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## **Report**

**Remediation Action Plan (RAP)  
Proposed New Amity College Campus  
Lot 1 DP 525996 No 85 Byron Road and  
Lot 2 DP 525996 No 63 Ingleburn Road  
Leppington NSW**

Prepared for:

**Amity College**

**C/- Gran Associates Pty Ltd**

**Level 1, 597 Darling Street**

**ROZELLE NSW 2039**

**Ref: JC18322B-r1(rev2)**

**May 2019**



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30<sup>th</sup> May 2019

Our Ref: JC18322B-r1(rev2)

Amity College  
C/- Gran Associates Pty Ltd  
Level 1, 597 Darling Street  
ROZELLE NSW 2039

Attention: Mr Peter Reed

Dear Sir

**Re: Remediation Action Plan (RAP)  
Proposed New Amity College Campus  
Lot 1 DP 525996 No 85 Byron Road and  
Lot 2 DP 525996 No 63 Ingleburn Road, Leppington**

Further to our Stage 1 and 2 Contamination Assessment for the above site, the attached is our Remediation Action Plan (RAP) report providing a remediation strategy and methodology to clean up the site to an acceptable standard for the proposed school development.

Yours faithfully,  
**GeoEnviro Consultancy Pty Ltd**

Solern Liew MIEA CPEng NER  
Director

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## **1. INTRODUCTION**

This report presents a Remediation Action Plan (RAP) for the site referred to as Lot 1 DP 525996 No 85 Byron Road and Lot 2 DP 525996 No 63 Ingleburn Road in Leppington as shown on Drawing No 1A.

We understand that the site occupies an area of about 3.3 hectares and the major southern and middle portions of the site is Zoned SP2 (Education Establishment) with the front portion of the site Zoned R3 (Residential). The portion of the site Zoned SP2 is proposed to be developed for the purposes of a school. Based on the masterplan drawings provided, the proposed school buildings will be up to 4 to 5 storeys high and will include a basement level.

A Phase 1 and 2 Contamination Assessment was prepared by GeoEnviro Consultancy Pty Ltd (Reference 1) in May 2019. The report concluded that the Subject Site has some contamination issues relating to buried rubbish/asbestos fill and elevated concentrations of Zinc in the depression area (Site Feature G – Drawing No 1A) requiring site remediation. In addition some minor hydrocarbon staining was visible on the surface in the area between the dwelling and shed (Site Feature C) and this is required to be remediated.

The objective of this RAP is to provide a strategy to remediate the site to ensure suitability of the site for the intended landuse. The RAP is based on information obtained from our previous investigation and from our review of information obtained from our previous investigation.

## **2. SITE INFORMATION**

### **2.1 Site Location**

The site is located at the south western corner of Ingleburn Road and Byron Road in Leppington and is approximately trapezoidal in shape measuring about 100m along Ingleburn Road and 290m along Bryon Road. The site widens to 125m at the rear. Refer to Drawing No 1 for site locality.

The site is within the jurisdiction of Camden Council, Parish of Cook and County of Cumberland.

Surrounding properties consist mainly of semi-rural residential blocks.

## **2.2 Site Topography and Geology/Hydrogeology**

The site is situated in a region typically characterised as gently undulating with relatively uniform ground surface generally falling to the north and north west towards Bonds Creek and Kemps Creek at angles typically ranging from 2 to 6 degrees.

Within the site, the northern portion of the site is approximately level with a slight dip to the north at angles of less than 2 degrees. Ground surface on the southern portion generally slopes towards a depression along western boundary at angles of between 3 and 4 degrees. Based on the survey drawing, the south eastern corner of the site is at Reduced Level (RL) 102.5m Australian Height Datum (AHD) and the north western corner of the site is at RL 93m AHD.

The 1:100,000 Soil Landscape of Penrith Series 9030 (Reference 2) prepared by the Soil Conservation Services of NSW indicates the site to be underlain by Residual soil belonging to the Blacktown landscape group. Typically, soil consists of highly plastic and moderately reactive subsoils with low permeability.

The 1:100,000 Geological Map of Penrith Series 9030 (Reference 3) indicates the underlying bedrock to consist of Bringelly shale of the Wianamatta Group consisting of shale, carbonaceous claystone, claystone, laminite, fine to medium grained lithic sandstone, rare coal and tuff.

## 2.3 Site Description and History

At the time of our site investigation, the site was mainly used for residential with the southern rear portion of the site consisting of medium dense trees. The following is a brief description of the site features.

Site Feature	Description
A	Driveway constructed of crushed rock.
B	Single-storey brick, weatherboard and tile dwelling with a metal garage to the rear.
C	Single-storey fibro/metal dwelling with a number of small metal, timber and fibro sheds to the west. Sheds used for storage of miscellaneous items. Some minor hydrocarbon staining visible on surface
D	Driveway constructed of crushed rock, sandstone and traces of building debris (eg bricks and asphalt lumps)
E	Metal, timber and fibro shed with building extensions.
F	Area of previous numerous small buildings and sheds. Previous market garden area (1950s)
G	Backfilled depression with rubbish fill consisting of concrete boulders, bricks, glass and asbestos fragments
H	Recent Market Garden beds
I	Previous market garden/agricultural area

### 3. PREVIOUS STUDIES

The site was the subject of a contamination assessment (Reference 1) undertaken by GeoEnviro and it consisted of a review of site history, a site inspection and soil sampling and analysis program. Refer to Appendix A for extracts of our previous report.

Soil sampling for initial screening was carried out on the 23<sup>rd</sup> and 24<sup>th</sup> April 2018 and involved drilling of forty boreholes (BH 1 to BH 40). An additional detailed investigation was subsequently carried out on the 8<sup>th</sup> January 2019 to assess the extent of contamination more accurately and this involved excavation and sampling of an additional thirty-eight (TP 1 to TP 38).

Details of the subsurface profiles from the test pits are summarised on the Borehole Reports and Table 1 in Appendix A. The following is a summary of the subsurface profiles encountered;

#### Topsoil and Topsoil/Fill

Topsoil and topsoil/fill were encountered in all boreholes and test pits except BH 17, BH 18, BH 28 and TP 4, 7, 8, 10, 27, 29 and 31 generally consisting of Clayey Silt of low liquid limit. Thickness of the topsoil and topsoil/fill was found to range from 150mm to 450mm.

A trace (<5%) of plastic was encountered in the topsoil/fill in BH 21 which was excavated in the previous building/shed locations (Site Feature F) and in BH 23 some (>5%) crushed rock and an asphalt lump were encountered noting that BH 23 was excavated along the edge of the accessway (Site Feature D).

#### Fill

Fill was encountered in BH 17, 18, 28 and TP 3 to 8, 10, 27 to 29 and 31 comprising of Clayey Silt/Silty Clay, Clayey Silt/Gravelly Silt, Gravelly Silt, Silty Clay and Silty Gravel. BH 17, 18, TP 27 and 29 were excavated in the access driveway (Site Feature D) and some (>5%) crushed rock and a trace (<5%) of brick fragments were encountered in the fill in BH 17 (Site Feature F).



Rubbish including concrete, brick, plastic metal and glass was encountered within the fill in BH 28, TP 4, 6 to 8 and 10 and this fill appeared to have been placed in the previous depression area (ie Site Feature G). Some (>5%) asbestos fragments were encountered in the fill in BH 28, TP 6 to 8 and 10. The fill was generally found to have thickness ranging from 0.3m to greater than 2.3m.

A disused asbestos pipe originally connected to the building (Site Feature C) was encountered in TP 31.

#### Natural Soil

Underlying the topsoil and fill in all boreholes and test pits except TP 10, natural soil consisting generally of medium to high plasticity Silty Clay was encountered. In general, the plasticity of the clay reduces to medium plasticity at lower depths with the inclusion of ironstone and siltstone bands, Gravelly Silty Clay and Interbedded Clay and Siltstone in some boreholes.

The natural clayey soil was generally assessed to be dry to moist (ie moisture content less than or equal to the plastic limit) and based on the SPT and hand penetrometer results, hard.

#### Bedrock

Bedrock consisting of Siltstone and Shale/Siltstone was encountered in all boreholes except 3, 10, 14, 18 and 24 at depths ranging from 0.9m to 3.0m below existing ground surface. The Siltstone and Shale/Siltstone was subjectively assessed to be low to medium strength and extremely weathered to distinctly weathered.

Bedrock was not encountered in any of the test pits which was taken a maximum depth of 1.7m into natural clay.

#### Groundwater

All boreholes and test pits were found to be dry during and shortly after completion of the site investigation

Environmental samples were collected and were analysed for contaminants of concern and this includes;

- Heavy metals - Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Mercury (Hg), Lead (Pb), Nickel (Ni) and Zinc (Zn).
- Organochlorine Pesticides (OCP).
- Polychlorinated biphenyl's (PCB)
- Total Recoverable Hydrocarbon (TRH)
- Benzene, Toluene, Ethyl Benzene and Xylenes (BTEX)
- Polycyclic Aromatic Hydrocarbons (PAH)
- Asbestos
- pH

Slightly elevated Zinc concentrations of 550mg/kg and 800mg/kg were encountered in the fill in BH 28 and TP 4 respectively and in TP 8, the concentration of Zinc was found to be 2000mg/kg above the EIL Criteria of 432mg/kg, noting that these samples were taken from the rubbish and asbestos (ie BH 28, TP 6, TP 8 and TP 10) impacted fill in the backfilled depression (Site Feature G).

A slightly elevated concentration of Zinc of 500mg/kg was found in the topsoil sample from TP 1 located in the treed area at the south eastern corner of the site. This concentration was found to be less than 2.5 times the EIL and taking into consideration the background concentration of Zinc within the site, an Upper 95% Confidence Limit of 169mg/kg was calculated and therefore within the EIL, hence acceptable.

The laboratory test results indicate all other samples to have concentrations of contaminants of concern to be within the Site Criteria or with negligible concentrations.

Our Stage 1 and 2 Contamination Assessment report (Reference 1) assessed the site to have a low risk of gross chemical contaminations, however the site was found to be impacted by buried rubbish/asbestos fill and elevated concentrations of Zinc in the backfilled depression area (Site Feature G) shown as Area 4 in Appendix A of this report. Depth of fill in Area 4 was found to range from 0.2m to greater than 2.3m.

For the proposed school development, site remediation is required to clean up Area 4. In addition the areas of hydrocarbon stained soil encountered between the dwelling and sheds (Area 1 - Site Feature C) should be remediated.

The report also indicated that there are other areas which require environmental monitoring during the development stage and these areas are as follows;

- Area 1 - Building and shed areas with hydrocarbon staining and asbestos buildings/sheds (Site Feature C). An asbestos pipe connected to the house (Site Feature C) was encountered in TP 31 indicating potential presence of more buried asbestos pipes used in the building area.
- Area 3 - Gravel access driveway with some fill and building debris such as bricks and asphalt (Site Feature D). Thickness of the access driveway was found to vary from 200mm to 300mm. It is possible for asbestos be present in the access way as this material was commonly used as building material in the past
- Area 5 - A spread of localised fill and topsoil/fill encountered in the previous building and shed location (Site Feature F) as encountered in BH 21 to 26 and TP 16 to 18 and 28 with thickness ranging from 0.2m to 0.4m. A trace foreign inclusion such as plastics and tile fragments were encountered in BH 21 and TP 16 and it is possible for asbestos to be present in this area.

We recommend a remediation action plan (RAP) be prepared providing a remediation strategy and methodology to clean up the site to acceptable standard for the proposed school development.

#### **4. INVESTIGATION AND CLEAN UP CRITERIA**

The results of laboratory analyses for this investigation were compared with published Australian contamination assessment criteria. The guidelines such as those published by the OEH and National Environmental Health Forum (NEHF) (Reference 6) are commonly used to assess contaminant concentrations. The NEHF criteria which was recently updated by the National Environment Protection Council Service Corporation (NEPC) in the National Environmental Protection (Assessment of Contaminated Sites) Measure (NEPM) – Schedule B1 (Reference 7) includes health-based soil investigation levels (HBILs) and this was adopted by OEH in May 2014.

HBILs are scientifically based, generic assessment criteria designed to be used in the first stage (Tier 1 or ‘screening’) of an assessment of potential risks to human health from chronic exposure to contaminants. They are intentionally conservative and are based on a reasonable worst-case scenario

For the purpose of assessing the contamination status of the site, the criteria for the most sensitive landuse, that being HBIL A residential with garden/accessible soil residential with garden/accessible soil including children’s day care centres, preschools and primary schools, has been adopted as the Site Criteria.

The more recent updates to the NEPM criteria (Reference 7) have included Health Screening Levels (HSL) developed by the Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) leading to the adoption of health criteria for TRH, BTEX and PAH. The HSLs have been developed for selected petroleum compounds and fractions and are applicable to assessing human health risk via the inhalation and direct contact pathways. The HSLs depend on specific soil physicochemical properties, land use scenarios, and the characteristics of building structures and they apply to different soil types and depths below surface up to 4 m depth.

For the purpose of assessing the contamination status of the site for TRH, BTEX and PAH, the HSL A and B (Low to high density residential) have been adopted.

The NEPC also includes EIL criteria for the protection of species based on 95% survival and this criteria is based on average background concentrations (ABC) for individual sites and added contaminant levels (ACL) calculated from survival rates for various species to contaminant exposures in different settings. For ecological levels for TPH, BTEX and PAH, the NEPC has provided ecological screening level (ESL) for the assessment. The EIL and ESL criteria have been included in the relevant tables as a sensitivity measure for the protection of ecological diversity within the site.

For the purpose of assessing the contamination status of the site, the criteria for residential with garden setting which includes preschools and primary schools (HBILs 'A' or HSL 'A' and 'B' level) is applicable.

The Clean-Up criteria (Acceptance Criteria) adopted for the site is based on the lower criteria of the Heath Criteria (HBILs 'A'/HSL 'A') and the Environmental Investigation Levels (EIL/ESL) as follows;

**Table A: Clean Up Criteria**

Analyte	HBILs A /HSL A & B Criteria (mg/kg)	EIL/ESL (mg/kg)	Clean-Up Criteria "Acceptance Criteria" (mg/kg)
Cu	6000	169	169
Pb	300	1127	300
Zn	7400	432	432
Cd	20	-	20
Cr	100	208	100
Ni	400	109	109
As	100	107	100
Hg	40	-	40
DDT	240	-	240
Deldrin	6	-	6
PCB	1	-	1
Benzo(a)pyrene	-	0.7	0.7
Benzo(a)pyrene (TEQ)	3		3
Total PAH	300	-	300
Benzene	0.7	65	0.7
Toluene	480	105	105
Ethyl-Benzene	480	125	125
Xylene	110	45	45
Naphthalene	5	-	5
F1 C <sub>6</sub> -C <sub>10</sub>	50	180	50
F2 >C <sub>10</sub> -C <sub>16</sub>	280	120	120
Asbestos (ACM)	0.01%		0.01%
Asbestos (AF/FA)	0.001%		0.001%

- a) - No Criteria Available  
b) Chromium III  
c) Chromium V1

In addition to the above criteria, considerations should be given to;

- Odour (eg hydrocarbon and solvents) where adoption of lower threshold criteria may be required if causes significant nuisance.
- Asbestos in fill or ground surface. All visible signs of asbestos fragments from the stockpiles and soil surface should be eliminated.
- The NEPM 2013 guidelines address the issue of aesthetic considerations in relation to non-hazardous inert foreign material (refuse) in soil or fill resulting from human activities. The guidelines permit the presence of foreign matter within the fill to be retained within the site subject to compliant of the fill material to the Site Criteria and aesthetically acceptable (eg malodorous soils, discoloured chemical deposits, stained soil, large monolithic deposits/large inert foreign matter, putrescible refuse and animal remains). Though the guidelines do not outline specific trigger values, we consider fill containing greater than 5% by weight of foreign matter to be aesthetically unacceptable, therefore the insitu fill is within acceptable limits

For off-site disposal of fill, contaminated material and surplus soil excavated as part of the proposed developments works is regulated by the provision of the Protection of the Environment Operations Act (POEO Act 1997) and associated regulations and guidelines including the DEC guideline on classification of waste (Reference 11).

## 5. CONCEPTUAL SITE MODEL

A conceptual site model (CSM) is a representation of site-related information regarding contamination sources and exposure pathways between those sources and receptors. The model provides the framework for identifying how the site became contaminated and how potential receptors may be exposed to contamination either in the present or the future and it enables an assessment of the potential pathways.

### 5.1 Identified Contamination

Based on the findings of the previous investigations, the contaminated area identified on site is as defined in Table B below.

**Table B: Areas of Environmental Concerns (AEC)**

Area of Environmental Concern	Description	Contaminant/Issues
AEC I	Backfilled Depression (Area 4)	Rubbish fill and asbestos
AEC II	Area between Dwelling and sheds (Area 1- Site Feature C)	Hydrocarbon

Refer to Drawing No 1A for locality of AEC I and AEC II.

### 5.2 Contaminants of Concern - Mobilisation Pathways

The risk of contamination concentrations in the ground pose a risk of harm to a sensitive receptor where a pathway for exposure exists between the source and receptor. The contamination present on site is asbestos impacted fill in AEC I and hydrocarbon area in AEC II.

The mobilisation pathways for AEC I is when asbestos fragments get broken down through weathering or anthropogenic activities and the asbestos fibre from the fragments becomes airborne. The mobilisation pathways for AEC II is skin ingestion.

### 5.3 Sensitive Receptors & Exposure Pathways

Based on the contaminants considered at the site we have identified the following sensitive receptors and potential exposure pathways:

#### Sensitive Receptors

- Construction and maintenance workers during construction site redevelopment.
- Future site users following development of the site with the most sensitive receptor being a child.
- Land users in adjacent areas.

#### Exposure Pathways

Potential Pathway	Potential Contamination
Inhalation	Dust including asbestos (AF/FA)
Dermal	Hydrocarbons (TRH, BTEX and PAH)
Water movement	Hydrocarbons (TRH, BTEX and PAH) and Asbestos (AF/FA)



## **6. REMEDIATION ACTION PLAN**

The following sections describe the components essential for the remediation of the site. Appropriate modification of these components may be required depending upon actual site conditions encountered during the remediation process and other factors involving the logistics of the work to be carried out.

### **6.1 Remediation Areas and Goals**

Based on our previous report (Reference 1), we have identified the following areas of environmental concerns (AEC) that require remediation (refer to Drawing No 1A);

- AEC I : The buried rubbish/asbestos and Zinc contaminated fill (Area 4 – Site Feature G) to require remediation and this area is referred to as Area of Environmental Concern 1 (AEC I)
- AEC II : The areas of hydrocarbon stained soil encountered between the dwelling and sheds (Area 1 - Site Feature C)

The remediation goal is to clean up AEC I and II to ensure the site is suitable for the proposed school development.

### **6.2 Remediation Criteria**

The Acceptance Criteria as outlined in Table A is adopted as the remediation criteria to clean up the site.

### **6.3 Remediation Strategy and Process**

The development of the site-specific remediation strategy initially involves comparing potential remediation options used to mitigate, remove and/or manage any exposure from contamination at the site.

The NEPM 2013 guidelines outline the preferred hierarchy of options for site clean-up and/or management as follows;

- a) On-site remediation of the contaminated material for re-use within the site.
- b) Excavation and disposal of material off-site to an approved landfill.
- c) On-site encapsulation and containment with suitable capping layer.

The preferred remediation strategy was determined based on the following considerations;

- Human health issues; dust suppression should be implemented during remediation works – particularly for asbestos.
- Ecological terrestrial ecosystems; appropriate consideration should be given to sensitive ecological communities when determining ecological investigation levels and screening levels.
- Reliability; only experienced contractors should be engaged to remediate contaminated materials at the site.
- Site remediation supervision and validation; all methods, whether treatment or disposal will require validation by experienced consultant prior to being considered suitable. This may include assessment by a suitably experienced occupational hygienist. We recommend full time supervision during bulk excavation of unsuitable materials to ensure appropriate waste segregation – mitigating waste bulking – likely reducing the volume disposed and subsequent landfill tipping fees.
- Lawful disposal – receipts for waste disposal must be retained by the waste contractor for inclusion in the validation report. The consultant should perform spot checks on trucks to ensure they are tipping at licensed facilities only.
- Regulatory Approvals; We understand that Camden Council will be involved in the approval process and this Council adopts Category 1 under SEPP 55 remediation work.
- Cost & Time; it is likely that the remediation activities will be required to happen swiftly to prevent further delay. Therefore, a cost/ time benefit analysis should be conducted to determine the most suitable method following excavation and realisation of the quantity.
- Proficient identification and management of unexpected finds; should any material be identified that differs from the descriptions provided in earlier environmental reports be observed during the works, the council must be notified and a suitably experienced environmental consultant should be engaged to direct the on-going works to ensure all risks are mitigated.

The remediation strategies are as follows;

AEC I – Buried Rubbish/Asbestos and Zinc Contaminated Fill

- Excavation of all topsoil/fill and fill to expose natural ground.
- All excavated fill should be noted for buried rubbish inclusion including bonded asbestos. Clean fill should be isolated from rubbish impacted fill and this fill should be analysed for Zinc to ensure concentrations are within the Acceptance Criteria. The rates of sampling and analysis should be based on the following (NEPM 1999 Schedule B2- amended 2013);

Sampling Rates for Zinc

Stockpile Volume (m <sup>3</sup> )	No of Samples
<75	3
75 - <100	4
100 - <125	5
125 - <150	6
150 - <175	7
175 - <200	8

Clean fill with Zinc concentrations within the Acceptance Criteria may be reused on site and fill with unacceptable concentrations of Zinc should be disposed off site to a landfill.

- The asbestos impacted topsoil/fill and fill should be classified in accordance to NSW EPA 2013 guidelines “Part 1 – Classifying Waste” (Reference 11) and to be disposed off-site to a landfill as “Special Waste – Asbestos”. Removal of asbestos impacted fill should be carried out by an asbestos licensed contractor in accordance with SafeWork and other regulatory requirements.
- Alternatively, the asbestos impacted soil may be screened and the cleaned topsoil/fill and fill may be reuse on-site. Asbestos impacted material may be treated based on the NEPM procedure by;
  - placement of fill in 7 to 10m<sup>3</sup> stockpiles and labelling each stockpile for reference during the remediation process.
  - Spreading of the labelled stockpiles thinly over an area and manually picking of asbestos fragments.

- Hand tilling and raking of the spread stockpile along overlapping and adjoining 1m wide transects with collection of any identified asbestos fragments. Transects are to be repeated until a minimum of 3 consecutive passes are completed with no asbestos fragments identified.
  - The screened stockpile with no visible signs of asbestos should be stockpiled and identified with stakes.
  - The stockpiles should be sampled and assessed for presence of asbestos in accordance to the NEPM 2013 procedure. The NEPM provides a guideline on health screening levels for asbestos in soil which may be classified in three types of asbestos; Bonded asbestos-containing-material (ACM), Fibrous asbestos (FA) and Asbestos fines (AF).
  - The stockpiles should also be analysed for Zinc based on the abovementioned rates.
- Stockpiles with bonded fibreboard (ACM), Fibrous Asbestos or Asbestos Fibres (FA/AF) above the allowable limits and/or with Zinc concentrations above the Acceptance Criteria should be disposed off site to a landfill.
  - Stockpiles with bonded fibreboard (ACM), Fibrous Asbestos or Asbestos Fibres (FA/AF) within the allowable limits and with Zinc concentrations within the Acceptance Criteria may be reused on site.

AEC II – Hydrocarbon Stained Soil between the dwelling and sheds (Area 1-Site Feature C)

- Excavation of all hydrocarbon stained topsoil/fill and fill to expose natural ground.
- Validation sampling and laboratory testing should be carried out on the excavated surface to ensure the underlying soil is clean of contaminants of concern within the Acceptance Criteria. The analytes required for validation includes Heavy Metals, TRH, BTEX and PAH
- In the event where the validation samples are found to have contamination, further excavation and removal of the affected soil should be carried out and additional validation sampling should be carried out to confirm complete removal of the contaminated soil.
- All hydrocarbon impacted topsoil/fill and fill should be disposal to a landfill

In addition to the above, the following issues which need to be addressed during development of the site are as follows;

- The shed/buildings (Areas 1 and 2) containing asbestos should be removed by licensed contractors to ensure all asbestos is removed off-site in accordance with appropriate legislation. Asbestos pipes were encountered connected to the house (Site Feature C) and therefore these pipes should be removed as part of demolition and site clearing works. This area should be monitored for hydrocarbon contamination during site clearing and validation testing should be carried out after demolition works to confirm this area is not impacted by hydrocarbon contamination.
- Rubbish fill containing bonded asbestos may still be present elsewhere within the site in between test locations in particular in the gravel accessway (Area 3- Site Feature D) and the area previously occupied by buildings/sheds (Area 5 – Site Feature F). Should bonded asbestos be encountered during construction works, all works should cease and an “Unexpected Asbestos Finds Protocol” as outlined in Appendix B should be initiated. Should asbestos be encountered, the asbestos impacted fill should be disposed to a landfill. Rubbish fill containing bonded asbestos should be removed and disposal to a landfill as “Special Waste – Asbestos”.
- Validation sampling and laboratory analysis should be carried out after site remediation works to ensure the areas are adequately remediated. Validation sampling and laboratory analysis should also be carried out in all other areas previously occupied by buildings and sheds (eg Site Features B) after removal/demolition of the structures to ensure that contamination does not exist in these areas. Should contaminants be encountered some additional remediation works may be required.
- All site remediation and validation works should be carried out under the supervision of an environmental consultant and this should include soil sampling and validation sampling to ensure these areas are adequately remediated.
- All other surface rubbish material not mentioned above and asbestos material where encountered on-site should be appropriately disposed off-site to an OEH approved landfill.
- All fill material requiring off-site disposal should be laboratory tested and characterised in accordance with NSW EPA guidelines (Reference 11).

## **7. VALIDATION PLAN**

### **7.1 Excavation Area**

All excavation areas from the asbestos and Zinc remediation process (ie AEC I) and the hydrocarbon stained areas (ie AEC II) should be adequately validated in order to ensure the area is adequately cleaned of contaminated soil. Validation of the excavated areas should include;

- Visual inspection for signs of anthropogenic material including ACM, building demolition rubbish/waste and hydrocarbon stained areas. The visual inspection will be conducted on a 2m grid.
- The results of the visual inspection will be confirmed through soil sampling if considered necessary. Validation sampling to be collected at regular spatial intervals of one every 5m apart for laboratory analysis of the contaminants of concern.
- Should contamination be encountered during validation of the excavated areas, further remediation works should be carried out.
- The validation laboratory test results should be compared with the appropriate acceptance criteria as outlined in Section 4 of this RAP.

### **7.2 Imported Fill Material**

All imported fill materials if required should be assessed for their suitability for use at the site. Imported fill includes VENM and ENM or any other material for which a valid and applicable NSW EPA Waste Exemption Order is in force.

Material shall only be considered suitable for use on-site if the following criteria (minimum) are satisfied:

- For VENM classification, one sample/analysis per 1000m<sup>3</sup> of earth fill or a minimum of 3 samples should generally be adequate depending on the homogeneity of the fill material. More samples per unit volume of earthfill may be required if the fill material is found to be variable. The material should comply with Part 1 – Classifying Waste guidelines (Reference 10).

- The material source site should be assessed by an experienced consultant for suitability.
- The concentrations of metals are within the accepted background concentrations.
- The other selected analytes (ie. TPH, BTEX, PAH, OCP, asbestos) are all less than the acceptable limits
- The composition, type and colour of the material should be generally consistent with the local geology.
- Imported material should be assessed for its aesthetic suitability to the site.
- Imported material should not affect the surrounding ecosystem or sensitive environmental receptors.

The supervising environmental consultant should perform routine inspections of the VENM upon arrival to site. The consultant should inspect the material to ensure it is consistent with the material characteristic/ descriptions provided in its respective source VENM report. Should any unexpected find, uncharacteristic material or visible/ olfactory contamination be observed in the VENM the load should be rejected from import to site.

We recommend the supervising consultant consider use of a '*Fill Import, Load Inspection Proforma*' which can be completed during the import works to verify each load of imported material

### **7.3 Final Validation Report**

The validation plan should be prepared by an experienced consultant. The report should be prepared in general accordance with the *NSW OEH 2011 Guidelines for Consultants Reporting on Contaminated Sites*. The report should comprehensively address:

- Historical investigations undertaken at the site
- Detail the remediation works undertaken at the site
- Present field and laboratory information satisfying the objectives of the RAP
- Demonstrate that the remediation outcomes have been achieved
- Include all waste tracking and disposal information, both for all exported wastes and all imported products.
- Detail any unexpected finds or pollution incidents which may have occurred during the works.

- Outline any variance from the remedial strategy and discuss how this was appropriately implemented.
- Outline any long-term environmental management or monitoring requirements for the site
- Include any other information relevant to the contamination status of the site
- Provide a statement regarding the future suitability of land for its intended use from a contamination perspective

## **8. QUALITY ASSURANCE PLAN**

Appropriate quality assurance/quality control (QA/QC) procedures should be maintained during the course of validation sampling. The samples should be analysed at a National Association of Testing Authority (NATA) accredited laboratory. The QA/QC procedures and results adopted should be included in the final validation report.

## **9. SITE MANAGEMENT PLAN**

It is the responsibility of the Contractor to develop a Site Management Plan (SMP) detailing overall site management, environmental management (including soil, air and water) and work health and safety (WHS) plans. This section provides a brief summary of some of the items which need to be included in the Contractor's plans.

Works shall comply with all legislative requirements including but not limited to those set out under the following Acts (and subsequent amendments and regulations);

- Environmentally Hazardous Chemicals Act (1985)
- Hazardous Chemicals Act (1985) (under review)
- Environmental Offences and Penalties Act (1989)
- Agricultural and Veterinary Chemicals Act (1994)
- Protection of the Environmental Operations Act (POEO) (1997) and associated exclusions;
- Pesticide Act (1999)
- OHS Amendment (Dangerous Goods) Act 2003 including OHS Amendment (Dangerous Goods Regulation 2005) and
- POEO Amendment Act 2005 (including POEO Amendment (Scheduled Activities and Waste) Regulation 2008).



## **9.1 Site Operations**

The schedule of remedial works, including timing and staging is to be prepared by the Contractor to meet the requirement of this RAP.

Remediation works will be restricted to the hours set out by Council.

It is the site owner/developers responsibilities to ensure that appropriate personnel are appointed to manage and conduct the remediation and validation works. This will include;

- The Principal's representative who is responsible for overseeing the implementation of this RAP
- The asbestos licensed Contractor, who is responsible for overseeing the implementation of this RAP, conducting the remediation works and managing the site and
- An environmental consultant who will be responsible for providing advice as required for the remedial works and undertaking the validation works in accordance with this RAP.

Other parties who may be employed to assist in the implementation of this RAP include but not limited to Occupational Hygienist and Asbestos Licensed Contractor.

The Contractor will be responsible for preparing a list of contacts for the works, including emergency contacts for the site operations and provision of signage at the site to allow the public to contact nominated site personnel out of hours.

## **9.2 Environmental Management Plan**

Generally, an approved EMP should be prepared for implementation during site works. The requirements of the EMP may include the following measures (but are not limited to):

- Measures to control noise emissions
- Measures to suppress odours and dust emissions
- Measures to monitor and control airborne asbestos.
- Selection of traffic routes to minimise residential noise intrusions
- Soil and sediment controls to prevent erosion/ run-off

- Measures to identify hazardous and industrial wastes and procedures for removal including asbestos
- Community consultation

Further:

- The development shall not result in increased sediment deposition to water bodies, wetlands, bushlands or environmentally significant lands.
- All disturbed areas shall be progressively stabilised and re-vegetated so no area remains exposed for extended periods.
- Sediment and erosion measures should be maintained until establishment of ground cover
- Vehicular access shall be controlled through installation of wash bays or shaker ramps to prevent tracking of sediment or dirt onto adjoining roadways. Wet washing of roadways to remove sediment is not permitted – another means must be implemented.
- All topsoil, aggregate, sand or spoil shall be stored clear of drainage lines, easements, water bodies, stormwater drains, footpaths, kerbs, roads and there shall be measures in place with the approved sediment and erosion control plan.
- The remediation works shall comply with the *NSW EPA Interim Construction Noise Guideline* for the control of noise from construction sites. No works shall occur outside the allowed hours as specified. It is preferable all noisy activities are focused in the mid-morning or mid-afternoon when most neighbours may not be at home.
- Any litter and refuse on-site should be immediately collected and placed in bins with plastic liners for disposal offsite in the general waste bins. Any outdoor bins should have secured lids to prevent birdlife picking items and dispersing rubbish across site.
- Good civil work practises and overall housekeeping should be maintained on-site, potential run-off from excavations and stockpiles should be appropriately protected using control measures such as hay bales and silt fencing.
- The project design and environmental protection measures should also consider the requirements specified in Landcom 2004 'The Blue Book Managing Urban Stormwater

### **9.3 Traffic Control and Management Plans**

Generally, a Construction Traffic Management Plan is required for development works. The plan should detail:

- Vehicle route
- Number of trucks
- Hours of operation
- Access arrangements
- Traffic control

The plan is to be submitted to council for approval and in some cases the RMS. The plans should be prepared in accordance with the *NSW RMS Traffic Control at Work Sites V4*.

### **9.4 Dust and Odour Management**

Given the sensitive location and general nature of remediation it is crucial adequate dust control measures are implemented during the remediation works. Dust shall be managed using techniques that may include (but not be limited to):

- Utilising a water cart to control dust on all exposed areas of site.
- Wetting down material prior to loading or handling
- Covering, grassing or stabilising exposed earth stockpiles that will be left for an extended period of time

It is overall good practice to prevent the generation of any nuisance dust during the works. Due to the nature of the contaminants and site conditions, odour is unlikely to be an issue at the site.

## **9.5 Airborne Asbestos Control and Management**

Regular air sampling and monitoring should be undertaken during and after completion of the site remediation works. In the event where a significant amount of friable asbestos (AF/FA) is uncovered during remediation works, daily air monitoring of airborne Asbestos Fines should be undertaken.

The levels of airborne Asbestos Fines should be analysed using the Standard Polarised Light Microscopy Method. The airborne asbestos fibre level of 0.1 fibre/ml is adopted as the occupational exposure standard.

Exceedance of this level will trigger the requirements for;

- The engagement of a Class A asbestos licensed remediation contractor and an Occupation Hygienist.
- A review of remediation work methodology to limit generation of airborne asbestos.
- Additional PPE requirements including P2 disposal dust mask or a particulate half-face mask with a P3 filter and disposal coveralls.
- Establishment of decontamination facilities.

## **10. CONTINGENCY PLAN**

A review of the RAP identified data gaps and potential risks to meeting the specified site validation criteria. A number of possible risks are outlined as well as contingencies to be implemented should unexpected finds occur. Health and environmental risks, and hazards associated with the remediation work and their minimisation or mitigation measures are discussed in Section 9.

### **10.1 Unexpected Finds Protocol**

Whilst undertaking remediation and civil works, should any site specific geologically-uncharacteristic material be observed that was not identified during earlier site investigations, an unexpected finds protocol as detailed in Appendix B should be initiated.

### **10.2 Complaints**

In view of the nature of the activities and type of contaminants identified at the site there is a potential for complaints to be received from members of the public relating to environmental emissions including:

- Noise and vibration arising from excavation; and
- Dust emissions arising from excavation, soil handling, and placement.

Management of environmental emissions shall be undertaken during the work as detailed in Section 11 and appropriate actions taken to further control emissions following receipt of a complaint. Such additional controls may include the following actions:

- Limiting disturbance and exposure of contaminated soil to meteorologically favourable periods (ie dry weather and not windy/gusty conditions); and
- Covering or wetting down soil, which are generating dust.

## **11. CONCLUSION**

Subject to site remediation as outlined in the Remediation Action Plan (RAP) above, we consider the subject site to be suitable for the proposed school development.

## 12. LIMITATIONS

The findings contained in this report are the results of discreet/specific sampling methodologies used in accordance with normal practices and standards. There is no investigation which is thorough enough to preclude the presence of material which presently, or in future, may be considered hazardous to the site. The site may be subject of dumping of rubbish fill in the past and the scope of this report do not cover for future dumping and burial of such material on the subject site.

As regulatory evaluation criteria are constantly updated, concentrations of contaminants presently considered low, may in the future fall short of regulatory standards that require further investigation/redemption.

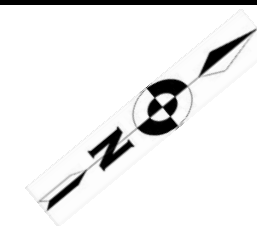
The statements presented in these documents are intended to advise you of what should be your realistic expectations of this report, and to present you with recommendations on how to minimise the risks associated with the groundworks for this project. The document is not intended to reduce the level of responsibility accepted by GeoEnviro Consultancy Pty Ltd, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in so doing.

Attached in Appendix C are documents entitled “Important Information about Your Environmental Site Assessment” in conjunction with which this report must be read, as it details important limitations regarding the investigation undertaken and this report.

## REFERENCES

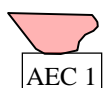
1. *Phase 1 and 2 Contamination Assessment - Proposed New Amity College Campus Development - Lot 1 DP 525996 No 85 Byron Road and Lot 2 DP 525996 No 63 Ingleburn Road Leppington NSW, - GeoEnviro Consultancy Pty Ltd Ref JC18322A-r1(rev2) dated May 2019*
2. *1:100,000 Geological Map of Penrith – Geological Series Sheet 9029-9129 (Edition 1) 1985*
3. *1:100,000 Soil Landscape Map of Penrith – Soil Conservation Service of NSW; Sheet 9029-9129*
4. *Australian & New Zealand Guidelines for the Assessment and Management of Contaminated Sites, Australian and New Zealand Conservation Council and National Health and Medical Research Council, 1992.*
5. *Assessment of Orchard and Market Garden Contamination - Contaminated Sites Discussion Paper, NSW EPA 1995.*
6. *Health Based Soil Investigation Levels, National Environmental Health Forum Monographs Soil Series No. 1 – 1996*
7. *National Environment Protection (Assessment of Site Contamination) Measure 1999(including updated Schedule B1 – 2013*
8. *Guidelines for Assessment Service Station Sites – NSW EPA 1994*
9. *Guidelines for the NSW Auditor Scheme, NSW EPA*
10. *Sampling Design Guidelines – NSW EPA 1995*
11. *Part 1 – Classifying Waste – 2014, NSW EPA*
12. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 – ANZECC.*
13. *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia – Department of Health -May 2009*
14. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 – ANZECC.*

Site Feature	Description
A	Driveway constructed of crushed rock.
B	Single-storey brick, weatherboard and tile dwelling with a metal garage to the rear.
C	Single-storey fibro/metal dwelling with a number of small metal, timber and fibro sheds to the west. Sheds used for storage of miscellaneous items. Some minor hydrocarbon staining visible on surface
D	Driveway constructed of crushed rock, sandstone and traces of building debris (eg bricks and asphalt lumps)
E	Metal, timber and fibro shed with building extensions.
F	Area of previous numerous small buildings and sheds. Previous market garden area (1950s)
G	Backfilled depression with rubbish fill consisting of concrete boulders, bricks, glass and asbestos fragments
H	Recent Market Garden beds
I	Previous market garden/agricultural area



Note: The extent AEC I and II are only approximate and should be confirmed during site remediation

#### Legend



Area of Environmental Concern



GeoEnviro Consultancy

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Drawn By: AT	Date: 10/4/19
Checked By: SL	Date: 10/4/19
Revision By:	Date:
Scale: Not to Scale	A3

<b>Gran Associates Pty Ltd</b> <b>85 Byron Road and 63 Ingleburn Road Leppington</b> <b>Area of Environmental Concern (AEC) Plan</b>	
<b>Project No: JC18322B</b>	<b>Drawing No: 1A</b>



## APPENDIX A

### Extracts of Previous Report



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## **Report**

**Stage 1 and 2 Contamination Assessment  
Proposed New Amity College Campus  
Lot 1 DP 525996 No 85 Byron Road and  
Lot 2 DP 525996 No 63 Ingleburn Road  
Leppington NSW**

Prepared for  
**Amity College**  
**C/- Gran Associates Pty Ltd**  
**Level 1, 597 Darling Street**  
**ROZELLE NSW 2039**

**Ref: JC18322A-r1(rev2)**  
**May 2019**



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30<sup>th</sup> May 2019

Our Ref: JC18322A-r1(rev2)

Amity College  
C/- Gran Associates Pty Ltd  
Level 1, 597 Darling Street  
ROZELLE NSW 2039

Attention: Mr Peter Reed

Dear Sir

**Re     Stage 1 and 2 Contamination Assessment  
Proposed New Amity College Campus  
Lot 1 DP 525996 No 85 Byron Road and  
Lot 2 DP 525996 No 63 Ingleburn Road, Leppington**

We are pleased to submit our Stage 1 and 2 Contamination Assessment report for the proposed new Amity College Campus to be located at the above address.

This report should be read in conjunction with our Geotechnical and Salinity report (ref JC18322A-r2(rev2) dated May 2019) and attached Important Information about your Environmental Site Assessment Report.

Should you have any queries, please contact the undersigned.

Yours faithfully

**GeoEnviro Consultancy Pty Ltd**

Solern Liew CPEng NER  
Director

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## ***Executive Summary***

This report presents the results of a Stage 1 and 2 Contamination Assessment for the site identified as Lot 1 DP 525996 No 85 Byron Road and Lot 2 DP 525996 No 63 Ingleburn Road, Leppington, as shown on Drawing No 1.

We understand that the site occupies an area of about 3.3 hectares and the major southern and middle portion of the site is Zoned SP2 (Education Establishment) with the front portion of the site Zoned R3 (Residential). The proposed New Amity College Campus will occupy the portion of site Zoned SP2 and based on the masterplan drawings provided, the proposed school buildings will be up to 4 to 5 storeys high and will include a basement level. The objective of this study was to assess if the site is suitable, or may be made suitable for the proposed school development in accordance with SEPP55 Remediation of Land (DUAP, 1998) and applicable guidelines approved by the NSW EPA.

At the time of the site investigation, the site was mainly used for residential with the southern rear portion of the site consisting of medium dense trees. The site has a number of buildings and sheds (Site Features C and E) used for general storage associated with agricultural activities including nursery and machinery maintenance works. Some minor hydrocarbon staining was visible on the surface in the area between the dwelling and the shed (Site Feature C).

In the middle of the site, historical review indicates numerous buildings and sheds (Site Feature F) to have once existed and the rear portion of the site near the western boundary appeared to be originally part of a drainage depression (ie Site Feature G) which has been backfilled.

Soil sampling for initial screening was carried out on the 23<sup>rd</sup> and 24<sup>th</sup> April 2018 and involved drilling of forty boreholes (BH 1 to BH 40). An additional detailed investigation was subsequently carried out on the 8<sup>th</sup> January 2019 to assess the extent of contamination more accurately and this involved excavation and sampling of an additional thirty-eight (TP 1 to TP 38).

Fill ranging from 0.3m to greater than 2.3 thick was encountered in BH 17, 18, 28 and TP 3 to 8, 10, 27 to 29 and 31 comprising of Clayey Silt/Silty Clay, Clayey Silt/Gravelly Silt, Gravelly Silt, Silty Clay and Silty Gravel Silt.

BH 17, 18, 20, 23 and TP 22, 27 and 29 were excavated in the access driveway (Site Feature D) and some (>5%) crushed rock and trace (<5%) of brick fragments were encountered in the fill in BH 17. Some asphalt lumps and crushed rock were encountered in the topsoil/fill in BH 23 in the driveway (Site Feature D).

Rubbish including concrete, brick, plastic metal and glass was encountered within the fill in BH 28, TP 4, 6 to 8 and 10 and this fill appeared to have been placed in the previous depression area (ie Site Feature G). Some asbestos fragments were encountered in the fill in BH 28, TP 6 to 8 and 10.

A trace of plastic was encountered in the topsoil/fill in TP 21 which was excavated in the previous building/shed locations (Site Feature F). A disused asbestos pipe originally connected to the building (Site Feature C) was encountered in TP 31.

The remainder of the site was generally found to be underlain by topsoil and topsoil/fill overlying natural to medium plasticity Silty Clay.

Selected soil samples were analysed for a range of potential contaminants consisting of Heavy metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn), Organochlorine pesticides, Polychlorinated Biphenyls, Total Recoverable Hydrocarbons, Benzene, Toluene, Ethyl Benzene and Xylene, Polycyclic Aromatic Hydrocarbons and asbestos. The results were interpreted by comparison with guideline Criteria recommended by the NSW EPA.

Slightly elevated Zinc concentrations of 550mg/kg and 800mg/kg were encountered in the fill in BH 28 and TP 4 respectively and in TP 8, the concentration of Zinc was found to be 2000mg/kg above the EIL Criteria of 432mg/kg, noting that these samples were taken from the rubbish and asbestos (ie BH 28, TP 6, TP 8 and TP 10) impacted fill in the backfilled depression (Site Feature G).

A slightly elevated concentration of Zinc of 500mg/kg was found in the topsoil sample from TP 1 located in the treed area at the south eastern corner of the site. This concentration was found to be less than 2.5 times the EIL and taking into consideration the background concentration of Zinc within the site, an Upper 95% Confidence Limit of 169mg/kg was calculated and therefore within the EIL, hence acceptable.

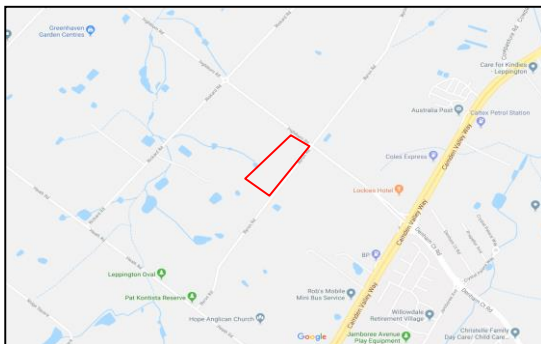
The laboratory test results indicate all other samples to have concentrations of contaminants of concern to be within the Site Criteria or with negligible concentrations

Within the context of the scope of work carried out, we consider the site to have a low risk of gross chemical contaminations, however the site was found to be impacted by buried rubbish/asbestos fill and elevated concentrations of Zinc in the backfilled depression area (Site Feature G) shown as Area 4 in Drawing No 8 with depth of fill ranging from 0.2m to greater than 2.3m.

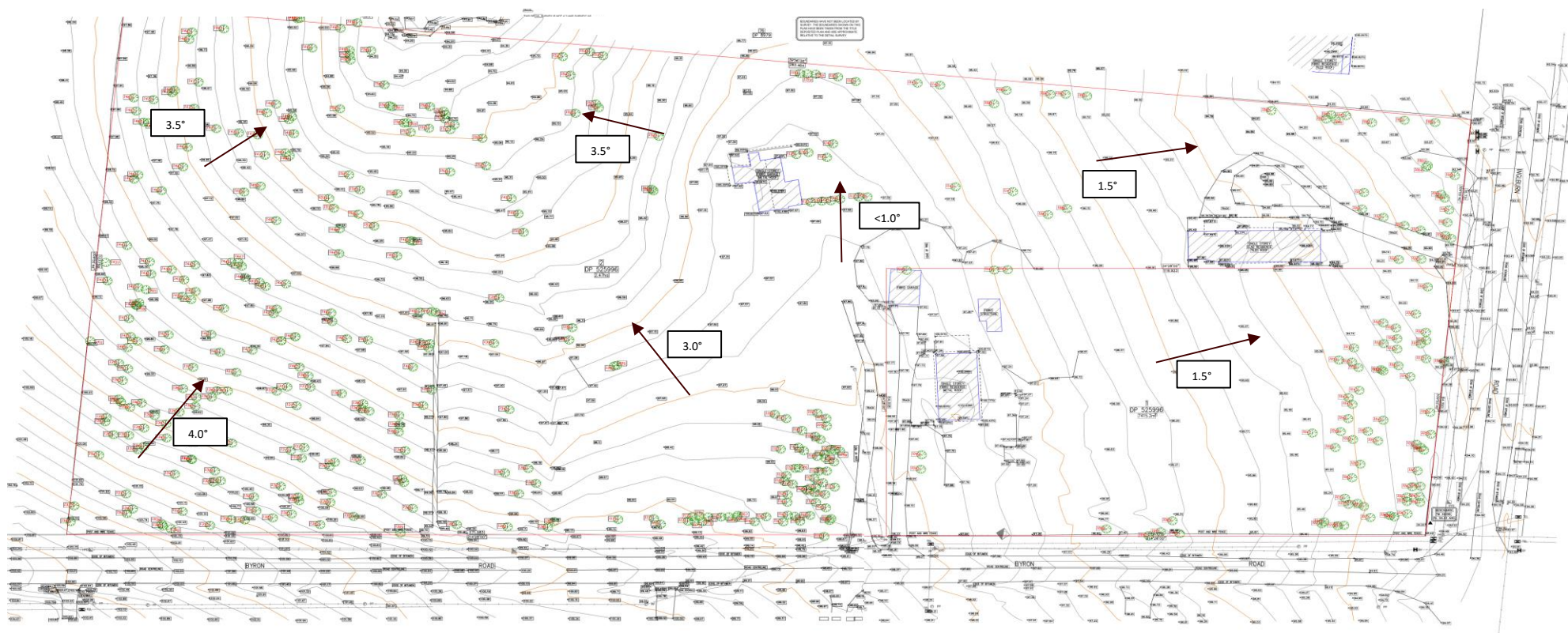
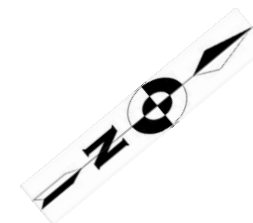
For the proposed school development, site remediation is required to clean up Area 4. We recommend a remediation action plan (RAP) be prepared outlining a remediation strategy to clean up the site to a suitable level for the proposed school development. In addition the areas of hydrocarbon stained soil encountered between the dwelling and sheds (Area 1 - Site Feature C) should be remediated.

Subject to successful remediation works and implementation of the RAP and validation works, the site would be suitable for the proposed school development and comply with SEPP55 Remediation of Land (DUAP, 1998).

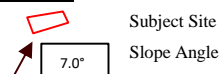




Site Locality



**Legend**



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Drawn By: AT	Date: 1/4/19
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Revision By:	Date:
Scale: Not to Scale	A3

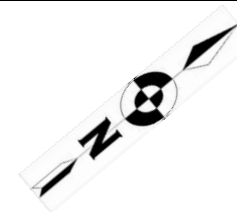
**Gran Associates Pty Ltd**  
**85 Byron Road and 63 Ingleburn Road Leppington**  
**Site Locality and Survey Plan**

**Project No: JC18322A**

**Drawing No:1**



Site Feature	Description
A	Driveway constructed of crushed rock.
B	Single-storey brick, weatherboard and tile dwelling with a metal garage to the rear.
C	Single-storey fibro/metal dwelling with a number of small metal, timber and fibro sheds to the west. Sheds used for storage of miscellaneous items. Some minor hydrocarbon staining visible on surface
D	Driveway constructed of crushed rock, sandstone and traces of building debris (eg bricks and asphalt lumps)
E	Metal, timber and fibro shed with building extensions.
F	Area of previous numerous small buildings and sheds. Previous market garden area (1950s)
G	Backfilled depression with rubbish fill consisting of concrete boulders, bricks, glass and asbestos fragments
H	Recent Market Garden beds
I	Previous market garden/agricultural area



Note: The extent site features are only indicative

#### Legend



Site Feature



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Drawn By: AT	Date: 6/6/18	<b>Gran Associates Pty Ltd</b> <b>85 Byron Road and 63 Ingleburn Road Leppington</b> <b>Site Zoning and Features Plan</b>	
Checked By: SL	Date: 6/6/18		
Revision By:	Date:		
Scale: Not to Scale		A3	Project No: JC18322A Drawing No: 2



**GeoEnviro Consultancy**

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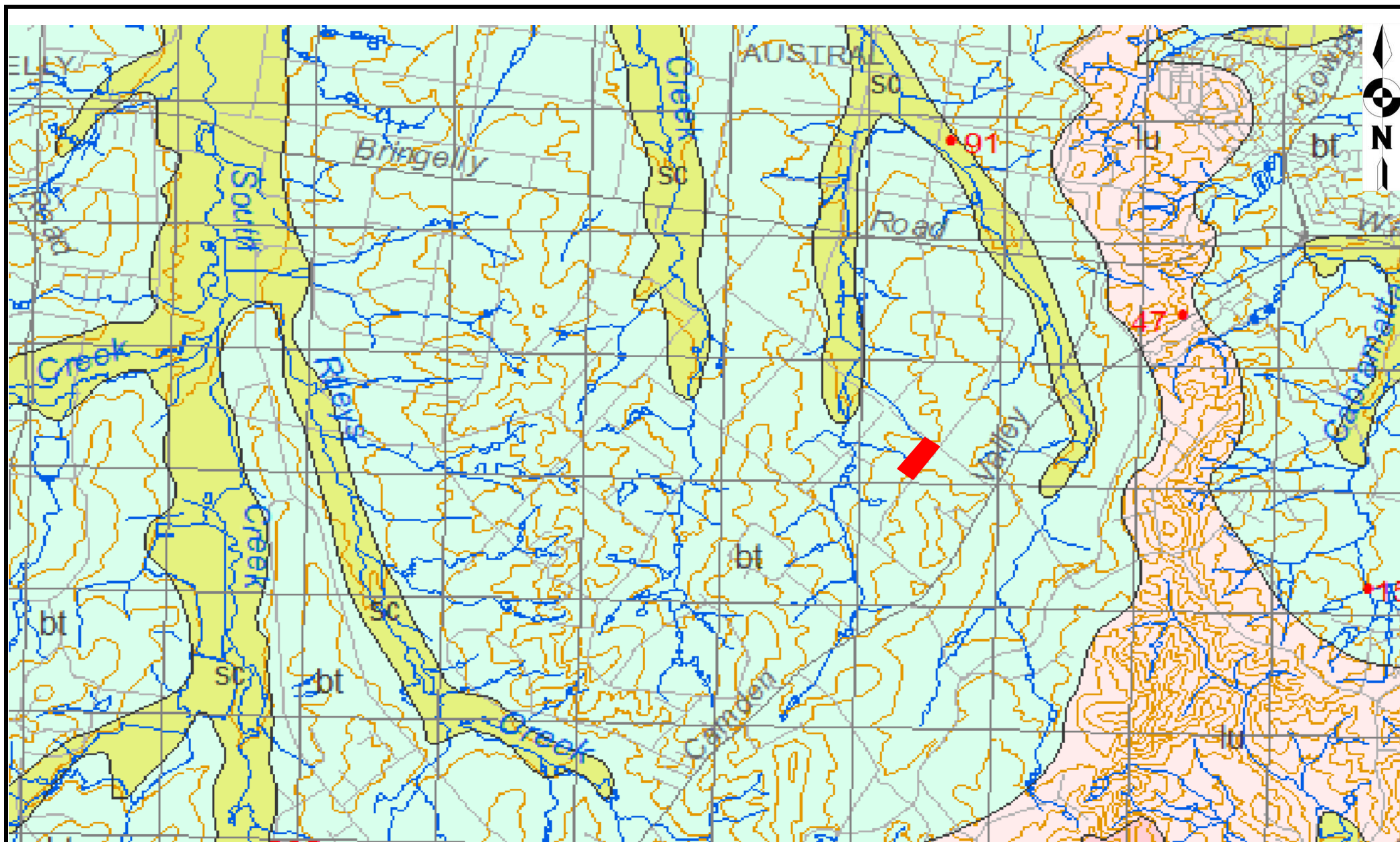
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Checked By: SL	Date: 1/4/19
Revision By:	Date:
Scale: Not to Scale	A3

**Gran Associates Pty Ltd**  
**85 Byron Road and 63 Ingleburn Road Leppington**  
**Proposed Development Plan**

**Project No: JC18322A**

**Drawing No: 3**





# **Legend**

- Subject Site
- bt Blacktown Landscape Group
- sc South Creek Landscape Group
- lu Luddenham Landscape Group

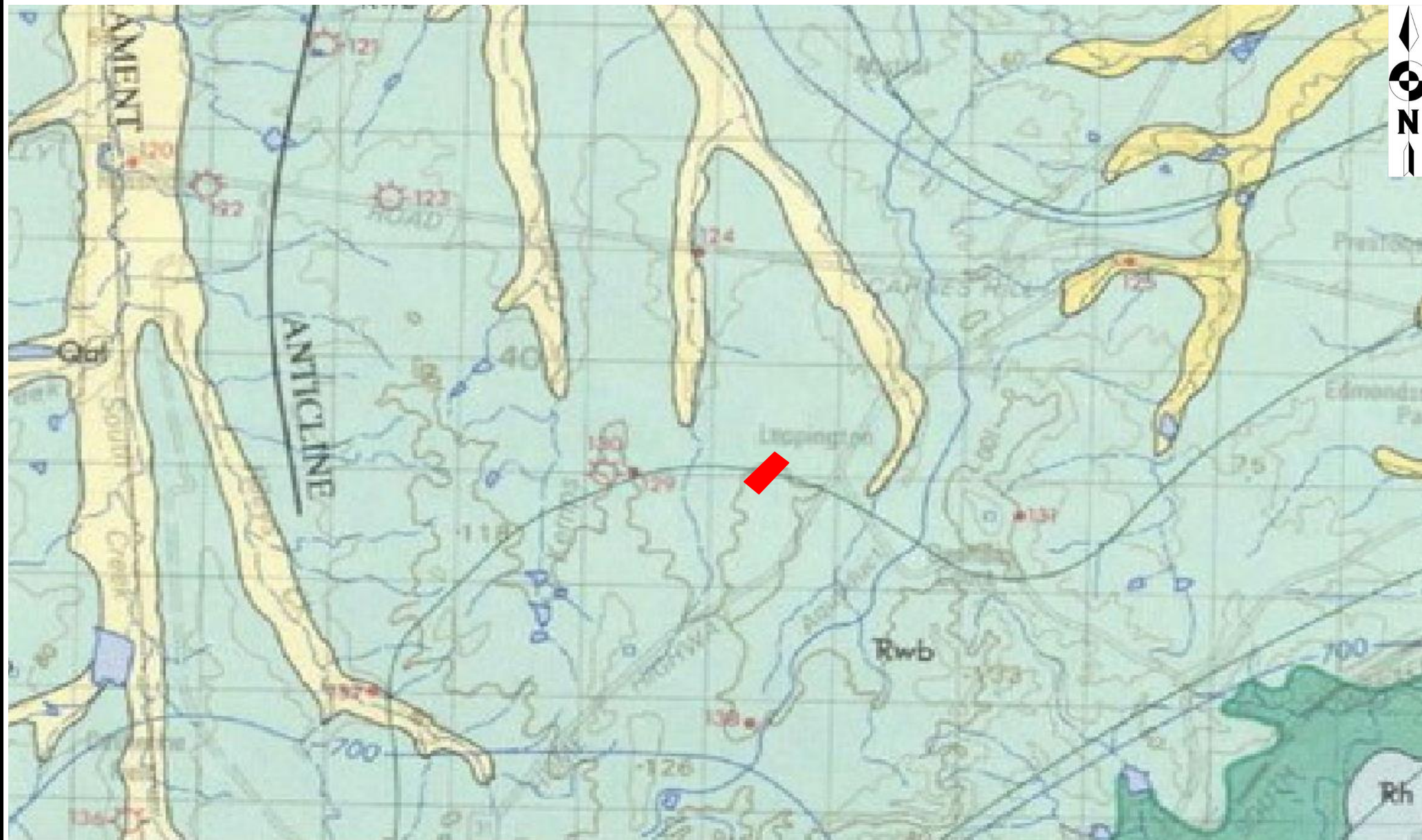


**GeoEnviro Consultancy**

Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia  
Tel: (02) 96798733 Fax: (02) 96798744

Drawn By: AT	Date: 1/4/19
Checked By: SL	Date: 1/4/19
Revision By:	Date:
Scale: Not to Scale	

<b>Gran Associates Pty Ltd</b> <b>85 Byron Road and 63 Ingleburn Road Leppington</b> <b>Soil Landscape Group Map</b>	
Project No: JC18322A	Drawing No: 4



# **Legend**

- Subject Site
- Bringelly Shale (Rwb)
- Fluvial Deposit (Qal)



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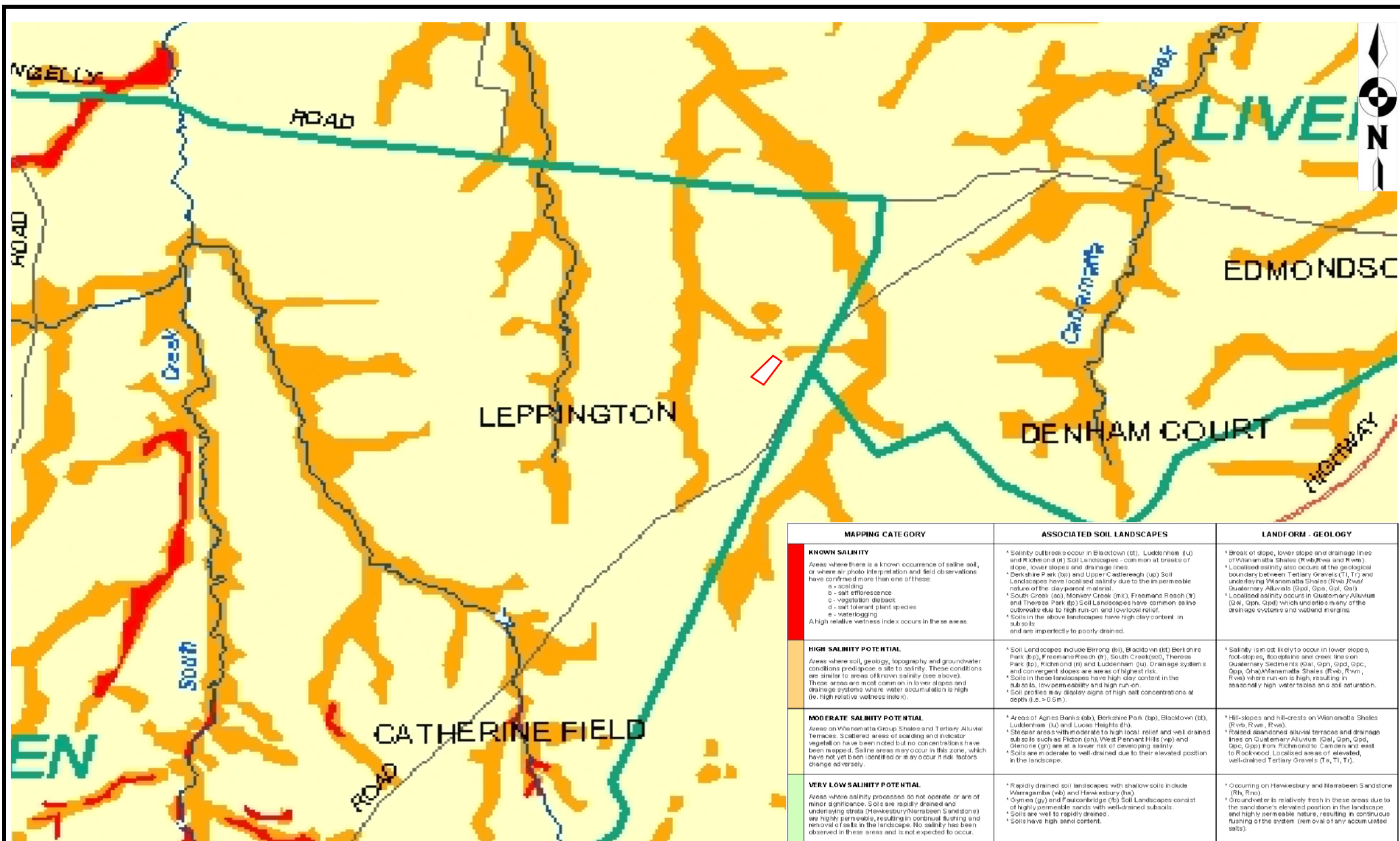
Drawn By: AT	Date: 1/4/19
Checked By: SL	Date: 1/4/19
Revision By:	Date:
Scale: Not to Scale	A3

**Gran Associates Pty Ltd**  
**85 Byron Road and 63 Ingleburn Road Leppington**  
**Geological Unit Map**

**Project No: JC18322A**

**Drawing No: 5**





# Legend

Subject Site



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Date: 1/4/19

Revision By:

Date:

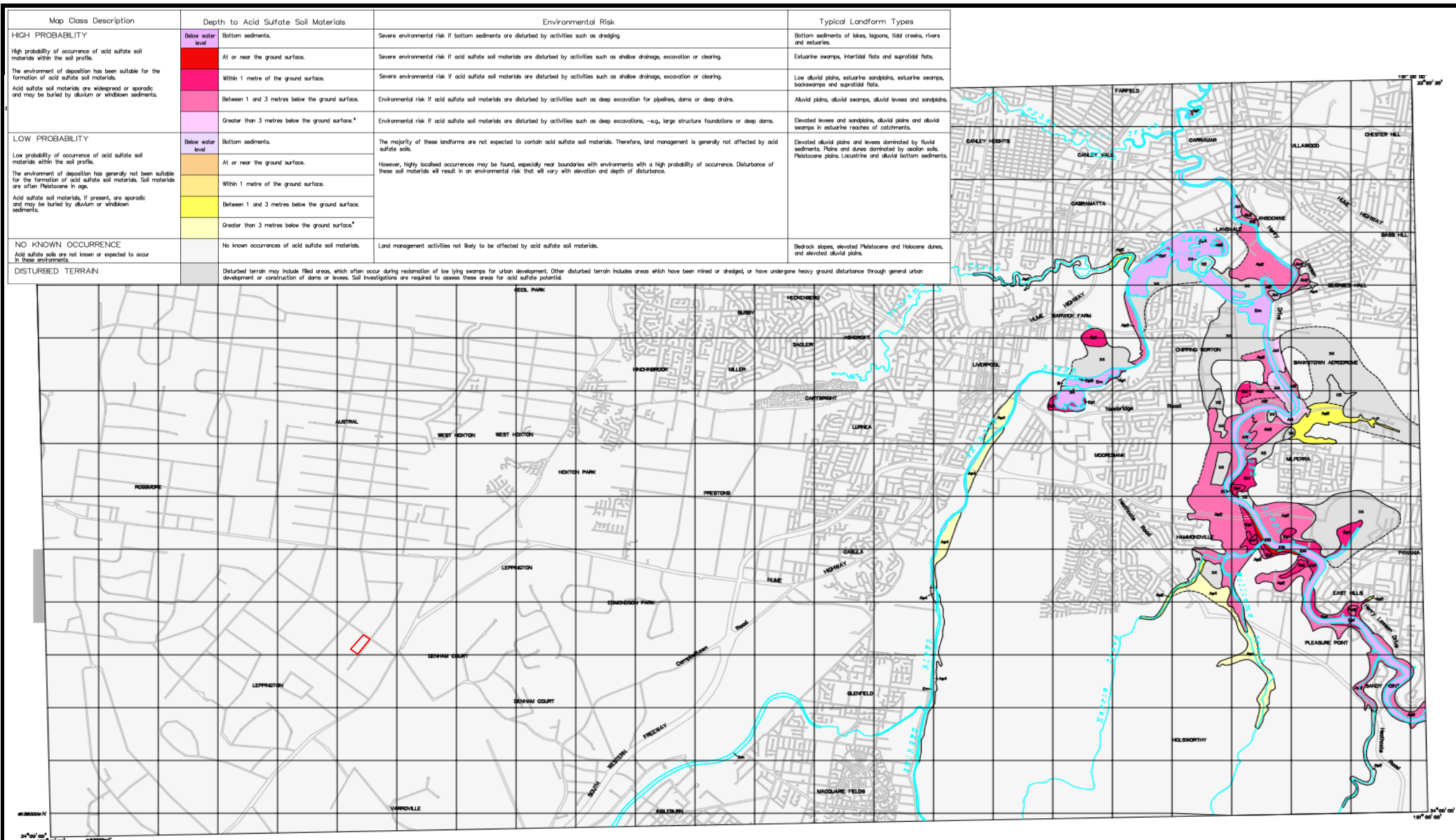
Scale: Not to Scale

A3

**Gran Associates Pty Ltd**  
**85 Byron Road and 63 Ingleburn Road Leppington**  
**Soil Salinity Map**

**Project No: JC18322A**

**Drawing No: 6**



## Legend



Subject Site



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Date: 1/4/19

Checked By: SL

Date: 1/4/19

Revision By:

Date:

Scale: Not to Scale

A3

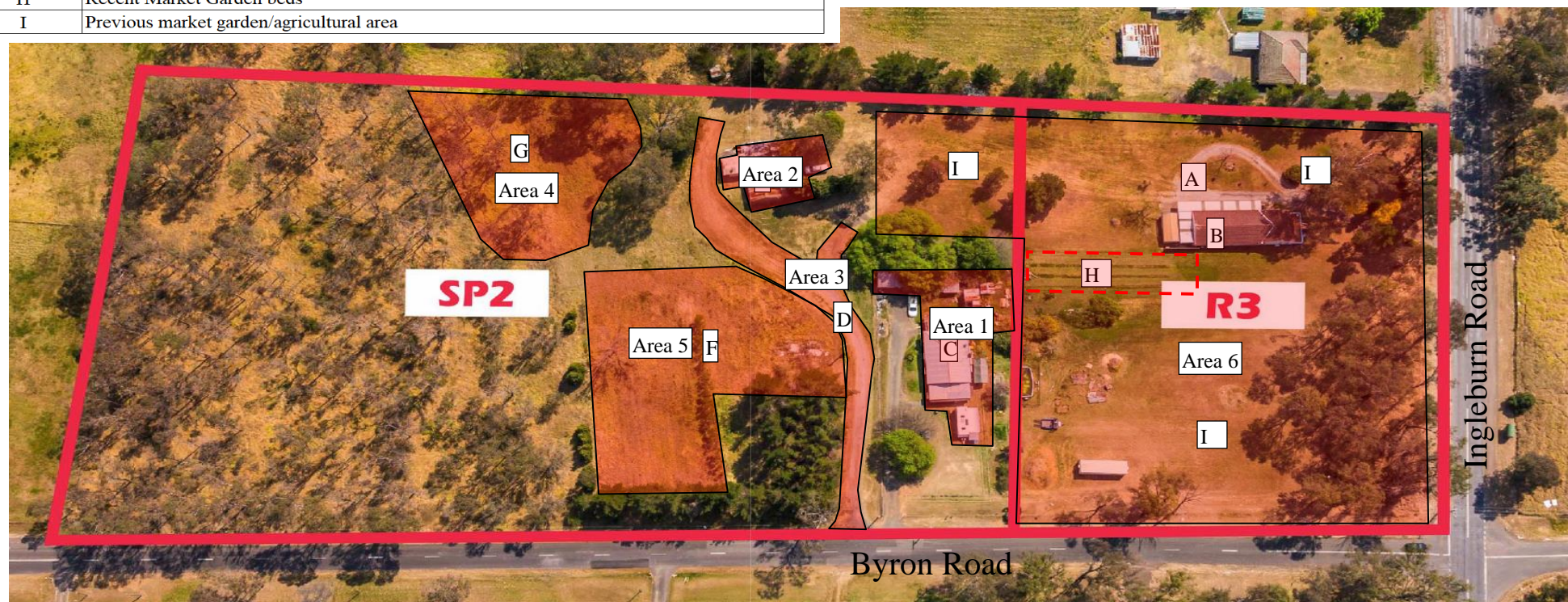
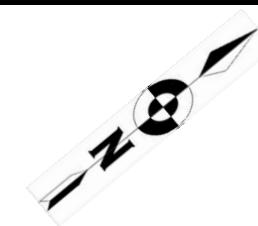
Gran Associates Pty Ltd  
85 Byron Road and 63 Ingleburn Road Leppington  
Acid Sulphate Soil Risk Map

Project No: JC18322A

Drawing No: 7



Site Feature	Description
A	Driveway constructed of crushed rock.
B	Single-storey brick, weatherboard and tile dwelling with a metal garage to the rear.
C	Single-storey fibro/metal dwelling with a number of small metal, timber and fibro sheds to the west. Sheds used for storage of miscellaneous items. Some minor hydrocarbon staining visible on surface
D	Driveway constructed of crushed rock, sandstone and traces of building debris (eg bricks and asphalt lumps)
E	Metal, timber and fibro shed with building extensions.
F	Area of previous numerous small buildings and sheds. Previous market garden area (1950s)
G	Backfilled depression with rubbish fill consisting of concrete boulders, bricks, glass and asbestos fragments
H	Recent Market Garden beds
I	Previous market garden/agricultural area



#### Legend

Area 1

Potential Contaminated Area

Note: The extent Areas 1 to 6 are only indicative



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Revision By:	Date:
Scale: Not to Scale	A3

<b>Gran Associates Pty Ltd</b> <b>85 Byron Road and 63 Ingleburn Road Leppington</b> <b>Potential Contaminated Areas Plan</b>	
<b>Project No: JC18322A</b>	<b>Drawing No: 8</b>





#### Legend



Borehole



**GeoEnviro Consultancy**

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Date: 1/4/19

Checked By: SL

Date: 1/4/19

Revision By:

Date:

Scale: Not to Scale

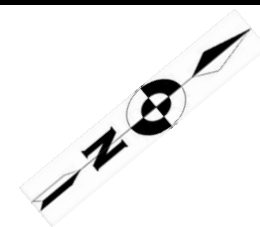
A3

**Gran Associates Pty Ltd**  
**85 Byron Road and 63 Ingleburn Road Leppington**  
**Initial Investigation - Borehole Location Plan**

**Project No: JC18322A**

**Drawing No: 9**





# Legend

 Borehole

## GeoEnviro Consultancy

Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia  
Tel: (02) 96798733 Fax: (02) 96798744

Drawn By: AT

Date: 1/4/19

Checked By: SL

Date: 1/4/19

Revision By:

Date:

Scale: Not to Scale

A3

**Gran Associates Pty Ltd**  
**85 Byron Road and 63 Ingleburn Road Leppington**  
**Additional Investigation - Test Pit Location Plan**

Project No: JC18322A

Drawing No: 10

Test Pit Number	Depth (m)	Profile Type	Description	Visible Contamination (odour, stain, asbestos, inclusion) Yes/No
TP 1	0.00-0.20	Topsoil	Clayey Silt: low liquid limit, brown, dry	No
	0.20-0.50	Natural	(CH) Silty Clay: high plasticity, red brown, dry	No
TP 2	0.00-0.40	Topsoil	Clayey Silt: low liquid limit, brown, dry	No
	0.40-0.70	Natural	(CH) Silty Clay: high plasticity, red brown, dry	No
TP 3	0.00-0.30	Fill	Silty Clay: low to medium plasticity, brown, dry	No
	0.30-0.50	Topsoil	Clayey Silt: low liquid limit, brown, dry	No
	0.50-0.80	Natural	(CH) Silty Clay: high plasticity, red brown, dry	No
TP 4	0.00-1.10	Fill	Silty Clay/Clayey Silt: low plasticity/low liquid limit, brown with some concrete boulders, brick, metal and glass pieces, moist	Yes
	1.10-1.50	Natural	(CI) Silty Clay: medium plasticity, brown grey, dry to moist	No
TP 5	0.00-0.80	Fill	Silty Clay: medium plasticity, brown red with topsoil, dry	No
	0.80-1.10	Topsoil	Clayey Silt: low liquid limit, brown, dry	No
	1.10-1.40	Natural	(CH) Silty Clay: high plasticity, brown red, dry	No
TP 6	0.00-0.30	Fill	Silty Clay/Clayey Silt: low plasticity/low liquid limit, brown with abundant fibro pieces, dry	Yes
	0.30-0.70	Fill	Silty Clay: high plasticity, red brown with gravel, dry	No
	0.70-0.90	Topsoil	Clayey Silt: low liquid limit, brown, dry	No
	0.90-1.20	Natural	(CI) Silty Clay: medium plasticity, brown grey, dry	No
TP 7	0.00-0.40	Fill	Silty Clay/Clayey Silt: low plasticity/low liquid limit, brown with abundant fibro pieces, dry	Yes
	0.40-1.30	Fill	Fill: Silty Clay: medium plasticity, grey brown red with gravel, dry	No
	1.30-1.70	Natural	(CI) Silty Clay: medium plasticity, grey brown, dry to moist	No
TP 8	0.00-0.20	Fill	Silty Clay/Clayey Silt: low plasticity/low liquid limit, brown with 2 fibro pieces, dry	Yes
	0.20-0.40	Topsoil	Clayey Silt: low liquid limit, brown grey, dry	No
	0.40-0.70	Natural	(CI) Silty Clay: medium plasticity, brown grey, dry	No
TP 9	0.00-0.35	Topsoil	Clayey Silt: low liquid limit, brown, dry	No
	0.35-0.60	Natural	(CH) Silty Clay: high plasticity, red brown, dry	No
TP 10	0.00-0.30	Fill	Silty Clay/Clayey Silt: low plasticity/low liquid limit, brown with shale gravel and some concrete pieces, dry	Yes
	0.30-1.20	Fill	Fill: Silty Clay: medium plasticity, grey brown with gravel, dry	No
	1.20-2.30	Fill	Clayey Silt: low liquid limit, brown with some concrete cobble, tile, metal, plastic, bricks and fibro pieces, dry (refusal on concrete)	Yes

Estimated Percentage Foreign Inclusion

Trace = <5%'

Some = >5%



**GeoEnviro  
Consultancy**

**TABLE 1 (Page 1 of 4)**  
**SUMMARY OF SOIL PROFILE**

Gran Associates Pty Ltd  
Proposed Amity College  
85 Byron Road and 63 Ingleburn Road Leppington

Test Pit Number	Depth (m)	Profile Type	Description	Visible Contamination (odour, staining, asbestos) Yes/No
TP 11	0.00-0.20 0.20-0.50	Topsoil/Fill Natural	Clayey Silt: low liquid limit, brown with gravel, dry (CH) Silty Clay: high plasticity, red brown, dry	No No
TP 12	0.00-0.40 0.40-0.70	Topsoil Natural	Clayey Silt: low liquid limit, brown, dry (CH) Silty Clay: high plasticity, red brown, dry	No No
TP 13	0.00-0.45 0.45-0.70	Topsoil Natural	Clayey Silt: low liquid limit, brown, dry to moist (CH) Silty Clay: high plasticity, red brown, dry to moist	No No
TP 14	0.00-0.30 0.30-0.60	Topsoil Natural	Clayey Silt: low liquid limit, brown, dry (CH) Silty Clay: high plasticity, red brown, dry	No No
TP 15	0.00-0.35 0.35-0.70	Topsoil Natural	Clayey Silt: low liquid limit, brown, dry (CH) Silty Clay: high plasticity, red brown, dry	No No
TP 16	0.00-0.40 0.40-0.70	Topsoil/Fill Natural	Clayey Silt; Low liquid limit, brown with gravel and trace of 1 tile fragments, dry (CH) Silty Clay: high plasticity, red brown, dry	No No
TP 17	0.00-0.30 0.30-0.60	Topsoil/Fill Natural	Clayey Silt: low liquid limit, brown with some clay, dry (CH) Silty Clay: high plasticity, red brown, dry	No No
TP 18	0.00-0.30 0.30-0.60	Topsoil/Fill Natural	Clayey Silt: low liquid limit, brown with some clay, dry (CH) Silty Clay: high plasticity, red brown, dry	No No
TP 19	0.00-0.35 0.35-0.60	Topsoil Natural	Clayey Silt: low liquid limit, brown with some clay, dry (CH) Silty Clay: high plasticity, red brown, dry	No No
TP 20	0.00-0.40 0.40-0.70	Topsoil Natural	Clayey Silt: low liquid limit, brown, dry (CH) Silty Clay: high plasticity, brown red, dry	No No
TP 21	0.00-0.30 0.30-0.60	Topsoil Natural	Clayey Silt: low liquid limit, brown with some clay, dry (CH) Silty Clay: high plasticity, red brown, dry	No No
TP 22 Driveway	0.00-0.20 0.20-0.50	Topsoil/Fill Natural	Clayey Silt: low liquid limit, brown with gravel, dry (CH) Silty Clay: high plasticity, brown, dry	No No

Estimated Percentage Foreign Inclusion

Trace = <5%

Some = >5%



**TABLE 1 (Page 2 of 4)**  
**SUMMARY OF SOIL PROFILE**

Gran Associates Pty Ltd  
Proposed Amity College  
85 Byron Road and 63 Ingleburn Road Leppington



Test Pit Number	Depth (m)	Profile Type	Description	Visible Contamination (odour, staining, asbestos) Yes/No
TP 23	0.00-0.15	Topsoil	Clayey Silt: low liquid limit, brown, moist to wet	No
	0.15-0.30	Natural	(CH) Silty Clay: high plasticity, red brown, moist	No
TP 24	0.00-0.20	Topsoil/Fill	Clayey Silt: low liquid limit, brown, moist	No
	0.20-0.70	Natural	(CH) Silty Clay: high plasticity, red brown, moist	No
TP 25	0.00-0.25	Topsoil/Fill	Clayey Silt: low liquid limit, brown with shale gravel, dry	No
	0.25-0.50	Natural	(CH) Silty Clay: high plasticity, red brown, dry	No
TP 26	0.00-0.20	Topsoil/Fill	Clayey Silt: low liquid limit, brown with shale gravel, dry	No
	0.20-0.50	Natural	(CH) Silty Clay: high plasticity, brown red, dry	No
TP 27 Driveway	0.00-0.15	Fill	Silty Gravel: fine to medium grained, grey, dry	No
	0.15-0.30	Fill	Gravelly Silt: low liquid limit, dark grey, dry	No
	0.30-0.60	Natural	(CH) Silty Clay: high plasticity, brown red, dry	No
TP 28	0.00-0.25	Topsoil/Fill	Clayey Silt: low liquid limit, brown, dry	No
	0.25-0.40	Fill	Silty Clay: medium plasticity, grey brown, dry	No
	0.40-0.60	Natural	(CH) Silty Clay: high plasticity, red brown, dry	No
TP 29 Driveway	0.00-0.20	Fill	Silty Gravel: fine to medium grained, grey, dry	No
	0.20-0.50	Natural	(CH) Silty Clay: high plasticity, brown red, dry	No
TP 30	0.00-0.30	Topsoil/Fill	Clayey Silt: low liquid limit, brown, dry to moist	No
	0.30-0.60	Natural	(CH) Silty Clay: high plasticity, brown red, dry to moist	No
TP 31	0.00-0.30	Fill	Fill: Silty Clay: low to medium plasticity, brown with sand and an intact asbestos pipe, moist	Yes
	0.30-0.50	Natural	(CH) Silty Clay: high plasticity, brown red, moist	No
TP 32	0.00-0.30	Topsoil	Clayey Silt: low liquid limit, brown, dry	No
	0.30-0.60	Natural	(CH) Silty Clay: high plasticity, red brown, dry	No
TP 33	0.00-0.15	Topsoil	Clayey Silt: low liquid limit, brown with some gravel, dry	No
	0.15-0.40	Natural	(CH) Silty Clay: high plasticity, red brown, dry to moist	No
TP 34	0.00-0.20	Topsoil	Clayey Silt: low liquid limit, brown, moist	No
	0.20-0.40	Natural	(CH) Silty Clay: high plasticity, red brown, moist	No

Estimated Percentage Foreign Inclusion

Trace = <5%

Some = >5%



**TABLE 1 (Page 3 of 4)**  
**SUMMARY OF SOIL PROFILE**

Gran Associates Pty Ltd  
Proposed Amity College  
85 Byron Road and 63 Ingleburn Road Leppington

Test Pit Number	Depth (m)	Profile Type	Description	Visible Contamination (odour, staining, asbestos) Yes/No
TP 35	0.00-0.30	Topsoil	Clayey Silt: low liquid limit, brown, dry to moist	No
	0.30-0.50	Natural	(CH) Silty Clay: high plasticity, red brown, dry to moist	No
TP 36	0.00-0.20	Topsoil	Clayey Silt: low liquid limit, brown with trace of gravel, dry to moist	No
	0.20-0.40	Natural	(CH) Silty Clay: high plasticity, red brown, dry	No
TP 37	0.00-0.25	Topsoil	Clayey Silt: low liquid limit, brown, dry	No
	0.25-0.60	Natural	(CH) Silty Clay: high plasticity, red brown, dry	No
TP 38	0.00-0.20	Topsoil	Clayey Silt: low liquid limit, brown with some gravel, dry to moist	No
	0.20-0.50	Natural	(CH) Silty Clay: high plasticity, red brown, dry to moist	No

Estimated Percentage Foreign Inclusion

Trace = <5%

Some = >5%



**TABLE 1 (Page 4 of 4)**  
**SUMMARY OF SOIL PROFILE**

Gran Associates Pty Ltd  
Proposed Amity College  
85 Byron Road and 63 Ingleburn Road Leppington

Sample	Depths (m)	Sample Date	Sample Type	Composite Schedule Depths (m)			Analysis													
							pH	Heavy Metals							OCP	PCB	TRH	BTEX	PAH	Asbestos
								As	Cd	Cr	Cu	Pb	Hg	Ni	Zn					
C1	0.0-0.1	23/04/2018	Soil	BH 2 (0.0-0.1 m)	BH 3 (0.0-0.1 m)	BH 4 (0.0-0.1 m)		o	o	o	o	o	o	o	o	o				
C2	0.0-0.1	23/04/2018	Soil	BH 9 (0.0-0.1 m)	BH 10 (0.0-0.1 m)	BH 11 (0.0-0.1 m)		o	o	o	o	o	o	o	o	o				
C3	0.0-0.1	23/04/2018	Soil	BH 12 (0.0-0.1 m)	BH 13 (0.0-0.1 m)	BH 14 (0.0-0.1 m)		o	o	o	o	o	o	o	o	o				
C4	0.0-0.1	23/04/2018	Soil	BH 21 (0.0-0.1 m)	BH 25 (0.0-0.1 m)	BH 26 (0.0-0.1 m)		o	o	o	o	o	o	o	o	o				
C5	0.0-0.1	23/04/2018	Soil	BH 24 (0.0-0.1 m)	BH 27 (0.0-0.1 m)	BH 38 (0.0-0.1 m)		o	o	o	o	o	o	o	o	o				
C6	0.0-0.1	23/04/2018	Soil	BH 31 (0.0-0.1 m)	BH 32 (0.0-0.1 m)	BH 33 (0.0-0.1 m)		o	o	o	o	o	o	o	o	o				
C7	0.0-0.1	23/04/2018	Soil	BH 35 (0.0-0.1 m)	BH 36 (0.0-0.1 m)	BH 37 (0.0-0.1 m)		o	o	o	o	o	o	o	o	o				
BH5	0.00-0.10	23/04/2018	Soil				o	o	o	o	o	o	o	o	o	o	o	o	o	o
BH17	0.00-0.10	23/04/2018	Soil				o	o	o	o	o	o	o	o	o	o	o	o	o	o
BH19	0.00-0.10	23/04/2018	Soil				o	o	o	o	o	o	o	o	o	o	o	o	o	o
BH23	0.00-0.10	23/04/2018	Soil				o	o	o	o	o	o	o	o	o	o	o	o	o	o
BH28	0.00-0.10	23/04/2018	Soil				o	o	o	o	o	o	o	o	o	o	o	o	o	o
BH34	0.00-0.10	23/04/2018	Soil				o	o	o	o	o	o	o	o	o	o	o	o	o	o
Duplicate A	-	23/04/2018	Soil				o	o	o	o	o	o	o	o	o	o	o	o	o	o
BH28 - ACM	-	23/04/2018	Material																	o
BH21	0.0-0.1	23/04/2018	Soil												o					
BH25	0.0-0.1	23/04/2018	Soil												o					
BH26	0.0-0.1	23/04/2018	Soil												o					
BH36	0.0-0.1	23/04/2018	Soil												o					
BH36	0.0-0.1	23/04/2018	Soil												o					
BH37	0.0-0.1	23/04/2018	Soil												o					
TP1	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o			
TP2	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o			
TP3	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o			
TP4	0.50-0.60	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP5	0.30-0.40	8/01/2019	Soil																	o
TP6	0.10-0.20	8/01/2019	Soil																	o
TP7	0.30-0.40	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP8	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o			o
TP9	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o			
TP10	1.20-0.30	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP13	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o			
TP14	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP15	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP16	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP17	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o			
TP18	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o			
TP19	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP20	0.00-0.10	8/01/2019	Soil																	o
TP21	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP22	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP23	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP24	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP25	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP26	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP27	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP28	0.00-0.10	8/01/2019	Soil																	o
TP29	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP30	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP31	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP32	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP33	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP34	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP35	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP36	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP37	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o				
TP38	0.00-0.10	8/01/2019	Soil					o	o	o	o	o	o	o	o	o				
Duplicate B	-	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
Duplicate C	-	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
Duplicate D	-	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
Duplicate E	-	8/01/2019	Soil					o	o	o	o	o	o	o	o	o	o	o	o	o
TP6 - Fibro	-	8/01/2019	Material					o	o	o	o	o	o	o	o	o	o	o	o	o
TP8 - Fibro	-	8/01/2019	Material																	o
TP10 - Fibro	-	8/01/2019	Material																	o

Note: O denotes tested



**TABLE 2**  
**Analytical Program**

Gran Associates Pty Ltd  
Proposed Anity College  
85 Byron Road and 63 Ingleburn Road Leppington

**Composite Sample**

Sample	Depths (m)	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
C1	0.0-0.1	8	<0.4	20	13	23	<0.1	5	18
C2	0.0-0.1	7	<0.4	19	13	19	<0.1	4	19
C3	0.0-0.1	9	<0.4	19	23	25	<0.1	5	120
C4	0.0-0.1	7	<0.4	17	25	45	<0.1	11	<b>170</b>
C5	0.0-0.1	7	<0.4	15	16	21	<0.1	13	50
C6	0.0-0.1	4	<0.4	18	20	21	<0.1	10	39
C7	0.0-0.1	6	<0.4	17	23	32	<0.1	12	<b>160</b>
Modified HBILs 'A' Criteria		33	7	33 (VI)	2000	100	13	133	2467
Modified EIL Criteria <sup>2</sup>		#REF!		#REF!	#REF!	#REF!		#REF!	#REF!

**Individual Samples**

Sample	Depths (m)	pH	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
BH5	0.00-0.10	6.3	13	<0.4	18	18	30	<0.1	4	20
BH17	0.00-0.10	6.8	7	0.5	25	56	92	<0.1	15	430
BH19	0.00-0.10		7	<0.4	17	15	27	<0.1	6	52
BH23	0.00-0.10		11	<0.4	13	19	26	<0.1	13	150
BH28	0.00-0.10	6.9	10	0.6	17	90	120	<0.1	17	<b>550</b>
BH34	0.00-0.10		5	<0.4	17	23	20	<0.1	11	43
Duplicate A	-		13	<0.4	17	18	30	<0.1	4	20
BH21	0.0-0.1									430
BH25	0.0-0.1									63
BH26	0.0-0.1									40
BH36	0.0-0.1									51
BH36	0.0-0.1									220
BH37	0.0-0.1									19
TP1	0.00-0.10		4	<0.4	18	20	91	0.3	14	<b>500</b>
TP2	0.00-0.10		6	<0.4	17	16	25	0.2	9	35
TP3	0.00-0.10		12	<0.4	15	30	22	0.2	12	74
TP4	0.50-0.60		9	2	19	45	59	0.2	16	<b>800</b>
TP7	0.30-0.40		10	0.4	18	26	51	0.2	9	350
TP8	0.00-0.10		7	0.4	24	170	89	0.1	170	<b>2000</b>
TP9	0.00-0.10		9	<0.4	20	23	35	0.2	12	41
TP10	1.20-0.30		5	<0.4	14	36	13	0.3	38	58
TP13	0.00-0.10		6	<0.4	17	22	29	0.2	13	48
TP14	0.00-0.10		6	<0.4	18	25	50	0.1	14	50
TP15	0.00-0.10		6	<0.4	16	24	27	0.1	13	43
TP17	0.00-0.10		6	<0.4	19	40	57	0.1	14	160
TP18	0.00-0.10		6	<0.4	20	26	28	0.1	10	40
TP19	0.00-0.10		6	<0.4	18	19	24	<0.1	25	90
TP21	0.00-0.10		9	0.6	14	14	34	<0.1	8	68
TP22	0.00-0.10		7	<0.4	15	9	15	<0.1	8	44
TP23	0.00-0.10		10	<0.4	16	16	110	0.1	9	150
TP24	0.00-0.10		9	<0.4	19	21	42	<0.1	14	120
TP25	0.00-0.10		12	0.6	33	46	130	0.1	22	280
TP26	0.00-0.10		6	<0.4	14	19	39	<0.1	9	98
TP27	0.00-0.10		4	<0.4	15	20	16	0.1	14	41
TP29	0.00-0.10		<4	<0.4	72	34	11	0.2	70	49
TP30	0.00-0.10		7	1	22	40	110	0.1	21	250
TP31	0.00-0.10		6	<0.4	9	33	52	<0.1	9	360
TP32	0.00-0.10		8	0.8	19	25	32	0.1	17	50
TP33	0.00-0.10		8	<0.4	15	16	32	<0.1	5	56
TP34	0.00-0.10		9	<0.4	18	27	160	<0.1	8	110
TP35	0.00-0.10		14	<0.4	18	34	59	<0.1	6	240
TP36	0.00-0.10		13	<0.4	19	24	37	<0.1	4	23
TP37	0.00-0.10		11	<0.4	21	30	31	<0.1	7	24
TP38	0.00-0.10		12	<0.4	19	21	32	<0.1	4	19
Duplicate B	-		7	<0.4	16	23	39	<0.1	10	110
Duplicate C	-		7	<0.4	13	50	44	<0.1	8	330
Duplicate D	-		5	<0.4	14	15	24	<0.1	41	84
Duplicate E	-		7	<0.4	17	24	81	<0.1	7	90
HBILs 'A' Criteria			100	20	100 (VI)	6000	300	40	400	7400
EIL Criteria			#REF!	NA	#REF!	#REF!	#REF!	NA	#REF!	#REF!

**EIL Derivation**

ABC <sup>3</sup>	#REF!	NA	#REF!	#REF!	#REF!	#REF!	NA	#REF!	#REF!
ACL <sup>4</sup>	#REF!	NA	#REF!	#REF!	#REF!	#REF!	NA	#REF!	#REF!

**Notes**

- 1) All results are expressed as mg/kg and pH (units).
- 2) Figures in bold italics that are underlined exceed the modified HBILs 'A' or HBIL 'A' Criteria
- 3) Figures in bold italics exceed the modified EIL or EIL Criteria
- 4) Ambient Background Concentrations
- 4) Added Contaminant Limits



**TABLE 3**  
**Summary of Analytical Results - Heavy Metals**  
 Gran Associates Pty Ltd  
 Proposed Amity College  
 85 Byron Road and 63 Ingleburn Road Leppington



### Composite Sample

Sample	Depths (m)	HCB	alpha-BHC	gamma-BHC	beta-BHC	Heptachlor	delta-BHC	Aldrin	Heptachlor Epoxide	gamma-Chlordane	alpha-chlordane	Endosulfan I	pp-DDE	Dieldrin	Endrin	pp-DDD	Endosulfan II	pp-DDT	Endrin Aldelyde	Endosulfan Sulphate	Methoxychlor	Total OCP
C1	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
C2	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
C3	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2
C4	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
C5	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
C6	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
C7	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
Modified HBILs 'A' Criteria		3			2			2		17	90	80	2	3	80		80				100	

### Individual Sample

[illegible]

## Notes

1) All results are expressed as mg/kg and pH (units).

2) Figures in bold italics exceed the modified HBILs 'A' or HBIL 'A' Criteria



**TABLE 4**  
**Summary of Analytical Results - OCF**

Gran Associates Pty Ltd  
Proposed Amity College  
85 Byron Road and 63 Ingleburn Road Leppington

**Composite Sample**

Sample	Depths (m)	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	Total PCB
C1	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
C2	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
C3	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
C4	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
C5	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
C6	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
C7	0.0-0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
<b>Modified HBILs 'A' Criteria</b>									<b>0.3</b>

**Individual Sample**

Sample	Depths (m)	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	Total PCB
BH5	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
BH17	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
BH19	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
BH23	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
BH28	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
BH34	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
Duplicate A	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP1	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP2	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP3	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP4	0.50-0.60	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP7	0.30-0.40	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP8	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP9	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP10	1.20-0.30	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP13	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP14	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP15	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP17	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP18	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP19	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP21	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP23	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP24	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP25	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP26	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP30	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP31	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP32	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP33	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP34	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP35	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP36	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP37	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
TP38	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
Duplicate B	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
Duplicate C	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
Duplicate D	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
Duplicate E	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ND
<b>HBILs 'A' Criteria</b>									<b>1</b>

**Notes**

- 1) All results are expressed as mg/kg and pH (units).
- 2) Figures in bold italics exceed the modified HBILs 'A' or HBIL 'A' Criteria



**TABLE 5**  
**Summary of Analytical Results - PCB**

Gran Associates Pty Ltd  
Proposed Amity College  
85 Byron Road and 63 Ingleburn Road Leppington

Sample	Depths (m)	C <sub>6</sub> -C <sub>9</sub>	C <sub>10</sub> -C <sub>14</sub>	C <sub>15</sub> -C <sub>28</sub>	C <sub>29</sub> -C <sub>36</sub>	C <sub>10</sub> -C <sub>36</sub>	F1 <sup>(4)</sup> C <sub>6</sub> -C <sub>10</sub>	F2 <sup>(5)</sup> >C <sub>10</sub> -C <sub>16</sub>	F3 C <sub>16</sub> -C <sub>34</sub>	F4 C <sub>34</sub> -C <sub>40</sub>	Volatile Organic Compounds (VOC)					
											Benzene	Toluene	Ethylbenzene	m+p-xylene	o-Xylene	Naphthalene
BH5	0.00-0.10	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
BH17	0.00-0.10	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
BH19	0.00-0.10	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
BH23	0.00-0.10	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
BH28	0.00-0.10	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
BH34	0.00-0.10	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
Duplicate A	-	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP4	0.50-0.60	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP7	0.30-0.40	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP10	1.20-0.30	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP15	0.00-0.10	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP19	0.00-0.10	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP21	0.00-0.10	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP22	0.00-0.10	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP23	0.00-0.10	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP24	0.00-0.10	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP25	0.00-0.10	<25	<50	<100	120	120	<25	<50	130	<100	<0.2	<0.5	<1	<2	<1	<1
TP26	0.00-0.10	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP27	0.00-0.10	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP29	0.00-0.10	<25	<50	<100	<100	<250	<25	<50	<100	<100						
TP30	0.00-0.10	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP31	0.00-0.10	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP32	0.00-0.10	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP33	0.00-0.10	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP34	0.00-0.10	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
TP35	0.00-0.10	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
Duplicate B	-	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
Duplicate C	-	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
Duplicate D	-	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
Duplicate E	-	<25	<50	<100	<100	<250	<25	<50	<100	<100	<0.2	<0.5	<1	<2	<1	<1
NSW DEC (1994)		65				1000					1	1.4	3.1	14		
HSLs 'A and B' Criteria (CLAY)							50	280			0.7	480	480	110	5	
							90				1			310		
							150				2					
							290				3					
ESL Criteria							180	120	1300	5600	65	105	125	45		

Notes

- 1) All results are expressed as mg/kg unless otherwise specified
- 2) Figures in bold exceed the NSW DEC criteria
- 3) ND Not detected
- 4) F1 is C<sub>6</sub>-C<sub>10</sub> minus the sum of the BTEX concentrations
- 5) F2 is >C<sub>10</sub>-C<sub>16</sub> Minus Naphthalene
- 6) Figures in bold italics that have been underlined exceed the HSLs 'A and B' Criteria
- 7) Figures in bold italics exceed the ESL Criteria



**TABLE 6**  
**Summary of Analytical Results - TRH and VOC**

Gran Associates Pty Ltd  
Proposed Amity College  
85 Byron Road and 63 Ingleburn Road Leppington

Sample	Depths (m)	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a,h)anthracene	Benzo(g,h,i)perylene	Benzo(a)pyrene TEQ	Total PAHs
BH5	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
BH17	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
BH19	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
BH23	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
BH28	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
BH34	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
Duplicate A	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
TP4	0.50-0.60	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
TP7	0.30-0.40	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
TP10	1.20-0.30	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
TP15	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
TP19	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
TP21	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
TP22	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
TP23	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
TP24	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
TP25	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
TP26	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	0.1
TP27	0.00-0.10	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	0.1	0.1	<0.1	<0.1	<0.2	0.06	<0.1	<0.1	<0.1	<0.5	0.36
TP29	0.00-0.10	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.2	0.1	<0.1	<0.1	0.2	<0.5	0.5
TP30	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
TP31	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
TP32	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
TP33	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
TP34	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
TP35	0.00-0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
Duplicate B	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
Duplicate C	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
Duplicate D	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
Duplicate E	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.05	<0.1	<0.1	<0.1	<0.5	ND
<b>HBILs 'A' Criteria</b>		<b>3</b>															<b>3*</b>	<b>300</b>
<b>ESL Criteria</b>												0.7						

Notes

- 1) All results are expressed as mg/kg
- 2) Figures in bold italics that have been underlined exceed the HBILs 'A' Criteria
- 3) Figures in bold italic exceed the ESL Criteria

\* B(a)P TEQ is calculated by multiplying the concentration of each carcinogenic PAH in the sample by its B(a)P TEF, given below, and summing these products

PAH Species	TEF
Benzo(a)anthracene	0.1
Benzo(a)pyrene	1
Benzo(b+j)fluoranthene	0.1
Benzo(k)fluoranthene	0.1
Benzo(g,h,i)perylene	0.01
Chrysene	0.01
Dibenzo(a,h)anthracene	1
Indeno(1,2,3-c,d)pyrene	0.1



## GeoEnviro Consultancy **TABLE 7** **Summary of Analytical Results - PAH**

Gran Associates Pty Ltd  
Proposed Amity College  
85 Byron Road and 63 Ingleburn Road Leppington

Sample	Depths (m)	Asbestos
BH5	0.00-0.10	ND
BH17	0.00-0.10	ND
BH19	0.00-0.10	ND
BH23	0.00-0.10	ND
BH28	0.00-0.10	ND
BH34	0.00-0.10	ND
BH28 - ACM	-	Chrysotile Asbestos
TP4	0.50-0.60	ND
TP5	0.30-0.40	ND
TP6	0.10-0.20	ND
TP7	0.30-0.40	ND
TP10	1.20-0.30	ND
TP15	0.00-0.10	ND
TP16	0.00-0.10	ND
TP19	0.00-0.10	ND
TP20	0.00-0.10	ND
TP21	0.00-0.10	ND
TP22	0.00-0.10	ND
TP23	0.00-0.10	ND
TP24	0.00-0.10	ND
TP25	0.00-0.10	ND
TP26	0.00-0.10	ND
TP27	0.00-0.10	ND
TP28	0.00-0.10	ND
TP29	0.00-0.10	ND
TP30	0.00-0.10	ND
TP31	0.00-0.10	ND
TP32	0.00-0.10	ND
TP33	0.00-0.10	ND
TP34	0.00-0.10	ND
TP35	0.00-0.10	ND
TP6 - Fibro	-	Chrysotile Asbestos
TP8 - Fibro	-	Chrysotile Asbestos
TP10 - Fibro	-	Chrysotile Asbestos
<b>HBILs 'A' Criteria</b>		<b>0.01% / 0.001% <sup>1</sup></b>

Note: ND = Not detected

Measured in % w/w

1) Bonded Asbestos Contaminant Material / Fibrous Asbestos and Asbestos Fines

2) Figures in bold italics exceed the HBILs 'A' Criteria



**TABLE 8**

**Summary of Analytical Results - Asbestos**

Gran Associates Pty Ltd  
Proposed Amity College  
85 Byron Road and 63 Ingleburn Road Leppington

Sample	Depths (m)	Metals							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
BH 5	0.00-0.10	13	<0.4	18	18	30	<0.1	4	20
Duplicate A		13	<0.4	17	18	30	<0.1	4	20
Relative Percentage Difference (RPD)		0.0	NA	5.7	0.0	0.0	NA	0.0	0.0

Sample	Depths (m)	OCP	PCB	TRH	BTEX	PAH
BH 5	0.00-0.10	ND	ND	ND	ND	ND
Duplicate A		ND	ND	ND	ND	ND
Relative Percentage Difference (RPD)		NA	NA	NA	NA	NA

Sample	Depths (m)	Metals							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
TP 26	0.00-0.10	6	<0.4	14	19	39	<0.1	9	98
Duplicate B		7	<0.4	16	23	39	<0.1	10	110
Relative Percentage Difference (RPD)		15.4	NA	13.3	19.0	0.0	NA	10.5	11.5

Sample	Depths (m)	OCP	PCB	TRH	BTEX	PAH
TP 26	0.00-0.10	ND	ND	ND	ND	ND
Duplicate B		ND	ND	ND	ND	ND
Relative Percentage Difference (RPD)		NA	NA	NA	NA	NA

Sample	Depths (m)	Metals							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
TP 7	0.3-0.4	10	0.4	18	26	51	0.2	9	350
Duplicate C		7	<0.4	13	50	44	<0.1	8	330
Relative Percentage Difference (RPD)		35.3	NA	32.3	63.2	14.7	NA	11.8	5.9

Sample	Depths (m)	OCP	PCB	TRH	BTEX	PAH
TP 7	0.3-0.4	ND	ND	ND	ND	ND
Duplicate C		ND	ND	ND	ND	ND
Relative Percentage Difference (RPD)		NA	NA	NA	NA	NA

Sample	Depths (m)	Metals							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
TP 19	0.00-0.10	6	<0.4	18	19	24	<0.1	25	90
Duplicate D		5	<0.4	14	15	24	<0.1	41	84
Relative Percentage Difference (RPD)		18.2	NA	25.0	23.5	0.0	NA	48.5	6.9

Sample	Depths (m)	OCP	PCB	TRH	BTEX	PAH
TP 19	0.00-0.10	ND	ND	ND	ND	ND
Duplicate D		ND	ND	ND	ND	ND
Relative Percentage Difference (RPD)		NA	NA	NA	NA	NA

Sample	Depths (m)	Metals							
		Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
TP 34	0.00-0.10	9	<0.4	18	27	160	<0.1	8	110
Duplicate E		7	<0.4	17	24	81	<0.1	7	90
Relative Percentage Difference (RPD)		25.0	NA	5.7	11.8	65.6	NA	13.3	20.0

Sample	Depths (m)	OCP	PCB	TRH	BTEX	PAH
TP 34	0.00-0.10	ND	ND	ND	ND	ND
Duplicate E		ND	ND	ND	ND	ND
Relative Percentage Difference (RPD)		NA	NA	NA	NA	NA

Notes

1) All results are expressed as mg/kg.

2) ND - Not Detected

3) NA - Not Applicable



**GeoEnviro  
Consultancy**

**TABLE 9  
Summary of Analytical Results - Quality Assurance**

Gran Associates Pty Ltd  
Proposed Amity College  
85 Byron Road and 63 Ingleburn Road Leppington



# GeoEnviro Consultancy Pty Ltd

Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia  
Tel: (02) 96798733 Fax: (02) 96798744

## Borehole Report

Borehole no: 1

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 23/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 95.0m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N I L	D R Y	DS				Topsoil: Clayey Silt: low liquid limit, brown with fine grained gravel				
				1.0		CI-CH	Silty Clay: medium to high plasticity, red brown with fine to medium grained gravel	D			
			6,20/30mm						H	>600	V bit refusal at 1.2
T C			N>20			CI	Silty Clay: medium plasticity, grey with heavy ironstaining, and ironstone and siltstone bands	D			
				2.0							
			DS								
				3.0			Interbedded Clay and Siltstone				
							Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				TC bit refusal at 3.8m
				4.0			End of BH 1 at 3.8m				
				5.0							
				6.0							
				7.0							
				8.0							



# GeoEnviro Consultancy Pty Ltd

Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia  
Tel: (02) 96798733 Fax: (02) 96798744

## Borehole Report

Borehole no: 2

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 23/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 94.8m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N	D				CH	Topsoil: Clayey Silt: low liquid limit, brown with trace of fine grained gravel Silty Clay: high plasticity, red brown with fine grained gravel	D			
			7,10,19 N=29	1.0					H	>600	
T				2.0		CI	Silty Clay: medium plasticity, dark grey brown with ironstaining and fine grained gravel As above but grey with ironstaining and fine grained gravel	D	H	>600	V bit refusal at 1.5m
			8,21,16 /70mm N>37	3.0							
				4.0			Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				
							End of BH 2 at 4.0m				TC bit refusal at 4.0m
				5.0							
				6.0							
				7.0							
				8.0							





# GeoEnviro Consultancy Pty Ltd

Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia  
Tel: (02) 96798733 Fax: (02) 96798744

## Borehole Report

Borehole no: 3

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 23/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 94.5m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N I L	D R Y					Topsoil: Clayey Silt: low liquid limit, brown with trace of fine grained gravel				
				1.0		CH	Silty Clay: high plasticity, red brown with fine grained gravel	D			
			2,11,22 N=33			CI	Gravelly Silty Clay: medium plasticity, red brown with fine to medium grained gravel and ironstone bands	D	H	>600	V bit refusal at 1.5m
T C				2.0		CI	Silty Clay: medium plasticity, grey brown with ironstaining and fine to medium grained gravel	D			
			11,13,19 /50mm N>32	3.0		CI	Gravelly Silty Clay: medium plasticity, red grey with fine to medium grained gravel	D	H	>600	SPT bouncing at 2.85m
							End of BH 3 at 3.4m				TC but refusal at 3.4m
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



# GeoEnviro Consultancy Pty Ltd

Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia  
Tel: (02) 96798733 Fax: (02) 96798744

## Borehole Report

Borehole no: 4

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 23/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 93.8m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N I L	D R Y					Topsoil: Clayey Silt: low liquid limit, brown with trace of fine grained gravel				
			5,13,18 N=31	1.0		CI-CH	Silty Clay: medium to high plasticity, brown with fine to medium grained gravel	D			
						CI	Silty Clay: medium plasticity, grey brown with ironstaining and fine to medium grained gravel	H		>600	V bit refusal at 1.5m
T C			10,15,21 N=36	2.0			As above but grey with ironstaining and ironstone bands				
				3.0				H		>600	
							Shale/Siltstone: brown grey, low strength, extremely weathered to distinctly weathered				
							End of BH 4 at 3.4m				
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



# GeoEnviro Consultancy Pty Ltd

Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia  
Tel: (02) 96798733 Fax: (02) 96798744

## Borehole Report

Borehole no: 5

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 23/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 94.8m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	I	D	DS				Topsoil: Clayey Silt: low liquid limit, brown with trace of fine grained gravel				
			DS			CH	Silty Clay: high plasticity, red brown with fine to medium grained gravel	D			
			DS								
			6,11,13 N=24	1.0		CI	Silty Clay: medium plasticity, grey with ironstaining and trace of ironstone bands	H		>600	
T	C		8,17 /30mm N>17	2.0			As above but with siltstone bands	H		>600	SPT bouncing at 2.68m V bit refusal at 2.7m
				3.0			Siltstone: brown and grey, low to medium strength, extremely weathered to distinctly weathered				
				4.0							TC bit refusal at 4.0m
							End of BH 5 at 4.0m				
				5.0							
				6.0							
				7.0							
				8.0							



# GeoEnviro Consultancy Pty Ltd

Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia  
Tel: (02) 96798733 Fax: (02) 96798744

## Borehole Report

Borehole no: 6

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 23/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 95.8m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N	D				CH	Topsoil: Clayey Silt: low liquid limit, brown with trace of fine grained gravel	D			
	I	R		1.0		CI	Silty Clay: high plasticity, red brown with fine grained gravel				
	L	Y	5,14,16 N=30				Silty Clay: medium plasticity, brown red	H		>600	
				2.0			As above but grey brown with ironstone bands				
				3.0			Siltstone: brown, low to medium strength, distinctly weathered with ironstone bands				V bit refusal at 2.6m
TC											TC bit refusal at 3.3m
				4.0			End of BH 6 at 3.3m				
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 7

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 23/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 95.4m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N	D				CH	Topsoil: Clayey Silt: low liquid limit, brown with trace of fine grained gravel Silty Clay: high plasticity, red brown	D			
	I		10,16,18 N=34	1.0		CI	Silty Clay: medium plasticity, grey brown with trace of ironstaining and ironstone bands		H		
	L		8,12,18 /40mm N>30	2.0							
				3.0			Siltstone: grey, low to medium strength, extremely weathered to distinctly weathered with ironstaining and clay bands				V bit refusal at 2.8m SPT bouncing at 2.84m
TC											TC bit refusal at 3.6m
				4.0			End of BH 7 at 3.6m				
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 8

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 23/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 95.8m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N	D	U50	1.0	CH	CH	Topsoil: Clayey Silt: low liquid limit, brown with trace of fine grained gravel Silty Clay: high plasticity, red brown	D			
			6,11,13 N=24	2.0	CI	CI	Silty Clay: medium plasticity, red and grey	H		>600	
				3.0			Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				V bit refusal at 2.6m TC bit refusal at 3.1
TC				4.0			End of BH 8 at 3.1m				
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 9

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 23/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 96.1m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N	D		1.0		CH	Topsoil: Clayey Silt: low liquid limit, brown with trace of fine grained gravel	D			
	I						Silty Clay: high plasticity, red brown	D			
	L		9,18,24 N=42	2.0		CI	Silty Clay: medium plasticity, grey brown with ironstaining and trace of ironstone bands	H		>600	
				3.0			Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				V bit refusal at 2.8m
TC				4.0			End of BH 9 at 3.6m				TC bit refusal at 3.6m
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 10

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 23/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 96.3m

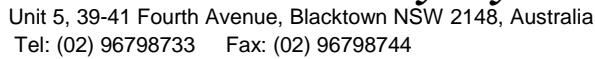
Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N	D	7,8,10 N=18	1.0	CH	CH	Topsoil: Clayey Silt: low liquid limit, brown with trace of fine grained gravel Silty Clay: high plasticity, red brown with trace of fine grained gravel	D	Vst		
				2.0	CI	CI	Silty Clay: medium plasticity, grey red with fine grained gravel As above but grey with iron staining and fine to medium grained gravel	H		>600	
				3.0			End of BH 10 at 2.6m				V bit refusal at 2.6m
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							





Borehole no: 11

Job no: JC18322A

Date: 23/4/18

Logged by: SG

R.L. Surface: 97.1m

Datum: AHD

[illegible]



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## Borehole Report

Borehole no: 12

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 23/4/16

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 96.9m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N	D	4,8,10 N=18	1.0	CH	CH	Topsoil: Clayey Silt: low liquid limit, brown	D	Vst		
				2.0	CI	CI	Silty Clay: high plasticity, red brown	D			
				3.0			Silty Clay: medium plasticity, grey and red with ironstone gravel bands		H	>600	V bit refusal at 2.8m
TC				4.0			Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				TC bit refusal at 3.6m
				5.0			End of BH 12 at 3.6m				
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 13

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 23/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 96.5m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N I L	D R Y					Topsoil: Clayey Silt: low liquid limit, brown with trace of fine grained gravel	D			
				1.0		CI-CH	Silty Clay: medium to high plasticity, red brown with fine grained gravel	D			
T C			4,18 /50mm N>18	2.0		CI	Silty Clay: medium plasticity, grey with ironstaining and ironstone bands	H		>600	SPT bouncing at 1.2m V bit refusal at 1.2m
							Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				
				3.0			End of BH 13 at 2.5m				
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 14

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 23/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 95.9m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N	D	DB	1.0		CH	Topsoil: Clayey Silt: low liquid limit, brown	D			
							Silty Clay: high plasticity, red brown	D			
			8,15,22 N=37			CI	Silty Clay: medium plasticity, grey brown	H		>600	
											V bit refusal at 1.6m
				2.0			End of BH 14 at 1.6m				
				3.0							
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 15

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 24/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 97.4m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N I L	D R Y	DS	1.0		CH	Topsoil: Clayey Silt: low liquid limit, brown	D			
						CI	Silty Clay: high plasticity, red brown	D	(H)		
							Silty Clay: medium plasticity, grey brown with fine grained gravel				V bit refusal at 1.2m
T C							Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				TC bit refusal at 1.8m
				2.0			End of BH 15 at 1.8m				
				3.0							
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 16

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 24/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 97.1m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N	D					Topsoil: Clayey Silt: low liquid limit, brown	D			
	I	R				CH	Silty Clay: high plasticity, red brown	D			
	L	Y									
			5,18,19 N=27	1.0		CI	Silty Clay: medium plasticity, grey brown		H		
											V bit refusal at 1.6m
T	C			2.0			Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				
							End of BH 16 at 2.0m				
				3.0							
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 17

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 24/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 97.8m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N	D	DS				Fill: Clayey Silt/Gravelly Silt: low liquid limit, brown with crushed rock and a trace of brick fragments	D			Driveway
	I	R	DS			CH	Silty Clay: high plasticity, red brown	D			
	L	Y		1.0		CI	Silty Clay: medium plasticity, grey brown		H		SPT bouncing at 1.17m V bit refusal at 1.3m
			15, 12 / 20mm								
			N>12								
T	C			2.0			Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				TC bit refusal at 2.0m
							End of BH 17 at 2.0m				
				3.0							
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 18

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 24/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 98.0m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N	D					Fill: Gravelly Silt: low liquid limit, dark grey	D			Driveway
	I	R				CH	Silty Clay: high plasticity, red brown with fine grained gravel	D			
	L	Y		1.0		CI	Silty Clay: medium plasticity, grey brown with ironstaining and fine grained gravel		H	>600	
			3,10,19 N=29								V bit refusal at 1.6m
				2.0			End of BH 18 at 1.6m				
				3.0							
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							





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## Borehole Report

Borehole no:19

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 24/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 97.7m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N	D	3,4,6 N=10	1.0	CH	CH	Topsoil: Clayey Silt: low liquid limit, brown with fine grained gravel Silty Clay: high plasticity, red brown with fine grained gravel	D	Vst	450	
				2.0	CI	CI	Silty Clay: medium plasticity, grey with ironstaining	H		600	
				3.0			Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				V bit refusal at 2.4m
TC				3.0			End of BH 19 at 3.0m				TC bit refusal at 3.0m
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 20

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 24/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 98.3m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N	D					Topsoil/Fill: Gravelly Clayey Silt: brown	D			Driveway
	I					CH	Silty Clay: high plasticity, red brown with fine grained gravel	D			
	L			1.0		CI	Silty Clay: medium plasticity, grey brown with fine gravel gravel and ironstone bands As above but with siltstone bands		H		SPT bouncing at 1.37m V bit refusal at 1.6m
			6,12,18 /70mm N>30								
T				2.0			Siltstone/Shale: grey brown, low to medium strength, extremely weathered to distinctly weathered				TC bit refusal at 2.4m
				3.0			End of BH 20 at 2.4m				
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 21

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 24/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 97.8m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N	D					Topsoil/fill: Clayey Silt: brown a trace of plastic	D			
	I	R				CH	Silty Clay: high plasticity, red brown	D			
	L	Y				CI	Silty Clay: medium plasticity, grey brown with fine grained gravel	(H)			V bit refusal at 0.9m
TC				1.0			Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				TC bit refusal at 1.4m
				2.0			End of BH 21 at 1.4m				
				3.0							
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 22

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 24/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 97.5m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N	D					Topsoil: Clayey Silt: low liquid limit, brown				
	I					CH	Silty Clay: high plasticity, red brown	D			
	L			1.0		CI	Silty Clay: medium plasticity, grey brown		H		
			14,14,22 N=36								V bit refusal at 1.4m
T				2.0			Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				
											TC bit refusal at 2.2m
				3.0			End of BH 22 at 2.2m				
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 23

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 24/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 97.2m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N	D		1.0	CH		Topsoil/fill: Clayey Silt: low liquid limit, brown with crushed rock with an asphalt lump	D			Driveway
	I	R			CI		Silty Clay: high plasticity, red brown	D			
	L	Y					Silty Clay: medium plasticity, grey brown with fine to medium grained gravel	(H)			V bit refusal at 0.9m
TC							Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				TC refusal at 1.5m
				2.0			End of BH 23 at 1.5m				
				3.0							
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 24

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 24/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 97.0m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	I	R					Topsoil/fill: Clayey Silt: low liquid limit, brown with some gravel	D			
N	L					CH	Silty Clay: high plasticity, red brown	D			
				1.0		CI	Silty Clay: medium plasticity, grey brown		(H)		V bit refusal at 0.9m
							End of BH 24 at 0.9m				
				2.0							
				3.0							
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 25

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 24/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 97.4m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N	D	U50	1.0		CH	Topsoil/Fill: Clayey Silt: low liquid limit, brown	D			
	I	R				CI	Silty Clay: high plasticity, red brown		(H)		
	L	Y					Silty Clay: medium plasticity, grey brown				V bit refusal at 1.0m
T	C						Siltstone: grey brown, low to medium strength, distinctly weathered				TC bit refusal at 1.6m
				2.0			End of BH 25 at 1.6m				
				3.0							
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



# GeoEnviro Consultancy Pty Ltd

Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia  
Tel: (02) 96798733 Fax: (02) 96798744

## Borehole Report

Borehole no: 26

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 24/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 98.4m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N I L	D R Y	DS				Topsoil: Clayey Silt: low liquid limit, brown	D			
			DS			CH	Silty Clay: high plasticity, red brown	D			
				1.0		CI	Silty Clay: medium plasticity, brown and grey with ironstaining				
			3,9,12 N=21				As above with siltstone bands		H	>600	
T C				2.0							V bit refusal at 2.2m
				3.0			Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				TC bit refusal at 3.0m
				4.0			End of BH 26 at 3.0m				
				5.0							
				6.0							
				7.0							
				8.0							





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## Borehole Report

Borehole no: 27

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 24/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 96.2m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N	D	8,12,14 N=26	1.0	CH	CH	Topsoil: Clayey Silt: low liquid limit, brown Silty Clay: high plasticity, red brown with fine grained gravel	D			
	I			2.0	CI	CI	Silty Clay: medium plasticity, grey with ironstaining		H	>600	V bit refusal at 2.7m
TC	L			3.0			Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				TC bit refusal at 3.4m
				4.0			End of BH 27 at 3.4m				
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 28

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 24/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 95.3m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N I L	D R Y	DS				Fill: Clayey Silt/Silty Clay: low liquid limit, brown with Asbestos and tile fragments	D			
			DS								
				1.0		CI-CH	Silty Clay: medium to high plasticity, grey brown with ironstaining				
			5,11,11 N=22			CI	Silty Clay: medium plasticity, grey with ironstaining	H		>600	V bit refusal at 1.9m
T C				2.0							
				3.0			Siltstone/Shale: grey brown, low to medium strength, extremely weathered to distinctly weathered				
							End of BH 28 at 3.2m				TC bit refusal at 3.2m
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 29

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 30/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 94.6m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N	D					Topsoil: Clayey Silt: low liquid limit, brown with trace of fine grained gravel	D			
	I	R				CI-CH	Silty Clay: medium to high plasticity, red brown/grey	D			
	L	Y		1.0							
			12, 18 / 40mm			CI	Silty Clay: medium plasticity, grey with ironstaining and ironstone bands		H	>600	SPT bouncing at 1.19m V bit refusal at 1.2m
TC			N>18				Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				TC bit refusal at 1.7m
				2.0			End of BH 29 at 1.7m				
				3.0							
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 30

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 30/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 95.8m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N I L	D R Y					Topsoil: Clayey Silt: low liquid limit, brown	D			
			U50	1.0		CI-CH	Silty Clay: medium to high plasticity, red brown	D			
			16,16			CI	Silty Clay: medium plasticity, grey brown				
			/120mm					H		>600	V bit refusal at 1.2m SPT bouncing at 1.27m
T C			N>16				Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				TC bit refusal at 1.8m
				2.0			End of BH 30 at 1.8m				
				3.0							
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 31

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 30/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 97.2m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N I L	D R Y	DS				Topsoil: Clayey Silt: low liquid limit, brown	D			
			DS			CI-CH	Silty Clay: medium to high plasticity, red grey	D			
			8,12,19 N=31	1.0		CI	Silty Clay: medium plasticity, grey with ironstaining	H		>600	
T C				2.0			Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				V bit refusal at 1.6m
							End of BH 31 at 2.6m				TC bit refusal at 2.6m
				3.0							
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 32

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 30/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 97.9m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N I L	D R Y					Topsoil: Clayey Silt: low liquid limit, brown	D			
				1.0		CI-CH	Silty Clay: medium to high plasticity, red brown	D			
			5,13,17 N=30			CI	Silty Clay: medium plasticity, grey with ironstaining		H	>600	
T C				2.0							V bit refusal at 1.6m
							Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				
				3.0			End of BH 32 at 2.5m				
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 33

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 30/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 98.9m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N I L	D R Y					Topsoil: Clayey Silt: low liquid limit, brown	D			
			DS			CI-CH	Silty Clay: medium to high plasticity, red brown	D			
			7,12,15 N=27	1.0		CI	Silty Clay: medium plasticity, grey with ironstaining	H		>600	
				2.0							V bit refusal at 1.9m
TC							Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				
				3.0			End of BH 33 at 2.8m				TC bit refusal at 2.8m
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 34

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 30/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 100.9m

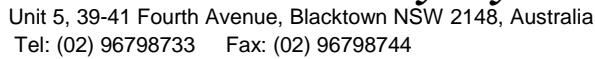
Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N I L	D R Y					Topsoil: Clayey Silt: low liquid limit, brown	D			
				1.0		CH	Silty Clay: high plasticity, red brown	D			
			5,11,12 /50mm N>23			CI	Silty Clay: medium plasticity grey with ironstaining	H		>600	SPT bouncing at 1.35m V bit refusal at 1.4m
T C				2.0			Shale/Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				TC bit refusal at 2.0m
				3.0			End of BH 34 at 2.0m				
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							





## Borehole no: 35

Job no: JC18322A

Date: 30/4/18

Logged by: SG

R.L. Surface: 99.8m

Datum: AHD

[illegible]



# GeoEnviro Consultancy Pty Ltd

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## Borehole Report

Borehole no: 36

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 30/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 97.8m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N I L	D R Y					Topsoil: Clayey Silt: low liquid limit, brown	D			
			3,8,13 N=21	1.0		CI	Silty Clay: medium plasticity, grey red	D			
				2.0			As above but with shale bands		H	>600	Disturbed Sample Taken
				3.0			Shale/Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				V bit refusal at 2.4m
TC							End of BH 36 at 3.0m				TC bit refusal at 3.0m
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 37

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 30/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 96.4m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N I L	D R Y					Topsoil: Clayey Silt: low liquid limit, brown	D			
				1.0		CH	Silty Clay: high plasticity, red brown	D			
			8,11,13 N=24			CI	Silty Clay: medium plasticity, grey red with ironstaining	H		>600	V bit refusal at 1.4m
TC				2.0			Shale/Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				TC bit refusal at 2.4m
				3.0			End of BH 37 at 2.4m				
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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Unit 5, 39-41 Fourth Avenue, Blacktown NSW 2148, Australia  
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## Borehole Report

Borehole no: 38

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 30/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 96.0m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N I L	D R Y					Topsoil/Fill: Clayey Silt: low liquid limit, brown	D			
			6,11,17 N=28	1.0		CH	Silty Clay: high plasticity, red brown	D			
				2.0		CI	Silty Clay: medium plasticity, grey red with ironstaining		H	>600	
T C							As above with siltstone bands				V bit refusal at 2.2m
				3.0			Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				
							End of BH 38 at 3.0m				
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 39

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 30/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 97.1m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N I L	D R Y					Topsoil: Clayey Silt: low liquid limit, brown	D			
				1.0		CI-CH	Silty Clay: medium to high plasticity, red brown	D			
			6,9,12 N=21			CI	Silty Clay: medium plasticity, grey red with ironstaining		H	>600	
				2.0			Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				V bit refusal at 1.7m
T C							End of BH 39 at 2.6m				TC bit refusal at 2.6m
				3.0							
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



# GeoEnviro Consultancy Pty Ltd

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## Borehole Report

Borehole no: 40

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 30/4/18

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: SG

Drill Model and Mounting: B80

Slope: 90°

R.L. Surface: 98.5m

Hole Diameter: 100mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
V	N I L	D R Y					Topsoil: Clayey Silt: low liquid limit, brown	D			
			DB			CI-CH	Silty Clay: medium to high plasticity, red brown	D			
				1.0			As above but grey brown		H	>600	
			4,10,13 N=23								
T C				2.0			Siltstone: grey brown, low to medium strength, extremely weathered to distinctly weathered				V bit refusal at 1.6m
											TC bit refusal at 2.2m
				3.0			End of BH 40 at 2.2m				
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 41

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 4/4/19

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: AT

Drill Model and Mounting: 5-tonne excavator

Slope: 90°

R.L. Surface: 101.6m

Hole Diameter: 200mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
A U G E R	N I L	D R Y	DS				Topsoil: Clayey Silt: low liquid limit, brown	D			
			DS			CH	Silty Clay: high plasticity, red brown	M			
				1.0		CI	Silty Clay: medium plasticity, grey brown	D-M			
			DS				As above but with shale bands				
				2.0							
							Shale/Siltstone: grey brown				
				3.0			End of BH 41 at 2.8m				
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 42

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 4/4/19

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: AT

Drill Model and Mounting: 5-tonne excavator

Slope: 90°

R.L. Surface: 95.3m

Hole Diameter: 200mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
A U G E R	N I L	D R Y	DS				Topsoil: Clayey Silt: low liquid limit, brown	D			
			DS			CH	Silty Clay: high plasticity, red brown	M			
				1.0		CI	Silty Clay: medium plasticity, grey brown	D			
			DS				Shale: grey brown				
							End of BH 42 at 1.3m				Refusal at 1.3m
				2.0							
				3.0							
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							





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Tel: (02) 96798733 Fax: (02) 96798744

## Borehole Report

Borehole no: 43

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 4/4/19

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: AT

Drill Model and Mounting: 5-tonne excavator

Slope: 90°

R.L. Surface: 95.7m

Hole Diameter: 200mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
AUGER	NIL	DRY	DS				Topsoil: Clayey Silt: low liquid limit, brown	D-M			
			DS			CH	Silty Clay: high plasticity, red brown	D-M			
				1.0		CI	Silty Clay: medium plasticity, brown				
			DS				As above but grey	D			
			DS								
				2.0							
							Siltstone: grey brown,				
							End of BH 43 at 2.8m				Refusal at 2.4m
				3.0							
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



# GeoEnviro Consultancy Pty Ltd

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## Borehole Report

Borehole no: 44

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 4/4/19

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: AT

Drill Model and Mounting: 5-tonne excavator

Slope: 90°

R.L. Surface: 95.6m

Hole Diameter: 200mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
A U G E R	N I L	D R Y	DS				Topsoil: Clayey Silt: low liquid limit, brown	M-W			
			DS			CH	Silty Clay: high plasticity, red brown	M			
				1.0		CI	Silty Clay: medium plasticity, brown	D-M			
			DS								
				2.0			Shale: grey brown				
							End of BH 44 at 2.0m				
				3.0							
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							



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## Borehole Report

Borehole no: 45

Client: Gran Associates Pty Ltd

Job no: JC18322A

Project: Proposed Amity College

Date: 4/4/19

Location: 85 Byron Road and 63 Ingleburn Road Leppington

Logged by: AT

Drill Model and Mounting: 5-tonne excavator

Slope: 90°

R.L. Surface: 94.4m

Hole Diameter: 200mm

Bearing: Vertical

Datum: AHD

Method	Support	Water	Notes: Samples, Tests, etc	Depth(m)	Classification Symbol	Unified Soil Classification	Material Description Soil Type, Plasticity or Particle Characteristic, colour, secondary and minor component	Moisture Content	Consistency/Density Index	Hand Penetrometer kPa	Structure and Additional Observations
AUGER	NIL	DRY	DG				Topsoil: Clayey Silt: low liquid limit, brown	D			
						CH	Silty Clay: high plasticity, red brown	D-M			
			DG	1.0							
						CI	Silty Clay: medium plasticity, grey red with ironstone gravel	D			
			DG	2.0							
							Shale: grey brown				
							End of BH 45 at 1.4m				Refusal at 1..4m
				3.0							
				4.0							
				5.0							
				6.0							
				7.0							
				8.0							

## Appendix B

### Unexpected Finds Protocol



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## UNEXPECTED FINDS PROTOCOL

ITEM	REQUIREMENTS	
<b>DEFINITION</b>	An unexpected find may be identified as a result of site activity, for example through earthworks and movement of plant on site including preparatory site works.	
<b>SITE SUPERVISOR</b>	<p>On being notified of an <b>Unexpected Find</b>, the Principal Contractor must:</p> <ul style="list-style-type: none"> <li>• Stop work &amp; notify the site manager/HSE coordinator as soon as practically possible.</li> <li>• Ensure the find is not further disturbed.</li> <li>• Ensure all personnel are removed from the area with the exception of personnel required to isolate or make safe the area.</li> <li>• Establish an “unexpected find” isolation zone as required to prevent or minimise exposure risks for site personnel, members of the public, fauna or flora. Note: Persons are not to expose themselves to further risk whilst establishing isolation zone.</li> <li>• Assess the requirement to evacuate areas or the entire site.</li> <li>• Co-ordinate site or area evacuation as assessed. Note: It is preferable to evacuate the whole site if there is any doubt as to the safety of personnel or the environment.</li> <li>• As soon as the safety of personnel, environment &amp; the site is secured the Site Manager/Supervisor should notify their relevant HSE Manager, Project Manager &amp; Construction Manager.</li> <li>• As soon as practically possible record the events associated with the unexpected find.</li> </ul>	
<b>PROJECT MANAGER</b>	<p>The Project Manager and/or HSE Manager in consultation with the relevant General Manager notify regulatory authorities as required.</p> <p>Establish a risk based process for managing clearance of the unexpected find &amp; establishing incident investigation.</p>	
	<p>The Project Manager or HSE Manager must also ensure that the find is reported to the Principal.</p> <p>This may be by verbal communication.</p>	
<b>UNEXPLODED ORDNANCE</b>	<ul style="list-style-type: none"> <li>• Do not touch or disturb.</li> <li>• Contact Police immediately.</li> </ul>	
<b>UNEXPECTED SERVICES (LIVE OR DISUSED)</b>	<ul style="list-style-type: none"> <li>• This may include power, gas or fuel.</li> <li>• Do not touch or further disturb.</li> <li>• The area must be immediately designated a non-smoking and “no naked flames” area.</li> <li>• All nearby machinery should be turned off.</li> <li>• Contact relevant governing authority.</li> <li>• Contact appropriate trade supervisor.</li> </ul>	
<b>ASBESTOS OR OTHER CONTAMINANTS</b>	<p>Products made from asbestos cement not only include fibro sheeting (flat and corrugated), but items such as water, drainage and flue pipes, roofing shingles and gutters.</p> <ul style="list-style-type: none"> <li>• Do not touch or further disturb.</li> <li>• Isolate area (10 metre isolation zone required for asbestos).</li> <li>• Contact hygienist.</li> <li>• Implement hygienist’s recommendations.</li> <li>• If persons have been exposed arrange medical advice/consultation i.e. possible asbestos fibre exposure will require lung function test &amp; chest x-ray. Note: This applies more specifically to friable type asbestos rather than non friable asbestos containing material however if any doubt exists treat as friable.</li> <li>• Obtain clearance from hygienist prior to re-entering area.</li> </ul>	
	<p><b>Non-Friable Asbestos</b></p> <p>Over 97% of the products in Australia were non-friable material in which the Asbestos fibres were bonded by cement, vinyl, resin or other similar material.</p>	<p><b>Friable Asbestos</b></p> <p>The hazardous friable asbestos is material which can be crumbled, pulverised, or reduced to powder by hand pressure. This may also include previously non-friable material which becomes broken or damaged by mechanical force.</p>

ITEM	REQUIREMENTS
<b>HUMAN REMAINS</b>	<ul style="list-style-type: none"> <li>Do not touch or disturb.</li> <li>Contact Police immediately.</li> </ul> <p>Please note that aboriginal burial objects (such as bark coffins) are defined by legislation as human remains.</p>
<b>HERITAGE ITEMS</b>	<ul style="list-style-type: none"> <li>Do not touch or disturb.</li> <li>Contact Heritage Office or relevant State or Local Government Authority.</li> </ul>
<b>OBJECTS OF POSSIBLE CULTURAL SIGNIFICANCE</b>	<ul style="list-style-type: none"> <li>Do not touch or disturb.</li> </ul> <p>Contact Department of Indigenous Affairs or relevant State or Local Government Authority.</p>
<b>UNEXPECTED FIND PROCESS</b>	<div style="text-align: center;"> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Unexpected Find Discovered</div> <div style="margin-bottom: 10px;">↓</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center;"><b>Person Uncovering Find</b></p> <div style="display: flex; justify-content: space-between;"> <div> 1. Stop work 2. Consider personnel safety etc </div> <div> 3. Notify Site Supervisor/ Manager location </div> </div> </div> <div style="margin-bottom: 10px;">↓</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center;"><b>Site Supervisor/Manager</b></p> <ul style="list-style-type: none"> <li>Establish Unexpected Find isolation zone as required</li> <li>Notify Project Manager/ Construction Manager and HSE Managers</li> </ul> </div> <div style="margin-bottom: 10px;">↓</div> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;"><b>Project Manager/Construction Manager</b></p> <ul style="list-style-type: none"> <li>In consultation with State General Manager/HSE Manager notify relevant authority (where required)</li> <li>Complete Incident Register in site diary</li> <li>Develop, document and implement process to clear find</li> </ul> </div> </div>

## APPENDIX C

### Important Information about your Environmental Site Assessment



## ***GeoEnviro Consultancy Pty Ltd***

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### **IMPORTANT INFORMATION REGARDING YOUR ENVIRONMENTAL SITE ASSESSMENT**

This Environmental Assessment Report was performed in general conformance with our understanding of the guidelines by the Australian and New Zealand Conservation Council (ANZECC), the Office of Environment and Heritage (OEH) and the National Environmental Protection (Assessment of Site Contamination) Measure 1999 (amended 2013).

These accompanying notes have been prepared by GeoEnviro Consultancy Pty Ltd, using guidelines prepared by ASFE; The Association of Engineering Firms Practising in the Geosciences. The notes are offered as an aid in the interpretation of your environmental site assessment report.

### **REASONS FOR AN ENVIRONMENTAL SITE ASSESSMENT**

Environmental site assessments are typically, though not exclusively, performed in the following circumstances:

- As a pre- acquisition assessment on behalf of either a purchaser or a vendor, when a property is to be sold
- As a pre-development assessment, when a property or area of land is to be redeveloped, or the land use has change, eg from a factory to a residential subdivision
- As a pre-development assessment of greenfield sites, to establish baseline conditions and assess environmental, geological and hydrological constraints to the development of, eg, a landfill
- As an audit of the environmental effects of previous and present site usage

Each circumstance requires a specific approach to the assessment of soil and groundwater contamination. In all cases the objective is to identify and if possible, quantify the risks which unrecognised contamination poses to the ongoing or proposed activity. Such risk may be both financial (clean-up costs or limitations in site use) and physical (health risks to site users or the public).

### **ENVIRONMENTAL SITE ASSESSMENT LIMITATIONS**

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





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## **AN ENVIRONMENTAL SITE ASSESSMENT REPORT IS BASED ON A UNIQUE SET OF PROJECT SPECIFIC FACTORS**

Your environmental assessment report should not be used;

- When the nature of the proposed development is changed, eg, if a residential development is proposed, rather than a commercial development
- When the size or configuration of the proposed development is altered, eg, if a basement is added
- When the location or orientation of the proposed structure is modified
- When there is a change of land ownership, or
- For application to an adjacent site

In order to avoid costly problems, you should ask your consultant to assess any changes in the project since the assessment and the implications, if any, to recommendations made in the assessment.

## **ENVIRONMENTAL SITE ASSESSMENT FINDINGS ARE PROFESSIONAL ESTIMATES**

Site assessment identifies actual sub-surface conditions only at those points where samples are taken, when they are taken. Data obtained from the sampling and subsequent laboratory analyses are interpreted by geologists, engineers or scientist and opinions are drawn about the overall subsurface conditions, the nature and extent of contamination, the likely impact on any proposed development and appropriate remediation measures. Actual conditions may differ from those inferred, because no professional, no matter how qualified and no sub-surface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, however, steps can be taken to help minimise the impact. For this reason, site owner should retain the services of their consultants throughout the development stage of the project in order to identify variances, conduct additional tests which may be necessary and to recommend solutions to problems encountered on site.

Soil and groundwater contamination is a field in which legislation and interpretation of legislation by government departments is changing rapidly. Whilst every attempt is made by GeoEnviro Consultancy Pty Ltd to be familiar with current policy, our interpretation of the investigation findings should not be taken to be that of the relevant authority. When approval from a statutory authority is required for a project, that approval should be directly sought.

## **STABILITY OF SUB-SURFACE CONDITIONS**

Sub-surface conditions can change by natural processes and site activities. As an environmental site assessment is based on conditions existing at the time of the investigation, project decisions should not be based on environmental site assessment data which may have been affected by time. The consultant should be requested to advise if additional tests are required.



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## **ENVIRONMENTAL SITE ASSESSMENTS ARE PERFORMED FOR SPECIFIC PURPOSES AND CLIENTS**

Environmental site assessments are prepared in response to a specific scope of work required to meet the specific needs or specific individuals. An assessment prepared for a consulting civil engineer may not be adequate to a construction contractor or another civil engineer.

An assessment should not be used by other persons for any purpose, or by the client for a different purposes. No individual, other than the client, should apply an assessment, even for its intended purposes, without first conferring with the consultant. No person should apply an assessment for any purposes other than that originally contemplated, without first conferring with the consultant.

## **MISINTERPRETATION OF ENVIRONMENTAL SITE ASSESSMENTS**

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

## **LOGS SHOULD NOT BE SEPARATED FORM THE REPORT**

Borehole and test pit logs are prepared by environmental scientists, engineers or geologist, based upon interpretation of field conditions and laboratory evaluation of field samples. Field logs normally provided in our reports and these should not be redrawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however, contractors can still misinterpret the logs during bid preparation if separated from the test of the assessment. Should this occur, delays and disputes , or unanticipated costs may result.

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

## **READ RESPONSIBILITY CLAUSES CLOSELY**

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