



INFORMATION REGARDING ENVIRONMENTAL AUDIT REPORTS

August 2007

VICTORIA'S AUDIT SYSTEM

An environmental audit system has operated in Victoria since 1989. The *Environment Protection Act 1970* (the Act) provides for the appointment by the Environment Protection Authority (EPA Victoria) of environmental auditors and the conduct of independent, high quality and rigorous environmental audits.

An environmental audit is an assessment of the condition of the environment, or the nature and extent of harm (or risk of harm) posed by an industrial process or activity, waste, substance or noise. Environmental audit reports are prepared by EPA-appointed environmental auditors who are highly qualified and skilled individuals.

Under the Act, the function of an environmental auditor is to conduct environmental audits and prepare environmental audit reports. Where an environmental audit is conducted to determine the condition of a site or its suitability for certain uses, an environmental auditor may issue either a certificate or statement of environmental audit.

A certificate indicates that the auditor is of the opinion that the site is suitable for any beneficial use defined in the Act, whilst a statement indicates that there is some restriction on the use of the site.

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

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Web: www.epa.vic.gov.au/envaudit

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

Executive Summary

Executive Table 1 Summary of Audit Information

Auditor	Peter Mirkov
Auditor account number	75577
Auditor appointment end date	16 March 2016
Auditor's appointment category	Contaminated Land
Audit Type	53X
Date EPA notified of audit	27 th August 2013 (Revision to original notification was sent on 28 May 2014 in which the site boundary was amended)
Audit service order number	0008004128 (CARMS #72448-1)
Name of person requesting audit	Mr Peter Gillon Gillon Group ABN 46 841 054 622 Phone number: (03) 9563 8120
Relationship of person requesting audit to site	Gillon Group is the representative for the site owner.
Name of premises owner	Jack Road Investments Pty Ltd No ABN/ACN or contact details provided for the site owners at this time. Contact details can be requested through Gillon Group where required.
Date of auditor engagement	23 / 08 / 2013
Completion date of the audit	02 / 10 / 2014
Reason for Audit	Environmental Audit Overlay
Audit Categorisation	Risk
Environmental Segments	Air, Land, Groundwater, Surface water
If the audit was required by an EPA notice, licence or other, please provide EPA reference number	N/A
Current land use zoning	Mixed Use Zone (MUZ) and Commercial 1 Zone (C1Z)
EPA Region	Southern Metro
Municipality	Bayside City Council
Dominant Lot on title plan	Lot 1 on Proposed Plan of Subdivision PS713815C
Additional Lot on title plan(s)	Lot 2 on Plan of Subdivision 138747 (Volume 09479 Folio 505)
Site/Premises name	N/A
Building/complex sub-unit/lot No.	N/A
Street/Lot – Lower No.	N/A
Street/Lot – Upper No.	33
Street Name	Jack
Street type (road, court, etc)	Road
Street suffix (North, South etc)	N/A
Suburb	Cheltenham
Postcode	3192
GIS Coordinate of Site centroid	GDA94 – Latitude/Longitude in decimal degrees
Latitude (GDA94)	-37.960983
Longitude (GDA94)	145.041134
Site area (in square metres)	27,045 m ²
Plan of site/premises showing the audit site boundary attached	Yes

Plan of site/premises showing the audit site boundary attached in a spatial data format	Yes
Members and categories of support team utilised	Ms Karen Teague (human toxicology and human health and ecological risk assessment relating to contamination), Mr Michael Blackam (hydrogeology).
Further works or requirements	Perched groundwater (0.5-2mbgs) at the site is polluted with TCE, PCE and TRH such that it presents a direct contact and/or vapour inhalation risk to future residents, maintenance workers and construction workers of the site. Development of the site should only proceed subject to the satisfactory design and installation of a vapour mitigation system and a warning layer to extend over areas of the site where perched water is present (as specified in Figure 1C attached to the Statement of Environmental Audit (Appendix A)). Development of a Contaminant Management Plan to manage exposure to perched water must also be completed. The presence of B(a)P TEQ in soil at the site may pose an unacceptable dermal contact risk to residents. A statement condition has been included requiring a minimum of 0.5mbgs of fill material to be present in all accessible soil areas. Development of the site should be conducted in accordance with the layout specified in the development plans attached to the Statement of Environmental Audit (Figure 1A, Appendix A and Figure 1B, Appendix B).
Nature and extent of continuing risk	Groundwater at the site is polluted. Groundwater must not be extracted and used for the following beneficial uses: - Potable Water Supply - Agriculture, Parks and Gardens - Primary Contact Recreation - Stock Watering and - Industrial without prior testing and review of results by an environmental auditor (appointed under part IXD of the <i>Environment Protection Act 1970</i>) to confirm its suitability for that use. It may be extracted for the purpose of environmental monitoring or remediation. The Auditor has recommended that the site be a designated Groundwater Quality Restricted Use Zone (GQRUZ) (as per the EPA GQRUZ Map attached to the Statement of Environmental Audit in Appendix A of this report). Soil at the site is contaminated with BaP TEQ such that it presents a direct contact risk to future residential of the site. Perched groundwater (0.5-2mbgs) at the site is polluted with TCE, PCE and TRH such that it presents a direct contact and/or vapour inhalation risk to future residents, maintenance workers and

	construction workers of the site. Deep aquifer groundwater (7-10mbgs) at the site is polluted with 1,1 DCA, 1,1 DCE, 1,2 DCA, Vinyl chloride and TCE such that it should not be extracted for any beneficial use on-site.
Outcome of the audit	Statement of Environmental Audit
Has EPA determined CUTEF at this site?	No
Has the Auditor determined CUTEF at this site?	Yes
Has a GQRUZ been identified at the site/beyond the site by EPA?	Yes Site is identified as a GQRUZ
Does NAPL remain at the site?	No

Please indicate which of the Protected Beneficial Uses of groundwater are precluded due to pollution	e.g. including site-sourced and regional pollution.	
	Protected Use	Precluded?
	Maintenance of Ecosystems	Yes
	Potable Water Supply (Desirable)	Yes
	Potable Water Supply (Acceptable)	Yes
	Potable Mineral Water Supply	N/A
	Agriculture, Parks and Gardens	Yes
	Stock Watering	Yes
	Primary Contact Recreation	Yes
	Industrial water use	Yes
	Buildings and Structures	No

Historical land use	From the early 1900s to the 1950s, the site was used as market gardens. Between the 1950s to the late 1990s, the site was predominantly used for carpet manufacturing. Since then it has been used for furniture showrooms, office space, cabinet and furniture making, powder coating, car storage and an insulation distributor. Operations ceased at the site in approximately August/September 2013 and the buildings were demolished in early 2014.
Current land use	Vacant
Proposed future land use	Medium to high density residential and recreational/open space. The site is being developed as one residential development with the site immediately to the south.
Surrounding land use – north	Commercial/industrial
Surrounding land use – south	Vacant, proposed to be developed for medium to high density residential with the subject site.
Surrounding land use – east	Low density residential
Surrounding land use – west	Commercial/industrial
Proposed land use zoning	No change proposed to zoning
Nearest surface water receptor – name	Port Phillip Bay
Nearest surface water receptor – distance (m)	2.7km

Nearest surface water receptor – direction	West
Likely point of groundwater discharge	Port Phillip Bay
Site aquifer formation	Brighton Group (deeper aquifer)
Groundwater flow direction	South/south-west
Groundwater TDS range (mg/L)	220 – 4,100
Groundwater Segment	A1
Are there multiple aquifers impacted by pollution at the site	Yes
Perched groundwater depth – upper (metres below ground level (mbgl))	0.47
Perched groundwater depth – lower (mbgl)	1.71
Regional groundwater depth – upper (mbgl)	7.02
Regional groundwater depth – lower (mbgl)	9.88
Number of bores within 2 km	321
Closest extractive use (distance in m)	Irrigation (300m north-west)
Zone of groundwater plume influence (m from site boundary)	Approximately 50m from east, 120m from west and 2m from southern site boundaries. Unable to be determined at the northern boundary due to identified co-sources of groundwater pollution present upgradient of the site.
Year groundwater last monitored	2014
Have you attached electronic copies of Current Groundwater Analytical Results presented as a summary table?	Yes. Provided as Tables J and K.

Appendix A

Statement of Environmental Audit (Area of the site excluding electrical substation) & GQMP

Environmental Audit Report
33 Jack Road, Cheltenham, Victoria, 3192

ENVIRONMENT PROTECTION ACT 1970
STATEMENT OF ENVIRONMENTAL AUDIT

I, Peter Mirkov of Peraco Environmental Services Pty Ltd, a person appointed by the Environment Protection Authority ('the Authority') under the *Environment Protection Act 1970* ('the Act') as an environmental auditor for the purposes of the Act, having

1. been requested by Mr Peter Gillon of Jack Road Investments Pty Ltd to issue a certificate of environmental audit in relation to the Site located at 33 Jack Road, Cheltenham, Victoria, 3192; defined as Lot 1 on proposed Plan of Subdivision PS713815C and Lot 2 on Plan of Subdivision 138747 (Volume 09479 Folio 505), this Statement covers the total Site area excluding an existing Electrical Substation (Figure 1A) ('the Site') owned/occupied by Jack Rd Investments Pty Ltd;
2. had regard to, among other things,
 - I. guidelines issued by the Authority for the purposes of Part IXD of the Act,
 - II. the beneficial uses that may be made of the Site
 - III. relevant State environment protection policies/industrial waste management policies, namely
SEPP Groundwaters of Victoria
SEPP Waters of Victoria
SEPP Ambient Air Quality & Air Quality Management
SEPP Prevention and Management of Contamination of Land
IWRG Industrial Waste Resource Guidelinesin making a total assessment of the nature and extent of any harm or detriment caused to, or the risk of any possible harm or detriment which may be caused to, any beneficial use made of the Site by any industrial processes or activity, waste or substance (including any chemical substance), and
3. completed an environmental audit report in accordance with section 53X of the Act, a copy of which has been sent to the Authority and the relevant planning and responsible authority.

HEREBY STATE that I am of the opinion that

The Site is suitable for the beneficial uses associated with sensitive (medium to high density), recreational / open space, commercial and industrial land uses

subject to the following conditions attached thereto:

- A. The Site must be covered with a physical barrier, such as a building slab, road or paving in the layout presented in the development plans for the Site (refer to Figure 2A). This Statement is linked to the pattern of use defined in the development plans, any substantive change to this development must be accepted by an environmental auditor appointed under Part IXD of the Environment Protection Act 1970, and this acceptance advised in writing to EPA and the development authority.

- B. Any landscaped area or garden bed must have at least 0.5m thickness of soil below the finished surface, which is demonstrated to be suitable for the Site [with consideration for aesthetics and the criteria listed within the Audit Report (reference J8427-R02)] and consistent with IWRG 621 as 'Fill Material'.
- C. All surfaces and structures forming the physical barrier (as prescribed in Condition A above), if subsequently damaged or removed during development or occupation of the Site, must be reinstated as soon as possible and to the same condition or better than they were prior to disturbance.
- D. A vapour mitigation system must be designed by a suitably qualified professional and accepted by an environmental auditor appointed under Part IXD of the Environment Protection Act 1970, and this acceptance advised in writing to EPA and the development authority. The vapour mitigation system is to be designed for all occupiable buildings, and any associated single level basements, within the area as shown on the attached Figure 3A. The vapour mitigation system must be installed beneath occupiable buildings, and any associated basements, within the area designated in Figure 3A by a qualified professional and the installation confirmed by an environmental auditor appointed pursuant under Part IXD of the Environment Protection Act 1970 in writing to EPA and the planning authority at completion. The vapour mitigation system may be omitted in the event that the area encompassing the contaminated perched groundwater [as defined by Figure 3A] is remediated to levels where vapour risks to the proposed development no longer exist, such omission must be approved by an environmental auditor appointed under Part IXD of the Environment Protection Act 1970, and this acceptance advised in writing to EPA and the development authority.
- E. A marker layer made of para-webbing material or similar marker layer material is required to be placed over the contaminated shallow perched groundwater to indicate when potentially contaminated perched groundwater may be encountered. The marker layer should be continuous, durable and visibly different to other construction materials at the Site. The marker layer should be placed at a maximum depth of 0.5 metres below finished ground surfaces and should cover the area as shown in attached Figure 3A (excluding areas where the vapour mitigation system is installed). The marker layer should also be identified in the Site development plan (and/or Section 173 or similar at the discretion of the responsible authority). The marker layer may be omitted in the event that the area encompassing the contaminated perched groundwater [as defined by Figure 3A] is remediated to levels where vapour risks and/or dermal contact risks to the proposed development no longer exist, such omission must be approved by an environmental auditor appointed under Part IXD of the Environment Protection Act 1970, and this acceptance advised in writing to EPA and the development authority.
- F. A Contamination Management Plan (CMP) for the contaminated shallow perched groundwater [as defined by the area as shown on Figure 3A] must be developed for the Site by a suitably qualified professional and accepted by an environmental auditor appointed under Part IXD of the Environment Protection Act 1970, and this acceptance advised in writing to EPA and the planning authority. The CMP must at a minimum include measures to prevent exposure to contaminated perched groundwater by residents, construction workers and maintenance workers and provisions for the management of any extracted groundwater during short term construction or long term basement seepage or alike. The CMP may be omitted in the event that the area encompassing the contaminated perched groundwater [as defined by Figure 3A] is remediated to levels where vapour risks, water disposal restrictions and/or dermal contact risks to the proposed development no longer exist, such omission must be approved by an environmental auditor appointed under Part IXD of the Environment Protection Act 1970, and this acceptance advised in writing to EPA and the development authority.
- G. No residential occupation or associated use in any part of a stage of the development may commence without the requirements of Conditions A, B, C, D E and F having been met and verified in writing by an

environmental auditor appointed under Part IXD of the Environment Protection Act 1970, and this acceptance advised in writing to EPA and the planning authority.

- H. Groundwater at the Site is polluted. Groundwater must not be used for any beneficial use without prior testing and review of results by an EPA appointed environmental auditor, appointed under Part IXD of the Environment Protection Act 1970, to confirm its suitability for that use. It may be extracted for the purpose of environmental monitoring or remediation.
- I. A Groundwater Quality Management Plan (GQMP) has been formulated for the Site as part of this audit, and a copy is attached to this Statement of Environmental Audit (SoEA) [GQMP prepared by Peraco Environmental Services Pty Ltd, reference J8427-R03, dated 2 October 2014]. It is a requirement of this SoEA that the ongoing monitoring and management of groundwater be implemented as detailed in the GQMP. The GQMP may be omitted in the event that the area encompassing the contaminated perched groundwater [as define by Figure 3A] is remediated to levels where vapour risk and dermal contact risks to the proposed development no longer exist. Such omission must be approved by an environmental auditor appointed under Part IXD of the Environment Protection Act 1970, and this must be advised in writing to the EPA and the development authority.
- J. It is a condition of this SoEA that all conditions of the GQMP be complied with.

The condition of the Site is detrimental or potentially detrimental to any (one or more) beneficial uses of the Site. Accordingly, I have not issued a certificate of environmental audit for the Site in its current condition, the reasons for which are presented in the environmental audit report. The terms and conditions that need to be complied with before a certificate of environmental audit may be issued are set out as follows:

- i). Clean-up of polluted groundwater such that all beneficial uses of groundwater are restored.
- ii). Residual polluted land remaining on-Site is remediated such that all beneficial uses of land are restored, or it is demonstrated that all elements of land at the Site do not pose an unacceptable human health and/or environmental risk through appropriate risk-based assessment

Other related information

1. The Auditor has determined that
 - a. Groundwater has been cleaned up to the extent practicable; and
 - b. The Auditor has recommended that the Site is designated as a Groundwater Quality Restricted Use Zone (GQRUZ). The extent of the proposed GQRUZ is shown on Figure 4A appended to this SoEA.
2. In accordance with Clause 19(3) of the SEPP (GoV) the EPA may require periodic reassessment of the practicability of groundwater clean-up.
3. The extractive beneficial uses 'Potable Water Supply', 'Agriculture, Parks and Gardens', 'Stock Watering', 'Primary Contact Recreation' and 'Industrial Use' are precluded by one or more of TRH C6-C10, TRH >C10-C40, trichloroethene, tetrachloroethene in the perched groundwater aquifer (at approximate depths of 0.5-2mbgs).
4. The extractive beneficial uses 'Potable Water Supply', 'Stock Watering' and 'Primary Contact Recreation' and 'Industrial Use' are precluded by one or more of trichloroethene, 1,2 dichloroethane, 1,1 dichloroethane, 1,1, dichloroethene and vinyl chloride in the deep groundwater aquifer (at approximate depths of 7-10mbgs).
5. Elevated concentrations of aluminium, iron, pH, selenium, arsenic, cobalt, copper, total chromium, lead, manganese, molybdenum, nickel, zinc, fluoride, nitrate and nitrite within the shallow and/or deep aquifer are

not considered to be derived from the Site itself. The presence of these elevated metals/contaminants may preclude one or more of the following beneficial uses: 'Maintenance of Ecosystems', 'Potable Water Supply', 'Agriculture, Parks and Gardens', 'Stock Watering', 'Primary Contact Recreation' and 'Industrial Use'. Volatile chlorinated hydrocarbon contamination of perched and deeper groundwater beneath the Site is the result of polluted sources from the Site as well as from upgradient sources (ie the Site is a co-source of chlorinated hydrocarbons contamination).

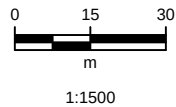
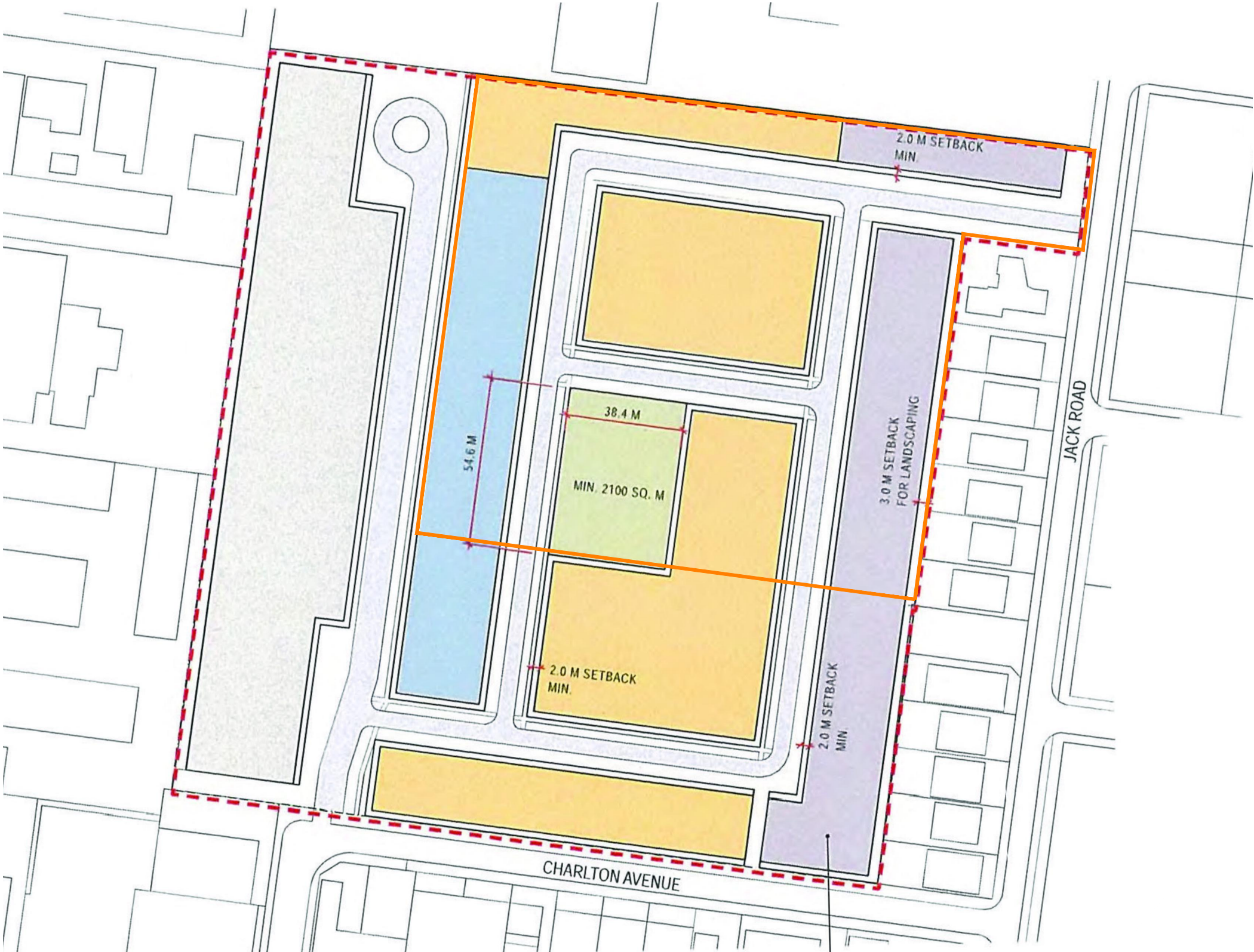
6. If double level basements are proposed within the development the need for vapour mitigation systems (as described under Statement Condition D) must be assessed by an EPA appointed auditor and such need communicated to the EPA and relevant planning authority.
7. Asbestos containing materials were found on the Site and have been removed as far as practicable. Small quantities of bonded asbestos cement (AC) fragments may remain within the soil and be uncovered during excavation works. These AC fragments are not anticipated to represent a health risk to occupiers of the completed development. If encountered during future development or use of the Site, any fragments should be handled and disposed in accordance with the relevant regulations.
8. Any soils and/or rock to be excavated from the Site and disposed of off-Site must be classified and managed in accordance with relevant statutory regulations and EPA guidelines (e.g. IWRG 621).
9. Any fill or soil imported to the Site shall be chemically tested soil or fill that classifies as "fill material" in accordance with relevant EPA guidelines.
10. Any groundwater monitoring bores present at the Site not required as part of the GQMP should be decommissioned in accordance with the requirements of "Minimum Construction Requirements for Water Bores in Australia", published by the Land and Water Biodiversity Committee (as amended).
11. In accordance with section 53ZE of the Environment Protection Act 1970 the owner/occupier of the Site must provide a copy of this SoEA and the Contaminant Management Plans to any person who becomes or proposes to become an occupier of the Site.
12. Two separate Statements of Environmental Audit have been issued for the proposed development which includes this Site. This Statement which covers the majority of the designed audit boundary, and a second Statement which covers an existing electrical substation. The soil beneath the substation could not be safely accessed for investigation purposes and as such this small part of the development (as identified in Figure 1B) was issued a separate Statement.

This statement forms part of environmental audit report (*Peraco Environmental Services Pty Ltd, Environmental Audit Report, 33 Jack Road, Cheltenham, 3192, Report Number J8427-R02, 2nd October 2014*). Further details regarding the condition of the Site may be found in the environmental audit report.

DATED 2nd October 2014

Signed


Peter Mirkov
ENVIRONMENTAL AUDITOR

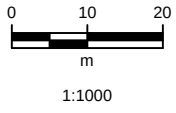
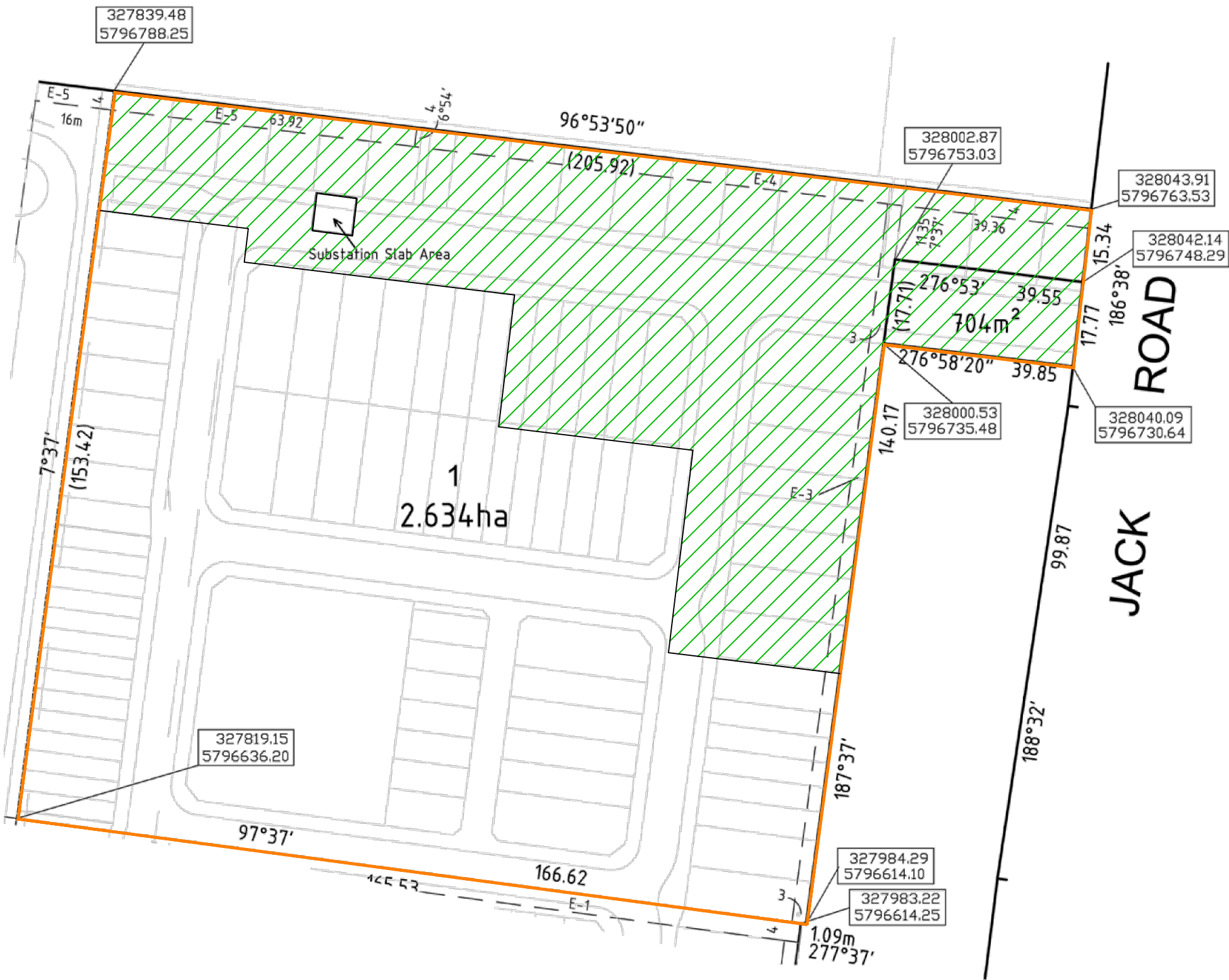


Drawing Number: J8427-4A	
Revision: A	
Date: 11/09/14	
Author: LZ	Checked by: MB
Data Source: Rothe Lowman, Jack Road Development Plan - 16	

ENVIRONMENTAL AUDIT BOUNDARY	
OPEN SPACE	
RESIDENTIAL TOWNHOUSE	

RESIDENTIAL TOWNHOUSE	
MIXED USE	
OFFICE / COMMERCIAL / INDUSTRIAL / WAREHOUSE	

Client	Jack Road Investments Pty Ltd
Site	33 Jack Road, Cheltenham
Title	Figure 2A - Proposed Development Plan



Drawing Number: J8427-4A	
Revision: A	
Date: 11/09/14	
Author: LZ	Checked by: MB
Data Source: Head & Humphreys, 7033-00-ENV-0201	

- ENVIRONMENTAL AUDIT BOUNDARY
- EXTENT OF PERCHED WATER CMP, MARKER LAYER AND VAPOUR MITIGATION SYSTEM
(AS OUTLINED IN ASSOCIATED STATEMENT CONDITIONS)

Client	Jack Road Investments Pty Ltd
Site	33 Jack Road, Cheltenham
Title	Figure 3A - Extent of Perched Water CMP, Marker Layer and Vapour Mitigation System



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GROUNDWATER QUALITY MANAGEMENT PLAN 33 JACK ROAD, CHELTENHAM, VICTORIA

Prepared for:

Jack Road Investments Pty Ltd
Door 14 North Drive, 236-262 East Boundary Road
East Bentleigh VIC 3165

Report Date: 2 October 2014
Project Ref: J8427.R03

Written/Submitted by:

A handwritten signature in black ink, appearing to read "Peter Mirkov".

Peter Mirkov
Environmental Auditor
(Appointed Pursuant to the Environment Protection Act 1970)

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Figure 1: Site Location Plan

Figure 2: Plan of Groundwater Monitoring Bores to be Retained and Monitored

Figure 3: Groundwater Contour Map – Perched Aquifer (August 2014)

Figure 4: Groundwater Contour Map – Deep Aquifer (August 2014)

Figure 5: Groundwater Impacts, Perched Aquifer VCHs

Figure 6: Groundwater Impacts, Perched Aquifer TPHs

Figure 7: Perched Water Zone

Figure 8: Recommended Groundwater Quality Restricted Use Zone

Abbreviations

AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
C6-C36	Hydrocarbon chainlength fraction
Bgs	below ground surface
BH	Borehole
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
COC	Chain of Custody
DO	Dissolved Oxygen
EC	Electrical Conductivity
Eh	Oxidation/Reduction Potential
ESA	Environmental Site Assessment
GME	Groundwater Monitoring Event
LOR	Limit of Reporting
µg/L	micrograms per litre
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
MW	Monitoring Well
NATA	National Association of Testing Authorities
NEHF	National Environmental Health Forum
NEPM	National Environment Protection Measure
PSH	Phase Separated Hydrocarbon
QA	Quality Assurance
QC	Quality Control
RL	Reduced Level
SWL	Static Water Level
TDS	Total Dissolved Solid
TOC	Top of Casing
TPH	Total Petroleum Hydrocarbon
UST	Underground Storage Tank
VCH	Volatile Chlorinated Hydrocarbons
VIC EPA	Environment Protection Authority of Victoria

1 Introduction

1.1 Background

This Groundwater Quality Management Plan (GQMP) has been prepared as part of the environmental audit for the site located at 33 Jack Road, Cheltenham, Victoria, conducted by Peter Mirkov. Compliance with this GQMP forms part of the conditions in the Statement of Environmental Audit issued for the site, refer to report ref. J8427-R02.

The location of the site is indicated on Figure 1. Groundwater bore locations, groundwater contours and plume maps are indicated on Figures 2 to 7. The recommended Groundwater Quality Restricted Use Zone is indicated on Figure 8.

1.2 Objective

The purpose of the GQMP is to outline ongoing groundwater management requirements for the site located at 33 Jack Road, Cheltenham. The specific requirement is to provide for a means to assessing the possible expansion of a contaminated perched groundwater aquifer that was identified along the northern part of the development site. Contamination of perched groundwater represented a potential indoor vapour air risk to future residents at the site, and as such the audit was completed with a Statement condition requiring the design and installation of a vapour barrier in areas where contaminated perched groundwater may be present. The objective of the GQMP is to monitor perched groundwater and to provide assurance that contaminated perched groundwater will not migrate into areas where vapour barrier systems have not been specified.

The areas encompassing the vapour barrier have also had Statement conditions placed requiring the installation of a marker layer and Contaminant Management Plan (CMP) to provide protection from possible dermal contact exposure to residents or workers. This GQMP will also provide assurance that these Statement conditions are also met.

It should be noted that this report is provided as a summary only and does not attempt to reproduce large quantities of data and information contained in the previous site assessment reports and the environmental audit report for the site. For a detailed description of all site conditions and environmental issues that created a need for this GQMP reference should be made to the environment audit report (Peraco Report J8427-R02).

The requirements of this GQMP must be overseen, as detailed in the GQMP, by an Environmental Auditor appointed pursuant to the *Environment Protection Act 1970*.

2 Site Description

General site information is presented in Table 2.1.

Table 2.1: Site Identification

Site Address:	33 Jack Road, Cheltenham, Victoria 3192
Title Details	Lot 1 on Proposed Plan of Subdivision PS713815C Lot 2 on Plan of Subdivision 138747 (Volume 09479 Folio 505)
Total Site Area:	Approximately 27,045 m ²
Current Zoning:	Mixed Use Zone (MUZ) and Commercial 1 Zone (C1Z) City of Bayside Planning Scheme

Current Site Use:	Vacant
Proposed Site Use:	Medium to high density residential and recreational/open space. The site is being developed as one residential development with the site immediately to the south (9-41 Charlton Ave, Cheltenham). The proposed development layout is provided on Figures 1A (attached to the Statement of Environmental Audit).

3 Geology and Hydrogeology

3.1 Geology – Regional/Local

The 1:63,360 Geological Survey of Victoria Ringwood map sheet (No.849) indicates that the site is underlain by Quaternary age sand dune deposits and swamp deposits comprising sands, silts and clays. The sediments are deposited in north-west/south-east aligned bands with the sand dune deposits forming topographic highs and swamp deposits forming topographic lows. The Quaternary sand deposits are generally up to 3m thick and contain groundwater, forming the shallow perched aquifer beneath the site. This shallow aquifer is perched on the underlying geology of the Brighton Group and is ephemeral with water levels fluctuating significantly over the year as they are largely dependent on rainfall recharge. Groundwater is expected at a depth of approximately 0.5 to 2m below ground level.

Beneath the Quaternary age sands are the Tertiary age Brighton Group Sands comprising sand, clayey sand, sandy clay and minor gravel. The Brighton Group sands are approximately 30m thick in the vicinity of the site and form the underlying Brighton Group Aquifer, where groundwater is expected at a depth of approximately 10m below ground level. The aquifer is fine grained and of low to moderate permeability with higher permeability layers of coarse sand and fine gravel.

Site specific geology encountered during drilling and excavation works conducted at the site is summarised in Table 3.1.

Table 3.1: Site Specific Geology

Depth interval (mbgs)	Soil lithology
0.0 – 1.0	FILL: Comprising fine to coarse grained sand and gravel, poorly sorted silt, gravel, sand and clay with crushed rock at some locations, generally extending to a depth of approximately 1.0m. The fill material was present at greater thickness at locations in the south eastern portion of the site and was encountered at depths up to 1.4m.
0.5 – 1.5	SAND: Fine grained, uniform, grey to brown, moist, dense, containing some fine to medium grained rounded gravels (inferred ironstone). At most locations, this sand extended from below the fill material to a maximum depth of 2.4m. At a number of locations, sand was not encountered, with fill material overlying natural sandy clay.
1.0 – 11.0	SANDY CLAY/SILTY CLAY: Low plasticity, medium grained sand, mottled red/grey/orange, moist, stiff, sand content decreasing with depth.
8.0 – 12.0	CLAYEY SAND: Fine to coarse grained, poorly graded, medium plasticity clay, mottled grey/brown/orange, some medium grained rounded gravel (inferred ironstone).

3.2 Hydrogeology – Regional/Local

The site is located in the East Port Phillip Bay groundwater catchment and groundwater beneath the site may be encountered in the shallow Quaternary sand sediments aquifer or the deeper Brighton Group aquifer.

Groundwater quality in the shallow aquifer is highly variable and dependent on the rate of local recharge, and total dissolved solids (TDS) is expected to be in the range 100 mg/L to 3,000 mg/L.

Based on the *Victorian Groundwater Beneficial Use Map of South Western Victoria Water Table Aquifers*, LRM determined that groundwater beneath the site was likely to be classified as Segment A1 (TDS up to 500 mg/L) as defined by the State Environmental Protection Policy (SEPP) *Groundwaters of Victoria*.

The closest natural surface water body to the site is Port Phillip Bay located approximately 2.7km west of the site. Groundwater flow is considered likely to flow west or south west towards Port Phillip Bay.

A review of Visualising Victoria's Groundwater database (<http://vvg.org.au/>) undertaken in August 2014 identified 321 registered groundwater wells within 2 km of the site. Eighty-three registered groundwater wells were identified within 500 m of the site. Six of these bores were registered for observation or investigation use with total depths between 10 and 15m and screened lithology being sand. The closest registered bores were located immediately north and immediately south of the site at the neighbouring properties (both registered as observation bores). The two closest extraction bores were irrigation bores located 300m north west (cross gradient) of the site and 400m south (down gradient) of the site and were drilled to depths of 40m and 36m respectively.

Groundwater monitoring wells were installed at the site to investigate both the perched Quaternary aquifer (the 'perched aquifer') and the Brighton Group aquifer (the 'deep aquifer') as part of the Audit. The audit report provides details on both aquifers, this GQMP is primarily concerned with the shallow perched groundwater aquifer.

Perched Quaternary Aquifer

At the time of the LRM works the perched aquifer was observed to extend across the north and north-eastern portion of the site. A total of 17 wells were installed in the perched aquifer at the site. Five of these wells; SW4 in the north-east corner, SW3 in the north, and SW11, SW12 and SW14 in the centre of the site, have consistently been dry.

Groundwater within this aquifer is considered localised, ephemeral and discontinuous and as such is not considered to represent a significant groundwater source for extractive use.

Standing water levels in the perched aquifer, as measured during the most recent GME in August 2014, ranged between 0.52 m below ground level (mbgl) at SW13 and 1.71mbgl at SW10.

Laboratory TDS concentrations in the range 200 – 3,300mg/L were reported. Reported TDS is consistent with the reported range of perched water within the region.

Where shallow groundwater was encountered across the site, the flow direction appeared generally to be in a southerly direction. Some mounding was observed at MW9AR, however this was considered to be associated with artificial recharge within the backfill material at the former tank pit.

It is noted that the groundwater SWL was above or at the screened interval in wells MW9A, MW9AR, SW1, SW6, SW8 and SW15. Given that the main contaminant of potential concern at the site was volatile chlorinated hydrocarbons, this was not considered to be of concern. The exception was elevated concentrations of TRH >C₁₀ in wells SW8 and SW15, which were not indicative of the presence of light non-aqueous phase liquid and as such this was not considered to be of concern.

A summary of the site specific hydrogeology is provided in Table 3.2.

Table 3.2: Site Specific Hydrogeology

Item	Description
Groundwater Gradient	The hydraulic gradient in the perched aquifer between MW9AR and SW9 is 0.0065 (using groundwater levels recorded in July and August 2014).
Hydraulic Conductivity	The hydraulic conductivity of the aquifer is reported to be moderate to low (a representative value of 0.4m/day is given by Leonard, 1992). Hydraulic conductivity testing (rising head tests) was undertaken on three shallow aquifer wells and three deeper aquifer wells. The test data were analysed by Coffey via two solutions appropriate for an unconfined aquifer: Hvorslev (1951) and Bouwer and Rice (1976). Average hydraulic conductivity of the perched aquifer was reported to be 0.45 – 0.7 m/day
Porosity	Porosity of the perched aquifer was assumed to be 26% based on the analysis of sample SVB01 (1.0 – 2.0m).
Seepage Velocity	The estimated seepage velocity in the perched aquifer (based on the hydraulic gradient on 0.0065 and assumed porosity of 26%) is estimated to range from 4 m/year to 7 m/year.

4 Environmental Management at the Site

4.1 Environmental Issues at the Site

Concentrations of VCH and TPH are present in the shallow Quaternary aquifer which currently preclude the relevant extractive beneficial uses of 'Potable Water Supply', 'Agriculture, Parks and Gardens', 'Stock Watering', 'Industrial Use' and/or 'Primary Contact Recreation'.

An assessment of potential risk to human health was conducted for the site. The results of the health risk assessment identified a potential risk to indoor air for future residential occupiers at the site, as such a Statement condition required the incorporation of a vapour barrier in areas where contaminated perched water was present. The contaminated perched groundwater also represented an unacceptable dermal contact and / or vapour risk to subsurface workers.

To assure that no future risk is posed to receptors (residents and workers) by way of perched groundwater unexpectedly migrating to areas where no management conditions have been specified (vapour barriers, marker layers and contaminant management plans) this GQMP has specified that the groundwater needs to be monitored for a period of time to ensure that conditions into the future remain as predicted in the audit report, ie remain stable or recede as predicted in the CUTEP report.

4.2 Regulatory Requirements

The regulations, legislation and policies that are most applicable to the management of groundwater at the site are considered to be:

- Environment Protection Act (1970);
- State Environment Protection Policy (Waters of Victoria);

- VICEPA, (1997), "State Environment Protection Policy (Groundwaters of Victoria)", No S160, 1997 as amended on 19 March 2002 (Special Gazette G12).
- State Environment Protection Policy (Prevention and Management of Contaminated Land);
- EPA Victoria, Guidelines for the Issue of Certificates and Statements of Environmental Audit, No. 759.2, February 2014.

In relation to this site, the Auditor completed an Auditor determined Clean Up to the Extent Practicable (CUTEP) assessment, and determined that CUTEP had been achieved. The Auditor's CUTEP determination included a recommendation that EPA designate the site as a Groundwater Quality Restricted Use Zone (GQRUZ) pursuant to Clause 19 of *State Environment Protection Policy (Groundwaters of Victoria)*, as amended in March 2002.

The extent of the Auditor's recommended GQRUZ is shown on Figure 7.

5 Groundwater Quality Management Plan

5.1 Purpose and Scope of Plan

The objectives of the groundwater management plan are to:

- Provide a means to manage potential risk to residential occupiers of the site
- Monitor any changed perched groundwater conditions or patterns with respect to the presence of perched water across the site, to ensure contaminated perched water does not extend into areas of the site not managed as the 'perched water zone' (see Figure 7) and
- Identify when groundwater management may cease.

5.2 Life of Plan

The Groundwater Quality Management Plan (GQMP) shall come into effect on the issue of the Environmental Audit Report by the environmental auditor for the site.

Any change to the GQMP for the site should only occur with the agreement of an EPA appointed Environmental Auditor, Jack Road Investments Pty Ltd and EPA or by direction of EPA.

The GQMP may cease with the agreement of EPA.

5.3 Implementation of Groundwater Quality Management Plan

It is the responsibility of Jack Road Investments Pty Ltd to implement the GQMP. Jack Road Investments Pty Ltd may delegate some responsibilities for specific tasks to other parties. However, responsibility to ensure the plan is implemented remains with Jack Road Investments Pty Ltd. It is noted that Jack Road Investments Pty Ltd may delegate or transfer this responsibility to another party, however the Jack Road Investments Pty Ltd must notify EPA of the transfer. The tasks considered necessary to be undertaken as part of the GQMP and the parties responsible for those tasks are shown in Table 5.1 below. Unless stated, it is assumed that the responsibility lies with Jack Road Investments Pty Ltd.

Table 5.1 – GQMP Tasks and Responsibilities

Task	Party / Parties Responsible
Appointment of Environmental Auditor and Environmental Consultant	Jack Road Investments Pty Ltd
Implementation of the Groundwater Quality Management Plan	Jack Road Investments Pty Ltd
Periodic environmental monitoring by suitably trained personnel.	Must be delegated to Jack Road Investments Pty Ltd's environmental consultant
Evaluation of monitoring results against trigger levels	Must be delegated to Jack Road Investments Pty Ltd's environmental consultant
Notifying environmental Auditor of change in site condition, if movement of perched water occurs into areas not managed as the 'perched water zone', if groundwater monitoring trigger levels are exceeded or if conditions of Statement of Environmental Audit are contravened	May be delegated to Jack Road Investments Pty Ltd's environmental consultant
Preparation of groundwater monitoring event (GME) reports to be reviewed by Environmental Auditor	Must be prepared in consultation with Jack Road Investments Pty Ltd's environmental consultant
Review of GME reports.	Auditor appointed pursuant to the <i>Environment Protection Act 1970</i> to be appointed by Jack Road Investments Pty Ltd
Implementation of remedial measures, where such measures are determined to be necessary by the Environmental Auditor and EPA, in response to environmental deficiencies observed	Responsibility of Jack Road Investments Pty Ltd but may be delegated to a suitably qualified consultant or contractor. Must be conducted in consultation with EPA, the Environmental Auditor and Jack Road Investments Pty Ltd's environmental consultant.
Keeping records of groundwater analytical results	May be delegated in part to the environmental consultant. Jack Road Investments Pty Ltd must keep copies of documentation.

In the event of groundwater monitoring trigger levels being exceeded or the conditions of Statement of Environmental Audit being contravened, then the Environmental Consultant and the Environmental Auditor must notify Jack Road Investments Pty Ltd and EPA immediately.

5.4 Reporting

Where actions are taken under the GQMP, Jack Road Investments Pty Ltd or its representative must document the actions taken.

If these actions indicate a change in the condition of the site from that expected (i.e. groundwater concentrations in excess of trigger levels, the occurrence of water in a historically dry well or evidence of the movement of perched water into areas outside that of the designed 'perched water zone' as per Figure 7), then details of the actions and all data must be immediately reported to the Environmental Auditor. Groundwater monitoring results that do not exceed trigger levels shall be documented in the annual report.

Reports of activities undertaken as part of this GQMP should be prepared by Jack Road Investments Pty Ltd or its representative and reviewed by an EPA appointed Environmental Auditor following each groundwater monitoring event.

The reports should be presented in a factual format, with emphasis being placed on methods employed and data obtained.

The reports should include (where applicable);

- Context of Report;
- Groundwater Monitoring Data (sample collection details, groundwater levels, the observed presence or absence of perched water, trends over time, analytical results and QA/QC details);
- Scale Plans;
- Comments on the status of groundwater pollution and any action that may be required.

6 Groundwater Management

6.1 General

This groundwater management plan has been developed based on the requirements of State Environment Protection Policies and EPA Victoria Guidelines for Groundwater Sampling.

6.2 Controls on Groundwater Extraction and Use

Groundwater (shallow perched or deeper aquifer) shall not be extracted from the Auditor recommended GQRUZ for any purpose other than clean-up or monitoring. Where groundwater is extracted from the site it must be disposed of in accordance with EPA waste guidelines and any site Trade Waste Agreement in force. Testing of the quality of groundwater should be conducted before disposal.

6.3 Groundwater Monitoring

6.3.1 Monitoring Frequency and Procedures

A total of 17 shallow wells and 24 deep wells have been installed at the site. Given the nature of contamination remaining; 11 on-site shallow wells have been specified to be required to be maintained, monitored for the presence or absence of perched water and sampled and analysed where water is observed, as part of the requirements of the GQMP.

The location of bores to be retained and monitored is shown on Figure 2 attached.

Bores specified to be retained as part of the GQMP shall be managed so that they remain functional and protected from contamination via entry of foreign objects, etc. and lockable caps should be fitted. The following table indicates the bores that are to be maintained.

Table 6.1 – Groundwater Monitoring Bores to be Retained

Bore ID	Location	Purpose
MW9AR	Within the plume	Monitor plume attenuation / plume increase
SW4	On-site, outside the plume	Monitor possible plume expansion and movement of perched water
SW6	On-site, outside the plume	Monitor possible plume expansion
SW7	On-site, outside the plume	Monitor possible plume expansion
SW9	On-site, outside the plume	Monitor possible plume expansion
SW10	On-site, outside the plume	Monitor possible plume expansion
SW11	On-site, outside the plume	Monitor possible plume expansion and movement of perched water
SW12	On-site, outside the plume	Monitor possible plume expansion and movement of perched water
SW13	On-site, outside the plume	Monitor possible plume expansion
SW14	On-site, outside the plume	Monitor possible plume expansion and movement of perched water
SW15	On-site and within plume	Monitor plume attenuation / plume increase

It is noted that during the most recent gauging event conducted in August 2014, wells SW4, SW11, SW12 and SW14 were dry. Groundwater was not observed in these wells at all during the Audit. The purpose of monitoring dry wells is to confirm that perched water does not migrate into areas where perched water was not observed during the audit, thus ensuring that VHC and TPH impacted water does not migrate outside of the areas where the vapour barrier, CMP and marker layer have been specified. In the event that perched groundwater does migrate beyond the designated vapour barrier area, the groundwater must be sampled, analysed and reviewed in the context of trigger levels specified in this GQMP or by way of additional site specific risk assessment to ensure that such perched groundwater migration doesn't represent any unacceptable risks to indoor air environments or as dermal contact to residents/workers.

Samples are to be collected from the groundwater monitoring bores nominated above at least once every six months for a period of three years, starting from the issue of the environmental audit report, or otherwise directed by the auditor. Monitoring should occur at regular six monthly intervals, however due to potential seasonality of perched water movement, the scheduling of groundwater sampling events should take into consideration periods of extended rainfall, with an aim of scheduling GMEs immediately following these periods.

Due to the temporal nature of perched water, the frequency of monitoring should not be reduced to annually.

If any of the nominated bores are damaged or destroyed, then a new bore must be installed in a similar location with similar construction details. The location of replacement bores must be agreed by the appointed Auditor. If a bore is no longer considered necessary by the Auditor appointed to review the GQMP, the bore may be removed from further monitoring. Groundwater samples must be collected in accordance with the procedures given in EPA Victoria (2000) "Groundwater Sampling Guidelines" No. 669 (or any superseding document). Groundwater levels should be

recorded at the time of sampling and be related to the Australian Height Datum. Purge volumes and field parameters shall be recorded and presented in the report of GQMP activities.

6.3.2 Groundwater Analytical Plan

Dissolved oxygen concentrations, redox potential, temperature and electrical conductivity should be measured in the field. As a minimum, samples must be analysed for total petroleum hydrocarbons and chlorinated hydrocarbons. Laboratory reporting limits must be below the adopted groundwater investigation levels as presented in Table F2 of the Audit Report. Samples must be analysed by an analytical laboratory that has received NATA accreditation for the analyses conducted, and reported in a NATA-endorsed test report.

6.3.3 QC Procedures

Quality control and assurance procedures should be conducted in accordance with EPA Victoria (2000) "Groundwater Sampling Guidelines". Sampling, analysis and data reporting shall be to the standards approved by the auditor.

6.4 Monitoring Data Review

A review of monitoring data should be conducted by the environmental consultant immediately after each round of groundwater monitoring. Any changes in groundwater level beyond normal fluctuations should be checked and the implications of such changes considered by an environmental specialist. Groundwater analytical data should be compared with results of previous monitoring rounds and the trigger levels defined in this document.

Reports of activities undertaken as part of this GQMP should be prepared following each monitoring event by the site occupier or its representative and reviewed by an EPA appointed Environmental Auditor.

Where the presence of perched water is observed outside the designated 'perched water zone', the EPA appointed Environmental Auditor should be notified immediately.

Any groundwater concentrations in excess of trigger levels shall be immediately reported to the EPA appointed Environmental Auditor, who shall then in turn immediately notify the EPA of the trigger level exceedances. The contingency plan nominated for trigger level exceedances must be implemented at this time.

The Auditor shall prepare a report based on the review of all sampling events conducted for submission to the site occupier and EPA after a maximum of three years of monitoring. At this time, the Environmental Auditor must review the requirements of the GQMP and seek EPA advice regarding the potential to cease the GQMP. Cessation of the GQMP may only occur with EPA approval. It should be noted that an EPA appointed Environmental Auditor may apply to the EPA for cessation of the GQMP sooner than a three year period of monitoring, however after three years the Auditor must review the GQMP and consider the potential for its cessation.

6.4.1 Compliance Targets

Compliance targets relate to the criteria for protection of the beneficial uses of groundwater including 'Agriculture, Parks and Gardens', 'Stock Watering', 'Industrial Use' and 'Primary Contact Recreation'. Maintenance of Ecosystems criteria was also exceeded, however given the nearest surface water receptor is 2.7km west of the site and the presence of the perched water has been observed to be localised, predominately within the site boundaries, it is highly unlikely that contamination from this site would ever reach a receptor at such a distance.

6.4.2 Groundwater Trigger Levels

In assessing suitable trigger levels consideration is given to the possible impact to the beneficial uses of land (via groundwater contaminant vapours) as well as minimising the migration of the plume and subsequent impact to possible beneficial uses of groundwater at down-gradient locations.

In determining trigger levels the following has been considered:

- Levels must be within the criteria for risk to indoor air environments as assessed during the site specific risk assessment
- Overall the management of the contamination needs to also provide assurance that the plume will not spread beyond a reasonable distance (considering likely natural attenuation) from the original source (near MW9)

The trigger levels will therefore relate to (1) ensuring that there is no significant spread of the chlorinated hydrocarbon contamination beyond what has been identified as a source near well MW9AR and (2) ensuring that there is no migration of chlorinated hydrocarbons outside the currently designated vapour barrier protection zone such that a potential indoor air risk results in those areas that do not have a vapour barrier.

With respect to the second of these objectives, the derivation of risks associated with indoor air for multiple chlorinated hydrocarbons is an additive process and as such there is no single unique combination of chlorinated hydrocarbons that can be specified as single trigger levels. As such the results from each round of groundwater monitoring needs to be assessed against the developed site specific health risk assessment model (which has been peer reviewed by an EPA approved health risk expert). The exposure risk model is documented in the Coffey Environments Pty Ltd (September 2014), *On-site Health Risk Assessment Report*, and this model must be utilised when assessing the risk to indoor air from chlorinated hydrocarbons outside the designated vapour barrier area from any round of groundwater monitoring, alternatively the auditor may develop another site specific risk model to predict indoor air risks and such model can alternatively be utilised subject to the model being peer reviewed by the auditor's appointed risk assessment expert. Similarly any perched groundwater outside of the vapour barrier level that contains any petroleum hydrocarbons should also be assessed against the risk model for dermal contact risks combined with inhalation risks for residents, trench workers and construction workers (as per the Coffey Environments Pty Ltd (September 2014), *On-site Health Risk Assessment Report*).

If groundwater concentrations exceed risk/trigger levels in one monitoring round, then the well at which the elevated concentration was observed should be immediately re-sampled and analysed to confirm the validity of the result. If the re-sampled groundwater concentration also exceeds the trigger/risk level, then monitoring results should immediately be referred to an Environmental Auditor for review. The data from the other wells in the sampling set should also be considered when assessing any actions.

With respect to the second objective of the trigger levels it is recommended that the auditor reviews the concentrations of volatile chlorinated hydrocarbons and TRH in each well at each round and make an assessment of the trends in concentrations over time. If the trends remain stable or decreasing then no action would be required. If trends demonstrate increasing concentrations (but not representative of any risk to indoor air as discussed for the first objective) then the auditor should assess the likelihood that continued increasing trends would result in expansion of the plume such that expansion of the perched groundwater plume is likely to affect areas outside the vapour barrier then the auditor should implement risk mitigation strategies as described below, in consultation with the EPA.

6.5 Contingency Risk Assessment and Possible Remedial Action Plan

Results of groundwater monitoring that indicate current groundwater concentrations above the trigger levels or above levels that may result in exceedances of acceptable risk levels (as described in 6.4.3 above), should result in the implementation of a groundwater risk assessment.

The risk assessment should consider:

- The cause of the increased hydrocarbon concentrations (with particular attention to potential for off-site impacts entering the site – as this has been indicated as a likely pathway);
- The migration pathways associated with the plume;

- The likely future migration of the plume – the gathered data will provide information from which migration models can be calibrated;
- The likely future impact on beneficial uses (especially indoor air risks) and hence the possible need to consider remedial action;
- The potential risk of impact to possible receptors of the groundwater; and
- Reassessment of the practicability of remediation options given gathered data.

This risk assessment, in consultation with the Auditor or EPA, will determine the need for an active remediation of the plume.

7 Review of Groundwater Quality Management Plan

After a period of three years the GQMP data collected over the three year period shall be reviewed by the Jack Road Investments' environmental consultant and by an EPA appointed environmental Auditor. The review shall include an assessment of:

- the results of groundwater monitoring; and
- whether retention, augmentation, modification or cessation of the GQMP is recommended.

An EPA appointed environmental Auditor shall prepare a GQMP review report. This report should include:

- a summary of the actions implemented, as part of the GQMP, over the review period;
- a review of the QA/QC relating to the data obtained;
- comments on the environmental implications of groundwater monitoring; and
- recommendations regarding the ongoing implementation of the plan, including any recommendations regarding monitoring frequency or changes to site criteria or discontinuation of monitoring.

A copy of the GQMP review report shall be provided to Jack Road Investments Pty Ltd and EPA. Any revision of the GQMP shall be only made with the agreement of Jack Road Investments Pty Ltd, an EPA appointed environmental Auditor and EPA. The review and subsequent changes to the GQMP should be finalised within six months.

If the EPA agrees that monitoring can be discontinued then the conditions pertaining to groundwater monitoring on the Statement of Environmental Audit shall be deemed to have been met and thus shall lapse. Otherwise the GQMP will continue for a further 3 years.

8 Summary

The requirements outlined in this GQMP are:

1. Jack Road Investments Pty Ltd to appoint an EPA accredited environmental Auditor to oversee the GQMP.
2. Jack Road Investments Pty Ltd to appoint a suitably qualified environmental consultant to undertake the GQMP.
3. Environmental consultant is to conduct groundwater monitoring rounds as stipulated in this GQMP and prepare a report as described in Section 5.4.
4. Auditor is to conduct reviews of the GQMP results/reports.
5. The Auditor is to conduct a three-yearly review of the GQMP as set out in Section 6.4 and submit such a review to EPA.
6. Cessation of groundwater management and monitoring shall occur when an EPA auditor recommends such cessation and the EPA agree in writing.

9 References

Peraco (2014) CUTEF Report, 33 Jack Road, Cheltenham, Victoria (ref. J8427-R01).

Peraco (2014) Environmental Audit Report, 33 Jack Road, Cheltenham, Victoria (ref. J8427-R02).

VICEPA (2000) "Groundwater Sampling Guidelines" EPA Publication 669 dated April 2000.

Environment Protection Act (1970).

VICEPA, (2003), "State Environment Protection Policy (Waters of Victoria)", Publication 905, 2003

VICEPA, (1997), "State Environment Protection Policy (Groundwaters of Victoria)", No S160, 1997 as amended on 19 March 2002 (Special Gazette G12).

State Environment Protection Policy (Prevention and Management of Contaminated Land);

VICEPA (2014), Guidelines for the Issue of Certificates and Statements of Environmental Audit, No. 759.2, February 2014.

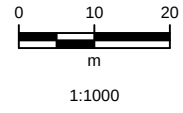
Figures

Groundwater Management Plan
33 Jack Road, Cheltenham, Victoria



Drawing Number: J8427-3	
Revision: A	
Date: 11/09/14	
Author: LZ	Checked by: MB
Data Source:	

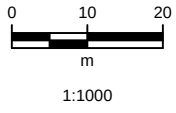
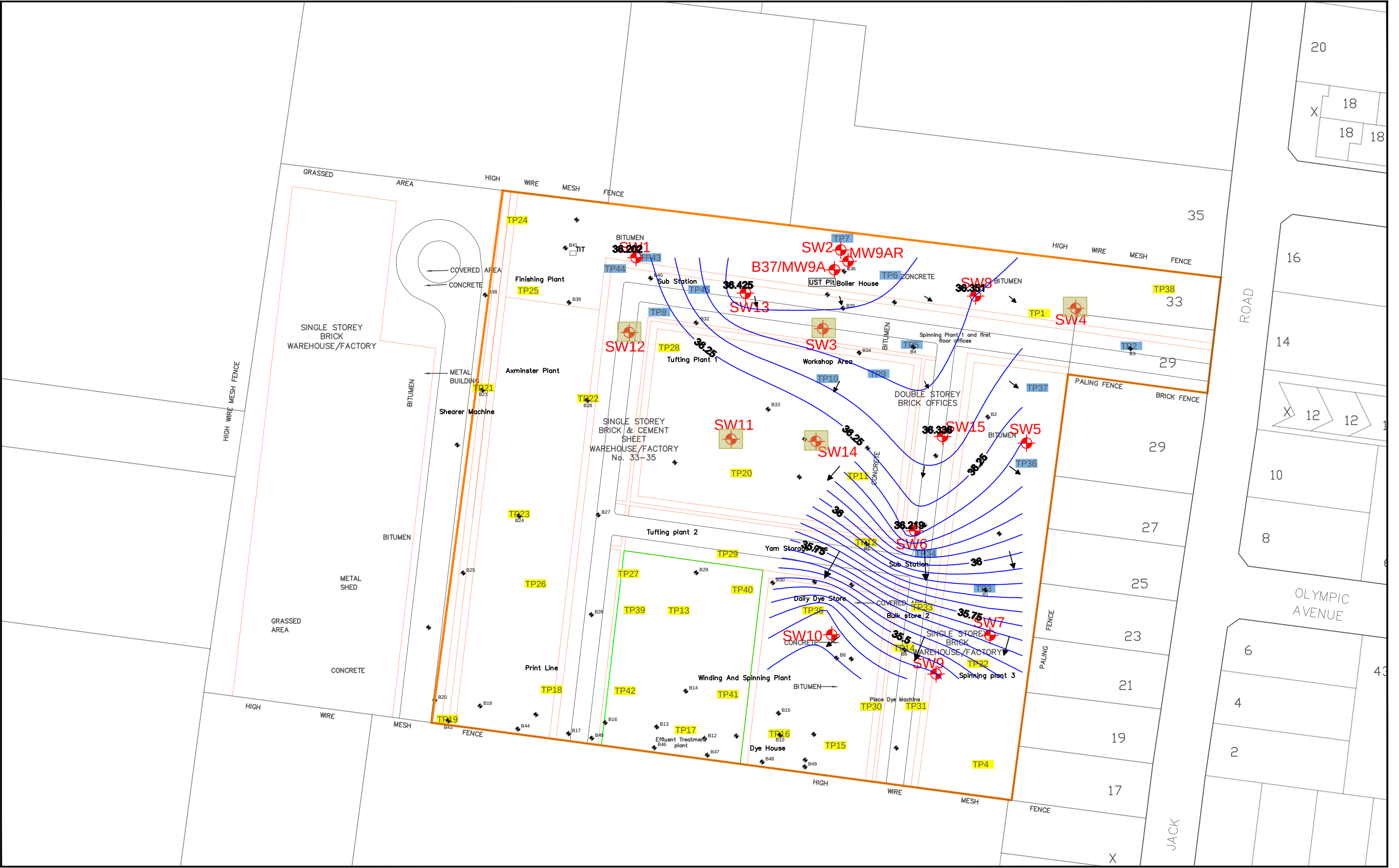
Client	Jack Road Investments Pty Ltd
Site	33 Jack Road, Cheltenham
Title	Figure 1 - Site Location



Drawing Number: J8427-3	
Revision: A	
Date: 11/09/14	
Author: LZ	Checked by: MB
Data Source: LRM Global, 10172, 25/08/14	

- ENVIRONMENTAL AUDIT BOUNDARY
- PROPOSED SITE CONSTRUCTION
- PROPOSED OPEN SURFACE AREA
- SHALLOW GROUNDWATER WELL

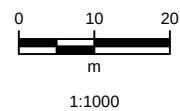
Client	Jack Road Investments Pty Ltd
Site	33 Jack Road, Cheltenham
Title	Figure 2 - Groundwater Monitoring Wells to be retained and monitored



Drawing Number: J8427-3	
Revision: A	
Date: 11/09/14	
Author: LZ	Checked by: MB
Data Source: LRM Global, 10172, 25/08/14	

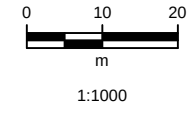
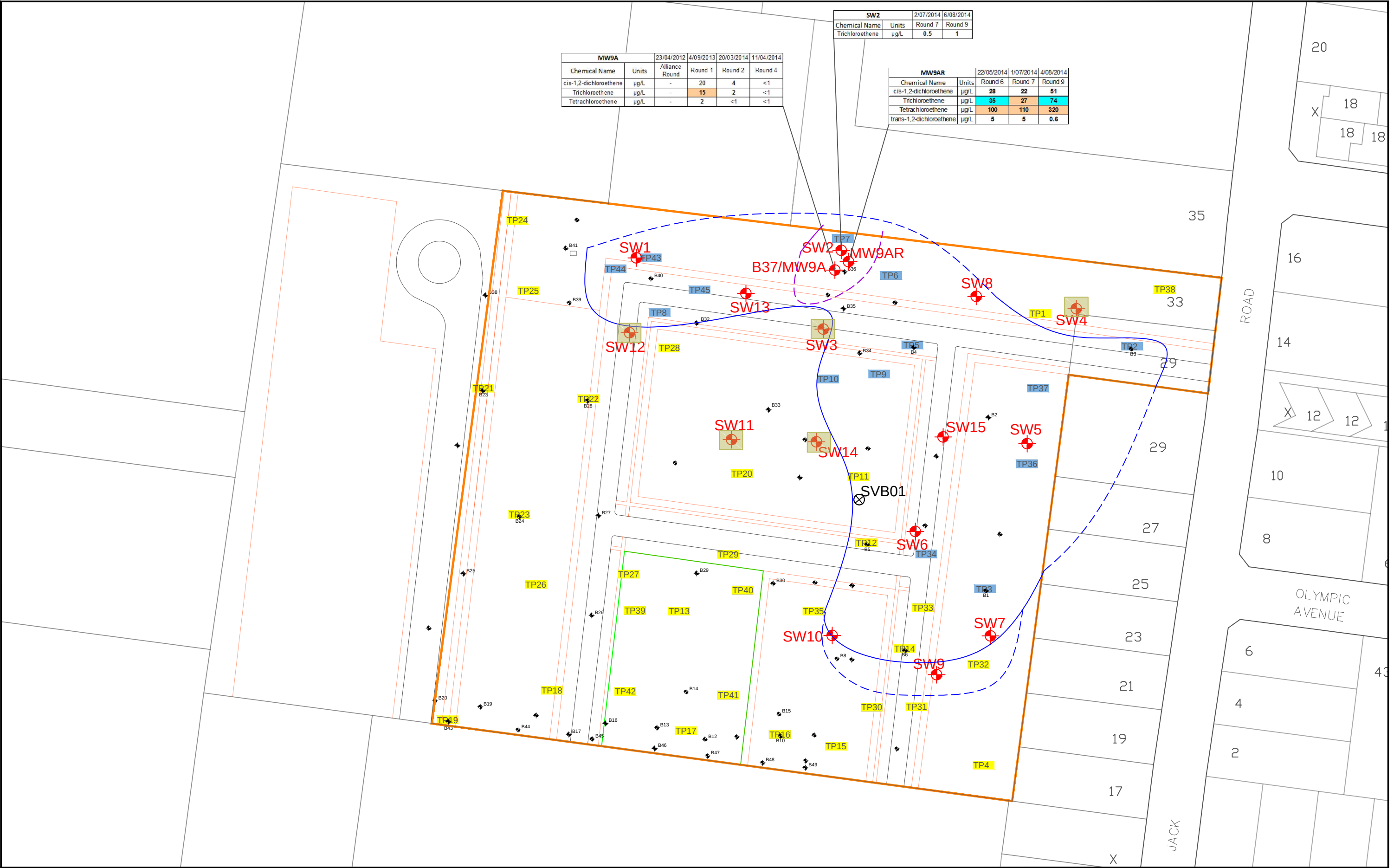
TEST PIT LOCATION	TP	ENVIRONMENTAL AUDIT BOUNDARY	SOIL BORE
TEST PIT LOCATION PERCHED WATER ENCOUNTERED	TP	PROPOSED SITE CONSTRUCTION	DIRECTION OF GROUNDWATER FLOW
GROUNDWATER CONTOURS (mAHd)		PROPOSED OPEN SURFACE AREA	DRY SHALLOW WELL
		SHALLOW GROUNDWATER WELL	NOTE* GROUNDWATER CONTOUR DOES NOT INCLUDE DATA FROM MW9AR AND SW2

Client	Jack Road Investments Pty Ltd
Site	33 Jack Road, Cheltenham
Title	Figure 3 - Groundwater Contour Plan, Perched Aquifer (August 2014)



DIRECTION OF GROUNDWATER FLOW

Figure 4 - Groundwater Contour Plan, Deep Aquifer (August 2014)



Drawing Number: J8427-3

Revision: A

Date: 11/09/14

Author: LZ

Checked by: MB

Data Source: LRM Global, 10172, 25/08/14

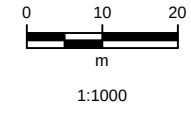
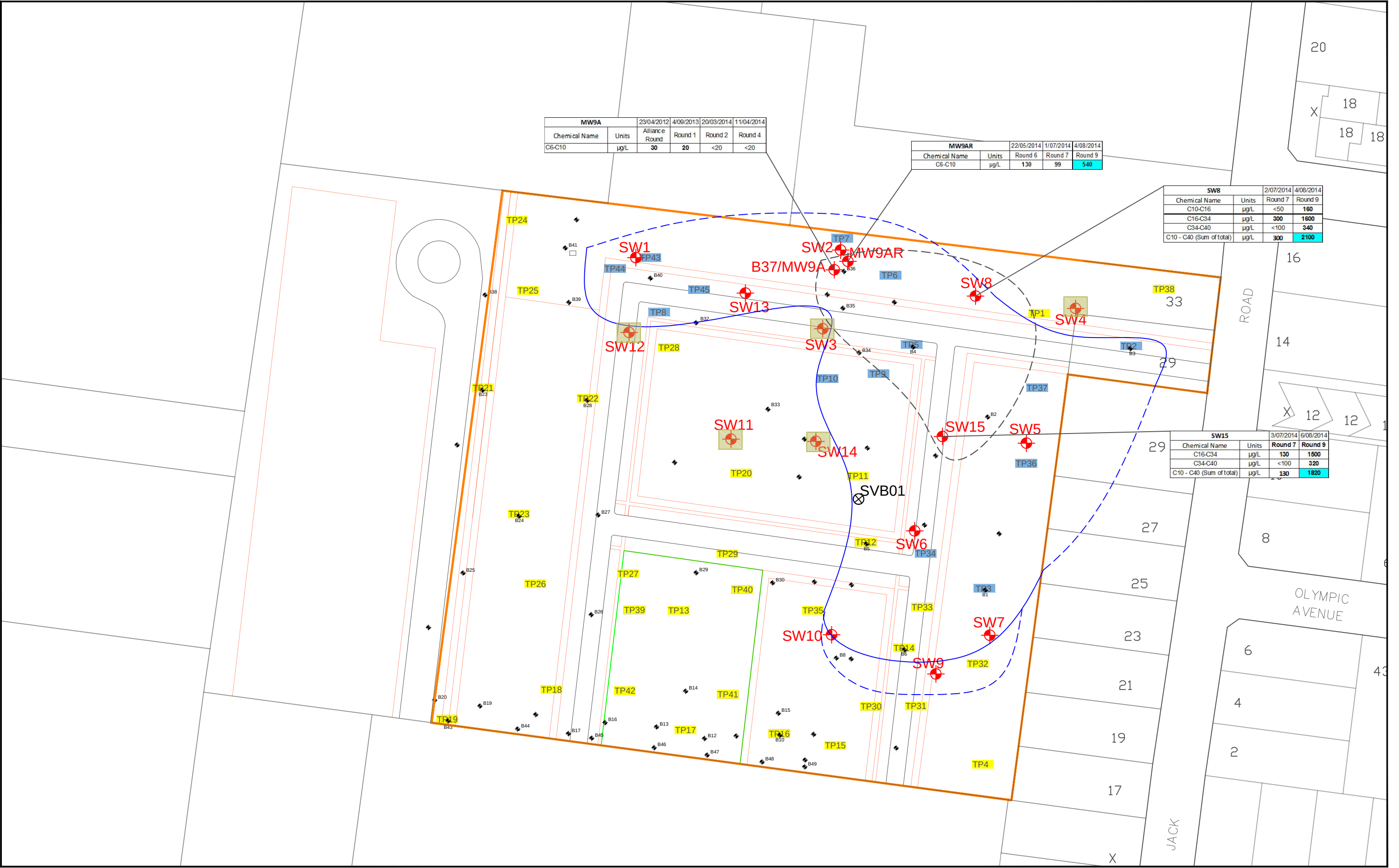
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- TEST PIT LOCATION PERCHED WATER ENCOUNTERED TP
- TRICHLOROETHENE PLUME
- INFERRED SHALLOW GROUNDWATER AQUIFER
- ENVIRONMENTAL AUDIT BOUNDARY
- PROPOSED SITE CONSTRUCTION
- PROPOSED OPEN SURFACE AREA
- SHALLOW GROUNDWATER WELL
- SOIL BORE
- DRY SHALLOW WELL

Maintenance of Ecosystems	Acceptable Potable Water Supply	Exceeds Agriculture, Parks and Gardens	Stock Watering	Primary Contact Recreation
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Client: Jack Road Investments Pty Ltd

Site: 33 Jack Road, Cheltenham

Title: Figure 5 - Groundwater Impacts, Perched Aquifer: VCHs



Drawing Number: J8427-3	
Revision: A	
Date: 11/09/14	
Author: LZ	Checked by: MB
Data Source: LRM Global, 10172, 25/08/14	

- TEST PIT LOCATION

TP
- TEST PIT LOCATION PERCHED WATER ENCOUNTERED

TP
- TPH PLUME

- INFERRED SHALLOW GROUNDWATER AQUIFER

- ENVIRONMENTAL AUDIT BOUNDARY

- PROPOSED SITE CONSTRUCTION

- PROPOSED OPEN SURFACE AREA

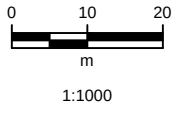
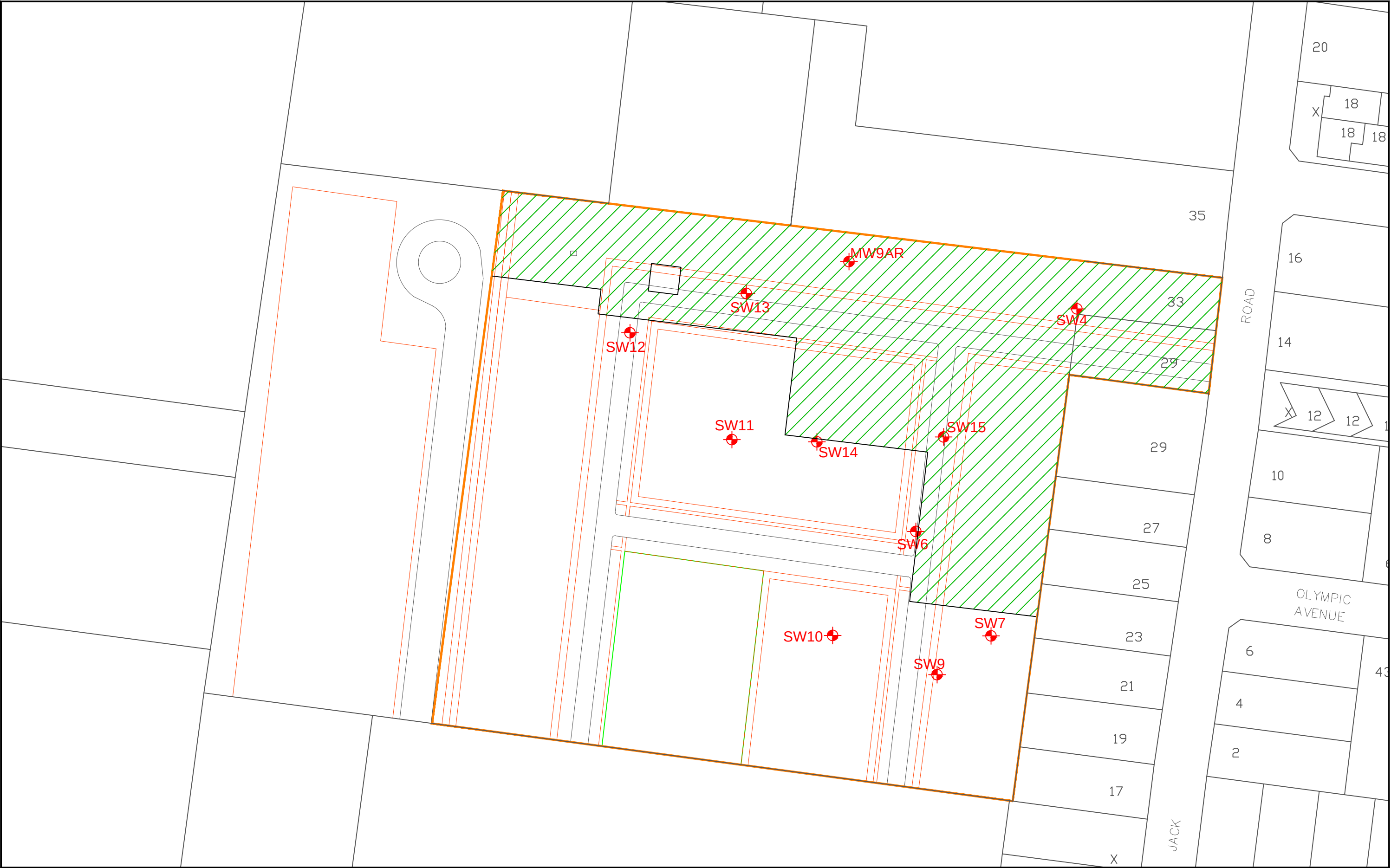
- SHALLOW GROUNDWATER WELL

- SOIL BORE

- DRY SHALLOW WELL

Exceeds				
Maintenance of Ecosystems	Acceptable Potable Water Supply	Agriculture, Parks and Gardens	Stock Watering	Primary Contact Recreation

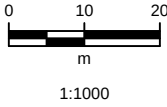
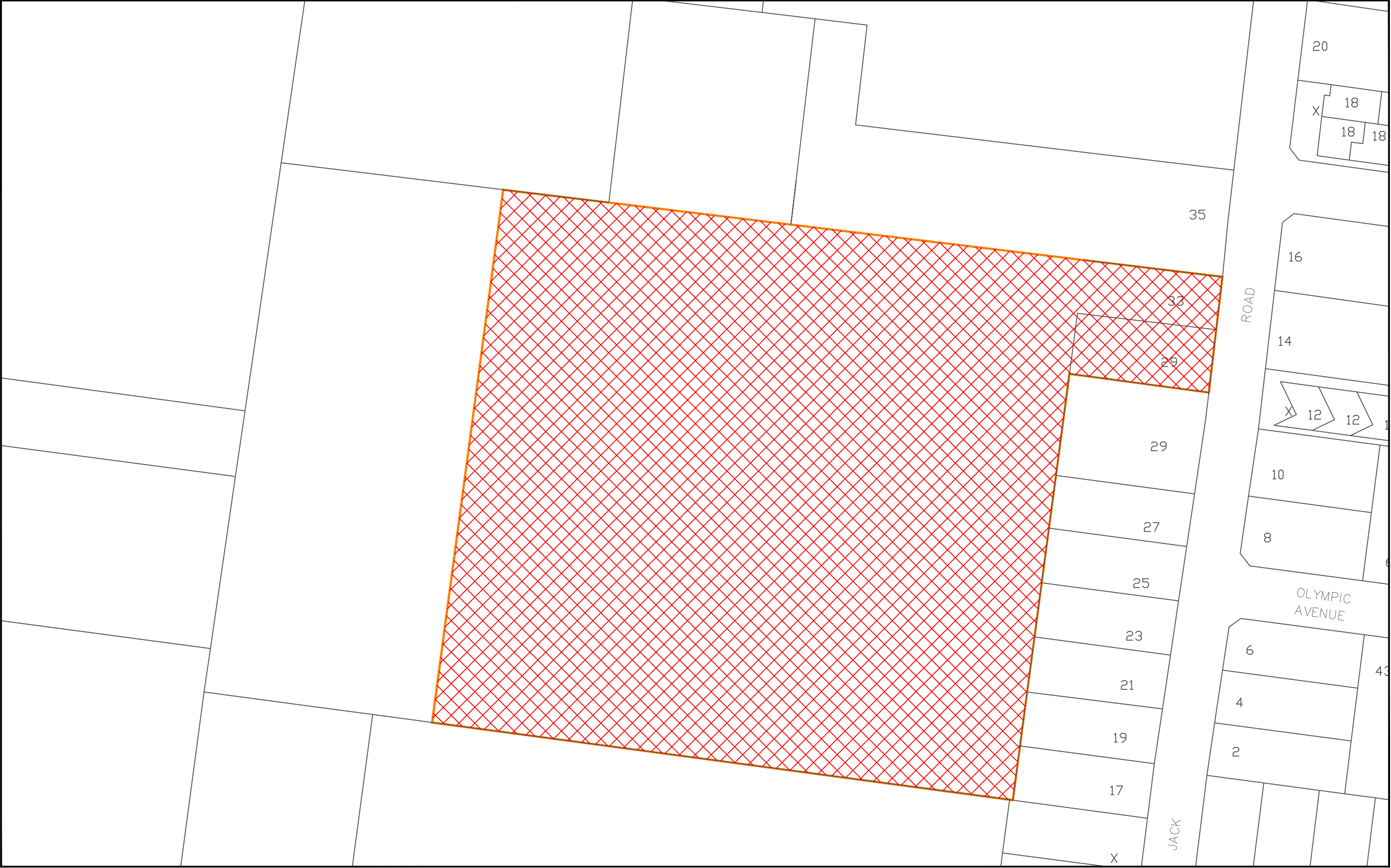
Client	Jack Road Investments Pty Ltd
Site	33 Jack Road, Cheltenham
Title	Figure 6 - Groundwater Impacts, Perched Aquifer: TRHs



Drawing Number: J8427-3	
Revision: A	
Date: 11/09/14	
Author: LZ	Checked by: MB
Data Source: LRM Global, 10172, 25/08/14	

ENVIRONMENTAL AUDIT BOUNDARY	SHALLOW GROUNDWATER WELL
PROPOSED SITE CONSTRUCTION	EXTENT OF PERCHED WATER CMP, MARKER LAYER AND VAPOUR MITIGATION SYSTEM (AS OUTLINED IN ASSOCIATED STATEMENT CONDITIONS)
PROPOSED OPEN SURFACE AREA	

Client	Jack Road Investments Pty Ltd
Site	33 Jack Road, Cheltenham
Title	Figure 7 - Perched Water Zone



Drawing Number: J8427-3	
Revision: A	
Date: 11/09/14	
Author: LZ	Checked by: MB
Data Source: LRM Global, 10172, 25/08/14	

- ENVIRONMENTAL AUDIT BOUNDARY
- GQRUZ EXTENT

Client	Jack Road Investments Pty Ltd
Site	33 Jack Road, Cheltenham
Title	Figure 8 - Auditor Recommended Groundwater Quality Restricted Use Zone

Appendix B

Statement of Environmental Audit (Electrical Substation)

Environmental Audit Report
33 Jack Road, Cheltenham, Victoria, 3192

ENVIRONMENT PROTECTION ACT 1970
STATEMENT OF ENVIRONMENTAL AUDIT

I, Peter Mirkov of Peraco Environmental Services Pty Ltd, a person appointed by the Environment Protection Authority ('the Authority') under the *Environment Protection Act 1970* ('the Act') as an environmental auditor for the purposes of the Act, having

1. been requested by Mr Peter Gillon of Jack Road Investments Pty Ltd to issue a certificate of environmental audit in relation to the Site located at 33 Jack Road, Cheltenham, Victoria, 3192; defined as Lot 1 on proposed Plan of Subdivision PS713815C and Lot 2 on Plan of Subdivision 138747 (Volume 09479 Folio 505), this Statement covers only the Electrical Substation located within the Site (Figure 1B) ('the Site'), owned/occupied by Jack Road Investments Pty Ltd;
2. had regard to, among other things,
 - I. guidelines issued by the Authority for the purposes of Part IXD of the Act,
 - II. the beneficial uses that may be made of the Site
 - III. relevant State environment protection policies/industrial waste management policies, namely
SEPP Groundwaters of Victoria
SEPP Waters of Victoria
SEPP Ambient Air Quality & Air Quality Management
SEPP Prevention and Management of Contamination of Land
IWRG Industrial Waste Resource Guidelinesin making a total assessment of the nature and extent of any harm or detriment caused to, or the risk of any possible harm or detriment which may be caused to, any beneficial use made of the Site by any industrial processes or activity, waste or substance (including any chemical substance), and
3. completed an environmental audit report in accordance with section 53X of the Act, a copy of which has been sent to the Authority and the relevant planning and responsible authority.

HEREBY STATE that I am of the opinion that

The Site is not suitable for any beneficial uses. The substation area must be developed as part of the future roadway easement as shown on the attached Figure 1B

subject to the following conditions attached thereto:

- A. The electrical substation area located in the north-east portion of the development [as defined by the attached registered survey - Figure 1B] is not considered suitable for any beneficial use. This electrical substation area may become suitable for sensitive (medium to high density), recreational / open space, commercial or industrial land uses (in accordance with the proposed land uses for the remainder of the Site) after assessment of soil conditions and acceptance by an environmental auditor appointed under Part IXD

of the Environment Protection Act 1970, and this acceptance advised in writing to EPA and the development authority.

- B. Groundwater at the Site is polluted. Groundwater must not be used for any beneficial use without prior testing and review of results by an EPA appointed environmental auditor, appointed under Part IXD of the Environment Protection Act 1970, to confirm its suitability for that use. It may be extracted for the purpose of environmental monitoring or remediation.

The condition of the Site is detrimental or potentially detrimental to any (one or more) beneficial uses of the Site. Accordingly, I have not issued a certificate of environmental audit for the Site in its current condition, the reasons for which are presented in the environmental audit report. The terms and conditions that need to be complied with before a certificate of environmental audit may be issued are set out as follows:

- i). Clean-up of polluted groundwater such that all beneficial uses of groundwater are restored.
- ii). The status of soil beneath the electrical substation is demonstrated to be suitable for the proposed land use.

Other related information

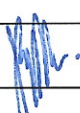
1. Two separate Statements of Environmental Audit have been issued for the proposed development which includes this Site. This Statement which covers an existing electrical substation and the second Statement covers the majority of the designed audit boundary [refer to Figure 1B]. The soil beneath the substation could not be safely accessed during the Environmental Audit covering the majority of the designed audit boundary and as such the electrical substation portion of the Site [as identified in Figure 1B] has been issued a separate Statement.
2. This electrical substation area may become suitable for sensitive (medium to high density), recreational / open space, commercial or industrial land uses (in accordance with the proposed land uses for the remainder of the Site) after assessment of soil conditions and acceptance by an environmental auditor appointed under Part IXD of the Environment Protection Act 1970, and this acceptance advised in writing to EPA and the development authority. Where the electrical substation is assessed as being suitable for the proposed Site use, an addendum to this Statement of Environmental Audit should be issued by an EPA appointed environmental auditor, appointed under Part IXD of the Environment Protection Act 1970.
3. It is expected that upon the removal and subsequent assessment of the electrical substation and issue of the addendum to this Statement of Environmental Audit, the addendum will consider the inclusion of Statement Conditions that may be necessary with respect to conditions found beneath the substation.
4. The Auditor has determined that
 - a. Groundwater has been cleaned up to the extent practicable; and
 - b. The Auditor has recommended that the Site is designated as a Groundwater Quality Restricted Use Zone (GQRUZ). The extent of the proposed GQRUZ is shown on Figure 2B appended to this SoEA
5. In accordance with Clause 19(3) of the SEPP (GoV) the EPA may require periodic reassessment of the practicability of groundwater clean-up.
6. The extractive beneficial uses 'Potable Water Supply', 'Agriculture, Parks and Gardens', 'Stock Watering', 'Primary Contact Recreation' and 'Industrial Use' are precluded by one or more of TRH C6-C10, TRH >C10-C40, trichloroethene, tetrachloroethene in the perched groundwater aquifer (at approximate depths of 0.5-2mbgs).

7. The extractive beneficial uses 'Potable Water Supply', 'Stock Watering' and 'Primary Contact Recreation' and 'Industrial Use' are precluded by one or more of trichloroethene, 1,2 dichloroethane, 1,1 dichloroethane, 1,1, dichloroethene and vinyl chloride in the deep groundwater aquifer (at approximate depths of 7-10mbgs).
8. Elevated concentrations of aluminium, iron, pH, selenium, arsenic, cobalt, copper, total chromium, lead, manganese, molybdenum, nickel, zinc, fluoride, nitrate and nitrite within the shallow and/or deep aquifer are not considered to be derived from the Site itself. The presence of these elevated metals/contaminants may preclude one or more of the following beneficial uses: 'Maintenance of Ecosystems', 'Potable Water Supply', 'Agriculture, Parks and Gardens', 'Stock Watering', 'Primary Contact Recreation' and 'Industrial Use'. Volatile chlorinated hydrocarbon contamination of perched and deeper groundwater beneath the Site is the result of polluted sources from the Site as well as from upgradient sources (ie the Site is a co-source of chlorinated hydrocarbons contamination).
9. Any soils and/or rock to be excavated from the Site and disposed of off-Site must be classified and managed in accordance with relevant statutory regulations and EPA guidelines (e.g. IWRG 621).
10. Any fill or soil imported to the Site shall be chemically tested soil or fill that classifies as "fill material" in accordance with relevant EPA guidelines.
11. In accordance with section 53ZE of the Environment Protection Act 1970 the owner/occupier of the Site must provide a copy of this SoEA and the Contaminant Management Plans to any person who becomes or proposes to become an occupier of the Site.

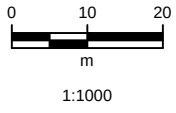
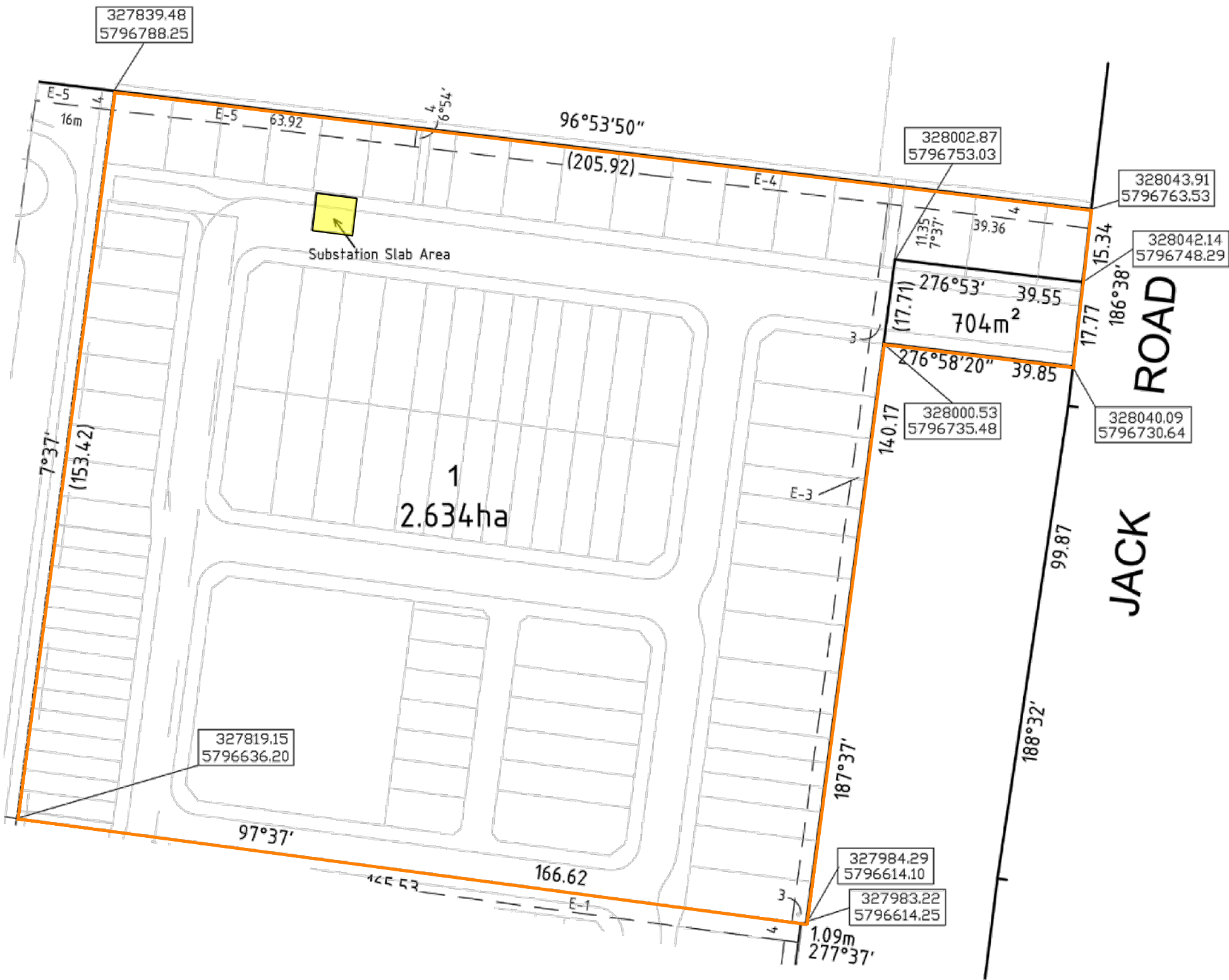
This statement forms part of environmental audit report (*Peraco Environmental Services Pty Ltd, Environmental Audit Report, 33 Jack Road, Cheltenham, 3192, Report Number J8427-R02, 2nd October 2014*). Further details regarding the condition of the Site may be found in the environmental audit report.

DATED 2nd October 2014

Signed



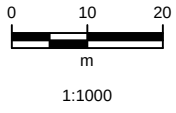
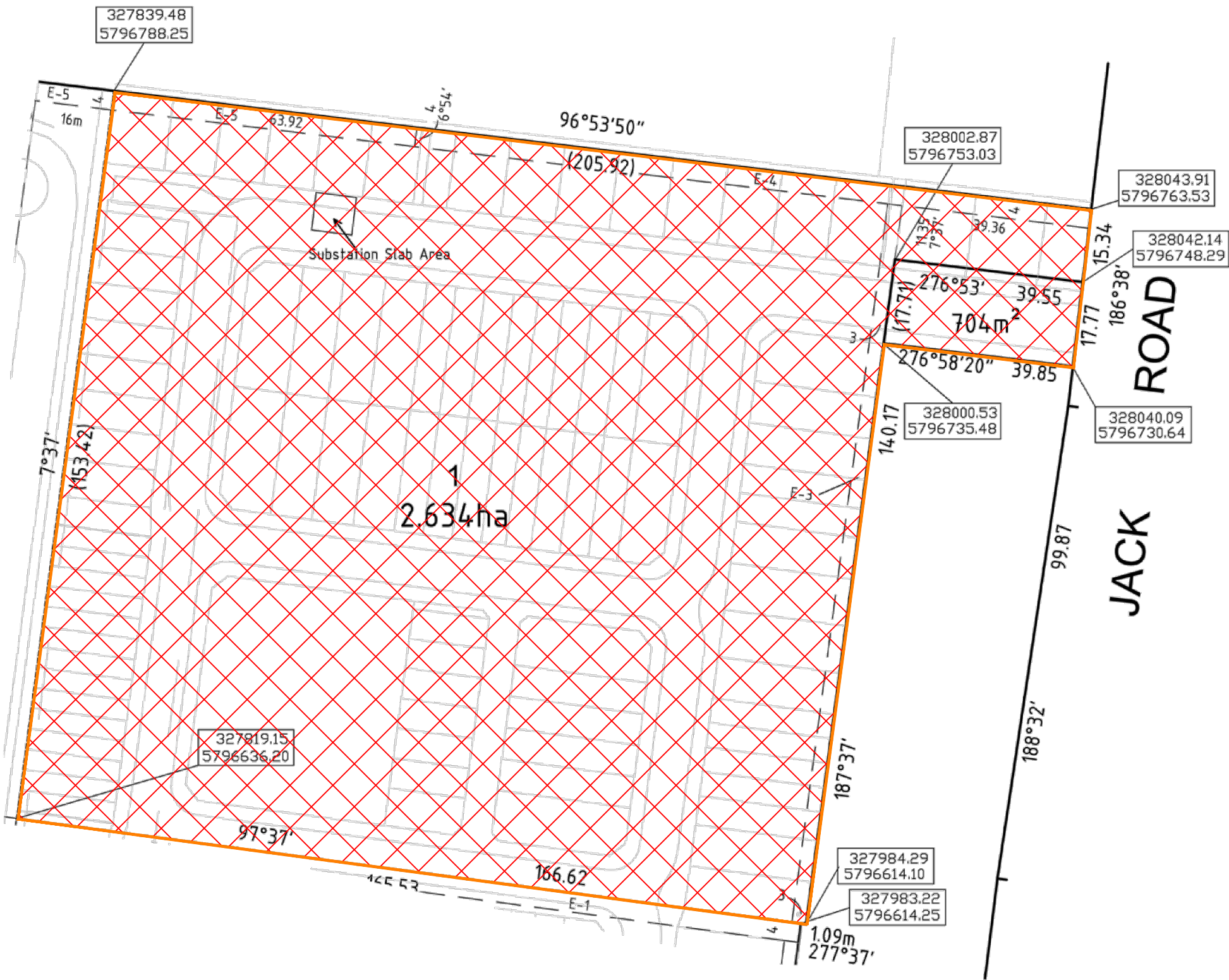
Peter Mirkov
ENVIRONMENTAL AUDITOR



Drawing Number: J8427-4B	
Revision: A	
Date: 11/09/14	
Author: LZ	Checked by: MB
Data Source: Head & Humphreys, 7033-00-ENV-0201	

- ENVIRONMENTAL AUDIT BOUNDARY
- EXTENT OF ELECTRICAL SUBSTATION

Client	Jack Road Investments Pty Ltd
Site	33 Jack Road, Cheltenham
Title	Figure 1B - Electrical Substation - Area B



Drawing Number: J8427-4B	
Revision: A	
Date: 11/09/14	
Author: LZ	Checked by: MB
Data Source: Head & Humphreys, 7033-00-ENV-0201	

- ENVIRONMENTAL AUDIT BOUNDARY
- GQRUZ EXTENT

Client	Jack Road Investments Pty Ltd
Site	33 Jack Road, Cheltenham
Title	Figure 2B - Recommended GQRUZ