

Voluntary Site Contamination Assessment Proposal (VSCAP)

Historical Pasadena Landfill

PREPARED FOR:	Environment Protection Authority South Australia (EPA)
COPY TO:	Kathryn Walker - Piper Alderman; Jarrod Bishop - LBW co
PREPARED BY:	City of Mitcham
DATE:	23 September 2020
VARIATION NO:	0

1. Introduction

1.1 General Information

The City of Mitcham enters into this Voluntary Site Contamination Assessment Proposal (VSCAP) under section 103I of the *Environment Protection Act 1993* to assess the nature and extent of site contamination Lot 101 Port Lincoln Boulevard, 89 Quinton Court and 91 Quinton Court, Pasadena, South Australia (the site), being the location of a former quarry into which Council deposited municipal waste during a period between 1959 to 1962. The VSCAP also includes assessment in the vicinity of the site to characterise the nature and extent of site contamination that may have emanated from the site and been caused by the historical waste disposal activities of the City of Mitcham.

1.2 Site Identification

Site identification details are listed in Table 1. Site Location Maps are provided in Appendix A.

Table 1 Site Identification Details

Site Address	Plan and Parcel Reference	Certificate of Title
Lot 101 Port Lincoln Boulevard, Pasadena SA	D54423 A101	CT5792/592
89 Quinton Court, Pasadena SA	F17784 A1	CT5485/303
91 Quinton Court, Pasadena SA	F17784 A2	CT5325/814

1.3 Site Contamination Background

Numerous environmental assessments and reviews have been carried out for the site between 1995 and 2020. Reports reviewed and considered in preparation of this VSCAP include:

- Golder Associates (1995). *Geotechnical Investigation Proposed Residential Development, Lot 3 Port Lincoln Boulevard, Pasadena, SA.*
- Woodward-Clyde (1996). *Evaluation of Landfill Gas (Methane) Migration Below Proposed Site for Residential Development: Lot 100, Port Lincoln Blvd.*
- Landfill Management Services (1999). *Landfill Gas Evaluation. Port Lincoln Boulevard, Pasadena, South Australia.*
- Landfill Management Services (2001). *Landfill Gas Monitoring Report. Port Lincoln Boulevard, Pasadena.*
- AEC (2004). *Former Quarry & Landfill- Pt Lincoln Blvd, Pasadena. Summary of assessment to date (AEC Ref 0590).*
- AGT (2004). *Groundwater Investigation, 9 Port Lincoln Boulevard, Pasadena.*
- TIERRA (August 2018). *Lot 101 Port Lincoln Boulevard, Pasadena, Stage 1 Landfill Gas Investigations – Source Investigations.*
- TIERRA (July 2018). *Lot 101 Port Lincoln Boulevard, Pasadena, Preliminary Landfill Gas Screening.*
- Tonkin (2019). *Property Screening at Residential Properties P1 to P5 and services along Thiselton Crescent and Quinton Court (six separate reports).*
- Fyfe (April 2020). *Former Pasadena Landfill Site: Independent Review of Available Information & Provision of Expert Witness Advice (Fyfe Ref: 80834-1).*

The site is divided by a creek channel along the approximate alignment of Thiselton Crescent. Anecdotal information indicated that the site was quarried for quartzite from the early 1900s to the 1950s. The quarry was developed from the creek into the slopes towards the north and south with the quarry floors sloping towards the creek. Land including the quarry was acquired by Mr Sydney Thomas Eberhard in 1959 and was subsequently used as a privately owned landfill, in which Council (and reportedly other parties) deposited municipal waste from 1959 until around 1962. Following cessation of waste deposition at the site by Council in approximately 1962, the former quarry continued to be filled with waste materials under the control of Mr Eberhard, reportedly including excavation spoil from the construction of Ayliffes Rd and concrete slabs near the creek from Chrysler at Clovelly Park.

The quarry extent and landfilling boundary was not accurately delineated and documented by the previous investigation reports listed above. Depth of filling to the north of the creek was identified to be up to 13 m below ground level (BGL) and to the south of the creek was identified to be up to approximately 9 mBGL. Previous intrusive investigations of landfill gas, groundwater and soil/waste have broadly indicated the following:

Landfill Gas

Landfill gas (LFG) assessment has been carried out across Lot 101. The majority of investigation has occurred within the northern portion of Lot 101 and included gas sampling locations within and surrounding the waste mass. Limited LFG assessment has occurred within the waste mass in the southern portion of Lot 101. No LFG assessment has been undertaken directly at 89 Quinton Court or 91 Quinton Court.

Elevated concentrations of methane and carbon dioxide have been recorded within the waste mass at up to 73% and 35% respectively. Tierra (2018) demonstrated that methane concentrations outside of the waste mass were well below the management limit of 1% set out in EPA (2019)¹. However, concentrations of carbon dioxide outside of the waste mass exceeded the management limit of 1.5% set out in EPA (2019) at several locations. A background assessment for carbon dioxide concentrations was not carried out.

In 2019, EPA engaged Tonkin to undertake an assessment of LFG in and around five properties located in close proximity to the landfill at the eastern end of Thiselton Crescent and Quinton Court. The assessment did not identify any concentrations of methane or carbon dioxide that posed a risk of harm to human health at the time.

Gaps exist in the locations, quality and representativeness of LFG assessment data. While the LFG data obtained in 2018 and 2019 did not indicate actual harm to human health or the environment, the data gaps evident do not support adequate assessment of potential for future harm to receptors.

Groundwater

Assessment of groundwater was commenced in 2004 (AEC) and comprised an investigation of landfill leachate. Perched groundwater or leachate was identified in the vicinity of the creek at the interface between fill material and the quarry base at 1.7 – 3.3 mBGL. A leachate type odour was noted and petroleum hydrocarbons were identified also.

Regional groundwater is expected to flow to the west or north west, consistent with the topographic gradient in the area. Perched groundwater or leachate was intermittently present, based on evidence in the historical reports, and may fluctuate seasonally. There is potential for hydraulic connection between the perched groundwater and the ephemeral creek passing through the site, particularly during periods of high rainfall. However, no assessment has been undertaken to determine whether such a connection exists.

In 2004 (AGT), drilling into the fractured rock immediately west of the landfill identified water cuts at 21-22 mBGL and 54-59 mBGL, which were characterised as regional groundwater saturated zones. No clear evidence of landfill leachate or petroleum hydrocarbons was identified in groundwater sampled from the deep well, suggesting potential isolation of the regional groundwater from perched groundwater/leachate accumulated in the landfill. Concentrations of metals including cadmium, chromium, copper, aluminium, iron, nickel, manganese and zinc were detected in the 2004 groundwater sample, but their relationship to background conditions in the regional groundwater and

¹ EPA, 2019. Environmental management of landfill facilities – solid waste disposal

current water quality criteria for the relevant Environmental Values of groundwater has not been assessed.

Significant gaps exist in the characterisation of groundwater at the site and in the vicinity. The limited, relatively poor-quality data obtained via previous monitoring results, the long period since last groundwater data collection in 2004, the absence of a background assessment, the absence of understanding of hydraulic relationships between water bodies, and new EPA guidelines implemented in 2018, indicate there is insufficient evidence to determine whether harm to water that is not trivial has occurred.

Soil/Waste

Golder (1995) reported that material within the landfill typically consisted of two layers. The upper layer was a mixture of sandy clay and refuse including brick, concrete, tiles and bitumen. The lower layer was rubbish including newspaper, plastic, glass, clothing scraps, rubber and soil. The fill-waste interface was encountered at depths varying between 1.5 m to 5 mBGL and the waste extended to depths up to 13 mBGL in BH1. LMS (1999) reported that the waste volume was estimated to be 30,000 T and comprised 90% domestic waste and 10% inert material.

There are no records to demonstrate the elevation of the landfill surface at cessation of waste disposal activities at the site by City of Mitcham around 1962. However, the 1963 aerial photograph (Mapland, DEW) shows the landfill surface within the quarry to be well below the natural ground level at the quarry edge at that time. Extracts of the 1959, 1963 and 1969 aerial photographs below show the progression of filling of the quarry (green line shows extent of quarry) through to completion during this period. No waste or fill material was placed on the site by the City of Mitcham after 1962, but it is evident that substantial landfilling occurred after this period under the control of Mr Eberhard.



Soil data from previous assessment work by AEC (2004) indicated several samples with concentrations of carcinogenic PAHs (as benzo(a)pyrene toxicity equivalent quotient – BaP TEQ) that marginally exceeded the current health investigation level (HIL) for urban recreational open space land use of 3 mg/kg. Initial statistical review of the BaP TEQ soils data by LBWco indicated a 95% upper confidence level of 1.9 mg/kg, which indicated no unacceptable risk for recreational open space land use. Petroleum hydrocarbon impacted soils were identified below 2 m depth near the creek, which was below the depth typically considered relevant for a potential exposure pathway to human or ecological receptors in an urban recreational open space setting

The existing data for soils and buried waste, which is unlikely to have materially changed since it was produced in 2004, did not indicate a potential for unacceptable risk to recreational open space users of the site, due to the relatively minor concentrations of chemical substances reported and due to the absence of a receptor because impacted material is generally too deep to be accessed by these site users. However, the buried waste may continue to pose a risk via production of LFG and leachate, the risks of which are to be further assessed by LFG and groundwater investigations.

1.4 Site Contamination Professionals

The site contamination consultant engaged to deliver the technical assessment work is LBW co Pty Ltd (LBWco). Management and communications will be led by Jarrod Bishop (Director | Senior Principal) and technical assessment services will be led by Nick Brewer (Principal Environmental Consultant).

Nick is a Certified Environmental Practitioner – Site Contamination Specialist under the EIANZ scheme and will operate as the landfill gas expert.

2. Objectives of proposed assessment

EPA requested that City of Mitcham enter into a VSCAP to address the data gaps raised by Dr Ruth Keogh of Fyfe Pty Ltd, in her letter to EPA of April 2020 (Ref: 80834-1). Based on consideration of Dr Keogh's opinion on data gaps in Section 5 of the letter, City of Mitcham agrees that the objectives of the proposed assessment are to:

1. Present an assessment of the available LFG results by an LFG expert and based on the findings, develop and implement a comprehensive LFG assessment program to assess risks posed to residences onsite and adjacent to the site, including under representative worst-case atmospheric and climatic conditions.
2. Prepare a detailed Preliminary Site Investigation (PSI) to document the history of site activities and extent of landfilling operations, identify potentially contaminating activities (PCAs) that may have impacted the site and develop a preliminary conceptual site model (CSM) for the site and the vicinity based on standard industry practice at the time of the PSI.
3. Develop and implement a comprehensive assessment of groundwater, including perched water/leachate and the deeper regional aquifer, to assess whether site contamination with respect to groundwater exists at the site and/or in the vicinity of the site as a result of the landfilling activities.
4. Prepare a Detailed Site Investigation (DSI) to document the assessment work and data, develop a comprehensive CSM and to present an appropriate assessment of risk to potential onsite receptors for recreational open space land use, and to potential offsite receptors.

3. Scope of Assessment

The scope of assessment for the VSCAP includes initial desktop investigations, review and reporting. The findings of the desktop work will then be used to develop and support implementation of the detailed intrusive investigations at the site and in the vicinity of the site. A broad outline of the scope of assessment work is provided below, in approximate chronological order:

- PSI – A desktop investigation to identify the current and historical land use and activities that have occurred at the site, to support the identification of PCAs in accordance with section 50 of the *Environment Protection Regulations 2009*, and the development of a preliminary CSM.
- LFG Risk Review – A desktop review of the available LFG data in the context of existing characterisation of the landfill, to assess potential risks to existing residential properties both onsite and in the vicinity of the site. Incorporate the findings into the preliminary CSM within the PSI report.
- Submit the PSI report for review by EPA
- SAQP – Subject to completion of the PSI and agreement on the CSM, prepare a detailed SAQP for the intrusive investigations of LFG and groundwater onsite and in the vicinity of the site, in accordance with relevant published guidelines.
- Submit the SAQP for review by the EPA
- LFG and groundwater investigations – Subject to completion of and agreement on the SAQP, implement the investigation program onsite and in the vicinity. Final details of the scope of

investigation work will be determined via the SAQP process. In general terms, these investigations will include:

- Assessment of background concentrations via the drilling, installation and sampling of upgradient, offsite LFG and groundwater wells.
 - Drilling, installing and sampling new onsite and offsite LFG wells. These wells will be of multi-level construction to support assessment of potential gas migration in the upper and lower formations in connection with the landfill.
 - Repairing, purging and sampling existing onsite LFG wells.
 - Drilling, installing and sampling new onsite and offsite groundwater wells. New wells will target assessment of the shallow perched groundwater/leachate and (separately) the deeper regional groundwater.
 - Purging and sampling existing onsite and offsite groundwater wells.
 - Monthly monitoring of the LFG well network – where possible timed to coincide with falling atmospheric pressure conditions and to capture a range of soil moisture conditions.
 - Monitoring of LFG in enclosed spaces in utility pits and private properties adjacent the landfill. Properties to be monitored will be selected based on potential for risk evident via results of monitoring of the LFG well network. Two events of enclosed space monitoring are proposed.
- Prepare monthly factual reports on LFG monitoring results and enclosed space monitoring data.
 - DSI – Prepare a DSI report for the LFG and groundwater investigations in accordance with industry guidelines.
 - Submit the DSI for review by the EPA

4. Methodology and Principles

The City of Mitcham will engage suitably qualified and experienced site contamination professionals and require them to undertake the works in accordance with appropriate published guidance. Detailed information on published guidelines, assessment rationale, methodology, key chemicals of interest and data quality objectives will be provided via the SAQP for agreement with EPA.

The City of Mitcham recognises the importance of engaging with the local community that may be impacted by and/or has a community interest in the environmental assessment works required for the landfill. Prior to commencement of the intrusive investigations onsite, and in parallel with the delivery of the investigations, the City of Mitcham will deliver a community engagement program relating to the VSCAP. It is proposed to contract experienced consultants AECOM to develop and deliver the program in collaboration with key personnel from City of Mitcham and LBWco. EPA will be informed of the program implementation once these details are known.

EPA stated that it considers the property at 8 Port Lincoln Boulevard, Pasadena (CT 5961/466) to be within the land the represents the historical Pasadena landfill. Aerial photos obtained by LBWco and assessed against cadastral boundaries by a GIS expert demonstrated that this property was located entirely outside the extent of the former quarry and landfill. Accordingly, City of Mitcham does not consider this property to be within the assessment site.

EPA stated that it expects the CSM to be developed as a deliverable of the VSCAP to take into account consideration of waste and soil contamination issues. Further direct characterisation of buried waste composition and soil was not identified as a data gap by Dr Keogh (refer to Objectives in Section 2) and is considered by City of Mitcham to be outside the scope of the VSCAP. City of Mitcham is not liable for waste deposited at the site after it ceased disposal operations around 1962. Nevertheless, risks posed by buried waste via the production of LFG and leachate will be considered by the VSCAP.

5. Timeframes and Milestones

Projected timeframes for the completion of key milestones and deliverables of the scope of works are set out in Table 2 below, and represents the best estimate based on the anticipated scope of assessment and site conditions. Milestones will be subject to variation based on a wide range of matters or conditions ("delay event") that could adversely impact delivery.

Table 2 Schedule of Milestones

Milestone	No. Weeks after commencement	Projected Date	Comment
PSI Report	2		Deliverable 1
<i>EPA review</i>	3		
SAQP	4		Deliverable 2
<i>EPA review</i>	5		
Community engagement plan	4		Deliverable 3
Commence community engagement	6		
LFG well installation, repairs	8		
Groundwater well installation	10		
LFG sampling and report #1	12		
Groundwater sampling event	13		
LFG sampling and report #2	16		
Enclosed space monitoring and reports	17		
Groundwater data review and interim report	18		<i>Section 83A notification to EPA (if required)</i>
LFG sampling and report #3	20		
LFG sampling and report #4	24		
LFG sampling, enclosed space monitoring and report #5	28		
LFG sampling and report #6	32		
DSI Report	36		Deliverable 4
<i>EPA review</i>	40		
Close out community engagement	42		

Potential delay events that would give cause to revise a milestone or delivery date, are anticipated to include, but are not limited to, the following:

- Federal or State Government direction in relation to the COVID-19 pandemic that requires team members to isolate or physically distance in a manner that prevents the key personnel and/or contractors from progressing the scope of work as planned.
- Unplanned absence from work of site contamination consultant's key person/personnel in the lead up to a milestone/deliverable (sick leave, personal leave, injury or death) and which cannot reasonably be mitigated by substitution of another team member.
- As above for a contractor.
- Review of a deliverable and provision of response by EPA takes longer than allowed in Table 2.
- Access to one or more investigation locations is prevented by circumstances outside of the site contamination consultant's control (e.g. prolonged inclement weather, blocked access, other incident) requiring works to be re-scheduled.
- Unexpected ground conditions are encountered during investigations, causing slower than expected investigation progress.
- Non-trivial mechanical failure of investigation and sampling equipment, requiring re-schedule of works.

- Outcomes required to meet the data quality objectives are not met, requiring re-work to generate new assessment data for consideration.
- Catastrophic data loss or IT system failure causing business interruption to the site contamination consultant or a contractor.
- Scope of works is varied in accordance with the mechanism in this VSCAP, resulting in revision to the schedule of milestones.

A delay event will be notified to the EPA in writing as soon as practicable after the delay event occurs and not more than 10 business days after the occurrence. The schedule of milestones will be revised as required following a delay event and notified to EPA prior to the next scheduled deliverable after the delay event.

A Delay Event shall be recorded in the Register of Delay Events (Appendix C).

6. Variation of Proposal

The VSCAP may be varied by agreement of the parties if one or more of the following circumstances arises. Variation may include either addition of new items/tasks or removal of items/tasks, as is deemed appropriate for the circumstances.

- Permission to access privately-owned land proposed for investigation is not granted by a land owner.
- Desktop research identifies new information that supports a variation to the scope of assessment work in order to appropriately address the VSCAP objectives.
- Site conditions are encountered indicating new information that supports a variation to the scope of assessment work in order to appropriately address the VSCAP objectives.
- City of Mitcham voluntarily elects to implement a more conservative approach to the assessment and undertake additional investigation scope to facilitate a higher confidence outcome.

A variation must be proposed and accepted in writing between the parties. Approved variations shall be recorded in the Register of Variations (Appendix D).

7. Commencement and Term of Proposal

The VSCAP will commence at the point in time that EPA approves the VSCAP and serves written notice of the approval to the City of Mitcham.

The term of the proposal shall be 12 months from the date of EPA approval.

8. EPA Regulatory Action

N/A

9. Notices

Notices between the parties shall be issued to the primary contact persons nominated below. Additional persons may be added to the distribution of Notices by agreement between the primary contact persons.

Mr John Valentine
City of Mitcham
PO Box 21
Mitcham Shopping Centre
Torrens Park SA 5062
jvalentine@mitchamcouncil.sa.gov.au


Ms Wendy Boyce
Environment Protection Authority
GPO Box 2607
Adelaide SA 5001
wendy.boyce@sa.gov.au

10. Additional Sections


N/A

11. Declarations

I declare that I, MATTHEW BEARS,
as the authorised representative of City of
Mitcham on their behalf agree to the
provisions of this VSCAP as defined under
section 103I of the Environment Protection Act
1993:

Signature: 
Printed Name: MATTHEW BEARS
Date: 24.9.20

I declare that I, Craig Harrison was in
the presence of Matthew Bears when
they signed this document:

Signature: 
Printed Name: CRIG HARRISON
Date: 24.9.20

Appendix A Site Maps



FIGURE 1

Site Location Plan

VSCAP

Lot 101 Port Lincoln Boulevard,
89 and 91 Quinton Court,
Pasadena SA

For

Piper Alderman

LEGEND

 Site Boundary

SCALE @ A3: 1:2,500



PROJECTION: GDA1994 MGA Zone 54



Job No.	191159		
Drawing No.	LBW-002-F0001-Rev0.qgs		
Drawn	KB	Rev.	0
Checked	JB	Date	13/08/2020



FIGURE 2
2020 Aerial Photograph

VSCAP
Lot 101 Port Lincoln Boulevard,
89 and 91 Quinton Court,
Pasadena SA
For
Piper Alderman

- LEGEND**
- Road
 - Approximate extent of quarry in 1959
 - Cadastral Boundary
 - Site Boundary

SCALE @ A3: 1:1,500
0 10 20 30 40 50 m
PROJECTION: GDA1994 MGA Zone 54



Job No.	191159		
Drawing No.	LBW-002-F0002-Rev0.ags		
Drawn	KB	Rev.	0
Checked	JB	Date	13/08/2020

COPYRIGHT - 1. Aerial imagery sourced from Nearmap, aerial dated 13.04.2020, sourced 18.03.2020. 2. Road data sourced from Data SA, https://data.sa.gov.au/, sourced March 2020. 3. Parcel boundaries digitised by LBW co., boundary information sourced from South Australian Property and Planning Atlas (https://maps.sa.gov.au/SAPPA), sourced May 2020.

Appendix B Schedule of Works

Task	Objective	Scope	Milestone/ Deliverable	Timing (weeks post commencement)
PSI report	Prepare a PSI report to document site history and current knowledge on site contamination risk in a preliminary CSM, in accordance with current industry guidelines	<p>Review and summarise previous investigation reports.</p> <p>Update site history information and presentation to current industry standard.</p> <p>Identify PCAs per Environment Protection Regulations 2009.</p> <p>Detailed review of LFG results and prepare preliminary risk assessment in accordance with CIRIA 665 (2007).</p> <p>Identify Environmental Values (EVs) for groundwater.</p> <p>Prepare preliminary CSM.</p>	EPA endorsed PSI report	<p>3</p> <p>16 November 2020</p>
SAQP	Set out the investigation strategy and provide detailed guidance on environmental sampling onsite and in the vicinity of the site to characterise the nature and extent of site contamination in ground gas and groundwater resulting from the historical landfilling activities by City of Mitcham	<p>Identify data gaps evident in the preliminary CSM presented in the PSI report.</p> <p>Develop the sampling design.</p> <p>Develop the data quality objectives.</p> <p>Present and justify the risk screening criteria for the assessment.</p> <p>Confirm the assessment schedule</p>	EPA endorsed SAQP	<p>5</p> <p>30 November 2020</p>
Community engagement plan	Describe the process for engaging with the local community regarding the investigation works. Set out roles and responsibilities.	By AECOM	Community engagement plan	<p>4</p> <p>23 November 2020</p>
DSI report	Prepare a DSI report that thoroughly characterises the nature and extent of site contamination that may have been caused by	Assess the new investigation data in accordance with EPA (2018) and VSCAP objectives.	EPA endorsed DSI report	<p>40</p> <p>2 August 2021</p>

Task	Objective	Scope	Milestone/ Deliverable	Timing (weeks post commencement)
	production of LFG and leachate from the waste burial activities of City of Mitcham.	Develop a comprehensive CSM. Prepare an appropriate risk assessment relative to the CSM.		
Community engagement close out	Inform local community of key findings of the DSI	To be advised	To be advised	42 16 August 2021

Appendix C Register of Delay Events

Delay Event No.	Description	Date Notified	Work Delayed	Action Proposed	EPA Approved

Appendix D Register of Variations

Variation No.	Description	Date Proposed	Proposed by	Date Agreed	Agreement Attached

Appendix E Additional Attachments

N/A