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Integrated Practical Solutions

Sampling and Analysis Quality Plan

Proposed Epping West Public School Alterations and Additions
96 Carlingford Road, Epping

Prepared for
School Infrastructure New South Wales (SINSW)

Project 99674.03
April 2021

Douglas Partners
Geotechnics / Environment / Groundwater

Document History

Document details

Project No.	99674.03	Document No.	R.001.Rev1
Document title	Sampling and Analysis Quality Plan Proposed Epping West Public School Alterations and Additions		
Site address	96 Carlingford Road, Epping		
Report prepared for	School Infrastructure New South Wales (SINSW)		
File name	99674.03.R.001.Rev1		

Document status and review

Status	Prepared by	Reviewed by	Date issued
Draft A	Nerilee Edwards	Paul Gorman	03 December 2020
Draft B	Nerilee Edwards	Paul Gorman	15 December 2020
Draft C	Nerilee Edwards	Paul Gorman	18 December 2020
Revision 0	Nerilee Edwards	Paul Gorman	11 February 2021
Revision 1	Nerilee Edwards	Paul Gorman	22 April 2021

Distribution of copies

Status	Electronic	Paper	Issued to
Draft A	1	-	Jacqueline Sellen, School Infrastructure New South Wales (SINSW)
Draft B	1	-	Jacqueline Sellen, School Infrastructure New South Wales (SINSW)
Draft C	1	-	Jacqueline Sellen, School Infrastructure New South Wales (SINSW)
Revision 0	1	-	Jacqueline Sellen, School Infrastructure New South Wales (SINSW)
Revision 1	1	-	Jacqueline Sellen, School Infrastructure New South Wales (NSW)

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

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bsi. ISO 9001 Quality Management
FS 604853

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Sampling and Analysis Quality Plan
Proposed Epping West Public School Alterations and Additions
96 Carlingford Road, Epping

1. Introduction

This Sampling and Analysis Quality Plan (SAQP) has been prepared to set out the proposed scope of works for a Detailed Site (Contamination) Investigation (DSI) at Epping West Public School, 96 Carlingford Road, Epping. The DSI is required to support the State Significant Development Application (SSDA) for proposed upgrade works at the school.

The SAQP has been prepared in accordance with Standard Form Agreement SINSW00650/20 dated 8 April 2020 and Douglas Partners Pty Ltd (DP) proposal dated 5 November 2020 (Proposal ref: SYD201231.P.002.Rev0). The work was commissioned by School Infrastructure NSW.

It is understood that this SAQP will be submitted to the appointed Site Auditor, Ms Rowena Salmon of Ramboll Australia Pty Ltd for comment and endorsement prior to the commencement of works.

The objective of this SAQP is to provide the proposed scope of works for the DSI to allow for feedback from the client and Site Auditor prior to commencement of works, and to allow for modifications to the proposed investigations if considered appropriate. The objective of the proposed DSI is to obtain data to assess the suitability of the development area (the "site") (from a contamination perspective) for the proposed school upgrade, and the need for additional works.

2. Scope of Works

The scope of works for this SAQP is:

- Review the available, relevant previous reports and summarise relevant information, including the conceptual site model (CSM);
- Review the proposed development plans;
- Undertake an inspection of the site from the street and undertake a preliminary assessment of site access; and
- Provide the proposed scope and rationale for the DSI, including the fieldwork, assessment methods and quality assurance and quality control measures.

3. Site Identification and Location

The site is currently an operational primary school. Site details are shown below. The site location and boundary is shown in Figure 1 and Drawing R.001.D01, Appendix A.

Site Address	96 Carlingford Road, Epping
Legal Description	Lot 11, Deposited Plan 1099882 Lot 1, Deposited Plan 122509 Lot 1, Deposited Plan 161495
Area	2.9666 hectares
Zoning	R2 low density residential
Local Government Area	City of Parramatta
Current Use	Primary School

Figure 1: Site Location and Approximate Boundary

4. Previous Assessments

4.1 Reviewed Reports

The following relevant reports were available for review:

- Dewey, P, *The History of Epping West Public School, 1927 - 2002*, 2002 (Dewey, 2002);
- GML Heritage *Epping West Public School Heritage Assessment* (Job 20-0115, November 2020) (GML, 2020);
- DP *Report on Contamination Assessment, Building The Education Revolution, Epping West Public School,* (Report: 71182.60-2) dated 21 October 2009 (DP, 2009)*;*
- DP *Report on Remedial Action Plan, Building The Education Revolution, Epping West Public School,* (Report 71182.60-7, dated 28 January 2010 (DP, 2010);
- WSP *Epping West Public School, Asbestos in Grounds Management Plan, NSW Department of Education* (Report 1851_ASB_13117_AMP, dated May 2019) (WSP, 2019);
- DP *Report on Geotechnical Desktop Report, Proposed Epping West Public School Upgrade, 96 Carlingford Road, Epping*, Reference 99674.00.R.001.Rev1, dated April (DP, 2021a)*;*
- DP *Report on Geotechnical Investigation, Epping West Public School Upgrade, 96 Carlingford Road, Epping*, Reference 99674.00.R.002.Rev1, dated April 2021 (DP, 2021b);
- DP *Report on Preliminary Site (Contamination) Investigation (PSI) Proposed Epping West Public School Upgrade, 96 Carlingford Road, Epping*, Reference 99674.01.R.001.Rev1, dated April 2021 (DP, 2021c); and
- DP *Report on Hazardous Building Materials (HBM) Survey Epping West Public School, 96 Carlingford Road, Epping*, Reference 99674.02.R.001.Rev2, dated April 2021 (DP, 2021d).

DP (2021c) included a review of Dewy (2002) and GML (2020) and relevant information from these reports is covered in Section 4.5. Relevant information from DP (DP, 2021a) was included in DP (2021b).

DP (2021a), (2021b), (2021c) and (2021d) were undertaken concurrently. The PSI (DP, 2021c) included a review of all of the geotechnical investigation (DP, 2021b) field results and analysis of soil samples from the 11 boreholes utilised for the combined field investigation programme.

The borehole locations referenced in this section are shown on Drawing R.001.D.02, Appendix A.

4.2 Building the Education Revolution Reports (DP 2009 and 2010)

DP has previously prepared a contamination assessment (DP, 2009) and remediation action plan (DP, 2010) for the construction of a two storey classroom and library building and a toilet block, which was located near the western boundary of the current site, as shown in Figure 2. DP (2009) comprised of a desktop review of the entire school campus and an intrusive soil investigation at the building footprint to assess the potential for contamination when taking into account the proposed land use at the time. The DP (2009) review of the site history and relevant searches indicated that the campus site was used for educational use and the surrounding land was used for residential land use and prior to 1955 for agricultural purposes.

The most significant risks associated with contamination at the campus were considered by DP (2009) to be associated historical filling, possible metals and pesticide contamination of surface soils due to past application of pesticides for termite control around existing and/or previous buildings, and asbestos from previous demolition works.

Figure 2: Previous Investigation by DP at Epping West Public School

DP (2009) included targeted intrusive soil sampling which was conducted in the proposed building footprint area (boreholes BH1 to BH3, as shown on Figure 2, above). All recorded laboratory results were within the site assessment criteria (SAC) applicable to the assessment with the exception of the SAC for Total Petroleum Hydrocarbons (TPH) in one sample. The TPH SAC was exceeded by Total Recoverable Hydrocarbons (TRH) recorded at 330 mg/kg of C15-C28 and 680 mg/kg of C29-C36 in Sample 2/0.1-0.2 from BH2. This recorded TRH concentration, in the absence of additional data to characterise the site, and based on the then applicable (now superseded) guidelines triggered a requirement for remediation.

DP (2010) provided a scope of works for the recommended remediation works. DP was not involved in any subsequent remediation works at the site, and has not been provided with any documentation prepared by others in this regard. Both buildings have been constructed as shown on Figure 2.

4.3 Asbestos in Grounds Management Plan (WSP, 2019)

WSP (2019), comprising an Asbestos in Grounds Management Plan for the site, has been reviewed. The report indicated non-friable fibre cement sheeting and pipe was exposed in a retaining wall at the northern end of the school adjacent to the sports ground. The report records the removal of accessible fibre cement sheeting debris and the sealing of exposed edges of fibre cement pipe. WSP (2019) commented that "Embankments comprising fill materials has (sic) become eroded, exposing fill and asbestos containing materials". WSP (2019) includes an 'Asbestos In Grounds Register' for the asbestos remaining in this location, including the need for inspections and a maintenance requirement that appropriate encapsulation/cover remains in place and is undisturbed. An extract of the plan showing the location of the retaining wall is provided in Figure 3.

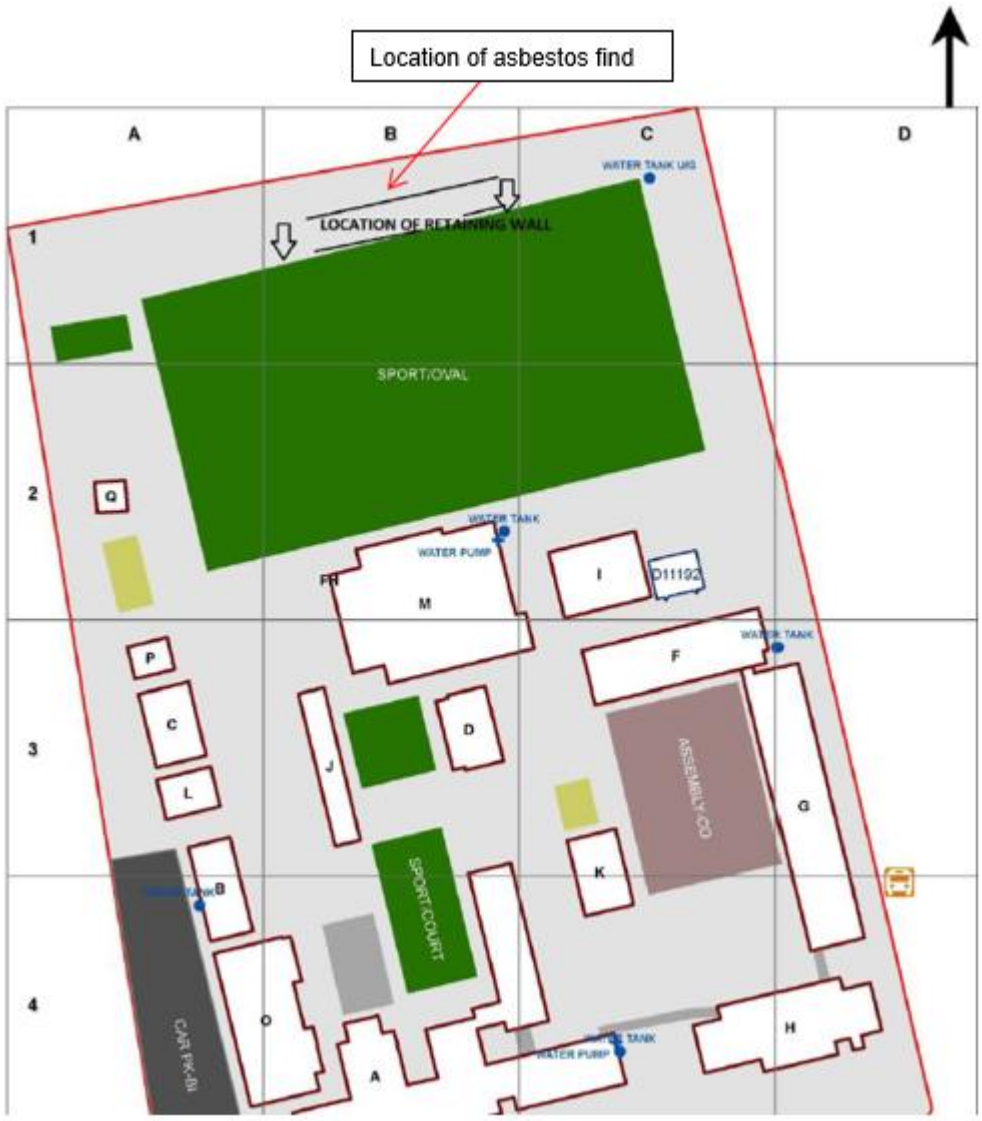

Figure 3: WSP (2019) Plan of Retaining Wall Where Asbestos Containing Materials Identified

4.4 Geotechnical Investigation (DP, 2021b)

DP (2021b) included the following geotechnical model for the site:

> *'The development area is underlain by variable depths of fill, typically deeper to the north-east of the site. Residual clays underlie the fill in most areas, which are derived from weathering of the Ashfield Shale and are typically stiff to hard, medium to high plasticity and moderately to highly reactive.*
>
> *The fill and residual clays are underlain by a weathered Ashfield Shale profile which is initially very low strength (Class IV). The siltstone bedrock typically increases to low strength with depth (Class III) and this continued to the termination depths of the rock-cored boreholes. Defects and weathered seams were present throughout the bedrock profile, as well as bands of medium and high strength rock near the bedrock surface.*
>
> *Groundwater was observed at a depth of 2.4 m (RL 117.6 m AHD) during the auger drilling at BH02, within fill. The water observed in BH02 is considered to be perched seepage within the fill rather than the regional groundwater table. The groundwater table is likely to be well below the bedrock surface. Seepage would be expected to occur near the rock surface and through joints or partings within the bedrock.'*

The interpreted geotechnical model is illustrated in Cross-Sections A-A' and B-B' as shown on the drawings from the geotechnical report, which are provided in Appendix B.

4.5 Preliminary Site (Contamination) Investigation (DP, 2021c)

DP (2021c) included a review of the site history and condition, development of a preliminary conceptual site model (CSM), logging soils/ rock from 11 borehole locations and analysis of soil from each location. The bore locations were selected to provide general site coverage and target areas of proposed buildings for geotechnical investigation purposes.

The PSI identified nine potential areas of environmental concern (PAEC) which could be potential sources of contamination. These are summarised in Section 7 of this SAQP.

The identified contaminants of potential concern (COPC) at the site comprised:

- Heavy metals (including As, Cd, Cr, Cu, Pb, Hg, Ni, Zn);
- Total petroleum hydrocarbons (TPH);
- Benzene, toluene, ethylbenzene and xylenes (BTEX);
- Polycyclic aromatic hydrocarbons (PAH);
- Organochlorine pesticides (OCP);
- Organophosphorus pesticides (OPP);
- Polychlorinated biphenyls (PCB);
- Phenols;
- Asbestos; and

- Synthetic mineral fibres (SMF).

The general stratum sequence encountered with increasing depth is as follows:

- **PAVEMENT:** Asphaltic concrete was present at BH01, BH08 and BH09 to depths of 0.03 m to 0.06 m. Concrete was penetrated at BH14 to a depth of 0.1 m;
- **FILL:** Fill was encountered within all boreholes either from the ground surface or beneath the pavement to depths of between 0.2 m to 4.3 m. It included clay, silty clay, sandy clay, silty sand, clayey sand and gravelly sand with varying proportions of rootlets, roots, grass, organic matter, charcoal, wood, and igneous, shale and ironstone gravel. Inclusions of ash and glass were observed in BH11 and BH12;
- **RESIDUAL CLAY**; and
- **WEATHERED SILTSTONE & INTERLAMINATED SILTSTONE / SANDSTONE BEDROCK**.

Potential asbestos containing materials (ACM) were not recorded in any boreholes.

Groundwater was intersected at 2.4 m depth (RL 117.6 m AHD) during auger drilling at BH02. Free groundwater was not observed during auger drilling in any of the other boreholes. The use of drilling fluid during coring at BH01 to BH04 prevented further observations with depth.

All analytical results on tested soil samples were within the SAC with the exception of benzo(a)pyrene (BaP) in Sample 11/1.9-2, which marginally exceeded the ecological-based ESL (recorded concentration of 0.88 mg/kg compared to the ESL of 0.7 mg/kg). Toxaphene, an OCP, was analysed in one sample (the inter-laboratory replicate sample), and a positive result was recorded. Whilst this single result was well within the SAC (a recorded concentration of 1.1 mg/kg compared to the HIL of 20 mg/kg), the available data for this analyte at the site is very low, and the detection indicates that toxaphene is a potential contaminant of concern at the site.

Based on the site history and the results of previous investigations and the current investigation DP (2021c) considered there to be a moderate to high risk that some degree of remediation / management for contamination will be required for the proposed upgrade works. It was recommended that a DSI be conducted to provide a more thorough assessment of contamination and to confirm the need or otherwise for remediation.

4.6 Hazardous Building Material Survey (DP, 2021d)

DP (2021d) identified the presence / assumed presence of the following HBM in current site buildings / structures: asbestos (friable and non-friable), synthetic mineral fibres (SMF), lead paint, lead dust and polychlorinated biphenyls (PCB). DP (2021d) also identified asbestos containing materials (ACM) on the ground in building sub-floor spaces.

5. Site Condition and Surrounding Environment

5.1 Site Layout

The site layout can be seen in the aerial photograph on Drawing R.001.D.01, Appendix A.

5.2 Site Observations

A site walkover was undertaken by an environmental engineer on 23 April 2020 as part of DP (2021c). The general site topography was consistent with that described in Section 5.4.1. The site layout was observed to be generally consistent with the 2014 aerial photograph. Site photographs are provided in DP (2021c). The following key site features pertinent to the PSI were observed.

- The site is bounded by West Epping Park to the north, Carlingford Road to the south, Ward Street to the east and low-rise residential dwellings to the west;
- Staff and visitor vehicle access is from Carlingford Road and parking is located at the entry, adjacent to the existing administration block;
- Current structures consist of a series of single storey masonry, timber and metal clad buildings. Building A was constructed in the 1920s. Eight buildings (B00B to B00D, B00F to B00H, B00J and B00K) generally constructed circa 1959; eight buildings (B00I and B00L to B00R) that were constructed between circa 2004 and 2013;
- A number of temporary classroom buildings are located on the eastern portion of the site, associated shade structures and covered walkways;
- A shipping container was present near the car park at the western portion of the site, which is understood to be used to store general equipment;
- A basketball court, playground and a landscaped area are observed at north portion of the site; and
- Well established vegetation is located along all boundaries of the site and appeared to be in healthy condition.

It is also noted that fibre cement fragments were observed on the ground surface in some building subfloor areas during DP (2021d), this includes Building G, which is scheduled for demolition as part of the proposed works.

5.3 Surrounding Land Use

The predominant adjacent land uses comprise:

- North - Recreational open space (West Epping Park) and community buildings;
- East - Ward Street and low density residential;
- South - Carlingford Road and low density residential; and
- West - Low density residential.

5.4 Environmental Setting

5.4.1 Topography

The site is located on a ridgeline as shown on Figure 4. The majority of the site is relatively level, whilst the western side of the site slopes downwards gently to the west and the northern side to the north. The surface levels across the school grounds range between about RL 118 m and RL 122 m relative to Australian Height Datum (AHD).

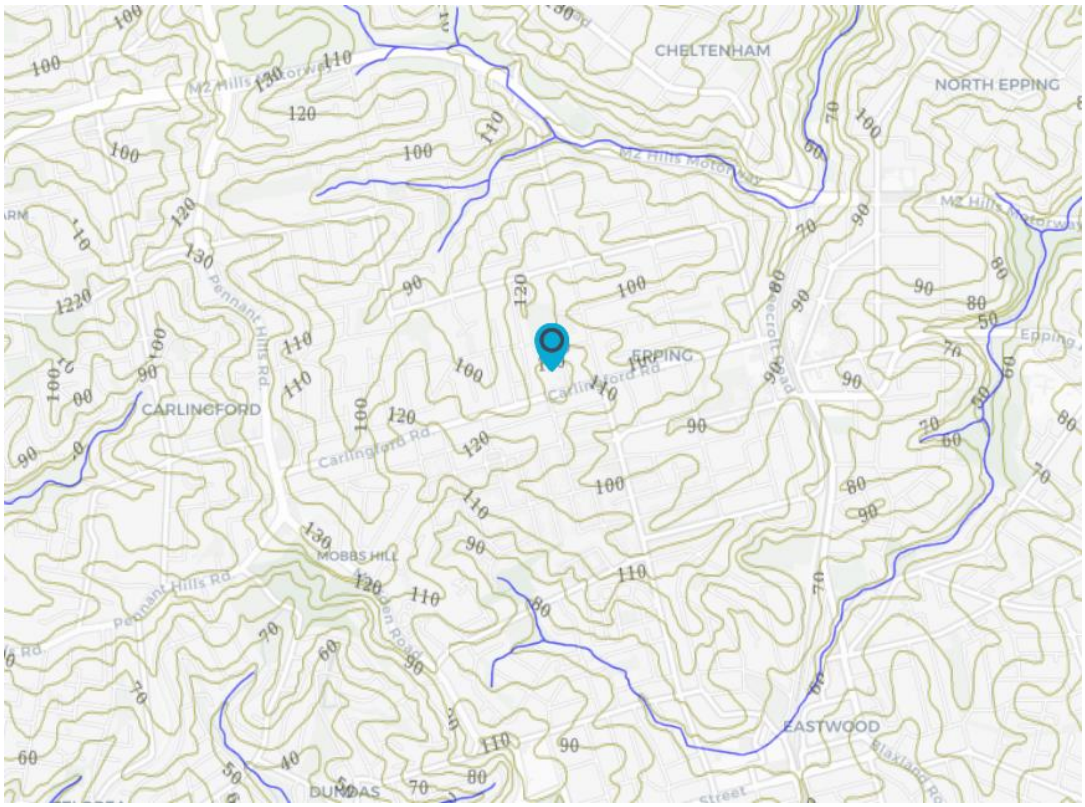

Figure 4: Local Topography and Water Courses (10 m AHD surface contours)

5.4.2 Site Geology and Soil Landscape

The Geological Survey of NSW Sydney, 1:100 000 Geology Sheet indicates that the site is underlain by Ashfield Shale, which typically comprises black to dark grey shale, and laminate (finely interceded sandstones and siltstones) and forms part of the Wianamatta Group.

The Soil Conservation Service of NSW, Sydney 1:100 000 Sheet indicates that the site is underlain by a landscape group known as the Glenorie soil landscape. The Glenorie soil landscape is an erosional soil landscape and is characterised by topography of undulating to rolling hills on Wianamatta Group shales, with local relief of 50 m to 80 m and slope gradients of 5% to 20%. The soils typically have a high erosion hazard, exhibit localised areas of highly plastic and impermeable subsoil and are moderately reactive.

5.4.3 Acid Sulphate Soils

Reference to the 1:25 000 Acid Sulphate Soils (ASS) Risk map indicates that the site is an area of no known occurrence of acid sulphate soils. The nearest mapped occurrence of ASS is near Parramatta River, which is several kilometres away from the site.

Further assessment of ASS is not considered to be required.

5.4.4 Surface Water and Groundwater

Based on the regional topography surface water from the site is expected to flow into the stormwater system and discharge into Devlins Creek, to the north of the site. Devlins Creek is a tributary of the Lane Cover River.

Based on the location of the site on a ridgeline, intrusive investigation would be required to determine the groundwater flow direction and likely receiving surface water body. Given the local geology (i.e., Ashfield Shale), the groundwater in the fractured rock aquifer beneath the site is anticipated to be saline. Accordingly, there would be no significant potential beneficial uses of the groundwater from the shale in this area and yields are also anticipated to be very low.

DP (2021c) did not identify any downgradient beneficial use of groundwater.

6. Proposed Development

The proposed development is for continued use of the site as a primary school. Extracts from preliminary concept details of the proposed development sourced from Attachment 2 of the SEARS Application (DFP, 2020) are provided in Appendix A (Architectural Plans prepared by BVN, dated 2 August 2020).

The proposed development can be described as alterations and additions to an existing educational establishment. In summary, the proposed works will include:

- Demolition works;
- Construction of a three (3) storey building in the south-eastern corner of the site and a two (2) storey building further north adjacent to the site's eastern boundary; and
- Refurbishment and renovation works to existing buildings, with a small addition to the western side of an existing building.

An existing building known as Building G (located between buildings F and H) is proposed to be demolished, Building G is a single storey classroom building.

It is also understood that the following work is proposed under a separate consent pathway:

- Removal of temporary classroom buildings currently located predominantly on the northern part of the site and associated make good works to reinstate the oval and play space which is predominantly on the northern part of the site.

7. Conceptual Site Model

A Conceptual Site Model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM is designed to provide the framework for identifying how a site became contaminated and how potential receptors may be exposed to contamination either in the present or the future *i.e.,* it enables an assessment of the potential source - pathway - receptor linkages.

Potential Sources

The potential sources of contamination and associated contaminants of potential concern (COPC) identified in the PSI (DP, 2021c), are provided in Table 1, below.

Table 1: Summary of Identified Potential Areas of Environmental Concern

Source	Description	Identified from	Comment	Contaminants of Potential Concern (COPC)
S1	TPH in fill	DP (2009)	Source and potential extent are unknown. May be limited. Due to current building at the location of previous TRH detection, targeted testing will not be undertaken. However, TRH (an indicator of TPH) will be assessed in general near surface soils.	TPH
S2	Asbestos in fill	WSP (2019)	Whilst this find was only localised, it could be indicative of more widespread asbestos in fill over the site	Asbestos
S3	Former dairy / agricultural use	Dewey (2002)	Potential for residual contamination generally considered to be low	Metals, TPH, OCP, OPP, PCB, asbestos
S4	Backfilled air raid trenches	Dewey (2002) & 1943 aerial photograph	Source / quality of fill used to backfill is unknown	Metals, TPH, BTEX, PAH, OCP, OPP, PCB, phenols, asbestos
S5	Filling of north east of site	GML (2020)	Source / quality of fill is unknown	Metals, TPH, BTEX, PAH, OCP, OPP, PCB, phenols, asbestos
S6	Demolition/deterioration of former buildings	Various	Possible HBM may have contaminated soils and been spread during subsequent earthworks.	Lead, PCB, asbestos, SMF (SMF to be assessed visually only)

Source	Description	Identified from	Comment	Contaminants of Potential Concern (COPC)
S7	Settlement of lead and chromate containing paint pigment dust from an off-site fire	Dewey (2002)	Fire occurred on Carlingford Road, the potential for impacts could therefore be higher in the south	Lead, chromium
S8	On-site bonfires	Dewey (2002)	Bonfires held on the oval in the north	PAH, metals
S9	Deterioration of existing buildings. Asbestos cement fragments at ground surface in building subfloor space	Site walkover DP (2021d)	Impacts most likely underneath / adjacent to existing structures.	Lead, PCB, asbestos, SMF (SMF to be assessed visually only)

It is considered that the potential sources are either soil-based or most likely to have impacted soil. As such there is not currently considered to be a trigger for groundwater investigation. The need for groundwater investigation may need to be reassessed following characterisation of contaminants levels in soil.

Potential Receptors

The following potential receptors have been identified:

- R1: Site users (public school);
- R2: Construction and maintenance workers;
- R3: Adjacent site users (residential and recreational);
- R4: Terrestrial ecology;
- R5: Surface water (Devlins Creek, fresh water body);
- R6: Groundwater; and
- R7: In-ground structures.

Potential Pathways

The following potential pathways have been identified:

- P1: Direct contact;
- P2: Ingestion and dermal contact;
- P3: Inhalation of dust and / or vapours;
- P4: Surface water run-off;
- P5: Leaching of contaminants and vertical migration into groundwater; and
- P6: Lateral migration of groundwater providing base flow to water bodies.

Summary of Potentially Complete Exposure Pathways

A 'source - pathway - receptor' approach has been used to assess the potential risks of harm being caused to human or environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways (potential complete pathways). The potential source - pathway - receptor linkages considered to be applicable to the site, shown below in Table 2.

Table 2: Summary of Potentially Complete Exposure Pathways

Potential Source	Transport and Exposure Pathway	Receptor
S1 to S9 COPC: metals, TPH, BTEX, PAH, PCB, OCP, OPP, phenols, SMF and asbestos	(P1) Direct contact (P2) Ingestion and dermal contact	(R1) Site users (R2) Construction and maintenance workers
	(P3) Inhalation of dust and/ or vapours	(R1) Site users (R2) Construction and maintenance workers (R3) Adjacent site users
	If potentially leachable contamination identified in soil: (P4) Surface water run off (P6) Lateral migration of groundwater	(R5) Surface water
	If potentially leachable contamination identified in soil: (P5) Leaching and vertical migration into groundwater	(R6) Groundwater
	(P1) Direct contact	(R4) Terrestrial ecology
	(P1) Direct contact	(R7) In-ground structures

8. Site Assessment Criteria

8.1 Soil Site Assessment Criteria

The soil site assessment criteria (SAC) are sourced from NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999* (as amended 2013) (NEPC, 2013). Based on the proposed continued use of the site as a primary school the SAC will be as follows:

- **HIL-A** - Health investigation levels for residential with garden/ accessible soil (includes primary schools);
- **HSL-A & B (vapour intrusion)** - health screening levels for vapour intrusion for low - high density residential;
- **EIL and ESL** - environmental investigation and screening levels for urban residential and public open space;
- **Management Limits** - Residential, parkland and public open space; and

- **HSL (direct contact)** - health screening levels for direct contact for low density residential. These thresholds will be sourced from CRC CARE *Health screening levels for petroleum hydrocarbons in soil and groundwater*, 2011 (CRC CARE, 2011), as referenced in NEPC (2013).

Other inputs which were considered in determining the applicable SAC are summarised in Table 3, below.

Table 3: Inputs to the Derivation of SAC

Variable	Input	Applicable to	Rationale
Depth of application	0 – 3 m depth	HIL	NEPC (2013) recommends that the HILs are apply generally to a depth of 3 m below the surface for residential use. This is also considered appropriate for the proposed primary school use. This HILs will also be used as a screening threshold for any results obtained below 3 m, along with qualitative consideration of the risk.
	Various, 0 - >4 m depth	HSL	The HSL are depth specific.
	0 – 2 m depth	EIL/ ESL	The top 2 m depth below ground level corresponds to the root zone and habitation zone of many species.
	Full profile	Management Limits	The risk from contamination above the Management Limits will be considered for all depths.
Soil Texture	Clay or sand	HSL	Based on the variety of soil textures encountered at the site in the PSI.
	Coarse to fine	ESL, Management Limits	
Clay content	5% to 50% (sample dependant)	EIL (Cr)	Conservative estimate based on the variety of soil textures encountered at the site in the DP
Level of Protection	80%	EIL	Based on NEPC (2013) recommendations for urban residential and public open space.
Contaminant “age”	“aged” (>2 years)	EIL (metals)	Based on likely source of contamination being historic fill and land use.
Traffic volume	High	EIL (Cu, Ni, Cr, Zn	Based on the site location away from main roads. Used for estimating background concentrations.
pH	6.5	EIL (Cu, Zn)	Based on the average of field results from DP Eight samples were tested, and values ranged between pH 5 and 7.9.
CEC	8.63 cmol/kg	EIL (Cu, Ni, Zn)	Based on the average of field results from DP. Three samples were tested, and values ranged between 7.8 and 9.4 cmol/kg.
Organic Carbon content	1%	EIL (Cu)	Conservative estimate due to no testing having been undertaken.

Variable	Input	Applicable to	Rationale
Sampling density, volume and analytical method	Sampling details	Asbestos	The relevant guidelines for asbestos will depend on the sampling density, type of sample collected (i.e., material fragment, <100 g soil, 500 mL soil, 10 L soil) and the analytical type (e.g., sieving, Australian Standard, NEPC (2013)). As a 'detailed asbestos assessment' in accordance with NEPC (2013) is not proposed, any asbestos detection will be considered to trigger the need for further investigation and/ or remediation. Quantitative HSL in NEPC (2013) for 500 mL and 10 L samples will, however, be considered in assessing the significant of individual results.

8.2 Waste Classification

The DSI will include a preliminary assessment of the waste classification of the material for off-site disposal purposes. This will be conducted in accordance with the POEO Act and the EPA *Waste Classification Guidelines* (EPA, 2014).

9. Sampling and Analysis Strategy and Sampling Methodology

9.1 Data Quality Objectives

This SAQP has been devised broadly in accordance with the seven step Data Quality Objective (DQO) process which is provided in Appendix B, Schedule B2 of *National Environment Protection (Assessment of Site Contamination) Measure* 1999, as amended 2013 (NEPC, 2013). The DQO process is outlined as follows:

(1) State the Problem

The "problem" to be addressed is that additional information is required to inform the assessment on the site's suitability for the proposed development and continued use as a primary school and whether remediation is required to make the site suitable.

(2) Identify the Decision/ Goal of the Study

The goal (objectives) of the study are provided in Section 1.

The following decisions will be made based on the data proposed to be obtained:

- Do the existing fill and / or natural soils pose a potential risk to identified receptors?

- Is the data sufficient to make a decision regarding the abovementioned risks, the compatibility of the site for the proposed development or are additional investigations required?
- Is the site suitable for the proposed continued use as a school from a contamination perspective?
- Does contamination at the site, if encountered, trigger the Duty to Report requirements under the CLM Act 1997?
- Are there any off-site migration issues that need to be considered?
- Is the data sufficient to enable the preparation of a Remediation Action Plan (RAP) and / or Environmental Management Plan (EMP) should the data suggest these are required?

(3) Identify the Information Inputs

Inputs into the decisions will be as follows:

- Results of previous investigations (as discussed in Section 4);
- Site history (as discussed in Section 4);
- The site condition (as discussed in Section 5);
- Field observations;
- Field and laboratory test results;
- The assessment criteria (as discussed in Section 8);
- Field and laboratory QA / QC data; and
- Details of the proposed development (as discussed in Section 6).

(4) Define the Boundaries of the Study

The site for the purposes of this SAQP is defined in Section 0 and the site boundaries are shown on Drawing R.001.D01, Appendix A.

The depth of the study will be the depth of intrusive investigation at any given location. In general boreholes will be extended to approximately 0.2 m into natural soil or prior refusal.

It is noted that the investigation of the site will be constrained by the presence of current site structures.

(5) Develop the Analytical Approach (or decision rule)

The information obtained during the assessment will be used to characterise the site in terms of contamination issues and risk to human health and / or the environment. The decision rules used in characterising the site will be as follows:

- Laboratory test results for systematic soil samples will be assessed individually or statistically (if considered appropriate) to determine the 95% upper confidence level (UCL) of the mean concentration for each analyte or analyte group (of like materials);

- Laboratory test results for targeted locations will be assessed individually or with other samples targeting the same issue;
- Laboratory test results for identified “hot spots” will be assessed individually;
- The adopted site criteria will be the NSW Environment Protection Authority (EPA) endorsed criteria (refer to Section 8);
- Where such criteria are not available, other recognised national or international standards will be used;
- The contaminant concentrations in soil/filling material will be considered to require further assessment or remedial action if:
  - The concentration of the contaminant is more than 2.5 times the SAC. Any location more than 2.5 times the adopted site criteria is classified as a ‘hotspot’, requiring further assessment / management; and
  - The calculated 95% Upper Confidence Limit (95% UCL) of average concentrations (excluding any ‘hotspot’ concentrations) exceeds the adopted SAC; and
  - The standard deviation of the results is greater than 50% of the SAC.
- Further investigation, remediation and / or management will be recommended if the site is found to be contaminated or containing contamination “hot spots”.

The acceptable limits for the proposed QA / QC assessment are provided in Section 10. An assessment of the overall data quality will be presented in the DSI report. Field and laboratory test results will be considered useable for the assessment after evaluation against the following data quality indicators (DQIs):

- Precision - a measure of variability or reproducibility of data;
- Accuracy - a measure of closeness of the data to the ‘true’ value;
- Representativeness - the confidence (qualitative) of data representativeness of media present on site;
- Completeness - a measure of the amount of usable data from a data collection activity; and
- Comparability - the confidence (qualitative) that data may be considered to be equivalent for each sampling and analytical event.

(6) Specify Performance or Acceptance Criteria

The possible decision errors for the proposed DSI are:

- Deciding that the site is suitable for the proposed continued use as a primary school without remediation when truly it is not; and
- Deciding that the site is not suitable for the proposed continued use as a primary school without remediation when truly it is.

Decision errors for the proposed assessment will be minimised and measured by the following:

- Compare new data with available previous investigations;

- Systematic soil sample numbers will comply with those recommended in the NSW EPA Sampling Design Guidelines (1995), which have risk probabilities already incorporated;
- The sampling regime will target each stratum identified to account for site variability;
- Sample collection and handling techniques will be in accordance with standard field procedures;
- Samples will be prepared and analysed by a NATA-accredited laboratory with the acceptance limits for laboratory QA / QC parameters based on the laboratory reported acceptance limits and those stated in NEPC (2013);
- The analyte selection is based on the conceptual site model (refer to Section 7). The potential for contaminants other than those proposed to be analysed is considered to be low;
- The SAC will be adopted from established and NSW EPA endorsed guidelines. Where not available, recognised national and international guidelines were used. The SAC have risk probabilities already incorporated;
- A significance level of 0.05 will be adopted for data with statistical analysis of 95% Upper Confidence Limit (95% UCL) of average concentrations; and
- NATA accredited laboratories using NATA endorsed methods are used to perform laboratory analysis. Where NATA endorsed methods are not used, the reasons will be stated and the effect of using non-NATA methods on the decision making process will be explained.

(7) Develop the Plan for Obtaining Data

Data collection points have been determined to assess potential soil impacts.

The *Contaminated Sites, Sampling Design Guidelines* (NSW EPA, 1995) recommend a minimum of 35-40 sampling points for characterisation of a site of 2.5 to 3 ha with no known point sources of contamination. Given that 11 locations have previously been sampled, an additional 29 sampling locations are proposed at the approximately 3 ha site.

Section 9.2 provides the sampling plan for the DSI.

9.2 Sampling Strategy and Design

9.2.1 Overview

The following sampling and analysis works are proposed:

- Undertaking works, including collection and analysis of QA/QC samples in accordance with Section 10;
- Ground penetrating radar (GPR) screen of the area of the former air raid trench (Source S4) to assist in locating the potential former trench;
- Collection of samples from 29 locations using a combination of boreholes drilled with a drill rig and hand augered boreholes (for locations not accessible by drill rig);

- The proposed target depth and/ or horizon(s) and rationale for each location are provided in Section 9.2.2. The following rationale has been considered for targeted sampling:
  - Samples locations will target fill and near surface soils to assess sources S2, S3, S5, S6 and S9. It is noted that due to the proposed assessment method being boreholes (to prevent settlement of test pits within school grounds), sufficient samples for 500 mL asbestos analysis may not be possible, and 40 g samples have therefore been allowed. If building debris is observed in fill, collection of a sample will be attempted over a larger depth range to obtain sufficient sample for 500 mL analysis;
  - Proposed location P121 will target the former air raid shelter trench (Source S4), with the location to be based on the 1943 photograph and GPR scan of this area;
  - Sampling locations near Carlingford Road will target metals in the surface soil for lead and chromium to assess for Source S7;
  - Sample locations will assess TPH in the near surface soils to assess source S1; and
  - Sample locations in the oval will assess PAH and metals in the near surface soils to assess source S8.
- Logging of encountered soil materials and pertinent field information; and
- Laboratory testing of selected soil samples as discussed in Section 9.3.2.

9.2.2 Proposed Sample Locations and Target Depths

The proposed sample locations are shown on Drawings R.001.D02 to R.001.D04, Appendix A.

Table 4, below, lists the sample locations and their targets. Each sample location will be extended approximately 0.2 m into natural soil or prior refusal/ limit of reach (note: hand auger location P102 and P103 are expected to refuse in fill).

Table 4: Proposed Sample Location Targets

Proposed Sample Location	Target Source (target analytes provided in notes)
P101	Fill, surface soils (500 mL asbestos)
P102 (HA)	Fill, surface soils (500 mL asbestos)
P103 (HA)	Fill, surface soils (500 mL asbestos)
P104	Fill
P105	Fill, surface soils (former bonfire area)
P106	Fill, surface soils (former bonfire area)
P107	Fill, surface soils (former bonfire area)
P108	Fill, surface soils (former bonfire area)
P109	Fill, surface soils (former bonfire area)
P110	Fill, surface soils (former bonfire area)
P111	Fill, surface soils (former bonfire area)
P112	Fill, surface soils (former bonfire area)
P113	Fill, surface soils (former bonfire area)
P114	Fill, surface soils (former bonfire area)
P115	Fill, surface soils (former bonfire area)
P116	Fill, surface soils (former bonfire area)

Proposed Sample Location	Target Source (target analytes provided in notes)
P117	Fill
P118	Fill, surface soils (former bonfire area)
P119	Fill, surface soils (nearby older building area)
P120	Fill
P121	Fill, former air raid shelter (based on historical aerial photographs and GPR results). Additional borehole locations will be marked in this area based on GPR and service location results, and drill rig access, and will be drilled if deeper fill indicative of the backfilled air raid shelter is not encountered in the initial bore(s).
P122	Fill
P123	Fill
P124	Fill
P125	Fill, surface soils (nearby older building area)
P126	Fill
P127	Fill, surface soils (paint pigment settlement, nearby older building area)
P128	Fill, surface soils (paint pigment settlement, nearby older building area)
P129	Fill, surface soils (paint pigment settlement, nearby older building area)

Analytes:

Fill:	Metals, TPH, BTEX, PAH, OCP, OPP, PCB, phenols, asbestos
Surface soils (former bonfire area):	PAH and metals
Surface soils (nearby older building area):	Lead, PCB, asbestos
Surface soils (Paint pigment settlement:	metals

9.3 Sampling and Analysis Plan and Methodology

9.3.1 Sampling Methodology

The proposed soil sampling methodology comprises:

- Collection of soil samples from all locations at the surface (where no pavement present), and then at regular intervals based on field observations, such as soil type and signs of potential concern;
- Transfer of samples for chemical analysis into laboratory-prepared glass jars, completely filled to ensure the headspace within the sample jar is minimised, and capped immediately to minimise loss of volatiles;
- Transfer of samples for asbestos analysis into snap-lock bags or laboratory-prepared glass jars. Approximate volumes of either 40 g will be collected as required for the proposed analysis. If building debris is observed in fill, sample will be attempted to be collected over a larger depth range to obtain sufficient sample for 500 mL analysis;
- Replicate samples will be collected and screened for volatiles compounds using a calibrated photo-ionisation detector (PID);
- QA / QC samples will be collected in accordance with Section 10;
- Labelling of sample containers with individual and unique identification, including project number, sample location and sample depth;
- Placement of the glass jars, with Teflon lined lid, into a cooled, insulated and sealed container for transport to the laboratory;

- All sampling information will be accurately recorded, and quality control maintained throughout the investigation; and
- Soils penetrated during the investigations will be logged in general accordance with the Unified Soil Classification system, with features such as seepage, discolouration, staining, odours and other indications of contamination being noted.

9.3.2 Proposed Laboratory Analysis

Selected samples from each location will be analysed for varying combination of the COPC identified in Section 7. These comprise:

- Heavy metals (including As, Cd, Cr, Cu, Pb, Hg, Ni, Zn);
- Total recoverable hydrocarbons (TRH) (as a screening test for TPH);
- BTEX;
- PAH;
- OCP (including toxaphene);
- OPP;
- PCB;
- Phenols; and
- Asbestos (mostly approximate 40 g samples, with 500 mL samples analysed if sufficient sample of fill with building debris can be obtained).

Note: SMF will be assessed visually only.

One sample is expected to be analysed from locations with shallow fill (i.e., approximately 0.5 m or less) whilst one to three samples will be analysed with deeper fill to provide data on the contaminant concentrations at varying depths in the fill.

9.4 Contingency Plan

In the event that the data obtained does not meet the DQO or is not sufficient to meet the project objectives the following will be conducted:

- Review the achieved results, the degree to which they are considered to be representative of site conditions and the known data gaps;
- Assess the significance of the data gaps with respect to the associated contamination risk and proposed development; and
- Consider the above in determining the need for, and scope of, additional works.

10. Quality Assurance and Quality Control

10.1 Field Quality Assurance and Quality Control

Quality Assurance (QA) and Quality Control (QC) procedures will be adopted throughout the field sampling program to assess sampling precision and accuracy and prevent cross-contamination.

Sample collection, management and field QA / QC procedures will include:

- An experienced contamination consultant collects the samples using standard operating procedures;
- Details of field observations are recorded for each sample location, including borehole logs with details of the materials observed and the samples collected;
- Field instruments and meters (i.e., the PID) will be calibrated prior to use;
- Field duplicates / replicates will be collected, and will be tested at a frequency of 10% of primary samples (comprising approximately 5% intra-laboratory replicate samples and 5% inter-laboratory replicate samples);
- Replicate samples will be analysed for the same chemical analytical suite of the primary sample;
- Trip spike and trip blank samples will be taken out into the field on a daily basis. Trip spike and blank samples will be analysed for BTEX. One trip spike and one trip blank will be analysed for each sample batch;
- Rinsate samples will be collected from non-disposable sampling equipment following decontamination and analysed for metals, PAH, TRH and BTEX. One rinsate sample from each day of fieldwork will be analysed where non-disposable equipment is used;
- An ice box (esky) with ice bricks will be used for storage of samples for chemical analysis during the fieldwork. Samples will be dispatched to the analytical laboratory in an ice box with ice bricks. Samples may be stored in a refrigerator at the DP office prior to dispatch to the analytical laboratory; and
- Samples will be dispatched with chain of custody documentation.

The following target ranges will be considered in assessing the data:

- Relative percentage difference (RPD) results for replicate / duplicate samples of ≤+/-30% for inorganic analytes and ≤+/-50% for organic analytes;
- Trip blank sample result: do not indicate a potential for significant cross contamination (ideally <PQL); and
- Trip spike sample recovery: 60-140%.

10.2 Laboratory Quality Assurance and Quality Control

Laboratory QA / QC will include the following:

- Samples will be analysed using NATA accredited methods. If analysis is undertaken without NATA accreditation (e.g., analysis of approximate 500 mL samples in accordance with NEPC (2013)) discussion of the reason and implication for this approach will be provided in the DSI report;
- Samples will be analysed within the recommended holding times;
- The practical quantitation limits (PQL) will be appropriate for the assessment of risk for each analyte;
- The quality assurance / quality control (QA / QC) protocols and results reported by the laboratories comply with their NATA accreditation and are consistent with the requirements of NEPC (2013);
- The contract laboratories will be NATA accredited and will conduct in-house QA/QC procedures involving the routine testing of:
  - Reagent blanks;
  - Spike recovery analysis;
  - Laboratory duplicate analysis;
  - Analysis of control standards; and
  - Calibration standards and blanks.

11. Data Assessment and Reporting

The DSI report will assess the data in accordance with this SAQP, including an assessment of the QA / QC.

The report will make a conclusion regarding the suitability of the site for the proposed school and recommendations for further work (as appropriate).

12. Concluding Statement

Following this SAQP will assist in providing sampling and analysis results to address data gaps in the characterisation of contamination risk at the site and in association with the concerned areas, in terms of potential impact to the site and proposed new public primary school. The results of the proposed sampling and testing will also be used to assess the need for further investigations and / or remediation.

The SAQP should be reviewed and endorsed by the Site Auditor prior to implementation.

13. References

CRC CARE. (2011). *Health screening levels for petroleum hydrocarbons in soil and groundwater.* Parts 1 to 3, Technical Report No. 10: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.

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DFP. (2020). *Request for Secretary's Environmental Assessment Requirements, Proposed Alterations and Additions to Epping West Public School.* Reference 21168A.4KC_SEARs Request_Final, dated 7 September 2020: DFP Planning Consultants.

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DP. (2021b). *Report on Geotechnical Investigation, Epping West Public School Upgrade, 96 Carlingford Road, Epping.* Douglas Partners Pty Ltd: Reference 99674.00.R.002.Rev1, dated April 2021.

DP. (2021c). *Report on Preliminary Site (Contamination) Investigation, Proposed Epping West Public School Upgrade, 96 Carlingford Road, Epping.* Douglas Partners Pty Ltd: Reference 99674.01.R.001.Rev1, dated April 2021 .

DP. (2021d). *Report on Hazardous Building Materials (HBM) Survey Epping West Public School, 96 Carlingford Road, Epping.* Douglas Partners Pty Ltd: Reference 99674.02.R.001.Rev2, dated April 2021.

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GML. (2020). *Epping West Public School Heritage Assessment.* GML Heritage: Job 20-0115, November 2020.

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WSP. (2019). *Epping West Public School, Asbestos in Grounds Management Plan, NSW Department of Education.* WSP: Report 1851_ASB_13117_AMP, dated May 2019.

14. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for this project at Epping West Public School, 96 Carlingford Road, Epping under the Standard Form Agreement SINSW00650/20 dated 8 April 2020 and undertaken in accordance with Douglas Partners Pty Ltd (DP) proposal SYD201231.P.002.Rev0 dated 5 November 2020. This report is provided for the exclusive use of School Infrastructure NSW for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and / or their agents.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Douglas Partners Pty Ltd

Appendix A

Notes About this Report

Drawing

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

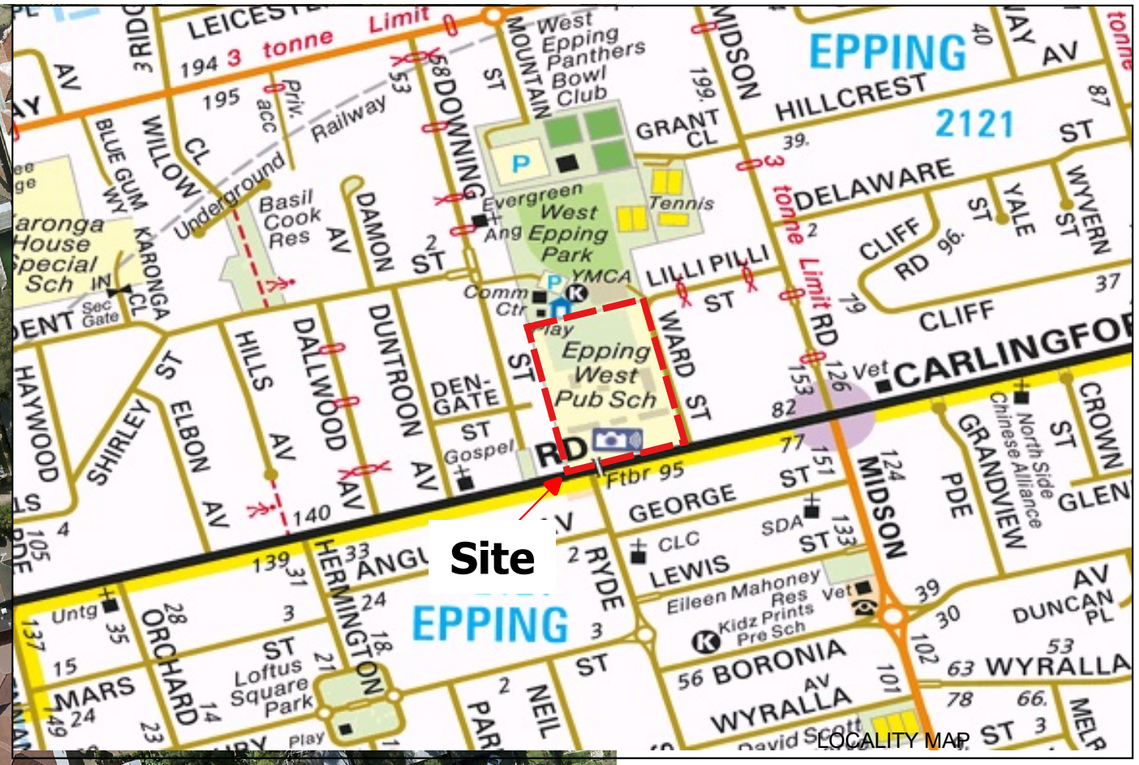
In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.



Legend

- Site Boundary

Notes:
1. Basemap from MetroMap (dated 29/08/2020)
2. Locality map from street-directory.com (dated 13/05/20)

0 20 40 60 m

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	School Infrastructure NSW		
OFFICE:	Sydney	DRAWN BY:	NLE
SCALE:	As Shown	DATE:	2.12.2020

TITLE: **Overview of Previous and Proposed Sample Locations**
Epping West Public School
96-104 Carlingford Road, Epping

PROJECT No: 99674.03
DRAWING No: R.001.D2
REVISION: DftA

Legend

- Site Boundary
- Proposed Borehole (HA indicates hand auger)
- Previous Borehole (DP, 2020c)
- Previous Borehole (DP, 2009)

Notes:
1. Basemap from MetroMap (dated 29/08/2020)
2. All locations shown are approximate only

0 20 40 60 m

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	School Infrastructure NSW		
OFFICE:	Sydney	DRAWN BY:	NLE
SCALE:	As Shown	DATE:	18.12.2020

TITLE: **Overview of Previous and Proposed Sample Locations**
Epping West Public School
96-104 Carlingford Road, Epping

N

PROJECT No:	99674.03
DRAWING No:	R.001.D2
REVISION:	0

Legend

- Site Boundary
- Proposed Borehole (HA indicates hand auger)

Notes:
1. Basemap from MetroMap (dated 29/08/2020)
2. All locations shown are approximate only

0 20 40 60 m

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	School Infrastructure NSW		
OFFICE:	Sydney	DRAWN BY:	NLE
SCALE:	As Shown	DATE:	2.12.2020

TITLE: **Proposed Sample Locations**
Epping West Public School
96-104 Carlingford Road, Epping

N

PROJECT No:	99674.03
DRAWING No:	R.001.D3
REVISION:	DftA

Legend

- Site Boundary
- Proposed Borehole (HA indicates hand auger)
- Previous Borehole (DP, 2020c)
- Previous Borehole (DP, 2009)

Notes:
1. Basemap from 1943 aerial photograph
2. All locations shown are approximate only

0 20 40 60 m

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	School Infrastructure NSW		
OFFICE:	Sydney	DRAWN BY:	NLE
SCALE:	As Shown	DATE:	2.12.2020

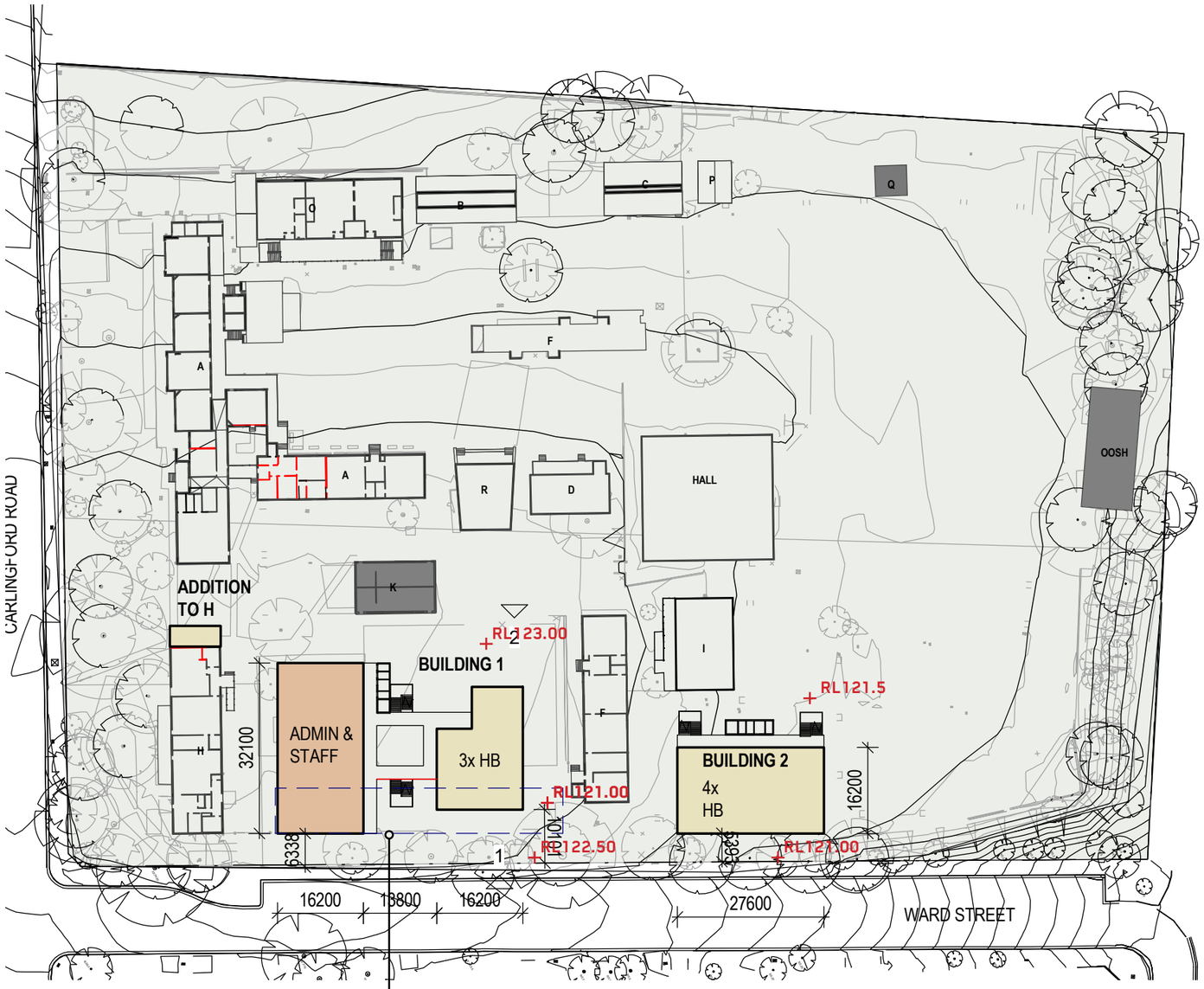
TITLE: **Previous and Proposed Sample Locations on 1943 Photograph**
Epping West Public School
96-104 Carlingford Road, Epping

N

PROJECT No:	99674.03
DRAWING No:	R.001.D4
REVISION:	DftA

INDICATIVE PROPOSAL

SITE PLAN (GROUND PLANE)

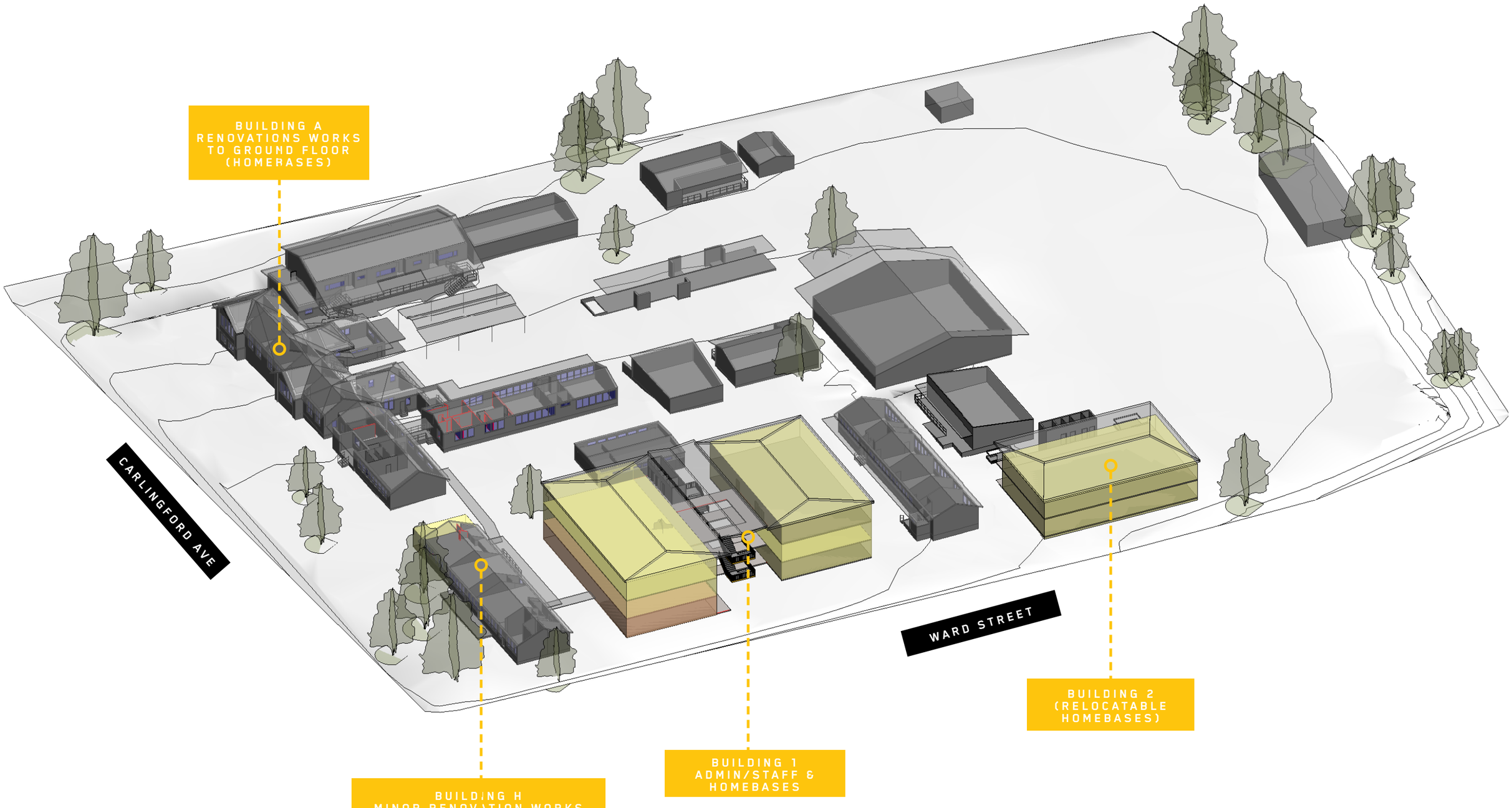


LINE OF BUILDING G
BUILDING TO BE DEMOLISHED

0 5 20 40M
SCALE 1:1000

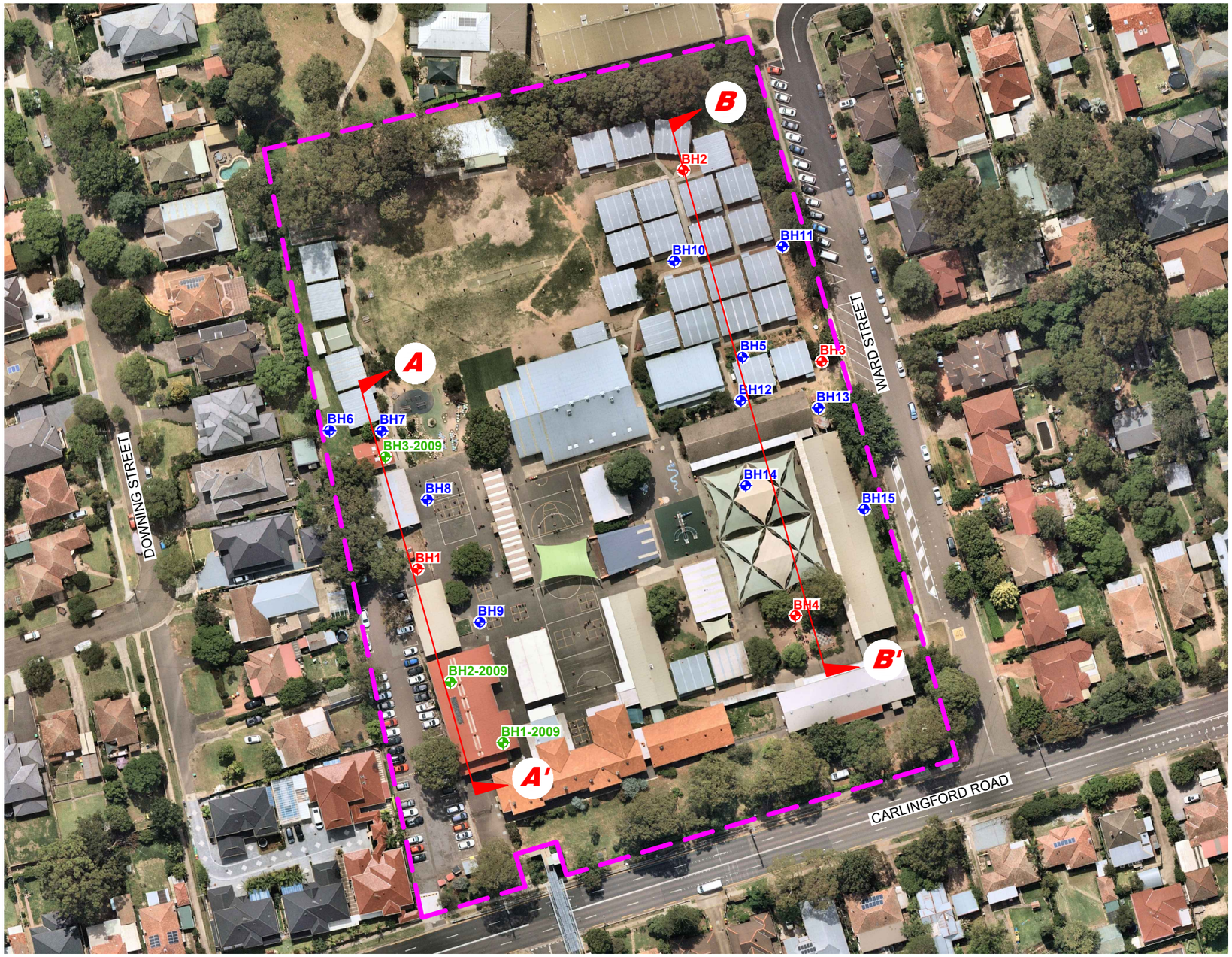
INDICATIVE PROPOSAL

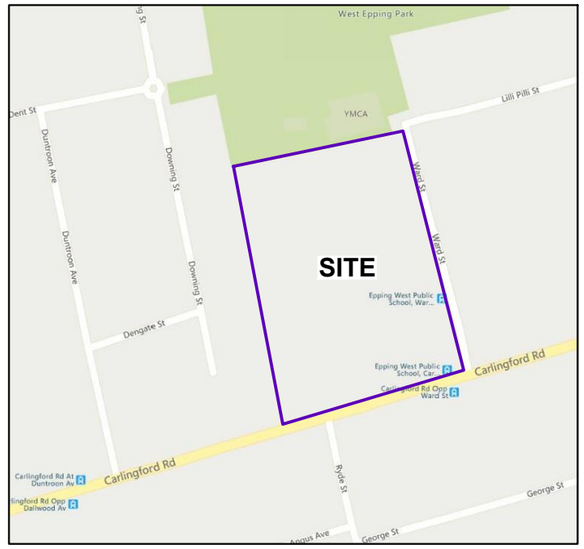
AXONOMETRIC



Appendix B

Geological Sections from Geotechnical Investigation Report (DP, 2020b)





Locality Plan

0 5 10 20 30 40 50 75 100 125m

1:1250 @ A3

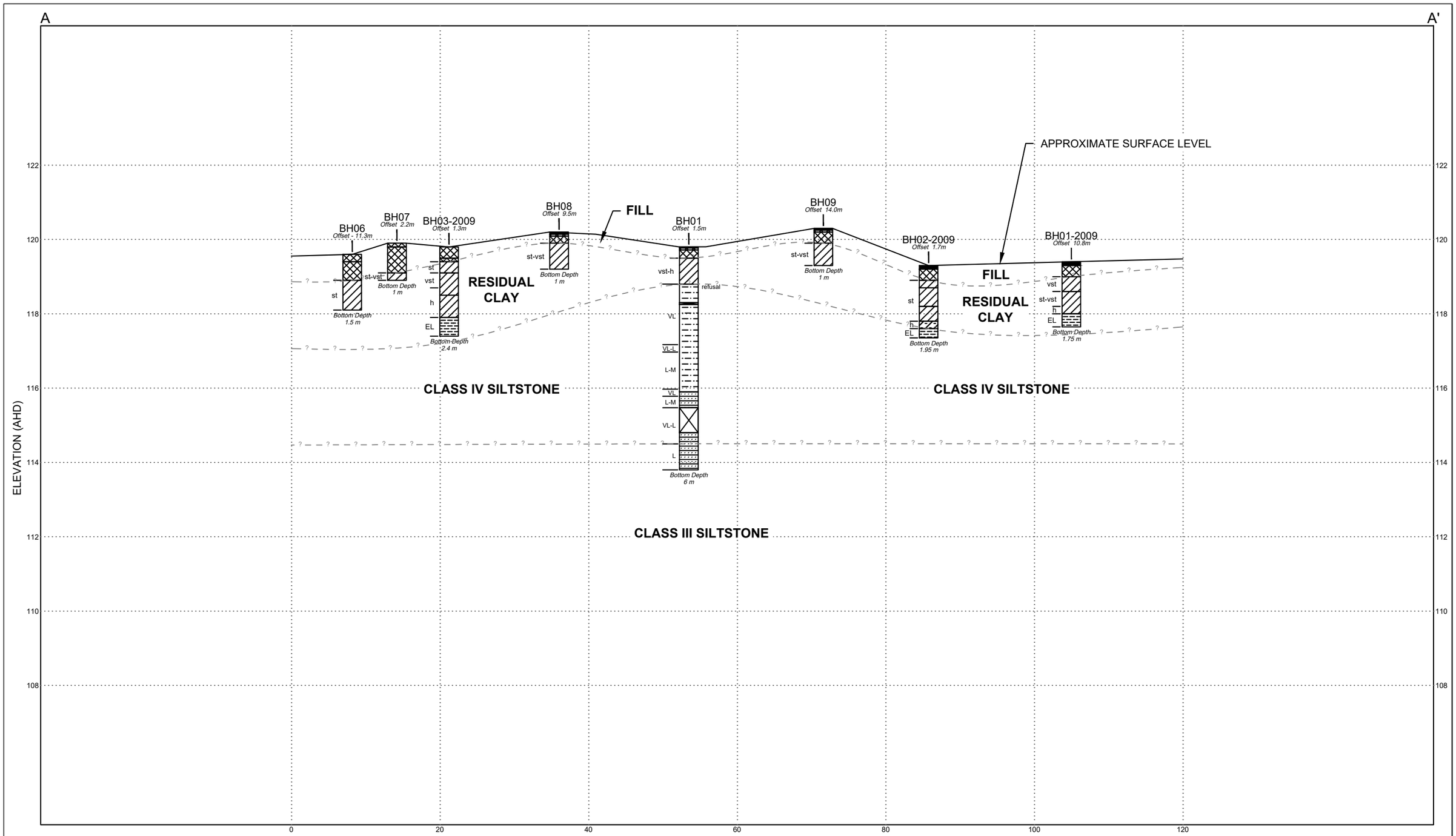
LEGEND

- Rock-cored Borehole
- Augered Borehole
- Previous Borehole (DP, 2009)
- Site Boundary
- A — A' Geotechnical Cross-section A-A'

NOTE:
1: Base image from Nearmap.com (Dated 28.02.2020)
2: Borehole coordinates measured using a high-precision differential GPS

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: School Infrastructure NSW		TITLE: **Borehole Location Plan**	PROJECT No: 99674.00
OFFICE: Sydney	DRAWN BY: IT	**Epping West Public School Upgrade**	DRAWING No: 1
SCALE: 1:1250 @ A3	DATE: 27.05.2020	**96 Carlingford Road, Epping**	REVISION: 0



LEGEND

- Core Loss
- Asphaltic Concrete
- Clay
- Filling
- Laminite
- Shale
- Shaly Clay
- Siltstone

NOTES:

1. Subsurface conditions are accurate at the borehole locations only. Variations in subsurface conditions may occur between borehole locations. Interpreted strata boundaries are approximate and should be used as a guide only.
2. Summary logs only and should be read in conjunction with detailed logs.
3. Horizontal and vertical scales are not equal.

ROCK STRENGTH

- EL - Extremely Low
- VL - Very Low
- L - Low
- M - Medium
- H - High

SOIL CONSISTENCY

- f - Firm
- st - Stiff
- vst - Very Stiff
- h - Hard

TESTS / OTHER

- N - Standard penetration test value
- — ? — — - Interpreted geotechnical boundary
- ▽ - Water level

Horizontal Scale (metres) 0 10

Vertical Exaggeration = 5.0

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: School Infrastructure NSW		TITLE: **Interpreted Geotechnical Cross-Section A-A'**
OFFICE: Sydney	DRAWN BY: IT	**Epping West School Upgrade**
SCALE: 1:500 (H) 1:100 (V) @ A3	DATE: 28.05.2020	**96 Carlingford Road, Epping**

PROJECT No:	99674.00
DRAWING No:	2
REVISION:	0