Level 19, Tower B, Citadel Tower, 799 Pacific Highway
Chatswood
NSW 2067 Australia

t: +61 2 9406 1000
f: +61 2 9415 1678
coffey.com

4 March 2021

Our ref: 754-SYDEN224285-L16

Richard Crookes Constructions
Level 3, 4 Broadcast Way,
Artarmon,
NSW 2064

Attention: Trent Scrivener

Dear Trent

Alexandria Park Public School – Remedial Works Plan Addendum (Chlorinated Hydrocarbons in Groundwater)

1. Introduction

Coffey Services Australia Pty Ltd (Coffey) was engaged by Richard Crookes Constructions Pty Ltd (RCC) to prepare an addendum to the existing Remedial Works Plan[1] (RWP) which was prepared for the Alexandria Park Community School redevelopment, located at 7-11 Park Road, Alexandria, NSW (the 'property'). The location of the property is shown on Figure 1 attached.

The property is being remediated and redeveloped in two Phases. Phase 1 of the redevelopment was completed in October 2020 and Phase 2 of the redevelopment (the 'site') has since commenced. The site boundary is shown on Figure 2 (Attachment B).

A Remedial Action Plan[2] (RAP), the RWP and existing RWP Addendum[3] provides a strategy to remediate the following actual and potential sources of contamination at the site:

- Fill contaminated with asbestos and lead; and
- Potential hydrocarbon impacts associated with an abandoned underground fuel storage tank (UST).

[1] Coffey. Alexandria Park Community School Redevelopment - Remedial Works Plan. Prepared for Richard Crookes Construction Pty Ltd. Report Ref: SYDEN224285-R02, 18 June 2019.
[2] Coffey, Remedial Action Plan, Alexandria Park Community School, Park Road, Alexandria NSW. Prepared for TKD Architects Pty Ltd. Ref: SYDEN199382.R03, dated 8 December 2017
[3] Coffey. Alexandria Park Public School – Remedial Works Plan Addendum for Underground Storage Tank Remediation and Validation, 754-SYDEN224285-L07, 30 September 2019

A draft Long-Term Environmental Management Plan[4] (LTEMP) has also been prepared which will be updated at the completion of remedial and validation works to outline the controls and procedures for the ongoing management of capped contamination at the site.

2. Purpose

A Groundwater Investigation and Updated Targeted Health Risk Assessment[5] for Phase 2 (Phase 2 GI and HRA) recently prepared by Coffey recommended that an addendum to the RWP be prepared to provide a strategy to:

1. Identify the source (i.e. onsite or offsite) of volatile halogenated compounds (VHC) groundwater impacts.
2. Validate low and acceptable vapour intrusion and inhalation risks to future users of Building A.
3. Further assess/validate vapour intrusion risks to the following offsite users:
   - APCS Phase 1 School Development located downgradient and to the south of the site.
   - Residential occupants of Buckland Street located upgradient but within 50m of the northern site boundary.

This general scope of work was endorsed by the EPA accredited Site Auditor Rebeka Hall of Zoic.

This RWP Addendum has been prepared to provide a strategy to further assess and/or validate these items.

3. Assessment and Validation Strategy

Table 1 provides a high-level overview of how chlorinated hydrocarbon impacts shall be further assessed and/or validated during construction to render the site suitable for use and address vapour intrusion risks for potential offsite migration. Investigations will be staged and the scope of work for subsequent stages will be refined based on review and analysis of preceding results.

Prior to carrying out further assessment, a Sampling Analysis and Quality Plan (SAQP) shall be prepared to outline the proposed assessment and validation activities, with respect to a refined conceptual site model, data quality objectives (DQO), fieldwork methodologies, analytical schedules and quality control requirements. The SAQP shall be prepared in accordance with Australian Standards and guidelines made, approved or endorsed by the NSW Environment Protection Authority (EPA)[6]. The SAQP shall also be reviewed and endorsed by the Site Auditor prior to commencement of associated fieldwork.

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[4] Coffey. Long Term Environmental Management Plan - Alexandria Park Community School (Phase 2) – 7 Park Road, Alexandria NSW. Prepared for Richard Crookes Constructions Pty Ltd. Ref: SYDEN224285-R05b, dated 2 February 2021.

[5] Coffey. Alexandria Park Community School (APCS) Re-Development: Phase 2 Groundwater Investigation and Targeted Health Risk Assessment (Volatile Halogenated Compounds). Ref: 754-SYDEN224285-L13-Rev1, dated 4 March 2021.

[6] https://www.epa.nsw.gov.au/your-environment/contaminated-land/statutory-guidelines, accessed 3 March 2021

Table 1: Proposed Assessment and Validation Strategy

Item to be addressed	Proposed Assessment/Validation Strategy	Decision Making and Contingency Planning

1. Identify the source (i.e. onsite or offsite) of volatile halogenated compounds (VHC) groundwater impacts	Further assessment shall be carried out comprising:
	• Measurement of VHCs in soil vapour using membrane interface probe (MIP) on a grid basis within the north-east portion of the site and offsite to the north and east (depending on the MIP results) surrounding MW14.
	• Carrying out ground penetrating radar (GPR) and other suitable geophysical techniques to assist in the identification of a point source such as an underground tank(s).
	• Installation of additional groundwater monitoring wells off-site (number, location and depths of installation to be guided by the MIP results).
	  ○ Up-gradient of MW14 (Buckland Street).
	  ○ Up and cross gradient of MW14 within Park Road.
	• Installation and sampling of additional installed groundwater monitoring wells within Buckland Street and Park Road and accessible onsite wells.
	• Analysis of groundwater samples for VHCs and water quality parameters which provide data on potential for groundwater conditions to be conducive to degradation.
	• Preparation of a report discussing the results.
		If a point source is identified, it shall be inspected and appropriately decommissioned/removed and validated where practical.
		If GPR is inconclusive or there is evidence of more extensive contamination, then active/passive soil vapour sampling from soil vapour bores shall be carried out on a grid basis to assist in identification of a potential point source. If a potential point source is considered likely then excavation shall be carried out and the point source inspected and decommissioned/removed and validated where practical.
		Sub slab soil vapour pins/bores will be located based on results of ground penetrating radar (and any other geophysics), MIP and groundwater sampling.
		If the Health Risk Assessment (including fate and transport modelling) indicates potential unacceptable risks to human health then further assessment, remediation and/or management measures will be required to be implemented to mitigate vapour intrusion risks.
		If the source of contamination is identified to be:
		• Onsite and there are unacceptable risks identified to:
		  ○ Future users of Building A then RCC would be required to remediate/manage contamination to make the site suitable for its intended use.
		  ○ Offsite receptors (impacted from an onsite source), then RCC would be required to remediate/manage contamination to mitigate offsite risks.
		• Offsite and there are unacceptable risks identified to:
		  ○ Site users then RCC would be required to remediate/manage contamination to make the site suitable for the intended use.
		  ○ Offsite users then the Department of Education and the Site Auditor should consider discussing the findings with the NSW EPA.

2. Validate low and acceptable vapour intrusion and inhalation risks to future users of Building A (consideration of soil vapour sampling and validate that the chlorinated hydrocarbon plume is not likely to migrate under Building A).
&
Further assess/validate vapour intrusion risks to the following offsite receptors:
• **Occupants of the APCS Phase 1 School Development located downgradient and to the south of the site.**
• **Residential occupants of Buckland Street located upgradient but within 50m of the northern site boundary.**
	Assessment shall be carried out including but not limited to:
	• Groundwater sampling and analysis:
	  ○ Reinstallation of damaged/lost well(s) within the site (i.e. MW19).
	  ○ Installation of two additional groundwater wells in the southern portion of the site and wells in Buckland Street and Park Road, as described above.
	  ○ Groundwater sampling from the Phase 1, Phase 2 and newly installed groundwater well network and analysis of samples for VHCs and natural attenuation parameters.
	  ○ Carrying out of slug tests in wells representative of subsurface conditions within the Phase 1 and Phase 2 groundwater well network to measure hydraulic conductivity.
	• Soil vapour sampling and analysis:
	  ○ Installation of sub-slab soil vapour pins/bores within:
	  ▪ The north-east of the site surrounding MW14 where highest VHC concentrations have been reported.
	  ▪ The Building A footprint. Coffey notes that at the time of preparing this RWP Addendum, the building slab was in the process of being poured.
	  ▪ Buckland Street adjacent to residential properties upgradient of the site, and Park Road as required.
	  ▪ The southern portion of the site adjacent to the Phase 1 development.
	  ○ Active soil vapour sampling and analysis of soil vapour samples for VHCs.
	• Other investigations / sampling required to fill any data gaps / uncertainties following completion and review of the above scope of works.
	• Reporting including:
	  ○ Preparation of a groundwater and soil investigation report including:
	  ▪ An outline of the objectives, scope of work, fieldwork methodology and laboratory analysis.
	  ▪ Comparison of laboratory results against laboratory reporting limits (groundwater) and interim soil vapour health investigation limits (HILs) for volatile organic chlorinated compounds presented in the ASC NEPM 20137.
	  ▪ Discussion of field and laboratory results with respect to receptors and inferred groundwater flow direction.
	  ▪ Update of the conceptual site model.
	  ○ Preparation of a Health Risk Assessment for offsite receptors including fate and transport modelling and update of the conceptual site model	

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4. Conclusion

Subject to implementation of this RWP Addendum (in accordance with a SAQP which will be prepared separately), Coffey considers that the items outlined in Table 1 can be addressed such that a Site Audit Statement can be obtained. Allowance for completing additional investigations outlined in Table 1 should be included in RCC's project timeframe. Furthermore, as outlined in Coffey's Phase 2 GI and HRA Report:

- The existing LTEMP shall be updated following completion of remedial works to include controls for:
  - Maintenance and construction workers in enclosed pits with low / no ventilation; and
  - Construction workers within deep excavations that intercept groundwater.
- If plans for redevelopment change which require excavation beneath the groundwater table or pits are created where groundwater can accumulate, then the existing construction contamination environmental management plan[8] (CCEMP) shall be updated to include additional controls to mitigate risks to construction workers from dermal contact and vapour inhalation.

5. Closure

We trust this meets your requirements at the time. We draw your attention to the attached sheets titled "Important Information about your Coffey Environmental Report" which should be read in conjunction with this letter. Please do not hesitate to contact the undersigned if you have any questions or require further information.

This letter should be provided to the Site Auditor for approval and endorsement.

For and on behalf of Coffey,

Anthony Plumb
Senior Associate Environmental Scientist

Attachments

A – Important Information about your Coffey Environmental Report
B – Figures

[8] Coffey. Construction Contamination Environmental Management Sub-Plan: Alexandria Park Community School Redevelopment, Park Road, Alexandria NSW. Prepared for Richard Crookes Constructions Pty Ltd. Ref: SYDEN224285-R01, dated 21 May 2019.

Attachment A - Important Information about your Coffey Environmental Report

Important information about your **Coffey** Environmental Report

Introduction

This report has been prepared by Coffey for you, as Coffey'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. Coffey may have also relied on data and other information provided by you and other qualified individuals in preparing this report. Coffey 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.

Your report has been written for a specific purpose

Your report has been developed for a specific purpose as agreed by us and applies only to the site or area investigated. Unless otherwise stated in the report, this report cannot be applied to an adjacent site or area, nor can it be used when the nature of the specific purpose changes from that which we agreed.

For each purpose, a tailored approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible quantify, risks that both recognised and potential contamination pose in the context of the agreed purpose. Such risks may be financial (for example, clean up costs or constraints on site use) and/or physical (for example, potential health risks to users of the site or the general public).

Limitations of the Report

The work was conducted, and the report has been prepared, in response to an agreed purpose and scope, within time and budgetary constraints, and in reliance on certain data and information made available to Coffey.

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.

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. Coffey should be kept appraised 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.

In addition, advancements in professional practice regarding contaminated land and changes in applicable statues 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.

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

Interpretation of factual data

Environmental site assessments identify actual conditions only at those points where samples are taken and on the date collected. Data derived from indirect field measurements, and sometimes other reports on the site, are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions.

Variations in soil and groundwater conditions may occur between test or sample locations and actual conditions may differ from those inferred to exist. No environmental assessment program, no matter how comprehensive, can reveal all subsurface details and anomalies. Similarly, no professional, no matter how well qualified, can reveal what is hidden by earth, rock or changed through time.

The actual interface between different materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions.

For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of a suitably qualified and experienced environmental consultant through the development and use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other unrecognised features encountered on site. Coffey would be pleased to assist with any investigation or advice in such circumstances.

Recommendations in this report

This report assumes, in accordance with industry practice, that the site conditions recognised through discrete sampling are representative of actual conditions throughout the investigation area. Recommendations are based on the resulting interpretation.

Should further data be obtained that differs from the data on which the report recommendations are based (such as through excavation or other additional assessment), then the recommendations would need to be reviewed and may need to be revised.

Report for benefit of client

Unless otherwise agreed between us, the report has been prepared for your benefit and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendation and should make their own enquiries and obtain independent advice in relation to such matters.

Coffey assumes no responsibility and will not be liable to any other person or organisation for, or in relation to, any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report.

To avoid misuse of the information presented in your report, we recommend that Coffey be consulted before the report is provided to another party who may not be familiar with the background and the purpose of the report. In particular, an environmental disclosure report for a property vendor may not be suitable for satisfying the needs of that property's purchaser. This report should not be applied for any purpose other than that stated in the report.

Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, a suitably qualified and experienced environmental consultant should be retained to explain the implications of the report to other professionals referring to the report and then review plans and specifications produced to see how other professionals have incorporated the report findings.

Given Coffey prepared the report and has familiarity with the site, Coffey is well placed to provide such assistance. If another party is engaged to interpret the recommendations of the report, there is a risk that the contents of the report may be misinterpreted and Coffey disowns any responsibility for such misinterpretation.

Data should not be separated from the report

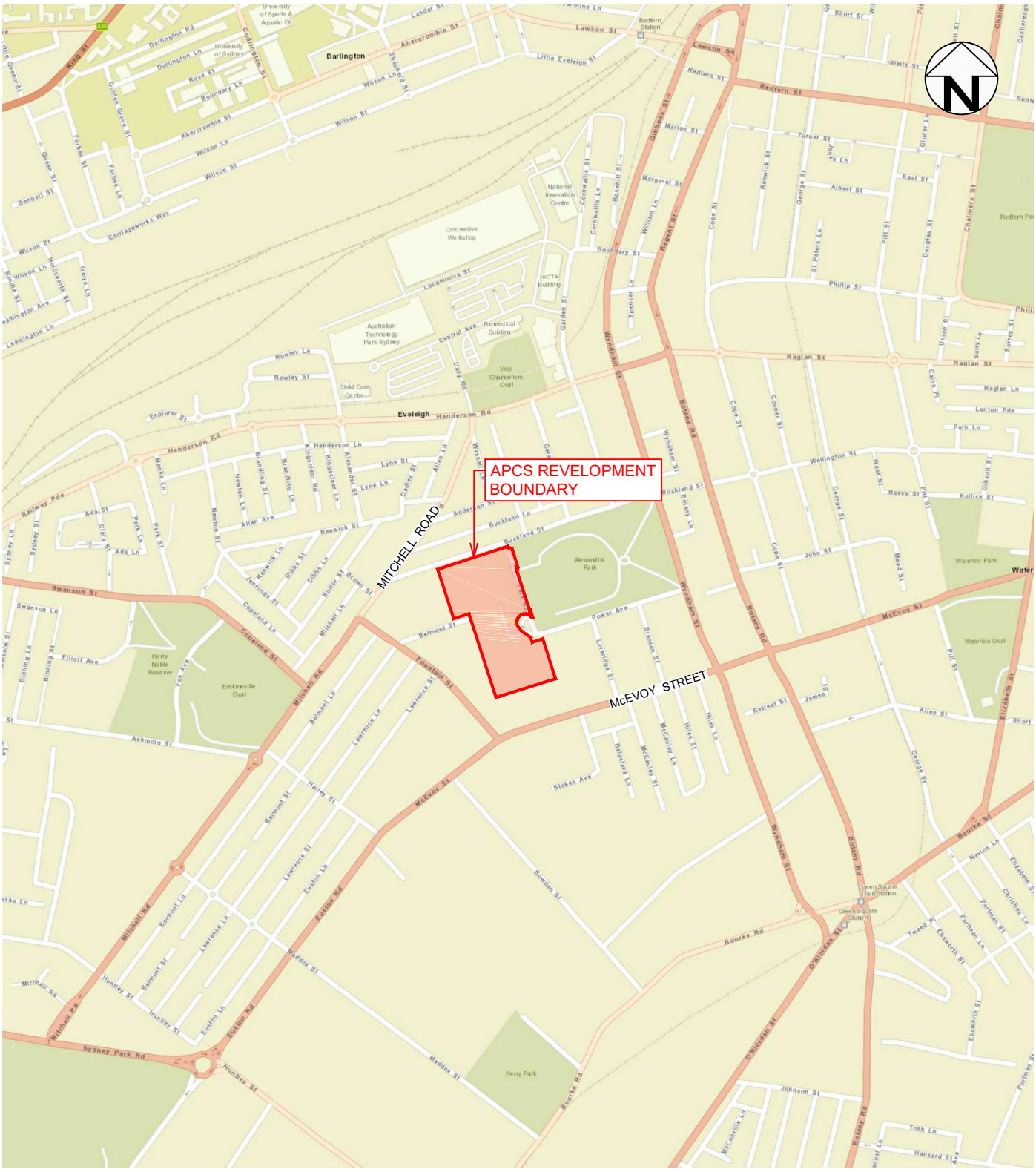
The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field 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. This has often resulted in claims being lodged against consultants, which are unfounded. 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 B – Figures



100 0 100 300 500

Scale (metres) 1:10000

IMAGERY SOURCE: WORLD STREET MAP
SOURCES: ESRI, HERE, GARMIN, USGS, INTERMAP, INCREMENT P, NRCAN, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), ESRI KOREA, ESRI (THAILAND), NGCC, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

drawn	AP / AW
approved	AP
date	24/02/2021
scale	AS SHOWN
original size	A4

coffey
A TETRA TECH COMPANY

client: RICHARD CROOKES CONSTRUCTION PTY LTD

project: ALEXANDRIA PARK COMMUNITY SCHOOL
PHASE 2 GROUNDWATER INVESTIGATION
PARK ROAD, ALEXANDRIA, NSW

title: PROPERTY LOCATION PLAN

project no: 754-SYDEN224285-L16 | figure no: FIGURE 1 | rev: 1

PLOT DATE: 24/02/2021 2:34:02 PM DWG FILE: \\TTS779FS1.TT.LOCAL\DATA\1. PROJECTS\1. SYDENENV\2018\SYDEN224285 APCS REDEVELOPMENT RICHARD CROOKES\09. CAD\754-SYDEN224285-L13.DWG

Analyte - MW16	Hydrasleeve	Hydrasleeve
	14/01/2021	11/02/2021
cis-1,2-dichloroethene	5	6
Trichloroethene	3	7
Tetrachloroethene	410	630
Methyl Ethyl Ketone	<1	<1
Acetone	<0.001	<0.001

Analyte - MW17	Hydrasleeve
	14/01/2021
cis-1,2-dichloroethene	<1
Trichloroethene	<1
Tetrachloroethene	57
Methyl Ethyl Ketone	<1
Acetone	<0.001

Analyte - MW15	Hydrasleeve	Low Flow
	21/05/2019	14/01/2021
cis-1,2-dichloroethene	<1	<1
Trichloroethene	<1	<1
Tetrachloroethene	<1	<1
Methyl Ethyl Ketone	<1	<1
Acetone	<0.001	<0.001

Analyte - MW18A	Hydrasleeve
	29/01/2021
cis-1,2-dichloroethene	<1
Trichloroethene	<1
Tetrachloroethene	<1
Methyl Ethyl Ketone	<1
Acetone	<0.001

Analyte - MW19	Low Flow
	22/01/2021
cis-1,2-dichloroethene	<1
Trichloroethene	<1
Tetrachloroethene	<1
Methyl Ethyl Ketone	<1
Acetone	<0.001

Analyte - MW14	Hydrasleeve	Hydrasleeve	Hydrasleeve	Low Flow	Low Flow
	21/05/2019	14/01/2021	11/02/2021		
cis-1,2-dichloroethene	29	290	23	6	8
Trichloroethene	4	140	16	6	8
Tetrachloroethene	120	1300	380	430	480
Methyl Ethyl Ketone	<1	<1	<1	<1	<1
Acetone	<0.001	<0.001	<0.001	<0.001	<0.001

Analyte - MW13	Hydrasleeve	Hydrasleeve	Hydrasleeve
	21/05/2019	14/01/2021	11/02/2021
cis-1,2-dichloroethene	6	<1	2
Trichloroethene	3	1	2
Tetrachloroethene	16	47	29
Methyl Ethyl Ketone	<1	60	<1
Acetone	<0.001	0.16	<0.001

LEGEND

- MONITORING WELL LOCATION (COFFEY, 2020-2021)
- MONITORING WELL LOCATION (COFFEY, 2019)
- MONITORING WELL LOCATION (COFFEY, 2017)
- MONITORING WELL LOCATION LOST/DESTROYED (AS OF 11 FEBRUARY 2021)
- TREE PROTECTION ZONE
- APPROXIMATE STORMWATER EASEMENT LOCATION
- APCS REDEVLOPMENT BOUNDARY
- PHASE 2 SITE BOUNDARY
- 10.4 GROUNDWATER CONTOURS (mAHD)
- GROUNDWATER FLOW DIRECTION

VOC GROUNDWATER RESULTS

Analyte	Unit
cis-1,2-dichloroethene	µg/L
Trichloroethene	µg/L
Tetrachloroethene	µg/L
Methyl Ethyl Ketone	µg/L
Acetone	mg/L

NOTE: PREVIOUS SAMPLING LOCATIONS PROVIDED BY CLIENT FROM PLANS BY GEOENVIRO CONSULTANCY, AND HIBBS & ASSOCIATES

revision	no.	description	drawn	approved	date
	1	ORIGINAL ISSUE	AW	AP	24/02/2021

10 0 20 40 60

Scale (metres) 1:1250

SOURCE: NEARMAP IMAGE - 1/08/2020

drawn	AP / AW
approved	AP
date	24/02/2021
scale	AS SHOWN
original size	A3

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client: RICHARD CROOKES CONSTRUCTION PTY LTD

project: ALEXANDRIA PARK COMMUNITY SCHOOL
PHASE 2 GROUNDWATER INVESTIGATION
PARK ROAD, ALEXANDRIA, NSW

title: SITE LAYOUT PLAN

project no: 754-SYDEN224285-L16 | figure no: FIGURE 2 | rev: 1

PLOT DATE: 24/02/2021 2:33:38 PM DWG FILE: \\TTS79FS1.TTT.LOCAL\DATA1\ PROJECTS\1. SYDENENV\2019\SYDEN224285 APCS REDEVELOPMENT RICHARD CROOKES\09. CAD\754-SYDEN224285-L13.DWG