ENVIRONMENTAL INVESTIGATION SERVICES

REPORT

TO

SCECGS REDLANDS, CREMORNE

ON

PRELIMINARY STAGE 1 ENVIRONMENTAL SITE ASSESSMENT

FOR

SCECGS REDLANDS, CREMORNE, CONCEPT PROPOSAL AND STAGE 1 DEVELOPMENT APPLICATION

AT

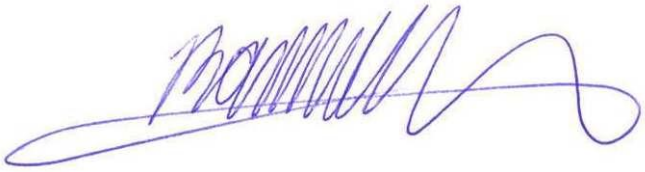
272 MILITARY ROAD, 7-8 MONFORD PLACE AND 1-11 GERARD STREET, CREMORNE

5 JUNE 2015 **REF: E27775Krpt2_rev2**

Postal Address: PO Box 976, North Ryde BC NSW 1670
Tel: 02 9888 5000 • Fax: 9888 5004
EIS is a division of Jeffery and Katauskas Pty Ltd • ABN 17 003 550 801

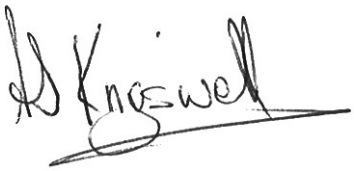
Document Distribution Record			
Report Reference	**Report Status/Revision**	**Distribution**	**Report Date**
E27775Krpt2	Final	Client	1 May 2015
E27775Krpt2_rev1	Final	Client	14 May 2015
E27775Krpt2_rev2	Final	Client	5 June 2015

Report prepared by:



Rob Muller
Environmental Scientist

Report reviewed by:



Adrian Kingswell
Principal Environmental Scientist

EXECUTIVE SUMMARY

SCECGS Redlands, Cremorne commissioned EIS to undertake a Preliminary Stage 1 Environmental Site Assessment (PESA) for the proposed Senior School campus development at 272 Military Road, 1-11 Gerard Street and 7-8 Monford Place, Cremorne. The proposed development includes demolition of the residential buildings and other structures at 1-11 Gerard Street and 7-8 Monford Place; demolition of the three-storey Mowll Building; construction of a new five-level building, the New Learning Hub, over a basement level car park; and construction of a new internal vehicular link between Waters Road and Military Road. Bulk excavations to a maximum depth of approximately 4.2m will be required.

The objectives of the PESA are to assess the potential risk for widespread soil contamination at the site; assess the potential risk to human health and the environment posed by the contaminants; provide a preliminary waste classification for the off-site disposal of soil/bedrock excavated for the development; and comment on the suitability of the site for the proposed development.

At the time of this assessment the centre of the site was occupied by the three-storey brick Mowll Building. Nos. 7 & 8 Monford Place were each occupied by two-storey brick residential buildings with associated paved areas and yards. The lots in the northern section of the site were occupied by single-storey brick buildings used by Redlands Senior Campus as offices, a workshop and classrooms. An assessment of the site's history indicated that the site has likely been used for either residential purposes or as part of Redlands Senior Campus since at least the 1940s.

Areas of Environmental Concern were identified to include fill material which may have been historically imported from various sources and can contain elevated concentrations of contaminants, and hazardous building materials. Potential contaminants of concern therefore include heavy metals, petroleum hydrocarbons, BTEX compounds, polycyclic aromatic hydrocarbons (PAHs), pesticides, polychlorinated biphenyls (PCBs) and asbestos. Potential receptors include current and future site occupants, contractors and workers, and off-site occupants.

Fieldwork for this investigation was undertaken from the 1st to the 3rd of October, 2014. Soil samples were obtained from three sampling points, representing approximately 17% of the minimum sampling density recommended for a Stage 2 ESA. Soil samples were collected from the fill and natural profiles encountered during the investigation. Subsurface conditions encountered included a brick paved surface at some locations, underlain by fill material in all boreholes to depths ranging from 0.8m to 1.2m. The fill material varied in composition and contained inclusions of plastic, glass, ash, slag and brick fragments. Residual silty clay soils were encountered beneath the fill material, underlain by weathered sandstone bedrock. Groundwater appeared to be at a depth of approximately 4m to 6m below ground level.

Selected soil samples were analysed for potential contaminants of concern. Analytical results were compared to Site Assessment Criteria (SAC), which were established with reference to appropriate guidelines and regulations. Elevated concentrations of benzo(a)pyrene TEQ (i.e. exceeding the SAC) were encountered in fill soil samples from all three boreholes. Benzo(a)pyrene TEQ is a measure of the toxicity of eight carcinogenic PAHs relative to benzo(a)pyrene. An elevated concentration of lead was encountered in one fill soil sample.

The source of the contamination is considered likely to be associated with the importation of contaminated fill rather than on-site activities. Ash or slag were noted to be present in two of the three boreholes where elevated concentrations of PAHs and lead were detected. Slag and ash were frequently used as fill material in Sydney during the early 20th century. The slag and ash may have originated from various metal processing industries and from coal burning, respectively. Based on the available data, the PAH and heavy metal contamination is considered likely to be confined to the fill material at the site. As acid leachate tests (TCLP) indicated that lead, nickel and benzo(a)pyrene are not leaching in significant concentrations, the underlying natural soil and bedrock is unlikely to be impacted by the contamination.

Due to the preliminary nature of the investigation the following data gaps remain:

- Inaccessible areas such as beneath existing buildings have not been investigated;
- The minimum sampling density for a Stage 2 Environmental Site Assessment has not been met. To achieve the minimum density an additional ten boreholes would be required.
- Groundwater has not been investigated.

Soil analytical results were compared to Waste Classification Guidelines to obtain a preliminary waste classification. The fill material was classified as General Solid Waste (non-putrescible), while the underlying natural soil and bedrock was classified as Virgin Excavated Natural Material (VENM).

Based on the scope of works undertaken, the contamination is considered to pose a moderate risk to the identified human receptors. EIS consider that the site can be made suitable for the proposed development provided that the following recommendations are implemented to address the data gaps:

- A Stage 2 ESA should be undertaken to meet the EPA recommended sampling density. The Stage 2 ESA should target the data gaps**.** Due to access issues, the Stage 2 ESA would ideally be conducted following the demolition of the existing buildings.
- Following the completion of the Stage 2 ESA, a Remediation Action Plan (RAP) should be prepared for the proposed development. The RAP will include remedial measures to be implemented to render the site suitable for the proposed development;
- A Validation Assessment report should be prepared to document the remediation action undertaken at the site;
- A Hazardous Materials Assessment should be conducted for the existing buildings prior to the commencement of demolition works;
- A Work, Health and Safety (WHS) plan should be prepared for the contaminants encountered at this site; and
- Inspections should be undertaken during demolition and excavation work to assess any unexpected conditions or subsurface facilities that may be discovered between investigation locations. This should facilitate appropriate adjustment of the works programme and schedule in relation to the changed site conditions. Inspections should be undertaken by experienced environmental personnel.

The conclusions and recommendations should be read in conjunction with the limitations presented in the body of the report.

TABLE OF CONTENTS

TABLE OF CONTENTS

1 INTRODUCTION

SCECGS Redlands, Cremorne ('the client') commissioned Environmental Investigation Services (EIS)[1] to undertake a Preliminary Stage 1 Environmental Site Assessment (PESA) for the proposed Senior School campus development at 272 Military Road, 7-8 Monford Place and 1-11 Gerard Street Cremorne. The site location is shown on Figure 1 and the PESA was generally confined to the proposed development area as shown on Figure 2. The proposed development area is referred to as 'the site' in this report.

The PESA was undertaken generally in accordance with an EIS proposal (Ref: EP8356K) of 31 March 2015 and written acceptance from the client of 20 April 2015.

A geotechnical investigation was undertaken in conjunction with the PESA by JK Geotechnics[2]. The results of the investigation are presented in a separate report (Ref. 27775ZRrpt rev1, dated 30/4/2015, 2015[3]).

1.1 Proposed Development Details

The proposed development includes:

- Demolition of the residential buildings and other structures at 7-8 Monford Place and 1-11 Gerard Street;
- Demolition of the three-storey Mowll Building;
- Construction of a new four-storey building, the New Learning Hub and a landscaped area over a basement level car park. Bulk excavations to a maximum depth of approximately 4.2m are expected to be required; and
- Construction of a new internal vehicular link between Waters Road and Military Road.

1.2 Objectives

The objectives of the PESA are to:

- Assess the potential risk for widespread soil contamination at the site;
- Assess the potential risk to human health and the environment posed by the contaminants;
- Provide a preliminary waste classification for the off-site disposal of soil/bedrock excavated for the development; and
- Comment on the suitability of the site for the proposed development.

1.3 Scope of Work

The scope of work included:

- A review of background information made available to EIS;

[1] Environmental consulting division of Jeffery & Katauskas Pty Ltd (J&K)

[2] Geotechnical consulting division of J&K

[3] Referred to as JK 2015 Report

- Preparation of site specific Data Quality Objectives (DQOs) and Data Quality Indicators (DQIs);
- A review of site information and site history documents;
- A site inspection to identify areas of environmental concern (AEC);
- Preparation of a Preliminary Conceptual Site Model (CSM) to outline the AEC, Potential Contaminants of Concern (PCC) and potential receptors;
- Design and implementation of a field sampling and laboratory analysis program;
- Interpretation of the analytical results against the adopted Site Assessment Criteria (SAC); and
- Preparation of a report presenting the results of the assessment.

The report was prepared with reference to the regulations/guidelines outlined in the table below. Individual guidelines are also referenced within the text of the report.

Table 1-1: Guidelines

Guidelines/Regulations/Documents
Contaminated Land Management Amendment Act (2008[4])
State Environmental Planning Policy No.55 – Remediation of Land (1998[5])
Guidelines for Consultants Reporting on Contaminated Sites (2011[6])
Guidelines on the Duty to Report Contamination[7]
Guidelines for the NSW Site Auditor Scheme, 2nd Edition (2006[8])
National Environmental Protection (Assessment of Site Contamination) Amendment Measure (2013[9])
NSW EPA Contaminated Sites Sampling Design Guidelines (1995[10])
NSW DECCW Waste Classification Guidelines - Part 1: Classifying Waste (2009[11])

[4] NSW Government Legislation, (2008), *Contaminated Land Management Amendment Act.* (referred to as CLM Amendment Act 2008)

[5] NSW Government, (1998), *State Environmental Planning Policy No. 55 – Remediation of Land.* (referred to as SEPP55)

[6] NSW Office of Environment and Heritage (OEH), (2011), *Guidelines for Consultants Reporting on Contaminated Sites.* (referred to as Reporting Guidelines 2011)

[7] NSW EPA, (Draft 2011), *Guidelines on the Duty to Report Contamination.* (referred to as Duty to Report Contamination 2011)

[8] NSW DEC, (2006), *Guidelines for the NSW Site Auditor Scheme, 2nd ed.* (referred to as Site Auditor Guidelines 2006)

[9] National Environment Protection Council (NEPC), (2013), *National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1).* (referred to as NEPM 2013)

[10] NSW EPA, (1995), *Contaminated Sites Sampling Design Guidelines.* (referred to as EPA Sampling Design Guidelines 1995)

[11] NSW DECCW, (2009), *Waste Classification Guidelines, Part 1: Classifying Waste.* (referred to as Waste Classification Guidelines 2009)

2 BACKGROUND

2.1 JK Geotechnical Investigation (JK, 24 October 2014[12])

Six boreholes were drilled at a variety of locations around the site, as shown on Figure 2. The boreholes revealed a subsurface profile consisting of fill material to depths ranging from 0.8m to 1.2m, underlain by residual silty clay soil and weathered sandstone bedrock.

2.2 Stage 1 Environmental Site Assessment (EIS, 19 November 2014[13])

EIS conducted a Stage 1 ESA for a portion of the proposed development. The ESA covered four lots or part lots in the south of the current proposed development area and one additional lot at 6 Winnie Street. Since that report was completed the development plans have changed to provide for a basement extending to Gerard Street and an internal vehicular link on the western boundary of the site.

The current report incorporates relevant information from the initial Stage 1 ESA and extends the assessment to include additional lots in the north and west of the proposed development area.

3 DATA QUALITY ASSESSMENT

3.1 Data Quality Objectives (DQOs)

The DQOs provide a systematic approach for undertaking the assessment and outline the criteria against which the data can be assessed. A methodology for establishing the DQOs is presented in the document *Data Quality Objectives Process for Hazardous Waste Site Investigations* (2000[14]). This methodology has been adopted in the NEPM 2013, AS4482.1-2005[15] and the Site Auditor Guidelines 2006. The main steps involved in preparing the DQOs are summarised in the table below:

Table 3-1: DQOs

Step	Input
State the Problem	The presence of contamination may pose a risk to human health and the environment. An ESA is required to assess the potential risk and to comment on the suitability of the site for the proposed development.
Identify the Decisions	The assessment aims to address the objectives outlined in Section 1.2.

[12] JK Geotechnics, (2014), *Geotechnical Investigation for Proposed Alterations and Additions at SCECGS Redlands, 272 Military Rd, Cremorne* (Ref: 27775ZRrpt dated 24/10/14)

[13] EIS (2014), *Stage 1 Environmental Site Assessment for Proposed Senior School Campus Development at 272 Military Road, 7-8 Monford Place & 6 Winnie Street, Cremorne* (Ref: E27775Krpt dated 19/11/2014)

[14] US EPA, (2000), *Data Quality Objectives Process for Hazardous Waste Site Investigations.* (referred to as US EPA 2000)

[15] Standards Australia, (2005), *Guide to the Investigation and Sampling of sites with Potentially Contaminated Soil.* (referred to as AS 2005)

Step	Input
Identify Inputs into the Decision	The following inputs will be used to address the decisions: • Review of site information including regional geology, topography, setting, acid sulfate soil (ASS) potential, hydrogeology, surface water flow and review of major services; • Review of site history information (see Section 5); • Undertake a site inspection to identify the AEC (see Section 4); • Prepare a Conceptual Site Model (see Section 6); • Design and implementation of a field sampling program (see Section 8); • Design and implementation of a laboratory analysis program (see Section 8); • Assessment of analytical data. The DQIs that will be used to assess the analytical data are outlined in Section 3.2 ; and • Compare the analytical results against the SAC outlined in Section 7.
Study Boundary	The investigation was generally confined to the proposed development area of the site as shown in Figure 2.
Develop a Decision Rule	The analytical results will be assessed against the SAC (see Section 7). The NEPM 2013 recommends using statistical analysis to assess the laboratory data for soil samples against the health based SAC. The data set should be assessed against the following criteria: • The 95% Upper Confidence Limit (UCL) value of the arithmetic mean concentration of each contaminant should be less than the SAC; • The standard deviation (SD) of the results must be less than 50% of the SAC; and • No single value exceeds 250% of the relevant SAC. Statistical calculations are not required if all results are below the SAC. Statistical calculations are not undertaken on Health Screening Levels (HSLs) as elevated point source contamination associated with petroleum hydrocarbons can pose a vapour risk.
Specific Limits on Decision Errors	Decision errors are false positive (i.e. stating the site is free of contamination when it is not) or false negative (i.e. stating that the site is contaminated when it is not). The more significant error is the false positive which may result in potential risks to human health and the environment. To account for this, the assessment has assumed that elevated concentrations of contaminants are present in the samples unless demonstrated otherwise.
Optimise the Design for Obtaining Data	The Site Auditor Guidelines 2006 recommend evaluating the data set as a whole to determine any limitations within the data set. The overall data set will be optimised by reviewing the data as the project proceeds. When necessary, adjustments will be made to the sampling or analytical program.

3.2 Data Quality Indicators (DQIs)

The DQIs required to address inputs into the decision include: precision, accuracy, representativeness, completeness and comparability. Reference should be made to the appendices for further information of the DQIs. The DQIs will be addressed as follows:

Table 3-2: DQIs

Indicator	Methods
Completeness	Data and documentation completeness will be achieved by: • Preparation of sampling and analysis plan; • Preparation of chain of custody (COC) records; • Review of the laboratory sample receipt information; • Use of National Association of Testing Authorities (NATA) registered laboratories for all analysis; • Visual, olfactory and PID screening of samples during the investigation; and • Laboratory analysis to target PCC. Any changes to the analytical schedule to be documented.
Comparability	Data comparability will be achieved by: • Maintaining consistency in sampling techniques; • Use of appropriate preservation, storage and transport methods; and • Use of consistent analysis techniques and reporting standards by the laboratories.
Representativeness	Data representativeness will be achieved by: • Appropriate coverage of sample locations across accessible areas of the site; and • Representative coverage of analysis for PCC. Any changes to the analytical schedule to be documented.
Precision	Precision will be achieved by: • Calculating the relative percentage difference (RPD) of duplicate samples; • The following acceptance criteria will be used to assess the RPD results: ➢ results > 10 times the practical quantitation limit (PQL), RPDs < 50% are acceptable; ➢ results between 5 and 10 times PQL, RPDs < 75% are acceptable; ➢ results < 5 times PQL, RPDs < 100% are acceptable; and • An explanation is provided if RPD results are outside the acceptance criteria.
Accuracy	Accuracy will be achieved by: • Use of trained and qualified field staff; • Appropriate industry standard sampling equipment and decontamination procedures; • Sampling and screening equipment will be factory calibrated on a regular basis. Calibration will be checked internally prior to use; • Sampling and equipment decontamination;

Indicator	Methods
	• Collection and analysis of field Quality Assurance (QA) and Quality Control (QC) samples for PCC; • The field QA/QC analysis will include: ➢ a minimum of 5% of samples as intra-laboratory duplicates; and ➢ One trip blank (TB) sample per batch. • Acceptable concentrations in TB samples. Non-compliance to be documented in the report; • Appropriate sample preservation, handling, holding time and COC procedure; • Review of the primary laboratory QA/QC data including: RPDs, surrogate recovery, repeat analysis, blanks, laboratory control samples (LCS) and matrix spikes; • The following acceptance criteria will be used to assess the primary laboratory QA/QC results. Non-compliance to be documented: ➢ RPDs: o results that are < 5 times the PQL, any RPD is acceptable; and o results > 5 times the PQL, RPDs between 0-50% are acceptable; ➢ LCS recovery and matrix spikes: o 70-130% recovery acceptable for metals and inorganics; o 60-140% recovery acceptable for organics; and o 10-140% recovery acceptable for VOCs; ➢ Surrogate spike recovery: o 60-140% recovery acceptable for general organics; and o 10-140% recovery acceptable for VOCs; ➢ Blanks: All less than PQL; and • Reporting to industry standards.

4 SITE INFORMATION AND PHYSICAL SETTING

4.1 Site Identification

Table 4-1: Site Identification Information

Site Owner:	SCECGS Redlands Ltd
Site Address:	272 Military Road; 7-8 Monford Place & 1-11 Gerard Street, Cremorne
Lots & Deposited Plans:	SP15886; SP10384; part of Lot 11 in DP877879; Lots 1, 2, 3 & 4 in DP783663; Lot 21A in DP83152; Lot 22A in DP152693; Lot 1 in DP81061; Lot 1 in DP83047; Lot 1 in DP713405; Lot 2 in DP222013; Lot 21 in DP88932; Lot 1 in DP80618
Current Land Use:	272 Military Road & 1-11 Gerard Street: school 7-8 Monford Place: residential
Proposed Land Use:	Secondary school building, landscaped school area, basement car park and internal vehicular link

Local Government Authority:	North Sydney Council
Current Zoning:	Zone SP2 – Infrastructure and Zone R4 – High Density Residential.
Area of Proposed Development (m^2):	Approx. 7,460m^2
RL (AHD):	Approx. 83m
Geographical Location (approx.):	S: 33° 49' 47" E: 151° 31' 31"
Site Location Plan:	Figure 1
Borehole Location Plan:	Figure 2
Site Contamination Data:	Figure 3

4.2 Site Location and Setting

The site is located in a mixed-use area of Cremorne dominated by residential dwellings and commercial premises. The site is located approximately 800m to the south of Willoughby Bay.

4.3 Topography

The site is located close to the crest of a ridge that is orientated approximately east-west with a gentle slope down towards the north-west.

4.4 Site Inspection

A walkover inspection of the southern section of the site and immediate surrounds was undertaken on 1/10/14, of the northern section of the site on 23/4/15 and of the western section of the site on 12/5/15. The inspection was limited to accessible areas of the site and did not include a detailed internal inspection of buildings. Selected site photographs obtained during the inspection are attached in the appendices.

The layout of the site at the time of the inspections was generally as shown in the aerial photograph in Figure 2. Five lots in the northern section of the site contained single-storey brick buildings that were used by the school as offices, a workshop and classrooms. The centre of the site contained a paved and landscaped area with several medium to large trees. A brick-paved access road extended from the eastern section of the site to Winnie Street.

The south-western section of the site was occupied by the large three-storey brick school building known as the Mowll Building. Nos. 7 & 8 Monford Place were each occupied by two-storey brick residential buildings with associated paved areas and yards.

The two separate lots in the western section of the site contained three brick cottages and a demountable, used by the school as offices and classrooms.

4.5 Surrounding Land Use

The immediate surrounds included the following land uses:

- North – Gerard Street, with low to medium-density residential and a church beyond;
- South – school grounds and buildings and low to medium-density residential;
- East – low to medium-density residential; and
- West – school grounds and buildings.

4.6 Underground Services

The 'Dial Before You Dig' (DBYD) plans were reviewed for the assessment. A brief summary of relevant information is presented below:

Table 4-2: Summary of Services

Service	Location	Contaminant Migratory Pathway
Sewer	The Sydney Water plan indicates that a sewer intersects the site at several locations. A copy of the plan is contained in the appendices.	The backfill around the sewer could act as a potential migratory pathway.
Stormwater	The North Sydney Council plan indicates that a stormwater pipe extends from Monford Place across the boundary between 7 & 8 Monford Place and intersects the site beneath the Mowll Building. A copy of the plan is contained in the appendices.	These services are considered to be a potential migratory pathway.
Telecommunications	The Telstra plan indicates that services intersect the site at several locations. A copy of the plan is contained in the appendices.	These services are considered to be a potential migratory pathway.
Electrical	The plans indicate that electrical cables extend from Monford Place towards the residential dwellings at 7 & 8 Monford Place, and towards the Mowll Building. A copy of the plan is contained in the appendices.	These services are considered to be a potential migratory pathway.

4.7 Regional Geology

A review of the regional geological map of Sydney (1983[16]) indicates that the site is underlain by Hawkesbury Sandstone, which typically consists of medium to coarse-grained quartz sandstone with minor shale and laminite lenses.

4.8 Hydrogeology

A review of groundwater bores registered with the NSW Office of Water[17] (NOW) was undertaken by EIS. The search was limited to registered bores located within approximately 500m of the site. The search did not reveal any registered bores within this radius.

The stratigraphy of the site is expected to consist of residual silty clay soils overlying relatively shallow bedrock. Based on these conditions and the results of the groundwater bore search, groundwater is not considered to be a significant resource for abstraction purposes in the immediate vicinity of the site.

4.9 Surface Water Flows

Based on the site and surrounding topography, surface water flows would be expected to enter the street stormwater system flowing toward the north.

5 SITE HISTORY ASSESSMENT

5.1 Aerial Photographs

Historical aerial photographs of the site and immediate surrounds were reviewed for the assessment. A summary of the relevant information is presented in the following table:

Table 5-1: Summary of Historical Aerial Photos

Year	Details
1930	The resolution of the photograph was poor, however the majority of the site appeared to have been developed.
1943[18]	The residential buildings in the northern and western sections of the site and at 7-8 Monford Place appeared to be in place as they were during the current investigation. The northern section of the site (currently occupied by the Mowll Building) appeared to be occupied by a house-sized structure in the western section, and either a larger building or a paved area in the eastern section. The two separate lots in the western section of the site appeared to contain houses.

[16] Department of Mineral Resources, (1983), *1:100,000 Geological Map of Sydney (Series 9130).*

[17] http://www.waterinfo.nsw.gov.au/gw/, visited on 6/11/14

[18] https://six.maps.nsw.gov.au/wps/portal/SIXViewer, visited on 18/11/14

Year	Details
1956	The site's appearance was consistent with its appearance during the current investigation, with residential buildings in the northern and western lots and at 7-8 Monford Place, and the Mowll Building located in the northern section of the site.
1965	The site's appearance was consistent with its appearance during the current investigation.
1972	The site's appearance was consistent with its appearance during the current investigation.
1982	The site's appearance was consistent with its appearance during the current investigation.
1991	The site's appearance was consistent with its appearance during the current investigation.
1999	The site's appearance was consistent with its appearance during the current investigation.

5.2 Land Title Search

Selected land title records were reviewed for the assessment. The record search was performed by Advance Legal Searchers Pty Ltd. Copies of the title records are attached in the appendices. The land title records did not identify any particular land uses which could have resulted in significant contamination. The professions of the individuals listed on the title records are not considered to be associated with site related activities.

5.3 Council Records

5.3.1 Development Applications (DA), Building Approvals (BA)

Council DA, BA and property files were reviewed for the assessment. The files included information dating back to the late 1970s. The files did not indicate any particular developments that were likely to have resulted in significant contamination.

5.3.2 Section 149 Planning Certificate

The s149 (2 and 5) planning certificates for Lot 11 DP877879 (272 Military Road), Lot 1 DP83047 (272 Military Road) and Lot 22A DP152693 (3 Gerard Street) were reviewed for the assessment. Copies of the certificates are attached in the appendices. A summary of the relevant information is presented below:

- The lots are not deemed to be significantly contaminated land;
- The lots are not subject to a management order;
- The lots are not the subject of an approved voluntary management proposal;
- The lots are not subject to an on-going management order under the provisions of the CLM Act 1997; and
- The lots are not subject to a Site Audit Statement (SAS).

5.4 WorkCover Records

WorkCover records for 272 Military Rd, Cremorne were reviewed for the assessment. The search did not indicate any licences to store dangerous goods including underground fuel storage tanks (USTs) or above ground storage tanks (ASTs) at the site. A copy of the WorkCover records is contained in the appendices.

5.5 NSW EPA Records

The NSW EPA records available online were reviewed for the assessment. A summary of the relevant information is provided in the following table:

Table 5-2: Summary of NSW EPA Online Records

Source	Details
CLM Act 1997[19]	There were no notices for the site under Section 58 of the Act.
NSW EPA List of Contaminated Sites[20]	The site is not listed on the NSW EPA register.
POEO Register[21]	There were no notices for the site on the POEO register.

5.6 Summary of Site History

A summary of the site history information is presented below:

- The aerial photographs and land title records indicate that the site has likely been used for either residential purposes or as part of Redlands Senior Campus since at least the 1940s;
- WorkCover records did not indicate any licences to store dangerous goods at the site; and
- NSW EPA records did not indicate any notices for the site.

5.7 Integrity of Site History Information

The majority of the site history information has been obtained from government organisations as outlined above. The veracity of the information from these sources is considered to be relatively high. A certain degree of information loss can be expected given the age of the development; gap between aerial photographs; and lack of detailed information prior to the 1900s.

6 PRELIMINARY CONCEPTUAL SITE MODEL (CSM)

6.1 Areas of Environmental Concern (AEC) & Potential Contaminants of Concern (PCC)

The AEC identified in the table below are based on a review of the background information, site history information and site inspection. The AEC are sections of the site that have potentially been

[19] http://www.epa.nsw.gov.au/prclmapp/searchregister.aspx, visited on 29/4/15
[20] http://www.epa.nsw.gov.au/clm/publiclist.htm, visited on 29/4/15
[21] http://www.epa.nsw.gov.au/prpoeoapp/, visited on 29/4/15

impacted by activities, site conditions and/or specific features that could present an environmental concern with regards to potential contamination.

Table 6-1: AEC and PCC

AEC	PCC
Fill Material: Fill material on site may have been historically imported from various sources and can contain elevated concentrations of contaminants.	HM, TPH, BTEX, VOCs, PAHs, OCPs, OPPs, PCBs and asbestos
Hazardous Building Materials: As the site appears largely unchanged since the 1950s, former buildings that have since been demolished may have used hazardous building materials such as asbestos. The use of such materials (e.g. asbestos) in the former buildings could have resulted in potential contamination.	Asbestos, lead and PCBs

Note:
HM – Heavy metals including arsenic, cadmium, chromium, copper, lead, mercury, nickel & zinc
TPH – Total petroleum hydrocarbons including light, mid and heavy fractions
BTEX – Monocyclic aromatic hydrocarbons
VOCs - Volatile organic compounds includes BTEX compounds
PAHs - Polycyclic aromatic hydrocarbons
OCPs - Organochlorine pesticides
OPPs - Organophosphorus pesticides
PCBs - Polychlorinated biphenyls

6.2 Contamination Fate and Transport

The fate and transport of PCC identified at the site is summarised in the following table:

Table 6-2: Fate and Transport of PCC

PCC	Fate and Transport
Non-volatile contaminants including: metals, heavy fraction PAHs, OCPs, OPPs, PCBs and asbestos	With the exception of asbestos, non-volatile contaminants are predominantly confined to the soil and groundwater medium. The mobility of these contaminants varies depending on: the nature and type of contaminant present (e.g. leachability, viscosity etc.); soil type/porosity; surface water infiltration; groundwater levels; and the rate of groundwater movement. ***Presence of Ash and Slag:*** Non-volatile contaminants associated with ash and slag waste (some heavy metals, heavy fraction PAHs, and sometimes heavy fraction TPHs) are bound within a relatively insoluble matrix. Slag and ash is usually formed as a by-product of combustion at high temperatures which 'locks in' the contaminants within the matrix. ***Presence of Asbestos:*** The potential transport of asbestos fibres is associated with the disturbance of asbestos contaminated soils and release of fibres into the atmosphere. This is likely to occur during excavation works.

PCC	Fate and Transport
	A number of studies have found that soils effectively filter out asbestos fibres and retain them within the soil matrix. The studies concluded that there is no significant migration of asbestos fibres, either through soil or groundwater.
Volatile contaminants including: TPH, BTEX, VOCs and light fraction PAHs	Volatile contaminants are usually more mobile when compared to the non-volatile compounds. The potential for migration of volatile contaminants such as light fraction PAHs and TPH is relatively high in sandy soil with a high water table. These contaminants break down rapidly as a result of microbial activity and availability of nutrients including nitrogen, oxygen etc. The mobile contaminants would be expected to move down to the rock surface or groundwater table and migrate down gradient from the source. The mobility would depend on a range of factors such as: soil type/porosity; surface water infiltration; groundwater levels; confining layers within the aquifer; solubility in groundwater etc.

6.3 Sensitive Receptors and Exposure Pathways

The potential receptors and exposure pathways identified at the site are presented in the following table:

Table 6-3: Potential Receptors and Exposure Pathways

Receptor	Pathway
Human Receptors: • Site occupants; • Site visitors; • Contractors and workers; • Future site occupants; and • Off-site occupants.	• Dermal contact, ingestion and inhalation; • Inhalation of airborne asbestos fibres; and • Abstraction and use of contaminated groundwater.

7 SITE ASSESSMENT CRITERIA (SAC)

The SAC adopted for this PESA are outlined in the table below. The SAC have been derived from NEPM 2013 and other guidelines as outlined in Section 1.3. Explanatory notes are included in the attached appendices.

The guideline values for individual contaminants outlined in Schedule B1 of the NEPM 2013 are reproduced in the appendices. The criteria for the individual contaminants analysed for this assessment are presented in the attached report tables.

Table 7-1: SAC Adopted for this Investigation

Guideline	Applicability
Health Investigation Levels (HILs)	The proposed land use is as a secondary school. The HIL-C criteria have been adopted for this PESA.
Health Screening Levels (HSLs)	The HSL-A criteria for soil have been adopted for this PESA, in accordance with Section 2.4.8 of NEPM 2013. An assessment of soil vapour is outside the scope of this PESA. Further consideration of vapour risks would be required in the event that particular contaminants are identified during the PESA.
Management Limits for TPH	The site history assessment has not identified any USTs or other fuel storage facilities at the site. These limits are not considered necessary for this PESA.
Asbestos in Soil	The 'presence/absence' of asbestos in soil has been adopted as the assessment criterion for the Preliminary Site Investigation (PSI).
Waste Classification Criteria	The proposed development includes excavation for a basement level. A Waste Classification will be required for the off-site disposal of material excavated for the development. The criteria outlined in the Waste Classification Guidelines 2009 have been adopted for this investigation.

8 INVESTIGATION PROCEDURE

8.1 Soil Sampling Plan

The NSW EPA Sampling Design Guidelines 1995 recommend a sampling density for a contamination assessment based on a systematic sampling pattern. Based on the size of the investigation area, the guidelines provide a minimum number of sampling points required for the investigation. The guidelines recommend sampling from a minimum of eighteen evenly spaced sampling points for a site of this size (approximately 7,460m^2) for a Stage 2 ESA. Samples for this investigation were obtained from three sampling points as shown on the attached Figure 2, representing approximately 17% of the minimum sampling density recommended for a Stage 2 ESA.

The sampling locations were placed on a systematic plan with a grid spacing of approximately 30m between sampling locations. A systematic plan was considered suitable to address potential contaminants associated with the fill material.

8.2 Soil Sampling Methodology

Fieldwork for this investigation was undertaken from the 1st to the 3rd of October, 2014. The boreholes were cleared for underground services prior to drilling. The boreholes were drilled using either a track-mounted hydraulically operated drill rig equipped with spiral flight augers, or using hand equipment due to access restrictions in certain areas. Soil samples were obtained from a

Standard Penetration Test (SPT) sampler or directly from the auger when conditions did not allow use of the SPT sampler.

Soil samples were collected from the fill and natural profiles encountered during the investigation. All samples were recorded on the borehole logs attached in the appendices.

Soil at selected depths was split into primary and duplicate samples for field QA/QC analysis. Samples were placed in glass jars with plastic caps and teflon seals with minimal headspace. Samples for asbestos analysis were placed in zip-lock plastic bags. Sampling personnel used disposable nitrile gloves during sampling activities. The samples were labelled with the job number, sampling location, sampling depth and date.

8.2.1 VOC Screening

A portable photoionisation detector (PID) was used to screen the samples for the presence of VOCs and to assist with selection of samples for BTEX analysis. The sensitivity of the PID is dependent on the organic compound and varies for different mixtures of hydrocarbons. Some compounds give relatively high readings and some can be undetectable even though present in identical concentrations. The PID is best used semi-quantitatively to compare samples contaminated by the same hydrocarbon source. The PID is calibrated before use by measurement of an isobutylene standard gas. All the PID measurements are quoted as parts per million (ppm) isobutylene equivalents.

PID screening for VOCs was undertaken on soil samples using the soil sample headspace method. VOC data was obtained from partly filled zip-lock plastic bags following equilibration of the headspace gases. The PID headspace data is presented on the COC documents attached in the appendices.

8.2.2 Decontamination and Sample Preservation

Details of the decontamination procedure adopted during sampling are presented in the appendices. Where applicable, the sampling equipment was decontaminated using a scrubbing brush and potable water and Decon 90 solution (phosphate-free detergent) followed by rinsing with potable water.

Soil samples were preserved by immediate storage in an insulated sample container with ice in accordance with AS4482.1-2005 and AS4482.2-1999[22] as summarised in the following table:

Table 8-1: Soil Sample Preservation and Storage

Analyte	Preservation	Storage
Heavy metals	Unpreserved glass jar with Teflon lined lid	Store at <4°, analysis within 28 days (mercury and Cr[VI]) and 180 days (other metals).

[22] *Guide to the Sampling and Investigation of Potentially Contaminated Soil Part2: Volatile Substances,* Standards Australia, 1999 (referred to as AS 1999)

Analyte	Preservation	Storage
VOCs (TPH/BTEX)	As above	Store at <4°, analysis within 14 days
PAHs, OCP, OPP & PCBs	As above	Store at <4°, analysis within 14 days
Asbestos	Sealed plastic bag	None

On completion of the fieldwork, the samples were delivered in the insulated sample container to a NATA-registered laboratory for analysis under standard COC procedures. Field sampling protocols adopted for this assessment are summarised in the attached appendices.

8.3 Analytical Schedule

The analytical schedule is outlined in the following table:

Table 8-2: Analytical Schedule

PCC	No. of Fill Soil Samples	No. of Natural Soil Samples
Heavy Metals	5	1
TPH/BTEX	5	1
PAHs	5	1
OCPs/OPPs	3	-
PCBs	3	-
Asbestos	3	-

8.4 Laboratory Analysis

The samples were analysed by the following laboratory:

Table 8-3: Laboratory Details

Samples	Laboratory	Report Reference
All primary samples, intra-laboratory duplicates and trip blanks,	Envirolab Services Pty Ltd, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	117307, 117307A

Samples were analysed by the laboratory using the analytical methods detailed in Schedule B(3) of NEPM 2013. Reference should be made to the laboratory reports attached in the appendices for further details.

9 INVESTIGATION RESULTS

9.1 Subsurface Conditions

A summary of the subsurface conditions encountered during the investigation is presented in the table below. Reference should be made to the borehole logs attached in the appendices for further details.

Table 9-1: Summary of Subsurface Conditions

Profile	Description[1]
Pavement	A brick paved surface was encountered in BH3, BH5 and BH7.
Fill	Fill material was encountered at the surface or beneath the pavement in all boreholes, to depths ranging from 0.8m to 1.2m. The fill material varied depending on the location and depth, and included sandy gravel, sandy silt, silty clay, gravelly silty sand and silty sand. The fill contained inclusions of plastic (BH7), glass (BH5, BH8), ash (BH3, BH4, BH6), slag (BH5, BH8) and brick fragments (BH5).
Natural Soil	Residual silty clay soils were encountered beneath the fill material in all boreholes.
Bedrock	Weathered sandstone bedrock was encountered beneath the residual clays in BH3, BH4, BH5 and BH6 at depths ranging from 3m to 7.5m
Groundwater	Groundwater seepage was not encountered in the boreholes during drilling. Within approximately 2 hours of drilling, standing water levels were recorded in some boreholes at depths of 6.2m (BH3), 6.3m (BH4) and 5.9m (BH6).

Note:
1 – Depths described in metres below ground level

9.1.1 VOC Screening

PID soil sample headspace readings are presented in the attached report tables and the COC documents attached in the appendices. All results were 0ppm equivalent isobutylene which indicates a lack of PID detectable VOCs.

9.2 Soil Laboratory Results

The soil laboratory results are compared to the relevant SAC in the attached report tables. Statistical calculations undertaken on the results using ProUCL (version 4.1) are attached in the appendices. A summary of the results assessed against the SAC is presented below.

Table 9-2: Summary of Soil Laboratory Results

Analyte	Results Compared to SAC
Heavy Metals	**HILs:** All heavy metal results were below the HIL-C criteria, with the exception of lead in sample BH7 (0.0m-0.2m), in which the concentration of lead detected (640mg/kg) exceeded the SAC of 600mg/kg. The 95% UCL was calculated using the lead data from the fill soil samples. The 95% UCL was 535mg/kg which was below the HIL-C criterion of 600mg/kg. The Standard Deviation (SD) was inside the acceptance criteria outlined in Section 3. **WC:** All heavy metal results were less than the CT1 and SCC1 criteria, with the exception of lead in three fill samples and nickel in one fill sample, as shown in Table C. TCLP leachates were prepared from the corresponding samples and analysed for lead or nickel as required. The results were less than the TCLP1 criteria.
TPH	**HSLs:** All TPH results were below the HSL-A criteria. **WC:** All TPH results were less than the relevant CT1 and SCC1 criteria.
BTEX	**HSLs:** All BTEX results were below the HSL-A criteria. **WC:** All BTEX results were less than the relevant CT1 and SCC1 criteria.
PAHs	**HILs:** Benzo(a)pyrene TEQ exceeded the HIL-C criterion in four of the five fill samples analysed. All other PAH results were less than the HIL-C criteria. **HSLs:** All naphthalene results were below the HSL-A criteria. **WC:** The benzo(a)pyrene results exceeded the CT1 criterion in four of the five fill samples analysed. TCLP leachates were prepared from the corresponding samples and analysed for PAHs. The results were less than the TCLP1 criteria.
OCPs & OPPs	**HILs:** All OCP and OPP results were below the HIL-C criteria. **WC:** All OCP and OPP results were less than the relevant CT1 and SCC1 criteria.

Analyte	Results Compared to SAC
PCBs	**HILs:** All PCB results were below the HIL-C criterion. **WC:** All PCB results were less than the SCC1 criterion.
Asbestos	**PSI:** Asbestos was not detected in the samples analysed for the investigation.

10 QA/QC ASSESSMENT

The QA/QC assessment includes a review of the DQIs established for the investigation (see Section 3.2). A summary of the field QA/QC samples are outlined below:

Table 10-1: Field QA/QC Samples

Field QA/QC	Frequency	Sample Details
Intra-laboratory duplicates	12.5% of primary samples	Soil Samples: DUP1 is a soil duplicate of sample BH2 (0.0-0.2)*.
Trip blanks	1 per batch	TB is a trip blank prepared on 1/10/14.

* BH2 was located on 6 Winnie Street, which formed part of the initial soil assessment. The sample and duplicate were analysed in the same batch as the samples from BH3, BH5 and BH7, which remain on the subject site.

An assessment of the DQIs is summarised in the following table.

Table 10-2: Assessment of DQIs

Completeness
Data and documentation completeness was achieved through the following measures: • A sampling and analysis plan was prepared for the investigation; • COC records were prepared for each batch of samples sent to the labs (refer to appendices); • Laboratory sample receipt information was reviewed for each batch (refer to appendices); • NATA-registered laboratories were used for all analysis; • Visual observations and PID screening of samples was undertaken during the investigation as noted on the borehole logs and COC documents (refer to appendices); and • Soil samples were analysed for the PCC identified in Section 6.1, except for VOCs which were screened using a PID. Four selected fill samples only were analysed for OCPs, OPPs, PCBs and asbestos.
Comparability
Data comparability was achieved through the following measures: • Similar sampling techniques were used during the investigation; • Appropriate preservation, storage and transport methods were adopted for all samples; and • Consistent analysis techniques and reporting standards were adopted by the laboratories.

Representativeness

Data representativeness was achieved through the following measures:

- The sampling plan was optimised to obtain adequate coverage of sample locations; and
- The assessment included a representative coverage of analysis for PCC.

Precision

Intra-laboratory RPD Results:

The intra-laboratory soil RPD results are presented in the attached report tables. The results indicated that field precision was acceptable.

The RPD values for a range of individual PAHs and for TRH C_{16}-C_{34} were outside the acceptance criteria. Values outside the acceptable limits have been attributed to sample heterogeneity and the difficulties associated with obtaining homogenous duplicate samples of heterogeneous matrices. As the primary sample results exceeded the duplicate sample results, these exceedences are not considered to have had an adverse impact on the data set as a whole.

Accuracy

Accuracy was achieved through the following measures:

- Trained and qualified field staff were used for the investigation;
- Appropriate industry standard sampling equipment and decontamination procedures were adopted for the investigation as outlined in the attached appendices;
- Sampling and screening equipment are routinely factory calibrated. An in-house calibration check was undertaken prior to using onsite;
  - Appropriate sample preservation, handling, holding time and COC procedures were adopted for the investigation.
- The report was prepared generally in accordance with Reporting Guidelines 2011;
- Accuracy of field sampling was assessed as follows:
  - TB Results: The trip blank results are presented in the attached report tables and were all less than the PQLs.
- Review of laboratory QA/QC data is summarised below:
  - Laboratory Duplicate RPD Results: Laboratory duplicate RPD results for the soil analysis were generally within the acceptance criteria adopted by the laboratory;
  - Matrix Spike Recovery: Matrix spike recovery concentrations were within the acceptable limits;
  - Surrogate Spike Recovery: Surrogate spike recovery concentrations were within the acceptable limits;
  - LCS recovery: LCS recovery concentrations were within the acceptable limits.

The DQIs adopted for this investigation (see Section 3.2) have been addressed.

11 DISCUSSION

Elevated concentrations of contaminants, above the Site Assessment Criteria, were encountered in the soil samples as outlined in Section 9. The site contamination data is shown on the attached Figure 3.

11.1 Summary of Soil Contamination

Elevated concentrations of benzo(a)pyrene TEQ were encountered in fill soil samples from all three boreholes. Benzo(a)pyrene TEQ is a measure of the toxicity of eight carcinogenic PAHs relative to benzo(a)pyrene.

An elevated concentration of lead was encountered in a fill soil sample collected from BH7, located between 8 Monford Place and the Mowll Building.

11.1.1 Potential Sources

The source of the contamination is considered likely to be associated with the importation of contaminated fill rather than on-site activities. Ash or slag were noted to be present in two of the three boreholes where elevated concentrations of PAHs and lead were detected.

Slag and ash were frequently used as fill material in Sydney during the early 20th century. The slag and ash may have originated from various metal processing industries and from coal burning, respectively.

11.1.2 Known Extent

Based on the available data, the PAH and heavy metal contamination is considered likely to be confined to the fill material at the site. As the acid leachate tests (TCLP) indicate that lead, nickel and benzo(a)pyrene are not leaching in significant concentrations, the underlying natural soil and bedrock is unlikely to be impacted by the contamination. Soil sample BH7 (1.0m-1.2m) was collected from the natural silty clay at a depth 0.2m-0.4m below the base of fill material in which elevated concentrations of both PAHs and heavy metals were detected. The concentrations of PAHs detected in the underlying natural soil were below the laboratory practical quantitation limit (PQL) while the concentrations of heavy metals detected were relatively low – within what would be expected for background levels.

11.2 Data Gaps

Due to the preliminary nature of the investigation the following data gaps remain:

- Inaccessible areas such as beneath existing buildings have not been investigated;
- The minimum sampling density for a Stage 2 Environmental Site Assessment has not been met. To achieve the minimum density a minimum of fifteen additional boreholes would be required for analysis.
- Groundwater has not been investigated.

12 PRELIMINARY WASTE CLASSIFICATION

12.1 Preliminary Classification of Fill Soil for Off-Site Disposal

The preliminary waste classification for the fill material is summarised in the following table:

Table 12-1: Preliminary Waste Classification of Fill

Extent	Classification	Disposal Option
Fill material at the site	General Solid Waste (non-putrescible) (GSW)	A facility licensed by the NSW EPA to receive the waste stream. Alternatively, the fill material is considered to be suitable for re-use on the site provided it meets geotechnical and earthwork requirements.

Note:
1. Waste Classification Guidelines 2009

Contaminated fill material should not be re-used on site. The fill material must be disposed of to a NSW EPA licensed facility. It is the responsibility of the receiving facility to ensure that the material meets their EPA license conditions. EIS accepts no liability whatsoever for illegal or inappropriate disposal of excavated material.

12.2 Preliminary Classification of Natural Soil and Bedrock for Off-Site Disposal

The preliminary waste classification for the natural material is summarised in the following table:

Table 12-2: Preliminary Waste Classification of Natural Material

Extent	Classification	Disposal Option
Natural silty clay soil and sandstone bedrock at the site	Virgin excavated natural material (VENM)	VENM is considered suitable for re-use on the site, or alternatively, the information included in this report may be used to assess whether the material is suitable for beneficial reuse at another site as fill material. Alternatively, the natural material can be disposed of as VENM to a facility licensed by the NSW EPA to receive the waste stream.

Material classed as VENM must not be mixed with any fill material (including building rubble) as this will invalidate the VENM classification. Where doubt exists about the difference between fill and VENM material an environmental/geotechnical engineer should be contacted.

13 TIER 1 RISK ASSESSMENT AND REVIEW OF CSM

Due to the surficial location of the PAH and heavy metal contamination at the site, the contamination is considered to pose a low to medium risk to the human receptors identified in Section 6.3. Additional work should be undertaken to address the data gaps outlined in Section 11.2 and to better characterise the risks.

14 CONCLUSIONS

EIS consider that the report objectives (see Sections 1.2 and Section 3) have been addressed. Based on the scope of works undertaken, EIS are of the opinion that the contamination encountered at the site poses a risk to the receptors.

EIS consider that the site can be made suitable for the proposed development provided that the following recommendations are implemented to address the data gaps:

- A Stage 2 ESA should be undertaken to meet the EPA-recommended sampling density. The Stage 2 ESA should target the data gaps identified in Section 11.2. Due to access issues, the Stage 2 ESA would ideally be conducted following the demolition of the existing buildings.
- Following the completion of the Stage 2 ESA, a Remediation Action Plan (RAP) should be prepared for the proposed development. The RAP will include remedial measures to be implemented to render the site suitable for the proposed development;
- A Validation Assessment report should be prepared to document the remediation action undertaken at the site;
- A Hazardous Materials Assessment should be conducted for the existing buildings prior to the commencement of demolition works;
- A Work, Health and Safety (WHS) plan should be prepared for the contaminants encountered at this site; and
- Inspections should be undertaken during demolition and excavation work to assess any unexpected conditions or subsurface facilities that may be discovered between investigation locations. This should facilitate appropriate adjustment of the works programme and schedule in relation to the changed site conditions. Inspections should be undertaken by experienced environmental personnel.

14.1 Regulatory Requirement

The regulatory requirements applicable for the site are outlined in the following table:

Table 14-1: Regulatory Requirement

Guideline	Applicability
Duty to Report Contamination 2008[23]	At this stage, EIS consider that there is no requirement to notify the NSW EPA of the site contamination. After successful implementation of the RAP, the site contamination is unlikely to meet the Notification Triggers.
POEO Act 1997	Section 143 of the POEO Act 1997 states that if waste is transported to a place that cannot lawfully be used as a waste facility for that waste, then the transporter and owner of the waste are each guilty of an offence. The transporter and owner of the waste have a duty to ensure that the waste is disposed of in an appropriate manner.
Dewatering Consent	In the event groundwater is intercepted during excavation works, dewatering may be required. Council, NSW Office of Water (NOW) and other relevant approvals (from discharge authorities like Sydney Water etc.) should be obtained prior to the commencement of dewatering.

15 LIMITATIONS

The report limitations are outlined below:

- EIS accepts no responsibility for any unidentified contamination issues at the site. Any unexpected problems/subsurface features that may be encountered during development works should be inspected by an environmental consultant as soon as possible;
- Previous use of this site may have involved excavation for the foundations of buildings, services, and similar facilities. In addition, unrecorded excavation and burial of material may have occurred on the site. Backfilling of excavations could have been undertaken with potentially contaminated material that may be discovered in discrete, isolated locations across the site during construction work;
- This report has been prepared based on site conditions which existed at the time of the investigation; scope of work and limitation outlined in the EIS proposal; and terms of contract between EIS and the client (as applicable);
- The conclusions presented in this report are based on investigation of conditions at specific locations, chosen to be as representative as possible under the given circumstances, visual observations of the site and immediate surrounds and documents reviewed as described in the report;
- Subsurface soil and rock conditions encountered between investigation locations may be found to be different from those expected. Groundwater conditions may also vary, especially after climatic changes;
- The investigation and preparation of this report have been undertaken in accordance with accepted practice for environmental consultants, with reference to applicable environmental regulatory authority and industry standards, guidelines and the assessment criteria outlined in the report;

[23] NSW Government Legislation, (2008), *Guidelines on the Duty to Report Contamination.* (referred to as Duty to Report Contamination 2008)

- Where information has been provided by third parties, EIS has not undertaken any verification process, except where specifically stated in the report;
- EIS has not undertaken any assessment of off-site areas that may be potential contamination sources or may have been impacted by site contamination, except where specifically stated in the report;
- EIS accept no responsibility for potentially asbestos containing materials that may exist at the site. These materials may be associated with demolition of pre-1990 constructed buildings or fill material at the site;
- EIS have not and will not make any determination regarding finances associated with the site;
- Additional investigation work may be required in the event of changes to the proposed development or land use. EIS should be contacted immediately in such circumstances;
- Material considered to be suitable from a geotechnical point of view may be unsatisfactory from a soil contamination viewpoint, and vice versa; and
- This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose.

LIST OF IN-TEXT TABLES

IMPORTANT INFORMATION ABOUT THIS REPORT

These notes have been prepared by EIS to assist with the assessment and interpretation of this report.

The Report is Based on a Unique Set of Project Specific Factors:
This report has been prepared in response to specific project requirements as stated in the EIS proposal document which may have been limited by instructions from the client. This report should be reviewed, and if necessary, revised if any of the following occur:

- the proposed land use is altered;
- the defined subject site is increased or sub-divided;
- the proposed development details including size, configuration, location, orientation of the structures or landscaped areas are modified;
- the proposed development levels are altered, e.g. addition of basement levels; or
- ownership of the site changes.

EIS/J&K will not accept any responsibility whatsoever for situations where one or more of the above factors have changed since completion of the assessment. If the subject site is sold, ownership of the assessment report should be transferred by EIS to the new site owners who will be informed of the conditions and limitations under which the assessment was undertaken. No person should apply an assessment for any purpose other than that originally intended without first conferring with the consultant.

Changes in Subsurface Conditions
Subsurface conditions are influenced by natural geological and hydrogeological process and human activities. Groundwater conditions are likely to vary over time with changes in climatic conditions and human activities within the catchment (e.g. water extraction for irrigation or industrial uses, subsurface waste water disposal, construction related dewatering). Soil and groundwater contaminant concentrations may also vary over time through contaminant migration, natural attenuation of organic contaminants, ongoing contaminating activities and placement or removal of fill material. The conclusions of an assessment report may have been affected by the above factors if a significant period of time has elapsed prior to commencement of the proposed development.

This Report is Based on Professional Interpretations of Factual Data
Site assessments identify actual subsurface conditions at the actual sampling locations at the time of the investigation. Data obtained from the sampling and subsequent laboratory analyses, available site history information and published regional information is interpreted by geologists, engineers or environmental scientists and opinions are drawn about the overall subsurface conditions, the nature and extent of contamination, the likely impact on the proposed development and appropriate remediation measures.

Actual conditions may differ from those inferred, because no professional, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, but steps can be taken to help minimise the impact. For this reason, site owners should retain the services of their consultants throughout the development stage of the project, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

Assessment Limitations
Although information provided by a site assessment can reduce exposure to the risk of the presence of contamination, no environmental site assessment can eliminate the risk. Even a rigorous professional assessment may not detect all contamination on a site. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas which showed no signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant which may occur; only the most likely contaminants are screened.

Misinterpretation of Site Assessments by Design Professionals

Costly problems can occur when other design professionals develop plans based on misinterpretation of an assessment report. To minimise problems associated with misinterpretations, the environmental consultant should be retained to work with appropriate professionals to explain relevant findings and to review the adequacy of plans and specifications relevant to contamination issues.

Logs Should not be Separated from the Assessment Report

Borehole and test pit logs are prepared by environmental scientists, engineers or geologists based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these should not be re-drawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however contractors can still misinterpret the logs during bid preparation if separated from the text of the assessment. If this occurs, delays, disputes and unanticipated costs may result. In all cases it is necessary to refer to the rest of the report to obtain a proper understanding of the assessment. Please note that logs with the 'Environmental Log' header are not suitable for geotechnical purposes as they have not been peer reviewed by a Senior Geotechnical Engineer.

To reduce the likelihood of borehole and test pit log misinterpretation, the complete assessment should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of subsurface information does not insulate an owner from the attendant liability. It is critical that the site owner provides all available site information to persons and organisations such as contractors.

Read Responsibility Clauses Closely

Because an environmental site assessment is based extensively on judgement and opinion, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, model clauses have been developed for use in written transmittals. These are definitive clauses designed to indicate consultant responsibility. Their use helps all parties involved recognise individual responsibilities and formulate appropriate action. Some of these definitive clauses are likely to appear in the environmental site assessment, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to any questions.

SITE PHOTOGRAPHS

Plate 1: The Mowll Building in the centre of the site.

Plate 2: 8 Monford Place in the south-western section of the site.

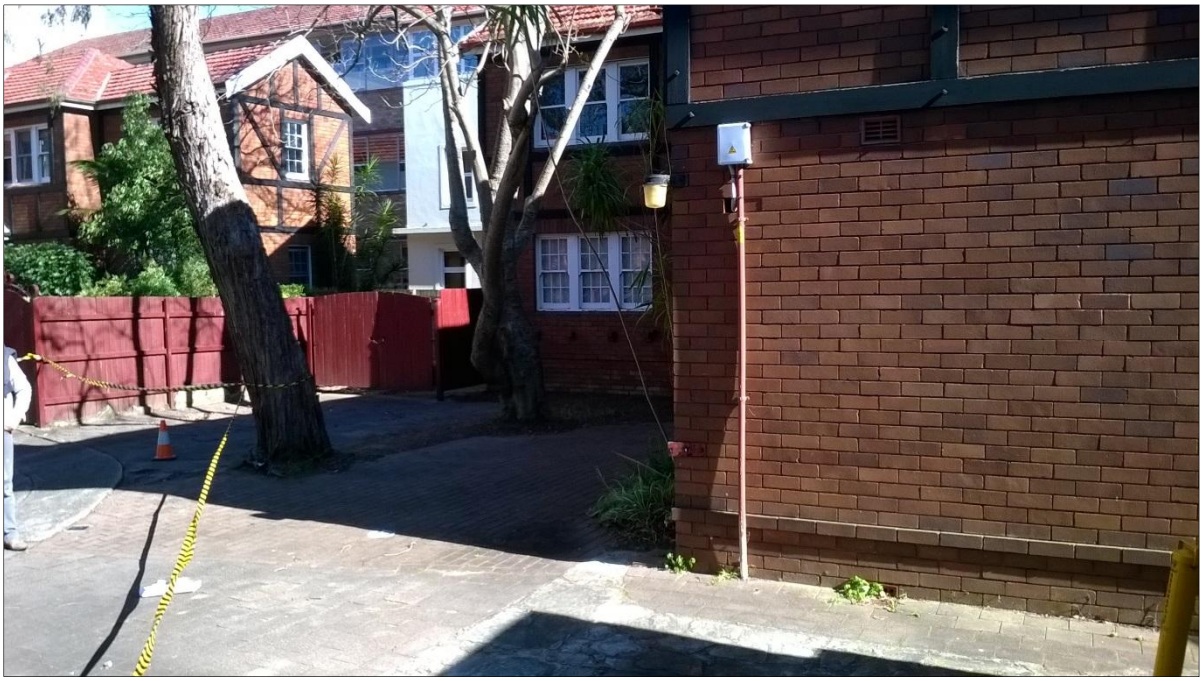


Plate 3: The rear of 7 Monford Place.

Plate 4: 7 Monford Place in the southern section of the site.

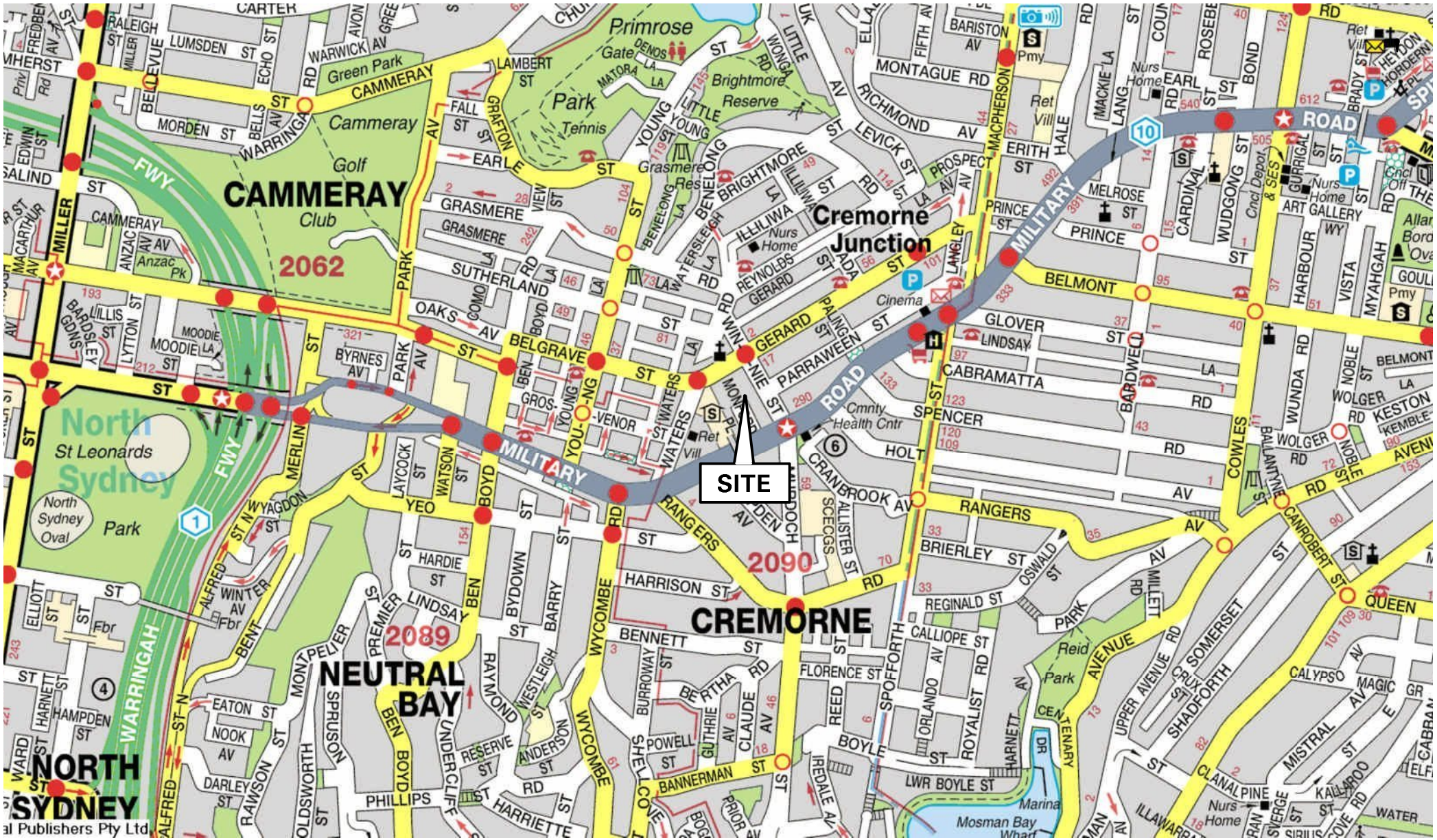
Plate 5: 1-3 Gerard Street in the north-western section of the site.

Plate 6: the northern section of the site viewed facing north-east, with Gerard Street to the left.

Plate 7: former residential houses now used as school buildings in the northern section of the site.

Plate 8: the northern section of the site viewed facing south-west.

REPORT FIGURES



NOTES:
Figure 1 has been recreated from UBD on disc (version 5.0). Figure is not to scale.

UBD Map ref: 216 K8

Reference should be made to the report text for a full understanding of this plan.

ENVIRONMENTAL INVESTIGATION SERVICES	Project Number: **E27775K**	Title: **SITE LOCATION PLAN**
	Figure: **1**	Address: **REDLANDS 272 MILITARY ROAD, CREMORNE, NSW**