

6.8.2.3 Soil Vapour Sampling

The soil vapour sampling will be undertaken by SGS.

The soil vapour bore covers will be removed and a visual inspection of the Teflon tubing conducted to detect any damage to the tubing. A pressure test will be conducted to ensure vacuum will not be formed when purging soil vapour, and to ensure that there will be sufficient soil vapour present to sample. This will be undertaken using a hand pump with pressure gauge, with approximately five pumps of the hand pump completed (comprising approximately 60 mL per pump, total 80 mL volume of air purged from the soil vapour bore) followed by monitoring of the pressure relax.

A pressure test will be completed on the soil vapour sampling train prior to connection to the soil vapour probe. This will be completed by applying a vacuum to the soil vapour sampling train using a syringe and assessing if the vacuum held for 30 seconds. In both instances the vacuum will be held to indicate no leaks from the sampling train.

A leak test of the soil vapour probe will be then undertaken using 95% helium gas. A background measurement of helium in ambient air will be first recorded followed by a background measurement of helium in the soil vapour probe. A shroud will be placed over soil vapour probe and helium will be pumped into the shroud for five minutes, with the helium detector (GasCheck 5000) used to record helium measurements at 1 minute intervals within the shroud and the soil vapour sampling train. It is noted that the shroud will be flush with ground level, with no significant gaps present between the shroud and ground. The helium concentration within the shroud will be recorded following the leak testing of the soil vapour probe. If there is greater than 10 % in the sampling line then the soil vapour probe will be deemed compromised and will not be sampled.

The general gas readings (carbon dioxide, methane, oxygen, hydrogen sulphide, carbon monoxide and balance) will be measured with a landfill gas meter (GEM2000), firstly in ambient air and then in the soil vapour probe prior to sampling to assess the subsurface atmosphere and to provide confidence that soil vapour will be sampled and not ambient air. Volatile organic compound measurements will be collected using a PID at the time.

The time purging with the GA2000 and PID will be recorded, with the soil vapour probes being purged for the minimum amount of time required for parameters to stabilise prior to sampling. Where possible, both flow rate and differential pressure will be recorded during soil vapour sampling.

The PID, helium detector and landfill gas meter purge rates will be recorded on the soil vapour field sampling sheets. The Summa canister pressure will be then measured using the laboratory supplied pressure gauge and the reading compared to the initial canister pressure recorded by the laboratory. This checks if the canister has retained a vacuum in the transit period. No sample is to be collected with canisters with vacuum less than -25 in Hg.

The Summa canister will be fitted with a flow controller and connected to the soil vapour probe. Soil vapour will be then sampled, and the start sampling time will be recorded. Once the pressure reading on the flow regulator reaches approximately -5 in Hg, sampling will be ceased and the canister valve closed tight to prevent sample loss. The end sampling time will be then recorded.

A post sampling canister pressure check will be then undertaken using the laboratory supplied pressure gauge. Post sampling general gas and PID readings will be measured for comparison with readings taken prior to sampling.

All laboratory testing will be completed by National Association of Testing Authorities (NATA) accredited laboratories (SGS) in accordance with the laboratory methods specified in the ASC NEPM. Duplicate samples will be sent to ALS (also NATA accredited).

6.8.2.4 Soil Vapour Analysis

Soil vapour analysis is summarised in Table 6-5 and is to be completed at appropriately accredited laboratories. On receipt of results, and comparison to the soil vapour validation criteria, discuss the findings with the auditor.

HOLD POINT 3 – Discuss soil vapour results with the auditor.

Table 6-5 Soil vapour analysis

Primary	Quality Control Type	Total #	Suite
8	Intra laboratory (SGS) x 1	11	VOC + TRH (US EPA TO-15)
	Inter laboratory (ALS) x 1		
	Trip blank x 1 (primary only)		C6-C10 TRH as analogue marker for VOC (TCE in ~C9 range)
TRH	Total Recoverable Hydrocarbons		
VOC	Volatile Organic Compounds		

6.8.3 Groundwater Contamination Validation

Further to Section 6.5.3, direct remediation of groundwater contamination is not practicable, rather, the primary and secondary source of on-site TCE (and other VOC and potential PFAS and some metals) is being targeted to reduce the potential for ongoing site-related groundwater contamination (and associated on-site and future off-site soil vapour contamination and risks).

To assess the success of the remedial works, post-remediation groundwater monitoring must be completed, with the scope and approach to be documented in a groundwater monitoring and management plan.

A Groundwater Monitoring and Management Plan (GMMP) must be prepared and submitted to the auditor for review and approval prior to or alongside the Remediation Validation Report (RVR).

The GMMP must include as a minimum (but not limited to):

- The nominated well locations proposed for sampling.
- Monitoring schedule (at least annually for at least two years).
- Gauging methodology.
- Sampling methodology.
- Analytical schedule (must cover those chemicals listed in Table 6-1).
- Reporting methodology.

6.8.4 Validation Criteria

6.8.4.1 Soils

The validation criteria to be adopted for this scope of works is presented in Table 6-6 and is sourced from Schedule B1 of the National Environment Protection (Assessment of Site Contamination) Measure (ASC NEPM) (1999, as amended 2013) human health and ecological protection criteria for low density residential land use (sensitive land use). These are summarised as follows:

Human Health – Sensitive Land Use: Low Density

Where ASC NEPM HSLs are specified, note that these are for petroleum sources (and may not be applicable to the nature of vapour or volatile contamination associated with the Site), they will be used for screening purposes in the first instance. The presence and risks posed by vapour phase chemicals in the soil will be measured directly and assessed against the nominated soil vapour criteria.

- ASC NEPM (1999, as amended 2013) Health Investigation Level (HIL) A and Health Screening Levels (HSL (0-1 m) A/ B SAND (in first instance).
- ASC NEPM (1999, as amended 2013) Management Limits for TPH Fractions F1-F4 in soils for residential, parkland and public open space.
- Friebel, E and Nadebaum, P. (2010) Soil Health Screening Levels for Direct Contact Criteria and HSLs for vapour intrusion for intrusive workers – Appendix A of CRC CARE (2010).

Human Health – Sensitive Land Use: High Density

- ASC NEPM (1999, as amended 2013) Health Investigation Level (HIL) B and Health Screening Levels (HSL (0-1 m) A/ B SAND (in first instance).
- ASC NEPM (1999, as amended 2013) Management Limits for TPH Fractions F1-F4 in soils for residential, parkland and public open space.
- Friebel, E and Nadebaum, P. (2010) Soil Health Screening Levels for Direct Contact Criteria and HSLs for vapour intrusion for intrusive workers – Appendix A of CRC CARE (2010).

Human Health – Open Space

- ASC NEPM (1999, as amended 2013) Health Investigation Level (HIL) C and Health Screening Levels (HSL (0-1 m) C SAND (in first instance).
- ASC NEPM (1999, as amended 2013) Management Limits for TPH Fractions F1-F4 in soils for residential, parkland and public open space.
- Friebel, E and Nadebaum, P. (2010) Soil Health Screening Levels for Direct Contact Criteria and HSLs for vapour intrusion for intrusive workers – Appendix A of CRC CARE (2010).

Environment (Ecology) Protection

- ASC NEPM (1999, as amended 2013) Ecological Investigation Limits and Ecological Screening Levels (EILs and ESLs) for urban residential land use and public open space (including site specific derived EIL) (Schedule B1).

The following is noted regarding the ASC NEPM (1999, as amended 2013) ESL for benzo(a)pyrene (BaP; a PAH) for urban residential land use:

- The ESL for BaP presented in Schedule B1 of the ASC NEPM (2013) is 0.7 mg/kg however this is directly based on the Canadian ecological soil quality guideline (SQGE) that was rescinded in 2010. The revised Canadian SQGE is 20 mg/kg.
- On 2 July 2015, the EPA issued advice to site contamination auditors advising that a new BaP ESL is under review for inclusion in the ASC NEPM, but in the interim, given that the ASC NEPM

HIL A (most conservative of the presented HIL criteria) human health risk screening level of 3.0 mg/kg for BaP_{TEQ} is much lower than the Canadian SQGE, the risk driver will be protection of sensitive human health receptors. Application of the 3.0 mg/kg BaP_{TEQ} criterion for evaluation of risks to ecology is considered to be suitably protective of ecological receptors. Thus, where soils fail the human health criterion, they are also judged to be potentially problematic to ecological receptors, in the first instance, pending further ecological assessment / risk assessment.

Table 6-6 Soil Validation Criteria

Chemical Substance	Human Health			Environment Ecological Protection Criterion (mg/kg) (urban residential and public open space)	Adopted Criterion assuming HIL A scenario (mg/kg) in the first instance	Comment
	ASC NEPM HIL A (mg/kg)	ASC NEPM HIL B (mg/kg)	ASC NEPM HIL C (mg/kg)			
TCE (and other VOC)	-	-	-	-	In field PID reading of <10 ppm in first instance during excavation phase – An allowance of 10 ppm is granted for soil moisture. Direct measurement of soil vapour will be undertaken for validation purposes.	Screening of soils using PID in first instance due to inaccuracy of laboratory analysis of TCE (volatile nature). Soil vapour analysis will be used for quantitative assessment.
arsenic	100	500	300	100	100	HIL A (and Ecological criterion) selected. Most conservative and protective value.
cadmium	20	150	90	-	20	HIL A criterion selected. Most conservative and protective value.
chromium (total) (adopting VI)	100	500	300	410 (Cr (III))	100	HIL A criterion selected. Most conservative and protective value.
copper	6,000	30,000	17,000	95 ^{##}	95	Ecological criterion selected. Most conservative and protective value.
lead	300	1200	600	1,100	300	HIL A criterion selected. Most conservative and protective value.
manganese	3,800	14,000	19,000	220	220	Ecological criterion selected. Most conservative and protective value. This value is likely to be less than naturally occurring Mn concentrations in soils of the Adelaide Plains. It will be difficult to identify naturally occurring concentrations from

Chemical Substance	Human Health			Environment	Adopted Criterion assuming HIL A scenario (mg/kg) in the first instance	Comment
	ASC NEPM HIL A (mg/kg)	ASC NEPM HIL B (mg/kg)	ASC NEPM HIL C (mg/kg)			
nickel	400	1200	1200	25 ^{##}	25	anthropogenic concentrations. Provide tier 2 discussion in the remediation validation report where concentrations exceed this value.
selenium	200	1400	700	0.52 [*]	0.52	Ecological criterion selected. Most conservative and protective value.
zinc	7,400	60,000	30,000	280 ^{##}	280	Ecological criterion selected. Most conservative and protective value.
Mercury (methyl)	10	30	13	-	10	HIL A criterion selected. Most conservative and protective value.
benzo(a)pyrene TEQ	3	4	3	-	3	BaP _{TEQ} is used for human health protection and screening the ecological value.
benzo(a)pyrene	-	-	-	3	3	Refer notes above regarding adoption of 3 mg/kg over listed ASC NEPM value.
Total Polycyclic Aromatic Hydrocarbon (PAH)	300	400	300	-	300	Total PAH for human health is available in ASC NEPM. Ecological protection generally uses benzo(a)pyrene.
DDT+DDE+DDD	240	600	400	180 (DDT Only)	180	Use 180 to screen DDT+DDE+DDD
aldrin and dieldrin	6	10	10	-	6	Most conservative (health)
chlordane	50	90	70	-	50	Most conservative (health)
endosulfan	270	400	340	-	270	Most conservative (health)

Chemical Substance	ASC NEPM HIL A (mg/kg)	Human Health ASC NEPM HIL B (mg/kg)	ASC NEPM HIL C (mg/kg)	Environment Ecological Protection Criterion (mg/kg) (urban residential and public open space)	Adopted Criterion assuming HIL A scenario (mg/kg) in the first instance	Comment
endrin	10	20	20	-	10	Most conservative (heath)
heptachlor	6	10	10	-	6	Most conservative (heath)
HCB	10	15	10	-	10	Most conservative (heath)
methoxychlor	300	500	400	-	300	Most conservative (heath)
mirex	10	20	20	-	10	Most conservative (heath)
toxaphene	20	30	30	-	20	Most conservative (heath)
2,4,5-T	600	900	800	-	600	Most conservative (heath)
2,4-D	900	1600	1300	-	900	Most conservative (heath)
MCPA	600	900	800	-	600	Most conservative (heath)
MCPB	600	900	800	-	600	Most conservative (heath)
meoprop	600	900	800	-	600	Most conservative (heath)
picloram	4500	6600	5700	-	4500	Most conservative (heath)
atrazine	320	470	400	-	320	Most conservative (heath)
chlorpyrifos	160	340	250	-	160	Most conservative (heath)
Bifenthrin	600	840	730	-	600	Most conservative (heath)
<p>TRH and BTEXN – note that soil vapour screening criteria is adopted in the first instance as it is more conservative than direct contact values in all cases unless marked ^{0.5} and for intrusive maintenance workers (shallow trench). For completion, soil health screening levels for vapour intrusion for intrusive maintenance workers (shallow trench) and direct contact are presented in Table 6-8 and Table 6-9 respectively should the vapour based criteria be exceeded.</p> <p>Where ASC NEPM HSLs are specified, note that these are for petroleum sources (and may not be applicable to the nature of vapour or volatile contamination associated with the Site), they will be used for screening purposes in the first instance. The presence and risks posed by vapour phase chemicals in the soil will be measured directly and assessed against the nominated soil vapour criteria.</p>						
benzene	0.5 [†]	0.5 [†]	Non Limiting	50 [†]	0.5	Human Health Protection criterion selected. Most conservative and protective value.
toluene	160 [†]	160 [†]	Non Limiting	85 [†]	85	Ecological Protection criterion selected. Most conservative and protective value.
ethylbenzene	55 [†]	5 [†]	Non Limiting	70 [†]	57	Human Health Protection criterion selected. Most conservative and protective value.
xylene	40 [†]	40 [†]	Non Limiting	45 [†]	40	Human Health Protection criterion selected. Most conservative and protective value.

Chemical Substance	Human Health			Environment Ecological Protection Criterion (mg/kg) (urban residential and public open space)	Adopted Criterion assuming HIL A scenario (mg/kg) in the first instance	Comment
	ASC NEPM HIL A (mg/kg)	ASC NEPM HIL B (mg/kg)	ASC NEPM HIL C (mg/kg)			
naphthalene	3 [†]	3 [†]	Non Limiting	170 [#]	3	Human Health Protection criterion selected. Most conservative and protective value.
Total Recoverable Hydrocarbon (TRH) Fraction F1	45 [†]	45 [†]	Non Limiting	180 [†]	45	Human Health Protection criterion selected. Most conservative and protective value.
Total Recoverable Hydrocarbon (TRH) Fraction F2	110 [†]	110 [†]	Non Limiting	120 [†]	110	Human Health Protection criterion selected. Most conservative and protective value.
Total Recoverable Hydrocarbon (TRH) Fraction F3	2,500 [∅]	5,800 ^{∅∅}	5,300 ^{∅∅}	300 [†]	300	Ecological criterion selected. Most conservative and protective value.
Total Recoverable Hydrocarbon (TRH) Fraction F4	6,300 ^{∅∅}	8,100 ^{∅∅}	7,400 ^{∅∅}	2,800 [†]	2,800	Ecological criterion selected. Most conservative and protective value.
PFAS – Sum of PFOA [#]	0.1	20	10	10	0.1	Human Health Protection criterion selected. Most conservative and protective value.
PFAS – Sum of PFOS and PFHxS [#]	0.01	2	1	1	0.01	Human Health Protection criterion selected. Most conservative and protective value.
Asbestos in Soils (Table 6-9)					Residential A	Most conservative
Key						
#	Site Specific Ecological Investigation Levels as derived using ASC NEPM Sch B1 process (refer LWC 2018).					
†	ASC NEPM Sch. B1 table 1A(3) Soil Health Screening Level (HSL) for Vapour Intrusion (sand, 0 – 1 m)					
∅	ASC NEPM Sch. B1 table 1B(6) Ecological Screening Levels (ESLs) for TPH Fractions F1 – F4, BTEX and benzo(a)pyrene in Soil					
∅∅	ASC NEPM Sch. B1 table 1B(7) Management Limits for TPH Fractions F1 – F4 in Soil					

Chemical Substance	ASC NEPM HIL A (mg/kg)	Human Health ASC NEPM HIL B (mg/kg)	ASC NEPM HIL C (mg/kg)	Environment Ecological Protection Criterion (mg/kg) (urban residential and public open space)	Adopted Criterion assuming HIL A scenario (mg/kg) in the first instance	Comment
Ø Ø						
#				Table A4 of CRC CARE Technical Report 10		
^				PFAS National Environmental Management Plan Version 2.0', Heads of EPA Australia and New Zealand 2020		
^^				Ecological Soil Screening Levels for Selenium Interim Final OSWER Directive 9285.7-72 – value is for plants (https://www.epa.gov/sites/default/files/2015-09/documents/eco-ssl_selenium.pdf)		
				Ecological Soil Screening Levels for Manganese Interim Final OSWER Directive 9285.7-71 – value is for plants (https://www.epa.gov/sites/default/files/2015-09/documents/eco-ssl_manganese.pdf)		

Table 6-7 Soil health screening levels for direct contact (mg/kg) (after Table A4 of CRC CARE Technical Report no. 10 Part 1 Appendix A – refer specific Table notes)

Chemical	HSL-A Residential (Low Density)	HSL-B Residential (High Density)	HSL-C Recreational / Open Space	HSL-D Commercial / Industrial	Intrusive Maintenance Worker
Toluene	14,000.	21,000.	18,000.	99,000.	120,000.
Ethylbenzene ^(c)	4,500.	5,900.	5,300.	27,000.	85,000.
Xylenes	12,000.	17,000.	15,000.	81,000.	130,000.
Naphthalene ^(c)	1,400.	2,200.	1,900.	11,000.	29,000.
Benzene	100.	140.	120.	430.	1,100.
C6-C10	4,400.	5,600.	5,100.	26,000.	82,000.
>C10-C16	3,300.	4,200.	3,800.	20,000.	62,000.
>C16-C34	4,500.	5,800.	5,300.	27,000.	85,000.
>C34-C40	6,300.	8,100.	7,400.	38,000.	120,000.

* Refer to Table Notes

Table 6-8 Soil health screening levels for vapour intrusion (mg/kg) for intrusive maintenance workers (shallow trench)

CHEMICAL ^(e)	Intrusive Maintenance Worker (Shallow Trench)			Saturation Conc. (C _{sat}) ^(j)
	0m to <2m	2m to <4m	4m+	
SAND ^(q)				
Toluene	NL	NL	NL	560.
Ethylbenzene ^(c)	NL	NL	NL	64.
Xylenes	NL	NL	NL	300.
Naphthalene ^(c)	NL	NL	NL	9.
Benzene	77.	160.	NL	360.
C6-C10	NL	NL	NL	950.
>C10-C16	NL	NL	NL	560.
SILT ^(q)				
Toluene	NL	NL	NL	640.
Ethylbenzene ^(c)	NL	NL	NL	69.
Xylenes	NL	NL	NL	330.
Naphthalene ^(c)	NL	NL	NL	10.
Benzene	250.	NL	NL	440.
C6-C10	NL	NL	NL	910.
>C10-C16	NL	NL	NL	570.
CLAY ^(q)				
Toluene	NL	NL	NL	630.
Ethylbenzene ^(c)	NL	NL	NL	68.
Xylenes	NL	NL	NL	330.
Naphthalene ^(c)	NL	NL	NL	10.
Benzene	350.	NL	NL	430.
C6-C10	NL	NL	NL	850.
>C10-C16	NL	NL	NL	560.

Table 6-9 Health screening levels for asbestos contamination in soil (Table 7 of Schedule B1 of ASC NEPM)

Form of asbestos	Health Screening Level (w/w)			
	Residential A ¹	Residential B ²	Recreational C ³	Commercial/Industrial D ⁴
Bonded ACM	0.01%	0.04%	0.02%	0.05%
FA and AF ⁵ (friable asbestos)	0.001%			
All forms of asbestos	No visible asbestos for surface soil			

1. Residential A with garden/accessible soil also includes children's day care centres, preschools and primary schools.
2. Residential B with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments.
3. Recreational C includes public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and unpaved footpaths.
4. Commercial/industrial D includes premises such as shops, offices, factories and industrial sites.
5. The screening level of 0.001% w/w asbestos in soil for FA and AF (i.e. non-bonded/friable asbestos) only applies where the FA and AF are able to be quantified by gravimetric procedures (refer Section 4.10). This screening level is not applicable to free fibres.

6.8.4.2 Soil Vapour

Soil vapour screening criteria is taken from LWC, 2021 (Table 6-10).

Table 6-10 Soil vapour screening criteria

Chemical substance	Value ($\mu\text{g}/\text{m}^3$)	Source	Reference / Link
tert-Amyl Methyl Ether (TAME)	<p>1,060,000 (No-observed-adverse-effect level (NOEAC)) – SIDS (2005) and European Union (2006). For conservatism, 10,000 folds of this can be considered as the site criterion (106).</p> <p>MDEQ (2015) reports ECHA (REACH) NOAEC of 250 ppm is reported as well as a DNEL (Derived No Effect Level) of 26.5 mg/m^3. The DNEL is for the general population hazard via inhalation route.</p> <p>Michigan Dept. of Environmental Quality (DEQ, 2015) lists an Initial Threshold Screening Level (ITSL) of 62 for indoor air.</p> <p>The lowest (most conservative) value sourced is 62 from Michigan DEQ (2015). This is adopted.</p> <p>This would be 2,066 for soil gas after AF of 0.03 applied.</p>	<p>SIDS INITIAL ASSESSMENT PROFILE (2005)</p> <p>European Union Risk Assessment Report 2-methoxy-2-methylbutane (TAME) (2006)</p> <p>Michigan State Government Department of Environmental Quality (USA) (2015)</p>	<p>SIDS - https://hpvchemicals.oecd.org/UI/handler.axd?id=dc73a34b-ef02-4c3e-bc12-e5d46ad1066f</p> <p>European Union Risk Assessment Report - https://echa.europa.eu/documents/10162/e1370695-3126-4a2d-afde-e37b5d568c52</p> <p>Michigan State Government Department of Environmental Quality (USA) (2015) - https://www.michigan.gov/documents/deq/deq-rd-chem-t-Amyl_methyl_etherDatasheet_527537_7.pdf</p>
Chloroform	140 = 4,666 after AF of 0.03 applied	WHO Tolerable Concentration for Inhalation (CICAD 58) (2004)	https://www.who.int/ipcs/publications/cicad/en/cicad58.pdf
1,2-Dichloroethane	0.11 based on ILCR of 1E-06 (USEPA RSL). Adjust for 1e-05 and apply 0.03 AF = 37	US EPA Cancer SL RSL adj. 1E-5:	https://semspub.epa.gov/wor/rk/HQ/400762.pdf
1,1-Dichloroethene	210 (threshold hazard quotient of 1) – apply AF of 0.03 = 7,000	US EPA Threshold SL (indoor air)	https://semspub.epa.gov/wor/rk/HQ/400762.pdf
trans-1,2-Dichloroethene	42 (threshold hazard quotient of 1) – apply AF of 0.03 = 1,400	US EPA RSL (based on threshold risk hazard quotient of 1).	https://semspub.epa.gov/wor/rk/HQ/400762.pdf
Freon 12	100 (threshold hazard quotient of 1) – apply AF of 0.03 = 3,333	US EPA RSL (based on threshold risk hazard quotient of 1).	https://semspub.epa.gov/wor/rk/HQ/400762.pdf
Methyl tert-butyl ether	111 adjusting USEPA RSL 1E-06 to 1E-05, apply 0.03 AF = 3,700	US EPA Cancer SL RSL adj. 1E-5	https://semspub.epa.gov/wor/rk/HQ/400762.pdf
2-Propanol (or iso-propanol)	210 (threshold hazard quotient of 1) – apply AF of 0.03 = 7,000	US EPA RSL (based on threshold risk hazard quotient of 1).	https://semspub.epa.gov/wor/rk/HQ/400762.pdf

Chemical substance	Value (µg/m³)	Source	Reference / Link
1,1,2,2-Tetrachloroethane	0.48 based on USEPA RSL for resident of 0.048 at 1E-6 transformed to 1E-05 ILCR and apply 0.03 AF = 16	US EPA Cancer SL RSL adj. 1E-5	https://semspub.epa.gov/work/HQ/400762.pdf
1,1,2-Trichloroethane	0.18 at 1E-06 and 1.8 at 1E-05 and apply 0.03 AF = 60	US EPA Cancer SL RSL adj. 1E-5	https://semspub.epa.gov/work/HQ/400762.pdf
1,2,4-Trimethylbenzene	63 (threshold hazard quotient of 1) – apply AF of 0.03 = 2,100	US EPA Threshold SL (indoor air)	https://semspub.epa.gov/work/HQ/400762.pdf
1,3,5-Trimethylbenzene	63 (threshold hazard quotient of 1) – apply AF of 0.03 = 2,100	US EPA Threshold SL (indoor air)	https://semspub.epa.gov/work/HQ/400762.pdf
Trichloroethene	20	ASC NEPM Schedule B1 Table 1A(2)	
1,1,1 TCA	60,000	ASC NEPM Schedule B1 Table 1A(2)	
PCE	2,000	ASC NEPM Schedule B1 Table 1A(2)	
Cis-1,2-dichloroethene	80	ASC NEPM Schedule B1 Table 1A(2)	
Vinyl chloride	30	ASC NEPM Schedule B1 Table 1A(2)	
Toluene	1,300,000	Table A1 of CRC CARE Technical Report 2010	https://www.crccare.com/files/dmfile/CRC CARE Technical Report10-Part1-Technicaldevelopmentdocument2.pdf
Ethylbenzene	330,000	Table A1 of CRC CARE Technical Report 2010	
Xylenes	220,000	Table A1 of CRC CARE Technical Report 2010	
Naphthalene	780	Table A1 of CRC CARE Technical Report 2010	
Benzene	990	Table A1 of CRC CARE Technical Report 2010	
Fraction F1 TRH	180	Table A1 of CRC CARE Technical Report 2010	
Fraction F2 TRH	130	Table A1 of CRC CARE Technical Report 2010	

6.8.4.3 Groundwater

The post remediation groundwater assessment criteria are taken from LWC, 2021 (Table 6-11). In accordance with the GAR (EPA, 2019), the most sensitive environmental value takes precedence. Chemical substances are elevated in offsite areas (including up hydraulic gradient) so the likelihood of chemical concentrations meeting such criteria is low, though these criteria can be used as the benchmark.

Table 6-11 Groundwater validation criteria

Environmental Value / Receptor	Guideline	Screening Level
Potable Water	<p><i>Australian Drinking Water Guidelines Paper 6</i>, (2011) National Water Quality Management Strategy. National Health and Medical Research Council – updated May 2019</p> <p><i>PFAS National Environmental Management Plan Version 2.0</i> January 2020, National Chemicals Working Group of the Heads of EPAs Australia and New Zealand (HEPA)</p> <p><i>Guidelines for Drinking-water Quality</i> (2017) 4th edition, World Health Organisation (WHO) – revised 2021, this has ramifications for assessment of TCE concentrations.</p>	<p>Health and Aesthetic guideline values</p> <p>Table 1. Human health guideline values developed by health regulators (Sum of PFOS and PFHxS / PFOA)</p> <p>Guideline values for chemicals that are of health significance in drinking-water (where not provided in Australian Drinking Water Guideline)</p>
Primary Contact, Recreation and Aesthetics	<p><i>Guidelines for Managing Risks in Recreational Waters</i> (2008), National Health and Medical Research Council</p> <p><i>PFAS National Environmental Management Plan Version 2.0</i> January 2020, National Chemicals Working Group of the Heads of EPAs Australia and New Zealand (HEPA)</p>	<p>Health and Aesthetic guideline values</p> <p>Table 1. Human health guideline values developed by health regulators (Sum of PFOS and PFHxS / PFOA)</p>
Primary Industry – Irrigation	Australia & New Zealand Guidelines for Fresh and Marine Water Quality	Long-term irrigation trigger values
Vapour Inhalation (residential, commercial and trench worker)	Assessment of groundwater as a source of VOC vapour will be by direct measurement of soil vapour as per Section 6.8.2.	
Industrial	There are no specific guidelines – such risks are judged on a case by case basis where chemicals are above conservative criteria.	Adoption of Primary Contact, Recreation and Aesthetics can act as a screening process for industrial land use (conservative).

6.8.4.4 Aesthetics

The SA EPA Guidelines for the Site Contamination Auditor System, August 2019 identifies the need for Auditor's to consider aesthetic impacts when considering the suitability of a site with reference to the amended ASC NEPM 1999. The presences of small amounts of solid, inert waste materials such as minor building and other debris that is typically found in developed urban areas can be considered by the Auditor without specific management requirements or remediation.

However, the presence of extensive rubble or waste (for example building waste) may require remediation on the basis of detriment to the aesthetic enjoyment and reasonable use of the Site.

The amended ASC NEPM 1999 recognises that while there are no numeric aesthetic guidelines, the site assessment nevertheless requires balanced consideration of the quantity, type and distribution of foreign material or odours in relation to the specific land use and its sensitivity. For example, higher expectations for soil quality would apply to residential properties with gardens compared to industrial settings.

Aesthetic consideration set out in the amended ASC NEPM 1999 include the following:

- Chemically discoloured soils or large quantities of various types of inert refuse, particularly if unsightly, that may cause ongoing concern to site users.
- The depth of the materials, including chemical residuals, in relation to the final surface of the Site; and
- The need for, and practicality of, any long-term management of foreign material.

The amended ASC NEPM 1999 advises that caution should be used for assessing sensitive land uses, such as residential, when large quantities of various fill types and demolition rubble are present.

The NSW EPA, Excavated Natural Material Exemption 2012 is referenced in the SA EPA Standard for the Production and Use of Waste Derived Fill, October 2013 and provides the following additional criteria on acceptable levels of foreign inclusions in 'natural material' which is typically suitable for sensitive land uses; excavated natural material is 'naturally occurring rock and soil (including but not limited to materials such as sandstone, shale, clay and soil) that has:

- been excavated from the ground, and
- contains at least 98% (by weight) natural material, and
- does not meet the definition of Virgin Excavated Natural Material in the Act'.

Within the course of an audit, auditors generally determine that the following physical and aesthetic screening criteria apply to the top 2.0m of soils remaining onsite:

- Should consist of clay, rock, sand, soil or other inert mineralogical matter.
- The combined concentration of natural and foreign inclusions in soils should not exceed 2% v/v.
- No visible asbestos should be present; and
- Soil staining or odorous contamination should not be present.

Should these aesthetic screening criteria be exceeded, further consideration of the detrimental impact on the aesthetic enjoyment and reasonable use of the Site will be undertaken.

6.8.4.5 Non-site Contamination Issues

Guidelines for the Site Contamination Audit System (2019) – provides additional non-site issues that an Auditor is expected to consider in relation to understanding the condition of the Site and its suitability for its intended use(s). These considerations include:

- Unexploded ordnance.
- Radioactive substances that may have been used or added to the Site.
- Biological substances, e.g. pathogens that may have been used or added to the Site.
- Any chemical substances (including waste) on or added to the Site that are noxious, poisonous or dangerous to human health and/or the environment; and
- Contaminated sediments.

These issues will be assessed by the Auditor on the basis of the site-specific requirements.

6.8.5 Validation Reporting

At the conclusion of the remediation works, LWC shall prepare a remediation validation report (RVR) detailing the scope and outcomes of all remediation works including excavation extents and quantities, materials tracking information and results of all validation sampling for provision to the Auditor.

Validation reporting will be in accordance with Schedule B2 of the ASC NEPM (1999, as amended 2013) and as per Remediation Reporting Checklist presented as Appendix 6 of EPA (2019a).

The RVR will include all necessary and relevant sub-documentation and detail the following:

- A summary of the project objective, scope of works undertaken, and methodology adopted.
- A detail summary of site conditions including infrastructure volumes, presence of product, site layout figures, descriptions, excavation extents and quantities and material tracking information.
- A summary of findings from, investigations including laboratory analysis presented in tabular form and including comparison to adopted guidelines.
- Data quality assessment and quality control evaluation and conclusions.
- Clear statements regarding the remediation of the Site, including site suitability, remaining site contamination and need for further management ; and
- Supporting documentation including lithological logs, certified laboratory results, chain of custody documentation, disposal documentation for the potential source infrastructure and soils as well as purchase receipts (including volume and source information) for any imported backfill material/s provided as appendices.

6.9 Excavation back fill works

The contractor will back fill excavations with re-usable (as determined by the Environmental Consultant and cleared by the site contamination auditor) exhumed material³ and/ or appropriate clean backfill material noting the proposed sensitive land use of the Site, and noting the following:

- Backfilling to be conducted in 300-millimetre (mm) lift achieving a minimum 95% compaction at each lift.
- Each backfill compaction must be overseen by a suitably qualified geotechnical contractor.

The above is consistent with Level 2 compaction requirements as per *Australian Standard AS 3798–2007 Guidelines on Earthworks for Commercial and Residential Developments*.

Backfill material proposed to be brought onto the Site must be validated to the satisfaction of the site contamination auditor prior to the material being received at the Site and will comprise the following:

- Adoption of sampling density as per *VIC EPA (2001) IWRG702*.
- Sample collection methodology to be consistent with that outlined in Section 6.8.1 and the *ASC NEPM (1999, as amended 2013)*.
- Analytical schedule to comprise analysis of one (1) sample for the broad NEPM (2013) HIL A Screen⁴ and 2 samples for the SA EPA Waste Fill Screen, with the remaining samples to be analysed for TRH, BTEX, PAHs and eight (8) metals (arsenic, cadmium, chromium, copper, nickel lead, mercury and zinc); and
- Must meet SA EPA (2013) Standard for the Production and Use of Waste Derived Fill waste fill criteria (chemical and aesthetic).

Where backfill material is not sourced from a quarry (i.e. is Waste Derived Fill – WDF from a ‘sensitive’ site (a site that has been confirmed to have no potentially contaminating activity)), the required supporting documentation will be reviewed by the SRP Manager and the Auditor to confirm suitability for re-use on Site prior to acceptance on Site and re-use. Verification testing or existing laboratory reports will be required for any WDF to potentially be received at the Site. This will be determined on a case by case basis in consultation with the auditor.

WHEN COMPLETE – THE ACTIONS SET OUT IN SECTION 6.8.2 MUST BE IMPLEMENTED!

6.10 Remediation Timeframes

In accordance with Appendix 5 of EPA (2019a), the SRP is required to document the timeframes applicable to the remediation project. Note that demolition of structures is required prior to commencement of remedial works.

Specific dates for demolition are currently unknown however estimates of remediation duration from completion of the demolition of structures phase is provided as Table 6-12.

³ Results to be compared against the validation criteria to determine suitability of the material to be used at the Site.

⁴ The screen includes As, B, Ba, Be, Cd, Cr, Co, Cu, Mn, Ni, Pb, Se, V, Zn, Hg, Cr VI, WAD CN, Organics as listed in the guideline including OCPs, Mirex, Atrazine, Chlorpyrifos, Bifenthrin, TRH/BTEXN PAHs/Phenols & PCBs, 16 Herbicides incl' 2,4,5-T, 2,4-5, MCPA, P-21/2 MCPB, Mecoprop & Picloram.

The dates associated with the following milestones are to be confirmed upon advice from the Site Owner (these are estimates).

Table 6-12 – Estimated remediation timeframe

Remediation Task	Duration	(Auditor) Hold Point
Preliminary works	Week one	
Demolition	Weeks 2 - 6	
Soil validation testing beneath former Buildings	Week 7	
Building C Source Removal	Week 7	1
Building C Source Validation	Week 8	2
Backfill of Building C Source Excavation	Week 9	
Soil Vapour Validation	Week 10 – 12	3
Preparation of GMMP	Week 10 - 12	
Preparation of RVR	Week 12 - 16	

7 ENVIRONMENTAL MANAGEMENT PLAN

All work will be carried out in strict accordance with the Environmental Management Plan (EMP) to mitigate potential risk to the current users of the site, site contractors, surrounding environment, surrounding residents and business community that may arise as a result of the works.

SA EPA (2019d) was consulted in developing the EMP component for remediation. Note that a site specific Construction Environmental Management Plan must be prepared and submitted to the auditor and approved by the auditor prior to the commencement of works, with respect to detailed environmental management measures, monitoring protocols and compliance criteria. The CEMP must be prepared in accordance with SA EPA 1095/19 Construction environmental management plan (CEMP) September 2019.

7.1 Soil Management Procedures

Management of the soil from excavation areas will be of utmost importance to control the potential exposure to and migration of contaminants.

All soil from the proposed excavation area on the site is a potential source of contamination and for the purposes of this EMP is to be considered as contaminated material. The following procedure, as a minimum, will be adopted to manage the contaminated soils:

1. Exposure and contact with the soils will be minimised to the extent practicable by suitable planning of work activities by the SRP Manager in consultation with the contractor.
2. All persons handling or working on the soils will adhere to appropriate WHS standards to minimise exposure, wearing appropriate personal protective equipment including:
 - a) Gloves.
 - b) Disposable Coveralls; and
 - c) Dust masks.

Taking care to prevent cross-contamination of nearby clean soils is important so as to avoid the spread of chemical substances, and to minimise the amount of soil needing to be treated and the resources required to undertake the project. Similarly, care should be exercised so that polluted surface water does not affect clean soils.

Consider:

1. likely sources of cross-contamination.
2. types and concentrations of chemical substances and by-products of decomposition.
3. extent of the remediation area.
4. duration and timing of the remediation works.
5. remediation work methods and staging of the works.
6. proper classification of waste material for off-site disposal, material tracking and contaminated soil landfill licensing requirements.
7. aesthetics; and
8. sensitivity of surrounding environments.

7.2 Temporary Soil Stockpiling

Any soil materials excavated during remediation will be temporarily stockpiled onsite in accordance with:

- **SA EPA (2019a), Guidelines for the Assessment and Remediation of Site Contamination**

Although prescribed for management of stockpiles at waste transfer / sorting stations, and not readily for temporary stockpile storage at development sites, the management of stockpiles should not contravene the following guidance:

- **SA EPA (2010) Guideline for stockpile management: Waste and waste derived products for recycling and reuse (Updated October 2020) and SA EPA (2018) Guidelines for Construction environmental management plans (CEMPs).**

The temporary nature of the stockpiles reduces the potential for chronic environmental exposures. Any stockpiles that are required to be maintained longer than the working day will be managed by initial emplacement on impermeable surfaces such as hard-standing or an impermeable layer such as plastic, and located away from potential environmental exposure routes such as drains, culverts etc. Tamping of the stockpile surface with mechanical plant (i.e. backhoe bucket) shall be undertaken to compact the stockpile and reduce the potential for wind driven erosion / dust generation.

Stockpiles must be:

1. Located away from any sensitive receptors (Adjacent residents need to be considered in determining the placement and management of stockpiles on-site). Temporarily stockpiled material can cause adverse impacts via dispersion of dusts or migration of stockpiled materials to surface/ groundwater and management is required to avoid such impacts.
2. Located away from any groundwater wells currently on site, which should be sealed with gatic covers already but should also be covered / or marked to avoid destruction, and to avoid seepage of any leach / run off from stockpiled material, for example using traffic cone and absorbent socks.
3. Not piled to a height greater than 3 m.
4. Stockpile height should reduce as it approaches the site boundary. Stockpile heights should be below fence lines when within about 5 m of the boundary.
5. Stockpiles should be covered with an effective covering. The contents of the stockpile will dictate the level of cover, i.e. complete enclosure or the formation of a crust layer.
6. Temporary bunding should be installed around stockpiles, and stockpiles should be located on waterproof surfaces such as asphalt or concrete, or under cover where available (i.e. beneath the current on-site cover near the UST location or located both on top of a covered by an impermeable cover).
7. Stockpiles should have sufficient moisture content before being handled. Water can be applied the night before and allowed to infiltrate the stockpile. Applying water to a stockpile during handling has little effect on reducing dust emissions. Using water jets or sprays has minimal effect in capturing airborne dust, especially when out in the open.

7.3 Dust Control

Dust control measures shall be implemented for all intrusive works, in particular work where contaminated soils within the excavation areas are being excavated and where movement of soil is required. For the purpose of this document, dust refers to particulate matter including airborne dust and organic solids (e.g. soot).

Dust generated from contaminated soil may cause risks to human health through contact with the skin, inhalation and through ingestion. Dust dispersion may also cause problems with soiling the surrounding area, particularly where dust becomes wet and/ or enters the stormwater system.

Dust suppression, as part of all site works, will be adequate at all times during and outside of normal working hours. Dust suppression mechanisms will be applied by the excavation contractor to prevent dust generation during remediation activities on the site.

The following dust control measures shall be adopted by the excavation contractor as required and as directed by the SRP Manager:

- Restrict excavation activities during adverse weather conditions (i.e. too windy); and
- Use of water to suppress dust (hosing and spraying).

7.4 Transport of Material to Licensed Landfill

Any excavated soils required to be transported offsite for disposal will be transported by an appropriately licensed transport contractor adopting the required SA EPA waste transport documentation / protocol. All loads must be covered during transport. All soils to be removed from the Site will be appropriately classified by the SRP Manager.

- Only appropriately licenced trucks and facilities will convey and receive waste.
- Waste disposal certificates must be retained and included in the validation report.

7.5 Wash Down/ Drag Out

Measures shall be taken to prevent and clean any drag-out of mud and soil from the Site onto surrounding roads via vehicle tyres. Wash down of tyres (and/ or vehicles if necessary) will be undertaken if necessary, using a hose in the area of hard-standing away from any surface water runoff receptors. In the event that the current infrastructure (i.e. hardstand area) is removed, a single entry/exit point should be established for vehicles with a tyre cleaning facility made available.

In the event of spillage of spoil or run-off from the Site occurs along with sediment accumulation, clean up as soon as practical will occur. In areas of public roads, any material tracked off-site by the contractors or any other vehicles will be cleaned up with the use of a mechanical street sweeper, as necessary.

7.6 Air Quality and Odours

The preferred strategy for protecting air quality during remediation of site contamination is prevention, minimisation, followed by environmental controls. Potential mitigation measures may include:

- minimising the exposed surface area of odorous/ noxious materials.
- timing excavation activities to minimise off-site nuisance (noting close proximity to residential structures).
- undertaking work in favourable weather conditions (e.g. lower temperatures, favourable winds) covering exposed surfaces overnight or during periods of low excavation activity.

- no stockpiling of odorous material near the boundary of the site adjacent the residential allotment.
- covering of all stockpiled odour material; and
- removing offensive odorous material offsite as soon as practicable.

7.7 Other Issues

7.7.1 Site Access and Security

Site access to the area of the proposed remediation works shall be restricted to personnel inducted into the SRP. The excavation contractor will ensure that the site is appropriately fenced off prior to commencement of works, using temporary fencing, bunting and warning signs, in order to restrict unnecessary workers and the general public from the work area.

7.7.2 Stormwater and Erosion

All effort will be made by the excavation contractor to prevent or minimise the potential for the generation of contaminated water and sediment as a result of remediation activities, including any water used during dust control.

Discharges to the local stormwater system will be prevented where the potential for run-off is identified. Site management procedures will be in accordance with the EPA Stormwater Pollution Prevention Code of Practice for the Building and Construction Industry. If necessary, measures for control of discharge may include:

- The provision of silt traps and 'socks'.
- Providing temporary Hessian (or similar) coverings to exposed surfaces where there is potential for surface water generation.
- Construction of temporary stormwater catch/ diversion drains; and
- Measures shall be taken to prevent and clean any drag-out of mud and soil from the site onto surrounding surfaces via worker boots, vehicles etc.

Given that works are anticipated to occur during summer, water collecting in excavations or earthworks is not likely to occur.

If water does build up in such excavations, and requires discharge, the management/ discharge of such water shall be in accordance with EPA "Environmental management of dewatering during construction activities (updated June 2021 – EPA 1093/21)".

7.7.3 Noise

Noise shall be managed to ensure impacts to on-site workers and neighbouring residences and/or businesses are reduced as practicable. This can be achieved through selection of appropriate equipment, noise suppression equipment on any excessively noisy machinery (e.g. compressors) and keeping machinery in good repair and condition. In addition, cartage trucks will be encouraged not to reverse so as to avoid noise impacts associated with reversing audio alerts. Traffic management/ flow on site may be planned to support this.

Working hours are to be prescribed by the excavation contractor prior to the commencement of site works.

Construction activities will be limited to the hours of 7:00 am to 7:00 pm Monday to Saturday, which is in accordance with the SA EPA Construction noise information sheet.

7.7.4 Chemicals, Oils, Diesel

All equipment on-site shall be appropriately managed to reduce the emission of fumes, smoke and chemicals into the atmosphere. It is important to ensure that leaking vehicles and/ or machinery are not used on-site.

No plant refuelling is expected to be undertaken on Site. Where plant refuelling is necessary then a dedicated refuelling station / area is required to isolate refuelling to one location. Care should be taken during refuelling to avoid over-spill. A 'spill kit' must be stored on site and available for use.

7.7.5 Waste Control

Waste materials that may be generated during the remediation works include concrete, steel, aluminium, and potentially fragments of foreign material that may be present in fill soil material (possible ash/ cinders, asbestos containing material, bricks etc.).

Effective construction planning can minimise the production of waste, and appropriate storage of wastes particularly suitable source separation of waste materials, can greatly improve recycling rates and potentially lower disposal fees.

The waste management hierarchy provides a framework to maximise the useful life of materials for instances in which waste cannot be avoided. Waste from construction and building sites should be managed in accordance with the waste management hierarchy.

Waste that is produced must be kept on-site and managed to prevent nuisance such as litter, dust and vermin, and to stop leachate from entering stormwater drains.

All waste generated during the remediation works shall be removed from the Site and disposed of in an appropriate and environmentally safe manner. Such waste includes any waste resulting from site activities and human presence.

The Site shall be adequately cleaned after completion of works and prior to vacation by the contractor.

All waste material generated on Site is to be disposed off-Site to a suitably licenced facility.

7.7.6 Traffic Management

Traffic entering and leaving the Site should adhere to a site specific simple traffic management plan to avoid trucks queuing in the Street, and causing noise and exhaust related odour / nuisance.

7.7.7 Dewatering of Excavations

Dewatering is not expected to be required. However, if required, dewatering works are to be undertaken in accordance with relevant South Australian legislation for the management of liquid waste, principally in the first instance in strict accordance with EPA "Environmental management of dewatering during construction activities (updated June 2021 – EPA 1093/21).

Where required, dewatering works will involve the removal of liquid from the excavation pits by an appropriately licenced vacuum truck operator for disposal to an appropriately licenced facility.

Alternatively, discharge of dewatered liquid to sewer may be undertaken provided that a once off trade waste agreement with SA Water has been obtained.

Consult EPA "Environmental management of dewatering during construction activities (updated June 2021 – EPA 1093/21 in the first instance.

7.8 Asbestos Containing Material

In the event that suspect asbestos containing materials are encountered during site remediation works including ACM in soil, the steps outlined in Table 7-1 must be followed.

Table 7-1 Actions should Asbestos Containing Material be Identified (or suspected)

Action	Description	Who
1. Stop Work	Stop work immediately. <i>Proceed to Action 2.</i>	Contractor/ site staff (or others) discovers or suspects PACM is present
2. Restrict Access to Affected Area	Restrict access to the area by installing temporary signage to prevent site occupants or members of the public from entering the immediate area, and to prevent any further disturbance of asbestos materials in the area. <i>Proceed to Action 3.</i>	Contractor/ SRP Site Representative
3. Notify the Site Owner and the Auditor	SRP Manager are to contact and update the Site Owner and the Auditor within 24 hours. <i>Proceed to Action 4.</i>	SRP Manager
4. Risk Assess and Sample Material (if required)	SRP Manager to assess material and if necessary, take samples of any suspected asbestos materials: <ul style="list-style-type: none"> • Notify Site Owner and Auditor of results. • Negative result → resume works • Positive result → Go to Action 5 	SRP Manager
5. SRP Manager to Engage Asbestos Removal Contractor for Clean-up (if required)	Consideration should be given to undertaking asbestos removal works. This will be dependent on the type, nature and amount of ACM identified and should be based on advice provided by the asbestos consultant. <ul style="list-style-type: none"> • Removal required → Go to Action 6 • No removal deemed necessary → Go to Action 7 	SRP Manager
6. Conduct Asbestos Fibre Air Monitoring and Independent Visual Clearance Inspection	Asbestos removal works are to be undertaken by appropriately licenced contractors in accordance with SafeWork SA guidance. Conduct asbestos fibre air monitoring adjacent to the contaminated work area (in a down-wind location) during any removal works to ensure that fibre levels do not exceed acceptable levels. After clean-up works have been completed, an independent visual clearance inspection (undertaken by SafeWork Licenced Inspector) shall be conducted to ensure that the asbestos removal has been completed to a satisfactory standard. Airborne asbestos fibre clearance monitoring shall also be conducted as required within removal work areas to ensure areas are safe for re-occupation by unprotected personnel. Asbestos Contractor to issue clearance documentation. Photographs are to be taken and retained for each area from which ACM has been removed. <i>Go to Action 7.</i>	SRP Manager (in conjunction with Asbestos Removalist/ Inspector)
7. Review SRP and Staff Debrief	SRP Manager to review the SRP procedures and controls to ensure they were being followed correctly. <i>Go to Action 8.</i>	SRP Manager

Action	Description	Who
8. Document Works Undertaken and Archive Documents	SRP Manager to update SRP if required and provide written documentation of any removal works (if undertaken) or information regarding the location of any additional ACM identified. Clearance certificates are to be retained and included in the validation report to be provided to the Auditor.	SRP Manager

Pending the outcomes of the process detailed in Table 7-1, further instruction regarding removal of asbestos containing material (and required monitoring) will be provided to the Auditor/ Site Owner.

ACM (and potentially other hazardous materials) is present in building fabric. Evidence of appropriate removal of these materials during demolition must be provided in the validation report.

7.9 Unexpected Finds

Unexpected finds include materials that have site contamination implications including, but not limited to:

- Unexpected foreign material or structures such as additional underground storage tanks or buried drums.
- Buried asbestos containing material; and
- Odorous, stained or oily soil material.

Where unexpected conditions are encountered at the Site during the remediation works, the following process shall be adopted:

- Remediation works are to cease in the area of the unexpected find. The area is to be barricaded/ demarcated with temporary fencing/ bunting and covered.
- The SRP Manager is to notify the Site Owner and the Site Auditor within 2 hours of the encountering the unexpected find.
- An inspection of the unexpected find shall be undertaken. Field testing will be undertaken as required to determine the nature and extent of the find. Works will be undertaken in accordance with relevant available guidance documentation (refer to Section 1.5). An assessment of required management and/ or remediation will be undertaken.
- The SRP Manager will provide written notification to the Auditor and the Site Owner summarising the outcomes of the site inspection/ assessment as soon as reasonably practicable following the site inspection. The SRP Manager will also provide details of the approach to remediation and the validation of the unexpected find to the Auditor.
- The SRP Manager will ensure that additional controls/ management measures are adopted (if required).
- Records of the unexpected find, field testing, results and implemented management strategies are to be recorded by the SRP Manager for inclusion in the validation report.

Note that depending on the nature of the unexpected find, additional work health and safety, environmental controls and validation works may be required.

7.10 Monitoring

Table 7-2 explains the monitoring, triggers, management and consequential actions of impacts that may occur at the Site during remediation or development processes.

Note that a site specific Construction Environmental Management Plan must be prepared and submitted to the auditor and approved by the auditor prior to the commencement of works, with respect to detailed environmental management measures. The CEMP must be prepared in accordance with SA EPA 1095/19 Construction environmental management plan (CEMP) September 2019 and will include monitoring protocols, frequencies, and compliance criteria for relevant environmental parameters (e.g. for water, noise and dust).

Table 7-2 – Monitoring and Contingency Protocols

Monitoring or Trigger	Type of impact	Management		Consequent Actions
		SRP Manager	Contractor	
Site Supervisor observes while on-site.	Any impact as measurable by 1 – 7 below	Cease operations, record date and time of incident for future reference.	Cease operations, record date and time of incident for future reference.	Review operations and controls to mitigate impacts generated. Contractor communicates with Site owner contact for significant ²⁴ impacts.
Neighbouring occupant or public complaint	Any impact as measurable by 1 – 7 below	Site supervisor contact and review all messages and enquiries the same or following working day. Obtain full details and log. If deemed urgent contact Contractor Site Supervisor and Site owner.	Review impacts from previous activities. Cease or modify future operations to reduce impacts, if necessary.	Site owner to contact complainant detailing action taken, if any, and log response.
Occupant or public - general enquiry/ concern.	No specific impact	Obtain full details and log. Site Owner contact to discuss concerns with enquirer.	NA.	Implement changes to operations, if necessary, and log.

- 1 If visible dust is crossing the property boundary the potential for adverse dust impacts exists and control measures should be implemented.
- 2 If the Site Supervisor is required to speak loudly at the perimeter of the fence in order to be heard this is deemed to be excessive noise or noise complaints are received from surrounding occupants.
- 3 Excessive vehicle movement or queuing.
- 4 Objectionable odour at or beyond the perimeter fence.
- 5 Surface water and sediment run-off beyond the boundaries of the site (including tracking of mud onto public roads).
- 6 The loss of liquid or solid waste containment. Any impacted soils must be assessed and managed using the approach detailed in the SRP.
- 7 Can be a perception of a negative impact which may not be measurable or have guidelines or standards to determine.

7.11 Emergency and Incident Response - Pollution

Emergency situations may include incidents such as a truck rollover while transporting contaminated soil to landfill, strong winds or rain which accelerates surface erosion of contaminated soil material.

An asbestos material 'incident' will typically involve the discovery or dislodgment of asbestos materials that do not pose an immediate threat of asbestos fibre being inhaled.

Emergency and incident response entails restriction of access to the area, notification to the Site Owner and the EPA:

EPA Pollution Reporting

Call: 8204 2004

The protocols described in Appendix A comprise the Environmental Management Plan/ Emergency and Incident Response plan. These protocols should only be conducted where safe to do so.

8 WORK HEALTH AND SAFETY CONSIDERATIONS

The WHS procedures outlined below only apply to inducted site users including earthmoving contractors.

The contaminants potentially present within the investigation area are not considered likely to represent a significant risk to the health of workers at the site associated with the scope of work of the SRP, however basic WHS procedures as outlined herein should be adopted, and should be consistent with current WHS legislation and practices.

The following standard WHS procedures shall be implemented for the duration of the remediation works:

- WHS induction for all Contractor personnel.
- Workers are made aware of the potential contamination status of the site.
- Appropriate personal protection equipment should be worn including:
 - Gloves worn if soil is being handled.
 - Long sleeve shirts and pants worn to minimise skin contact with soils.
 - Dust generation is minimised during excavation activities. However, dusk masks may be required by some personnel depending on the conditions at the faces of excavations.
- Eating, drinking or smoking is prohibited within designated intrusive work zones; and
- Any environmental or WHS incidents shall be reported immediately and a stop work implemented at the site.

A site specific WHS document must be prepared by the earthworks contractor and signed off on by all relevant site personnel. This plan must consider general hazards of working on a construction site e.g. trips, falls, traffic).

Workers on site are expected to hold a 'White Card'.

9 SRP MONITORING

The effectiveness of the SRP will be reviewed periodically through a review process that checks each aspect of the SRP as outlined in the previous sections against its requirements and objectives to ensure that it is operating in a manner for which it was prepared.

Monitoring and review shall be the responsibility of the SRP Manager.

9.1 Non-Conformances

A register of non-conformances shall be established and maintained by for all active and resolved non-conformances. All non-conformances will be reviewed, and corrective actions developed to prevent recurrence. The SRP will be revised wherever appropriate to reflect these corrective actions.

9.2 Complaints

All complaints will be referred to the SRP Manager will be recorded in a complaint register with the following details:

- the name and address of any complainant.
- the time and date the complaint was received.
- a description of the complaint.
- the activity or activities and any associated equipment that gave rise to the complaint.
- the action that was taken to resolve the issues that led to the complaint.
- the date the complaint was resolved and documentation of complainant's level of satisfaction with the actions to resolve the issue; and
- notifying the relevant authority or the EPA of complaints regarding environmental nuisance (particularly noise and dust) and the actions undertaken to resolve the complaint, and of any non-conformance with the SRP that results in environmental nuisance.

Where appropriate the complainant will be notified of action taken. Complaints can be recorded on a Corrective Action Request Form as contained in Appendix B.

9.3 Record Keeping

Records will be kept of the following:

- Changes to the SRP.
- Minutes of meetings.
- Inspection reports.
- Environmental monitoring records and results (including calibration certificates).
- Non-conformances and complaints; and
- Approvals, certification and licences issued by statutory authorities.

All documents will be numbered to identify their revision status.

9.4 Review

A review process shall be carried out to verify compliance with and effectiveness of the SRP. The review will be managed by the SRP Manager who will:

- Undertake the reviews.
- Maintain records of the review; and
- Ensure corrective actions are promptly implemented.

The review should address the implementation and effectiveness of prescribed field procedures and documentation within the SRP.

An example Checklist Form is contained in Appendix C.

10 REFERENCES

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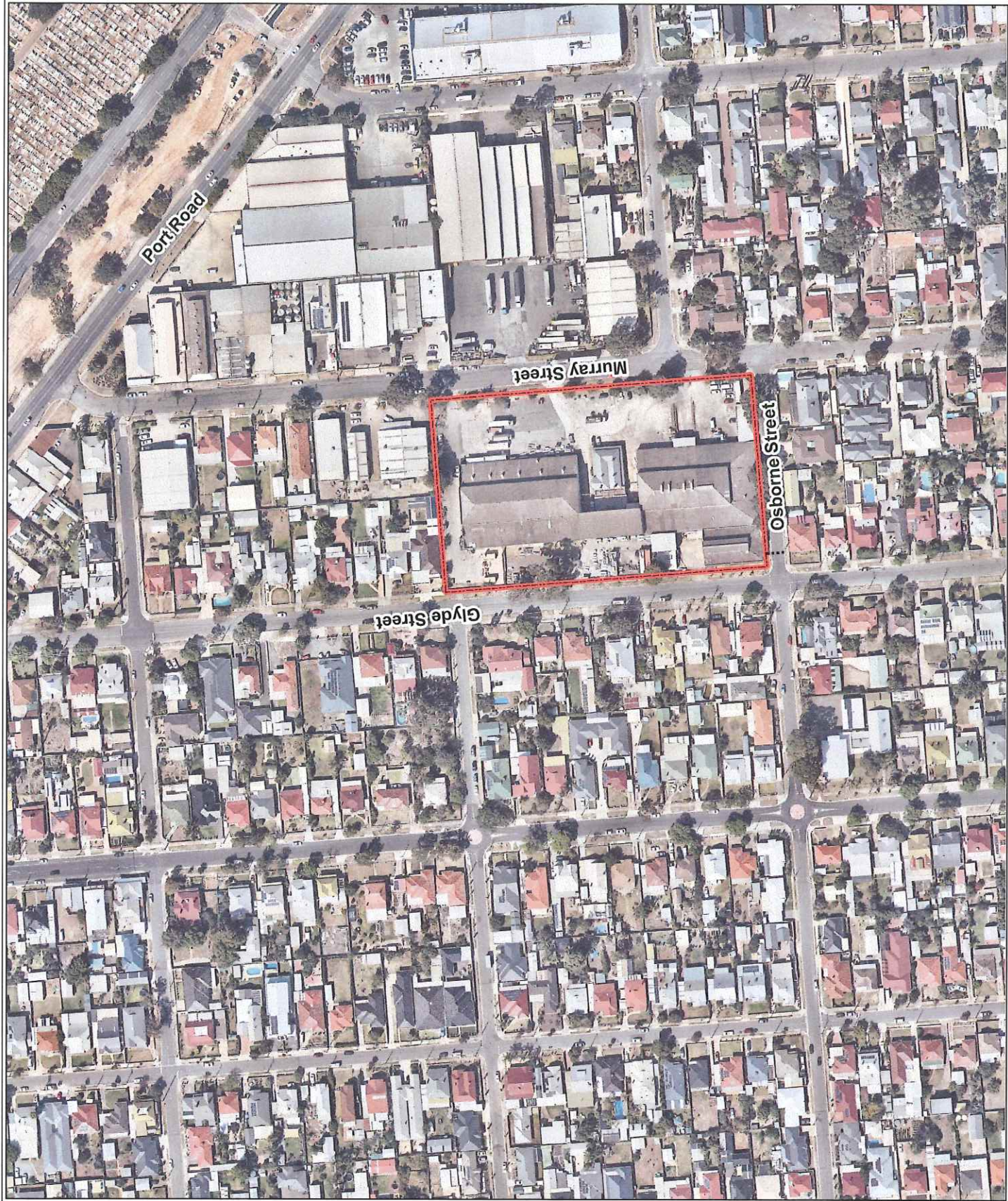
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Work Health and Safety Act 2012 (South Australian State Legislation).

Work Health and Safety Regulations 2012 (South Australian State Legislation).

FIGURES



Legend

Site Boundary

0 15 30 60 90 Metres



Land & Water Consulting Pty Ltd
1000 West Street, Adelaide, SA 5000
Phone: 08 8333 1111 Fax: 08 8333 1112

Date: March 2021

Projection: GDA 1994, Zone 54

Project:

Site Remediation Plan,
24 - 30 Murray Street, Albert Park,
South Australia

Site Address:

24 - 30 Murray Street, Albert Park, South Australia

Figure Title:

Site Location Plan

Appendix in Set

1 of 7

Figure

Scale: See Plan

Drawing Reference

AAAA

Revision

A



Legend

- Site Boundary
- Site Features
- Area A as per Woodward-Clyde (1997)
- Area B as per Woodward-Clyde (1997)



Date: June 2018

Projection: GDA 1994, Zone 54

Project:
Detailed Site Investigation -
24 - 30 Murray Street, Albert Park,
South Australia

Site Address:

24 - 30 Murray Street, Albert Park, South Australia

Figure Title:

Site Features

Appendix in Set

2 of 7

Figure

2

Scale: See Plan

Drawing Reference

AAAA

Revision


A



Legend

- Site Boundary
- Site Features
- Groundwater Investigation Location (LWC, 2020)
- Existing Groundwater Investigation Location (LWC)

Note: Basemap sourced from Nearmap dated October 2020

 LWC Land & Water Consulting Level 1, 100/102 Sturt Street Adelaide SA 5000 Phone: 08 8333 1111 Email: info@lwc.com.au		N ▲	
Date: July 2021	Project: GDA 1994, Zone 54		
Project:			
Detailed Site Investigation (SSRA)			
Site Address:		24 - 30 Murray Street, Albert Park, South Australia	
Figure Title:		Groundwater Monitoring Wells	
Figure in Set	3 of 7	Figure	
Scale: See Plan		3	
Drawing Reference		Revision	A

Legend

- Site Boundary
- Site Features
- Soil Vapour Investigation Location (Passive Sampler) (LWC, Aug 2020)
- Soil Vapour Investigation Location (Passive Sampler) (LWC, May 2018)
- Soil Vapour Investigation Location (Passive Sampler) (LWC, Dec 2017)
- Active Vapour Sampling Locations (June 2019)
- Inferred TCE Source Zone

Note: Basemap sourced from Naarmap dated October 2020



Date: August 2021

Project: GDA 1984, Zone 54

Detailed Site Investigation (SSRA)

Site Address:

24 - 30 Murray Street, Albert Park, South Australia

Figure Title:

TCE Soil Vapour Concentrations (All data)

Figure in Set

6 of 7

Figure

4

Scale: See Plan

Revision

Reference

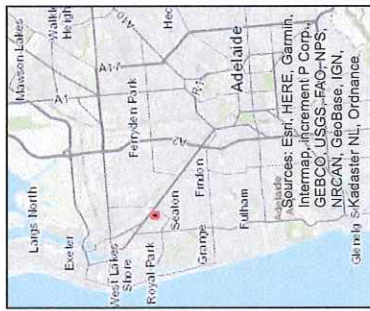
A





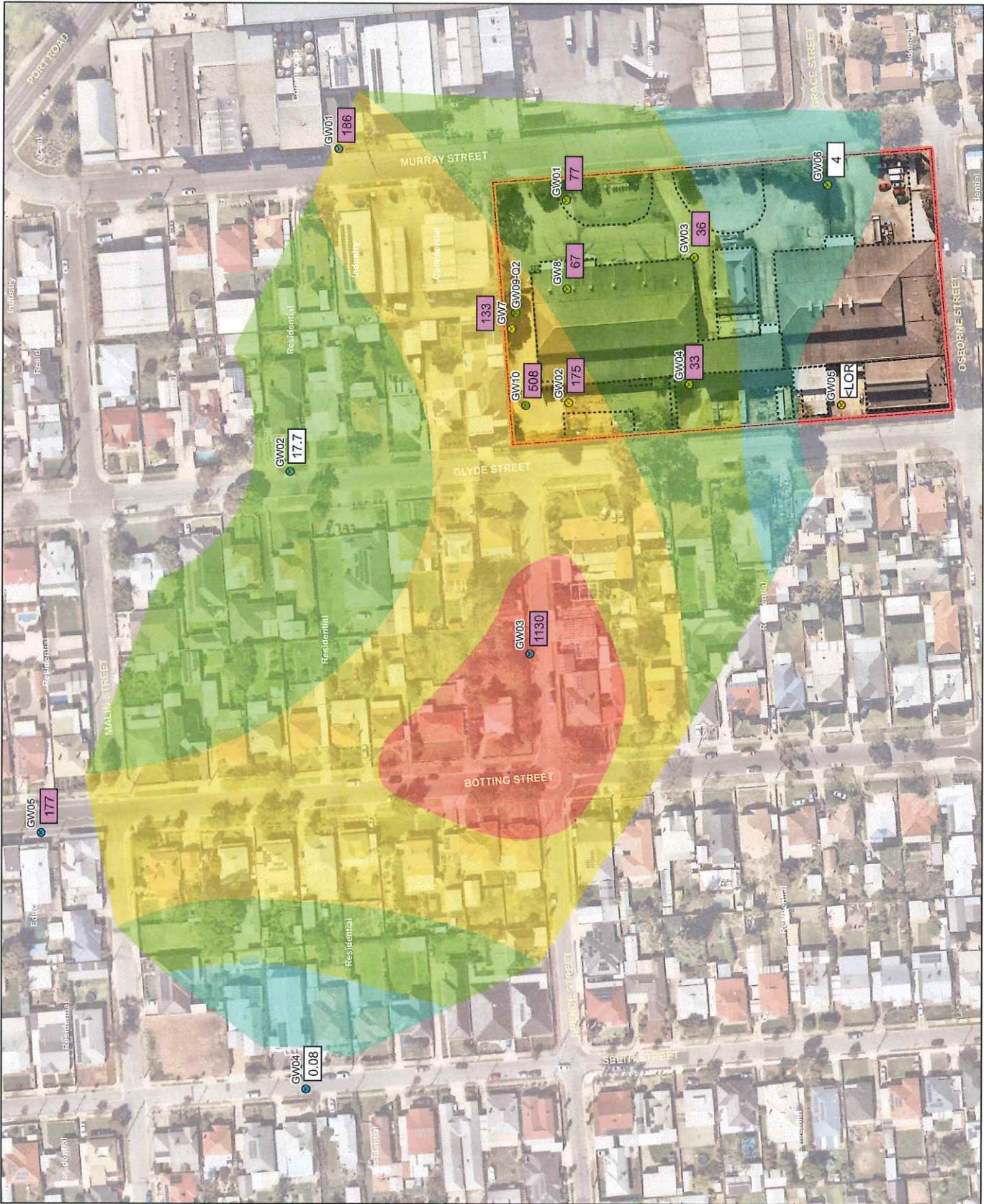


Legend

- Cadastre
- Site Boundary
- Fill Areas of Interest
- Indicative Extent
- Area A
- Area B
- Area C



 LWC Land & Water Consulting Level 1, 100 Sturt Street Adelaide, SA 5004 Web: www.lwc.com.au		 N A	
Project: Site Remediation Plan Totino		Figure Title: Indicative Extent of Fill Areas of Interest	
Date: April 2021	Projection: GDA84 Z54	Scale: See Plan	Figure in Set: 5 of 7
Site Address: 100 Sturt Street Adelaide Park, SA 5014		Figure 5b Revision A	
Drawing Reference: AAAAA			



Legend

Site Boundary

Railway

Site Features

Groundwater Investigation Location (LWC, 2020)

Groundwater Investigation Location (Golder, 2019)

Existing Groundwater Investigation Location

Inferred TCE Groundwater Plume (ug/L)

1000+

100-999

9-99

1-8

Groundwater TCE Concentration (ug/L) not exceeding the WHO DWQG 4th Ed Criterion (8 ug/L)

Groundwater TCE Concentration (ug/L) exceeding the WHO DWQG 4th Ed Criterion (8 ug/L)

Groundwater TCE Concentration (ug/L) exceeding the WHO DWQG 4th Ed Criterion (8 ug/L)

Note: GW01, GW02, GW03, GW04 and GW05 extracted from Golder Jan 2020

Basemap sourced from Nearmap dated October 2020

0 5 10 20 30 40 Meters



Date: November 2020

Projection: GDA 1984, Zone 54

Project:

Detailed Site Investigation

Site Address:

24 - 30 Murray Street, Albert Park, South Australia

Figure Title:

Groundwater Analytical Results Plan with Reported TCE Concentrations (September 2020) - Q1 Aquifer

Figure in Set 6 of 7

Scale: See Plan

Drawing Reference

Figure 6 Revision A

Legend

- Site Boundary
- Site Features
- Soil Bore Investigation Locations



Note: Basemap sourced from Nearmap dated October 2020



Date: July 2021	Projection: GDA 1994, Zone 54	Figure in Set	7 of 7	Figure	7
Project: Detailed Site Investigation (SSKA)		Scale: See Plan		Drawing Reference	Revision
Site Address: 24 - 30 Murray Street, Albert Park, South Australia					A
Figure Title: Soil Bore Investigation Locations					

APPENDIX A PERSONAL PROTECTIVE EQUIPMENT & EMERGENCY AND INCIDENT RESPONSE PROCEDURES

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment (PPE), which for the purposes of this report includes Respiratory Protective Equipment (RPE), should only be used when other desirable control methods are not feasible or residual risk requires further controls. All PPE that cannot be effectively decontaminated should be disposed of as asbestos waste.

The type of PPE required should be based on risk assessment. For instance a P1 disposable respirator may be appropriate for inspection purposes but a full face; positive pressure demand air-line respirator would be required for friable asbestos removal work in an enclosure. PPE requirements should be in accordance with the Code of Practice for the Safe Removal of Asbestos 2nd Edition [NOHSC:2002 (2005) Appendix C]. Table 4, pages 75 and 76 of the aforementioned code may be particularly useful.

In managing asbestos the following should be considered:

- **No smoking is to be permitted during site works.**
- **Workers handling asbestos or ACM should wash their hands thoroughly in warm soapy water before eating, drinking, smoking or using toilet facilities.**
- **If clothing is contaminated it should be removed and disposed as recommended.**

Respiratory Protective Devices

Where the above controls do not reduce atmospheric contaminants to acceptable levels, approved and suitable respiratory protective devices should be provided and used. As outlined in Australian Standard AS 1716, such suitable devices include air purifying respirators.

- **As a minimum an approved class P2 face mask or respirator should be worn when there is deemed to be a potential risk of exposure to asbestos fibres.**

Disposable Coveralls

Disposable coveralls with fitted hoods and cuffs may be worn and disposed of as asbestos waste. Fitted hoods should always be worn over respirator straps/hoods and eye wear.

In some circumstances where disposable protective clothing may not be appropriate i.e. fire hazard, re-useable types may be used if effective laundering can be established.

If undergarments or clothing is contaminated it should be removed and disposed as recommended unless there is a laundering facility available capable of laundering asbestos contaminated clothing.

Footwear and Gloves

Appropriate safety footwear such as steel-capped rubber-soled shoes or gumboots should be provided for all asbestos works. This footwear must remain in the asbestos work area for the duration of the asbestos works. On completion of the asbestos works the safety footwear must be either effectively decontaminated or disposed of as asbestos waste.

The use of protective gloves should be worn at all times when handling asbestos waste. On completion of the asbestos works, all gloves used should be disposed of as asbestos waste.

Minor Works

The following procedure must be implemented if there is a probability of disturbance to asbestos.

- **Disposable coveralls, including a hood shall be worn.**
- **An approved Class P2 facemask or respirator shall be worn during the works.**
- **There shall be no direct contact with any identified asbestos.**
- **Before leaving the work areas, with mask still in position, the surface of the coveralls and exposed body parts shall be decontaminated.**
- **Coveralls shall be removed (with mask still on) and placed in an asbestos waste bag which shall then be sealed and labelled.**

Decontamination

Decontamination of PPE used by personnel and equipment used during works shall occur before leaving the Site. Decontamination can be via a suitable vacuum cleaner or wet down method.

EMERGENCY AND INCIDENT CONTROL PROCEDURES

The protocols described below shall only be conducted where safe to do so.

Emergency Situations

Situations where life or property is considered to be at immediate risk, e.g. fire in asbestos contaminated area or strong wind event. The following protocols shall be implemented:

- **Evacuate all workers, residents and general public.**
- **Seal off or otherwise isolate the area and restrict access if possible.**
- **Advise the Site Owner (and auditor)**
- **Determine “clean up” or other remedial action.**
- **Conduct remedial action.**
- **Conduct clearance air monitoring, if required.**
- **Document the situation.**

Incident Situations

Situations not previously identified where there are potential for exposure to asbestos, e.g. ACM spill (from truck rollover), accidental uncovering of ACM fragments on-site shall be handled as per below:

- **Isolate the area and impose access restrictions.**
- **Consult the CEMP.**
- **Advise the Site Owner and Auditor.**
- **Determine “clean up” or other remedial action.**
- **Conduct remedial action.**
- **Conduct clearance air monitoring, if required.**
- **Document the situation.**

Note: Trucks engaged for remedial works should have their own emergency and incident response protocols and must be appropriately licenced.

APPENDIX B CORRECTIVE ACTION REQUEST FORM

CORRECTIVE ACTION REQUEST FORM**REPORT NO:****DATE:**

Report type (circle): Complaint WHS incident Environmental incident Other (describe):
Reported by: Name: Telephone: (W) Other Contact Details: Report taken by: Date: ... / ... / ... Time:
Description: Is the problem occurring now? Y / N Has it been lodged previously? Y / N
Immediate action taken (if any):
Investigation (describe cause of incident): Investigation by: Date: ... / ... / ...
Corrective/preventative action taken (if any): Taken by: Date:
Complainant response: Is a complainant response required? Y / N Completed ρ Date: ... / ... / ...
Review: Reviewed and Signed off by: Date:

Review No.					Reviewer		Date	
Item No	Item to be Assessed	Complies (Y?N)	Evidence / Required Actions	Responsibility				

APPENDIX C SRP REVIEW CHECKLIST

Project Environmental Inspection Checklist

- This Inspection Checklist is to be completed by the CEMP Manager in conjunction with the Site Supervisor**

Project Name:		Project No:		
Project Manager:		Date:		
Contractor Name:		Contract Name:		Contract No:

✓ Satisfactory

✗ Not Satisfactory

Describe corrective action required:

N/A

	✓ Satisfactory	✗ Not Satisfactory	Describe corrective action required:	N/A
Environmental System				
Contractor's environmental policy displayed?				
Environmental Inspection records onsite?				
Tool box, prestart & project meeting records onsite?				
Housekeeping and Material Storage				
Stockpile location - not on vegetation, within driplines or drainage lines?				
No vegetation impacts?				
No fauna impacts?				
Mobile Plant and Equipment				
Plant and equipment clean prior to start onsite? E.g. free of weeds, soil & vegetation?				
Major plant & equipment services/maintained? E.g. no oil leaks, exhaust emissions OK, exhaust noise OK				
Hazardous Substances				
Spill kits, spill containment equipment onsite?				
Fuels & chemicals stored in bund, container, spill trays?				
Excavation and Trenching				
Spoil/topsoil appropriately stockpiled?				
Contaminated spoil separated and disposed to licensed facility?				
Aboriginal Heritage items identified?				
Fauna identified in trenches? Removed by NPWS/RSPCA?				
Imported fill confirmed as weed free?				
Asbestos Work				
Asbestos waste disposed to licensed facility?				
Asbestos removal being undertaken by suitably licenced contractor?				
Asbestos monitoring in place?				
Water				
No evidence of discharges to watercourses?				
Sediment & erosion controls in place?				
Controls in place when working over/adjacent to water?				

Amenities			
Waste separation/recycling bins in place?			
Other			
Compliance with other requirements not specified above (see site specific EMP)?			

SIGNATURE – CONTRACTOR

I confirm the Project Environmental Inspection Checklist has been completed. Where non compliance has been identified corrective action will be , or has been taken.			
Contractor Representative:			
Signature		Date:	

SIGNATURE – PROJECT MANAGER

I confirm the contractor's implementation and maintenance of project specific controls has been inspected against "EMS-APPR-B Standard Preliminary Environmental Management Plan (Construction) – Minor Works" Where non compliance has been identified corrective action will be, or has been taken.			
Project Manager:			
Signature		Date:	

A completed copy of this form must be kept on file.

APPENDIX D SRP CONTENT CHECKLIST

Report Section and Information to be Included in an SRP where Relevant as Required in Appendix 5 of EPA 2019a	Included?
Executive Summary	
Background	<input checked="" type="checkbox"/>
Summary of Risk Conclusion	<input checked="" type="checkbox"/>
Scope of Work	<input checked="" type="checkbox"/>
Environmental Values	<input checked="" type="checkbox"/>
Determination of Harm to Human Health, Water of the Environment	<input checked="" type="checkbox"/>
Remediation Goals and Objectives	<input checked="" type="checkbox"/>
Summary of Remediation Conclusions and Recommendations	<input checked="" type="checkbox"/>
Site Information	
Site identification (address, allotments, plans, certificates of title, coordinates, maps)	<input checked="" type="checkbox"/>
Site owner / occupier	<input checked="" type="checkbox"/>
Site plan (layout, scale, north arrow, other site features)	<input checked="" type="checkbox"/>
Current and proposed site use and identification of site users	<input checked="" type="checkbox"/>
General Information	
Name of person requesting the work	<input checked="" type="checkbox"/>
Summary of previous works undertaken (include triggers for remediation, risk conclusions from DSI or SSRA)	<input checked="" type="checkbox"/>
Site contamination audit details	<input checked="" type="checkbox"/>
Remediation Options and Issues	

Report Section and Information to be Included in an SRP where Relevant as Required in Appendix 5 of EPA 2019a	Included?
Define remediation approaches (logistical, technical, financial, value, or water resource and ability to restore, threat to human health or environment)	Remedial options assessed. Excavation and removal of sources is considered best effective, noting the final development design is unknown. Adopted options could be altered under audit later in the process if required.
Discuss impracticability considerations	Impracticability of proposed remedial options is assessed. Excavation and removal of sources is considered straightforward and best effective (other than costs), noting the final development design is unknown. Adopted options could be altered under audit later in the process if required.
Evaluate available and viable remediation options to achieve goals	The current adopted remedial options are considered best effective, noting the final development design is unknown. Adopted options could be altered under audit later in the process if required.
Document rationale for selected remediation option	Refer Section 6.
Document management measures to prevent / reduce additional harm to human health, water or environment.	Refer Section 7
Determine the timeframe for remediation	6.10
Review by SA EPA or site contamination auditor	This document forms part of deliverable to be reviewed by the appointed site contamination auditor (refer Section 2 and also Table 3-1).
Stakeholder engagement	Refer Section 6.6
Reporting	
Signed copy of reports	Refer Document Control Page
Appendices may be provided in electronic format	<input checked="" type="checkbox"/>
Searchable PDF	<input checked="" type="checkbox"/>
Electronic files unlocked	<input checked="" type="checkbox"/>

APPENDIX E STATEMENT OF LIMITATIONS

STATEMENT OF LIMITATIONS & IMPORTANT INFORMATION REGARDING YOUR REPORT

INTRODUCTION

This report has been prepared by Land & Water Consulting for you, as Land & Water Consulting's client, in accordance with our agreed purpose, scope, schedule and budget.

The report has been prepared using accepted procedures and practices of the consulting profession at the time it was prepared, and the opinions, recommendations and conclusions set out in the report are made in accordance with generally accepted principles and practices of that profession.

The report is based on information gained from environmental conditions (including assessment of some or all of soil, groundwater, vapour and surface water) and supplemented by reported data of the local area and professional experience. Assessment has been scoped with consideration to industry standards, regulations, guidelines and your specific requirements, including budget and timing. The characterisation of site conditions is an interpretation of information collected during assessment, in accordance with industry practice.

This interpretation is not a complete description of all material on or in the vicinity of the site, due to the inherent variation in spatial and temporal patterns of contaminant presence and impact in the natural environment. Land & Water Consulting may have also relied on data and other information provided by you and other qualified individuals in preparing this report. Land & Water Consulting has not verified the accuracy or completeness of such data or information except as otherwise stated in the report. For these reasons the report must be regarded as interpretative, in accordance with industry standards and practice, rather than being a definitive record.

No warranty or guarantee of the site conditions is intended.

This report was prepared for the sole use of you, the Client and may not contain sufficient information for purposes of other parties or for other uses. Any reliance on this report by third parties shall be at such parties sole risk. This report shall only be presented in full and may not be used to support any other objectives than those set out in the report, except where written approval with comments are provided by Land & Water Consulting.

The report does not include the evaluation or assessment of potential geotechnical engineering constraints of the site.

LIMITATIONS OF THE REPORT

The scope of works undertaken and the report prepared to complete the assessment was in accordance with the information provided by the client and the specifications for works required under the contract. As such, works undertaken and statements made are based on those specifications (such as levels of risks and significance of any contamination) and should be considered and interpreted within this context. The analyses, evaluations, opinions and conclusions presented in this report are based on that purpose and scope, requirements, data or information, and they could change if such requirements or data are inaccurate or incomplete.

Your environmental report should not be used without reference to Land & Water Consulting in the first instance:

- When the nature of the proposed development is changed, for example if a residential development is proposed instead of a commercial one;
- When the size or configuration of the proposed development is altered;
- When the location or orientation of the proposed structures are modified;
- When there is a change in ownership;
- For application to an adjacent site.

In addition, advancements in professional practice regarding contaminated land and changes in applicable statutes and/or guidelines may affect the validity of this report. Consequently, the currency of conclusions and recommendations in this report should be verified if you propose to use this report more than 6 months after its date of issue.

ENVIRONMENTAL ASSESSMENT “FINDINGS” ARE PROFESSIONAL ESTIMATES

The information in this report is considered to be accurate with respect to conditions encountered at the site at the time of investigation and considering the inherent limitations associated with extrapolating information from a sample set. Note however that site assessment identifies actual subsurface conditions only at those specific points where samples are taken, when they are taken. Environmental data derived through sampling and analysis are interpreted by consultants who then render an opinion about overall subsurface conditions, the nature and extent of contamination and potential impacts on the use of the land. Actual conditions may differ from those inferred to exist as no professional and no subsurface assessment program can reveal every detail within the ground across a site. Subsurface conditions can vary across a particular site and no practical degree of sampling can ever eliminate the possibility that conditions may be present at a site that have not been represented through sampling.

SUBSURFACE CONDITIONS CAN CHANGE

This report is valid as of the date of preparation. The condition of the site (including subsurface conditions) and extent or nature of contamination or other environmental hazards can change over time, as a result of either natural processes or human influence. Land & Water Consulting should be kept apprised of any such events and should be consulted for further investigations if any changes are noted, particularly during construction activities where excavations often reveal subsurface conditions. Since subsurface conditions (including contamination concentrations) can change within a limited period of time and space, this inherent limitation to the representation of site conditions provided by this report should always be taken into consideration particularly if the report is used after a delay in time.

DATA SHOULD NOT BE SEPARATED FROM THE REPORT

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field logs, field testing and laboratory evaluation of samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

This report should be reproduced in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

RESPONSIBILITY

Environmental reporting relies on interpretation of factual information using professional judgement and opinion and has a level of uncertainty attached to it, which is much less exact than other design disciplines. As noted earlier, the recommendations and findings set out in this report should only be regarded as interpretive and should not be taken as accurate and complete information about all environmental media at all depths and locations across the site.



Attachment E: Limit of liability advice



Environment Protection Authority
GPO Box 2607 Adelaide SA 5001
211 Victoria Square Adelaide SA 5000
T (08) 8204 2004
Country areas 1800 623 445

EPA 61909, 05/24545

Attn: Mr Don Totino
DFJ Holdings Pty Ltd
982 Port Road
ALBERT PARK SA 5014

Dear Mr Totino

RE: AUDITOR NOTIFICATION OF A HAZARDOUS CIRCUMSTANCE – ACTION RESPONSES

24 Murray Street, ALBERT PARK

Thank you for providing the Environment Protection Authority (EPA) with a copy of the following letter:

- *Auditor notification of a Hazardous Circumstance – 24 Murray Street, Albert Park: Response to Action Required, prepared by Land & Water Consulting and dated 9 February 2018.*

The letter documents responses to the matters identified by the EPA in our letter dated 25 January 2018. The EPA has considered each of the responses and the information provided.

Interim management measures

Based on the information provided in Section 3.1 and Table 3-2, there appears to be no, or limited potential for exposure of on-site receptors through vapour intrusion pathways associated with the soil vapour contamination identified on-site, taking into account the current known site conditions and status.

Determination of nature and extent and what remediation is required

The proposed actions identified in Section 3.2 and associated schedule provided in Attachment B of the letter are noted.

Provision and timing of reports

Based on all of the information provided, the request to extend the reporting timeframe milestone to 30 June 2018 is acceptable.

Site ownership information

The historical site ownership information provided indicates that there have been a number of site owners and occupiers at the site. The information indicates that main historical site activities are associated with tin can manufacturing conducted undertaken by J Gadsens Proprietary Limited.

Based on the information included in your letter, DFJ Holdings purchased the site in May 2009 as a going concern comprising recreational businesses, empty storage spaces and a refrigeration warehouse/cold store.

Based on the information you have provided to the EPA, DFJ Holdings does not appear to have undertaken a potentially contaminating activity at the site and are unlikely to have contributed to the contamination identified. As such, the EPA does not consider DFJ Holdings to be responsible for contamination beyond the site boundaries as part of the completion of the audit process. This determination is based on an assumption that there are no agreements in place (e.g. as a condition of

sale) which transfer any liability for off-site contamination to DFJ Holdings. A copy of the sale agreement would assist the EPA to confirm this assumption.

Despite this determination, the site contamination auditor currently engaged by DFJ Holdings to undertake an audit of the site, must still consider the impacts of any on-site contamination to on *and* off-site receptors.

As the site is proposed to be developed for residential use, it is also important that you understand your obligations with regards to site development activities and the potential to cause or contribute to site contamination as a result of a change of land use¹.

Ongoing obligations

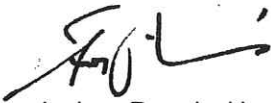
If at any stage a change in the nature and extent of site contamination at the site is identified from new information such that a hazardous circumstance exists which is not accurately described by the current notification, your engaged site contamination auditor will be required to notify the EPA.

In addition, if at any stage a change in the nature and extent of site contamination of underground water at the site is identified from new information – or this notification no longer accurately describes the nature and extent of the site contamination of the underground water, an updated section 83A notification is required to be provided to the EPA as soon as reasonably practicable. Please note that this requirement extends to an owner, occupier, site contamination auditor or site contamination consultant (pursuant to section 83A(1)(a) and (b) of the Act). You should discuss this duty with your consultant and auditor to ensure that there is no confusion in reporting obligations.

Fact sheets relating to your obligations under the *Environment Protection Act 1993*, the EPA Public Register and the EPA Site Contamination Regulatory and Orphan Site Management Framework can be found at www.epa.sa.gov.au.

If you would like further assistance on this matter please contact Wendy Boyce on (08) 8204 2033 or at wendy.boyce@sa.gov.au.

Yours sincerely



Andrew Pruszinski

MANAGER, SITE CONTAMINATION

ENVIRONMENT PROTECTION AUTHORITY

Date: **16 March 2018**

cc: Mr Graeme Miller, c/ Senversa Pty Ltd, 125 Sturt Street ADELAIDE SA 5000

Dr James Fox, Land & Water Consulting, Suite 3, 4-8 Goodwood Road, WAYVILLE SA 5034

¹ In accordance with section 103D(2) of the *Environment Protection Act 1993*

