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26 August 2016

NSW Department of Education c/o Louise Browne Grimshaw Architects LLP Level 3, Hickson Road Sydney NSW 2000

Via email: <u>Louise.Browne@grimshaw-architects.com</u> cc: <u>Tim.Wright@douglaspartners.com.au</u>

Dear Louise,

Re: Interim Advice No.1 – Review of Existing Information for Redevelopment of Parramatta Public and Arthur Phillip High Schools, Macquarie Street, Parramatta, NSW

A. Introduction

Grimshaw Architects LLP (Grimshaw), on behalf of NSW Department of Education (NSW DOE), has appointed Kylie Lloyd of Zoic Environmental Pty Ltd (Zoic) as NSW EPA accredited Contaminated Site Auditor (Accreditation No.0302) to conduct an audit at 80-100 and 175 Macquarie Street, Parramatta, NSW ("the site").

The aim of the engagement is to enable a site audit statement (SAS) and associated site audit report (SAR) to be prepared that confirms the suitability of the site, for proposed redevelopment as a high and primary school, in accordance with the NSW DEC (2006) Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (2nd edition).

B. Scope of Audit and Nature of Interim Advice

NSW DEC (2006) describes the site assessment and audit process as:

- (i) *Consultant is commissioned to assess contamination.* The contaminated site consultant designs and undertakes the site assessment and, where required, all remediation and validation activities to achieve the objectives specified by the owner or developer; and
- (ii) Site auditor reviews the consultant's work. The site owner or developer commissions the site auditor to review the consultant's work. The auditor prepares a site audit report and a site audit statement at the conclusion of the review, which are given to the owner or developer.

Therefore, the contaminated land consultant and other relevant parties should be satisfied that the work to be conducted conforms to all appropriate regulations, standards and guidelines and is suitable based on the site history and the proposed land use.

The project is a State Significant Development (SDD) and based on advice dated 17 June 2016 from NSW EPA in relation to Secretary's Environmental Assessment Requirements (SEARs) is **statutory** in nature, as defined under Part 4 of the Contaminated Land Management (CLM) Act. Consequently, a site audit notification (SAN) has been forwarded to NSW EPA.

The NSW EPA recommended that *a site auditor accredited under the CLM Act (1997) must* prepare a Section A SAS for the entire development stating that the site is suitable for the proposed land uses prior to commencement of construction.

NSW EPA identified the following site specific concerns based on the information (including the draft SEARs) available on the Department of Planning and Environment (DP&E) major projects web site:

- The need to undertake a detailed assessment of potential site contamination following demolition of existing buildings, and infrastructure, including information about groundwater;
- Handling, transport and disposal of any asbestos waste and any lead-based paint waste encountered during demolition;
- Demolition, site preparation, construction and construction-related noise and vibration impacts (including recommended standard construction hours and intra-day respite periods for highly intrusive noise generating work) on noise sensitive receptors such as surrounding residences;
- Demolition, site preparation and construction phase dust control and management;
- Demolition, site preparation and construction phase erosion and sediment control and management;
- Operational noise impacts on noise sensitive receivers (especially surrounding residences) arising from operational activities such as waste collection, loading dock activities and mechanical services (including commissioning of mechanical air handling plant and equipment);
- Operational waste management within the context of waste management hierarchy; and
- Operational water and energy conservation and efficiency.

C. Current Interim Advice

In preparing this interim audit advice, the Auditor has reviewed the following reports related to land contamination assessment:

- Alliance Geotechnical Pty Limited (Alliance) (31 July 2015) Geotechnical Investigation Report (GI) at Arthur Phillip High School (APHS) and Parramatta Public School (PPS), Macquarie Street, Parramatta (Ref: 1915-GR-1-1);
- Alliance (11 August 2015) Detailed Site Investigation (DSI) at APHS and PPS, Macquarie Street, Parramatta (Ref: 1915/ER-1-1);
- Alliance (14 August 2016) Remedial Action Plan (RAP) and Asbestos Management Plan (AMP) at APHS and PPS, Macquarie Street, Parramatta (Ref: 1915-1-2);
- Douglas Partners Pty Limited (Douglas) (21 March 2016) Review of Reports Site Contamination (RSC) at APHS and PPS, Macquarie Street, Parramatta (Ref: 85374.01.R.001.Rev1);
- Douglas (21 March 2016) Review of Reports Hazardous Building Materials (RHBM) at APHS and PPS, Macquarie Street, Parramatta (Ref: 85374.01.R.002.Rev1);
- Douglas (June 2016) DRAFT Report on Detailed Site Investigation (Contamination) (DSI) at PPS, 174 Macquarie Street, Parramatta (Ref: 85374.02);
- Douglas (July 2016) DRAFT Report on Detailed Site Investigation (Contamination) (DSI) at APHS South Site, Macquarie Street, Parramatta (Ref: 85374.02); and
- Douglas (12 July 2016) Proposal for Groundwater Investigation Site Contamination at APHS and PPS, Macquarie Street, Parramatta (Ref: SYD160465.P.002.Rev0).

The purpose of the current IA is to document Auditor findings following the review of existing information related to site conditions and contamination status. This advice also outlines any data gaps identified in the existing information which should be addressed by the appointed consultant as either part of any further investigation works, or as part of any remedial or validation works that may be required at the site.

D. Summary of Site Information

In reviewing the above documents, the Auditor understands the following about the site.

Tables 1 – 3 in the annexes to this letter identifies that the site is located within a mixed use precinct with surrounding properties including residential and commercial land use. Key information from the surrounding site is defined as:

- APHS North: 80-100 Macquarie Street, Parramatta, Approximately 1.24 Ha, legally described as Lot 413 DP820541, Lots 62, 63, 63A, 64 and 65 in DP758829
- APHS South: 175 Macquarie Street, Parramatta, Approximately 0.9 Ha, Lots 1, 2 and 3 DP115296 and Part Lot 414 DP820542
- PPS North: 175 Macquarie Street, Parramatta, Approximately 0.87 Ha, Part Lot 414 DP820542 and Lots 24, 25, 26 and 27A DP449406

The site lies at approximately 10m AHD on the crest of a hill which slopes steadily to the east, north and south and there were observed to be suspected asbestos containing material (ACM fragments) located in APHS North and at the boundary of APHS South and PPS North. The site has had a history of agricultural land use prior to 1925 with a school and other public uses present since 1925, other than construction of zig-zag trenches during WWII.

It is reported that the site is underlain by Wianamatta Group Ashfield Shale and residual Blacktown Landscape group. The site has no known occurrence of acid sulfate soils. Investigations to date confirmed fill underlain by clay then shale, with depth to groundwater anticipated to be shallow based on the registered bores within 1km radius of the site encountering water between 2.4m and 7m below ground level.

Based on the history of the site the following contaminants of potential concern were identified:

- Fill Heavy metals (M8), total recoverable hydrocarbons (TRH), poly aromatic hydrocarbons (PAH), mono aromatic hydrocarbons (BTEXN), organochlorine pesticides (OCP), phenol, polychlorinated biphenyls (PCB) and asbestos
- General site
- OCP and OPP from former agricultural uses,
- Asbestos, lead in paint, synthetic mineral fibre (SMF) and PCB from hazardous materials in buildings or former building footprints;
- ACM fragments at surface;
- Contaminants associated with Defence sites including PFOS and PFOA.

The consultant has considered the contaminants of potential concern (COPC) in the following media:

- Soil
- Groundwater
- Air
- Surface water run off (unsealed area)

The investigations revealed that the concentrations of COPC generally meet the adopted site criteria with the following exceptions:

- PPS North: ACM and AF/FA in fill materials. No respirible fibres detected. TP3 and HA16
 needed immediate access restriction and covering of the latter with woodchips to limit
 wind / rain erosion.
- PPS North: Lead in BH19 at 0.5-0.6m (740mg/kg) exceeds HIL A (300mg/kg)
- PPS North: BaP in BH2, BH5 and HA14 (max 3.7mg/kg) exceeds HIL A (3mg/kg) and ESL (0.7mg/kg). BH2 results were due to the presence of bitumen.
- APHS South: BaP in BH7, BH9, BH10 and BH12 (max 110mg/kg) exceeds HIL A (3mg/kg) and ESL (0.7mg/kg). Elevated results were due to the presence of bitumen.
- APHS South: TRH F2 and F3 in BH7, BH9, BH10 and BH12 (maximum 570 and 12,000mg/kg) exceeds HIL A / Management Limit (300 and 3500mg/kg) and ESL (120 and 1300mg/kg). The TRH is heavier end and not considered to relate to solvent and ethanol odours.
- APHS South: BaP (max 0.9mg/kg) exceeds the ESL (0.7mg/kg) in natural clay.
- APHS South: whilst not identified it was considered asbestos could be present in the fill materials.

E. Auditor Comments

The existing documents provided have been reviewed against the NSW OEH (2011) Guidelines for Consultants Reporting on Contaminated Sites. The reports largely meet the guideline requirements, however, the following clarifications are requested:

- 1. To meet NSW OEH (2011) requirements please provide further detail on the **bold items** in the Auditor summary tables in the annexure to this letter.
- 2. For each of the three site areas (APHA North and South and PPS North), please summarise and confirm that potential data gaps associated with the shallow nature of investigations (i.e. hand auger holes termination on fill); small (<500ml) sample sizes for asbestos, un-investigated areas (i.e. existing building footprints or sports pitches / play areas) and chemical suite inconsistencies across the site identified in Alliance (2015) DSI have been or will be addressed by subsequent Douglas investigations / remedial and validation works.</p>
- 3. Douglas (2016) PPS DSI, General: Please confirm the address of the School. The website states 177 Macquarie Street, however, the Detailed Site Investigation states 174 Macquarie Street, Parramatta.
- 4. Douglas (2016) PPS DSI, Section 4.1 and 4.4: Please confirm distance to Parramatta River. Is it more accurately described as being 300m north east at its closest point?
- 5. Douglas (2016) PPS DSI, Section 7: Please provide a comment on the integrity of the Alliance QA/QC for samples adopted as part of this DSI.
- 6. Douglas (2016) PPS DSI, Section 7.4: Please provide a comment on the appropriateness of sampling techniques adopted by both Alliance and Douglas with respect to preservation of potential volatile contaminants.
- 7. Douglas (2016) PPS DSI, Section 9.1: Do you know what the green staining and unidentified odour might be indicative of? Please confirm that this sample was analysed, if not please provide justification why it wasn't sampled.
- 8. Douglas (2016) PPS DSI, Table E1: The Auditor notes that the previous investigation tested predominantly natural soils. Given the size of the site and the required 20 locations to be analysed to meet NSW EPA (1995) requirements in both fill and natural material, please discuss the appropriateness of Alliance's investigation and whether the fill has been appropriately characterised.
- 9. Douglas (2016) PPS DSI, PDF Page 88: Given the known presence of asbestos at the site, please confirm why the use of sub sampled 30-60g samples of soil for asbestos analysis is appropriate to characterise the site to meet NEPM (2013) requirements, especially since AF and FA are potentially present?

- 10. Douglas (2016) PPS DSI, Laboratory Data: Please provide copies of SRN.
- 11. Douglas (2016) APHS DSI: Please confirm address for this site.
- 12. Douglas (2016) APHS DSI: Please provide more detail on the history of Lancer Barracks to the south of the site. It is noted that an internet search of the adjacent barracks / military use of site may assist with information on its history and land use required to determine potential COPC that could be present to address NSW EPA concerns and ensure that these are included in any future analysis.
- 13. Douglas (2016) APHS DSI, Section 4.1 and 4.4: Please check distance to Parramatta River as it appears to be approximately 380m north east at its closest point.
- 14. Douglas (2016) APHS DSI, Section 7: Please provide a comment on the integrity of the Alliance QA/QC for samples adopted as part of this DSI.
- 15. Douglas (2016) APHS DSI, Section 7.4: Please provide a comment on the appropriateness of sampling techniques adopted by Alliance and Douglas with respect to preservation of potential volatile contaminants.
- 16. Douglas (2016) APHS DSI, Section 9.1: Do you know what the strong solvent / ethanol odour related to in BH8, 9 and 10 might be indicative of? Please confirm that this sample was analysed for an appropriate suite of COPCs, if not please provide justification why it wasn't sampled.
- 17. Douglas (2016) APHS DSI Section 11.2: Given that volatile TRH F2 was recorded in some samples, is it reasonable to conclude that they are not related to the solvent odours recorded in this area. Should VOC and SVOC analysis be conducted in this area to determine what COPC, if any, is present? Is there also a risk of groundwater impact beneath this potential source area?
- 18. Douglas (2016) APHS, Appendix D: The figures indicate BH7 to 12 inclusive but the logs relate to BH1 to 6, please confirm? Also please identify where solvent/ethanol odours were detected on the logs and associated PID results.
- 19. Douglas (2016) APHS DSI, Table E1: The Auditor notes that the previous investigation tested predominantly natural soils. Given the size of the site and the required 20 location to be analysed to meet NSW EPA (1995) requirements, please confirm that the fill has been appropriately characterised.
- 20. Douglas (2016) APHS DSI, PDF Page 79: Given the known presence of asbestos at the site, please confirm why the use of sub sampled 30-60g samples of soil for asbestos analysis is appropriate to characterise the site to meet NEPM (2013) requirements, especially since AF and FA are potentially present?
- 21. Douglas (2016) APHS DSI, Laboratory Data: Please provide copies of SRN.
- 22. General: Where are the PID results presented? Please provide a calibration certificate for the instrument together with a procedure for use and calibration.
- 23. Douglas (2016) Proposal for Groundwater: Prior to installation of wells, please provide rationale for their location and confirm that analysis of PFOS and PFOA will be conducted to a detection limit of <0.05µg/L. At a recent EIANZ seminar, the NSW EPA advised that detections of PFOS and PFOA in groundwater do not require further investigation (*"at this stage"*) if they fall below <0.05µg/L.

We request that Douglas provide responses to the above comments together with a copy of a RAP which includes details of additional investigations, remediation and validation works required to render the site suitable for the proposed land use as well as addressing the NSW EPA's site specific concerns (letter dated 17 June 2016).

F. Closure

This interim audit advice does not constitute a SAS or a SAR, but rather is provided to assist the Client in the assessment and management of contamination issues at the site. The information provided herein should not be considered pre-emptive of the final site audit conclusions. It represents the Auditor's opinion based on the review of currently available Site information.

Should you have any queries or wish to discuss any points, please do not hesitate to contact me.

Yours sincerely,

Kylie Lloyd Contaminated Site Auditor Zoic Environmental Pty Ltd

ANNEXURE A

Table 1: Site Identification

Title	Details	
Street Address:	APHS North: 80-100 Macquarie Street, Parramatta, NSW APHS South: 175 Macquarie Street, Parramatta, NSW	
Property Description:	APHS North: Lot 413 DP820541, Lots 62, 63, 63A, 64 and 65 in DP758829 APHS South: Lots 1, 2 and 3 DP115296 and Part Lot 414 DP820542 PPS North: Part Lot 414 DP820542 and Lots 24, 25, 26 and 27A DP449406	
Current Site Ownership:	Minister for Education	
Geographical Coordinates: (GDA MGA 56 centre of site):	APHS North: E315615.102, N6256493.085 APHS South: E315510.71, N6256419.861 PPS North: E:315641.835, N6256395.205	
Property Size:	APHS North: Approximately 1.24 Ha APHS South: Approximately 0.9 Ha PPS North: Approximately 0.87 Ha	
Local Government Area:	Parramatta City Council	
Zoning – Existing:	No information provided	
Zoning – Previous:	No information provided	

Table 2: Immediate Site Surrounds

Title	Details	
North:	Commercial land use (including mechanic workshop) fronting George Street	
South:	Little Street, a military museum, Lancer Barracks and NSW Police Headquarters	
East:	Charles Street beyond which lies commercial land uses	
West	Barrack Lane and commercial land uses fronting Smith street, north of Macquarie Street	
	Smith Street, high density redevelopment and Sydney Water, south of Macquarie Street	

Table 3: General Site Condition

Title	Details	
Topography and Drainage:	The site lies at approximately 10m AHD on the crest of a hill which slopes steadily to the east, north and south.	
	The APHS North grassed sports ground was flat with a batter on the southern and western sides sloping down from Macquarie Street and the car park to the sports ground.	
	In unsealed areas, precipitation is anticipated to infiltrate the ground surface until saturation and then flow towards low lying areas towards the east and into the stormwater system.	
Boundary Condition:	The entire site was bound by a 2.5m high fence with secure gates	
Visible Signs of Contamination:	Suspected ACM fragments were observed at the surface to the north of the school and slope west of demountable buildings (APHS North) and at the centre of the southern boundary (APHS South / PPS North)	

Title	Details	
Visible Signs of Plant Stress:	No information provided	
Presence of Drums, Wastes and Fill Materials:	No UST, AST or bulk storage of dangerous chemicals or other hazardous goods was observed.	
	Fill material was present across the site to depths of between 0.3 and 1m bgl	
Odours:	No odours noted	
Condition of Buildings & Roads:	APHS North comprises approximately 20 buildings (including a sports hall and 19 demountable classrooms), a partially sealed/unsealed car park with driveway, sports hall and soft bitumen covered sports courts.	
	APHS South comprises a number of large school buildings, a bitumen covered car park and bitumen covered playground at the centre.	
	PPS North comprises a large brick building, 10 demountable classrooms, a car park, a large metal awning and a number of playgrounds including a large area in the centre which was covered in soft bitumen.	
Quality of Surface Water:	No surface water is present on site	
Flood Potential:	No information provided	
Relevant Local Sensitive	The nearest surface water receptor is the Parramatta River (240m east)	
Environments:	The current school land uses represent local sensitive environments	
Other Relevant Information:	Inaccessible areas of the site included sports courts (APHS North), all building footprints, the majority of soft bitumen areas (PPS North) and hard bitumen areas (APHS South)	

Table 4: Site History

Title	Details	
Previous Land Use & Chronological List:	 Prior to 1925: Agricultural land use 1925-present: school and other public uses except construction of zig- zag trenches during WWII 	
Land Titles:	APHS	
	• 1918-1990: Crown Land (with public school, child care, asylum for infirm)	
	• 1990-2003: State of NSW	
	• 2003-present: Minister for Education and Training	
	PPS	
	 1882-1988: Private owner, War Services Homes, King George V, Minister for public instruction / Council of Education 	
	• 1988-present: Minister for Education	
Summary of Council Records:	No information provided	
EPA Records:	No information found for the site and surrounds in public registers when searched on 10 August 2015.	
	NSW EPA advised that the site was previously used as or is adjacent to a Barracks and may have included above and below ground fuel storage and use of fire fighting foams (potentially containing PFOS or PFOA)	
WorkCover Dangerous Goods Licenses/ USTs/ ASTs:	No information provided	
Summary of Aerial Photographs	APHS North	
(on site and adjacent sites):	1930: Barracks and unsealed area	
	1943: Most buildings removed and cleared areas comprised zig-zag trenches associated with WWII were present	
	1951: Unchanged except backfill of trenches	

Title	Details
	1961: Area to west of building cleared
	1978: Removal of building and earthworks consistent with embankment west of sports ground. The school hall was constructed and area to the south was a sports hall. The remainder was vacant and unsealed
	1991: No significant changes
	2002: New buildings constructed in the location of the existing demountables
	2015: Construction of new demountable buildings APHS South and PPS
	1930: Buildings generally consistent with current layout with unsealed areas and trees
	1943: Similar with some minor building configuration changes and removal of two buildings
	1951: Two buildings constructed at centre of southern boundary
	1961: Construction of two buildings and removal of one building
	1978: APHS South layout consistent with present day. PPS North layout still evolving with removal and addition of structures
	1991: Bitumen laid around buildings
	2002: New buildings constructed in the location of the existing demountables
	2015: Construction of new demountable buildings
	Surrounds
	1930: North and east were residential and south and west were commercial with minor residential
	1943: No significant changes
	1951: No significant changes
	1961: Commercial buildings constructed to the north and west
	1978: further commercial development to north and east
	and south respectively
	2002: Continuing high rise and commercial development
Summary of Historical Site Photos (where available):	No information provided
Description of Manufacturing / Industrial Processes and Location:	No manufacturing or industrial processes are known to have occurred on site.
inventory of Chemicals and Wastes and their Location:	No UST, AST or bulk storage of chemicals are known to have occurred on site.
	Considerable demolition and earthworks has occurred during the site history and the presence of uncontrolled filling (including asbestos and other hazardous building materials) is considered likely.
Product Spill and Loss History:	Not applicable (refer above)
Discharges to Land, Air & Water:	None are known to have occurred (refer to permits, licences and approvals below)
Complaint History:	No information provided
Sewer & Service Plans:	No information provided
Local Site Knowledge:	No additional information available
Local Literature Review:	No additional information available
Permits, Licenses and Approvals: A search of the NSW EPA registers on 10 August 2015 confirme for the site or immediate surrounds under CLM Act 1997 or PO	

Title	Details	
	A search of the NSW EPA registers on 1 June 2016 confirmed no records for the site or immediate surrounds under CLM Act 1997 or POEO Act 1997.	
Other Relevant Information:	www.lancers.org.au indicated that Lancer Barracks were built in Parramatta between 1818 and 1820 to house the British troops who garrisoned the then colony of New South Wales and is now a military museum.	
Table 5: Subsurface Conditions		
Title	Details	
Geology Map Conditions	The Sydney 1:100,000 Geological Sheet 9030 (1983) indicates that the site is underlain by Wianamatta Group Ashfield Shale	
Soil Map Conditions	The Sydney 1:100,000 Soil Landscape Sheet indicates that the site is underlain by the residual Blacktown Landscape group.	
Acid Sulfate Soils:	The NSW National Resource Atlas Acid Sulfate Soil Risk Maps indicates that the site overlies and area of "no know occurrence of acid sulfate soil	
Salinity:	No information provided	
Soil Classification Method:	AS1726-1993 Geotechnical Site Investigations	
Ground Conditions Summary from	Fill: 0.3 to 1.0m bgl	
boreholes records:	Clay: 0.3 - 2.2m+ bgl	
	Shale: 0.5-1.2m+ bgl	
Location of Fill Materials:	Entire site	
Regional Hydrogeology:	No information provided	
Summary of Monitoring Wells:	None installed	
Depth to Groundwater:	Unknown at present but potentially as shallow as 2.4m bgl (refer below)	
Direction and Rate of Groundwater Flow:	Groundwater is expected to flow eastwards towards Parramatta River. No rate of flow was provided.	
Use of Water Abstraction:	5 registered bores were identified within a 1km radius with standing water level at between 2.4 and 7m bgs. The closest of which lies 750m east.	
Nearest Water Body:	The nearest surface water receptor is the Parramatta River (240m east)	
Background Water Quality:	No information provided	
Preferential Water Courses:	None present on site	
Summary of Local Meteorology:	No information provided	

Table 6: Summary of Works Completed

Report Objectives, Scope and Outcomes	
The objective of the report was to provide information for the design of the	
new building footings, lot classification, soil aggressivity for steel and	
concrete structures.	
The GI comprised drilling of 13 boreholes with insitu testing and sampling followed by laboratory testing, engineering analysis and reporting.	
The outcomes of the report relevant to this Audit were:	
Ground conditions encountered included fill (0.3-1.5m bgl), alluvium	

Date	Report Objectives, Scope and Outcomes
	(locally to 5.1m bgl), stiff clay (1.5 to 5m bgl) and shale (2.8 to 5.8m);
	 Groundwater was encountered at depths between 1.7 and 3.6m bgl (3.3- 5.9m AHD) in alluvium and residual soils; and
	 No basements are proposed for the site but cut and fill will be required to achieve proposed site levels.
Alliance 11 August 2015 Detailed Site Investigation (DSI) (Ref: 1915/ER-1-1)	The objectives of this report were to assess the potential for soil and groundwater contamination on the site, based on a review of site setting and past land uses (i.e. site history) and to conduct an investigation to characterise potential contamination at the site and to draw conclusions regarding the suitability of the site for the proposed high rise school use, or to make recommendations to enable such conclusions.
	The scope of the report included:
	 Review of topographic, geological and soil maps;
	 Assessment of hydrogeological conditions and abstraction bores;
	 Land title and historical aerial photograph review;
	Review of NSW EPA public registers;
	 Formation of 55 sample bores using a drill rig, hand auger and surface sampling;
	 Laboratory analysis for M8 (53), PAH (10), TPH (10), BTEX (10), OCP/OPP/PCB (10) and asbestos (31); and
	Preparation of a DSI report.
	The outcomes of the report were:
	 Potential AEC included former agricultural uses; hazardous materials in former and current structures; ACM fragments on ground surface and fill of unknown origin;
	• Fill material in the northern portion ranged between 0.3 to 1.0m bgl. ACM was observed at 2 locations at the surface (BH7 and HA9) with no other visual or olfactory evidence of contamination;
	 Fill material in the southern portion ranged between 0.4 to 0.7m bgl. ACM was observed at 1 location at the surface (HA16) with no other visual or olfactory evidence of contamination;
	 All COPC were below the adopted residential land use criteria with the exception of ACM and friable asbestos in BH4, HA9 and HA16;
	 A RAP will need to be prepared to facilitate management or off site disposal
	 An Asbestos Management Plan (AMP) will need to be prepared to facilitate development works; and
	• A Validation Report will need to be prepared to conclude that the site is suitable for the proposed land use.
Alliance	The objectives of the report were:
14 August 2016 Remedial Action Plan (RAP) and Asbestos Management Plan (AMP) (Ref: 1915-1-2)	 Document procedures and standards to remove or manage risks associated with ACM and friable asbestos impacted soils;
	 Identify a remedial strategy to make the site suitable for use as a high rise school with open space;
	 Ensure asbestos is managed during construction works to protect human health and the environment; and
	Present an unexpected finds protocol.
	The outcomes of the report were:
	 Asbestos quantification using test pits (1 per 100m2) and NEPM (2013) methodology in Area 1 (1500m2 north site adjacent to sports fields), Area 2 (800m2 north site north of school hall), and Area 3 (500m2 south site near demountable buildings);
	 Visual inspection of currently inaccessible areas of the site (including sports courts, building footprints and soft bitumen areas at PPS and hard bitumen areas at APHS:

Date	Report Objectives, Scope and Outcomes	
	 Remediation of asbestos in soil in the vicinity of BH4 (250m2 to depth of 0.5m), HA9 (280m2 to 0.4m depth), and, HA16 (100m2 to at least 0.4m depth); 	
	 Remediation options included onsite treatment of bonded ACM, off site disposal or consolidation and isolation; 	
	• Validation works as per NEPM (2013);	
	 Asbestos management as per WHS Regulation 2011, WorkCover and Safe Work Australia requirements; and 	
	 If the RAP is followed, the site can be made suitable for the proposed land use with no EMP and no notation on title. 	
Douglas 21 March 2016	The objective was to conduct a review of existing site contamination reports and provide:	
Review of Site Contamination	• A summary of the findings;	
(RSC)	 Identify data gaps or omissions; and 	
(Ref: 85374.01.R.001.Rev1)	 Provision of initial advice relating to additional investigations or remediation / management options for the proposed redevelopment. 	
	The outcomes of the report were:	
	 The Alliance reports need to be updated to include WA(2009) requirements; 	
	 Reassessment of the extent of the areas requiring additional asbestos quantification works and areas of remediation; 	
	 Inclusion of the requirements for the assessment, consolidation and isolation of AF/FA impacted material; and 	
	 Updating of the validation plan and inclusion of remediation acceptance criteria. 	
Douglas 21 March 2016	The objective was to conduct a review of existing and historic asbestos registers and asbestos / hazmat reports and provide:	
Review of Hazardous Building	• A summary of the findings;	
Materials (RHMB)	 Identify data gaps or omissions; and 	
(Ref: 85374.01.R.001.Rev2)	 Provision of initial advice relating to additional surveys or remediation / management options to meet requirements of WHS Regulation 2011 	
	The report concluded that an intrusive asbestos and hazardous materials survey is conducted and an updated asbestos register prepared prior to demolition of any buildings. The works would need to be conducted out of hours to ensure no staff, pupils or members of the public were present. The asbestos register would then be used for the basis of a Removal Control Plan to be incorporated into the Demolition Action Plan for the site.	
Douglas June 2016	The objective of the report was to address data gaps in previous reports as identified in Douglas (March 2016) RSC referred to above.	
DRAFT PPS DSI	The scope of the report included:	
(Ref: 85374.02)	 Assessment of existing analytical data; 	
	 Conduct statistical analysis of the lead concentrations recorded in filling and natural soils; 	
	 Determine the presence or otherwise of dangerous goods; 	
	 Excavate 3 hand dug pits to 0.5m; 	
	 Drill 6 hand auger holes to 0.5m; 	
	Sample collection and screening for VOC; and	
	 Analysis of selected samples for M8, TPH, BTEX, PAH, OCP, OPP, PCB, asbestos and pH / CEC including QA/QC. 	
	The outcomes of the report were:	
	 Immediate Action: Restrict access to TP3 and HA16 and capping HA16 with woodchips to prevent asbestos material spread in wind or rain events; 	
	 Conduct hazardous building materials survey prior to demolition: 	

Date	Report Objectives, Scope and Outcomes		
	Removal of hazardous materials and issue of a clearance certificate;		
	 Demolition of buildings and removal of hardstanding; 		
	 Investigation targeting lead, asbestos and BaP including leachate testing; 		
	 Assessment of remedial options for soil contamination with consideration of containment and EMP; and 		
	 Preparation of an unexpected finds protocol for implementation during demolition and construction. 		
Douglas	The objective of the report was to inform the design of the proposed redevelopment of APHS		
DRAFT APHA DSI	The scope of the report included:		
(Bef: 85374 02)	 Assessment of existing analytical data; 		
(101.00014.02)	• Conduct statistical analysis of the lead concentrations recorded in filling and natural soils;		
	 Determine the presence or otherwise of dangerous goods; 		
	• Drill 6 hand auger holes to 0.4 and 1.1m;		
	 Sample collection and screening for VOC; and 		
	 Analysis of selected samples for M8, TPH, BTEX, PAH, OCP, OPP, PCB, asbestos and pH / CEC including QA/QC. 		
	The outcomes of the report were:		
	 No Immediate Management Action was required; 		
	 Conduct hazardous building materials survey prior to demolition; 		
	 Removal of hazardous materials and issue of a clearance certificate; 		
	 Demolition of buildings and removal of hardstanding; 		
	 Investigation targeting previously untested ares of hardstanding and buildings including solvent / ethanol odours reported in BH8, BH9 and BH10 including leachate testing for lead and nickel results; 		
	 Assessment of remedial options for soil contamination with consideration of containment and EMP; and 		
	 Preparation of an unexpected finds protocol for implementation during demolition and construction. 		
Douglas 12 July 2016 Proposal for Groundwater Investigation (PGI) (Ref: SYD160465.P.002.Rev0)	The document outlines the scope of groundwater investigation to investigate the potential for contamination to have occurred at the hydraulically upgradient Lancer Barracks which then may potentially impact the site. The COPC could include diesel, waste oil and PFOS or PFOA based fire-fighting foams.		
	The scope of the proposed works include:		
	 Install three 8m deep groundwater monitoring wells, one each in PPS, APHS South and APHS North; 		
	 Well development by purging three well volumes; 		
	 Groundwater sampling using a peristaltic pump whilst recording pH, conductivity, DO and ORP; 		
	 Analysis including QAQC (dup, trip spike and blank) at a NATA accredited laboratory for M8, TRH, PAH, phenols, PCB, OCP, OPP, VOC, poly-fluoroalkyl substances (PFAS, including PFOS and PFOA) and hardness; and 		
	 Presentation of the results in the relevant PPS, APHS South and APHS North DSI reports. 		

Alliance and Douglas identified the following potentially contaminating activities and contaminants of concern associated with past and present activities across the site.

Area	Activity	Potential Contaminants
Entire Site	Uncontrolled Filling	Heavy metals (M8), total recoverable hydrocarbons (TRH), poly aromatic hydrocarbons (PAH), mono aromatic hydrocarbons (BTEXN), organochlorine pesticides (OCP), phenol, polychlorinated biphenyls (PCB) and asbestos
Entire site	Former Agricultural Uses	OCP and OPP
Entire site	Hazardous materials in existing buildings	Asbestos, lead in paint, synthetic mineral fibre (SMF) and PCB
Entire site	Hazardous materials in former building footprints	Asbestos, lead in paint, SMF and PCB
Entire site	Suspected ACM fragments at surface	Asbestos
Barracks/ Military Use	NSW EPA advised that APHS North and south of APHS South have been used for Defence purposes	COPC associated with Defence site – to be confirmed by consultant PFOS or PFOA based fire-fighting foams

Table 7: Summary of Potentially Contaminating Activities