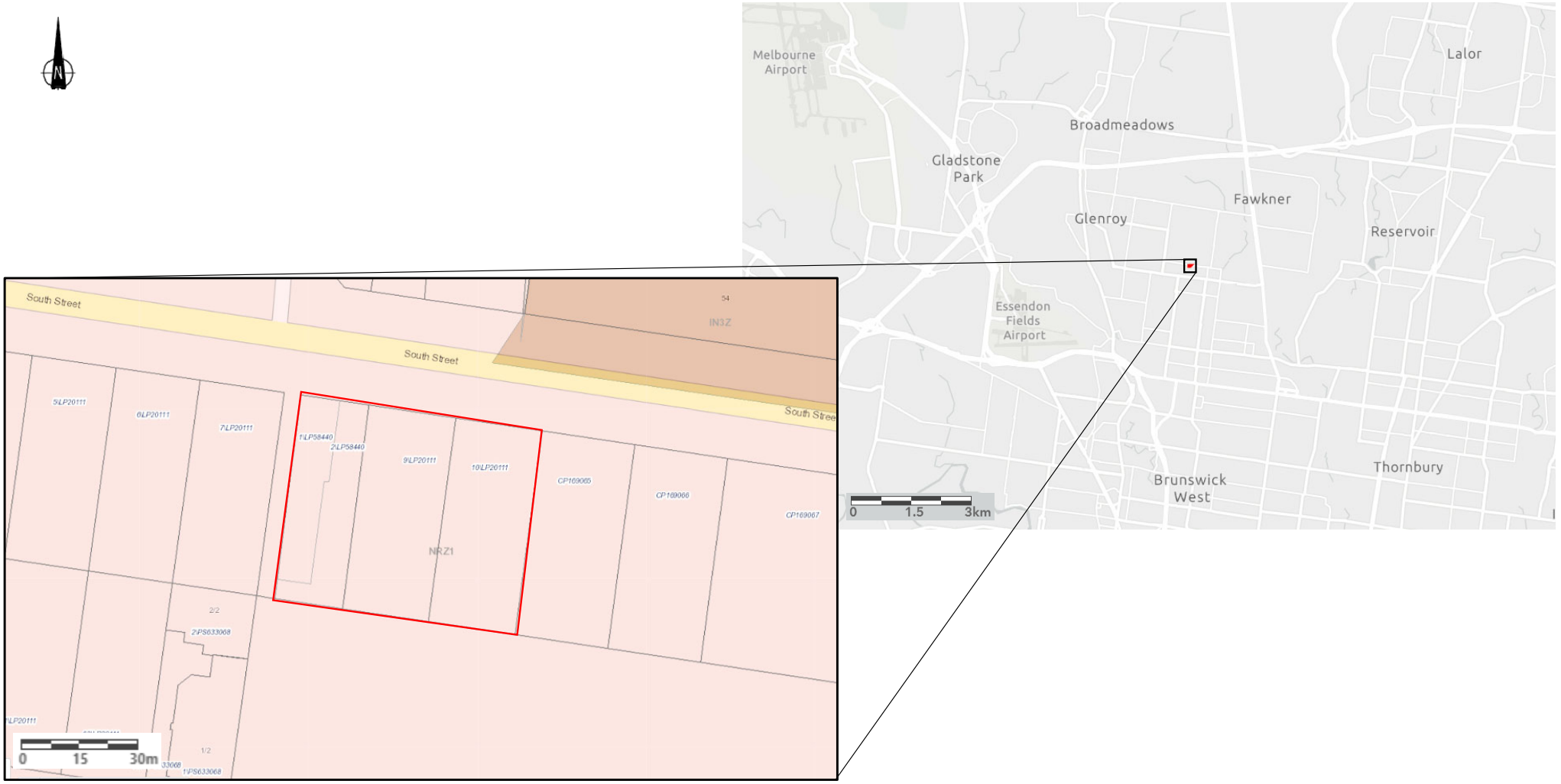
I state that:

- I am appointed as an environmental auditor by the Environment Protection Authority Victoria under the *Environment Protection Act 2017*.
- The findings contained in this statement represents a true and accurate summary of the findings of the preliminary risk screen assessment that I have completed.

Date:	23 March 2023
Signed:	
Name:	Steven Jon Kirsanovs
	Environmental Auditor

FIGURES

Figure 1 PRSA Site Boundary Plan



LEGEND

SITE BOUNDARY

RKH 02 / 03 / 2023
7004 Rev.01

KIRSA ENVIRONMENTAL

Adapted from:
Victoria Plan (March 2023)
ArcGIS (March 2023)

PRSA SITE BOUNDARY PLAN
87 – 91 SOUTH STREET, HADFIELD, VIC

TABLES

TABLE 1

Soil Sample Summary Tables

Project ID: 20015
Site ID: Hadfield, VIC
Client Company: South Streeet Property Holdings Pty Ltd

Table 1 - Soil EIL and HIL Results

	Inorganics					Anions	Metals																		
	Moisture Content	pH CaCl2	Cyanide Total	Cyanide amenable to chlorination	Fluoride	Sulphate (as SO4)	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium (III+VI)	Chromium (hexavalent)	Cobalt	Copper	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Tin	Vanadium
	%	pH Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.1	0.1	1	1	40	100	5	2	10	1	50	0.4	2	0.5	2	5	5	5	0.1	2	2	5	2	5	5
NEPM 2013 EIL Fill (Urban Residential and Public Open Space)							20[#1]	100	330[#2]	21[#2]		10[#3]	200[#4]	130[#5]	50[#1]	70[#6]	1,100[#7]	500[#8]	6.6[#3]	10[#1]	35[#9]	10[#10]	20[#1]	50[#1]	130[#11]
NEPM 2013 EIL Natural (Urban Residential and Public Open Space)							20[#1]	100	330[#2]	21[#2]		10[#3]	200[#4]	130[#5]	50[#1]	70[#6]	1,100[#7]	500[#8]	6.6[#3]	10[#1]	35[#9]	10[#10]	20[#1]	50[#1]	130[#11]
NEPM 2013 EIL Fill (Commercial/Industrial)							*40[#1]*	*160*	*330[#2]*	*21[#2]*		*22[#3]*	*320[#4]*		*300[#1]*	*95[#6]*	*1,800[#7]*	*500[#8]*	*24[#3]*	*40[#1]*	*60[#9]*	*10[#10]*		*300[#1]*	*130[#11]*
NEPM 2013 EIL Natural (Commercial/Industrial)							**40[#1]**	**160**	**330[#2]**	**21[#2]**		**22[#3]**	**320[#4]**		**300[#1]**	**95[#6]**	**1,800[#7]**	**500[#8]**	**24[#3]**	**40[#1]**	**60[#9]**	**10[#10]**		**300[#1]**	**130[#11]**
NEPM 2013 Table 1A(1) HILs Res A Soil			250[#20]		3,100[#21]		31[#21]	100[#22]	15,000[#21]	60	4,500	20	120,000[#23]	100	100	6,000	300[#24]	3,800	40[#25]	390[#21]	400	200	390[#21]	47,000[#21]	390[#21]
NEPM 2013 Table 1A(1) HILs Res B Soil			300[#20]		3,100[#21]		31[#21]	500[#22]	15,000[#21]	90	40,000	150	120,000[#23]	500	600	30,000	1,200[#24]	14,000	120[#25]	390[#21]	1,200	1,400	390[#21]	47,000[#21]	390[#21]
NEPM 2013 Table 1A(1) HILs Rec C Soil			240[#20]		3,100[#21]		31[#21]	300[#22]	15,000[#21]	90	20,000	90	120,000[#23]	300	300	17,000	600[#24]	19,000	80[#25]	390[#21]	1,200	700	390[#21]	47,000[#21]	390[#21]
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil			1,500[#20]		47,000[#21]		470[#21]	3,000[#22]	220,000[#21]	500	300,000	900		3,600	4,000	240,000	1,500[#24]	60,000	730[#25]	5,800[#21]	6,000	10,000	5,800[#21]	700,000[#21]	5,800[#21]

Location	Field ID	Date	Lab Report No.	Sample Type	Matrix Description																					
B1	B1/0.2	09/03/2023	EM2304311	Normal	Fill	18.6	7.4	<1	<1	190	-	<5	<5	190	<1	<50	<1	-	<0.5	-	8	14	-	<0.1	<2	20	<5	<2	<5	-
B1	B090323A	09/03/2023	EM2304311	Field_D	Fill	19.2	-	-	-	-	-	-	<5	-	-	-	<1	29	-	-	*133*	26	-	0.2	-	18	-	-	-	-
B1	B201/0.2	09/03/2023	970590	Interlab_D	Fill	21	-	-	-	-	-	-	<2	-	-	-	<0.4	40	-	-	7.0	13	-	<0.1	-	18	-	-	-	-
B1	B1/0.5	09/03/2023	EM2304311	Normal	Natural	17.5	-	-	-	-	-	-	<5	-	-	-	<1	19	-	-	<5	11	-	<0.1	-	13	-	-	-	-
B1	B1/1.0	09/03/2023	EM2304311	Normal	Natural	18.0	-	-	-	-	-	-	<5	10	<1	<50	<1	18	-	12	<5	10	21	<0.1	-	13	<5	-	-	34
B2	B2/0.15	09/03/2023	EM2304311	Normal	Fill	16.6	-	-	-	-	-	-	<5	300	<1	<50	<1	24	-	13	8	16	150	<0.1	-	16	<5	-	-	46
B2	B2/0.4	09/03/2023	EM2304311	Normal	Natural	22.2	-	-	-	-	-	-	<5	-	-	-	<1	26	-	-	6	12	-	<0.1	-	17	-	-	-	-
B2	B090323B	09/03/2023	EM2304311	Field_D	Natural	20.8	-	-	-	-	-	-	<5	-	-	-	<1	21	-	-	5	12	-	<0.1	-	19	-	-	-	-
B2	B202/0.4	09/03/2023	970590	Interlab_D	Natural	23	-	-	-	-	-	-	<2	-	-	-	<0.4	44	-	-	7.6	15	-	<0.1	-	25	-	-	-	-
B2	B2/1.0	09/03/2023	EM2304311	Normal	Natural	23.1	-	-	-	-	-	-	<5	50	<1	<50	<1	22	-	6	5	13	38	<0.1	-	11	<5	-	-	47
B3	B3/0.1	09/03/2023	EM2304311	Normal	Fill	14.2	-	-	-	-	-	-	<5	-	-	-	<1	14	-	-	15	31	-	<0.1	-	14	-	-	-	-
B3	B3/0.25	09/03/2023	EM2304311	Normal	Fill	16.0	-	-	-	-	-	-	<5	120	<1	<50	<1	21	-	13	5	11	83	<0.1	-	13	<5	-	-	34
B3	B3/0.45	09/03/2023	EM2304311	Normal	Natural	22.0	-	-	-	-	-	-	19	280	1	<50	<1	28	-	16	<5	25	78	<0.1	-	17	<5	-	-	**194**
B4	B4/0.1	09/03/2023	EM2304311	Normal	Fill	13.4	-	-	-	-	-	-	<5	20	<1	<50	<1	21	-	5	<5	12	88	<0.1	-	8	<5	-	-	70
B4	B4/0.5	09/03/2023	EM2304311	Normal	Natural	19.4	-	-	-	-	-	-	<5	330	1	<50	<1	27	-	19	5	12	40	<0.1	-	20	<5	-	-	56
B5	B5/0.1	09/03/2023	EM2304311	Normal	Fill	12.6	-	-	-	-	-	-	<5	50	<1	<50	<1	17	-	4	12	20	86	<0.1	-	9	<5	-	-	39
B5	B5/0.25	09/03/2023	EM2304311	Normal	Fill	14.8	-	-	-	-	540	-	<5	-	-	-	<1	21	-	-	7	12	-	<0.1	-	9	-	-	-	-
B5	B5/0.5	09/03/2023	EM2304311	Normal	Natural	23.3	7.2	<1	<1	210	350	<5	<5	170	<1	<50	<1	-	<0.5	-	7	12	-	<0.1	<2	20	<5	<2	<5	-
B5	B5/1.0	09/03/2023	EM2304311	Normal	Natural	20.0	-	-	-	-	-	-	<5	40	<1	<50	<1	12	-	5	<5	9	18	<0.1	-	7	<5	-	-	27
B6	B6/0.1	09/03/2023	EM2304311	Normal	Fill	12.6	-	-	-	-	-	-	<5	20	<1	<50	<1	22	-	4	8	10	31	<0.1	-	7	<5	-	-	49
B6	B6/0.5	09/03/2023	EM2304311	Normal	Natural	18.4	-	-	-	-	-	-	7	80	<1	<50	<1	27	-	12	6	13	36	<0.1	-	15	<5	-	-	111
B7	B7/0.1	09/03/2023	EM2304311	Normal	Fill	13.4	-	-	-	-	-	-	<5	-	-	-	<1	21	-	-	32	32	-	0.2	-	10	-	-	-	-
B7	B7/0.25	09/03/2023	EM2304311	Normal	Fill	17.6	-	-	-	-	-	-	<5	30	<1	<50	<1	21	-	5	7	12	41	<0.1	-	8	<5	-	-	42
B7	B7/0.9	09/03/2023	EM2304311	Normal	Natural	13.7	-	-	-	-	-	-	<5	30	<1	<50	<1	17	-	19	<5	9	36	<0.1	-	15	<5	-	-	34
SV1	SV1/0.5	09/03/2023	EM2304311	Normal	Natural	21.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comments
#1 Based on CCME 1991
#2 US EPA 2005 ECO SSL
#3 Based on CCME 1999
#4 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(3) and ABC provided for an old Victorian suburb with low traffic (Olszowy et al 1995). Criteria based on Cr(III).
#5 ECO SSL 2008 - Protection of Mammalian Wildlife
#6 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(2) and ABC provided for an old Victorian suburb with low traffic (Olszowy et al 1995).
#7 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(4) and ABC provided for an old Victorian suburb with low traffic (Olszowy et al 1995).
#8 NEPC 1999. NEPM Interim Urban Ecological Investigation Level.
#9 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(3) and ABC provided for an old Victorian suburb with low traffic (Olszowy et al 1995).
#10 Based on EPA IWRG 621 Clean Fill Criteria
#11 Based on CCME 1997
#12 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(1) and ABC provided for an old Victorian suburb with low traffic (Olszowy et al 1995).
#13 US EPA 2007 ECO SSL - Based on high molecular weight PAHs
#14 Based on Ministry of Infrastructure and Environment, Dutch Target Intervention Value (2013 Circular)
#15 Based on US EPA Region 4 Soil Screening Value (All Receptors) - revised 2015
#16 Based on PFAS NEMP, indirect exposure pathway (HEPA 2018)
#17 Based on PFAS NEMP, direct exposure pathway (HEPA 2018)
#18 Based on PFAS NEMP, direct exposure pathway (HEPA 2020)
#19 Based on PFAS NEMP, indirect exposure pathway for intensively developed sites (HEPA 2018)
#20 Based on free cyanide.
#21 Based on US EPA Regional Screening Levels (RSLs) (TR=1 E-6, HQ=1.0), revised May 2020
#22 Arsenic: HIL assumes 70% oral bioavailability. Site-specific bioavailability maybe important and should be considered where appropriate (refer shedule B7).
#23 Based on US EPA Regional Screening Levels (RSLs) (TR=1 E-6, HQ=1.0), revised May 2020 - Chromium insoluble salts criteria has been adopted
#24 Lead: HILs A,B,C based on blood lead models (IEUBK & HIL D on adult lead model for where 50% bioavailability considered. Site-specific bioavailability should be considered where appropriate.
#25 Elemental mercury: HIL does not address elemental mercury. a site specific assessment should be considered if elemental mercury is present, or suspected to be present.
#26 Carcinogenic PAHs: HIL based on 8 carcinogenic PAHs & their TEFs (relative to BaP, ref Schedule B7). BaP TEQ = Sum of each carcinogenic PAH adjusted by its BaP TEF (refer Tabl 1A(1).
#27 Total PAHs: Based on sum of 16 most common reported (WHO 98). HIL application should consider presence of carcinogenic PAHs (should meet BaP TEQ HIL) & naphthalene (should meet relevant HSL)
#28 PCBs: HIL refers to non-dioxin like PCBs only. Where PCB source is known, or suspected at a site, a site-specific assessment of exposure to all PCBs (inc dioxin like PCBs) should be undertaken
#29 Based on PFAS NEMP (HEPA 2018)

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Project ID: 20015
Site ID: Hadfield, VIC
Client Company: South Streeet Property Holdings Pty Ltd

Table 1 - Soil EIL and HIL Results

	Metals	TRH												MAH								PAH										
	Zinc	C6 - C9	C10 - C14	C15 - C28	C29-C36	+C10 - C36 (Sum of total)	C6-C10	TRH C6-C10 less BTEX (F1)	C10-C16	TRH>C10-C16 less Napthalene (F2)	C16-C34	C34-C40	C10 - C40 (Sum of total)	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	BTEX (Sum)	Styrene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene TEQ (LOR)	Benzo(a)pyrene TEQ calc (Half)	Benzo(a)pyrene TEQ calc (Zero)	Benzo(a) pyrene	Benzo(g,h,i)perylene	Benzo(b+j)fluoranthene	Benzo(k)fluoranthene
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	5	10	20	50	50	50	10	10	50	50	100	100	50	0.1	0.1	0.1	0.2	0.1	0.3	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NEPM 2013 EIL Fill (Urban Residential and Public Open Space)	110[#12]																															
NEPM 2013 EIL Natural (Urban Residential and Public Open Space)	110[#12]																															
NEPM 2013 EIL Fill (Commercial/Industrial)	*150*[#12]																															
NEPM 2013 EIL Natural (Commercial/Industrial)	**150**[#12]																															
NEPM 2013 Table 1A(1) HILs Res A Soil	7,400																									3[#26]	3[#26]	3[#26]				
NEPM 2013 Table 1A(1) HILs Res B Soil	60,000																									4[#26]	4[#26]	4[#26]				
NEPM 2013 Table 1A(1) HILs Rec C Soil	30,000																									3[#26]	3[#26]	3[#26]				
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil	400,000																									40[#26]	40[#26]	40[#26]				
Location	**Field ID**	**Date**	**Lab Report No.**	**Sample Type**	**Matrix Description**																													
B1	B1/0.2	09/03/2023	EM2304311	Normal	Fill	18	<10	<50	<100	<100	<50	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	-	-
B1	B090323A	09/03/2023	EM2304311	Field_D	Fill	42	<10	<50	<100	<100	<50	14	14	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	-	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	<0.5	<0.5
B1	B201/0.2	09/03/2023	970590	Interlab_D	Fill	40	<20	30	<50	<50	<50	<20	<20	<50	<50	<100	<100	<100	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	-	-	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	<0.5	<0.5
B1	B1/0.5	09/03/2023	EM2304311	Normal	Natural	12	<10	<50	<100	<100	<50	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	-	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	<0.5	<0.5
B1	B1/1.0	09/03/2023	EM2304311	Normal	Natural	<5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B2/0.15	09/03/2023	EM2304311	Normal	Fill	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B2/0.4	09/03/2023	EM2304311	Normal	Natural	10	<10	<50	<100	<100	<50	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	-	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	<0.5	<0.5
B2	B090323B	09/03/2023	EM2304311	Field_D	Natural	7	<10	<50	<100	<100	<50	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	-	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	<0.5	<0.5
B2	B202/0.4	09/03/2023	970590	Interlab_D	Natural	20	<20	<20	<50	<50	<50	<20	<20	<50	<50	<100	<100	<100	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	-	-	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	<0.5	<0.5
B2	B2/1.0	09/03/2023	EM2304311	Normal	Natural	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B3	B3/0.1	09/03/2023	EM2304311	Normal	Fill	44	<10	<50	<100	<100	<50	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	-	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	<0.5	<0.5
B3	B3/0.25	09/03/2023	EM2304311	Normal	Fill	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B3	B3/0.45	09/03/2023	EM2304311	Normal	Natural	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B4	B4/0.1	09/03/2023	EM2304311	Normal	Fill	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B4	B4/0.5	09/03/2023	EM2304311	Normal	Natural	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B5	B5/0.1	09/03/2023	EM2304311	Normal	Fill	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B5	B5/0.25	09/03/2023	EM2304311	Normal	Fill	13	<10	<50	<100	<100	<50	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	-	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	<0.5	<0.5
B5	B5/0.5	09/03/2023	EM2304311	Normal	Natural	14	<10	<50	<100	<100	<50	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	-	-
B5	B5/1.0	09/03/2023	EM2304311	Normal	Natural	<5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B6	B6/0.1	09/03/2023	EM2304311	Normal	Fill	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B6	B6/0.5	09/03/2023	EM2304311	Normal	Natural	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B7	B7/0.1	09/03/2023	EM2304311	Normal	Fill	83	<10	<50	<100	<100	<50	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	-	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	<0.5	<0.5
B7	B7/0.25	09/03/2023	EM2304311	Normal	Fill	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B7	B7/0.9	09/03/2023	EM2304311	Normal	Natural	<5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SV1	SV1/0.5	09/03/2023	EM2304311	Normal	Natural	-	<10	<50	<100	<100	<50	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-

Comments
#1 Based on CCME 1991
#2 US EPA 2005 ECO SSL
#3 Based on CCME 1999
#4 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(3) and ABC provided for ar
#5 ECO SSL 2008 - Protection of Mammalian Wildlife
#6 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(2) and ABC provided for ar
#7 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(4) and ABC provided for ar
#8 NEPC 1999. NEPM Interim Urban Ecological Investigation Level.
#9 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(3) and ABC provided for ar
#10 Based on EPA IWRG 621 Clean Fill Criteria
#11 Based on CCME 1997
#12 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(1) and ABC provided for a
#13 US EPA 2007 ECO SSL - Based on high molecular weight PAHs
#14 Based on Ministry of Infrastructure and Environment, Dutch Target Intervention Value (2013 Circular)
#15 Based on US EPA Region 4 Soil Screening Value (All Receptors) - revised 2015
#16 Based on PFAS NEMP, indirect exposure pathway (HEPA 2018)
#17 Based on PFAS NEMP, direct exposure pathway (HEPA 2018)
#18 Based on PFAS NEMP, direct exposure pathway (HEPA 2020)
#19 Based on PFAS NEMP, indirect exposure pathway for intensively developed sites (HEPA 2018)
#20 Based on free cyanide.
#21 Based on US EPA Regional Screening Levels (RSLs) (TR=1 E-6, HQ=1.0), revised May 2020
#22 Arsenic: HIL assumes 70% oral bioavailability. Site-specific bioavailability maybe important and should be consi
#23 Based on US EPA Regional Screening Levels (RSLs) (TR=1 E-6, HQ=1.0), revised May 2020 - Chromium insol
#24 Lead: HILs A,B,C based on blood lead models (IEUBK & HIL D on adult lead model for where 50% bioavailabilit
#25 Elemental mercury: HIL does not address elemental mercury. a site specific assessment should be considered i
#26 Carcinogenic PAHs: HIL based on 8 carcinogenic PAHs & their TEFs (relative to BaP, ref Schedule B7). BaP TE
#27 Total PAHs: Based on sum of 16 most common reported (WHO 98). HIL application should consider presence o
#28 PCBs: HIL refers to non-dioxin like PCBs only. Where PCB source is known, or suspected at a site, a site-speci
#29 Based on PFAS NEMP (HEPA 2018)

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Project ID: 20015
Site ID: Hadfield, VIC
Client Company: South Streeet Property Holdings Pty Ltd

Table 1 - Soil EIL and HIL Results

	PAH										Phenols Halogenated				Phenols Non-Halogenated										Halogenated Vol. Organics				
	Benzo(b+j) & Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)	2,4,5-trichlorophenol	2,4,6-trichlorophenol	2,4-dichlorophenol	2-chlorophenol	2-methylphenol	3/4-Methylphenol (m/p-cresol)	Cresol Total	2,4-dimethylphenol	2,4-dinitrophenol	2-nitrophenol	4,6-Dinitro-2-methylphenol	4,6-Dinitro-o-cyclohexyl phenol	4-nitrophenol	Phenol	Phenols (Total Non Halogenated)	1,1,1,2-tetrachloroethane	1,1,1-trichloroethane	1,1,2,2-tetrachloroethane	1,1,2-trichloroethane	1,1-dichloroethane
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.05	0.05	0.03	0.03	1	1	1	1	5	1	5	5	5	1	1	0.01	0.01	0.02	0.04	0.5
NEPM 2013 EIL Fill (Urban Residential and Public Open Space)							170			18[#13]																				
NEPM 2013 EIL Natural (Urban Residential and Public Open Space)							170			18[#13]																				
NEPM 2013 EIL Fill (Commercial/Industrial)							*370*																							
NEPM 2013 EIL Natural (Commercial/Industrial)							**370**																							
NEPM 2013 Table 1A(1) HILs Res A Soil										300[#27]							400							3,000						
NEPM 2013 Table 1A(1) HILs Res B Soil										400[#27]							4,700							45,000						
NEPM 2013 Table 1A(1) HILs Rec C Soil										300[#27]							4,000							40,000						
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil										4,000[#27]							25,000							240,000						
Location	**Field ID**	**Date**	**Lab Report No.**	**Sample Type**	**Matrix Description**																										
B1	B1/0.2	09/03/2023	EM2304311	Normal	Fill	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.03	<0.03	<1	<1	<1	<1	<5	<1	<5	<5	<5	<1	<1	<0.01	<0.01	<0.02	<0.04	<0.5
B1	B090323A	09/03/2023	EM2304311	Field_D	Fill	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1	B201/0.2	09/03/2023	970590	Interlab_D	Fill	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1	B1/0.5	09/03/2023	EM2304311	Normal	Natural	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1	B1/1.0	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B2/0.15	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B2/0.4	09/03/2023	EM2304311	Normal	Natural	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B090323B	09/03/2023	EM2304311	Field_D	Natural	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B202/0.4	09/03/2023	970590	Interlab_D	Natural	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B2/1.0	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B3	B3/0.1	09/03/2023	EM2304311	Normal	Fill	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
B3	B3/0.25	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B3	B3/0.45	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B4	B4/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B4	B4/0.5	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B5	B5/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B5	B5/0.25	09/03/2023	EM2304311	Normal	Fill	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
B5	B5/0.5	09/03/2023	EM2304311	Normal	Natural	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.03	<0.03	<1	<1	<1	<1	<5	<1	<5	<5	<5	<1	<1	<0.01	<0.01	<0.02	<0.04	-
B5	B5/1.0	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B6	B6/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B6	B6/0.5	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B7	B7/0.1	09/03/2023	EM2304311	Normal	Fill	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B7	B7/0.25	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B7	B7/0.9	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SV1	SV1/0.5	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5

Comments
#1 Based on CCME 1991
#2 US EPA 2005 ECO SSL
#3 Based on CCME 1999
#4 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(3) and ABC provided for ar
#5 ECO SSL 2008 - Protection of Mammalian Wildlife
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#7 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(4) and ABC provided for ar
#8 NEPC 1999. NEPM Interim Urban Ecological Investigation Level.
#9 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(3) and ABC provided for ar
#10 Based on EPA IWRG 621 Clean Fill Criteria
#11 Based on CCME 1997
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#19 Based on PFAS NEMP, indirect exposure pathway for intensively developed sites (HEPA 2018)
#20 Based on free cyanide.
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#22 Arsenic: HIL assumes 70% oral bioavailability. Site-specific bioavailability maybe important and should be consi
#23 Based on US EPA Regional Screening Levels (RSLs) (TR=1 E-6, HQ=1.0), revised May 2020 - Chromium insol
#24 Lead: HILs A,B,C based on blood lead models (IEUBK & HIL D on adult lead model for where 50% bioavailabilit
#25 Elemental mercury: HIL does not address elemental mercury. a site specific assessment should be considered i
#26 Carcinogenic PAHs: HIL based on 8 carcinogenic PAHs & their TEFs (relative to BaP, ref Schedule B7). BaP TE
#27 Total PAHs: Based on sum of 16 most common reported (WHO 98). HIL application should consider presence o
#28 PCBs: HIL refers to non-dioxin like PCBs only. Where PCB source is known, or suspected at a site, a site-speci
#29 Based on PFAS NEMP (HEPA 2018)

Project ID: 20015
Site ID: Hadfield, VIC
Client Company: South Streeet Property Holdings Pty Ltd

Table 1 - Soil EIL and HIL Results

						Halogenated Vol. Organics																															
Location	Field ID	Date	Lab Report No.	Sample Type	Matrix Description	1,1-dichloroethene	1,1-dichloropropene	1,2,3-trichloropropane	1,2-dibromo-3-chloropropane	1,2-dibromoethane	1,2-dichloroethane	1,2-dichloropropane	1,3-dichloropropane	2,2-dichloropropane	2-chlorotoluene	4-chlorotoluene	Bromobenzene	Bromomethane	Dichlorodifluoromethane	Bromodichloromethane	Iodomethane	Bromoform	Carbon tetrachloride	Chlorobenzene	Chlorodibromomethane	Chloroform	cis-1,2-dichloroethene	cis-1,3-dichloropropene	Dibromomethane	Dichloromethane	Tetrachloroethene	Chloromethane	trans-1,2-dichloroethene	trans-1,3-dichloropropene	Trichloroethene	Trichlorofluoromethane	Vinyl chloride
						mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL						0.01	0.5	0.5	0.5	0.5	0.02	0.5	0.5	0.5	0.5	0.5	0.5	5	5	0.5	0.5	0.5	0.01	0.02	0.5	0.02	0.01	0.5	0.5	0.4	0.02	5	0.02	0.5	0.02	5	0.02
NEPM 2013 EIL Fill (Urban Residential and Public Open Space)																																					
NEPM 2013 EIL Natural (Urban Residential and Public Open Space)																																					
NEPM 2013 EIL Fill (Commercial/Industrial)																																					
NEPM 2013 EIL Natural (Commercial/Industrial)																																					
NEPM 2013 Table 1A(1) HILs Res A Soil																																					
NEPM 2013 Table 1A(1) HILs Res B Soil																																					
NEPM 2013 Table 1A(1) HILs Rec C Soil																																					
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil																																					
B1	B1/0.2	09/03/2023	EM2304311	Normal	Fill	<0.01	<0.5	<0.5	<0.5	<0.5	<0.02	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<0.5	<0.5	<0.5	<0.01	<0.02	<0.5	<0.02	<0.01	<0.5	<0.5	<0.4	<0.02	<5	<0.02	<0.5	<0.02	<5	<0.02
B1	B090323A	09/03/2023	EM2304311	Field_D	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1	B201/0.2	09/03/2023	970590	Interlab_D	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1	B1/0.5	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1	B1/1.0	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B2/0.15	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B2/0.4	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B090323B	09/03/2023	EM2304311	Field_D	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B202/0.4	09/03/2023	970590	Interlab_D	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B2/1.0	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B3	B3/0.1	09/03/2023	EM2304311	Normal	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<5	<5
B3	B3/0.25	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B3	B3/0.45	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B4	B4/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B4	B4/0.5	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B5	B5/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B5	B5/0.25	09/03/2023	EM2304311	Normal	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<5	<5
B5	B5/0.5	09/03/2023	EM2304311	Normal	Natural	<0.01	-	-	-	-	<0.02	-	-	-	-	-	-	-	-	-	-	-	<0.01	<0.02	-	<0.02	<0.01	-	-	<0.4	<0.02	-	<0.02	-	<0.02	-	<0.02
B5	B5/1.0	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B6	B6/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B6	B6/0.5	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B7	B7/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B7	B7/0.25	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B7	B7/0.9	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SV1	SV1/0.5	09/03/2023	EM2304311	Normal	Natural	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<5	<5

Comments
#1 Based on CCME 1991
#2 US EPA 2005 ECO SSL
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compassenvironmental

Project ID: 20015
Site ID: Hadfield, VIC
Client Company: South Streeet Property Holdings Pty Ltd

Table 1 - Soil EIL and HIL Results

	Halogenated Vol. Organics		VOCs			Chlorinated Hydrocarbons								Organochlorine Pesticides																
	Chloroethane	1,2,3-trichlorobenzene	cis-1,4-Dichloro-2-butene	Pentachloroethane	trans-1,4-Dichloro-2-butene	Trichlorobenzene (total)	1,2,4-trichlorobenzene	1,2-dichlorobenzene	1,3,5-Trichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	Hexachlorobenzene	Hexachlorobutadiene	4,4-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane	Chlordane (cis)	Chlordane (trans)	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	5	0.01	0.5	0.5	0.5	0.01	0.01	0.02	0.01	0.5	0.02	0.03	0.02	0.05	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.05	0.05	0.05	0.03	0.03	0.03	0.03	0.03	0.03
NEPM 2013 EIL Fill (Urban Residential and Public Open Space)																			4 #14	0.27 #15				180							
NEPM 2013 EIL Natural (Urban Residential and Public Open Space)																			4 #14	0.27 #15				180							
NEPM 2013 EIL Fill (Commercial/Industrial)																			*4 #14*	*0.27 #15*				*640*							
NEPM 2013 EIL Natural (Commercial/Industrial)																			**4 #14**	**0.27 #15**				**640**							
NEPM 2013 Table 1A(1) HILs Res A Soil												10					6		50						240					10	
NEPM 2013 Table 1A(1) HILs Res B Soil												15					10		90						600					20	
NEPM 2013 Table 1A(1) HILs Rec C Soil												10					10		70						400					20	
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil												80					45		530						3,600					100	

Location	Field ID	Date	Lab Report No.	Sample Type	Matrix Description																												
B1	B1/0.2	09/03/2023	EM2304311	Normal	Fill	<5	<0.01	<0.5	<0.5	<0.5	<0.01	<0.01	<0.02	<0.01	<0.5	<0.02	<0.03	<0.02	<0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.05	<0.05	<0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
B1	B090323A	09/03/2023	EM2304311	Field_D	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1	B201/0.2	09/03/2023	970590	Interlab_D	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1	B1/0.5	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1	B1/1.0	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B2/0.15	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B2/0.4	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B090323B	09/03/2023	EM2304311	Field_D	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B202/0.4	09/03/2023	970590	Interlab_D	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B2/1.0	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B3	B3/0.1	09/03/2023	EM2304311	Normal	Fill	<5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B3	B3/0.25	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B3	B3/0.45	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B4	B4/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B4	B4/0.5	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B5	B5/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B5	B5/0.25	09/03/2023	EM2304311	Normal	Fill	<5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B5	B5/0.5	09/03/2023	EM2304311	Normal	Natural	-	<0.01	-	-	-	<0.01	<0.01	<0.02	<0.01	-	<0.02	<0.03	<0.02	<0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.05	<0.05	<0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
B5	B5/1.0	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B6	B6/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B6	B6/0.5	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B7	B7/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B7	B7/0.25	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B7	B7/0.9	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SV1	SV1/0.5	09/03/2023	EM2304311	Normal	Natural	<5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	<0.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comments
#1 Based on CCME 1991
#2 US EPA 2005 ECO SSL
#3 Based on CCME 1999
#4 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(3) and ABC provided for ar
#5 ECO SSL 2008 - Protection of Mammalian Wildlife
#6 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(2) and ABC provided for ar
#7 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(4) and ABC provided for ar
#8 NEPC 1999. NEPM Interim Urban Ecological Investigation Level.
#9 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(3) and ABC provided for ar
#10 Based on EPA IWRG 621 Clean Fill Criteria
#11 Based on CCME 1997
#12 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(1) and ABC provided for a
#13 US EPA 2007 ECO SSL - Based on high molecular weight PAHs
#14 Based on Ministry of Infrastructure and Environment, Dutch Target Intervention Value (2013 Circular)
#15 Based on US EPA Region 4 Soil Screening Value (All Receptors) - revised 2015
#16 Based on PFAS NEMP, indirect exposure pathway (HEPA 2018)
#17 Based on PFAS NEMP, direct exposure pathway (HEPA 2018)
#18 Based on PFAS NEMP, direct exposure pathway (HEPA 2020)
#19 Based on PFAS NEMP, indirect exposure pathway for intensively developed sites (HEPA 2018)
#20 Based on free cyanide.
#21 Based on US EPA Regional Screening Levels (RSLs) (TR=1 E-6, HQ=1.0), revised May 2020
#22 Arsenic: HIL assumes 70% oral bioavailability. Site-specific bioavailability maybe important and should be consi
#23 Based on US EPA Regional Screening Levels (RSLs) (TR=1 E-6, HQ=1.0), revised May 2020 - Chromium insol
#24 Lead: HILs A,B,C based on blood lead models (IEUBK & HIL D on adult lead model for where 50% bioavailabilit
#25 Elemental mercury: HIL does not address elemental mercury. a site specific assessment should be considered i
#26 Carcinogenic PAHs: HIL based on 8 carcinogenic PAHs & their TEFs (relative to BaP, ref Schedule B7). BaP TE
#27 Total PAHs: Based on sum of 16 most common reported (WHO 98). HIL application should consider presence o
#28 PCBs: HIL refers to non-dioxin like PCBs only. Where PCB source is known, or suspected at a site, a site-speci
#29 Based on PFAS NEMP (HEPA 2018)

compassenvironmental

Project ID: 20015
Site ID: Hadfield, VIC
Client Company: South Streeet Property Holdings Pty Ltd

Table 1 - Soil EIL and HIL Results

	Organochlorine Pesticides				Herbicides		Polychlorinated Biphenyls	Solvents	Explosives		Phthalates	Organo Metals	SVOCs	PFAS							
	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor	Hedonal	Dinoseb	PCBs (Sum of total)	Methyl Ethyl Ketone	2,4-Dinitrotoluene	Nitrobenzene	Bis(2-ethylhexyl) phthalate	Tributyltin oxide (TBTO)	Formaldehyde	10:2 Fluorotelomer sulfonic acid (10:2 FTS)	4:2 Fluorotelomer sulfonic acid (4:2 FTS)	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	8:2 Fluorotelomer sulfonic acid (8:2 FTS)	N-Ethyl perfluorooctane sulfonamide (NEtFOSA)	N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	N-ethylperfluorooctane sulfonamidoethanol (NEtFOSE)	N-Methyl perfluorooctane sulfonamide (NMeFOSA)
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.03	0.03	0.03	0.03	0.001	5	0.1	1	1	0.5	0.5	0.01	2	0.0005	0.0005	0.0005	0.0005	0.0005	0.0002	0.0005	0.0005
NEPM 2013 EIL Fill (Urban Residential and Public Open Space)	1.2[#14]																				
NEPM 2013 EIL Natural (Urban Residential and Public Open Space)	1.2[#14]																				
NEPM 2013 EIL Fill (Commercial/Industrial)	*1.2[#14]*																				
NEPM 2013 EIL Natural (Commercial/Industrial)	**1.2[#14]**																				
NEPM 2013 Table 1A(1) HILs Res A Soil		6		300	900		1[#28]														
NEPM 2013 Table 1A(1) HILs Res B Soil		10		500	1,600		1[#28]														
NEPM 2013 Table 1A(1) HILs Rec C Soil		10		400	1,300		1[#28]														
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil		50		2,500	9,000		7[#28]														

Location	Field ID	Date	Lab Report No.	Sample Type	Matrix Description																	
B1	B1/0.2	09/03/2023	EM2304311	Normal	Fill	<0.03	<0.03	<0.03	<0.03	<0.001	<5	<0.1	<1	<1.0	<0.5	<0.5	<0.01	<2	-	-	-	-	-	-	-
B1	B090323A	09/03/2023	EM2304311	Field_D	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1	B201/0.2	09/03/2023	970590	Interlab_D	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1	B1/0.5	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1	B1/1.0	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B2/0.15	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B2/0.4	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B090323B	09/03/2023	EM2304311	Field_D	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B202/0.4	09/03/2023	970590	Interlab_D	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B2/1.0	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B3	B3/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B3	B3/0.25	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B3	B3/0.45	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B4	B4/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B4	B4/0.5	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005
B5	B5/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005
B5	B5/0.25	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B5	B5/0.5	09/03/2023	EM2304311	Normal	Natural	<0.03	<0.03	<0.03	<0.03	<0.001	<5	<0.1	<1	<1.0	<0.5	<0.5	<0.01	2	-	-	-	-	-	-	-	-
B5	B5/1.0	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B6	B6/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B6	B6/0.5	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B7	B7/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B7	B7/0.25	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B7	B7/0.9	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SV1	SV1/0.5	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comments
#1 Based on CCME 1991
#2 US EPA 2005 ECO SSL
#3 Based on CCME 1999
#4 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(3) and ABC provided for ar
#5 ECO SSL 2008 - Protection of Mammalian Wildlife
#6 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(2) and ABC provided for ar
#7 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(4) and ABC provided for ar
#8 NEPC 1999. NEPM Interim Urban Ecological Investigation Level.
#9 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(3) and ABC provided for ar
#10 Based on EPA IWRG 621 Clean Fill Criteria
#11 Based on CCME 1997
#12 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(1) and ABC provided for a
#13 US EPA 2007 ECO SSL - Based on high molecular weight PAHs
#14 Based on Ministry of Infrastructure and Environment, Dutch Target Intervention Value (2013 Circular)
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#16 Based on PFAS NEMP, indirect exposure pathway (HEPA 2018)
#17 Based on PFAS NEMP, direct exposure pathway (HEPA 2018)
#18 Based on PFAS NEMP, direct exposure pathway (HEPA 2020)
#19 Based on PFAS NEMP, indirect exposure pathway for intensively developed sites (HEPA 2018)
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#23 Based on US EPA Regional Screening Levels (RSLs) (TR=1 E-6, HQ=1.0), revised May 2020 - Chromium insol
#24 Lead: HILs A,B,C based on blood lead models (IEUBK & HIL D on adult lead model for where 50% bioavailabilit
#25 Elemental mercury: HIL does not address elemental mercury. a site specific assessment should be considered i
#26 Carcinogenic PAHs: HIL based on 8 carcinogenic PAHs & their TEFs (relative to BaP, ref Schedule B7). BaP TE
#27 Total PAHs: Based on sum of 16 most common reported (WHO 98). HIL application should consider presence o
#28 PCBs: HIL refers to non-dioxin like PCBs only. Where PCB source is known, or suspected at a site, a site-speci
#29 Based on PFAS NEMP (HEPA 2018)

compassenvironmental

Project ID: 20015
Site ID: Hadfield, VIC
Client Company: South Streeet Property Holdings Pty Ltd

Table 1 - Soil EIL and HIL Results

	PFAS																							
	N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	N-Methylperfluorooctanesulfonamidoethanol (N-MeFOSE)	Perfluorobutane sulfonic acid (PFBS)	Perfluorobutanoic acid (PFBA)	Perfluorodecanesulfonic acid (PFDS)	Perfluorodecanoic acid (PFDA)	Perfluorododecanoic acid (PFDoDA)	Perfluoroheptane sulfonic acid (PFHpS)	Perfluoroheptanoic acid (PFHpA)	Perfluorohexane sulfonic acid (PFHxS)	Perfluorohexanoic acid (PFHxA)	Perfluorononanoic acid (PFNA)	Perfluorooctane sulfonamide (PFOSA)	Perfluorooctanesulfonic acid (PFOS)	Perfluorooctanoic acid (PFOA)	Perfluoropentane sulfonic acid (PFPeS)	Perfluoropentanoic acid (PFPeA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluoroundecanoic acid (PFUnDA)	Sum of PFASs	Sum of PFHxS and PFOS	Sum of WA DWER PFAS (n=10)*
	µg/kg	mg/kg	mg/kg	mg/kg	µg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/kg	mg/kg
EQL	0.2	0.0005	0.0002	0.001	0.2	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0005	0.0002	0.0002		0.2	0.0002
NEPM 2013 EIL Fill (Urban Residential and Public Open Space)														0.01[#16]	10[#17]									
NEPM 2013 EIL Natural (Urban Residential and Public Open Space)														0.01[#16]	10[#18]									
NEPM 2013 EIL Fill (Commercial/Industrial)														*0.14*[#19]	*10*[#17]									
NEPM 2013 EIL Natural (Commercial/Industrial)														**0.14**[#19]	**10**[#17]									
NEPM 2013 Table 1A(1) HILs Res A Soil															0.1[#29]							9[#29]		
NEPM 2013 Table 1A(1) HILs Res B Soil															20[#29]							2,000[#29]		
NEPM 2013 Table 1A(1) HILs Rec C Soil															10[#29]							1,000[#29]		
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil															50[#29]							20,000[#29]		
Location	**Field ID**	**Date**	**Lab Report No.**	**Sample Type**	**Matrix Description**																					
B1	B1/0.2	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1	B090323A	09/03/2023	EM2304311	Field_D	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1	B201/0.2	09/03/2023	970590	Interlab_D	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1	B1/0.5	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B1	B1/1.0	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B2/0.15	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B2/0.4	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B090323B	09/03/2023	EM2304311	Field_D	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B202/0.4	09/03/2023	970590	Interlab_D	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B2/1.0	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B3	B3/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B3	B3/0.25	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B3	B3/0.45	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B4	B4/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B4	B4/0.5	09/03/2023	EM2304311	Normal	Natural	<0.2	<0.0005	<0.0002	<0.001	<0.2	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	<0.0002	<0.2	<0.0002
B5	B5/0.1	09/03/2023	EM2304311	Normal	Fill	<0.2	<0.0005	<0.0002	<0.001	<0.2	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0007	0.0002	<0.0002	<0.0002	<0.0005	<0.0002	<0.0002	0.0009	0.7	0.0009
B5	B5/0.25	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B5	B5/0.5	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B5	B5/1.0	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B6	B6/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B6	B6/0.5	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B7	B7/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B7	B7/0.25	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B7	B7/0.9	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SV1	SV1/0.5	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Comments
#1 Based on CCME 1991
#2 US EPA 2005 ECO SSL
#3 Based on CCME 1999
#4 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(3) and ABC provided for ar
#5 ECO SSL 2008 - Protection of Mammalian Wildlife
#6 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(2) and ABC provided for ar
#7 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(4) and ABC provided for ar
#8 NEPC 1999. NEPM Interim Urban Ecological Investigation Level.
#9 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(3) and ABC provided for ar
#10 Based on EPA IWRG 621 Clean Fill Criteria
#11 Based on CCME 1997
#12 Generic, conservative value based on ACL from NEPM 2013, Schedule B1, Table 1B(1) and ABC provided for a
#13 US EPA 2007 ECO SSL - Based on high molecular weight PAHs
#14 Based on Ministry of Infrastructure and Environment, Dutch Target Intervention Value (2013 Circular)
#15 Based on US EPA Region 4 Soil Screening Value (All Receptors) - revised 2015
#16 Based on PFAS NEMP, indirect exposure pathway (HEPA 2018)
#17 Based on PFAS NEMP, direct exposure pathway (HEPA 2018)
#18 Based on PFAS NEMP, direct exposure pathway (HEPA 2020)
#19 Based on PFAS NEMP, indirect exposure pathway for intensively developed sites (HEPA 2018)
#20 Based on free cyanide.
#21 Based on US EPA Regional Screening Levels (RSLs) (TR=1 E-6, HQ=1.0), revised May 2020
#22 Arsenic: HIL assumes 70% oral bioavailability. Site-specific bioavailability maybe important and should be consi
#23 Based on US EPA Regional Screening Levels (RSLs) (TR=1 E-6, HQ=1.0), revised May 2020 - Chromium insol
#24 Lead: HILs A,B,C based on blood lead models (IEUBK & HIL D on adult lead model for where 50% bioavailabilit
#25 Elemental mercury: HIL does not address elemental mercury. a site specific assessment should be considered i
#26 Carcinogenic PAHs: HIL based on 8 carcinogenic PAHs & their TEFs (relative to BaP, ref Schedule B7). BaP TE
#27 Total PAHs: Based on sum of 16 most common reported (WHO 98). HIL application should consider presence o
#28 PCBs: HIL refers to non-dioxin like PCBs only. Where PCB source is known, or suspected at a site, a site-speci
#29 Based on PFAS NEMP (HEPA 2018)

compassenvironmental

Project ID: 20015
Site ID: Hadfield, VIC
Client Company: South Streeet Property Holdings Pty Ltd

Table 2 - Soil ESL and HSL Results

	TRH												MAH								PAH											
	C6 - C9	C10 - C14	C15 - C28	C29-C36	+C10 - C36 (Sum of total)	C6-C10	TRH C6-C10 less BTEX (F1)	C10-C16	TRH>C10-C16 less Napthalene (F2)	C16-C34	C34-C40	C10 - C40 (Sum of total)	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	BTEX (Sum)	Styrene	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene TEQ (LOR)	Benzo(a)pyrene TEQ calc (Half)	Benzo(a)pyrene TEQ calc (Zero)	Benzo(a) pyrene	Benzo(g,h,i)perylene	Benzo(b+j)fluoranthene	Benzo(k)fluoranthene	Benzo(b+j) & Benzo(k)fluoranthene
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	10	20	50	50	50	10	10	50	50	100	100	50	0.1	0.1	0.1	0.2	0.1	0.3	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1
NEPM 2013 Table 1B(6) ESLs Urban Res & Public Open Space, Coarse Soil (0-2 m)							180[#1]		120[#2]	300	2,800		50	85	70			105											20[#3]				
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil (0-2 m)							215[#1]		170[#2]	1,700	3,300		75	135	165			180											72[#3]				
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand (0-1 m)							45[#1]		110[#2]				0.5	160	55			40															
NEPM 2013 Table 1A(3) Rec C Soil HSL for Vapour Intrusion, Sand (0-1 m)							NL [#4]		NL [#4]				NL [#4]	NL [#4]	NL [#4]			NL [#4]															
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand (0-1 m)							260[#1]		NL [#4]				3	NL [#4]	NL [#4]			230															
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil						*700* [#5]		*1,000* [#5]		*3,500*	*10,000*																						
NEPM 2013 Table 1B(7) Management Limits Comm / Ind, Coarse Soil						**700** [#5]		**1,000** [#5]		**5,000**	**10,000**																						
Direct Contact HSL A Residential (low density)						4,400[#6]		3,300[#6]		4,500[#6]	6,300[#6]		100[#6]	14,000[#6]	4,500[#6]			12,000[#6]															
Direct Contact HSL B Residential (high density)						5,600[#6]		4,200[#6]		5,800[#6]	8,100[#6]		140[#6]	21,000[#6]	5,900[#6]			17,000[#6]															
Direct Contact HSL C Recreational/ Open Space						5,100[#6]		3,800[#6]		5,300[#6]	7,400[#6]		120[#6]	18,000[#6]	5,300[#6]			15,000[#6]															
Direct Contact HSL D Commercial/ Industrial						26,000[#6]		20,000[#6]		27,000[#6]	38,000[#6]		430[#6]	99,000[#6]	27,000[#6]			81,000[#6]															
B1	B1/0.2	09/03/2023	EM2304311	Normal	Fill	<10	<50	<100	<100	<50	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	-	-	<1.0
B1	B090323A	09/03/2023	EM2304311	Field_D	Fill	<10	<50	<100	<100	<50	14	14	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	-	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	-
B1	B201/0.2	09/03/2023	970590	Interlab_D	Fill	<20	30	<50	<50	<50	<20	<20	<50	<50	<100	<100	<100	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	-
B1	B1/0.5	09/03/2023	EM2304311	Normal	Natural	<10	<50	<100	<100	<50	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	-	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	-
B1	B1/1.0	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B2/0.15	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	B2/0.4	09/03/2023	EM2304311	Normal	Natural	<10	<50	<100	<100	<50	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	-	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	-
B2	B090323B	09/03/2023	EM2304311	Field_D	Natural	<10	<50	<100	<100	<50	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	-	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	-
B2	B202/0.4	09/03/2023	970590	Interlab_D	Natural	<20	<20	<50	<50	<50	<20	<20	<50	<50	<100	<100	<100	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	-
B2	B2/1.0	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B3	B3/0.1	09/03/2023	EM2304311	Normal	Fill	<10	<50	<100	<100	<50	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	-	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	-
B3	B3/0.25	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B3	B3/0.45	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B4	B4/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B4	B4/0.5	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B5	B5/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B5	B5/0.25	09/03/2023	EM2304311	Normal	Fill	<10	<50	<100	<100	<50	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	-	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	-
B5	B5/0.5	09/03/2023	EM2304311	Normal	Natural	<10	<50	<100	<100	<50	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	-	-	<1.0
B5	B5/1.0	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B6	B6/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B6	B6/0.5	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B7	B7/0.1	09/03/2023	EM2304311	Normal	Fill	<10	<50	<100	<100	<50	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	-	<0.5	<0.5	<0.5	<0.5	1.2	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	-
B7	B7/0.25	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B7	B7/0.9	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SV1	SV1/0.5	09/03/2023	EM2304311	Normal	Natural	<10	<50	<100	<100	<50	<10	<10	<50	<50	<100	<100	<50	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-

Comments
#1 To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.
#2 To obtain F2 subtract naphthalene from the >C10 - C16 fraction.
#3 Based on revised CCME (2010) criteria.
#4 Derived soil HSL exceeds soil saturation concentration
#5 Separate management limits for BTEX & naphthalene are not available hence should not be subtracted from the relevant fractions to obtain F1 & F2
#6 CRC Care (2011)

Project ID: 20015
Site ID: Hadfield, VIC
Client Company: South Streeet Property Holdings Pty Ltd

Table 2 - Soil ESL and HSL Results

	PAH								
	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NEPM 2013 Table 1B(6) ESLs Urban Res & Public Open Space, Coarse Soil (0-2 m)									
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil (0-2 m)									
NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand (0-1 m)						3			
NEPM 2013 Table 1A(3) Rec C Soil HSL for Vapour Intrusion, Sand (0-1 m)						NL [#4]			
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand (0-1 m)						NL [#4]			
NEPM 2013 Table 1B(7) Management Limits in Res / Parkland, Coarse Soil									
NEPM 2013 Table 1B(7) Management Limits Comm / Ind, Coarse Soil									
Direct Contact HSL A Residential (low density)						1,400[#6]			
Direct Contact HSL B Residential (high density)						2,200[#6]			
Direct Contact HSL C Recreational/ Open Space						1,900[#6]			
Direct Contact HSL D Commercial/ Industrial						11,000[#6]			

Location	Field ID	Date	Lab Report No.	Sample Type	Matrix Description									
B1	B1/0.2	09/03/2023	EM2304311	Normal	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
B1	B090323A	09/03/2023	EM2304311	Field_D	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
B1	B201/0.2	09/03/2023	970590	Interlab_D	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
B1	B1/0.5	09/03/2023	EM2304311	Normal	Natural	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
B1	B1/1.0	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-
B2	B2/0.15	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-
B2	B2/0.4	09/03/2023	EM2304311	Normal	Natural	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
B2	B090323B	09/03/2023	EM2304311	Field_D	Natural	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
B2	B202/0.4	09/03/2023	970590	Interlab_D	Natural	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
B2	B2/1.0	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-
B3	B3/0.1	09/03/2023	EM2304311	Normal	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
B3	B3/0.25	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-
B3	B3/0.45	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-
B4	B4/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-
B4	B4/0.5	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-
B5	B5/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-
B5	B5/0.25	09/03/2023	EM2304311	Normal	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
B5	B5/0.5	09/03/2023	EM2304311	Normal	Natural	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
B5	B5/1.0	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-
B6	B6/0.1	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-
B6	B6/0.5	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-
B7	B7/0.1	09/03/2023	EM2304311	Normal	Fill	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
B7	B7/0.25	09/03/2023	EM2304311	Normal	Fill	-	-	-	-	-	-	-	-	-
B7	B7/0.9	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	-	-	-	-
SV1	SV1/0.5	09/03/2023	EM2304311	Normal	Natural	-	-	-	-	-	<1	-	-	-

Comments
#1 To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.
#2 To obtain F2 subtract naphthalene from the >C10 - C16 fraction.
#3 Based on revised CCME (2010) criteria.
#4 Derived soil HSL exceeds soil saturation concentration
#5 Separate management limits for BTEX & naphthalene are not available hence should not be subtracted fr
#6 CRC Care (2011)

TABLE 2

Soil Vapour Sample Summary Tables

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Project: 20015
Client: SOUTH STREET PROPERTY HOLDINGS PTY LTD
Site: Hadfield

Table 1 - Soil Vapour Results

	TRH				MAH									PAH	Halogenated Vol. Organics												
	C6-C10	TRH C6-C10 less BTEX (F1)	C10-C16	TRH>C10-C16 less Napthalene (F2)	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	BTEX (Sum)	Isopropylbenzene	1,2,4-trimethylbenzene	Naphthalene	1,2-dichloroethane	1,1,1-trichloroethane	1,1,2-trichloroethane	1,1-dichloroethane	1,1-dichloroethene	Carbon tetrachloride	Chlorobenzene	Chloroform	cis-1,2-dichloroethene	Dichlorodifluoromethane	Halothane	trans-1,2-dichloroethene
	mg/m3	mg/m3	mg/m3	mg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	mg/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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NEPM 2013 Table 1A(2) Res A Soil Vap VOCC HILs																60,000							80			
NEPM 2013 Table 1A(2) Res B Soil Vap VOCC HILs																60,000							80			
NEPM 2013 Table 1A(2) Rec C Soil Vap VOCC HILs																1,200,000							2,000			
NEPM 2013 Table 1A(2) Comm/Ind D Soil Vap VOCC HILs																230,000							300			
NEPM 2013 Table 1A(5) Res Soil Vapour HSL A/B for Vapour Intrusion, Sand 0-1 m		180[#1]		130[#2]	1,000	1,300,000	330,000			220,000				800												
NEPM 2013 Table 1A(5) Rec C Soil Vapour HSL for Vapour Intrusion, Sand 0-1 m		86,000[#1]		NL [#2]	360,000	NL	NL			NL				NL												
NEPM 2013 Table 1A(5) Comm/Ind D Soil Vapour HSL, Sand 0-1 m		680[#1]		500[#2]	4,000	4,800,000	1,300,000			840,000				3,000												
Intrusive Maintenance Worker Soil Vapour HSL (Shallow Trench), Sand 0-2 m	180,000		NL		760,000	NL	NL			NL				880,000												
Explosive/ Flammable Limits - Lower Limit	*50,699*[#3]				*35,130,000*[#3]	*41,440,000*[#3]	*43,409,000*[#4]			*47,750,000*[#3]				*57,649,000*[#3]												
Explosive/ Flammable Limits - Upper Limit	**359,967**[#3]				**226,750,000**[#3]	**267,479,000**[#3]	**308,207,000**[#4]			**286,503,000**[#3]				**309,211,000**[#3]												

Location	Field ID	Date	Lab Report No.	Sample Type																						
SV1	SV1 AN-LU-22-665	16/03/2023	ME332999	Normal	<0.98	<0.98	<0.41	<0.41	<7.4	<5	<4	<4.1	<4.1	<4.1	<0.0074	<1.9	<2.7	<5	<7.4	<14	<5.6	<18	<22	<12	<4.4	<9.2	<9.4	<98	<33	<9.8

Comments
#1 To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.
#2 To obtain F2 subtract naphthalene from the >C10 - C16 fraction.
#3 Lower and Upper EL based on Ground Gas Handbook (2009)
#4 Limit adopted from worst case EL across BTEX limits

compassenvironmental

Project: 20015
Client: SOUTH STREET PROPERTY HOLDINGS PTY LTD
Site: Hadfield

Table 1 - Soil Vapour Results

	HVOLs				Chlorinated Hydrocarbons					Solvents	
	Tetrachloroethene	Trichloroethene	Trichlorofluoromethane	Vinyl chloride	1,2,3-trichlorobenzene	1,2,4-trichlorobenzene	1,2-dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	Hexane	Methyl Ethyl Ketone
	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m³	µg/m3
EQL	0	0	0	0	0	0	0	0	0	0	0
NEPM 2013 Table 1A(2) Res A Soil Vap VOCC HILs	2,000	20		30							
NEPM 2013 Table 1A(2) Res B Soil Vap VOCC HILs	2,000	20		30							
NEPM 2013 Table 1A(2) Rec C Soil Vap VOCC HILs	40,000	400		500							
NEPM 2013 Table 1A(2) Comm/Ind D Soil Vap VOCC HILs	8,000	80		100							
NEPM 2013 Table 1A(5) Res Soil Vapour HSL A/B for Vapour Intrusion, Sand 0-1 m											
NEPM 2013 Table 1A(5) Rec C Soil Vapour HSL for Vapour Intrusion, Sand 0-1 m											
NEPM 2013 Table 1A(5) Comm/Ind D Soil Vapour HSL, Sand 0-1 m											
Intrusive Maintenance Worker Soil Vapour HSL (Shallow Trench), Sand 0-2 m											
Explosive/ Flammable Limits - Lower Limit				*97,106,000* [#3]							
Explosive/ Flammable Limits - Upper Limit				**792,182,000** [#3]							
Location **Field ID** **Date** **Lab Report No.** **Sample Type**											
SV1 SV1 AN-LU-22-665 16/03/2023 ME332999 Normal	<4.4	<5.7	<36	<36	<2.3	<3.9	<2.3	<2.7	<2.6	<9.8	<14

Comments
#1 To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.
#2 To obtain F2 subtract naphthalene from the >C10 - C16 fraction.
#3 Lower and Upper EL based on Ground Gas Handbook (2009)
#4 Limit adopted from worst case EL across BTEX limits