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# Alliance Geotechnical

Engineering | Environmental | Testing

Report Type:

**Remedial Action Plan**

Project Name:

**Bankstown North Public-School Redevelopment**

Project Address:

**322 Hume Highway, Bankstown NSW**

*Client Name:*

***NSW Department of Education (c/- JDH Architects)***

**30 June 2020**

**Report No: 10834-ER-1-2**

We give you the right information to make the right decisions

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## DOCUMENT CONTROL

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Rev 0	02 March 2020	Isabelle Figatowski	Steven Wallace	JDH Architects	Issued for review
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## EXECUTIVE SUMMARY

Alliance Geotechnical Pty Ltd (AG) was engaged by NSW Department of Education (c/- JDH Architects), to prepare a remedial action plan (RAP) for 322 Hume Highway, Bankstown NSW (refer **Figure 1** with the 'site' boundaries outlined in **Figure 2**).

AG has the following project appreciation:

- The site is comprised a portion of the Bankstown North Public School totalling an area of 2.2 hectares;
- A preliminary site investigation (PSI) has been reported for the site by GeoEnviro in 2018;
- A supplementary contamination assessment was carried out in 2019 by AG to address data gaps identified within the site's PSI and to satisfy the requirements of the NSW EPA Sampling Design Guidelines (1995); and
- A remedial action plan is required to address the findings of the supplementary contamination assessment.

The objectives of this project were to:

- Prepare a remedial action plan to address unacceptable contamination exposure risks on the site identified in the AG (2019) report, in the context of the proposed land use setting.

The scope of works undertaken to address the project objectives, included:

- A desktop review; and
- Reporting.

The remedial goal for this site is to remediate asbestos containing material (ACM) soil contamination and heavy metal contamination to a level that does not present an unacceptable human health exposure risk or ecological risk, based on the proposed land use setting.

The extent of remediation on the site is considered to be the following:

- Benzo(a)pyrene TEQ and Zinc (AEC01);
- Zinc (AEC02);
- Non-friable ACM within fill materials surrounding TP14 (AEC03); and
- Non-friable ACM restricted to surface soils localised at BH25 (AEC04).

The inferred extents of remediation are presented in **Figure 2**.

It is noted that the extent of remediation for the site may require amendment, subject to the discovery of unexpected findings during remedial works.

Based on the extent of the remediation identified in **Section 8.2**, and the proposed site redevelopment works, remedial options considered appropriate for this site include:

- Excavation and removal off site;
- Excavate and spread for raking/picking; and
- In-situ raking and picking.

Taking into consideration the client's objectives for the site, and the nature and extent of the proposed site redevelopment works, the preferred remedial option for the site is:

- Excavate and dispose offsite to a licensed receiving facility;

AG approximates that the quantity of soil for offsite disposal will consist of the sites area multiplied by the depth of excavation. The approximate quantities of potentially contaminated soil material onsite consist of:

- AEC01: 200m<sup>2</sup> (130m<sup>3</sup> or 250 tonnes @ 500mm depth, 1.3x bulking factor, and 1.8tonnes/m<sup>3</sup> assumed soil density);
- AEC02: 200m<sup>2</sup> (130m<sup>3</sup> or 250 tonnes @ 500mm depth, 1.3x bulking factor, and 1.8tonnes/m<sup>3</sup> assumed soil density);
- AEC03: 200m<sup>2</sup> (390m<sup>3</sup> or 700 tonnes @ 1.50m height, 1.3x bulking factor, and 1.8tonnes/m<sup>3</sup> assumed soil density); and
- AEC04: 100m<sup>2</sup> (40m<sup>3</sup> or 70 tonnes @ 300mm depth, 1.3x bulking factor, and 1.8tonnes/m<sup>3</sup> assumed soil density).

Note that unexpected finds during remedial works may increase the lateral or vertical extent of known contaminated material onsite, thus increasing the currently understood remedial extent and total quantities of material.

Based on the information presented in historical contamination assessment reports, and AG's observations made on site, AG concludes that the remedial goal can be achieved and the site made suitable for the proposed land use setting, subject to:

- Implementation of the strategies, methodologies and measures set out in this remedial action plan; and
- Preparation of a site validation report.

AG recommends that waste classification, remediation monitoring and validation works should be undertaken by a suitably experienced environmental consultant and occupational hygienist.

This report must be read in conjunction with the limitations set out in **Section 11**

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Figure 1            Site Locality

Figure 2            Areas of Environmental Concern / Inferred Remedial Extent

## APPENDICES

A            Proposed Development including cut and fill plan

B            Borehole Logs

## LIST OF ABBREVIATIONS

A list of the common abbreviations used throughout this report is provided below:

ACM	Asbestos Containing Material
AEC	Area of Environmental Concern
AG	Alliance Geotechnical Pty Ltd
AHD	Australian Height Datum
BTEX	Benzene, toluene, ethyl benzene, xylenes
COPC	Contaminant of Potential Concern
CSM	Conceptual Site Model
DP	Deposited Plan
DSI	Detailed Site Investigation
EPA	Environment Protection Authority
LOR	Limit of reporting
m	metres
m <sup>2</sup>	square metres
m bgl	metres below ground level
mg/kg	milligrams per kilogram
NSW	New South Wales
OCP	Organochlorine pesticides
PAH	Polycyclic aromatic hydrocarbons
PCB	Polychlorinated biphenyls
PSI	Preliminary Site Investigation
RAP	Remedial Action Plan
RPD	Relative percentage difference
TRH	Total recoverable hydrocarbons
UCL	Upper Confidence Limit

# 1. INTRODUCTION

## 1.1. Background

Alliance Geotechnical Pty Ltd (AG) was engaged by NSW Department of Education (c/- JDH Architects), to prepare a remedial action plan (RAP) for 322 Hume Highway, Bankstown NSW 2200 (refer Figure 1 with the 'site' boundaries outlined in Figure 2).

AG has the following project appreciation:

- The site is comprised a portion of the Bankstown North Public School totalling an area of 2.2 hectares;
- A preliminary site investigation (PSI) has been reported for the site by GeoEnviro in 2018;
- A supplementary contamination assessment was carried out in 2019 by AG to address data gaps identified within the site's PSI and to satisfy the requirements of the NSW EPA Sampling Design Guidelines (1995); and
- A remedial action plan is required to address the findings of the supplementary contamination assessment

## 1.2. Objectives

The objectives of this project were to:

- Prepare a remedial action plan to address unacceptable contamination exposure risks on the site identified in the AG (2019) report, in the context of the proposed land use setting.

The **Remedial Action Plan** is required by the Secretary's Environmental Assessment Requirements (SEARs) for SSD 10290. Table 1.1 identifies the SEARs and relevant reference within this report.

**Table 1.1.1 – SEARs and Relevant Reference**

SEARs Item	Report Reference
<u>13 Contamination</u>	
Assess and quantify any soil and groundwater contamination and demonstrate that the site is suitable for the proposed use in accordance with SEPP 55.	Whole Report
Detail the process of the identification, handling, transport and disposal of any hazardous waste encountered during demotion, site preparation and construction.	Section 6.5.8 and Section 9.2

AG notes that any change in remedial strategy, (including addressing the findings of the additional investigations and/or changes in the final design) can be prepared and included as an addendum to the existing RAP. Such changes in remedial strategy will require review and endorsement by the contaminated land consultant.

## 1.3. Scope of Work

The scope of work undertaken to address the project objective included:

- A desktop review of history; and
- Data assessment and reporting.

## 2. SITE SETTING

### 2.1. Site Identification

Site identification details and associated information is present in **Table 2.1**. The locality of the site is presented in **Figure 1**, with the general layout and site boundaries depicted in **Figure 2**.

**Table 2.1 Site Identification Information**

Site Address	322 Hume Highway, Bankstown NSW
Cadastral Identification	Lot 10 in DP1232584
Geographical Coordinates	33°54'18.6" S 151°02'16.6" E (Source: Google Earth)
Site Area	2.2 hectares (Source: SixMaps - <a href="https://maps.six.nsw.gov.au/">https://maps.six.nsw.gov.au/</a> )
Zoning	SP2 – Infrastructure (Educational Establishment) (Bankstown Local Environmental Plan 2015)
Current Land Use	Public School
Proposed Land Use	Public School
Local Government Area	Canterbury Bankstown Council

### 2.2. Ground Conditions and Surrounding Environment

A summary of available site and local data identifying topography, geology, soils, and hydrology is provided in **Table 2.2**.

**Table 2.2 Summary of Ground Conditions and Surrounding Environment**

Geology	AG (2019) indicated that the site is likely to be underlain by Wianamatta Group, with Potts Hill Sandstone (Rwp), shale, carbonaceous claystone, laminate, rare coal and tuff.
Topography	AG (2019) reported the topography of the site is generally flat with a slight downward gradient from east to west. AG understands that the site is located at an elevation ranging from approximately 62 m to 66 m Australian Height Datum (AHD).
Acid Sulfate Soil Risk	AG (2019) indicated that the site lies in an area mapped as 'Low Probability' with respect to acid sulfate soils. This infers that land management activities are not likely to be affected by acid sulfate soil materials.  Further assessment of acid sulfate soils in the context of this investigation is considered by AG as not warranted. (Source: <a href="https://www.environment.nsw.gov.au/eSpade2WebApp">https://www.environment.nsw.gov.au/eSpade2WebApp</a> )
Site Drainage	Drainage in hardstand areas is likely to be collected and discharged to the municipal stormwater system. Drainage in unsealed areas is likely to consist of direct soil infiltration and overland flow.
Nearest Surface Waterbody	Duck River, with Parramatta River downstream.

## 2.3. Hydrogeology and Groundwater Use

Available hydrogeological data and records of groundwater use, obtained for this investigation, are summarised below in **Table 2.3**.

**Table 2.3 Background Hydrogeological Information**

Aquifer Type	Unconfined in unconsolidated alluvial sediments. Unconfined to semi-confined in fractured rock along structures. Vertical and lateral flow components. Local perching above clay-rich layers (seasonal).
Depth to Watertable <sup>1</sup>	2 to 6 m
Inferred Groundwater Flow Direction	Based on prevailing site topography, groundwater flow direction in the vicinity of the site is inferred to be towards the south to west.

**Notes:**

<sup>1</sup> Sourced from <https://www.environment.nsw.gov.au/eSpade2WebApp>

### 3. PREVIOUS CONTAMINATION ASSESSMENTS

The following reports were considered during the undertaking of this project:

- GeoEnviro Consultancy Pty Ltd 2018 – ‘Preliminary Environmental Site Assessment Report, Bankstown North Public School, 322 Hume Highway, Bankstown, NSW’, ref: JG18129A-r2, dated October; and
- AG 2019, ‘Supplementary Contamination Assessment, Bankstown North Public School, 322 Hume Highway, Bankstown, NSW’, ref: 9150-ER-1-1, dated 29<sup>th</sup> November.

A summary of these reports is presented in **Section 3.1. to 3.2.**

#### 3.1. GeoEnviro (2018)

The objectives of the project were to:

- Review the site history and available site information from public records to assess the potential areas and contaminants of concern;
- Assess the subsurface soil contamination with limited chemical analysis including asbestos analysis and this is limited to the nominated borehole locations;
- Provide comments on further remediation, management and/or investigation requirements (if any) considered suitable for the proposed redevelopment of the school; and
- Assess the waste classification of soils during borehole investigation for offsite disposal.

The scope of works undertaken to address the project objectives, included:

- A review of available information on the site history from aerial photographs.
- A search of records on previous notices issued by NSW EPA.
- A search of information on Groundwater boreholes in the area from the NSW Natural Resource Atlas (NRA).
- A review of Canterbury Bankstown Council's Section 10.7(2) Zoning Certificates.
- An inspection of the site to identify apparent or suspected areas of contamination and observing visible signs of soil contamination from the boreholes.
- Soil sampling from the geotechnical boreholes and chemical analysis to detect the presence or otherwise of the contaminants of concern.

The site history data collected and site walkover observations made were assessed within the objectives of that project and in the context of the proposed development works. That assessment identified areas of environmental concern (AEC) and contaminants of potential concern (COPC) which may be present on site. The AEC identified are presented in attached **Figure 3** and associated COPC are presented in the table below.

**Table 3.1. Areas of Environmental Concern**

ID	Area of Environmental Concern	Land Use Activity	Contaminants of Potential Concern
AEC01	Surface fill materials	Demolition and uncontrolled filling	Asbestos, Heavy metals, OCP's, PCB's, TRH, BTEX, PAH and pH

Based on GeoEnviro Consultancy Pty Ltd.'s assessment of the desktop review information and fieldwork data, in the context of the proposed change in land use application, GeoEnviro Consultancy made the following conclusions:

- One soil sample collected at BH2(0.2-0.3) from the asphaltic driveway, was found to have slightly elevated concentrations of benzo(a)pyrene (1.4mg/kg) exceeding the ESL criteria (0.7mg/kg) adopted for the site. The elevated concentration of benzo(a)pyrene reported for BH2(0.2-0.3) is likely due to leaching PAH from the asphaltic driveway and does not constitute a contamination hotspot; and
- The preliminary environmental assessment did not encounter obvious signs of gross ground contamination; however, contamination may still exist within the school premises.

Based on these conclusions, GeoEnviro Consultancy Pty Ltd made the following recommendations:

- Additional investigations should be carried out; and
- A waste classification assessment of the soil materials proposed to be excavated and removed should be obtained from a suitably experienced environmental consultant prior to the excavation and disposal of the soil materials.

Fill soils proposed to be excavated across the site should be disposed offsite in accordance with relevant NSW EPA waste classification guidelines.

### **3.2. AG (2019)**

AG had the following project appreciation:

- The site is proposed for redevelopment comprising demolition of existing buildings and construction of a 3-storey building for 24 new permanent homebases; a 3-storey building for new staff and administration facilities, new library, special programs and homebases; construction of a new carpark, games court, assembly area and Kiss & Drop Area; and
- The client requires a supplementary contamination assessment to address the findings of the Preliminary Environmental Site Assessment undertaken by GeoEnviro Consultancy Pty Ltd.

The objectives of the investigation were to:

- Assess the potential nature and extent of identified contaminants of potential concern on the site, with reference to the areas of environmental concern reported in the preliminary environmental assessment;
- Provide advice on whether the site would be suitable (in the context of land contamination) for the proposed land use setting; and
- Provide recommendations for further investigation, management and/or remediation (if warranted).

The scope of works undertaken to address the investigation objectives, included:

- A desktop review, including site information on regional geology, soil landscape, acid sulfate soil risk and registered groundwater boreholes;
- A review of previous Preliminary ESA report;
- Fieldwork including intrusive sampling;
- Laboratory analysis; and
- Data assessment and reporting.

Based on the findings of desktop review information, fieldwork observations and laboratory analytical data, in the context of the proposed redevelopment scenario, AG makes the following conclusions:

- The detected concentrations of benzo(α)pyrene (B(α)P) TEQ recorded in soil sample TP05-0.0-0.2 (5.2mg/kg) assessed, may present an unacceptable direct contact human health exposure risk;
- The detected concentrations of Zinc recorded in soil samples TP05-0.0-0.2 (360mg/kg) and BH07-0.0-0.2 (380mg/kg) assessed, may present an unacceptable ecological exposure risk;
- The detected concentrations of TRH >C<sub>10</sub>-C<sub>16</sub> (F2) recorded in soil sample BH28 0.0-0.2 (130mg/kg) assessed, may present an unacceptable ecological exposure risk. The elevated concentrations of TRH >C<sub>10</sub>-C<sub>16</sub> (F2) in fill sample BH28 0.0-0.2 analysed, were subjected to a statistical analysis using ProUCL 5.1.002 by analysing 26 samples of similar fill profile across the entire site with the resulting 95% upper confidence limit of 63.56mg/kg adopted, which is lower than the site adopted criteria for TRH >C<sub>10</sub>-C<sub>16</sub> (F2) (120mg/kg);
- The detected concentrations of TRH >C<sub>16</sub>-C<sub>34</sub> (F3) recorded in soil sample TP05-0.0-0.2 (1900mg/kg) assessed, may present an unacceptable ecological exposure risk. The elevated concentrations of TRH >C<sub>16</sub>-C<sub>34</sub> (F3) in fill sample TP05-0.0-0.2 analysed, were subjected to a statistical analysis using ProUCL 5.1.002 by analysing 28 samples of similar fill profile across the entire site with the resulting 95% upper confidence limit of 352.4mg/kg adopted, which is lower than the site adopted criteria for TRH >C<sub>16</sub>-C<sub>34</sub> (F3) (1300mg/kg);
- The ecological exposure risk for all the samples analysed were below the relevant adopted NEPM ASC (2013) adopted site assessment criteria for the site except for (B(a)P in samples TP05-0.0-0.2 (5.2mg/kg) and BH25-0.0-0.3 (0.9mg/kg). However, AG considers the ecological screening level value shown in Table 11 of the CRC CARE Technical Report 39 (2017) (Canadian SQGE) for Urban residential and public open space (20 mg/kg) to be more accurate/appropriate for characterisation of the site as it is also conservative and has a higher reliability than the NEPM ASC (2013) ESL value. Using the CRC CARE (2017) adapted screen level for the site means, all samples analysed for B(a)P as pertains to ecological exposure risk are below the applicable site screening level; and
- Bonded asbestos containing material detected in fill material at sampling point TP14 and on surface soils around sampling point BH25, may present unacceptable direct contact human health exposure risk.

From a contaminated land perspective, the land as assessed during this investigation, is not deemed suitable for the proposed land use setting. However, it is considered that subject to the further assessment, management and/or remediation of potential unacceptable contamination risks identified onsite, the site could be suitable for the intended use.

Based on these conclusions, AG makes the following recommendations:

- Preparation of a Remedial Action Plan (RAP) to document in detail all procedures and plans to be implemented to ensure the site is made suitable for the proposed land use setting. Any RAP must include a procedure for unexpected finds during any future demolition and construction works. The RAP should also detail the process of the identification, handling, transport and disposal of any hazardous waste encountered during demolition, site preparation and construction; and
- The RAP should be prepared by a suitably experienced environmental consultant.

## 4. REMEDIATION CRITERIA

The site criteria for the media of concern are set out in Table 4.1 and will be adopted based on the proposed land use scenario<sup>1</sup> and identified receptors.

**Table 4.1 Adopted Site Assessment Criteria**

Exposure Pathway	Land Use Setting <sup>2</sup>	Reference
Human health direct contact	HIL A	Table 1A(1) in NEPC (2013a) Table B4 in Friebe, E & Nadebaum P (2011) Table 2 in DoEE (2018)
Human health inhalation/intrusion	HSL A / Residential A	Table 1A(2) in NEPC (2013a) <sup>3</sup> Table 1A(3) in NEPC (2013a) Table 1A(4) in NEPC (2013a) Table 1A(5) in NEPC (2013a)
Human health (asbestos)	Residential A	Table 7 in NEPC (2013a) <sup>4</sup>
Human health (aesthetics)	All	Characteristics and processes in Section 3.6.2 and 3.6.3 in NEPC (1999a)
Ecological	Areas of Ecological Significance Urban residential / public open space	Table 1B(6) in NEPC (2013a) Table 3 in DoEE (2018) Table 11 in CRC CARE (2017)
Management Limits (petroleum hydrocarbons)	Residential, parkland and public open space	Table 1B(7) in NEPC (2013a)

<sup>1</sup> The land use scenarios in Section 2.2 of NEPC (1999a) will be considered when adopting human health assessment criteria. The land use scenarios in Section 2.5 of NEPC (1999a) will be considered when adopting ecological assessment criteria.

<sup>2</sup> Consideration will be given to soil type, soil texture, soil depth, and appropriate species protection levels.

<sup>3</sup> Secondary school buildings should be assessed using the Residential A / Residential B HILs for vapour intrusion purposes.

<sup>4</sup> A depth of up to 10cm below ground level is adopted to define 'surface soil'.

## 5. RESULTS & SITE CHARACTERISATION

### 5.1. Site Geology

Observations of soils encountered during sampling work were described and recorded on test pit logs. A copy of these test pit logs is presented in **Appendix B**.

Soil profiles observed and described typically consist of a silty clay fill, overlying residual clay. Anthropogenic materials were observed within the fill profile at several locations, with inclusions comprising of concrete gravels, glass, brick, tile and some potentially asbestos containing materials (PACM). Test pits advance into natural soils at each sampling location, with the exception of BH08, TP27 and TP28.

### 5.2. Field Observations

Field Observation compiled during the intrusive investigation are summarised below:

- Olfactory evidence of contamination was not detected in any of the soil samples collected.
- Visual evidence of potential asbestos containing materials (PACM) observed within the fill materials at TP14.
- PID screening results collected during sampling did not identify elevated levels of VOCs.

### 5.3. Soil Analytical Laboratory Results

#### Human Health

Analytical results reported F1 to F4 TRH and BTEXN in soils at concentrations less than adopted HIL-A and HSL-A&B direct contact and inhalation / vapour intrusion human-health exposure criteria.

Total PAH, benzo(α)pyrene (B(α)P) TEQ, OCP, and PCB, were reported a concentration less than adopted HIL-A direct contact human health exposure criteria, with the exception of sample TP05-0.0-0.2 (8.6mg/kg), which returned analytical results that exceeded the benzo(α)pyrene TEQ that exceeded the applicable adopted direct contact human health exposure criteria.

Metal concentrations were reported at concentration less than adopted HIL-A direct contact human health exposure criteria.

PACM was visually identified during the collection of soil samples from within the in-situ fill material at TP14 and on the site surface at BH25. Two suspected ACM fragments (TP14-FCS & BH25-FCS) were collected, laboratory analysed, and confirmed to contain non-friable asbestos in the form of chrysotile and amosite within only TP14-FCS.

#### Ecological Receptors

##### **Ecological Investigation Levels (EILs)**

Site specific EILs were calculated for Chromium III, Copper, Nickel and Zinc using soil samples collected across the site from test pits TP05, TP14 and TP24. Results obtained from these samples were entered into the NEPM ASC 2013 EIL Calculator to generate site specific EILs and the results are shown below in **Table 5.1** and **Table 5.2**:

**Table 5.1 Laboratory Result used for Site Specific Derivations of ACLs**

Analyte/ Sample ID	TP5 0.5-0.7 (mg/kg)	TP14 1.3-1.5 (mg/kg)	TP24 0.8-1.0 (mg/kg)
% Clay	38	34	37

pH	5.3	5.0	5.0
CEC	13	11	18

**Table 5.2 Site EILs Derived from NEPM ASC 2013 EIL Calculator**

Analyte/ Sample ID	TP5 0.5-0.7 (mg/kg)	TP14 1.3-1.5 (mg/kg)	TP24 0.8-1.0 (mg/kg)	Adopted site criteria (mg/kg)
Copper (Cu)	130	100	100	130
Nickel (Ni)	200	180	250	200
Chromium III (Cr <sup>III</sup> )	630	600	620	630
Zinc (Zn)	310	260	260	310

Based on the average depth of fill across site, AG considered it appropriate to adopt values derived from TP5 0.5-0.7 as the adopted site specific EIL criteria for the assessment of Cr<sup>III</sup>, Cu, Ni and Zinc across the site because this was seen to be more representative of the site.

#### Metals

The concentrations of relevant contaminants of concern detected in the soil samples analysed were less than the applicable adopted site-specific ecological investigation levels (EIL), with the exception of Zinc in TP05-0.0-0.2 (360mg/kg) and BH07-0.0-0.2 (380mg/kg).

#### Total Recoverable Hydrocarbons (TRHs)

The concentrations of relevant contaminants of concern detected in the soil samples analysed were less than the applicable adopted site-specific ecological screening level (ESL) criteria, with the exception of TRH >C<sub>16</sub>-C<sub>34</sub> (F3) in TP05-0.0-0.2 (1900mg/kg exceeding the criteria of 1300mg/kg) and TRH >C<sub>10</sub>-C<sub>16</sub> (F2) in BH28 0.0-0.2 (130mg/kg exceeding the criteria of 120mg/kg).

In accordance with the NEPC ASC 2013 guidelines, the detected concentrations of **TRH >C<sub>10</sub>-C<sub>16</sub> (F2)** in the fill samples analysed, were subjected to a statistical analysis using ProUCL 5.1.002 by analysing 26 samples of similar fill profile and depth across the site. The maximum value of the data set was 130 mg/kg, the standard deviation of the data set was 20.16, while the 95% upper confidence limit was 63.56mg/kg, which is less than the adopted direct contact human health exposure criteria for **TRH >C<sub>10</sub>-C<sub>16</sub> (F2)**. A copy of the **TRH >C<sub>10</sub>-C<sub>16</sub> (F2)** ProUCL output is presented in **Appendix E**.

Likewise, the detected concentrations of **TRH >C<sub>16</sub>-C<sub>34</sub> (F3)** in the fill samples analysed, were subjected to a statistical analysis using ProUCL 5.1.002 by analysing 28 samples of similar fill profile and depth across the site. The maximum value of the data set was 1900 mg/kg, the standard deviation of the data set was 345.3, while the 95% upper confidence limit was 352.4mg/kg, which is less than the adopted direct contact human health exposure criteria for **TRH >C<sub>16</sub>-C<sub>34</sub> (F3)**. A copy of the **TRH >C<sub>16</sub>-C<sub>34</sub> (F3)** ProUCL output is presented in **Appendix E**. Furthermore, the vertical extent of the exceedance is considered to be delineated to 0.5m bgl.

## PAHs

The concentrations of relevant PAH COPCs were less than adopted ESL criteria (0.7mg/kg), with the exception of benzo(α)pyrene (B(a)P) in samples TP05-0.0-0.2 (5.2mg/kg) and BH25-0.0-0.3 (0.9mg/kg).

AG considers that, although the results reported appear to be above the NEPM ASC 2013 ESL/EIL, the CRC CARE Technical Report 39 on Risk-based management and remediation guidance for benzo(a)pyrene (2017) states that:

*“...the ESLs in the NEPM are classified as low reliability, it is useful to consider whether there is additional and more recent information that allows higher reliability values to be estimated. Note that values derived in this way are intended to assist in informing an assessment of B(a)P following NEPM ecological risk assessment guidelines, but as they have not been developed through the NEPM review process, they should not be cited as NEPM ESLs.”*

Therefore, since the NEPM ESL values for B(a)P are considered to be conservative and of low reliability, it is prudent to reflect a more reliable guideline limit for the assessment of B(a)P as per the CRC CARE (2017) guidelines. **Table 5.3** below reflects the adopted site criteria as per CRC CARE Technical Report 39 (2017).

**Table 5.3 High reliability ecological guideline for fresh B(a)P**

Land use	% protection	Derived ecological guideline (95% confidence limits) mg/kg	NEPM low reliability ESL mg/kg	Canadian SQGE
Commercial and industrial	65	172 (57–371) (High reliability)	1.4	72
Urban residential and public open space	85	33 (21–135) (High reliability)	0.7	20
National parks/areas with high ecological values	99	0.2 (0.1–21) (High reliability)	0.7	NA

SQGE = soil quality guidelines for environmental health (CCME 2010).

AG considers the Canadian SQGE the most appropriate derived ecological screening level limit (20 mg/kg) to be more accurate for characterisation of B(a)P impacts at the site. Using the more reliable assessment criteria as per CRC CARE (2017), all concentrations of B(a)P in samples analysed are less than the applicable ecological guideline value.

## Management Limits and Aesthetics

The concentrations of TRH C<sub>6</sub>-C<sub>10</sub>, >C<sub>10</sub>-C<sub>16</sub>, >C<sub>16</sub>-C<sub>34</sub> and >C<sub>34</sub>-C<sub>40</sub> detected in the soil samples analysed, were less than the applicable adopted TRH management limits.

There was no highly malodorous site media (e.g. strong residual petroleum hydrocarbon odours, hydrogen sulphide in site media, organosulfur compounds), no hydrocarbon sheen on surface water, no discoloured chemical deposits or soil staining with chemical waste, no large monolithic deposits of otherwise low risk material (e.g. gypsum as powder or plasterboard, cement kiln dust), no presence of putrescible refuse including material that may generate hazardous levels of methane such as a deep-

fill profile of green waste or large quantities of timber waste, and no soils containing residue from animal burial (e.g. former abattoir sites) visually observed onsite.

#### **5.4. Soil Characterisation**

Investigation findings indicate that the detected concentrations of contaminants within soils across the site did not exceed the adopted Human Health, Ecological Screening Levels or Management Limits for Petroleum Hydrocarbons criteria, with the exception of localised hotspots for benzo(α)pyrene exceeding the adopted human health investigation level, and zinc and TRHs exceeding the adopted ecological screening levels. Observations made by AG of the site and land adjacent to the site, did not indicate any signs of phytotoxic impact (e.g. plant stress and/or die back).

Asbestos, present as bonded cement-fibre sheeting fragments, was identified in fill soil at one sampling point (TP14) and on the surface at BH25. Given the distribution of bonded cement-fibre sheeting fragments, localised to within the vicinity of this test pit, the source of this contamination is potentially related to demolition practices at the site, though fill as a potential source cannot be discounted. Friable asbestos or asbestos fines were not identified in samples from the same location.

However, quantitative methods of analysis were not utilised for samples within this investigation, and so the lateral extent of asbestos in soil has not been properly assessed. In light of this, supplementary asbestos investigation, in accordance with WA DOH (2009) guidance, should be completed to laterally quantify and delineate the risk posed by asbestos in fill soils at the site

## 6. REVISED CONCEPTUAL SITE MODEL

As a result of the investigation findings, the CSM developed on the basis of site history, historic land use and intrusive sampling has been updated and refined to reflect plausible source-pathway-receptors linkages applicable to the proposed development and end land use of the site. The revised CSM. The revised CSM and source-pathway-receptor linkages are presented in **Table 6-1**.

**Table 6.1 Revised Conceptual Site Model**

<b>AEC ID</b>	<b>Location</b>	<b>Potential Sources</b>	<b>Impacted Media</b>	<b>Contaminants of Potential Concern</b>	<b>Exposure Pathway</b>	<b>Potential Receptors</b>
AEC01	TP05	Surface fill materials Historical building demolition	Soil	Zinc and Benzo(a)Pyrene TEQ	Ingestion Dermal contact Inhalation	Construction and maintenance workers End users of the site post-redevelopment
AEC02	BH07	Surface fill materials Historical building demolition	Soil	Zinc	Ingestion Dermal contact Inhalation	Construction and maintenance workers End users of the site post-redevelopment
AEC03	TP14	Demolition and uncontrolled filling	Soil	Bonded ACM in fill material	Inhalation	Construction and maintenance workers End users of the site post-redevelopment
AEC04	BH25	Demolition and uncontrolled filling	Soil	Bonded ACM on surface soils	Inhalation	Construction and maintenance workers End users of the site post-redevelopment

## 7. REMEDIAL STRATEGY OPTIONS DISCUSSION

A range of soil remediation options have been considered for the site. The options considered include only those which are proven to be effective on past remediation or related projects. The following sections review each of the soil remediation option considered and outline the selection process used.

### 7.1. Remediation Strategy Development Rationale

Given the distribution of contamination has been defined, it is recommended that various remediation options be considered.

Due to the nature and distribution of the contaminant in the underlying soil matrix, an effective remediation approach for the site must be tailored towards the key impacted source material which is the impacted reworked imported fill material. A discussion of remediation options for impacted soil is provided in the below sections.

### 7.2. Remediation Options for Impacted Soil

The potential list of remediation options associated with impacted soil is extensive.

Consequently, only relevant remediation strategies that have been considered which include the following:

- Institutional controls / do nothing;
- Capping and Isolation/on-site treatment; and
- Excavation and off-site disposal.

A discussion on the merits and disadvantages of each option is discussed in **Table 7.2**

**Table 7.2 – Remediation Options Assessment**

Treatment Option	Description	Advantages			Disadvantages		
		Technical	Financial	Logistical	Technical	Financial	Logistical
Do Nothing Scenario	No remedial action taken.  Impacted soil left in-situ.	Lowest greenhouse emissions.  Not considered a significant human health risk as long as the site is not disturbed.	No short-term remedial costs incurred.  No operation and maintenance required.	No disturbance to site required.  Existing landscape can be retained.  No odour or dust management is required.	As the site is to be developed for 'education' purposes, direct access to soil will not be restricted.  This option is not protective of human health including site development workers and future tenants of the site in the long term, given increased likelihood for adverse effects with prolonged exposure.  On-going liabilities including human health and the environment would remain.	Potential for future liability (e.g. EPA notices and potential health impacts to site users if exposed to unsafe levels for a long period of time.)	A long-term environmental management plan will need to be developed for site users and potential future excavation or maintenance requirements.  Impacted material would remain on-site indefinitely.
Capping and Isolation of impacted soils	Soil removal, capping and isolation to restrict direct access to soil.  Some impacted soil left in-situ.	Protective of human health including construction/maintenance workers.  Direct access to soil will be restricted and can be isolated with the appropriate mitigation measures.	Potentially lower costs through greater confidence of delivery through strategic planning (no time delays).	Moderate excavation is required to remove all the identified AECs across the entire site.  Limited environmental management required during the works (e.g. dust, noise)	Some impacted material would remain on-site indefinitely.  Not suitable for asbestos impacted soil identified in the top 3 metres of the site as a notation would be placed on the planning certificate.  Ecological impacts from loss of existing trees on the site.	Moderate disposal costs incurred in addition to the cost of importing clean soil material.	A long-term environmental management plan will need to be developed for site users and potential future excavation or maintenance requirements.  Impacted material would remain on-site indefinitely.

Treatment Option	Description	Advantages			Disadvantages		
		Technical	Financial	Logistical	Technical	Financial	Logistical
				~ 2 months to remediate the site.			
Excavation & Offsite Disposal	<p>Removal of all identified contaminated soil to an EPA licensed waste facility.</p> <p>Validation sampling to demonstrate the conditions of the residual soil impact.</p> <p>Reinstatement of excavated areas with material validated as suitable for the intended land use.</p>	<p>Protective of human health including future tenants and construction workers.</p> <p>Facilitate future development of the entire site.</p> <p>No long-term EMP will be required.</p>	No onsite operation and maintenance required.	No ongoing management required as the impacted soil will have been removed offsite.	<p>Based on the soil investigation results, for off-site disposal purposes, the impacted soil to be excavated and removed offsite would require waste classification in accordance with the NSW EPA <i>Waste Classification Guidelines 2014</i>.</p> <p>Ecological impacts from loss of existing trees on the site.</p>	Very high remedial cost incurred to remediate and backfill the entire site.	<p>Major excavation works is required.</p> <p>Odour, vapour and dust management required during the excavation works.</p> <p>May increase truck traffic in area to transport contaminated soil for a short period of time.</p>

### 7.3. Selected Remediation Strategy

Based on AG's assessment detailed above, our understanding of the project objectives and taking into consideration the proposed development plans and proposed cut and fill across the site, the preferred remedial strategies will comprise a combination of 'excavation and offsite disposal'.

Below is a summary of the remediation strategies in respect of AECs.

The total volume of potentially contaminated material onsite has been approximated based on laboratory analytical results. The approximate quantities of potentially contaminated soil material onsite consist of:

- AEC01: 200m<sup>2</sup> (130m<sup>3</sup> or 250 tonnes @ 500mm depth, 1.3x bulking factor, and 1.8tonnes/m<sup>3</sup> assumed soil density);
- AEC02: 200m<sup>2</sup> (130m<sup>3</sup> or 250 tonnes @ 500mm depth, 1.3x bulking factor, and 1.8tonnes/m<sup>3</sup> assumed soil density);
- AEC03: 200m<sup>2</sup> (390m<sup>3</sup> or 700 tonnes @ 1.50m height, 1.3x bulking factor, and 1.8tonnes/m<sup>3</sup> assumed soil density); and
- AEC04: 100m<sup>2</sup> (40m<sup>3</sup> or 70 tonnes @ 300mm depth, 1.3x bulking factor, and 1.8tonnes/m<sup>3</sup> assumed soil density).

Note that unexpected finds during remedial works may increase the lateral or vertical extent of known contaminated material onsite, thus increasing the currently understood remedial extent and total quantities of material.

Based on review of the proposed development plans and proposed cut and fill, AG states that waste classification analysis will be required to be carried out on all impacted soil materials to facilitate offsite disposal in accordance with the NSW EPA Waste Classification Guidelines 2014.

Please refer to **Figure 3** showing revised AEC's.

## **8. REMEDIAL ACTION PLAN**

### **8.1. Remedial Goal**

The remedial goal for this site is to remediate potential soil contamination (where identified) to a level that does not present an unacceptable human health exposure risk, based on the proposed land use setting.

### **8.2. Remediation Extent**

The lateral extent of remediation on the site is considered to be, as a minimum, the following:

- AEC01 – Zinc and Benzo(a)Pyrene TEQ impacted soils delineated around TP05;
- AEC02 – Zinc impacted soils delineated around BH07;
- AEC03 – Impacted bonded ACM fill materials delineated around TP14; and
- AEC04 – Bonded ACM impacted surface around BH25.

The inferred extents of remediation are presented in **Figure 2**.

It is noted that the extent of remediation for the site may require amendment, based on discovery of unexpected findings during remedial works, site observations and/or validation soil sample analytical laboratory results.

### **8.3. Sequence of Works for Remediation**

#### **8.3.1. Remediation Schedule & Staging**

Remediation and validation works will likely be completed in approximately 1-2 weeks. It is expected that remediation timeframes will be further refined following appointment of the remediation contractor, and the staging of the remediation tasks in the contractor's works program.

#### **8.3.2. Notifications and Approvals**

Notification of an intention to undertake remediation works on the site, will be submitted to the relevant planning consent authority, 30 days prior to remediation works commencing. The proposed remediation works would likely be classed as Category 2 under SEPP55, which do not require consent from the planning authority.

The following information will also be provided to the planning consent authority, 14 days prior to the commencement of remediation works.

- Copies of the contamination assessment reports and this RAP; and
- Contact details of the contractor appointed to undertake the remediation works
- Contact details of the parties responsible (if not the remediation contractor) for ensuring remediation works comply with relevant regulatory requirements.

A notification will be submitted to SafeWork NSW prior to undertaking asbestos removal works (where applicable). The removal works will be undertaken by a suitably licensed contractor. It is noted that:

- Removal of friable asbestos will require the contractor to hold a Class A licence; and
- Removal of non-friable asbestos will require the contractor to hold a Class B licence.

Further, it is noted that:

- Where remedial works requires demolition, excavation or shoring, development consent or a construction certificate may be required from the planning consent authority; and
- Where remedial works occur adjacent to Roads and Maritime Services (RMS) controlled assets, further approvals may be needed to address RMS requirements. It is expected that any such requirements would be identified by Council during the 30-day notification period.

Within one month of completion of remediation and validation works, a notification will be submitted to the planning consent authority.

### 8.3.3. Remediation Works

Remedial works will be guided and monitored by the environmental consultant. The environmental consultant will assist the remediation contractor in setting out the inferred lateral extents of remediation required for each AEC. The environmental consultant will monitor remedial works in each AEC and provide guidance to the remedial contractor on:

- When to pause remedial works in an AEC, to allow validation works to be undertaken; and
- Where to extend remedial works in an AEC beyond the inferred extent (if observations indicate a need for chasing out additional contamination).

The tracking of waste materials across and off the site, will be the responsibility of the remediation contractor. This is integral for the successful completion of a site validation report.

A broad asbestos contamination risk requiring remediation, has been identified for the site. The proposed remedial strategy to be adopted for each of those risks, along with the relevant AECs that those strategies apply to, are presented in **Table Error! Reference source not found.**

The validation strategies for each of these risks, are presented in **Section 9.7** of this remedial action plan.

**Table 8.1 Remediation Works**

Contamination Risk	Relevant Areas	Proposed Remedial Strategy
Bonded ACM on surface (generally <0.2m deep)	AEC04	Excavation of surface soils (approximately 0.3 m bgs), temporary stockpiling, disposal off-site  The remediation contractor will retain transport and disposal records for all wastes removed off site.
Bonded ACM in fill materials	AEC03	Excavation of soils down to depth of fill materials, temporary stockpiling, disposal off-site  The remediation contractor will retain transport and disposal records for all wastes removed off site.

Contamination Risk	Relevant Areas	Proposed Remedial Strategy
Benz(a)pyrene, Zinc and Bonded ACM in fill materials	AEC01-AEC02	Excavation of soils down to depth of fill materials, temporary stockpiling, disposal off-site  The remediation contractor will retain transport and disposal records for all wastes removed off site.

#### 8.3.4. Temporary Stockpiling

It is noted that stockpiling of soil materials may need to be undertaken during site works to enable more efficient loading of trucks to facilitate off-site disposal. All stockpiles created as a result of the remediation process, must be placed on either geofabric textile or builder's plastic (minimum 200 µm thickness) to prevent cross contamination.

Any remaining stockpiles of bonded asbestos containing materials must be covered with either geofabric textile or builder's plastic (minimum 200 µm thickness) at the end of the day.

Any friable asbestos stockpiled material (if observed) must be watered down and kept wet whilst uncovered and must be covered if it is to remain on-site overnight.

#### 8.3.5. Backfilling

Should remedial excavations require backfilling, then backfill soils will be limited to:

- Virgin excavated natural material (VENM);
- Excavated natural material (ENM); or
- Other material that is the subject of a resource recovery exemption and the placement of that material is within the lawful constraints of the resource recovery exemption (and does not present an unacceptable exposure risk to human health or the environment, within the context of the proposed land use setting).

Consideration will be given to geotechnical engineering requirements associated with backfilling; however, those requirements will be specified by others elsewhere.

#### 8.3.6. Remediation Contingency Plan

Remediation works have an inherent degree of uncertainty. Based on the site history information made available, and AG's experience with comparable projects, AG considers the situations set out in **Table 8.3.7** may be encountered during remediation works. Contingency plans for those situations are also presented in **Table 8.3.7**.

**Table 8.3.7 Remediation Contingency Plan**

Situation	Contingency Plan
Unexpected potential contamination or underground structures encountered during remediation (e.g. underground storage tank, underground pit).	<p>Consider excavation of test pits / trenches to assess potential for contamination to be present.</p> <p>Remove underground structures (if required) and associated soil contamination (if required).</p> <p>Consider groundwater assessment, subject to nature and extent of identified soil contamination.</p> <p>Amendment to the preferred remedial strategy (if required), pending the outcomes of the assessment of the unidentified contamination.</p>
Potential asbestos containing materials (ACM) observed in fill material.	<p>Stop work. Analyse sample/s of potential ACM. Subject to results, commence relevant SafeWork NSW notifications, engage a suitably experienced environmental consultant, amend soil waste classification/s (if warranted) and remove asbestos impacted materials. Removal works may require raking, hand picking and/or excavation, depending on the nature and extent of the asbestos find (refer remedial strategy details presented in <b>Section 9.7.1</b>). The consultant will then implement the relevant asbestos validation methodology (refer <b>Section 9.7.1</b>), depending on the nature/extent of the asbestos find and remedial option adopted.</p>

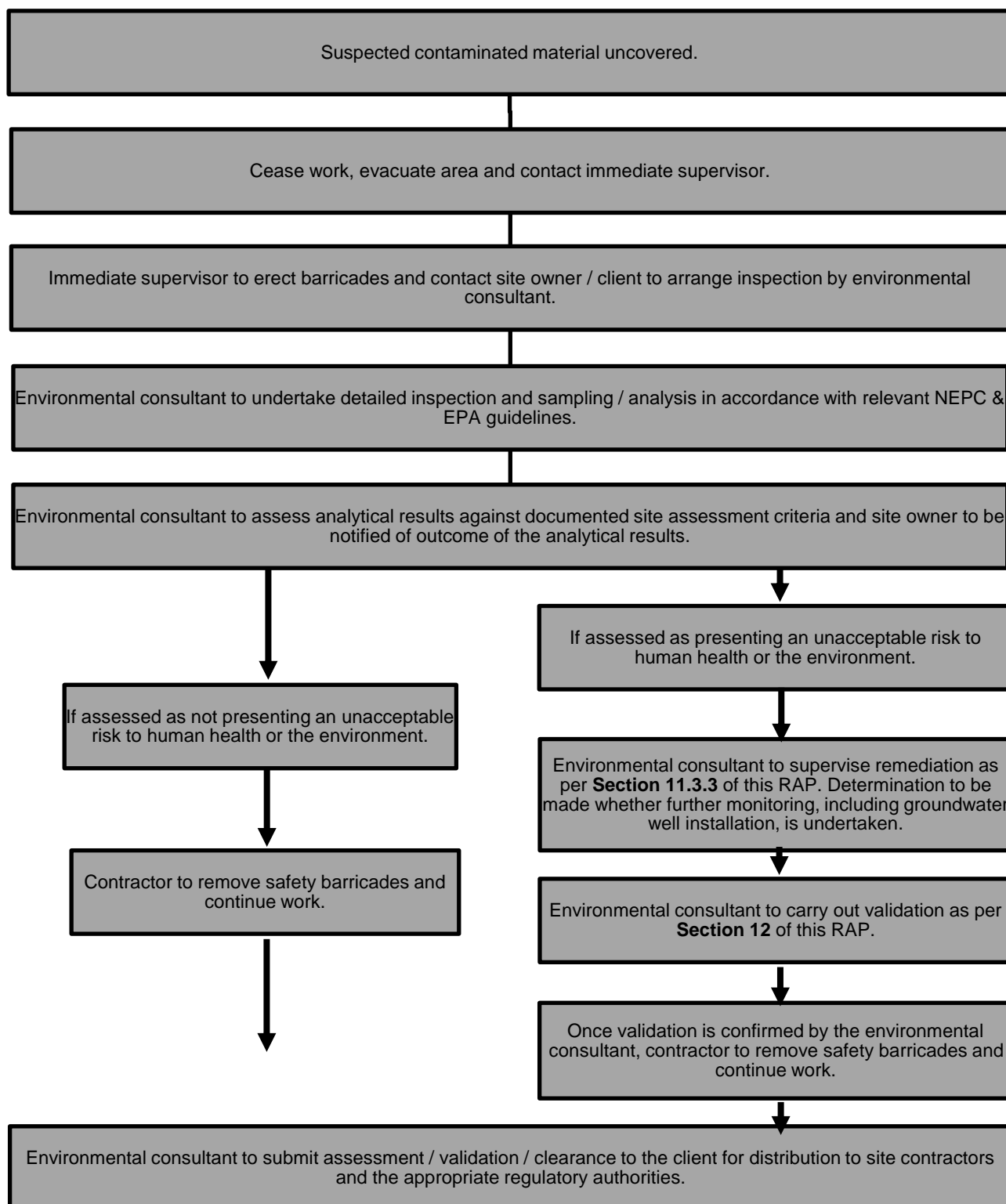
### 8.3.7. Unexpected Finds Protocol

The contamination assessments to date have not indicated the presence of significant soil contamination that is unacceptable for the proposed land use beyond the area of remediation described in this RAP. However, it is possible that unexpected finds may be present within the fill material. To this end, an unexpected finds protocol has been compiled, and is summarised herein. Unexpected finds could include, but are not limited to:

- Other underground storage tanks that are previously not identified;
- Buried containers and drums;
- Phase separated hydrocarbons;
- Powders and other suspicious buried material;
- Potentially hazardous materials; and
- Evidence of contamination including significant staining, odours and discolouration.

In the event that any material suspected of containing potentially hazardous substances is found during remediation works, the following unexpected finds protocol is to be followed:

## UNEXPECTED FINDS PROTOCOL



## 9. VALIDATION DATA QUALITY OBJECTIVES

Appendix B of NEPC (1999b) provides guidance on the development of data quality objectives (DQO) using a seven-step process.

The DQO for this project are set out in **Sections 9.1 to 9.7** of this report.

### 9.1. Step 1: State the problem

The first step involves summarising the contamination problem that will require new data and identifying the resources available to resolve the problem.

The objective of this project is to assess whether the remedial goal has been achieved, and whether the site presents an unacceptable human health exposure risk, for the proposed land use setting.

This project is being undertaken because:

- the site is the subject of redevelopment works; and
- historically identified areas of environmental concern on the site, have the potential to present an unacceptable human health exposure risk in the context of the proposed land use setting.

The project team identified for this project includes Alliance Geotechnical Pty Ltd, the developer and the planning consent authority.

The regulatory authorities identified for this investigation include NSW EPA and the local Council.

### 9.2. Step 2: Identify the decision/goal of the study

The second step involves identifying decisions that need to be made about the contamination problem and the new environmental data required to make them.

The decisions that need to be made during this investigation include:

- Is the environmental data collected for the project, suitable for assessing relevant land contamination exposure risks?
- Do the concentrations of identified contaminants of potential concern (COPC) present an unacceptable exposure risk to identified receptors, for the proposed land use setting?
- Is the site suitable for the proposed land use setting, in the context of land contamination?

### 9.3. Step 3: Identify the information inputs

The third step involves identifying the information needed to support decisions and whether new environmental data will be needed.

The inputs required to make the decisions set out in **Section 9.2** for this investigation, will include:

- data obtained during searches of the site's history;
- the nature and extent of sampling at the site, including both density and distribution;
- samples of relevant site media;
- the measured physical and/or chemical parameters of the site media samples (including field screening and laboratory analysis, where relevant); and
- assessment criteria adopted for each of the media sampled.

Taking into consideration the objectives of this project, and the revised conceptual site model is presented in **Section 7** of this project, the assessment criteria relevant to the proposed land use setting have been adopted for this investigation:

- Human health direct contact – HILs in Table 1A (1) in NEPC (1999a) and HSLs in Table B4 of Friebel, E & Nadebaum, P (2011) – HIL A for low density residential;
- Human health inhalation/vapour intrusion – HSLs in Table 1 (A) in NEPC (1999a) – HSL A/B for clay soils;
- Ecological – EILs in Tables 1B(1) to 1B(5) and ESLs 1B(6) and 1B(7) in NEPC (1999a) – EIL/ESLs for urban residential and public open spaces. EIL/ESL calculation will be determined using site-specific soil parameter data (i.e. pH, CEC, soil texture and clay content);
- Human health (asbestos) – HSLs in Table 7 of NEPC (1999a);
- Aesthetics – no highly malodorous site media (e.g. strong residual petroleum hydrocarbon odours, hydrogen sulphide in site media, organosulfur compounds), no hydrocarbon sheen on surface water, no discoloured chemical deposits or soil staining with chemical waste other than of a very minor nature, no large monolithic deposits of otherwise low risk material (e.g. gypsum as powder or plasterboard, cement kiln dust), no presence of putrescible refuse including material that may generate hazardous levels of methane such as a deep-fill profile of green waste or large quantities of timber waste, and no soils containing residue from animal burial (e.g. former abattoir sites)

#### **9.4. Step 4: Define the boundaries of the study**

The fourth step involves specifying the spatial and temporal aspects of the environmental media that the data must represent to support decisions.

The spatial extent of the project will be limited to the site as defined by its boundaries.

The temporal boundaries of the project include:

- the project timeframes presented in the AG proposal for this project, and subsequent remediation contractor works program;
- unacceptable weather conditions at the time of undertaking fieldwork, including rainfall, cold and/or heat;
- access availability of the site (to be defined by the site owner/representative); and
- availability of AG field staff (typically normal daylight working hours, Monday to Friday).

The lateral extent that contamination is expected to be distributed across, based on the conceptual site model, is defined by the inferred boundaries of the areas of environmental concern (AEC).

The vertical extent that contamination is expected to be distributed across, based on the conceptual site model and the project scope, is limited to fill material.

The scale of the decisions required will be based on the entire site.

Constraints which may affect the carrying out of this investigation may include access limitations, presence of above and below ground infrastructure, and hazards creating health and safety risks.

## **9.5. Step 5: Develop the analytical approach (or decision rule)**

The fifth step involves defining the parameter of interest, specifying the action level, and integrating information from Steps 1 to 4 into a single statement that gives a logical basis for choosing between alternative actions.

### **9.5.1. Rinsate Blanks**

One rinsate blank will be collected and scheduled for analysis, for each day of sampling undertaken, if non-disposable sampling equipment was used on that day. The rinsate blank will be analysed for at least one of the analytes the sample/s collected that day are being scheduled for analysis for (with the exception of asbestos).

### **9.5.2. Trip Spikes and Trip Blank Samples**

One trip spike and trip blank sample will be used and scheduled for analysis, for each day of sampling undertaken, if site samples being collected that day are being analysed for volatile contaminants of concern (typically BTEX and/or TRH C<sub>6</sub>-C<sub>10</sub>).

### **9.5.3. Field Duplicates and Field Triplicates**

Field duplicate and Field triplicates will be collected at a rate of one per twenty (5%) site samples collected. The duplicates and triplicates collected will be analysed for at least one of the analytes that the parent sample of the duplicate/triplicate is being scheduled for analysis for (with the exception of asbestos).

The relevant percent difference (RPD) of concentrations of relevant analytes, between the parent sample and the duplicate/triplicate will be calculated.

### **9.5.4. Laboratory Analysis Quality Assurance / Quality Control**

The analytical laboratory QA/QC program will typically include laboratory method blank samples, matrix spike samples, surrogate spike samples, laboratory control samples, and laboratory duplicate samples.

### **9.5.5. If/Then Decision Rules**

AG has adopted the following 'if/then' decision rules for this investigation:

- If the result of the assessment of field data and laboratory analytical data is considered acceptable, then that field data and laboratory analytical data is suitable for interpretation within the scope of this investigation; and
- If the field data and laboratory analytical data is within the constraints of the assessment criteria adopted for this investigation (refer **Section 10.3**), then the contamination exposure risks to identified receptors, are considered acceptable.

In the event the assessment of field data and/or laboratory analytical data results in the data being not suitable for interpretation, then AG will determine if additional data is required to allow interpretation to be undertaken.

In the event that field data and/or laboratory analytical data exceeds the assessment criteria adopted for this investigation (refer **Section 9.3**), AG will undertake an assessment of the exceedance in the context of the project objectives to determine if additional data is required and whether management and/or remediation is required.

## 9.6. Step 6: Specify the performance or acceptance criteria

The sixth step involves specifying the decision maker's acceptable limits on decision errors, which are used to establish performance goals for limiting uncertainties in the data. When assessing contaminated land, there are generally two types of errors in decision making:

- Contamination exposure risks for a specific land use setting are acceptable, when they are not; and
- Contamination exposure risks for a specific land use setting are not acceptable, when they are.

AG will mitigate the risk of decision error by:

- Calculation of the 95% upper confidence limit (UCL) statistic to assess the mean concentration of relevant contaminants of potential concern;
- Assignment of fieldwork tasks to suitably experienced AG consulting staff, and suitably experienced contractors;
- Assignment of laboratory analytical tasks to reputable NATA accredited laboratories;
- Assignment of data interpretation tasks to suitably experienced AG consulting staff, and outsourcing to technical experts where required.

AG will also adopt a range of data quality indicators (DQI) to facilitate assessment of the completeness, comparability, representativeness, precision and accuracy (bias).

**Table 9.6 – Data quality indicators**

<b>Completeness</b>			
<b>Field Considerations</b>	<b>Assessment Criterion</b>	<b>Laboratory Considerations</b>	<b>Assessment Criterion</b>
Critical locations sampled	Refer <b>Section 9.7.1</b>	Critical samples analysed according to DQO	Refer <b>Section 9.7.6</b>
Critical samples collected	Refer <b>Section 9.7.1</b>	Analytes analysed according to DQO	Refer <b>Section 9.7.6</b>
SOPs appropriate and complied with	100%	Appropriate laboratory analytical methods and LORs	Refer <b>Section 9.7.6</b>
Field documentation complete	All sampling point logs, calibration logs and chain of custody forms	Sample documentation complete	All sample receipt advices, all certificates of analysis
		Sample extraction and holding times complied with	Refer <b>Section 9.7.7</b>
<b>Comparability</b>			

Field Considerations	Assessment Criterion	Laboratory Considerations	Assessment Criterion
Same SOPs used on each occasion	100%	Same analytical methods used by primary laboratory	Refer <b>Section 9.7.7</b>
Climatic conditions	Samples stored in insulated containers with ice, immediately after collection	Same LORs at primary laboratory	Refer <b>Section 9.7.7</b>
Same types of samples collected, and handled/preserved in same manner	All soil samples same size, all stored in insulated containers with ice	Same laboratory for primary sample analysis	All primary samples to SGS Environmental
		Same analytical measurement units	Refer <b>Section 9.7.7</b>

#### Representativeness

Field Considerations	Assessment Criterion	Laboratory Considerations	Assessment Criterion
Appropriate media sampled according to SAQP	Refer <b>Section 9.4</b>	Samples analysed according to SAQP	Refer <b>Section 9.7.6</b>
Media identified in SAQP sampled	Refer <b>Section 9.4</b>		

#### Precision

Field Considerations	Assessment Criterion	Laboratory Considerations	Assessment Criterion
Field duplicate / triplicate RPD	Minimum 5% duplicates and triplicates No limit for analytical results <10 times LOR 50% for analytical results 10-20 times LOR 30% for analytical results >20 times LOR	Laboratory duplicates	No exceedances of laboratory acceptance criteria
SOPs appropriate and complied with	100%		

#### Accuracy (bias)

Field Considerations	Assessment Criterion	Laboratory Considerations	Assessment Criterion
Rinsate blanks	Less than laboratory limit of reporting	Laboratory method blank	No exceedances of laboratory acceptance criteria
Field trip spikes	Recoveries between 60% and 140%	Matrix spike recovery	No exceedances of laboratory acceptance criteria
Field trip blanks	Analyte concentration <LOR	Surrogate spike recovery	No exceedances of laboratory acceptance criteria
		Laboratory control sample recovery	No exceedances of laboratory acceptance criteria

## 9.7. Step 7: Develop the plan for obtaining data

The seventh step involves identifying the most resource effective sampling and analysis design for generating the data that is required to satisfy the DQOs.

### 9.7.1. Validation Sampling

As this project has included gathering data which provides a reasonable understanding of site history (in the context of potential areas of environmental concern on the site), and taking into consideration Table 1 in WA DOH (2009), it is considered reasonable to adopt a judgemental sampling pattern, where necessary, for each AEC.

The validation sampling arrangements for this project are presented in **Table 9.7.1**.

**Table 9.7.1 Validation Sampling**

Contamination Risk	Relevant Areas	Validation Methodology
Bonded ACM on Surface	AEC04	<p>Visual inspection of surface soils to confirm removal of the known lateral and vertical extent of contamination.</p> <p>Visual inspection of at least two rake passes in perpendicular direction of treated material, using a rake with teeth spaced <math>\leq 7\text{mm}</math> apart and <math>&gt;10\text{cm}</math> long, will be carried out by a licensed asbestos assessor or competent person (as per definition in SafeWork NSW 2019).</p> <p>Photographic record of removal.</p>
Bonded ACM in fill materials	AEC03	<p>Visual inspection of excavation footprint to confirm removal of fill will be carried out by a licensed asbestos assessor or competent person (as per definition in SafeWork NSW 2019).</p> <p>If suspect materials present at the base of excavation, collect 500mL samples at twice the density outlined in Table 1 of WA DOH (2009), with a minimum of three samples.</p> <p>1 x 500mL sample will be collected per 5 linear metres of excavation wall, with a minimum of 1 per wall. Bulk bags will be screened for fragments of non-friable ACM.</p> <p>Photographic record of excavation.</p> <p>If any fragments of Bonded ACM are identified within the remediated material during the validation process, remedial contractor will restart remedial strategy as outlined in <b>Table 6.5.5</b>. This process is to continue until remedial goal is achieved.</p> <p>Photographic record of removal.</p>

Benzo(a)pyrene and Heavy Metals in fill materials	AEC01 / AEC02	<p>Visual inspection of excavation footprint to confirm removal of fill.</p> <p>One 250mL jar soil sample per 25m<sup>2</sup> of excavation footprint.</p> <p>1 x 250mL jar soil sample per 5 linear metres of excavation wall, with a minimum of 1 per wall.</p> <p>Soil samples analysed for PAHs and Heavy Metals.</p> <p>Photographic record of excavation.</p>
Imported Fill	VENM	<p>Analysis shall be in accordance with the available information from the source site history and available results.</p> <p>VENM certificate provided for each source site.</p>
Imported Fill	ENM	<p>Quantity dependent – refer to The Excavated Natural Material (ENM) exemption for further details.</p> <p>ENM certificate provided for each source site.</p>

Following the completion of successful remediation and validation works, a final site walkover by a licensed asbestos assessor, will result in the issue of an asbestos clearance certificate for the site.

If visual or olfactory observations indicated a potential for soil contamination to be present, then collection of additional validation samples will be considered.

The location of each sampling point will be marked on a site plan.

### 9.7.2. Sampling Methodology

Grab soil samples will be collected at each required sampling point directly from the base and walls (where appropriate) of the excavation, however for asbestos sampling of fill material (should fill materials remain) a 10L (bucket sample for bonded ACM) and a 500mL (quantification AF/FA) samples are required.

The asbestos sampling and analysis for assessment and validation of fill materials will be conducted in accordance with WA DOH (2009), and involves:

- Collection of a 10L sample from each test location;
- The 10L sample will be weighed and recorded;
- Samples shall be screened through a 7mm sieve or spread out on a contrasting colour fabric/tarp;
- Observable ACM and FA weighed and calculated for asbestos soil concentration;
- One wetted 500mL sample will be collected from each test location; and
- Samples will be sent to the laboratory for asbestos quantification (AF/FA) testing.

Depending on the depth of the excavation footprint, an excavator may be required to obtain samples. In these instances, samples will be collected from soils in the centre of the excavator bucket, to avoid cross contamination from the excavator bucket.

Sampling will be guided by a combination of visual evidence (ACM) and olfactory evidence.

Observations of the materials encountered during sampling will be recorded on the relevant field observation log with photographic record.

### **9.7.3. Identification, Storage and Handling of Samples**

Sample identifiers will be used for each sample collected, based on the sampling point number and the depth/interval the sample was collected from, e.g. a sample collected from AEC04 from the excavation footprint base, would be identified as AEC04-Base.

Project samples will be stored in laboratory prepared glass jars or zip-lock bags if collected for asbestos).

Reference will also be made to Table 5 in WA DOH (2009) for the sampling and screening of fill soils for the presence of asbestos, where practical. Subsequently, application of asbestos screening criteria published in NEPC (1999a) may be limited.

Soil samples in glass jars will be placed in insulated container/s with ice.

Samples will be transported to the relevant analytical laboratory, with chain of custody (COC) documentation that includes the following information:

- AG project identification number;
- Each sample identifier;
- Date each sample was collected;
- Sample type (e.g. soil or water);
- Container type/s for each sample collected;
- Preservation method used for each sample (e.g. ice);
- Analytical requirements for each sample and turnaround times; and
- Date and time of dispatch and receipt of samples (including signatures).

### **9.7.4. Decontamination**

In the event that non-disposable sampling equipment is used, that equipment will be decontaminated before and in between sampling events, to mitigate potential for cross contamination between samples collected. The decontamination methodology to be adopted for this project will include:

- Washing relevant sampling equipment using potable water with a phosphate free detergent (i.e. Decon 90 or similar) mixed into the water;
- Rinsing the washed non-disposable sampling equipment with distilled or de-ionised water; and
- Air drying as required.

### **9.7.5. Laboratory Selection**

The analytical laboratories used for this project will be NATA accredited for the analysis undertaken.

### 9.7.6. Laboratory Analytical Schedule

Project samples will be scheduled for NATA accredited laboratory analysis, using a combination of:

- Observations made in the field of the media sampled;
- Headspace screening results (where available);
- The contaminants of potential concern (COPC) identified for the area of environmental concern that the sample was collected from.

Based on site history, AG has adopted the laboratory analytical schedule presented in **Table 9.7.6** for this project.

**Table 9.7.6 Laboratory Analytical Schedule**

Sample Type	Analytical Schedule
500mL bag	Asbestos (0.001%)
250mL Jar	Heavy Metals, PAHs
VENM	All samples for TRH, BTEX, PAH, OCP, PCB, metals (8) and asbestos (absence / presence)
ENM	All samples for analytical suite set out in the ENM exemption order.

### 9.7.7. Laboratory Holding Times, Analytical Methods and Limits of Reporting

The laboratory holding times, analytical methods and limits of reporting (LOR) being used for this project, are presented in **Table 9.7.6**

**Table 9.7.6 Laboratory Holding Times, Analytical Methods and Limits of Reporting**

Analyte	Holding Time	Analytical Method	Limit of Reporting (mg/kg)
Asbestos	No limit	AS4964:2004	Absence / presence
Asbestos	No limit	Inhouse Method	0.001% w/w
PAHs	14 Days	USEPA 8270	0.1-0.5
Heavy Metals	14 days	USEPA 8015B & C	0.05 – 2

## 10. REPORTING

### 10.1. Site Validation Report

At the completion of proposed remediation, an interim site validation report will be prepared by AG, reviewed and endorsed by the Site Auditor. At the completion of all remedial works for the site, a site validation report will be prepared with reference to the relevant sections of NSW EPA (2020). The final site validation report will include:

- Document status;
- Executive summary;
- Objectives;
- Scope of work;
- Site identification;
- Site history;
- Site condition and surrounding environment;
- Previous results;
- Conceptual site model;
- Implementation of remedial action plan;
- Sampling and analysis plan and sampling methodology;
- Validation results and discussion
- Field quality assurance/ quality control;
- Laboratory quality assurance/ quality control;
- Quality assurance/ quality control data evaluation;
- Waste management; and
- Conclusions and recommendations.

## 11. SITE MANAGEMENT PLAN

The following site management plan will apply during undertaking of the remediation tasks.

### 11.1. Asbestos Management & Controls

#### 11.1.1. Equipment

The following is an equipment register of required materials in preparation for works:

- Appropriate personal protective equipment; disposable suits, P2 and P3 respirators, disposable gloves and disposable boot covers;
- Asbestos warning signage and barricade taping;
- 200 µm thick polyethylene asbestos waste bags;
- Black 200µm plastic lining;
- Water system capable of generating a light mist at low pressure;
- General personal hygiene equipment (e.g. wipes, brushes etc);
- Airborne Asbestos Monitoring (AAM) equipment (provided by the qualified occupational hygienist); and
- Waste transport system.

#### 11.1.2. Personal Protective Equipment

The following personal protective equipment (PPE) is required on the project:

- Steel capped safety boots / steel capped gum boots.
- Disposable gloves.
- Disposable boot covers (if required).
- Safety Hard Hat.
- Disposable coveralls (type 5, category 3 (EN ISO 13982–1) or equivalent that would meet this standard (if required).
- Coveralls worn should be made from either 100% synthetic material or a mixed natural / synthetic fabric capable of providing adequate protection against fibre penetration. All fabrics must be capable of preventing the penetration of asbestos fibres down to a diameter of 0.5µm and to a maximum 1% penetration of all airborne asbestos fibres. Once worn, disposable overalls are not to be reused or laundered.
- Disposable half-face particulate respirator (P2 or P3 rated dependant on type of removal): The respirator must conform to the requirements of AS/NZS 1716:2009 Selection, Use and Maintenance of Respiratory Protective Devices or its equivalent. These disposable respirators must be replaced at each decontamination event.

#### 11.1.3. Bulk Excavation Works

In regards to excavation, soil movement and placement of asbestos contaminated soil within the site, AG recommends the following:

- At least 5 days prior to commencing works, a SafeWork NSW Notification for Friable Asbestos Removal Works will be lodged (if applicable) by the appointed Licensed Asbestos Removalist;
- All excavation, soil movement and capping of the asbestos contaminated soil should be carried out under the supervision of a LAA or suitably qualified occupational hygienist and Class A or Class B licensed removalist contractor team;
- The LAA or qualified occupational hygienist will supervise the removal works to ensure that all removal procedures are implemented in accordance with the NSW Code of Practice: *How to Safely Remove Asbestos* (2019) and requirements set out in this document;
- Asbestos Air Monitoring will be carried out for the entirety of the works to ensure adequacy of control measures within the work site;
- A nominated decontamination area for plant and machinery will be erected outside the boundary of the removal areas during any friable asbestos removal / handling works;
- At the end of each shift, the source area and any temporary placement will be made safe using geofabric or appropriate plastic sheeting;
- At the end of each shift, the LAA or qualified occupational hygienist shall undertake an asbestos clearance / make-safe inspection to ensure that each area has been made safe. Records of these inspections will be provided to Spaceframe Constructions by the LAA / qualified occupational hygienist once completed;
- Following the removal of all asbestos contaminated soil, interim validation inspections and sampling of the source area will be carried out by a LAA, qualified occupational hygienist and / or Environmental Consultant;
- At the completion of asbestos works, all plant and machinery used during the works are to be decontaminated by the licensed removalist contractor;
- At the completion of the works, a validation report will then be prepared and issued in accordance with the appropriate legislation and guidelines (where required).

## **11.2. Soil and Stormwater Management**

### **11.2.1. Site Access/Egress**

Vehicle access and egress to the site will be stabilised to prevent tracking of sediment onto roads and footpaths. Soil, mud and other similar materials will be removed from the roadway adjacent the access/egress point by sweeping, shovelling or a means other than washing, on a daily basis, or as required.

Trucks will be loaded adjacent to the nominated waste dispatch area or to the remediation excavation (where practical). Spills of excavated soil will be scraped / swept up and combined with the soil being disposed offsite.

Soil and sediment will be broomed or washed off vehicle/plant tyres and tracks, prior to vehicles/plant leaving the remediation works zone. This soil and sediment will be scraped / swept up and managed onsite or disposed of, depending on its contamination status.

As per DA condition 12, a site-specific sediment and erosion control plan will be prepared and maintained by the remediation contractor, to suit staging of the remediation works. Erosion and sediment control measures will be maintained in a functional condition. Sediment laden stormwater runoff will be controlled using measures outlined in Landcom 2004, *'Managing Urban Stormwater - Soils and Construction'* (the Blue Book).

### 11.2.2. Stockpiles

Stockpiles of soil or other materials:

- will not be placed on footpaths or nature strips, unless approved by Council;
- will be placed away from gutters, stormwater pits and other drainage lines;
- will be kept moist at all time;
- will be stored in a secure area and be covered if remaining on site for more than 24 hours; and
- will generally be constructed as low elongated mounds on level surfaces.

### 11.2.3. Excavation Pump Out

Should excavations require pumping out, water will be analysed for total suspended solids, pH, metals and petroleum hydrocarbons. Should analytical results be less than relevant marine water ecosystem groundwater investigation levels in ANZG 2018, then the excavation water (if any) may be discharged to stormwater.

Should analytical results exceed ANZG 2018 criteria, other options for disposal will be considered, including:

- discharge to sewer (with prior approval from Sydney Water with a Trade Waste Agreement);
- removal and offsite disposal by a liquid waste contractor.

### 11.2.4. Rehabilitation and Landscaping

Stabilisation of exposed areas on the site, where required, will be undertaken in a progressive manner, as stages of remediation works are completed. Stabilisation will be maintained until such time as site redevelopment works commence.

As site redevelopment works are expected to be undertaken in conjunction with remediation works, revegetation of the site is considered unlikely to be required.

## 11.3. Waste Management

Removal of materials from site for recycling and/or disposal, will be undertaken with reference to the relevant provisions of the Protection of the Environment Operations Act (1997), SafeWork NSW (2019) and NSW EPA (2014).

The **remediation contractor** will maintain detailed records of materials removed from the site, including date/time of removal, quantities of materials, transport company details and vehicle registration details.

The **remediation contractor** will retain records verifying lawful disposal of the materials, including weighbridge / tipping dockets from the waste receiver.

The **remediation contractor** will retain following material tracking information, they are as follows.

For waste classification:

- Waste classification document;
- Material source and description;
- Sampling density, pattern, COPCs;
- Result summary, including appropriate table with comparison to acceptance criteria; and

- Waste classification.

For offsite disposal works:

- Source location;
- Estimated volume (based on excavation size);
- Actual volume of disposal;
- Waste classification;
- Transporter;
- Final destination, PoEO licence;
- Reconciliation of waste dockets with actual disposal volume; and
- Reconciliation of actual disposal volume and the estimated volume of disposal (based on excavation size).

For imported material:

- Volume of imported material;
- Source site;
- VENM certificate or certificate applicable for NSW EPA exemptions (e.g. ENM certificate);
- Placement location; and
- Transporter.

#### **11.4. Groundwater Management**

Should dewatering of the site be required, development consent may be required from the planning consent authority. Dewatering may also require approvals from the NSW Department of Primary Industry – Water and WaterNSW.

#### **11.5. Noise Control**

Noise levels from the site during the project will not exceed the limits indicated in AS2436-2010.

No 'offensive noise' as defined under the Protection of the Environment Operations Act 1997 will be created during remediation works/activities.

Plant and equipment will be fitted with noise attenuation devices (e.g. mufflers on exhausts). Consideration will be given to use of reversing alarms other than the standard pulsed tonal alarms.

Vehicle access roads will be designed in such a way to minimise the need for plant and vehicles to reverse (e.g. provision of a turning circle adjacent to the remediation works zone).

#### **11.6. Dust Control**

Dust may be generated during remediation works and associated tasks. To mitigate risk of dust emissions migrating beyond the site boundary, consideration will be given to implementing the following procedures:

- erection of dust screens around the perimeter of the site (e.g. fencing with shade cloth attached);
- securely covering all loads entering or exiting the site;

- use of water sprays across the site to suppress dust;
- covering stockpiles of contaminated soil remaining on site for more than 24 hours;
- keeping excavation surfaces moist;
- wetting down of placed fill material during spreading;
- sweeping of hardstand surfaces;
- minimising soil disturbance works during windy days; and
- retaining stabilised site access/egress points for vehicles.

Airborne fibre monitoring will be implemented during all remedial works at the site, and will be carried out in accordance with SafeWork NSW (2019) Code of Practice – How to Safely Remove Asbestos.

Portable battery-operated air monitors are to be placed within static positions approximately 1.5m above the ground surrounding the work/removal area. The air sample analysis shall be carried out by a NATA-accredited laboratory. The results of asbestos air monitoring should be provided to the Site Project Management Representative the day following the removal or handling works. Project management will display results of air monitoring on the site's safety notice board for a period of 24hr.

Concentrations of asbestos fibres shall be dealt with as follows:

Action Level (airborne asbestos fibres/ml)	Action
Less than 0.01 fibres/ml	Continue with control measures
At 0.01 fibres/ml or more than 0.01 fibres/ml but less than or equal to 0.02 fibres/ml	Review control measures, Investigate the cause, Implement new controls to prevent further release.
More than 0.02	Stop removal works, Notify the relevant regulator that work has ceased, Investigate the cause, Extend the isolation area and implement controls to minimise further exposure, Do not recommence work until fibre levels are at or below 0.01 fibres/ml.

### 11.7. Odour Control

Generation of significant odours during the remediation works is considered to be unlikely.

If odours are generated, odours will be monitored at the site boundary. Should unacceptable odours be detected at the site boundary, consideration will be given to implementing the following procedures:

- use of appropriate covering techniques such as plastic sheeting to cover excavation faces or stockpiles;
- use of fine mist sprays (which may incorporate deodorizing agents);
- use of hydrocarbon mitigating agents on impacted areas/materials; and
- adequate maintenance of equipment and machinery to minimise exhaust emissions.

A record of unacceptable odours and corrective/preventative action taken, will be maintained by the remediation contractor.

## 11.8. Traffic Management

Haulage routes for trucks transporting soil, materials, equipment or machinery to and from the site will be selected by the remediation contractor and will meet the following objectives:

- compliance with all traffic road rules;
- minimisation of noise, vibration and odour to adjacent premises; and
- utilisation of state roads and minimisation of use of local roads.

The remediation contractor will ensure that site vehicles:

- conduct deliveries of soil, materials, equipment or machinery during the hours of remediation work identified in **Section 11.14**;
- securely cover all loads to prevent dust or odour emissions during transportation;
- exit the site in a forward direction; and
- do not track soil, mud or sediment onto the road.

## 11.9. Vibration Management

Vibration emissions during remediation works will be controlled to mitigate risk of potential damage to assets on adjacent properties, and to mitigate unreasonable loss of amenity to nearby residents.

## 11.10. Fill Importation

Material proposed to be imported to site as engineered fill, will be limited to materials certified as:

- Virgin Excavated Natural Material (VENM); or
- Excavated Natural Material (ENM).

VENM certification will be undertaken with reference to NSW EPA (1995). ENM certification will be undertaken with reference to NSW EPA Excavated Natural Material Exemption.

The concentrations of potential contaminants in VENM and ENM proposed to be imported to site, will be compared against NSW EPA Waste Classification Guidelines 2014 and NSW EPA Excavated Natural Material Order 2014.

Imported fill will be compatible with existing soil characteristics for site drainage purposes.

The remediation contractor will maintain detailed records of all fill imported to the site, including details of the supplier, the source of the fill, the quantities of the fill, vehicle registration numbers and the dates/times the fill was received on site.

## 11.11. Work Health and Safety

### 11.11.1. Safe Work Method Statement

Each contractor and sub-contractor undertaking remediation works, or working within a remediation works zone, will prepare a project specific safe work method statement (SWMS), which will include, but not be limited to:

- the tasks to be undertaken;
- hazards identified for each of the tasks to be undertaken;
- an assessment of risk for each hazard, considering likelihood and consequence;

- control measures to eliminate or mitigate risks associated with each identified hazard.

#### **11.11.2. Personal Protective Equipment**

The following minimum personal protective equipment (PPE) should be worn by all persons working in or visiting the remediation works zone:

- long sleeves and long pants
- high visibility vests (or clothing);
- safety boots;
- hard hats
- gloves; and
- eye protection (e.g. safety glasses).

Additional PPE may be required in accordance with task specific control measures in SWMS (refer **Section 11.11.1**).

#### **11.11.3. Decontamination of Personnel**

Personnel undertaking remediation tasks, or entering the remediation works zone, be required to decontaminate upon exiting the remediation works zone. Decontamination procedures will include:

- cleaning down of protective footwear (including removal of soil from the soles); and
- washing of hands.

The following minimum personal protective equipment (PPE) should be worn by any persons the remediation works zone:

- gloves;
- safety boots;
- hard hats;
- high visibility vests or clothing; and
- safety glasses.

#### **11.12. Site Signage**

A sign will be posted on the boundary of the site, adjacent to the site access point, which will include 24-hour contact details of the remediation contractor. This sign will be maintained onsite until all remediation works are complete.

#### **11.13. Site Security**

Site security will be maintained throughout the duration of the remediation works, with appropriate boundary fencing and gate locks. This will include areas/ stages that are awaiting validation sign-off or have previously been validated.

Other security measures may be implemented, if the need arises.

#### **11.14. Site Hours of Operation**

Remediation works will be undertaken on Monday to Friday between the hours of 7:00am to 5:00pm, and Saturday between the hours of 8:00am and 1:00pm.

Remediation works will not be undertaken outside the hours stated above, or on Sundays or public holidays.

### 11.15. Community Relations and Complaints

Owners, occupants and tenants of properties adjoining the site and across the road from the site, will be provided with notification of remediation works, at least two days prior to those works commencing.

Personnel undertaking remediation works on the site, will direct all third-party communications and/or complaints to the Project Manager. The Project Manager will arrange for the communication/complaint to be assessed, a response prepared, corrective/preventative actions implemented (if necessary).

A register will be maintained on site for the recording of communications / complaints from third parties, including but not limited to, local residents and local businesses.

### 11.16. Emergency Preparedness

An emergency assembly point will be established at the site egress point. This point will be communicated to all site workers and visitors, during relevant site induction processes.

In the event of an emergency, site workers and visitors will assemble here and await further instructions from the site supervisor, project manager or emergency services.

In the event of soil and/or groundwater contamination as a result of a spill and/or fire, the steps described in **Section 8.3.5** 'Unexpected Finds Protocol' Should be followed and implemented.

Spill control kits and fire extinguishers will be located on site, as and where required.

Contact details to be used in the event of an emergency, are presented in **Section 11.17**.

### 11.17. Register of Contacts

A register of contacts for the project is presented in **Table 11.17**.

**Table 11.17 Register of Contacts**

Project Role	Person	Organisation	Contact
Emergency Services	-	Fire / Police / Ambulance	000
Site Owner	-	School Infrastructure NSW	1300 482 651
Principal Contractor	TBC	TBC	TBC
Planning Consent Authority	-	Canterbury Bankstown Council	(02) 9707 9000
WHS Regulatory Authority	-	SafeWork NSW	131 050
Environment Protection Authority	-	NSW EPA	131 500
Remediation Contractor	TBC	TBC	TBC
Environmental Consultant	Aidan Rooney	Alliance Geotechnical	0436 427 630

## 12. CONCLUSIONS

Based on the information presented in the historical contamination assessment reports, AG makes the following conclusions:

- Implementation of the strategies, methodologies and measures set out in this remedial action plan would facilitate management and/or remediation of potentially unacceptable land contamination risks in current proposed development areas onsite thus rendering the site suitable for the proposed land use;
- Prior to any removal of soils from site for offsite disposal during remedial works, waste classification for soils to be disposed of should be prepared by a suitably experienced environmental consultant; and
- Future remedial works should be monitored and validated by a suitably experienced environmental consultant.

This report must be read in conjunction with the limitations set out in **Section 13**.

### 13. STATEMENT OF LIMITATIONS

The findings presented in this report are based on specific searches of relevant, government historical databases and anecdotal information that were made available during the course of this investigation. To the best of our knowledge, these observations represent a reasonable interpretation of the general condition of the site at the time of report completion.

This report has been prepared solely for the use of the client to whom it is addressed and no other party is entitled to rely on its findings.

No warranties are made as to the information provided in this report. All conclusions and recommendations made in this report are of the professional opinions of personnel involved with the project and while normal checking of the accuracy of data has been conducted, any circumstances outside the scope of this report or which are not made known to personnel and which may impact on those opinions is not the responsibility of Alliance Geotechnical Pty Ltd. Should information become available regarding conditions at the site including previously unknown sources of contamination, AG reserves the right to review the report in the context of the additional information.

This report must be reviewed in its entirety and in conjunction with the objectives, scope and terms applicable to AG's engagement. The report must not be used for any purpose other than the purpose specified at the time AG was engaged to prepare the report.

Logs, figures, and drawings are generated for this report based on individual AG consultant interpretations of nominated data, as well as observations made at the time site walkover/s were completed.

Data and/or information presented in this report must not be redrawn for its inclusion in other reports, plans or documents, nor should that data and/or information be separated from this report in any way.

Should additional information that may impact on the findings of this report be encountered or site conditions change, AG reserves the right to review and amend this report.

## 14. REFERENCES

AG 2019, 'Supplementary Contamination Assessment, Bankstown North Public School, 322 Hume Highway, Bankstown, NSW', ref: 9150-ER-1-1, dated 29<sup>th</sup> November;

GeoEnviro Consultancy Pty Ltd 2018 – 'Preliminary Environmental Site Assessment Report, Bankstown North Public School, 322 Hume Highway, Bankstown, NSW', ref: JG18129A-r2, dated October;

National Environment Protection Council (NEPC) 1999a, 'Schedule B(1) Guideline on Investigation Levels for Soil and Groundwater, National Environment Protection (Assessment of Site Contamination) Measure (NEPM) as amended in May 2013';

CRC CARE 2017, '*Risk-based management and remediation guidance for benzo(a)pyrene*, CRC CARE Technical Report no. 39, CRC for Contamination Assessment and Remediation of the Environment, Newcastle, Australia';

National Environment Protection Council (NEPC) 1999b, 'Schedule B(2) Guideline on Site Characterisation, National Environment Protection (Assessment of Site Contamination) Measure (NEPM) as amended in May 2013';

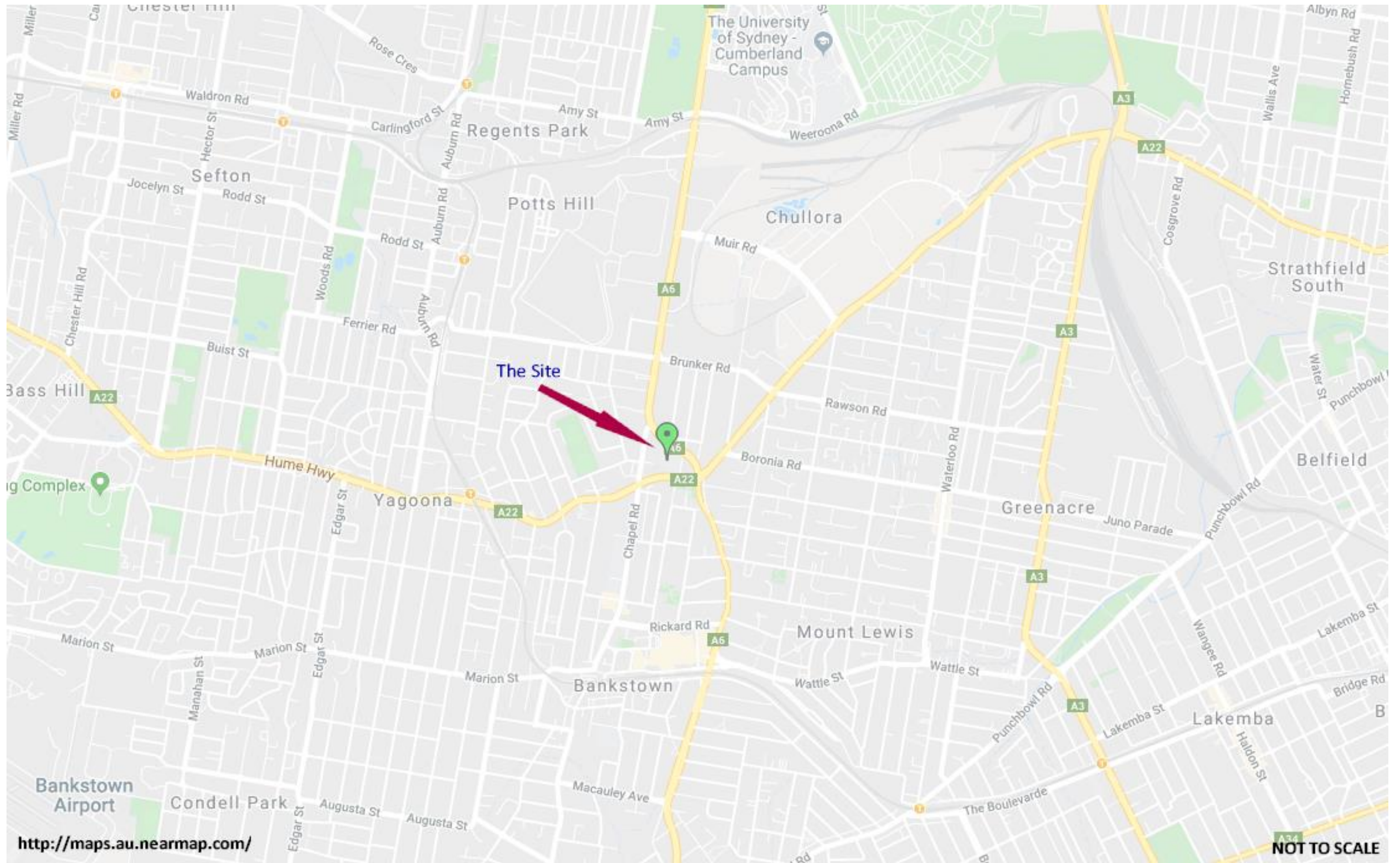
NSW EPA 1995, 'Contaminated Sites: Sampling Design Guidelines';

NSW EPA 2017, 'Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (3<sup>rd</sup> edition)';

NSW EPA 2020, 'Guidelines for consultants reporting on contaminated land; Contaminated land guidelines'; and

WA DOH 2009, 'Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia' dated May 2009.

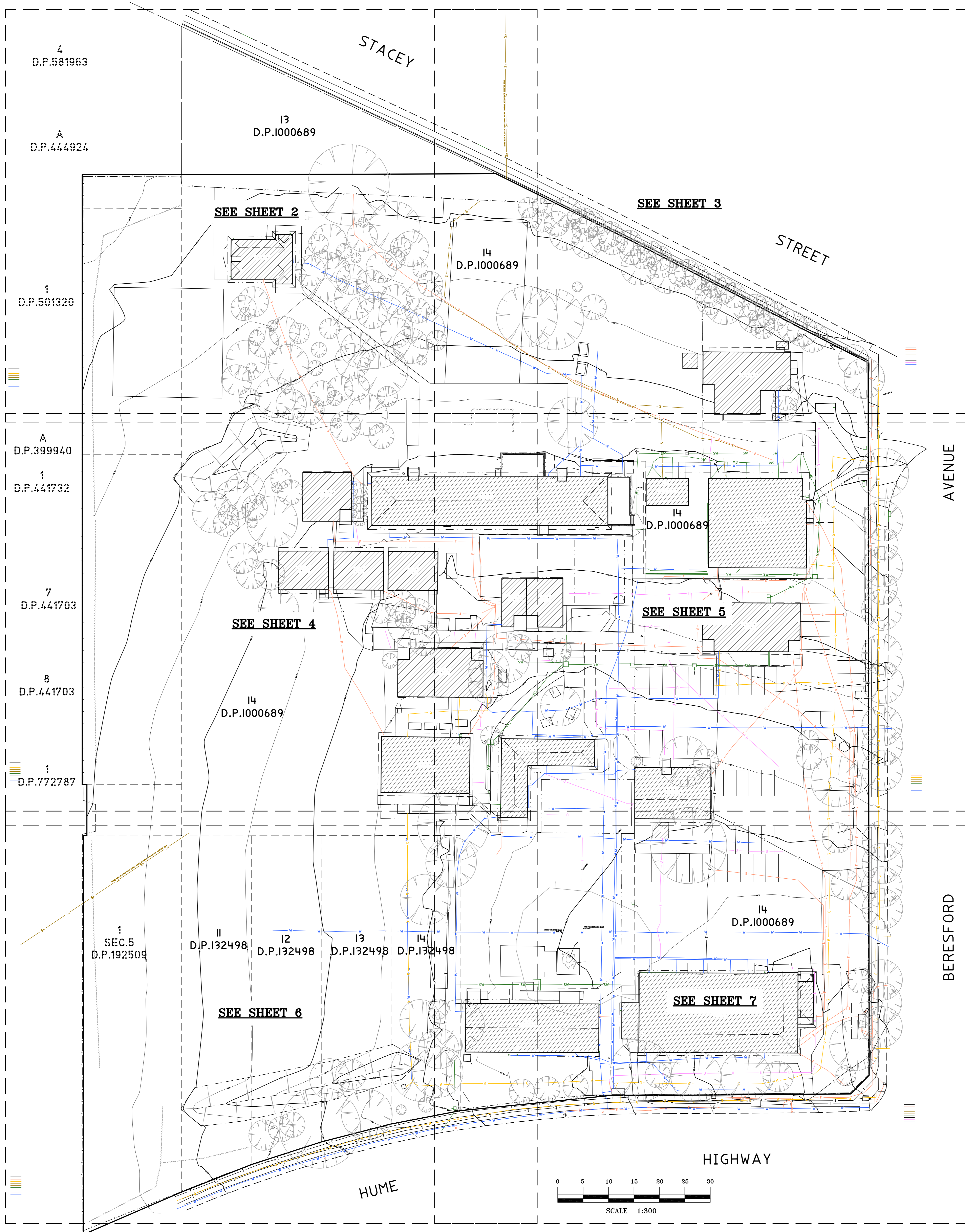
## **SITE FIGURES**





## **APPENDIX A**

### **SITE SURVEY**



TITLE INDICATES THAT LOT 14 IN D.P.1000689 IS SUBJECT TO:

- RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
- HIGHWAY COVENANT (NOT INVESTIGATED)
- DP129802 EASEMENT FOR ELECTRICITY AND OTHER PURPOSES 3.3 METRE(S) WIDE AFFECTING THE PART(S) SHOWN SO BURNED IN DP129802

TITLE INDICATES THAT LOTS 11,12,13&14 IN D.P.132498 IS SUBJECT TO:

- RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
- DPO626 LAND EXCLUDES MINERALS

TITLE INDICATES THAT LOT A IN D.P.444924 IS SUBJECT TO:

- RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)

TITLE INDICATES THAT LOT 1 IN D.P.501320 IS SUBJECT TO:

- LAND EXCLUDES MINERALS (SH PUBLIC WORKS ACT, 1982)

TITLE INDICATES THAT LOT A IN D.P.399940 IS SUBJECT TO:

- RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)

TITLE INDICATES THAT LOT 1 IN D.P.441732 IS SUBJECT TO:

- RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)

TITLE INDICATES THAT LOTS 7 & 8 IN D.P.441703 IS SUBJECT TO:

- 6997TH LAND EXCLUDES MINERALS

TITLE INDICATES THAT LOT 1 IN D.P.772787 IS SUBJECT TO:

- RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
- LIMITED TITLE, LIMITATION PURSUANT TO SECTION 28(1)(a) OF THE REAL PROPERTY ACT, 1900. THE BOUNDARIES OF THE LAND COMPRISED HEREIN HAVE NOT BEEN INVESTIGATED BY THE REGISTRAR GENERAL.

TITLE INDICATES THAT LOT 1 SEC.5 IN D.P.192509 IS SUBJECT TO:

- RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
- LIMITED TITLE, LIMITATION PURSUANT TO SECTION 28(1)(a) OF THE REAL PROPERTY ACT, 1900. THE BOUNDARIES OF THE LAND COMPRISED HEREIN HAVE NOT BEEN INVESTIGATED BY THE REGISTRAR GENERAL. BK 2048 NO 885



**LEGEND: (SEE NOTES 1)**

- COMMUNICATIONS LINES (UNDERGROUND)
- ELECTRICITY LINE (UNDERGROUND)
- GAS LINE
- SEWER LINE (UNDERGROUND)
- SEWER LINE (UNDERGROUND PLOTTED DBYD)
- STORMWATER LINE
- TELSTRA LINES
- TELEPHONE LINES (UNDERGROUND)
- WATER LINE (UNDERGROUND)

**NOTES 1**

- THE PURPOSE OF THIS PLAN IS FOR DESIGN ONLY. CURRENT PLANS ISSUED BY SERVICE PROVIDERS THROUGH DIAL BEFORE YOU DIG ARE STILL REQUIRED. CONTRACTORS AND SUBCONTRACTORS WILL NEED TO EXERCISE THEIR OWN DUTY OF CARE AND SHOULD MAKE THEIR OWN DIAL BEFORE YOU DIG ENQUIRY BEFORE EXCAVATION/CONSTRUCTION. YOU MUST ENSURE DIAL BEFORE YOU DIG ARE CURRENT AS THEY HAVE VARYING EXPIRATION DATES, AND MAY REQUIRE RE-ISSUE OTHERWISE THE INFORMATION ON THIS PLAN MAY NO LONGER BE CURRENT.
- WARNING: UNKNOWN SERVICES MAY EXIST THAT COULD NOT BE ELECTRONICALLY DETECTED. THE DIAGRAMS OF THE SERVICE PROVIDER MAY NOT DEPICT ALL ASSETS WITHIN THEIR NETWORK AND SERVICE PROVIDERS MAY SHARE CONDUITS AND /OR TRENCHES AT THIS LOCATION.
- WARNING: SINGLE MARKED LINES MAY REPRESENT MULTIPLE CONDUITS. PIPES AND/OR CABLES AT THIS LOCATION, THE RECORDING OF DEPTH AND POSITION OF UTILITIES CANNOT BE GUARANTEED AS CORRECT. WE RECOMMEND NON DESTRUCTIVE DIGGING/POT-HOLING TO EXPOSE SERVICES FOR ACCURATE IDENTIFICATION AND DEPTH.
- CAUTION: DURNIN HAVE SURVEYED AND MARKED OUT EXISTING SERVICES IN THE AREA SPECIFIED BY THE CLIENT. THESE SERVICE LINES HAVE BEEN LOCATED BY ABOVE GROUND SERVICE TRACING METHODS AND HAVE NOT BEEN SIGHTED. DMS SURVEYORS HAVE THEN LOCATED THE LINE MARKED BY DURNIN. THE LOCATION OF THESE MARKED SERVICES ARE APPROXIMATE ONLY. THE POSITION OF THE MARKED SERVICE LINES HAS BEEN MADE WITH REFERENCE TO THE RELEVANT SERVICE AUTHORITY DIAGRAMS. ALL SERVICES MAY NOT HAVE BEEN SHOWN AND UTILITY DESCRIPTIONS HAVE BEEN TAKEN FROM UTILITY PROVIDED DIAGRAMS WHERE AVAILABLE. WE RECOMMEND NON DESTRUCTIVE DIGGING/POT-HOLING TO EXPOSE MARKED SERVICES TO IDENTIFY AND SHOW EXACT DEPTH AND LOCATION OF SERVICE LINES PRIOR TO EXCAVATIONS. COMMENCING UTILITIES PLOTTED ON THE PLAN THAT TERMINATE IN THE SPECIFIED AREA MAY GO TO FEATURES THAT HAVE NOT BEEN SHOWN ON THE BACKGROUND DETAIL SURVEY PROVIDED BY CLIENT. THE RISK REMAINS WITH THE CLIENT AND/OR SUB CONTRACTOR AND THEIR RESPONSIBILITY TO EXERCISE CAUTION AT ALL TIMES.

CODE	DEPTH	PIPE
106.78	SSL	131 B 0.78 EOT
1	1	1
RL	LOCATION	NOTE
	QUALITY	

**SUBSURFACE UTILITY INFORMATION**

QL-D IS THE LOWEST OF THE FOUR QUALITY LEVELS STIPULATED IN ASS488. IT IS AN INDICATIVE POSITION CORRELATED FROM EXISTING RECORDS, CURSORY SITE INSPECTION, ANECDOTAL EVIDENCE.

QL-C IS THE NEXT LEVEL UP FROM QL-D. ASS488 STATES THAT QL-C IS A SURFACE FEATURE CORRELATION OR AN INTERPRETATION OF THE APPROXIMATE LOCATIONS AND ATTRIBUTES OF A SURFACE FEATURE USING A COMBINATION OF EXISTING RECORDS (ANECDOTAL EVIDENCE) SOME BOOM TECHNIQUES AND A SITE SURVEY OF VISIBLE EVIDENCE.

QL-B ELECTRONICALLY TRACED AS PER ASS488 DIRECT CONNECTION, INDUCTION, FLEXITRACE/SOUND, FLEXIROD/SOUND WITH AN ESTIMATED POSITIONAL TOLERANCE OF +/- 300MM IN PLAN, +/- 500MM IN DEPTH (HIGH CONFIDENCE LEVEL).

QL-A IS THE HIGHEST QUALITY LEVEL AS PER ASS488 AND CONSISTS OF THE POSITIVE IDENTIFICATION OF THE ATTRIBUTE AND LOCATION OF A SUBSURFACE UTILITY AT A POINT TO AN ABSOLUTE SPATIAL POSITION IN THREE DIMENSIONS. THIS CAN BE ACHIEVED AT OPENED PITS AND IN THE POT-HOLES WHERE THE UTILITY IS EXPOSED.

HORIZONTAL AND VERTICAL TOLERANCE: +/- 50MM

QL-2 ELECTRONICALLY LOCATED WITH GROUND PENETRATING RADAR OR OTHER ELECTRONIC LOCATING TECHNIQUES NOT COMPLIANT WITH ASS488 ESTIMATED POSITIONAL TOLERANCE IS +/- 300MM IN PLAN, +/- 500MM IN DEPTH (HIGH CONFIDENCE LEVEL).

QL-1 ELECTRONICALLY LOCATED BUT WITH REDUCED CONFIDENCE IN PLAN POSITION/DEPTH (MEDIUM CONFIDENCE LEVEL).

QL-0 ELECTRONICALLY LOCATED WITH LOW CONFIDENCE LEVEL IN PLAN POSITION/DEPTH (LOW CONFIDENCE LEVEL).

## NOTES

- A BASIC BOUNDARY SURVEY HAS BEEN UNDERTAKEN SUITABLE FOR COUNCIL DA SUBMISSION (TITLE DIMENSIONS ONLY) - BOUNDARY DEFINITION IS SUBJECT TO FURTHER SURVEY.
- IF CONSTRUCTION ON OR NEAR BOUNDARIES IS REQUIRED IT IS RECOMMENDED THAT THE BOUNDARIES OF THE LAND BE MARKED.
- THIS DETAIL SURVEY IS NOT A "SURVEY" AS DEFINED BY THE SURVEYING AND SPATIAL INFORMATION ACT, 2002.
- AREA IS APPROXIMATE ONLY AND HAS BEEN CALCULATED BY TITLE DIMENSIONS. ALL TITLE DIMENSIONS OF THE LAND HAVE NOT BEEN CONFIRMED BY SURVEY. IF AREAS ARE CRITICAL WE RECOMMEND A BOUNDARY SURVEY FOR PUBLIC RECORD.
- TREE SIZES ARE ESTIMATES ONLY.
- THIS PLAN HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF JDH ARCHITECTS.
- RELATIONSHIP OF IMPROVEMENTS TO BOUNDARIES IS DIAGRAMMATIC ONLY. WHERE OBJECTS ARE CRITICAL, THEY SHOULD BE CONFIRMED BY FURTHER SURVEY.
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- DIAL BEFORE YOU DIG SERVICES (60 1100) SHOULD BE USED BEFORE CARRYING OUT ANY CONSTRUCTION ACTIVITY IN OR NEAR THE SURVEYED AREA.
- CRITICAL SPOT LEVELS SHOULD BE CONFIRMED WITH SURVEYOR.
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- CONTOURS SHOWN DEPICT THE TOPOGRAPHY. THEY DO NOT REPRESENT THE EXACT LEVEL AT ANY PARTICULAR POINT. ONLY SPOT LEVELS SHOULD BE USED FOR CALCULATIONS OF QUANTITIES WITH CAUTION.
- CONTOUR INTERVAL - 0.5 metre. - SPOT LEVELS SHOULD BE ADOPTED.
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- CSL = COMMUNICATIONS SURFACE LEVEL
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- DK = DECK
- DNP = DOWN PIPE
- DS = DOOR SILL LEVEL
- EX = ELECTRICITY KIOSK
- EPIL = ELECTRICITY PILLAR
- EPIT = ELECTRICITY PIT
- ESL = ELECTRICITY SURFACE LEVEL
- FCE = FENCE
- FHY = FIRE HYDRANT
- FL = FLOOR LEVEL
- FP = FLAG POLE
- GDN = GARDEN
- GP = GUTTER LEVEL
- GPL = GAS PLAQUE
- GRT = GRATE
- GSL = GAS SLA
- GVA = GAS VALVE
- HYD = HYDRANT
- LAN = LANDING
- LID = MISCELLANEOUS PIT LID
- LIN = LINTEL
- LM = LINE MARKING
- LP = LIGHT POLE
- NS = NATURAL SURFACE
- PAV = PAVING
- PIPE = PIPE OBVERT
- PIT = TOP OF PIT
- PH = PERMANENT MARK
- RF = TOP OF ROOF
- RMP = RAMP
- RR = ROOF RIDGE
- RTA = RTA/RHS PIT
- SGN = SIGN
- SIP = SEWER INSPECTION PIT
- SPC = SPEED CAMERA
- SSL = SEWER SURFACE LEVEL
- STR = STAIRS
- SWPIT = STORMWATER PIT
- WSL = STORMWATER SURFACE LEVEL
- TS = TOP OF BANK
- TG = TOP OF GUTTER
- TAB = TOP OF KERB
- TLE = TREE LINE
- TLI = TRAFFIC LIGHT
- TOT = TOP OF TREE
- TPIT = TELSTRA PIT
- TR = TREE
- TSL = TELSTRA SURFACE LEVEL
- TSP = TRAFFIC SIGNAL PIT
- TW = TOP OF WALL
- UEV = UNDERSIDE OF EAVE
- USL = UNKNOWN SERVICE SURFACE LEVEL
- UTR = UNDERSIDE OF TREE
- VER = VERANDAH
- WR = WATER METER
- WPIT = WATER PIT SPOT
- WSL = WATER SLA SURFACE LEVEL
- WV = WATER VALVE

**HORIZONTAL DATUM:**  
CO-ORDINATE SYSTEM: MGA  
MARKS: ADOPED: 5SM IJH4  
**VERTICAL DATUM:**  
DATUM: AUSTRALIAN HEIGHT DATUM (AHD)  
B.M. ADOPED: 5SM IJH4  
R.L. 66.994 (ORDER L2)  
SOURCE: S.C.I.M.S. (4/10/18)

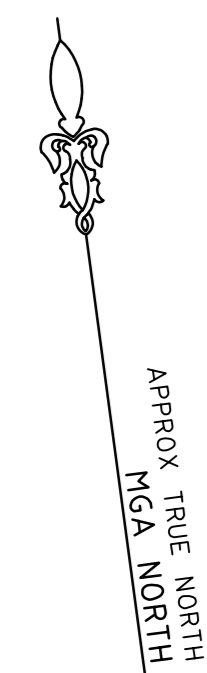
9	TREE CANOPY REVISED	24/10/19
2	INDIVIDUAL LOT AREAS ADDED	18/02/19
1	FIRST ISSUE	19/10/18

**CLIENT:**  
**JDH ARCHITECTS**  
**44 LITTLE STREET,**  
**DARLINGHURST NSW 2010**

**SURVEY PLAN SHOWING DETAIL & LEVELS OVER LOT 14 IN DP1000689, LOTS 11 TO 14 IN DP132498, LOT A IN DP444924, LOT 1 IN DP501320, LOT A IN DP399940, LOT 1 IN DP441732, LOTS 7 & 8 IN DP441703, LOT 1 IN DP772787 & LOT 1 SEC.5 IN DP192509 BANKSTOWN NORTH, PUBLIC SCHOOL**

**C.M.S. Surveyors Pty Limited**  
ACN: 096 240 201  
RD Box 463 Dee Why NSW 2099  
2/39A South Creek Road, Dee Why NSW 2099  
Telephone: (02) 9971 4802  
Facsimile: (02) 9971 4802  
E-mail: info@cmsurveyors.com.au

LGA: CATERBURY-BANKSTOWN		SHEET 1 OF 7	
SURVEYED ME/H/C	DRAWN GP	CHECKED ME/H/C	APPROVED DR
SURVEY INSTRUCTION 18067		SCALE 1:300 @ A0	DATE OF SURVEY 8/10/18-23/10/19
DRAWING NAME <b>18067detail</b>			ISSUE <b>3</b>
CAD FILE 18067detail 3.dwg			



4  
D.P.581963

13  
D.P.1000689

A  
D.P.444924  
AREA=126.5m<sup>2</sup>

I  
D.P.501320  
AREA=695.6m<sup>2</sup>

14  
D.P.1000689  
AREA=2.136ha

A  
D.P.399940

JOINS SHEET 4

#### SUBSURFACE UTILITY INFORMATION

Q1-D IS THE LOWEST OF THE FOUR QUALITY LEVELS STIPULATED IN ASS488. IT IS AN INDICATIVE POSITION COMPILED FROM EXISTING RECORDS, CURSORY SITE INSPECTION, ANECDOTAL EVIDENCE.  
Q1-C IS THE NEXT LEVEL UP FROM Q1-D. ASS488 STATES THAT Q1-C IS A SURFACE FEATURE CORRELATION OR AN INTERPRETATION OF THE APPROXIMATE LOCATIONS AND ATTRIBUTES OF A SURFACE FEATURE USING A COMBINATION TOP, OFC, WALL, ANECDOTAL EVIDENCE, SONIC BOOM TECHNIQUES AND A SITE SURVEY OF VISIBLE EVIDENCE.  
Q1-B ELECTRONICALLY TRACED AS PER ASS488 (DIRECT CONNECTION, INDUCTION, FLEXITRACE/SONDE, FLEXROD/SONDE) WITH AN ESTIMATED POSITIONAL TOLERANCE OF +/-300MM IN PLAN, +/-500MM IN DEPTH (HIGH CONFIDENCE LEVEL).  
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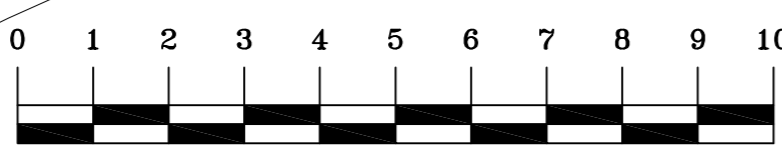
END = END OF TRACE  
FOD = FULL OF DEBRIS  
GPR = GROUND PENETRATING RADAR  
UTO = UNABLE TO OPEN



#### LEGEND: (SEE NOTES 1)

— COMMUNICATIONS LINES (UNDERGROUND)  
— ELECTRICITY LINE (UNDERGROUND)  
— GAS LINE  
— SEWER LINE (UNDERGROUND)  
— SEWER LINE (UNDERGROUND PLOTTED DRY)  
— STORMWATER LINE  
— TELSTRA LINE  
— UNKNOWN SERVICE (UNDERGROUND)  
— WATER LINE (UNDERGROUND)

PLEASE NOTE: DISCREPANCIES EXIST BETWEEN THE TITLE AND AVAILABLE DISTANCES ALONG THE SOUTHERN & WESTERN BOUNDARIES. DUE TO THESE ANOMALIES, IF STRUCTURES ARE TO BE BUILT ON OR ADJACENT TO THE SOUTHERN AND WESTERN BOUNDARIES OF THE SUBJECT SITE, WE STRONGLY RECOMMEND THAT FURTHER BOUNDARY INVESTIGATION IS CARRIED OUT.



- NOTES**
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ESL = ELECTRICITY SURFACE LEVEL  
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PHY = FIRE HYDRANT  
FL = FLOOR LEVEL  
FP = FLAG POLE  
GDN = GARDEN  
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GPL = GAS PLAQUE  
GRT = GRATE  
GSL = GAS SLA  
GVA = GAS VALVE  
HYD = HYDRANT  
LAN = LANDING  
LID = MISCELLANEOUS PIT LID  
LIN = LINTEL  
LM = LINE MARKING  
LP = LIGHT POLE  
NS = NATURAL SURFACE  
PAV = PAVING  
PIPE = PIPE OBVERT  
PIT = TOP OF PIT  
PH = PERMANENT MARK  
RF = TOP OF ROOF  
RMP = RAMP  
RR = ROOF RIDGE  
RTA = RTA/RHS PIT  
SGN = SIGN  
SIP = SEWER INSPECTION PIT  
SPC = SPEED CAMERA  
SSL = SEWER SURFACE LEVEL  
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TPIT = TELSTRA PIT  
TR = TREE  
TSL = TELSTRA SURFACE LEVEL  
TSP = TRAFFIC SIGNAL PIT  
TR = TOP OF ROOF  
UEV = UNDERSIDE OF EAVE  
USL = UNKNOWN SERVICE SURFACE LEVEL  
UTR = UNDERSIDE OF TREE  
VER = VERANDAH  
WR = WATER METER  
WPIT = WATER PIT SPOT  
WSL = WATER SLA SURFACE LEVEL  
WV = WATER VALVE

#### HORIZONTAL DATUM:

CO-ORDINATE SYSTEM: MGA

MARKS ADOPTED: SSM IHIH

#### VERTICAL DATUM:

DATUM: AUSTRALIAN HEIGHT DATUM (AHD)

B.M. ADOPTED: SSM IHIH

R.L. 66.994 (ORDER L2)

SOURCE: S.C.I.M.S. (4/10/18)

3	TREE CANOPY REVISED	24/10/19
2	INDIVIDUAL LOT AREAS ADDED	18/02/19
1	FIRST ISSUE	19/10/18

**CLIENT:**  
JDH ARCHITECTS  
44 LITTLE STREET,  
DARLINGHURST NSW 2010

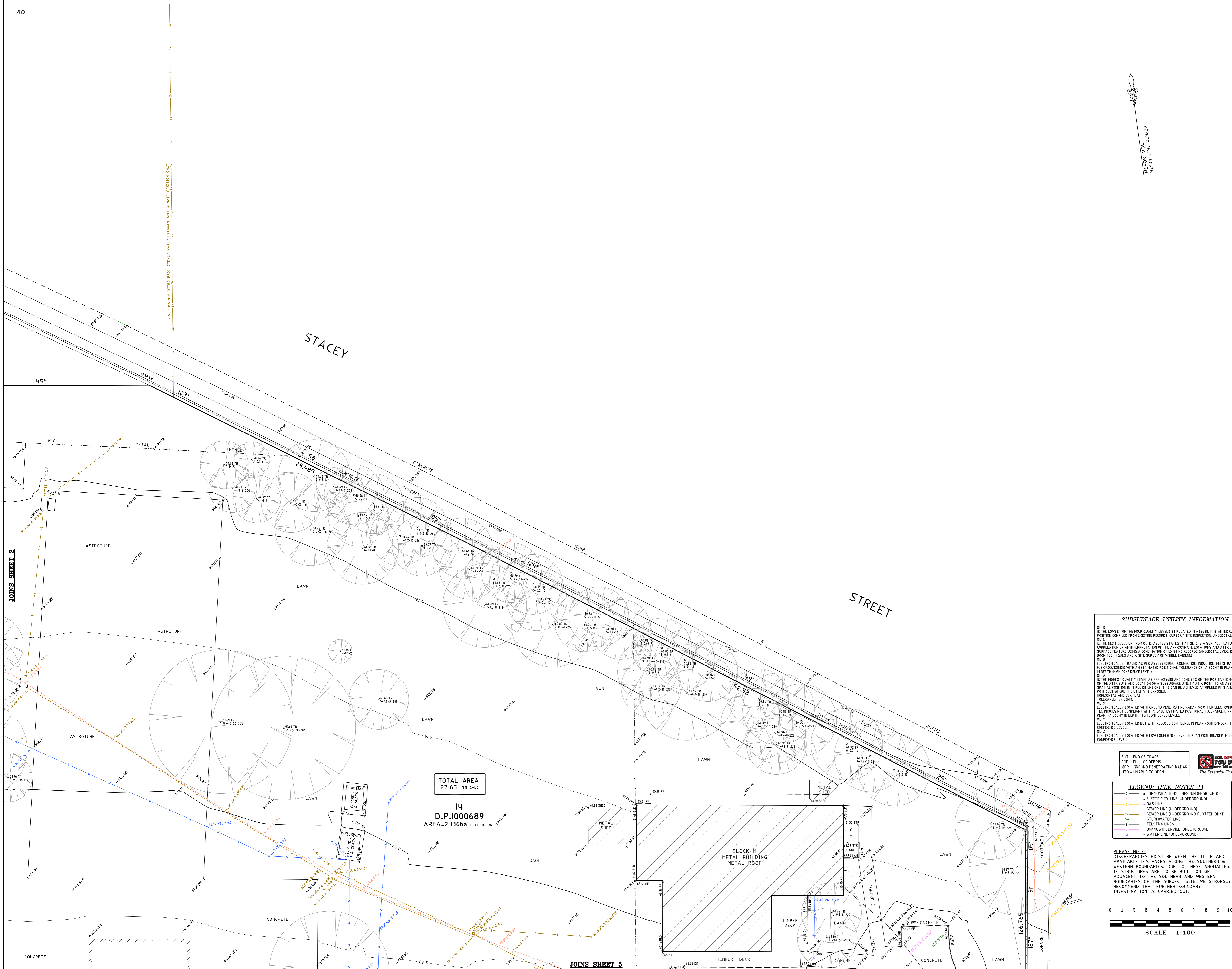
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ACN: 096 240 201

RG Box 463 Dee Why NSW 2099  
2/39A South Creek Road, Dee Why NSW 2099  
Telephone: (02) 9971 4802  
Facsimile: (02) 9971 4802  
E-mail: info@cmsurveyors.com.au

LGA: CATERBURY-BANKSTOWN SHEET 2 OF 7

SURVEYED	DRAWN	CHECKED	APPROVED
ME/HJC	GP	ME/HJC	DR
SURVEY INSTRUCTION 18067	SCALE 1:100 IN AD	DATE OF SURVEY 8/10/18-23/10/19	
DRAWING NAME 18067detail	CAD FILE 18067detail 3.dwg	ISSUE 3	



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- GRT = GRATE
- GSL = GAS SLA
- GVA = GAS VALVE
- HYD = HYDRANT
- LAN = LANDING
- LID = MISCELLANEOUS PIT LID
- LIN = LINTEL
- LM = LINE MARKING
- LP = LIGHT POLE
- NS = NATURAL SURFACE
- PAV = PAVING
- PIPE = PIPE OBVERT
- PIT = TOP OF PIT
- PH = PERMANENT MARK
- RF = TOP OF ROOF
- RMP = RAMP
- RR = ROOF RIDGE
- RTA = RTA/RHS PIT
- SGN = SIGN
- SP = SEWER INSPECTION PIT
- SPC = SPEED CAMERA
- SSL = SEWER SURFACE LEVEL
- STR = STAIRS
- SWPIT = STORMWATER PIT
- SWSL = STORMWATER SURFACE LEVEL
- TB = TOP OF BANK
- TG = TOP OF GUTTER
- TKB = TOP OF KERB
- TLE = TREE LINE
- TLI = TRAFFIC LIGHT
- TOT = TOP OF TREE
- TPIT = TELSTRA PIT
- TR = TREE
- TSL = TELSTRA SURFACE LEVEL
- TSP = TRAFFIC SIGNAL PIT
- TW = TOP OF WALL
- UEV = UNDERSIDE OF EAVE
- USL = UNKNOWN SERVICE SURFACE LEVEL
- UTR = UNDERSIDE OF TREE
- VER = VERANDAH
- WR = WATER METER
- WPIT = WATER PIT SPOT
- WSL = WATER SLA SURFACE LEVEL
- WV = WATER VALVE

## SUBSURFACE UTILITY INFORMATION

QL-D IS THE LOWEST OF THE FOUR QUALITY LEVELS STIPULATED IN ASSA88. IT IS AN INDICATIVE POSITION COMPILED FROM EXISTING RECORDS, CUNGRY SITE INSPECTION, ANECDOTAL EVIDENCE.

QL-C IS THE NEXT LEVEL UP FROM QL-D. ASSA88 STATES THAT QL-C IS A SURFACE FEATURE CORRELATION OR AN INTERPRETATION OF THE APPROXIMATE LOCATIONS AND ATTRIBUTES OF A SURFACE FEATURE USING A COMBINATION OF EXISTING RECORDS, ANECDOTAL EVIDENCE, SONIC BOOM TECHNIQUES AND A SITE SURVEY OF VISIBLE EVIDENCE.

QL-B ELECTRONICALLY TRACED AS PER ASSA88 (DIRECT CONNECTION, INDUCTION, FLEXITRACE/SOONDE, FLEXROD/SOONDE) WITH AN ESTIMATED POSITIONAL TOLERANCE OF +/- 300MM IN PLAN, +/- 500MM IN DEPTH (HIGH CONFIDENCE LEVEL).

QL-A IS THE HIGHEST QUALITY LEVEL AS PER ASSA88 AND CONSISTS OF THE POSITIVE IDENTIFICATION OF THE ATTRIBUTE AND LOCATION OF A SUBSURFACE UTILITY AT A POINT TO AN ABSOLUTE SPATIAL POSITION IN THREE DIMENSIONS. THIS CAN BE ACHIEVED AT OPENED PITS AND IN THE PORTHOLES WHERE THE UTILITY IS EXPOSED.

QL-H ELECTRONICALLY LOCATED BUT WITH REDUCED CONFIDENCE IN PLAN POSITION/DEPTH (MEDIUM CONFIDENCE LEVEL).

QL-L ELECTRONICALLY LOCATED WITH LOW CONFIDENCE LEVEL IN PLAN POSITION/DEPTH (LOW CONFIDENCE LEVEL).

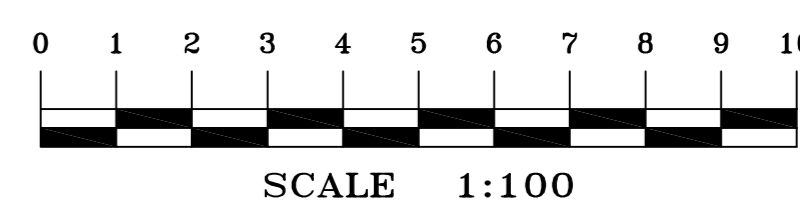
EOT = END OF TRACE  
FOD = FULL OF DEBRIS  
GPR = GROUND PENETRATING RADAR  
UTO = UNABLE TO OPEN



## LEGEND: (SEE NOTES 1)

- C = COMMUNICATIONS LINES (UNDERGROUND)
- E = ELECTRICITY LINE (UNDERGROUND)
- G = GAS LINE
- S = SEWER LINE (UNDERGROUND)
- SW = SEWER LINE (UNDERGROUND PLOTTED BYDI)
- ST = STORMWATER LINE
- T = TELSTRA LINES
- U = UNKNOWN SERVICE (UNDERGROUND)
- W = WATER LINE (UNDERGROUND)

PLEASE NOTE:  
DISCREPANCIES EXIST BETWEEN THE TITLE AND AVAILABLE DISTANCES ALONG THE SOUTHERN & WESTERN BOUNDARIES. DUE TO THESE ANOMALIES, IF STRUCTURES ARE TO BE BUILT ON OR ADJACENT TO THE SOUTHERN AND WESTERN BOUNDARIES OF THE SUBJECT SITE, WE STRONGLY RECOMMEND THAT FURTHER BOUNDARY INVESTIGATION IS CARRIED OUT.



## HORIZONTAL DATUM:

CO-ORDINATE SYSTEM: MGA  
MARKS: ADOPTED: 55M 141H

## VERTICAL DATUM:

DATUM: AUSTRALIAN HEIGHT DATUM (AHD)  
B.M. ADOPTED: 55M 141H

R.L. 66.994 (ORDER L2)  
SOURCE: S.C.I.M.S. (4/10/18)

1	INDIVIDUAL LOT AREAS ADDED	18/02/19
2	FIRST ISSUE	19/10/18
3	TREE CANOPY REVISED	24/10/19

**CLIENT:**  
**JDH ARCHITECTS**  
**44 LITTLE STREET,**  
**DARLINGHURST NSW 2010**

**SURVEY PLAN SHOWING DETAIL & LEVELS OVER LOT 14 IN DP1000689, LOTS 11 TO 14 IN DP132498, LOT A IN DP444924, LOT 1 IN DP501320, LOT A IN DP399940, LOT 1 IN DP441732, LOTS 7 & 8 IN DP441703, LOT 1 IN DP72787 & LOT 1 SEC.5 IN DP192509 BANKSTOWN NORTH, PUBLIC SCHOOL**

**C.M.S. Surveyors Pty Limited**  
ACN: 096 240 201

RS Box 463 Dee Why NSW 2099  
2/39A South Creek Road, Dee Why NSW 2099  
Telephone: (02) 9971 4802  
Facsimile: (02) 9971 4802  
E-mail: info@cmsurveyors.com.au

LGA: CATERBURY-BANKSTOWN			SHEET 3 OF 7	
SURVEYED ME/H/C		DRAWN GP	CHECKED ME/H/C	APPROVED DR
SURVEY INSTRUCTION 18067		SCALE 1:100 @ A0	DATE OF SURVEY 8/10/18-23/10/19	
DRAWING NAME 18067detail				ISSUE 3
CAD FILE 18067detail 3.dwg				

AO

A  
D.P.399940  
AREA=234m<sup>2</sup> TITLE

JOINS SHEET 2

I  
D.P.441732  
AREA=234m<sup>2</sup> TITLE

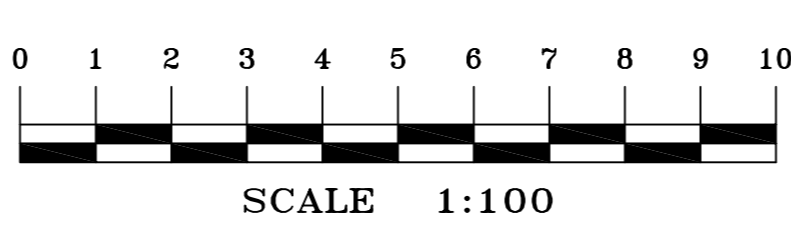
7  
D.P.441703  
AREA=467.9m<sup>2</sup> TITLE

8  
D.P.441703  
AREA=556.4m<sup>2</sup> TITLE

I  
D.P.772787  
AREA=187.1m<sup>2</sup> TITLE

14  
D.P.I000689  
AREA=2.136ha TITLE (DEGN.)  
TOTAL AREA  
27.65 ha CALC

JOINS SHEET 6



## SUBSURFACE UTILITY INFORMATION

QL-D IS THE LOWEST OF THE FOUR QUALITY LEVELS STIPULATED IN ASS488. IT IS AN INDICATIVE POSITION COMPILED FROM EXISTING RECORDS, CURSORY SITE INSPECTION, ANECDOTAL EVIDENCE.

QL-C IS THE NEXT LEVEL UP FROM QL-D. ASS488 STATES THAT QL-C IS A SURFACE FEATURE CORRELATION OR AN INTERPRETATION OF THE APPROXIMATE LOCATION AND ATTRIBUTES OF A SURFACE FEATURE USING A COMBINATION OF EXISTING RECORDS (ANECDOTAL EVIDENCE) SONIC BOM TECHNIQUES AND A SITE SURVEY OF VISIBLE EVIDENCE.

QL-B ELECTRONICALLY TRACED AS PER ASS488 DIRECT CONNECTION, INDUCTION, FLEXITRACE/SONDE, FLEXIROD/SONDE) WITH AN ESTIMATED POSITIONAL TOLERANCE OF +/-3000MM IN PLAN, +/-5000MM IN DEPTH (HIGH CONFIDENCE LEVEL).

QL-A IS THE HIGHEST QUALITY LEVEL AS PER ASS488 AND CONSISTS OF THE POSITIVE IDENTIFICATION OF THE ATTRIBUTE AND LOCATION OF A SUBSURFACE UTILITY AT A POINT TO AN ABSOLUTE SPATIAL POSITION IN THREE DIMENSIONS. THIS CAN BE ACHIEVED AT OPENED PITS AND IN THE POTHOLES WHERE THE UTILITY IS EXPOSED.

QL-X ELECTRONICALLY LOCATED WITH GROUND PENETRATING RADAR OR OTHER ELECTRONIC LOCATING TECHNIQUES NOT COMPLIANT WITH ASS488. ESTIMATED POSITIONAL TOLERANCE IS +/-3000MM IN PLAN, +/-5000MM IN DEPTH (MEDIUM CONFIDENCE LEVEL).

QL-Y ELECTRONICALLY LOCATED BUT WITH REDUCED CONFIDENCE IN PLAN POSITION/DEPTH (MEDIUM CONFIDENCE LEVEL).

QL-Z ELECTRONICALLY LOCATED WITH LOW CONFIDENCE LEVEL IN PLAN POSITION/DEPTH (LOW CONFIDENCE LEVEL).

EOT = END OF TRACE  
FOU = FULL OF DEBRIS  
GPR = GROUND PENETRATING RADAR  
UTO = UNABLE TO OPEN



## LEGEND: (SEE NOTES 1)

— c — = COMMUNICATIONS LINES (UNDERGROUND)  
— e — = ELECTRICITY LINES (UNDERGROUND)  
— g — = GAS LINE  
— s — = SEWER LINE (UNDERGROUND) (PLOTTED BY OJ)  
— sw — = STORMWATER LINE  
— t — = TELSTRA LINES  
— u — = UNKNOWN SERVICE (UNDERGROUND)  
— w — = WATER LINE (UNDERGROUND)

PLEASE NOTE:  
DISCREPANCIES EXIST BETWEEN THE TITLE AND AVAILABLE DISTANCES ALONG THE SOUTHERN & WESTERN BOUNDARIES. DUE TO THESE ANOMALIES, IF STRUCTURES ARE TO BE BUILT ON OR ADJACENT TO THE SOUTHERN AND WESTERN BOUNDARIES OF THE SUBJECT SITE, WE STRONGLY RECOMMEND THAT FURTHER BOUNDARY INVESTIGATION IS CARRIED OUT.

- NOTES**
- A BASIC BOUNDARY SURVEY HAS BEEN UNDERTAKEN SUITABLE FOR COUNCIL DA SUBMISSION (TITLE DIMENSIONS ONLY) - BOUNDARY DEFINITION IS SUBJECT TO FURTHER SURVEY.
  - IF CONSTRUCTION ON OR NEAR BOUNDARIES IS REQUIRED IT IS RECOMMENDED THAT THE BOUNDARIES OF THE LAND BE MARKED.
  - THIS DETAIL SURVEY IS NOT A "SURVEY" AS DEFINED BY THE SURVEYING AND SPATIAL INFORMATION ACT, 2002.
  - AREA IS APPROXIMATE ONLY AND HAS BEEN CALCULATED BY TITLE DIMENSIONS. ALL TITLE DIMENSIONS OF THE LAND HAVE NOT BEEN CONFIRMED BY SURVEY. IF AREA IS CRITICAL WE RECOMMEND A BOUNDARY SURVEY FOR PUBLIC RECORD.
  - TREE SIZES ARE ESTIMATES ONLY.
  - THIS PLAN HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF JDH ARCHITECTS.
  - RELATIONSHIP OF IMPROVEMENTS TO BOUNDARIES IS DIAGRAMMATIC ONLY. WHERE OBJECTS ARE CRITICAL, THEY SHOULD BE CONFIRMED BY FURTHER SURVEY.
  - EXCEPT WHERE SHOWN BY DIMENSION LOCATION OF DETAIL WITH RESPECT TO BOUNDARIES IS INDICATIVE ONLY.
  - DIAL BEFORE YOU DIG SERVICES (60-1100) SHOULD BE USED BEFORE CARRYING OUT ANY CONSTRUCTION ACTIVITY IN OR NEAR THE SURVEYED AREA.
  - CRITICAL SPOT LEVELS SHOULD BE CONFIRMED WITH SURVEYOR.
  - THIS PLAN IS ONLY TO BE USED FOR THE PURPOSE OF DESIGNING NEW CONSTRUCTIONS.
  - CONTOURS SHOWN DEPICT THE TOPOGRAPHY. THEY DO NOT REPRESENT THE EXACT LEVEL AT ANY PARTICULAR POINT. ONLY SPOT LEVELS SHOULD BE USED FOR CALCULATIONS OF QUANTITIES WITH CAUTION.
  - CONTOUR INTERVAL - 0.5 metre. - SPOT LEVELS SHOULD BE ADOPTED.
  - POSITION OF RIDGE LINES ARE DIAGRAMMATIC ONLY (NOT TO SCALE).
  - THE INFORMATION IS ONLY TO BE USED AT A SCALE ACCURACY OF 1:100.
  - DO NOT SCALE OFF THIS PLAN / FIGURED DIMENSIONS TO BE TAKEN IN PREFERENCE TO SCALED READINGS.
  - COPYRIGHT © CMS SURVEYORS 2019.
  - NO PART OF THIS SURVEY MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM, WITHOUT THE WRITTEN PERMISSION OF THE COPYRIGHT OWNER EXCEPT AS PERMITTED BY THE COPYRIGHT ACT 1968.
  - ANY PERMITTED DOWNLOADING, ELECTRONIC STORAGE, DISPLAY, PRINT, COPY OR REPRODUCTION OF THIS SURVEY SHOULD CONTAIN NO ALTERATION OR ADDITION TO THE ORIGINAL SURVEY.
  - THIS NOTICE MUST NOT BE ERASED.

## LEGEND:

BB = BOTTOM OF BANK  
BIT = BITUMEN  
BLD = EXTERNAL BUILDING  
BR = BOTTOM WALL  
CON = CONCRETE  
CPIT = COMMUNICATIONS PIT  
CSL = COMMUNICATIONS SURFACE LEVEL  
DD = DISH DRAIN  
DK = DECK  
DNP = DOWN PIPE  
DS = DOOR SILL LEVEL  
EK = ELECTRICITY KIOSK  
EPIL = ELECTRICITY PULLAR  
EPIT = ELECTRICITY PIT  
ESL = ELECTRICITY SURFACE LEVEL  
FCE = FENCE  
PHY = FIRE HYDRANT  
FL = FLOOR LEVEL  
FP = FLAG POLE  
GDN = GARDEN  
GP = GUTTER LEVEL  
GPL = GAS PLAQUE  
GSL = GAS SLA  
GVA = GAS VALVE  
HYD = HYDRANT  
LAN = LANDING  
LID = MISCELLANEOUS PIT LID  
LIN = LINTEL  
LM = LINE MARKING  
LP = LIGHT POLE  
NS = NATURAL SURFACE  
PAV = PAVING  
PIPE = PIPE OVERBUT  
PIT = TOP OF PIT  
PH = PERMANENT MARK  
RF = TOP OF ROOF  
RMP = RAMP  
RR = ROOF RIDGE  
RTA = RTA/RHS PIT  
SGN = SIGN  
SIP = SEWER INSPECTION PIT  
SPC = SPEED CAMERA  
SSL = SEWER SURFACE LEVEL  
STR = STAIRS  
SWPIT = STORMWATER PIT  
SWSL = STORMWATER SURFACE LEVEL  
TB = TOP OF BANK  
TG = TOP OF GUTTER  
TKB = TOP OF KERB  
TLE = TREE LINE  
TLI = TRAFFIC LIGHT  
TOT = TOP OF TREE  
TPIT = TELSTRA PIT  
TR = TREE  
TSL = TELSTRA SURFACE LEVEL  
TSP = TRAFFIC SIGNAL PIT  
TW = TOP OF WALL  
UEV = UNDERSIDE OF EAVE  
USL = UNKNOWN SERVICE SURFACE LEVEL  
UTR = UNDERSIDE OF TREE  
VER = VERANDAH  
WR = WATER METER  
WPIT = WATER PIT SPOT  
WSL = WATER SLA SURFACE LEVEL  
WV = WATER VALVE

## HORIZONTAL DATUM:

CO-ORDINATE SYSTEM: MGA  
MARKS ADOPTED: SSM IHHH

## VERTICAL DATUM:

DATUM: AUSTRALIAN HEIGHT DATUM (AHD)  
B.M. ADOPTED: SSM IHHH  
R.L. 66.994 (ORDER L2)  
SOURCE: S.C.I.M.S. (4/10/18)

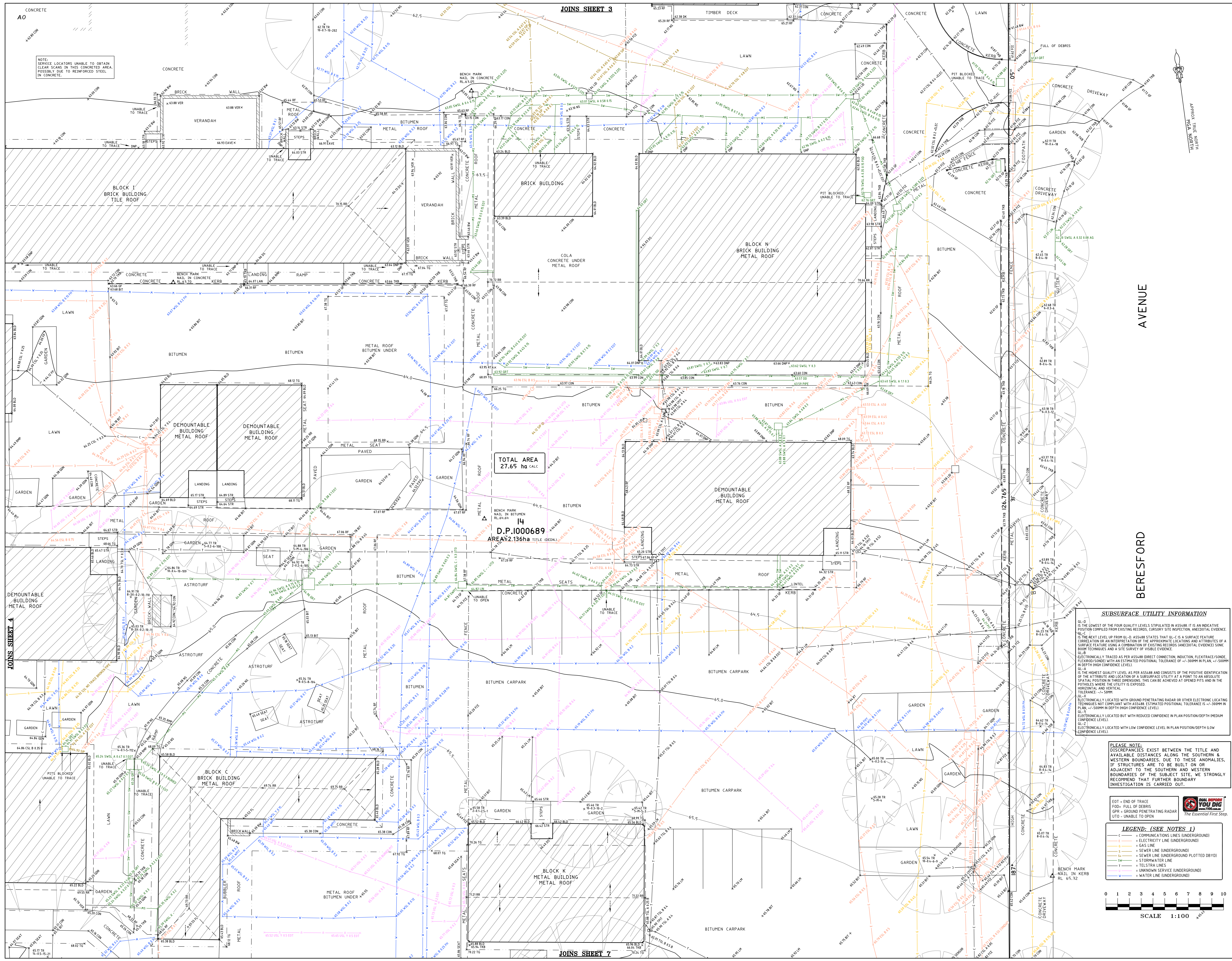
9	TREE CANOPY REVISED	24/10/19
2	INDIVIDUAL LOT AREAS ADDED	18/02/19
1	FIRST ISSUE	19/10/18

**CLIENT:**  
JDH ARCHITECTS  
44 LITTLE STREET,  
DARLINGHURST NSW 2010

**SURVEY PLAN SHOWING DETAIL & LEVELS OVER LOT 14 IN DP1000689, LOTS 11 TO 14 IN DP132498, LOT A IN DP444924, LOT 1 IN DP501320, LOT A IN DP399940, LOT 1 IN DP441732, LOTS 7 & 8 IN DP441703, LOT 1 IN DP772787 & LOT 1 SEC.5 IN DP192509 BANKSTOWN NORTH, PUBLIC SCHOOL**

**C.M.S. Surveyors Pty Limited**  
ACN: 096 240 201  
PO Box 463 Dee Why NSW 2089  
2/39A South Creek Road, Dee Why NSW 2089  
Telephone: (02) 9971 4802  
Facsimile: (02) 9971 4822  
E-mail: info@cmsurveyors.com.au

ACN: 096 240 201			
PO Box 463 Dee Why NSW 2099 2/39A South Creek Road, Dee Why NSW 2099 Telephone: (02) 9971 4802 Facsimile: (02) 9971 4822 E-mail: info@surveyors.com.au			
LG: CATERBURY-BANKSTOWN		SHEET 4 OF 7	
SURVEYED ME/H/C	DRAWN GP	CHECKED ME/H/C	APPROVED DR
SURVEY INSTRUCTION 18067		SCALE 1:100 @ A0	DATE OF SURVEY 8/10/18-23/10/19
DRAWING NAME 18067detail			ISSUE
CAD FILE 18067detail 3.dwg			3



**NOTES**

- A BASIC BOUNDARY SURVEY HAS BEEN UNDERTAKEN SUITABLE FOR CONVEYANCE OF THE LAND (TITLE DEEDS ONLY) - BOUNDARY DEFINITIONS ARE SUBJECT TO FURTHER SURVEY.
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- TREE AREAS ARE ESTIMATES ONLY.
- THIS PLAN HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF JOHN ARCHITECTS.
- RELATIONSHIP OF IMPROVEMENTS TO BOUNDARIES IS DIAGRAMMATIC ONLY. WHERE SPOTS ARE CRITICAL, THEY SHOULD BE CONFIRMED BY FURTHER SURVEY.
- EXCEPT WHERE SHOWN BY DIMENSION LOCATION OF DETAIL WITH REFERENCE TO BOUNDARIES IS INDICATIVE ONLY.
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- CONTOUR INTERVAL - 0.5 metre. SPOT LEVELS SHOULD BE ADOPTED.
- POSITION OF RIDGE LINES ARE DIAGRAMMATIC ONLY (NOT TO SCALE).
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  - CPIT = COMMUNICATIONS PIT
  - CSL = COMMUNICATIONS SURFACE LEVEL
  - DD = DISH DRAIN
  - DK = DECK
  - DNP = DOWN PIPE
  - DS = DOOR SILL LEVEL
  - EK = ELECTRICITY KIOSK
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  - EPIT = ELECTRICITY PIT
  - ESL = ELECTRICITY SURFACE LEVEL
  - FCE = FENCE
  - FHY = FIRE HYDRANT
  - FL = FLOOR LEVEL
  - FP = FLAG POLE
  - GDN = GARDEN
  - GF = GUTTER LEVEL
  - GPL = GAS PLAUQUE
  - GRT = GRATE
  - GSL = GAS SLA
  - GVA = GAS VALVE
  - HYD = HYDRANT
  - LAN = LANDING
  - LID = MISCELLANEOUS PIT LID
  - LIN = LINTEL
  - LM = LINE MARKING
  - LP = LIGHT POLE
  - NS = NATURAL SURFACE
  - PAV = PAVING
  - PIPE = PIPE OVERT
  - PIT = TOP OF PIT
  - PH = PERMANENT MARK
  - RF = TOP OF ROOF
  - RMP = RAMP
  - RR = ROOF RIDGE
  - RTA = RTA/RHS PIT
  - SGN = SIGN
  - SIP = SEWER INSPECTION PIT
  - SPC = SPEED CAMERA
  - SSL = SEWER SURFACE LEVEL
  - STR = STAIRS
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  - WSL = STORMWATER SURFACE LEVEL
  - TB = TOP OF BANK
  - TG = TOP OF GUTTER
  - TMB = TOP OF KERB
  - TLE = TREE LINE
  - TLL = TRAFFIC LIGHT
  - TOT = TOP OF TREE
  - TPIT = TELSTRA PIT
  - TR = TREE
  - TR = TREE
  - TSL = TELSTRA SURFACE LEVEL
  - TSP = TRAFFIC SIGNAL PIT
  - TW = UNDERSIDE OF EAVE
  - USL = UNKNOWN SERVICE SURFACE LEVEL
  - UTR = UNDERSIDE TREE
  - VER = VERANDAH
  - WH = WATER METER
  - WPIT = WATER PIT SPOT
  - WSL = WATER SLA SURFACE LEVEL
  - WV = WATER VALVE
- THREE  
SPREAD-DIAMETER-HEIGHT-TAG  
NUMBER

**SUBSURFACE UTILITY INFORMATION**

QL-D  
IS THE LOWEST OF THE FOUR QUALITY LEVELS STIPULATED IN ASSA88. IT IS AN INDICATIVE POSITION DERIVED FROM EXISTING RECORDS, CURSORY SITE INSPECTION, ANECDOTAL EVIDENCE.

QL-C  
IS THE NEXT LEVEL UP FROM QL-D. ASSA88 STATES THAT QL-C IS A SURFACE FEATURE CORRELATION OR AN INTERPRETATION OF THE APPROXIMATE LOCATIONS AND ATTRIBUTES OF A SURFACE FEATURE USING A COMBINATION OF EXISTING RECORDS (ANECDOTAL EVIDENCE) SONIC ROOM TECHNIQUES AND A SITE SURVEY OF VISIBLE EVIDENCE.

QL-B  
ELECTRONICALLY TRACED AS PER ASSA88 DIRECT CONNECTION, INDUCTION, FLEXTRACE, PSOMDE, FLEXROD/SONDED WITH AN ESTIMATED POSITIONAL TOLERANCE OF +/-300MM IN PLAN, +/-500MM IN DEPTH (HIGH CONFIDENCE LEVEL).

QL-A  
IS THE HIGHEST QUALITY LEVEL AS PER ASSA88 AND CONSISTS OF THE POSITIVE IDENTIFICATION OF THE ATTRIBUTE AND LOCATION OF A SUBSURFACE UTILITY AT A POINT TO AN ABSOLUTE SPATIAL POSITION IN THREE DIMENSIONS. THIS CAN BE ACHIEVED AT OPENED PITS AND IN THE POTHOLES WHERE THE UTILITY IS EXPOSED.

QL-E  
ELECTRONICALLY LOCATED WITH GROUND PENETRATING RADAR OR OTHER ELECTRONIC LOCATING TECHNIQUES NOT COMPLIANT WITH ASSA88. ESTIMATED POSITIONAL TOLERANCE IS +/-500MM IN PLAN, +/-500MM IN DEPTH (HIGH CONFIDENCE LEVEL).

QL-F  
ELECTRONICALLY LOCATED BUT WITH REDUCED CONFIDENCE IN PLAN POSITION/DEPTH (MEDIUM CONFIDENCE LEVEL).

QL-G  
ELECTRONICALLY LOCATED WITH LOW CONFIDENCE LEVEL IN PLAN POSITION/DEPTH (LOW CONFIDENCE LEVEL).

**PLEASE NOTE:**  
DISCREPANCIES EXIST BETWEEN THE TITLE AND AVAILABLE DISTANCES ALONG THE SOUTHERN & WESTERN BOUNDARIES. DUE TO THESE ANOMALIES, IF STRUCTURES ARE TO BE BUILT ON OR ADJACENT TO THE SOUTHERN AND WESTERN BOUNDARIES OF THE SUBJECT SITE, WE STRONGLY RECOMMEND THAT FURTHER BOUNDARY INVESTIGATION IS CARRIED OUT.

**LEGEND: (SEE NOTES 1)**

- = COMMUNICATIONS LINES (UNDERGROUND)
- = ELECTRICITY LINES (UNDERGROUND)
- = GAS LINE
- = SEWER LINE (UNDERGROUND)
- = SEWER LINE (UNDERGROUND PLOTTED OBYD)
- = STORMWATER LINE
- = TELSTRA LINES
- = UNKNOWN SERVICE (UNDERGROUND)
- = WATER LINE (UNDERGROUND)

**CLIENT:**  
JH ARCHITECTS  
44 LITTLE STREET,  
DARLINGHURST NSW 2010

**SURVEY PLAN SHOWING DETAIL & LEVELS OVER LOT 14 IN DP1000689, LOTS 11 TO 14 IN DP132498, LOT A IN DP444924, LOT 1 IN DP501320, LOT A IN DP399940, LOT 1 IN DP441732, LOTS 7 & 8 IN DP441703, LOT 1 IN DP727287 & LOT 1 SEC.5 IN DP192509 BANKSTOWN NORTH, PUBLIC SCHOOL**

**C.M.S. Surveyors Pty Limited**  
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Telephone: (02) 9971 4802  
Facsimile: (02) 9971 4822  
E-mail: info@cmsurveyors.com.au

**LG: CATBURY-BANKSTOWN SHEET 5 OF 7**

SURVEYED ME/H/C	DRAWN GP	CHECKED ME/H/C	APPROVED DR
18067	18067	18067	18067
DRAWING NAME: 18067detail			ISSUE: 3
CAD FILE: 18067detail.dwg			

AO

I  
D.P.772787  
AREA=187.1m<sup>2</sup> TITLE

JOINS SHEET 4

I  
SEC.5  
D.P.I92509  
AREA=1432m<sup>2</sup> APPROX. CALC

II  
D.P.I32498  
AREA=925.7m<sup>2</sup> TITLE

I2  
D.P.I32498  
AREA=851.1m<sup>2</sup> TITLE

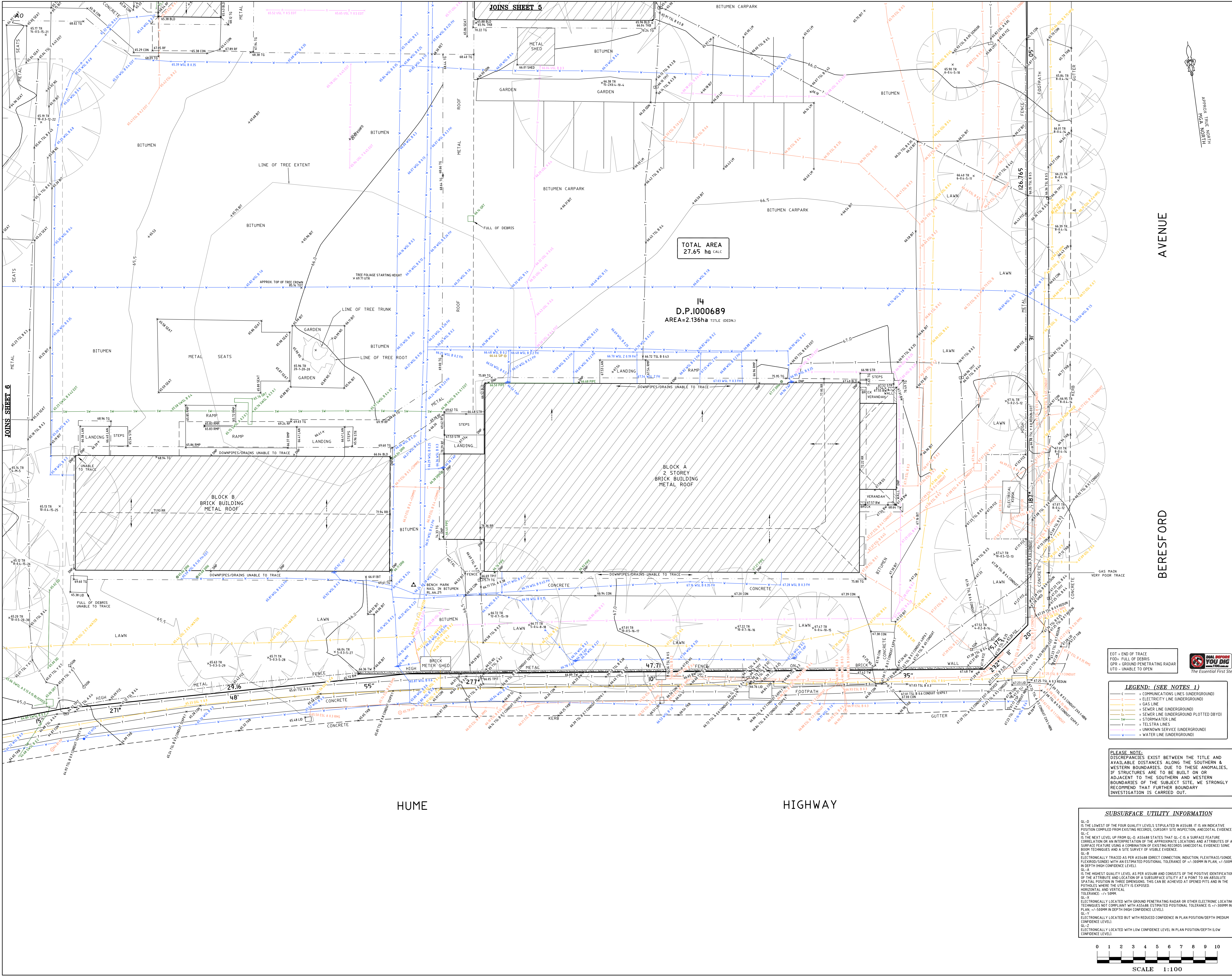
I3  
D.P.I32498  
AREA=798m<sup>2</sup> TITLE

I4  
D.P.I32498  
AREA=751.2m<sup>2</sup> TITLE

TOTAL AREA  
27.65 ha CALC

- NOTES**
- A BASIC BOUNDARY SURVEY HAS BEEN UNDERTAKEN SUITABLE FOR COUNCIL DA SUBMISSION (TITLE DIMENSIONS ONLY) - BOUNDARY DIMENSIONS ARE SUBJECT TO FURTHER SURVEY.
  - IF CONSTRUCTION ON OR NEAR BOUNDARIES IS REQUIRED IT IS RECOMMENDED THAT THE BOUNDARIES OF THE LAND BE MARKED.
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  - AREA IS APPROXIMATE ONLY AND HAS BEEN CALCULATED BY TITLE DIMENSIONS. ALL TITLE DIMENSIONS OF THE LAND HAVE NOT BEEN CONFIRMED BY SURVEY. IF AREAS ARE CRITICAL WE RECOMMEND A BOUNDARY SURVEY FOR PUBLIC RECORD.
  - TREE SIZES ARE ESTIMATES ONLY.
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  - RELATIONSHIP OF IMPROVEMENTS TO BOUNDARIES IS DIAGRAMMATIC ONLY. WHERE OFFSETS ARE CRITICAL, THEY SHOULD BE CONFIRMED BY FURTHER SURVEY.
  - EXCEPT WHERE SHOWN BY DIMENSION LOCATION OF DETAIL WITH RESPECT TO BOUNDARIES IS INDICATIVE ONLY.
  - DIAL BEFORE YOU DIG SERVICES (AN 1100) SHOULD BE USED BEFORE CARRYING OUT ANY CONSTRUCTION ACTIVITY IN OR NEAR THE SURVEYED AREA.
  - CRITICAL SPOT LEVELS SHOULD BE CONFIRMED WITH SURVEYOR.
  - THIS PLAN IS ONLY TO BE USED FOR THE PURPOSE OF DESIGNING NEW CONSTRUCTIONS.
  - CONTOURS SHOWN DEPICT THE TOPOGRAPHY. THEY DO NOT REPRESENT THE EXACT LEVEL AT ANY PARTICULAR POINT. ONLY SPOT LEVELS SHOULD BE USED FOR CALCULATIONS OF QUANTITIES WITH CAUTION.
  - CONTOUR INTERVAL - 0.5 metre. - SPOT LEVELS SHOULD BE ADOPTED.
  - POSITION OF RIDGE LINES ARE DIAGRAMMATIC ONLY (NOT TO SCALE).
  - THE INFORMATION IS ONLY TO BE USED AT A SCALE ACCURACY OF 1:100.
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  - THIS NOTICE MUST NOT BE ERASED.

- LEGEND:**
- BB = BOTTOM OF BANK
  - BIT = BITUMEN
  - BLD = EXTERNAL BUILDING
  - BTM = BOTTOM WALL
  - CON = CONCRETE
  - CPIT = COMMUNICATIONS PIT
  - CSL = COMMUNICATIONS SURFACE LEVEL
  - DD = DISH DRAIN
  - DK = DECK
  - DNP = DOWN PIPE
  - DS = DOOR SILL LEVEL
  - EK = ELECTRICITY KIOSK
  - EPIL = ELECTRICITY PILLAR
  - EPIT = ELECTRICITY PIT
  - ESL = ELECTRICITY SURFACE LEVEL
  - FCE = FENCE
  - FHY = FIRE HYDRANT
  - FL = FLOOR LEVEL
  - FP = FLAG POLE
  - GDN = GARDEN
  - GP = GUTTER LEVEL
  - GPL = GAS PLAQUE
  - GRT = GRATE
  - GSL = GAS SLA
  - GVA = GAS VALVE
  - HYD = HYDRANT
  - LAN = LANDING
  - LID = MISCELLANEOUS PIT LID
  - LIN = LINTEL
  - LM = LINE MARKING
  - LP = LIGHT POLE
  - NS = NATURAL SURFACE
  - PAV = PAVING
  - PIPE = PIPE OBVERT
  - PIT = TOP OF PIT
  - PH = PERMANENT MARK
  - RF = TOP OF ROOF
  - RMP = RAMP
  - RR = ROOF RIDGE
  - RTA = RTA/RHS PIT
  - SGN = SIGN
  - SP = SEWER INSPECTION PIT
  - SPC = SPEED CAMERA
  - SSL = SEWER SURFACE LEVEL
  - STR = STAIRS
  - SWPIT = STORMWATER PIT
  - WSL = STORMWATER SURFACE LEVEL
  - TB = TOP OF BANK
  - TG = TOP OF GUTTER
  - TMB = TOP OF KERB
  - TLE = TREE LINE
  - TLI = TRAFFIC LIGHT
  - TOT = TOP OF TREE
  - TPIT = TELSTRA PIT
  - TR = TREE
  - TSL = TELSTRA SURFACE LEVEL
  - TSP = TRAFFIC SIGNAL PIT
  - TW = TOP OF WALL
  - UEV = UNDERSIDE OF EAVE
  - USL = UNKNOWN SERVICE SURFACE LEVEL
  - UTR = UNDERSIDE OF TREE
  - VER = VERANDAH
  - WR = WATER METER
  - WPIT = WATER PIT SPOT
  - WSL = WATER SLA SURFACE LEVEL
  - WV = WATER VALVE
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- NOTES**
- A BASIC BOUNDARY SURVEY HAS BEEN UNDERTAKEN SUITABLE FOR COUNCIL DA SUBMISSION (TITLE DIMENSIONS ONLY) - BOUNDARY DIMENSIONS SUBJECT TO FURTHER SURVEY.
  - IF CONSTRUCTION ON OR NEAR BOUNDARIES IS REQUIRED IT IS RECOMMENDED THAT THE BOUNDARIES OF THE LAND BE MARKED.
  - THIS DETAIL SURVEY IS NOT A "SURVEY" AS DEFINED BY THE SURVEYING AND SPATIAL INFORMATION ACT, 2002.
  - AREA IS APPROXIMATE ONLY AND HAS BEEN CALCULATED BY TITLE DIMENSIONS. ALL TITLE DIMENSIONS OF THE LAND HAVE NOT BEEN SURVEYED. IF AREAS ARE CRITICAL WE RECOMMEND A BOUNDARY SURVEY FOR PUBLIC RECORD.
  - TREE SIZES ARE ESTIMATES ONLY.
  - THIS PLAN HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF JDH ARCHITECTS.
  - RELATIONSHIP OF IMPROVEMENTS TO BOUNDARIES IS DIAGRAMMATIC ONLY. WHERE OBJECTS ARE CRITICAL, THEY SHOULD BE CONFIRMED BY FURTHER SURVEY.
  - EXCEPT WHERE SHOWN BY DIMENSION LOCATION OF DETAIL WITH RESPECT TO BOUNDARIES IS INDICATIVE ONLY.
  - DIAL BEFORE YOU DIG SERVICES (60-100) SHOULD BE USED BEFORE CARRYING OUT ANY CONSTRUCTION ACTIVITY IN OR NEAR THE SURVEYED AREA.
  - CRITICAL SPOT LEVELS SHOULD BE CONFIRMED WITH SURVEYOR.
  - THIS PLAN IS ONLY TO BE USED FOR THE PURPOSE OF DESIGNING NEW CONSTRUCTIONS.
  - CONTOURS SHOWN DEPICT THE TOPOGRAPHY. THEY DO NOT REPRESENT THE EXACT LEVEL AT ANY PARTICULAR POINT. ONLY SPOT LEVELS SHOULD BE USED FOR CALCULATIONS OF QUANTITIES WITH CAUTION.
  - CONTOUR INTERVAL - 0.5 metre - SPOT LEVELS SHOULD BE ADOPTED.
  - POSITION OF RIDGE LINES ARE DIAGRAMMATIC ONLY (NOT TO SCALE).
  - THE INFORMATION IS ONLY TO BE USED AT A SCALE ACCURACY OF 1:100.
  - DO NOT SCALE OFF THIS PLAN / FIGURED DIMENSIONS TO BE TAKEN IN PREFERENCE TO SCALED READINGS.
  - COPYRIGHT © C.M.S. SURVEYORS 2019.
  - NO PART OF THIS SURVEY MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM, WITHOUT THE WRITTEN PERMISSION OF THE COPYRIGHT OWNER EXCEPT AS PERMITTED BY THE COPYRIGHT ACT 1968.
  - ANY PERMITTED DOWNLOADING, ELECTRONIC STORAGE, DISPLAY, PRINT, COPY OR REPRODUCTION OF THIS SURVEY SHOULD CONTAIN NO ALTERATION OR ADDITION TO THE ORIGINAL SURVEY.
  - THIS NOTICE MUST NOT BE ERASED.

**LEGEND:**

BB = BOTTOM OF BANK  
BIT = BITUMEN  
BLD = EXTERNAL BUILDING  
BW = BOTTOM WALL  
CON = CONCRETE  
CPIT = COMMUNICATIONS PIT  
CSL = COMMUNICATIONS SURFACE LEVEL  
DD = DISH DRAIN  
DK = DECK  
DNP = DOWN PIPE  
DS = DOOR SILL LEVEL  
EK = ELECTRICITY KIOSK  
EPIL = ELECTRICITY PILLAR  
EPIT = ELECTRICITY PIT  
ESL = ELECTRICITY SURFACE LEVEL  
FCE = FENCE  
PHY = FIRE HYDRANT  
FL = FLOOR LEVEL  
FP = FLAG POLE  
GDN = GARDEN  
GP = GUTTER LEVEL  
GPL = GAS PLAQUE  
GRT = GRATE  
GSL = GAS SLA  
GVA = GAS VALVE  
HYD = HYDRANT  
LAN = LANDING  
LID = MISCELLANEOUS PIT LID  
LIN = LINTEL  
LM = LINE MARKING  
LP = LIGHT POLE  
NS = NATURAL SURFACE  
PAV = PAVING  
PIPE = PIPE OBVERT  
PIT = TOP OF PIT  
PH = PERMANENT MARK  
RF = TOP OF ROOF  
RMP = RAMP  
RR = ROOF RIDGE  
RTA = RTA/RHS PIT  
SGN = SIGN  
SP = SEWER INSPECTION PIT  
SPC = SPEED CAMERA  
SSL = SEWER SURFACE LEVEL  
STR = STAIRS  
SWPIT = STORMWATER PIT  
WSL = STORMWATER SURFACE LEVEL  
TS = TOP OF BANK  
TG = TOP OF GUTTER  
TAB = TOP OF KERB  
TLE = TREE LINE  
TLI = TRAFFIC LIGHT  
TOT = TOP OF TREE  
TPIT = TELSTRA PIT  
TR = TREE  
TSL = TELSTRA SURFACE LEVEL  
TSP = TRAFFIC SIGNAL PIT  
TW = TOP OF WALL  
UEV = UNDERSIDE OF EAVE  
USL = UNKNOWN SERVICE SURFACE LEVEL  
UTR = UNDERSIDE OF TREE  
VER = VERANDAH  
WH = WATER METER  
WPIT = WATER PIT SPOT  
WSL = WATER SLA SURFACE LEVEL  
WV = WATER VALVE

3  
TREE  
SPREAD-DIAMETER-HEIGHT-TAG  
NUMBER

**HORIZONTAL DATUM:**  
CO-ORDINATE SYSTEM: MGA  
MARKS: ADOPTED: SSM IJH4  
**VERTICAL DATUM:**  
DATUM: AUSTRALIAN HEIGHT DATUM (AHD)  
B.M. ADOPTED: SSM IJH4  
R.L. 66.994 (ORDER L2)  
SOURCE: S.C.I.M.S. (4/10/18)

3	TREE CANOPY REVISED	24/10/19
2	INDIVIDUAL LOT AREAS ADDED	18/02/19
1	FIRST ISSUE	19/10/18

**CLIENT:**  
**JDH ARCHITECTS**  
**44 LITTLE STREET,**  
**DARLINGHURST NSW 2010**

**SURVEY PLAN SHOWING DETAIL & LEVELS OVER LOT 14 IN DP1000689, LOTS 11 TO 14 IN DP132498, LOT A IN DP444924, LOT 1 IN DP501320, LOT A IN DP399940, LOT 1 IN DP441732, LOTS 7 & 8 IN DP441703, LOT 1 IN DP72787 & LOT 1 SEC.5 IN DP192509 BANKSTOWN NORTH, PUBLIC SCHOOL**

**C.M.S. Surveyors Pty Limited**  
ACN: 096 240 201  
RG Box 463 Dee Why NSW 2099  
2/39A South Creek Road, Dee Why NSW 2099  
Telephone: (02) 9971 4802  
Facsimile: (02) 9971 4822  
E-mail: info@cmsurveyors.com.au

LGA: CATERBURY-BANKSTOWN SHEET 7 OF 7			
SURVEYED ME/H/C	DRAWN GP	CHECKED ME/H/C	APPROVED DR
SURVEY INSTRUCTION 18067		SCALE 1:100 AS SHOWN	
DRAWING NAME 18067detail		DATE OF SURVEY 8/10/18-23/10/19	
CAD FILE 18067detail.dwg		ISSUE 3	

**LEGEND: (SEE NOTES 1)**

- COMMUNICATIONS LINES (UNDERGROUND)
- ELECTRICITY LINE (UNDERGROUND)
- GAS LINE
- SEWER LINE (UNDERGROUND)
- SEWER LINE UNDERGROUND PLOTTED BY/DI
- STORMWATER LINE
- TELSTRA LINES
- UNKNOWN SERVICE (UNDERGROUND)
- WATER LINE (UNDERGROUND)

**PLEASE NOTE:**  
DISCREPANCIES EXIST BETWEEN THE TITLE AND AVAILABLE DISTANCES ALONG THE SOUTHERN & WESTERN BOUNDARIES, DUE TO THESE ANOMALIES, IF STRUCTURES ARE TO BE BUILT ON OR ADJACENT TO THE SOUTHERN AND WESTERN BOUNDARIES OF THE SUBJECT SITE, WE STRONGLY RECOMMEND THAT FURTHER BOUNDARY INVESTIGATION IS CARRIED OUT.

**SUBSURFACE UTILITY INFORMATION**

QL-D IS THE LOWEST OF THE FOUR QUALITY LEVELS STIPULATED IN ASS488. IT IS AN INDICATIVE POSITION COMPILED FROM EXISTING RECORDS, CURSORY SITE INSPECTION, ANECDOTAL EVIDENCE.

QL-C IS THE NEXT LEVEL UP FROM QL-D. ASS488 STATES THAT QL-C IS A SURFACE FEATURE CORRELATION OR AN INTERPRETATION OF THE APPROXIMATE LOCATIONS AND ATTRIBUTES OF A SURFACE FEATURE USING A COMBINATION OF EXISTING RECORDS, ANECDOTAL EVIDENCE, SOME BOREHOLE TECHNIQUES AND A SITE SURVEY OF VISIBLE EVIDENCE.

QL-B IS ELECTRONICALLY TRACED AS PER ASS488 DIRECT CONNECTION, INDUCTION, FLEXITRACE/SOURCE, FLEXOROD/SONDIT WITH AN ESTIMATED POSITIONAL TOLERANCE OF +/-300MM IN PLAN, +/-500MM IN DEPTH (HIGH CONFIDENCE LEVEL).

QL-A IS THE HIGHEST QUALITY LEVEL AS PER ASS488 AND CONSISTS OF THE POSITIVE IDENTIFICATION OF THE ATTRIBUTE AND LOCATION OF A SUBSURFACE UTILITY AT A POINT TO AN ABSOLUTE SPATIAL POSITION IN THREE DIMENSIONS. THIS CAN BE ACHIEVED AT OPENED PITS AND IN THE POTHOLES WHERE THE UTILITY IS EXPOSED.

TOLEANCE - +/-500MM

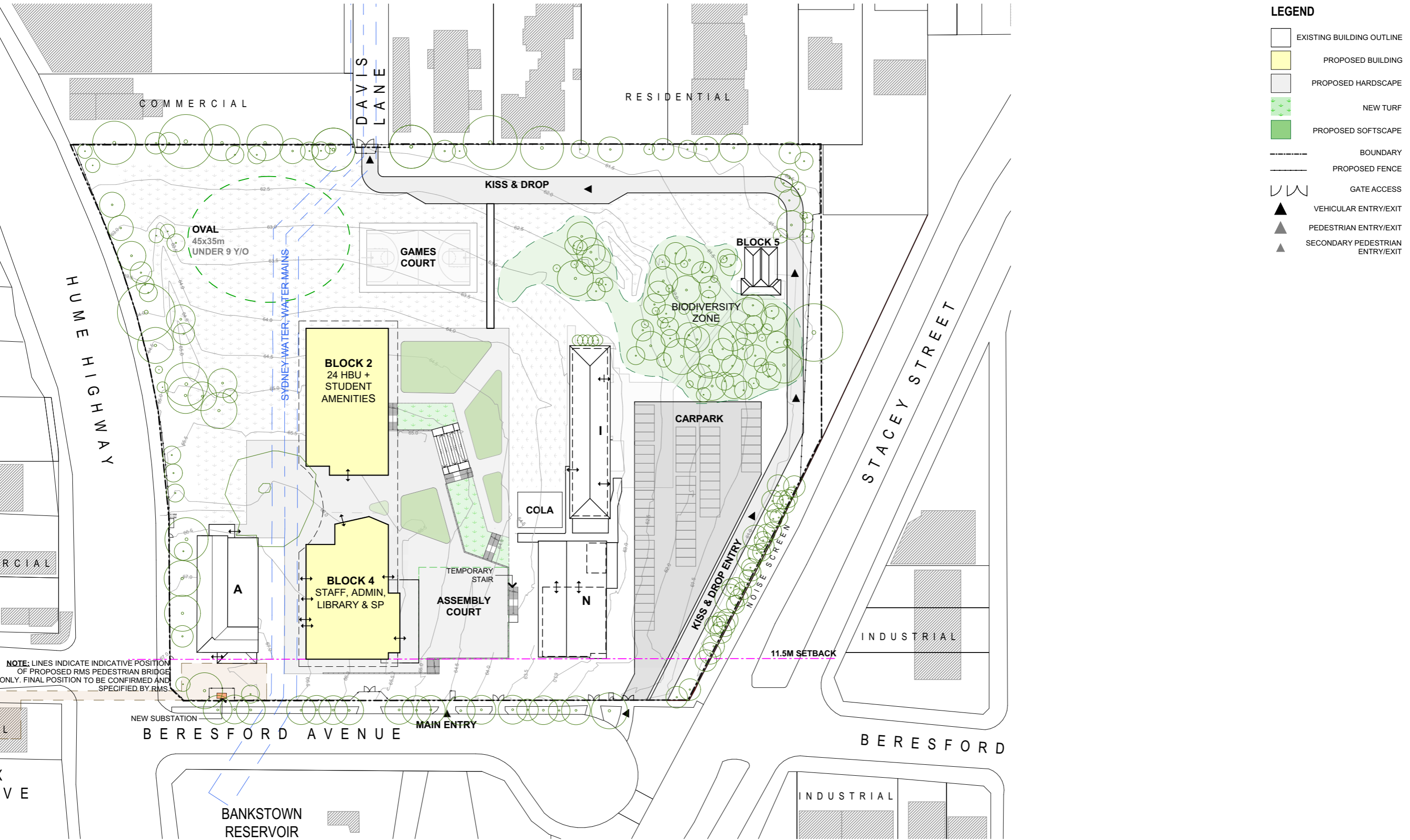
QL-X ELECTRONICALLY LOCATED WITH GROUND PENETRATING RADAR OR OTHER ELECTRONIC LOCATING TECHNIQUES NOT COMPLIANT WITH ASS488. ESTIMATED POSITIONAL TOLERANCE IS +/-300MM IN PLAN, +/-500MM IN DEPTH (MEDIUM CONFIDENCE LEVEL).

QL-Z ELECTRONICALLY LOCATED BUT WITH REDUCED CONFIDENCE IN PLAN POSITION/DEPTH (LOW CONFIDENCE LEVEL).

SCALE 1:100

CD10\_04

SITE PLAN - STAGE 1



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## **APPENDIX B**

### **BOREHOLE LOGS**



## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19			
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19			
<b>Location:</b> North Bankstown Public School				<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size:</b> mm			
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m		<b>Driller:</b>		<b>Logged:</b> AW			
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical		<b>Bearing:</b> ---		<b>Checked:</b>			
Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition Consistency/Density Index	Additional Observations
HA					FILL	FILL: Silty CLAY, brown, moist, soft.	BH07 - 0.0-0.2	M	No ACM, staining or hydrocarbon odours present.
					CL	CLAY, bright orange with grey mottling, moist, stiff.	BH07 - 0.2-0.4	M	
			0.5						
			1.0						
			1.5			Borehole BH07 terminated at 1.1m			



**BH No: BH08**  
**Sheet: 1 of 1**  
**Job No:9150**

Client: JDH Architects				Started: 5/11/19						
Project: Supplementary Contamination Assessment				Finished: 5/11/19						
Location: North Bankstown Public School				Hole Location: North Bankstown Public School		Borehole Size mm				
Rig Type:		Hole Coordinates , m		Driller:		Logged: AW				
RL Surface: m		Contractor: Alliance Geotechnical		Bearing: ---		Checked:				
Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
HA					FILL	FILL: Silty CLAY, brown, moist, soft.	BH08 - 0.0-0.2	M		No ACM, staining or hydrocarbon odours present.
			0.5			Borehole BH08 terminated at 0.2m				
			1.0							
			1.5							



## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19			
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19			
<b>Location:</b> North Bankstown Public School						<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size</b> mm	
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m				<b>Driller:</b>		<b>Logged:</b> AW	
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical				<b>Bearing:</b> ---		<b>Checked:</b>	

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
HA					FILL	FILL: Silty CLAY, light brown, dry, soft. Trace gravels.		D		No ACM, staining or hydrocarbon odours present.
							BH09 - 0.1-0.3			
					CL	CLAY, orange/grey with red mottling, moist, very stiff.		M		
			0.5				BH09 - 0.3-0.5			
			1.0							
						Borehole BH09 terminated at 1.1m				
			1.5							

## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19		
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19		
<b>Location:</b> North Bankstown Public School				<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size</b> mm		
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m		<b>Driller:</b>		<b>Logged:</b> AW		
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical		<b>Bearing:</b> ---		<b>Checked:</b>		

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
HA					FILL	FILL: Silty CLAY, light brown, dry, soft, Trace gravels.	BH10 - 0.0-0.2	D		No ACM, staining or hydrocarbon odours present.
					CL	CLAY, orange/grey with red mottling, moist, very stiff.	BH10 - 0.2-0.4	M		
			0.5							
			1.0							
			1.5			Borehole BH10 terminated at 1.1m				



## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19				
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19				
<b>Location:</b> North Bankstown Public School						<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size</b> mm		
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m				<b>Driller:</b>		<b>Logged:</b> AW		
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical				<b>Bearing:</b> ---		<b>Checked:</b>		
Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
HA			0.5		FILL	FILL: Silty CLAY, brown, dry, firm.	BH11 - 0.0-0.1	D		No ACM, staining or hydrocarbon odours present.
					CL	CLAY, orangegrey moist, stiff.	BH11 - 0.1-0.3	M		
			1.0							
			1.5							
						Borehole BH11 terminated at 1.1m				



## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19				
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19				
<b>Location:</b> North Bankstown Public School						<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size</b> mm		
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m				<b>Driller:</b>		<b>Logged:</b> AW		
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical				<b>Bearing:</b> ---		<b>Checked:</b>		
Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
HA			0.5		FILL	FILL: Silty CLAY, brown, dry, soft. Concrete gravels.	BH15 - 0.0-0.1	D		No ACM, staining or hydrocarbon odours present.
					CL	CLAY, orange/grey, moist, firm.	BH15 - 0.1-0.3	M		
			1.0							
			1.5							
						Borehole BH15 terminated at 1.1m				







## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19			
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19			
<b>Location:</b> North Bankstown Public School						<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size</b> mm	
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m				<b>Driller:</b>		<b>Logged:</b> AW	
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical				<b>Bearing:</b> ---		<b>Checked:</b>	

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
HA			0.5		FILL	FILL: Silty CLAY, brown, dry, soft. Concrete gravels.	BH16 - 0.0-0.1	D		No ACM, staining or hydrocarbon odours present.
					CL	CLAY, grey/orange, moist, very stiff.	BH16 - 0.1-0.3	M		
			1.0							
			1.5			Borehole BH16 terminated at 1.1m				

## Borehole Log





Client: JDH Architects						Started: 5/11/19				
Project: Supplementary Contamination Assessment						Finished: 5/11/19				
Location: North Bankstown Public School				Hole Location: North Bankstown Public School			Borehole Size mm			
Rig Type:		Hole Coordinates , m				Driller:		Logged: AW		
RL Surface: m		Contractor: Alliance Geotechnical				Bearing: ---		Checked:		
Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
HA					FILL	FILL: Silty CLAY, brown, dry, soft. Concrete gravels.	 BH17 - 0.0-0.1	D		No ACM, staining or hydrocarbon odours present.
					CL	CLAY, grey/orange, moist, firm.	 BH17 - 0.1-0.3	M		
			0.5							
			1.0							
			1.5			Borehole BH17 terminated at 1.1m				

## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19			
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19			
<b>Location:</b> North Bankstown Public School						<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size</b> mm	
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m				<b>Driller:</b>		<b>Logged:</b> AW	
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical				<b>Bearing:</b> ---		<b>Checked:</b>	

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
HA					FILL	FILL: Silty CLAY, brown, dry, very loose, soft. Concrete gravels.	BH18 - 0.0-0.1	D		No ACM, staining or hydrocarbon odours present.
					CL	CLAY, grey/brown with orange mottling, moist, firm.	BH18 - 0.1-0.3	M		
			0.5							
			1.0							
			1.5							
						Borehole BH18 terminated at 1.1m				

## Borehole Log

Client: JDH Architects						Started: 5/11/19				
Project: Supplementary Contamination Assessment						Finished: 5/11/19				
Location: North Bankstown Public School				Hole Location: North Bankstown Public School			Borehole Size mm			
Rig Type:		Hole Coordinates , m				Driller:		Logged: AW		
RL Surface: m		Contractor: Alliance Geotechnical				Bearing: ---		Checked:		
Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
HA					FILL	FILL: Silty CLAY, brown, dry, very loose, soft. Concrete gravels.	 BH19 - 0.0-0.2	D		No ACM, staining or hydrocarbon odours present.
					CL	CLAY, grey/orange, moist, firm.	 BH19 - 0.3-0.5	M		
						Borehole BH19 terminated at 1.1m				



## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19			
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19			
<b>Location:</b> North Bankstown Public School				<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size</b> mm			
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m		<b>Driller:</b>		<b>Logged:</b> AW			
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical		<b>Bearing:</b> ---		<b>Checked:</b>			
Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition Consistency/ Density Index	Additional Observations
HA					FILL	FILL: Silty CLAY, dark brown, dry, very loose, soft. Concrete gravels.	BH20 - 0.0-0.2	D	No ACM, staining or hydrocarbon odours present.
			0.5		CL	CLAY, grey/orange, moist, firm.	BH20 - 0.3-0.5	M	
			1.0						
			1.5			Borehole BH20 terminated at 1.1m			



## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19			
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19			
<b>Location:</b> North Bankstown Public School				<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size</b> mm			
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m		<b>Driller:</b>		<b>Logged:</b> AW			
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical		<b>Bearing:</b> ---		<b>Checked:</b>			
Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition Consistency/ Density Index	Additional Observations
HA					FILL	FILL: Silty CLAY, dark brown, dry, very loose, soft. Concrete gravels.	BH21 - 0.0-0.2	D	No ACM, staining or hydrocarbon odours present.
			0.5		CL	CLAY, grey/orange, moist, firm.	BH21 - 0.3-0.5	M	
			1.0						
			1.5			Borehole BH21 terminated at 1.1m			



## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19		
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19		
<b>Location:</b> North Bankstown Public School				<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size</b> mm		
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m		<b>Driller:</b>		<b>Logged:</b> AW		
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical		<b>Bearing:</b> ---		<b>Checked:</b>		

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
HA					FILL	FILL: Silty CLAY, dark brown, dry, loose, soft. Concrete gravels.		D		No ACM, staining or hydrocarbon odours present.
							BH25 - 0.1-0.3			
					CL	CLAY, grey/orange with red mottling, moist, firm.		M		
			0.5				BH25 - 0.3-0.5			
			1.0							
			1.5			Borehole BH25 terminated at 1.1m				



## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19				
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19				
<b>Location:</b> North Bankstown Public School						<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size:</b> mm		
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m				<b>Driller:</b>		<b>Logged:</b> AW		
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical				<b>Bearing:</b> ---		<b>Checked:</b>		
Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
HA					FILL	FILL: Silty CLAY, brown, dry, soft.	BH26 - 0.0-0.2	D		No ACM, staining or hydrocarbon odours present.
					CL	CLAY, orange/brown with red mottling, moist, stiff.	BH26 - 0.2-0.4	M		
			0.5							
			1.0							
			1.5			Borehole BH26 terminated at 1.1m				

## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19		
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19		
<b>Location:</b> North Bankstown Public School				<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size:</b> mm		
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m		<b>Driller:</b>		<b>Logged:</b> AW		
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical		<b>Bearing:</b> ---		<b>Checked:</b>		

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
E					FILL	FILL: Silty CLAY, brown, dry, soft, trace gravels.	TP01 - 0.0-0.1 (DUP01/DUP1A)	D		No ACM, staining or hydrocarbon odours present.
					CL	CLAY, red with grey mottling, dry, very stiff.	TP01 - 0.1-0.3	D		
			0.5			Borehole TP01 terminated at 0.5m				
			1.0							
			1.5							



## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19				
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19				
<b>Location:</b> North Bankstown Public School						<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size:</b> mm		
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m		<b>Driller:</b>		<b>Logged:</b> AW				
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical		<b>Bearing:</b> ---		<b>Checked:</b>				
Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
E					FILL	FILL: Silty CLAY, brown, dry, soft, trace gravels.	TP02 - 0.0-0.2	D		No ACM, staining or hydrocarbon odours present.
					CL	CLAY, red with grey mottling, dry, very stiff.	TP02 - 0.2-0.4	D		
			0.5							
			1.0							
			1.5							
						Borehole TP02 terminated at 0.6m				



## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19		
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19		
<b>Location:</b> North Bankstown Public School				<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size:</b> mm		
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m		<b>Driller:</b>		<b>Logged:</b> AW		
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical		<b>Bearing:</b> ---		<b>Checked:</b>		

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
E					FILL	FILL: Silty CLAY, brown, dry, soft, trace gravels.	TP03 - 0.0-0.15	D		No ACM, staining or hydrocarbon odours present.
					CL	CLAY, red with grey mottling, dry, very stiff.	TP03 - 0.15-0.3	D		
			0.5							
			1.0							
			1.5							
						Borehole TP03 terminated at 0.5m				



## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19			
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19			
<b>Location:</b> North Bankstown Public School						<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size</b> mm	
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m				<b>Driller:</b>		<b>Logged:</b> AW	
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical				<b>Bearing:</b> ---		<b>Checked:</b>	

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
E					FILL	FILL: Silty CLAY, brown, dry, soft, trace gravels.		D		No ACM, staining or hydrocarbon odours present.
					CL	CLAY, red with grey mottling, dry, very stiff.	TP04 - 0.0-0.2	D		
							TP04 - 0.2-0.4			
			0.5			Borehole TP04 terminated at 0.5m				
			1.0							
			1.5							



## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19				
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19				
<b>Location:</b> North Bankstown Public School						<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size</b> mm		
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m		<b>Driller:</b>		<b>Logged:</b> AW				
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical		<b>Bearing:</b> ---		<b>Checked:</b>				
Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
E					FILL	FILL: Silty CLAY, dark brown, dry, soft. Glass, brick, tile.	TP05 - 0.0-0.2	D		No ACM, staining or hydrocarbon odours present.
			0.5		CL	CLAY, red with grey mottling, dry, very stiff.	TP05 - 0.5-0.7	D		
			1.0			Borehole TP05 terminated at 0.9m				
			1.5							



## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19			
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19			
<b>Location:</b> North Bankstown Public School						<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size</b> mm	
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m		<b>Driller:</b>		<b>Logged:</b> AW			
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical		<b>Bearing:</b> ---		<b>Checked:</b>			

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
E					FILL	FILL: Silty CLAY, light brown, dry, soft. Gravels.	TP06 - 0.0-0.2 (DUP02/DUP2A)	D		No ACM, staining or hydrocarbon odours present.
			0.5		CL	CLAY, red/grey, moist, firm.	TP06 - 0.4-0.6	M		
			1.0							
			1.5							
						Borehole TP06 terminated at 0.8m				



## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19		
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19		
<b>Location:</b> North Bankstown Public School				<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size</b> mm		
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m		<b>Driller:</b>		<b>Logged:</b> AW		
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical		<b>Bearing:</b> ---		<b>Checked:</b>		

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
E					FILL	FILL: Silty CLAY, brown, dry, soft, trace gravels.	TP12 - 0.0-0.1	D		No ACM, staining or hydrocarbon odours present.
					CL	CLAY, red with grey mottling, dry, very stiff.	TP12 - 0.1-0.3	D		
			0.5							
			1.0							
			1.5							
						Borehole TP12 terminated at 0.5m				



## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19		
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19		
<b>Location:</b> North Bankstown Public School				<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size</b> mm		
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m		<b>Driller:</b>		<b>Logged:</b> AW		
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical		<b>Bearing:</b> ---		<b>Checked:</b>		

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
E					FILL	FILL: Silty CLAY, brown, dry, soft, trace gravels.	 TP13 - 0.0-0.15   TP13 - 0.15-0.3	D		No ACM, staining or hydrocarbon odours present.
					CL	CLAY, red with grey mottling, dry, very stiff.		D		
			0.5							
			1.0							
			1.5							
						Borehole TP13 terminated at 0.5m				



## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19				
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19				
<b>Location:</b> North Bankstown Public School						<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size:</b> mm		
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m				<b>Driller:</b>		<b>Logged:</b> AW		
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical				<b>Bearing:</b> ---		<b>Checked:</b>		
Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
E					FILL	FILL: Silty CLAY, grey/brown, dry, stiff. Concrete gravels, brick, tile.	TP14 - 0.0-0.2	D		ACM noted within FILL layer.
			0.5							
			1.0				TP14 - 0.8-1.0			
			1.5		CL	CLAY, red with grey mottling, dry, very stiff.	TP14 - 1.3-1.5	D		No ACM, staining or hydrocarbon odours present.

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Borehole TP14 terminated at 1.8m



## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19				
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19				
<b>Location:</b> North Bankstown Public School						<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size</b> mm		
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m		<b>Driller:</b>		<b>Logged:</b> AW				
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical		<b>Bearing:</b> ---		<b>Checked:</b>				
Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
E					FILL	FILL: Silty CLAY, brown, dry, soft, trace gravels.	TP22 - 0.0-0.2	D		No ACM, staining or hydrocarbon odours present.
			0.5		CL	CLAY, red with grey mottling, dry, very stiff.	TP22 - 0.3-0.5	D		
						Borehole TP22 terminated at 0.6m				







## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19			
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19			
<b>Location:</b> North Bankstown Public School						<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size</b> mm	
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m		<b>Driller:</b>		<b>Logged:</b> AW			
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical		<b>Bearing:</b> ---		<b>Checked:</b>			

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
E					FILL	FILL: Silty CLAY, brown, dry, soft, trace gravels.	TP23 - 0.0-0.2	D		No ACM, staining or hydrocarbon odours present.
					CL	CLAY, red with grey mottling, dry, very stiff.	TP23 - 0.3-0.5	D		
			0.5							
			1.0							
			1.5							
						Borehole TP23 terminated at 0.6m				



## Borehole Log

Client: JDH Architects					Started: 5/11/19					
Project: Supplementary Contamination Assessment					Finished: 5/11/19					
Location: North Bankstown Public School					Hole Location: North Bankstown Public School		Borehole Size mm			
Rig Type:		Hole Coordinates , m			Driller:		Logged: AW			
RL Surface: m		Contractor: Alliance Geotechnical			Bearing: ---		Checked:			
Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
E					FILL	FILL: Silty CLAY, brown, dry, soft. Trace gravels and aggregate gravels.	 TP24 - 0.0-0.2	D		No ACM, staining or hydrocarbon odours present.
			0.5							
					CL	CLAY, red with grey mottling, dry, firm.	 TP24 - 0.8-1.0	D		
			1.0							
						Borehole TP24 terminated at 1.1m				
			1.5							



**BH No: TP27**  
**Sheet: 1 of 1**  
**Job No:9150**

Client: JDH Architects				Started: 5/11/19					
Project: Supplementary Contamination Assessment				Finished: 5/11/19					
Location: North Bankstown Public School				Hole Location: North Bankstown Public School		Borehole Size mm			
Rig Type:		Hole Coordinates , m		Driller:		Logged: AW			
RL Surface: m		Contractor: Alliance Geotechnical		Bearing: ---		Checked:			
Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition Consistency/ Density Index	Additional Observations
W					FILL	FILL: Silty CLAY, brown, moist, soft.	 TP27 - 0.0-0.2	M	No ACM, staining or hydrocarbon odours present.
Borehole TP27 terminated at 0.2m									



## Borehole Log

<b>Client:</b> JDH Architects						<b>Started:</b> 5/11/19			
<b>Project:</b> Supplementary Contamination Assessment						<b>Finished:</b> 5/11/19			
<b>Location:</b> North Bankstown Public School						<b>Hole Location:</b> North Bankstown Public School		<b>Borehole Size</b> mm	
<b>Rig Type:</b>		<b>Hole Coordinates</b> , m				<b>Driller:</b>		<b>Logged:</b> AW	
<b>RL Surface:</b> m		<b>Contractor:</b> Alliance Geotechnical				<b>Bearing:</b> ---		<b>Checked:</b>	

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/Density Index	Additional Observations
E					FILL	FILL: Silty CLAY, brown, moist, soft.	TP28 - 0.0-0.2	M		No ACM, staining or hydrocarbon odours present.
Borehole TP28 terminated at 0.2m										
			0.5							
			1.0							
			1.5							

