

REPORT TO HEALTH INFRASTRUCTURE C/-CBRE

ON PRELIMINARY SITE INVESTIGATION (PSI)

FOR PROPOSED NEPEAN HOSPITAL STAGE 2 DEVELOPMENT

AT NEPEAN HOSPITAL, DERBY STREET, KINGSWOOD, NSW

Date: 12 November 2021 Ref: E34236PLrpt

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Executive Summary

Health Infrastructure ('the client') commissioned JK Environments (JKE) to undertake a Preliminary Site Investigation (PSI) for the proposed Stage 2 development at Nepean Hospital, Derby Street, Kingswood, NSW. The purpose of the PSI is to make a preliminary assessment of site contamination. The site location is shown on Figure 1 and the investigation was confined to the Stage 2 development boundaries (referred to herein as 'the site') as shown on Figure 2 attached in the appendices.

This report has been prepared to address the requirements for a PSI under State Environmental Planning Policy No.55 – Remediation of Land (1998)¹, as required by the Planning Secretary's Environmental Assessment Requirements (SEARs) for the State Significant Development (SSD).

The primary aims of the PSI were to: identify past or present potentially contaminating activities at the site; identify the potential for site contamination; and assess the need for further investigation. The objectives were to:

- Provide an appraisal of the past site use(s) based on a review of historical records;
- Assess the current site conditions and land use by completing a site walkover inspection;
- Identify potential contamination sources/areas of environmental concern (AEC) and contaminants of potential concern (CoPC);
- Prepare a conceptual site model (CSM);
- Assess the need for further investigation; and
- Comment on site suitability for the proposed development (from a contamination viewpoint).

The scope of work included the following:

- Review of site information, including background and site history information from various sources outlined in the report;
- A walkover site inspection; and
- Preparation of a PSI report presenting the results of the assessment, including a CSM.

The information reviewed for this PSI indicated that the site has historically been vacant or used for grazing/agricultural purposes, prior to it being developed as part of the wider hospital campus. The historical storage of flammable liquids (notably xylene), underground storage tanks (USTs) within the Stage 2 site area and the wider hospital campus, and detectable concentrations of xylene within groundwater were identified during previous investigations. These previous investigations did not identify significant, widespread contamination in fill. However, asbestos has been found in fill and at the ground surface, both within the Stage 2 site area and within the wider hospital.

Based on the scope of work undertaken for this assessment, JKE identified the following potential contamination sources/AEC:

- Fill material;
- Historical agricultural use;
- Use of pesticides;
- Suspected UST and flammable liquids store;
- Hazardous Building Material; and
- Off-site sources (within the wider hospital campus).

Considering the above, and based on a qualitative assessment of various lines of evidence as discussed throughout this report, JKE are of the opinion that there is a potential for site contamination. Most notably, the potential source(s) of the hydrocarbons in groundwater has not been confirmed and there is uncertainty around the contamination status of the fill, particularly with regards to asbestos.

Based on the potential contamination sources/AEC identified, and the potential for contamination, further investigation of the contamination conditions is considered to be required.

¹ State Environmental Planning Policy No. 55 – Remediation of Land 1998 (NSW) (referred to as SEPP55)



JKE is of the opinion that the historical land uses and potential sources of contamination identified would not preclude the proposed development. Considering the historical land uses at the site and the known presence of fill from previous investigations, a Detailed Site Investigation (DSI) is required to establish whether remediation is necessary. JKE understand that due to access constraints associated with the continued operation of the hospital, sampling for the DSI may be limited. However, the DSI should be undertaken to the extent practicable. Prior to undertaking the DSI, a Sampling, Analysis and Quality Plan (SAQP) should be prepared.

JKE also recommend that a waste classification be undertaken to classify material to be excavated and disposed off-site for the proposed development.

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



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Attachments

Appendix A: Report Figures Appendix B: Site Information Appendix C: Proposed Development Plans Appendix D: Guidelines and Reference Documents



Abbreviations

Asbestos Fines/Fibrous Asbestos	AF/FA
Ambient Background Concentrations	ABC
Added Contaminant Limits	ACL
Asbestos Containing Material	ACM
Australian Drinking Water Guidelines	ADWG
Area of Environmental Concern	AEC
Australian Height Datum	AHD
Acid Sulfate Soil	ASS
Above-Ground Storage Tank	AST
Below Ground Level	BGL
Benzo(a)pyrene Toxicity Equivalent Factor	BaP TEQ
Bureau of Meteorology	BOM
Benzene, Toluene, Ethylbenzene, Xylene	BTEX
Cation Exchange Capacity	CEC
Contaminated Land Management	CLM
Contaminant(s) of Potential Concern	CoPC
Chain of Custody	COC
Conceptual Site Model	CSM
Development Application	DA
Detailed Site Investigation	DSI
Ecological Investigation Level	EIL
Ecological Screening Level	ESL
Environmental Management Plan	EMP
Excavated Natural Material	ENM
Environment Protection Authority	EPA
Environmental Site Assessment	ESA
Fibre Cement Fragment(s)	FCF
Health Investigation Level	HILs
Health Screening Level	HSLs
JK Environments	JKE
Map Grid of Australia	MGA
National Association of Testing Authorities	ΝΑΤΑ
National Environmental Protection Measure	NEPM
Organochlorine Pesticides	OCP
Organophosphate Pesticides	OPP
Polycyclic Aromatic Hydrocarbons	РАН
Potential ASS	PASS
Polychlorinated Biphenyls	PCBs
Per-and Polyfluoroalkyl Substances	PFAS
Photo-ionisation Detector	PID
Protection of the Environment Operations	ΡΟΕΟ
Practical Quantitation Limit	PQL
Remediation Action Plan	RAP
Sampling, Analysis and Quality Plan	SAQP
Secretary's Environmental Assessment Requirements	SEARS
Site Audit Statement	SAS
Site Audit Report	SAR
Source, Pathway, Receptor	SPR
State Significant Development	SSD
Standing Water Level	SWL
Total Recoverable Hydrocarbons	TRH
United States Environmental Protection Agency	USEPA
Underground Storage Tank	UST
	•••



VENM

voc

wно

WHS

Virgin Excavated Natural Material Volatile Organic Compounds World Health Organisation Work Health and Safety

Units

Litres	L
Metres BGL	mBGL
Metres	m
Millivolts	mV
Millilitres	ml or mL
Milliequivalents	meq
micro Siemens per Centimetre	μS/cm
Micrograms per Litre	μg/L
Milligrams per Kilogram	mg/kg
Milligrams per Litre	mg/L
Parts Per Million	ppm
Percentage weight for weight	%w/w
Percentage	%



1 INTRODUCTION

Health Infrastructure ('the client') commissioned JK Environments (JKE) to undertake a Preliminary Site Investigation (PSI) for the proposed Stage 2 development at Nepean Hospital, Derby Street, Kingswood, NSW. The purpose of the PSI is to make a preliminary assessment of site contamination. The site location is shown on Figure 1 and the investigation was confined to the Stage 2 development boundaries (referred to herein as 'the site') as shown on Figure 2 attached in the appendices.

This report has been prepared to address the requirements for a PSI under State Environmental Planning Policy No.55 – Remediation of Land (1998)², as required by the Planning Secretary's Environmental Assessment Requirements (SEARs) for the State Significant Development (SSD).

JKE has completed a number of investigations across the wider Nepean Hospital campus for various historical development. A detailed review of these reports is provided in Section 2.

1.1 Proposed Development Details

Based on the details provided, JKE understand that the proposed development includes:

- Substantial demolition works throughout North Block;
- Demolition of the Doctor's Accommodation, Hope Cottage and Pathology buildings;
- Alterations and additions to the remaining buildings and structures;
- Roadworks and landscaping in external areas and along Barber Avenue; and
- Construction of the main Stage 2 building which will link the Stage 1 tower building.

Details of cut/fill earthworks have not been provided at this stage; however, it is anticipated that excavations will be required for the main Stage 2 building, footings and underground services. Some filling is also expected to occur, while the majority of the roadways/driveways and landscaped areas are anticipated to be completed close to the existing grade. A concept layout plan for the Stage 2 development is attached in Appendix C.

1.2 Aim and Objectives

The primary aims of the PSI were to: identify past or present potentially contaminating activities at the site; identify the potential for site contamination; and assess the need for further investigation. The objectives were to:

- Provide an appraisal of the past site use(s) based on a review of historical records;
- Assess the current site conditions and land use by completing a site walkover inspection;
- Identify potential contamination sources/areas of environmental concern (AEC) and contaminants of potential concern (CoPC);
- Prepare a conceptual site model (CSM);
- Assess the need for further investigation; and



² State Environmental Planning Policy No. 55 – Remediation of Land 1998 (NSW) (referred to as SEPP55)



• Comment on site suitability for the proposed development (from a contamination viewpoint).

1.3 Scope of Work

The investigation was undertaken generally in accordance with a JKE proposal (Ref: EP54363P) of 15 June 2021 and written acceptance from the client of 2 July 2021. The scope of work included the following:

- Review of site information, including background and site history information from various sources outlined in the report;
- A walkover site inspection; and
- Preparation of a PSI report presenting the results of the assessment, including a CSM.

The scope of work was undertaken with reference to the National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)³, guidelines made under or with regards to the Contaminated Land Management Act (1997)⁴ and SEPP55. A list of reference documents/guidelines is included in the appendices.

³ National Environment Protection Council (NEPC), (2013). National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013). (referred to as NEPM 2013)

⁴ Contaminated Land Management Act 1997 (NSW) (referred to as CLM Act 1997)



2 SITE INFORMATION

2.1 Site Identification

Table 2-1: Site Identification

Current Site Owner (certificate of title):	Health Infrastructure NSW
Site Address:	Derby Street, Kingswood, NSW
Lot & Deposited Plan:	Part of Lot 4 in DP1238301
Current Land Use:	Hospital
Proposed Land Use:	Hospital
Local Government Authority (LGA):	Penrith City Council
Current Zoning:	SP2: Infrastructure
Site Area (m²) (approx.):	28,000m² (2.8ha)
RL (AHD in m) (approx.):	~53-55
Geographical Location (decimal degrees) (approx. centre of	Latitude: -33.758899
site):	Longitude: 150.7136
Site Location Plan:	Figure 1
Previous JKE Investigation Location Plan:	Figure 2
Notable Features from Previous Investigations:	Figure 3
Notable Features Plan:	Figure 4

2.2 Site Location and Regional Setting

The site is located within the grounds of the wider Nepean Hospital campus and is bound by The Nepean Private Hospital to the north and Parker Street to the west. The site is located approximately 600m to the north-west of a small tributary to Werrington Creek.

2.3 Topography

The regional topography is gently undulating characterised by a local ridgeline that runs on a north-south orientation, roughly along Parker Street and the Northern Road. The site itself consists of gentle undulating land with a general slope down to the east at a gradient of approximately 2-3°. Large portions of the site have been levelled for the existing hospital buildings and surrounding development.



2.4 Site Inspection

A walkover inspection of the site was undertaken by JKE on 7 September 2021. The inspection was limited to accessible areas of the site and immediate surrounds. The internal areas of buildings were generally not inspected due to access restrictions. Selected site photographs obtained during the inspection are attached in the appendices.

A summary of the inspection findings is outlined in the following subsections:

2.4.1 Current Site Use and/or Indicators of Former Site Use

The majority of the site is occupied by Nepean Hospital buildings and infrastructure. Structures on site include five adjoining buildings of brick, steel, cement and concrete rendered construction with metal roofing. Site buildings were of varying construction age, with some noted to be from circa 1960s/1970s. Based on the age of the site buildings, it is considered likely that hazardous building materials including asbestos are present in the building fabric. No signs or indicators of former land use other than a hospital was identified.

2.4.2 Boundary Conditions, Soil Stability and Erosion

External site areas were mostly concrete or asphalt/bitumen paved and used for vehicle parking and internal access. However, localised garden beds and landscaped areas occur throughout the site, notably in the northeastern areas and adjoining the access roads that form the western areas of the site, accessed from Parker Street. The boundaries of the site were generally not clearly defined by fences or cadastral boundaries as the site was nominated to encompass the proposed Stage 2 development area.

2.4.3 Presence of Drums/Chemical Storage and Waste

The storage of chemicals (other than very small quantities of cleaning products) was not observed at the time of the inspection, although it is noted that the internal areas of buildings were generally not accessible. A flammable liquids store was located in the central west portion of the site. The Golder reports identified a historical diesel underground storage tank (UST) in the south-western area of the site (see Figure 2); however, we were not able to identify any conclusive indicators of the UST during our inspection.

2.4.4 Evidence of Cut and Fill

Portions of the site may have historically been cut and/or filled to create a level platform for the existing development. Filling has occurred across the site and previous investigations generally encountered fill to depths ranging from approximately 0.5m to 1.5m below ground level (BGL). The filling is evident by inclusions such as gravels and debris at the surface where soils are exposed.

2.4.5 Visible or Olfactory Indicators of Contamination (odours, spills etc)

No indicators of contamination such as staining or odours were identified at the time of the inspection. Fill was evident at the ground surface in some areas as noted above.



2.4.6 Drainage and Services

A network of stormwater drains was observed across the site and presumed to be plumbed into the local stormwater system. The majority of surface water runoff is expected to eventuate at the bounding street frontages and ultimately discharged into the municipal stormwater system. Extensive local services occur throughout the hospital including electrical, telecommunications, water, hydrants etc.

2.4.7 Sensitive Environments

Sensitive environments such as wetlands, ponds, creeks or extensive areas of natural vegetation were not identified on site or in the immediate surrounds.

2.4.8 Landscaped Areas and Visible Signs of Plant Stress

Localised garden beds and landscaped areas occur throughout the site, notably in the north-eastern areas and adjoining the access roads that form the western areas of the site, accessed from Parker Street. The garden beds were at ground level and contained young native trees, low-lying shrubs and creepers. No visual signs of plant stress or dieback was identified at the time of the inspection.

2.5 Surrounding Land Use

During the site inspection, JKE observed the following land uses in the immediate surrounds:

- North Barber Avenue and Nepean Private Hospital;
- South North Block and the wider hospital campus;
- East Internal service roads and the Barber Street multi-storey car park;
- West Wider hospital campus buildings and the 'Stage 1 Area' hospital development construction site.

2.6 Underground Services

The 'Dial Before You Dig' (DBYD) plans were reviewed for the PSI in order to establish whether any major underground services exist at the site or in the immediate vicinity that could act as a preferential pathway for contamination migration. Local service plans were also supplied by the client. The site contains numerous underground services associated with the hospital, not all of which are shown on the DBYD. There is a potential for underground service trenches to act as preferential contaminant migration pathways. However, this would need to be further assessed depending on the nature, extent and contaminant fate and transport properties of any identified contaminants.



3 PREVIOUS INVESTIGATION AND SITE HISTORY SUMMARY

3.1 Preliminary Environmental Site Assessment (PESA)

JKE (as EIS, prior to our rebranding) completed a PESA (Ref: E29845KPrpt)⁵ of the wider hospital campus. The 2017 PESA report also referenced and reviewed two previous contamination reports prepared by Golder Associates (Ref: 107622058-004-R-RevA⁶ and Ref:107622059-003-R-Rev0)⁷ which covered other portions of the wider hospital campus, with some overlap into the Stage 2 site area.

The 2017 PESA included a site inspection and soil sampling and analysis from 16 borehole locations identified as BH1 to BH16. All of these locations with the exception of BH6, BH7 and BH8 were located within the vicinity of the Stage 2 site area, as shown on Figure 2. The 2017 PESA report identified the following:

- A search of SafeWork NSW records did not identify any records pertaining to the wider hospital campus. However, the report noted that it is possible that the search did not identify any records due to the various street addresses that have historically been used for the hospital. The 2017 PESA scope also included a review of the Golder 2010a and 2010b reports which did identify the storage of dangerous goods, some of which are located within the Stage 2 site area (shown on Figures 3 and 4);
- Potential sources of contamination/AEC outlined in the CSM included fill material, above-ground bulk fuel and chemical storage, former/abandoned USTs, historical agricultural use and hazardous building materials;
- All soil results were below the human-health based site assessment criteria (SAC) for a commercial/industrial land use setting; and
- Minor elevations of nickel and benzo(a)pyrene above the ecological SAC for commercial/industrial land use were identified in road base fill material beneath the asphaltic pavement.

The PESA report concluded that: "....the potential for widespread, significant contamination at the site was considered to be low to moderate. Based on the scope of work undertaken, EIS are of the opinion that the site can be made suitable for the proposed development via the completion of additional investigation, and if required, remediation."

3.1.1 Golder 2010a

The investigation was limited to the general area currently occupied by East Block, south of the Stage 2 site area, as shown on Figure 3. The Golder 2010a report included a summary of a preliminary investigation undertaken by Golder in 2009. The preliminary investigation indicated the following:

• The investigation identified no specific potential sources of contamination (past or present) associated with land use operations. Potentially contaminating past activities could have included the generation, storage and in-ground disposal of waste produced at the hospital;

⁵ EIS (2017a). Report to Health Infrastructure on Preliminary Environmental Site Assessment (Contamination) for Proposed Hospital Upgrade at Nepean Hospital, Derby Street, Kingswood, NSW. (referred to as the 2017 PESA report)

⁶ Golder (2010a). Penrith Health Campus Redevelopment Stage 3 (East Block), Nepean Hospital – Phase I & II Environmental Site Assessment dated 20 May 2010 (referred to as Golder 2010a)

⁷ Golder (2010b). Penrith Health Campus Redevelopment Stage 3A, Nepean Hospital – Phase I & II Environmental Site Assessment dated 1 July 2010 (referred to as Golder 2010b)



- CoPC included heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), total petroleum hydrocarbons (TPHs – referred to herein as total recoverable hydrocarbons, TRHs), benzene, toluene, ethylbenzene, xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), polychlorinated biphenyls (PCBs), asbestos fibres and asbestos containing materials (ACM); and
- The risk to construction workers and future site users from the CoPC was considered likely to be low, and the risk to surface and groundwater was considered likely to be negligible.

In summary, the preliminary investigation recommended:

- An intrusive investigation to confirm the above findings;
- Review of the CoPC following the investigation and visual inspection of the soils to ensure testing includes all appropriate contaminants;
- Review of the potential risks to workers, site users, surface water and groundwater, with remedial actions prescribed accordingly if required; and
- A hazardous materials survey prior to demolition of the existing structures.

The Golder 2010a investigation was designed as a detailed contamination assessment including review of historical information (Phase 1 desktop) and detailed investigation of the assessment area (see Figure 3). The investigation included sampling from 16 boreholes which met the minimum guideline density required by the NSW EPA. In summary:

- The investigation area formed part of the wider hospital campus, located to the south of the Stage 2 site area. Historical land titles indicated that the site has been owned by the Nepean District Hospital since the early 1940s. Prior to this, part of the land was owned by Frederick Nepean Jones (a Master Tanner by trade);
- A search of WorkCover NSW records (now SafeWork NSW) did not identify any records pertaining to dangerous goods storage in the investigation area. However, the search did identify a number of areas within the wider hospital site where dangerous goods have been stored, including USTs for diesel. As the records were not attached to the draft report, the location of the USTs could not be established;
- A fragment of fibre cement (possible ACM) was observed within exposed soils "to the south of East Block". Exposed soils did not indicate the presence of widespread fill materials;
- The investigation identified fill up to a maximum depth of approximately 1.6m, overlying natural soil and weathered siltstone and shale;
- Groundwater was identified at a depth of approximately 5.3m;
- Field photo-ionisation detector (PID) screening indicated a low probability of volatile organic compound (VOC) contamination, with results ranging from 0ppm to 1.7ppm; and
- A total of 15 primary samples were analysed for the CoPC listed previously. All results were below the adopted SAC for commercial/industrial land use.

Golder 2010a concluded that ".....the area of investigation is considered to have a low likelihood of extensive soil contamination and low risk to human health. However, based on the findings of the Phase I there is a potential for the presence of fragments of fibro cement which may contain asbestos. It is recommended that if these materials are encountered they are to be collected and disposed of by an appropriately licensed contractor,....".



JKE note that substantial earthworks appear to have occurred (i.e. in the Golder 2010a investigation area) following the Golder 2010a investigation. This may have included cut/fill earthworks, and/or importation of additional fill.

3.1.2 Golder 2010b

The Golder 2010b investigation was limited to three separate proposed development areas, as shown on Figure 3. These areas included a Mental Health Patient Unit in the central south of the site, an Oral Health Unit in the south-east of the site, and a new maintenance depot in the north/north-west of the wider hospital campus. The new maintenance depot investigated by Golder 2010b is located within the Stage 2 site area.

The Golder 2010b investigation was designed as a detailed contamination assessment including review of historical information (Phase 1 desktop) and detailed investigation of the three nominated areas. The investigation included sampling from a total of 25 boreholes which Golder stated met the minimum guideline density required by the NSW EPA. In summary:

- The development areas formed part of the wider hospital campus. Historical aerial photographs indicated that some cultivation activities may have occurred on site in the early to mid-1900s;
- Section 149 (2&5) planning certificates (now Section 10.7 (2&5)) indicated that the land does not: include and is not affected by the following:
 - Critical habitat;
 - Conservation areas;
 - Mine subsidence;
 - Policy adopted by council to restrict development on the land due to land slip, bushfire, tidal inundation, subsidence, acid sulfate soils or any other risk;
 - The land has not been declared an investigation or remediation area under Part 3 of the CLM Act
 1997 and is not subject of a voluntary investigation proposal or site audit statement.
- A search of WorkCover NSW records (now SafeWork NSW) was included. The records identified a number of dangerous goods stores/depots within the hospital (most of which are not considered by JKE to be significant as they relate to above ground stores for medical-related items such as nitrous oxide and oxygen). Based on a review of the records by JKE, the following was noted (reference can also be made to Figure 3):
 - A former UST (9,000L for petrol or diesel storage) was abandoned in the central-south-western section of the wider hospital (understood by JKE to be outside the Stage 2 site boundary). A letter dated September 1995 indicated that the tank was *"evacuated, filled with sand and all pipework's removed"*;
 - A former UST (25,000L) was abandoned via concrete grout filling and sealing of vents and fill points. The location of this UST is unknown. Although the details vary somewhat, based on the date of the documentation, JKE consider this may be the same UST as noted above;
 - Up to 40L of xylene was stored in a 'roofed store' in the north-western section of the wider hospital campus;
 - Up to 40L of diesel was contained within a 'storage area' in the central-southern area of the wider hospital campus;



- The investigation identified fill up to a maximum depth of approximately 2m, overlying natural soil and weathered siltstone and shale;
- Groundwater was identified at depths ranging from approximately 2.8m to 5.3m below ground level (BGL);
- Field PID screening indicated a low probability of VOC contamination, with results ranging from 0ppm to 8.5ppm;
- A total of 40 primary soil samples were analysed for the CoPC listed previously. With the exception of the presence of asbestos in one soil sample obtained from BHA (see Figure 3), all results were below the adopted SAC for commercial/industrial land use; and
- A total of four primary groundwater samples were analysed for heavy metals, TRHs, BTEX and PAHs. Marginally elevated concentrations of some heavy metals were detected. Golder considered that the metals were the result of the underlying geology (i.e. a regional condition, rather than a site-specific contamination issue). TRHs, xylene and ethylbenzene were encountered in BHI (which is within the Stage 2 site area) and BH102 (see Figure 3). The concentrations were below the SAC adopted by Golder and were considered to indicate the possibility of on-site contamination resulting from past or current uses.

Golder 2010b concluded that ".....the area of investigation is considered to have a low likelihood of extensive soil contamination and low risk to human health.".

3.2 Nepean Hospital Multi-storey Car Park Development

JKE (as EIS), completed several stages of investigation as part of the multi-storey car park development at Nepean Hospital. The data obtained as part of the 2017 PESA report was reviewed and formed the basis of these investigations. The investigations undertaken for the multi-storey car park development are summarised in the following sub-sections.

3.2.1 Preliminary Stage 2 ESA

The Preliminary Stage 2 ESA report (Ref: E29845KDrpt2.1)⁸ involved soil sampling and analysis from a total of eight borehole and test pit locations (identified as BH101 to BH108 and TP103 to TP106) and installation and sampling from three groundwater monitoring well locations. The 2017 Stage 2 ESA report identified the following:

- The investigation identified fill up to a maximum depth of approximately 1.6m, overlying natural soil and weathered siltstone and shale;
- All soil results were below the human-health based SAC for a 'public open space' land use setting;
- Asbestos was identified in fibre cement material at the ground surface and within the fill soil at several locations within the multi-storey car park site area;
- Minor elevations of nickel and TRH above the ecological SAC for commercial/industrial land use were identified in shallow fill material, however were considered not to pose a risk to ecological receptors

⁸ EIS (2017b). Report to Health Infrastructure on Preliminary Stage 2 Environmental Site Assessment for Proposed Hospital Upgrade – Multistorey Car Park at Nepean Hospital, Derby Street, Kingswood, NSW. (referred to as the 2017 Stage 2 ESA report)



due to the lack of sensitive environmental receptors at the site and the material was to removed and replaced as part of the development;

- Groundwater was identified at depths ranging from approximately 1.75m to 3.52mBGL;
- Field PID screening indicated a low probability of VOC contamination, with results ranging from 0ppm to <0.6ppm;
- A total of three primary groundwater samples were analysed for heavy metals, TRHs, BTEX and PAHs. Marginally elevated concentrations of some heavy metals were detected above the ecological SAC for freshwater environments; however, these elevations were considered the result of regional groundwater conditions, rather than a site-specific contamination issue.

The 2017 Stage 2 ESA report concluded that the ACM materials identified could pose a risk to site receptors if not managed properly. Therefore, remediation and implementation of a RAP was considered necessary for the proposed multi-storey car park.

3.2.2 Remediation Action Plan (RAP)

As per the recommendation in the 2017 Stage 2 ESA, JKE (as EIS) compiled a RAP report (Ref; E29845KDrpt-RAP)⁹ to outline the remediation strategy and management of the asbestos contamination at the multi-storey car park site. The remedial approach outlined in the 2017 RAP report involved the excavation and off-site disposal of all fill soil within the multi-storey car park site area to a licensed landfill facility. This was considered the most appropriate to remove the risk of asbestos contamination in the context of the proposed development.

3.2.3 Detailed Site Investigation (DSI)

Following discussions with the client, JKE (as EIS) were commissioned to further assess the asbestos contamination at the site in order to provide an alternate remediation option to that outlined in the 2017 RAP, and a DSI was undertaken. The DSI report (Ref: E29845KDrpt2.1)¹⁰ involved asbestos quantification soil sampling and analysis from a total of 34 locations (identified as TP301 to TP334), as shown on Figure 2. The 2018 DSI report identified the following:

- Asbestos was identified in 11 samples of various materials identified on the surface or within the fill soil at several sampling locations within the multi-storey car park site area. The ACM included fibre cement material, insulation material and bituminous membrane material;
- Bonded ACM was identified above the human-health SAC within the fill soil sampled from TP320 (0-0.3), as shown on Figure 4; and
- Asbestos fines and fibrous asbestos (AF/FA) was encountered above the human-health SAC in one soil sample collected from TP310a), as shown on Figure 4.

The 2018 DSI report concluded that the asbestos contamination at the site will require remediation and an updated RAP report was to be issued for the proposed multi-storey car park.

⁹ EIS (2017c). Report to Health Infrastructure on Remediation Action Plan for Proposed Hospital Upgrade – Multistorey Car Park at Nepean Hospital, Derby Street, Kingswood, NSW. (referred to as the 2017 RAP)

¹⁰ EIS (2018a). Report to Health Infrastructure on Detailed Site Investigation (Asbestos Quantification) for Proposed Hospital Upgrade – Multistorey Car Park at Nepean Hospital, Derby Street, Kingswood, NSW. (referred to as the 2018 DSI report)



3.2.4 Updated Remediation Action Plan (RAP)

JKE (as EIS) provided an updated RAP report (Ref: E29845KDrpt-RAP2rev2)¹¹ to reassess and outline the updated remediation strategy and management of the asbestos contamination at the multi-storey car park site. The updated remedial approach involved the burial of asbestos impacted fill material within constructed borrow pits and subsequent capping system. The 2018b RAP report was only applicable to the multi-storey car park development and is not relevant to the Stage 2 site area.

3.3 Nepean Hospital Redevelopment (Stage 1 Area)

JKE (as EIS), completed several stages of investigation as part of the Nepean Hospital and Integrated Ambulatory Services Redevelopment, commonly referred to as the Stage 1 Area. The data obtained as part of the 2017 PESA report was reviewed and formed the basis of these investigations. The investigations undertaken for the Stage 1 Area redevelopment are summarised in detail in the following sub-sections.

3.3.1 Preliminary Stage 2 ESA

The Preliminary Stage 2 ESA report (Ref: E29845KDrpt2.3rev4)¹² involved soil sampling and analysis from a total of 24 borehole locations, including BH10 to BH16 from the 2017 PESA and an additional 17 locations identified as BH106, BH131 to BH145 and BH201 to BH202, as shown on Figure 2. The 2018 Stage 2 ESA also included installation and sampling from four groundwater monitoring well locations. The 2018 Stage 2 ESA report identified the following:

- The investigation identified fill up to a maximum depth of approximately 2.0m, overlying natural soil and weathered siltstone and shale bedrock;
- All soil results were below the human-health based SAC for a 'public open space' land use setting;
- Asbestos was identified in fibre cement material at the ground surface and within the fill soil at two locations (BH134 and BH135), as shown on Figure 4;
- Minor elevations encountered during the 2017 PESA, of nickel and benzo(a)pyrene above the ecological SAC for commercial/industrial land use, were reassessed against the updated ecological SAC for the 2018 Stage 2 ESA. The report concluded that there is a very low risk to ecological receptors and soil remediation was not required;
- Groundwater was identified at depths ranging from approximately 1.35m to 3.67mBGL;
- Field PID screening indicated a low probability of VOC contamination, with results ranging from 0ppm to <0.9ppm; and
- A total of four primary groundwater samples were analysed for heavy metals, TRHs, BTEX and PAHs. Marginally elevated concentrations of some heavy metals were detected above the ecological SAC for freshwater environments; however, these elevations were considered the result of regional groundwater conditions, rather than a site-specific contamination issue.



¹¹ EIS (2018b). Report to Health Infrastructure on Remediation Action Plan for Proposed Hospital Upgrade – Multistorey Car Park at Nepean Hospital, Derby Street, Kingswood, NSW. (referred to as the 2018b RAP)

¹² EIS (2018c). Report to Health Infrastructure on Preliminary Stage 2 Environmental Site Assessment for Nepean Hospital & Integrated Ambulatory Services Redevelopment - SSDA at Nepean Hospital, Derby Street, Kingswood, NSW. (referred to as the 2018 Stage 2 ESA report)



The 2018 Stage 2 ESA report concluded that the ACM materials identified could pose a risk to site receptors if not managed properly. Therefore, remediation and implementation of a RAP was considered necessary for the proposed Stage 1 Area redevelopment.

3.3.2 Remediation Action Plan (RAP)

JKE (as EIS) provided an RAP (Ref; E29845KDrpt-RAP-2.3rev)¹³ to outline the remediation strategy and management of the asbestos contamination for the proposed Stage 1 Area. The 2018d RAP superseded a previously issued Remediation Concept Plan (RCP) issued in 2017.

The remedial approach outlined in the 2018d RAP report involved the excavation and off-site disposal of all fill soil within the Stage 1 Area redevelopment to a licensed landfill facility. This was considered the most appropriate to remove the risk of asbestos contamination in the consideration of the extensive excavations required for the proposed development. The 2018d RAP also recommended that an additional pre-remediation assessment be undertaken following demolition of the existing buildings to better define the horizontal and vertical extent of the ACM within fill soil across the remediation areas.

JKE note that no further work was undertaken by us for the Stage 1 Area development, following issue of the 2018d RAP report. The proposed remediation areas outlined in the 2018d RAP covered part of the western portion of the Stage 2 site area. JKE has not been involved and not received any information on the status of the remediation or validation of the Stage 1 Area.

3.4 CAMHS

JKE has completed an investigation for the CAMHS development in the southern portion of the wider hospital campus (Ref: E330780PLrpt)¹⁴. The 2021 PSI included a review of site information and site history, a walkover site inspection and soil sampling and analysis from four borehole locations. The report identified the following:

- The CAMHS site had historically been vacant or used for grazing/agricultural purposes prior to its development as part of the wider Nepean Hospital campus;
- The 2021 PSI scope also included a review of the Golder 2010a and 2010b reports which did identify the storage of dangerous goods as noted previously;
- Potential sources of contamination/AEC outlined in the CSM included fill material, off-site contamination sources (within the wider hospital campus), historical agricultural use, use of pesticides and hazardous building materials;
- All soil results were below the human-health based SAC for a commercial/industrial land use setting;
- Asbestos in the form of bonded fibre cement fragments (FCF) was identified surface of the site within the sub-floor of the Nepean 2 building located in the south-east corner of the CAMHS site, as part of the Hazardous Building Materials Survey; and

¹³ EIS (2018d). Report to Health Infrastructure on Remediation Action Plan for Nepean Hospital & Integrated Ambulatory Services Redevelopment -SSDA at Nepean Hospital, Derby Street, Kingswood, NSW. (referred to as the 2018d RAP)

¹⁴ JKE (2021). Report to Health Infrastructure C/- CBRE on Preliminary (Stage 1) Site Investigation for Proposed Nepean CAMHS Development at Nepean Hospital, Derby Street, Kingswood, NSW. (referred to as 2021 PSI report)



• Detectable concentrations of xylene within groundwater identified during the Golder 2010b investigation, may be indicative of potential off-site sources of contamination within the wider hospital campus. Groundwater was not encountered during drilling for the 2021 PSI, however, groundwater may be potentially contaminated and there was considered to be a potential for vapour intrusion in the context of the proposed development.

The 2021 PSI report concluded that: "....the contamination identified at the site may pose a risk to humanhealth if the contamination is not managed properly during the construction phase of the proposed development. Based on the findings of the investigation, JKE are of the opinion that the site can be made suitable for the proposed development. A DSI is required to address the data gaps. In the interim, we recommend an 'emu pick' be undertaken by a competent person or Class B licenced asbestos removalist to remove any visible ACM from the ground surface in the subfloor area. An interim AMP should also be prepared to manage potential risks associated with asbestos in/on soil."

3.5 Summary of Site History Information

A time line summary of the historical land uses and activities for the site is presented below. The information is based on a weight of evidence assessment of the previous investigations summarised in Section 3.1 to 3.4 above, site history documentation and observations made by JKE.

Year(s)	On-site - Potential Land Use / Activities	Off-site - Potential Land Use / Activities
Pre 1943	Vacant / Agricultural (grazing)	Vacant / Agricultural (grazing)
1943-1970	Part of the Nepean Hospital campus. Only minor development on-site had occurred with internal roadways for the wider hospital present at the site.	Nepean Hospital campus. Various construction and development activities relating to the expansion of the hospital have continuously taken place for upgrading of facilities.
1970-1982	Construction of hospital buildings within the site occurred sometime between 1970 and 1982. Potential cut/fill works may have taken place associated with the construction works. The construction of ancillary roadways and car parks associated with the hospital occurred during this time. Storage of flammable liquids and petroleum products in above and below ground storage areas, including USTs likely commenced during this period.	Storage of flammable liquids and petroleum products in above and below ground storage areas, including USTs.
1982-2000	Construction of the various additional buildings and extensions of the site occurred during this time. Potential cut/fill works may have taken place associated with the construction works	

Table 3-1: Summary of Historical Land Uses / Activities



Year(s)	On-site - Potential Land Use / Activities	Off-site - Potential Land Use / Activities
2000-2020	The site remained generally similar to the present day. Various refurbishment and extension works may have taken place during this time.	

Overall, the previous reports as summarised in Section 3 were considered to provide a relatively detailed picture of the site history that has facilitated a reasonable understanding of the likely potential contamination sources and CoPC.

3.6 Integrity of Site History Information

The majority of the site history information was obtained from government organisations, and presented in JKE/EIS reports or reports by Golder, as outlined in the relevant sections of this report. 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 lack of specific construction/demolition activities over time, including importation of fill for earthworks and for engineering purposes under roads etc.



4 GEOLOGY AND HYDROGEOLOGY

4.1 Regional Geology

Regional geological maps reviewed for previous investigations indicated that the site is underlain by Bringelly Shale of the Wianamatta Group, which typically consists of shale, carbonaceous claystone, claystone, laminite, fine to medium grained lithic sandstone, rare coal and tuff.

Investigations have identified a fill layer with depths generally ranging from approximately 0.5mBGL to 1.5mBGL, underlain by natural (residual silty clay soil) to depths of around 2-3mBGL then claystone/siltstone bedrock.

4.2 Acid Sulfate Soil (ASS) Risk and Planning

The site is not located in an ASS risk area according to the risk maps prepared by the Department of Land and Water Conservation. The site is not located in an ASS risk are according to the local council planning maps

4.3 Dryland Salinity

Information reviewed for the previous investigations indicated that the site is located within an area of moderate salinity potential.

4.4 Hydrogeology

Searches of registered groundwater bore records were undertaken during previous investigations and there were no nearby registered groundwater users (i.e. within approximately 1,000m of the site).

Considering the local topography, surrounding land features and information presented in previous reports, JKE anticipate groundwater to flow towards the north or north-east. This was confirmed via the groundwater contour modelling presented in the EIS/JKE reports summarised in Section 3. Groundwater has typically been found at depths of 2-4mBGL, within the natural soil or bedrock.

4.5 Water Bodies

Surface water bodies were not identified in the immediate vicinity of the site. The closest surface water body is the tributary to Werrington Creek located approximately 600m to the south-east of the site. This is cross-gradient from site and is not likely to be a potential receptor.



5 CONCEPTUAL SITE MODEL

NEPM (2013) defines a CSM as a representation of site related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM for the site is presented in the following sub-sections and is based on the site information (including the site inspection information) and the review of site history information/previous reports. Reference should also be made to the figures attached in the appendices.

5.1 Potential Contamination Sources/AEC and CoPC

The potential contamination sources/AEC and CoPC are presented in the following table:

Source / AEC	CoPC
Fill material – Previous investigations identified fill to variable depths across the site and the wider hospital campus. The fill may have been imported from various sources and could be contaminated.The previous investigations did not identify significant, widespread contamination in fill. However, asbestos has been found in fill and on the ground surface previously within the Stage 2 site area.	Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), TRH, BTEX, PAHs, OCPs, OPPs, PCBs and asbestos. Previous investigations did not identify the above CoPC in soil at unacceptable concentrations. However, bonded asbestos materials have been identified within fill and on the ground surface within the Stage 2 site area. The fill across the site has not been adequately characterised.
Suspected UST and Flammable Liquids Store – A suspected UST associated with a service generator, together with storage of flammable liquids above ground, have been identified in the central western section of the site. It is also noted that investigations by Golder also identified low concentrations of xylene in groundwater in the central-northern part of the site, the source of which is not known. These features are shown on Figure 3 in Appendix A.	TRH/BTEX and the PAH compound naphthalene
<u>Historical agricultural use</u> – The site may have been historically used for grazing purposes prior to 1949. This could have resulted in contamination across the site via use of machinery, application of pesticides, installation of drainage pipework containing asbestos etc.	Heavy metals, TRH, PAHs, OCPs and asbestos JKE note that OCPs only became commercially available in the 1940s. Prior to this time pesticides were predominantly heavy metal compounds.
Use of pesticides – Pesticides may have been used beneath the buildings and/or around the site for typical pest control applications. Pesticides have not been identified in soil at unacceptable concentrations during previous investigations, however, sampling in building footprints has typically not occurred.	Heavy metals and OCPs
Hazardous Building Material – Hazardous building materials may be present as a result of former building and demolition activities (this has already been identified in some areas via the occurrence of ACM	Asbestos, lead and PCBs

Table 5-1: Potential (and/or known) Contamination Sources/AEC and Contaminants of Potential Concern



Source / AEC	CoPC
in/on soil). These materials may also be present in the existing buildings/structures on site.	
Off-site sources of contamination (within the wider hospital campus) – Historical records and findings from the previous investigations identified: bulk diesel storage and flammable liquids (notably xylene) in the southern section and of the wider hospital campus.	Lead, TRH, BTEX and the PAH compound naphthalene.

Based on the site inspection and historical assessment, JKE are of the opinion that there is a low potential for the site to have been used for activities associated with point sources of PFAS (as outlined in Appendix B of the PFAS National Environmental Management Plan 2020)¹⁵. It is acknowledged that PFAS can be associated with pesticides and agricultural use, however, this is more commonly linked to intensive farming practices and there is no evidence that intensive farming occurred. There has also been no reported fire history at the site or associated with the above ground gas storage that JKE is aware of. Therefore, PFAS are not CoPC at the site.

5.2 Mechanism for Contamination, Affected Media, Receptors and Exposure Pathways

The mechanisms for contamination, affected media, receptors and exposure pathways relevant to the potential contamination sources/AEC are outlined in the following CSM table:

Potential mechanism for contamination	Potential mechanisms for contamination include 'top-down' impacts (e.g. placement of fill, demolition activities, leaching from surficial material etc), spills or sub-surface release (e.g. impacts from buried material, leaking USTs etc).
Affected media	Soil and groundwater have been identified as potentially affected media. It is noted that some of the CoPC are volatile and may affect soil vapour. Soil vapour would need to be considered depending on the contamination status of soil/groundwater. However, soil vapour is not currently considered to be a potentially affected medium based on the site history and existing soil/groundwater data.
Receptor identification	 Human receptors include site occupants/users (including primarily adults), construction workers and intrusive maintenance workers. Off-site human receptors include adjacent land users. Use of the site by children may occur, however is expected to be infrequent. Ecological receptors include terrestrial organisms and plants within unpaved areas. Although the nearest surface water body is not in close proximity to the site, for completeness freshwater ecosystems associated with down-gradient water bodies are to be considered.
Potential exposure pathways	Potential exposure pathways relevant to the human receptors include ingestion, dermal absorption and inhalation of dust (all contaminants) and vapours (volatile TRH, naphthalene and BTEX). The potential for exposure would typically be

Table 5-2: Conceptual Site Model



¹⁵ Heads of EPA Australia and New Zealand, (2020). PFAS National Environmental Management Plan Version 2.0 (referred to as PFAS NEMP)



associated with the construction and excavation works, and future use of the site including exposure to soils in unpaved areas and potential exposure to vapours in buildings.	
Potential exposure pathways for ecological receptors include primary/direct contact and ingestion.	
The following have been identified as notential exposure mechanisms for site	
The following have been identified as potential exposure meetialisms for site	
contamination:	
 Vapour intrusion into the proposed basement and/or building (either from soil contamination or volatilisation of contaminants from groundwater); and Contact (dermal, ingestion or inhalation) with exposed soils in landscaped areas and/or unpaved areas. 	



6 CONCLUSIONS

6.1 Contamination Sources/AEC and Potential for Site Contamination

Based on the scope of work undertaken for this PSI, JKE identified the following potential contamination sources/AEC:

- Fill material;
- Historical agricultural use;
- Use of pesticides;
- Suspected UST and flammable liquids store;
- Hazardous Building Material; and
- Off-site sources (within the wider hospital campus).

The information reviewed for previous investigations indicates that the site has historically been vacant or used for grazing/agricultural purposes, prior to it being developed as part of the wider hospital campus.

The historical storage of flammable liquids (notably xylene), USTs within the Stage 2 site area and the wider hospital campus, and detectable concentrations of xylene within groundwater were identified during the Golder investigations. Previous investigations did not identify significant, widespread contamination in fill. However, asbestos has been found in fill and at the ground surface, both within the Stage 2 site area and within the wider hospital.

Considering the above, and based on a qualitative assessment of various lines of evidence as discussed throughout this report, JKE are of the opinion that there is a potential for site contamination. Most notably, the potential source(s) of the hydrocarbons in groundwater has not been confirmed and there is uncertainty around the contamination status of the fill, particularly with regards to asbestos.

6.2 Need for Further Investigation

Based on the potential contamination sources/AEC identified, and the potential for contamination, further investigation of the contamination conditions is considered to be required.

6.3 Conclusions and Recommendations

JKE is of the opinion that the historical land uses and potential sources of contamination identified would not preclude the proposed development. Considering the historical land uses at the site and the known presence of fill from previous investigations, a Detailed Site Investigation (DSI) is required to establish whether remediation is necessary. JKE understand that due to access constraints associated with the continued operation of the hospital, sampling for the DSI may be limited. However, the DSI should be undertaken to the extent practicable. Prior to undertaking the DSI, a Sampling, Analysis and Quality Plan (SAQP) should be prepared.



JKE also recommend that a waste classification be undertaken to classify material to be excavated and disposed off-site for the proposed development.

JKE consider that the PSI objectives outlined in Section 1.2 have been addressed.



7 LIMITATIONS

The following limitation apply to this investigation:

- JKE 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 JKE proposal; and terms of contract between JKE 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;
- This report has been prepared 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;
- Where information has been provided by third parties, JKE has not undertaken any verification process, except where specifically stated in the report;
- JKE has not investigated off-site areas that may be potential contamination sources or may have been impacted by site contamination, except where specifically stated in the report;
- JKE 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;
- JKE 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 landuse. JKE should be contacted immediately in such circumstances; 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.



Important Information About This Report

These notes have been prepared by JKE to assist with the 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 JKE 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, eg addition of basement levels; or
- Ownership of the site changes.

JKE 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 JKE 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.

Investigation Limitations:

Although information provided by an investigation can reduce exposure to the risk of the presence of contamination, no investigation 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 Reports by Design Professionals:

Costly problems can occur when design professionals develop plans based on misinterpretation of the 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 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 report 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:

As the investigation 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 report, and you are encouraged to read them closely.



Appendix A: Report Figures









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JK		s plan should be read in conjunction with the Environmental report.							





Appendix B: Site Information





Selected Site Photos





Project Ref: E34236PL Site Address: Nepean Hospital, Derby Street, Kingswood, NSW Selected Site Photos Dated: 7 September 2021



Photograph 1: Taken showing the central portion of the site, facing east.













Photograph 5: Taken showing the northern boundary of the site along Barber Avenue, facing



Appendix C: Proposed Development Plans







1 SITE PLAN - EXISTING

LEGEND

- ----- HOSPITAL CAMPUS BOUNDARY
- STAGE 1: NOT PART OF THIS APPLICATION APPROVED WORKS UNDER SSD 8766



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EXISTING SITE PLAN

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2 SITE PLAN - PROPOSED

LEGEND

	HOSPITAL CAMPUS BOUN
[]	STAGE 1: NOT PART OF TH APPROVED UNDER SSD 87
	EXTENT OF ALTERATION LANDSCAPING AND BACK
	EXTENT OF STAGE 2 TOW



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PROPOSED SITE PLAN

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NS TO EXISTING ROADWORKS, CK OF HOUSE LOADING DOCK

VER







3 WEST ELEVATION - SEARS





INDICATIVE ELEVATION - ISSUED FOR SEARS APPLICATION



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View Looking Towards Main Entry

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DESIGNED BY: Designer APPROVED BY: Approver Design Development

RENDER

DRAWING NUMBER ISSUE NHR-BVN-DRW-ARC-TB2-XXP- NL00019 A

Appendix D: Guidelines and Reference Documents

Contaminated Land Management Act 1997 (NSW)

Department of Land and Water Conservation, (1997). 1:25,000 Acid Sulfate Soil Risk Map Series

Managing Land Contamination, Planning Guidelines SEPP55 – Remediation of Land (1998)

NSW EPA, (2015). Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997

NSW EPA, (2017). Guidelines for the NSW Site Auditor Scheme, 3rd Edition

NSW EPA, (2020). Consultants Reporting on Contaminated Land, Contaminated Land Guidelines

National Environment Protection Council (NEPC), (2013) National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)

Protection of the Environment Operations Act 1997 (NSW)

State Environmental Planning Policy No.55 – Remediation of Land 1998 (NSW)