



Douglas Partners

Geotechnics | Environment | Groundwater

Report on
Detailed Site Investigation (Contamination)

Uniting Charlestown Development
27 Tiral Street, Charlestown

Prepared for
The Uniting Church in Australia Property Trust (NSW)
for Uniting (NSW.ACT)

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

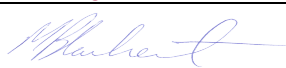
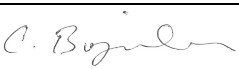
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Report on Detailed Site Investigation (Contamination)

Uniting Charlestown Development

27 Tiral Street, Charlestown

1. Introduction

This report presents the results of a detailed site investigation (DSI) for contamination undertaken for the Uniting Charlestown Development at 27 Tiral Street, Charlestown. The investigation was commissioned in an email dated 6 January 2020 by David Hutchinson of The Uniting Church in Australia Property Trust (NSW) for Uniting (NSW.ACT) and was undertaken with reference to Douglas Partners Pty Ltd (DP) proposal NCL190709.P.003.Rev0 dated 9 December 2019.

It is understood that the development is likely to include several buildings ranging in height from about 4 to 12 storeys and may include basements. It is understood that the final layout, development height and design finish levels of the project will be governed by several factors including mine subsidence parameters and the remediation requirements for the site. Further details regarding the proposed development are provided in Section 3.

The investigation was staged with reference to NSW EPA (2020) and NEPC (2013) and included an initial preliminary site investigation (PSI) to review previous investigations conducted at the site by others and provide a preliminary assessment of site conditions targeting identified potential contamination sources. A subsequent DSI was conducted to provide a systematic coverage of the site with reference to the minimum sampling design guidelines outlined in NSW EPA (1995) in order to further assess the extent and distribution of contamination and assess remediation options for the site and proposed development. This report presents the results of both the PSI and DSI findings.

The investigation comprised the following:

- Review of previous investigations supplied by the client as follows:
 - o Coffey Geosciences Pty Ltd – Site Contamination Assessment (Coffey, 2004);
 - o Coffey Environments Pty Ltd - Phase 1 Environmental Site (Coffey, 2009);
- Brief site history review and update to the previous site history information presented in the PSI (Coffey, 2009);
- Site walkover by a senior environmental engineer to identify areas of potential contamination and assess current site conditions;
- Excavation of an initial 12 test pits (Pits 101 to 112) at targeted locations across the site for geotechnical and environmental assessment purposes (ie PSI);
- Excavation of an additional 22 test pits (Pits 201 to 206, 206A, 207 to 221) at targeted and systematic locations across the site for the DSI;
- Laboratory testing of selected soil samples for a range of potential organic and inorganic contaminants;

- Preliminary assessment of hazardous ground gases (HGG) due to former mining activities within the site;
- Preparation of this report presenting the results of the DSI findings.

The PSI and DSI were undertaken with reference to NSW EPA (2020), NEPC (2013) and NSW EPA (2019).

It is noted that the DSI was undertaken in conjunction with a geotechnical and mine subsidence investigation for the site which will be reported separately (DP, 2020a and 2020b). The geotechnical and mine subsidence investigation included the excavation of 12 shallow test pits (Pits 101 to 112) and the drilling of 12 bores for geotechnical and mine subsidence investigation purposes. Pertinent information from these investigations relevant to this DSI had been incorporated with this report.

For the purposes of this investigation the client provided the following information:

- Partial copy of Coffey (2004) report (text and Appendix A);
- Copy of Coffey (2009) report (only partial copy of Drawing 2 supplied);
- Plus Architecture – Uniting Charlestown Masterplan Design Presentation (Ref 20456 191024);
- Plus Architecture – Uniting Charlestown – Design Development and Staging unreferenced plans supplied 9 March 2020;
- Plus Architecture – Uniting Charlestown - Option C, ELC under Tower unreferenced plan supplied 9 March 2020.

2. Site Description

The site is described as Lot 223 DP551260, 27 Tiral Street, Charlestown, NSW and comprises a roughly trapezoidal shaped area of approximately 2.079 ha. The site (investigation area) includes a variable width drainage easement and drainage reserve which runs approximately south to north though the eastern portion of the site as shown on de Witt Consulting (DWC) Plan of Demolition (Ref 2243 dated 14 September 2010) provided in Appendix E.

The site was formerly known as the Hunter Institute of Technology, Charlestown TAFE and at the time of the current investigation comprised an undeveloped vacant site with remnants of the former buildings, structures and landscape areas including the bowling green, one hole golf course, tennis court, garden beds and internal asphalt sealed roads and building slabs and footings associated with the former TAFE.

Current site levels range from about RL 88 (AHD) in the north eastern corner of the site to RL 101 in the south western corner of the site.

The site is bounded by the following:

- James Street and residential development to the north of the site;
- Residential development to the east of the site;
- Tiral Street and residential development to the south of the site; and

- Dudley Road and community health facilities (ambulance co-ordination centre, dialysis centre) to the west of the site.

The site is currently zoned R3 - Medium Density Residential (east of Smith Street) and B4 – Mixed Use (west of Smith Street) with reference to Lake Macquarie City Council (LMCC) LEP 2014 Land Zoning Map. The site is shown in Figure 1 below.



Figure 1 – Six maps image of the site

3. Proposed Development

At the time of preparing this report, the proposed Uniting Charlestown development was still in the design concept stage. Based on the Plus Architecture Design Development and Staging Plan and Option C, ELC under Tower Plan provided on 9 March 2020 by the client, we understand the proposed development will comprise the following:

- A seniors living development comprising several buildings ranging in height from about 4 to 12 storeys which may include basements in the eastern portion of the site (R3 zoning) and a 16 storey mixed use building in the western portion of the site (B4 zoning);
- The seniors living buildings will comprise a mixture of independent living units (ILU), Residential Aged Care (RAC), a seniors gym, carparking facilities, a potential early learning centre (ELC) with internal pavements and landscape areas;
- The mixed use building will comprise residential units, commercial space and a key hotel/medical hotel or medical centre;
- It is understood that the final layout, development height and design finish levels of the project will be governed by several factors including mine subsidence parameters and the remediation requirements for the site;

- Based on information available to date, however, the client is aiming to minimise proposed cuts to the site.

Further details are shown on the Plus Architecture plans provided in Appendix E.

4. Geology and Hydrogeology

The 1:100 000 scale Newcastle Coalfield Regional Geology map indicates that the site is underlain by bedrock of the Permian aged Newcastle Coal Measures (Adamstown Subgroup), which typically comprised conglomerate, sandstone, siltstone, coal and tuff.

The 1:25 000 scale Acid Sulphate Soil Risk Map for Newcastle indicates that the site lies in an area of no known occurrence of acid sulphate soils (ASS). It is noted that ASS are typically found in low-lying estuarine areas below RL 5. Given the mapping and level of the site (ie >RL80) the soils at the site are not considered to be ASS.

The regional groundwater flow regime is believed to be to the north east to east of the site, towards Flaggy Creek, which is approximately 140 m north-east of the site and is considered to be the nearest sensitive receptor. Flaggy Creek drains to the north east to east through Glenrock Reserve to the Pacific Ocean, which is located approximately 4 km east north east of the site.

A record search of registered groundwater wells with the NSW Department of Primary Industries (DPI) Office of Water (NOW) indicated that there are a series of groundwater monitoring wells located approximately 170 m north of the site around Charles Street, Smith Street and The Pacific Highway which are likely to be associated with the two service stations along the Pacific Highway. Groundwater wells GW202565 and GW202566, located on the southern side of Charles Street closest to the site are identified as shallow groundwater monitoring bores drilled to depths of 6.2 m and 6.0 m respectively with a standing water level of 4.3 m and 4.15 m respectively in natural clays. These wells are considered up-gradient or across gradient from the site. There were no registered wells between the site and the Pacific Ocean.

It is noted that DP has conducted additional geotechnical and preliminary mine subsidence investigations for the proposed development (DP, 2020a; 2020b). Drilling was conducted to locate the depth, condition and extent of mine workings within the site. It is understood that the site is underlain by a number of coal seams including the Montrose, Wave Hill, Fern Valley and Victoria Tunnel Coal Seams as indicated in Table 2 from the mine subsidence report (DP, 2020a) reproduced below in Table 1.

It is noted that the Victoria Tunnel Seam is the only coal seam that contains abandoned mine workings at depths of generally greater than 130 m, and the workings are flooded. Reference should be made to the mine subsidence report (DP, 2020a) for details.

Table 1: Summary of subsurface conditions (Bores M1, M1A, M2 and M3) from DP (2020a)

Formation	Bore M1		Thickness (m)	Bore M1A		Thickness (m)	Bore M2		Thickness (m)	Bore M3		Thickness (m)	Description (Rock strength information based on Bore 3 only)
	Depth			Depth			Depth			Depth (m)			
	From	To		From	To		From	To		From	To		
Soil	0.0	9.0	9.0	0	8.0	8.0	0.0	9.0	9.0	0	8.6	8.6	Fill, overlying residual soils. Residual carbonaceous and tuffaceous clay and extremely weathered coal most likely from the weathered Australasian Seam was encountered at several test locations.
Tickhole Formation	9.0	37.0	28.0	8.0	36.9	28.9	9.0	19.3	10.3	8.6	18.1	9.5	Siltstone, sandstone, conglomerate with minor tuff and coal. (Typically, Very Low to Low strength becoming low to medium at the base of the unit)
Montrose Seam	37.0	40.4	3.4	36.9	40.3	3.4	19.3	22.7	3.4	18.1	21.4	3.3	Coal with tuffaceous and carbonaceous bands. (Typically, low strength becoming medium strength near the base of the unit)
Kahibah Formation	40.4	58.8	18.4	40.3	58.7	18.4	22.7	44.5	21.8	21.4	42.7	21.3	Sandstone, conglomerate minor siltstone with basal Wave Hill Tuff Member (Typically, medium to high strength with some very high strength sandstone bands in the lower part of the unit)
Wave Hill Seam	58.8	61.6	2.8	58.7	61.5	2.8	44.5	47.2	2.7	42.7	45.6	2.9	Coal with tuffaceous clay seams (Typically, medium strength with tuffaceous clay seams)
Highfields / Glebe Formation	61.6	104.2	42.6	61.5	104.0	42.5	44.5	90.9	46.4	45.6	89.3	43.9	Sandstone, Conglomerate, and laminate (Typically, high to very high strength) with the Fern Valley Tuff (Typically high strength) member comprising tuffaceous sandstone and siltstone located near the middle of the formation.
Fern Valley Upper Seam	104.2	106.2	2.0	104.0	105.9	1.9	90.9	93.2	2.3	89.3	91.5	2.2	Stoney coal with carbonaceous and tuffaceous bands (Typically, medium strength)
Fern Valley Split	106.2	111.3	5.1	105.9	111.4	5.5	93.2	97.8	4.6	91.5	96.2	4.7	Tuffaceous Sandstone and siltstone, with basal siltstone unit (Typically, medium to high strength)
Fern Valley Lower Split	111.3	114.6	3.3	111.4	114.5	3.1	97.8	100.7	2.9	96.2	98.9	2.7	Stoney Coal with carbonaceous and tuffaceous bands. (Typically, medium to high strength)
Kotara Formation	114.6	137.8	23.2	114.5	137.0	22.5	103.0	124.1	21.1	98.9	122.7	23.8	Siltstone, sandstone and tuffaceous siltstone. (Typically, medium to high strength in the upper portion of the unit becoming high to very high strength over the lower portion of the unit)
Victoria Tunnel Coal Seam	137.8	140.6	2.8	NE	NE	NE	NE	NE	NE	NE	NE	NE	Coal with tuffaceous bands
Void (Based on CCTV Inspection and drilling resistance)	NE	NE	NE	137.0	137.4	0.4	124.1	124.7	0.6	122.7	123.5	0.8	
Rubble (Based on CCTV Inspection and drilling resistance)	NE	NE	NE	137.4	140.4	3.0	124.7	127.8	3.1	123.5	126.2	2.7	Large 'blocky' (based on CCTV Inspection)
Shepherds Hill Formation	140.6	>143.75	>3.15	140.4	>143.67	>3.27	127.8	>128.6	>0.8	126.2	>129.0	>2.8	No samples returned to surface

5. Desktop Review

A brief review of Coffey (2004) and Coffey (2009) contamination reports was conducted for the assessment.

Pertinent information from these assessments is presented below.

Coffey (2004) – Site Contamination Assessment:

A contamination and hazardous materials assessment was carried out by Coffey for the NSW Department of Education at the former Charlestown TAFE in February 2004.

The site had ceased operation as a TAFE for horticultural studies such as Green Keeping in late 2003 and at the time of the investigation was being prepared for sale with several shade houses being demolished.

The assessment comprised a brief site history review, site walkover, limited soil sampling and analysis and sampling of building materials.

The site history review comprised a title deed search which indicated the following:

- The site was originally owned by the Crown and held by Gordon Bowden and William James Schadel within Special Holdings No 1923-14;
- The land was later resumed by the Crown in November 1963 for the purposes of a Technical College, which commenced development in the 1970's with the official opening in May 1979;
- The site has a drainage reserve and an easement (DP648824) to drain water 3.6 m wide;
- An undated partial plan of Portion 223 indicates the site had a creek in the northern portion of the site which ran east and exited the site through the drainage reserve. The plan also describes the site as undulating poor soil, sandstone formation with Bloodwood Mahogany Teatree, Gum and Oak trees. Surrounding properties comprise a reserve for classification to the north, privately owned land to the east and south and Hospital designated land to the west.

Structures present at the time of the assessment comprised six buildings, a tennis court, bowling green area, a native garden area, tropical swimming pool surrounds and general native and exotic garden areas. No significant filling was evident to Coffey's other than the fill placed to form the bowling green to the west of the chemical store and machinery shed which Coffey's indicate may be up to 4 m in depth.

Coffey's indicated that based on the site history the primary contamination issue at the site would be related to the use of herbicides and pesticides for teaching horticultural studies. Coffey's indicated that Organochlorine and Organophosphorus pesticides (OCP/OPP) would be the primary chemicals of concern. Coffey's also indicated that hazardous building materials (HBM) (ie asbestos and lead based paints) within site buildings may be a contaminant concern.

Based on the above Coffey's conducted a preliminary field work and laboratory testing program comprising collection of four shallow soil samples (S1 to S4) from the golf fairway (S1), tennis court (S2), bowling green (S3) and green house (S4). The samples were analysed for OCP, OPP and heavy metals (8), with results compared to the then current NSW EPA guidelines for the Site Auditor Scheme (NSW EPA, 1998) and guidelines for assessing service station sites (NSW EPA, 1994) for a range of health-based land uses and phytotoxicity based investigation levels.

The results of chemical analysis indicated the following:

- OCP, OPP and heavy metal concentrations were within the adopted (now superseded) health-based guidelines for all land uses scenarios (ie residential to industrial);
- Heavy metals concentrations were all within the adopted (now superseded) phytotoxicity criteria, with the exception of arsenic (As) concentrations in two of the four surface samples which had concentrations up to 30 mg/kg. It is noted that the current ecological investigation level (EIL) for a residential /open space scenario (NEPC, 2013) for arsenic is 100 mg/kg (refer to the SAC in Section 13). It is noted that zinc concentrations in three of the four surface samples (S1, S2 and S4) exceed the currently adopted EIL of 130 mg/kg;
- Trace concentrations (0.1 mg/kg) of OCP (DDE) were found in sample S3 (bowling green).

Coffey's concluded that the arsenic concentrations identified at the tennis court and golf fairway may be a result of residual pesticide application and recommended further investigation if arsenic sensitive plants were proposed and to validate surface soils within areas formerly used for green keeping in order to confirm if hot spots are present.

In addition to the surface soil sampling and tested, Coffey's also sampled and analysed building material samples for asbestos and lead. The buildings assessed comprised the Administration Building (Building A), Classrooms (Building B), Library (Building C), Tennis Shed, Machinery Shed (Building D), Chemical Store (Building E) and Potting Shed (Building F), although not all fibro sheeting materials were analysed as they were either stamped as not containing asbestos or Coffey's assumed the absence of asbestos based on the age of the building. The building locations are partly shown in the Coffey (2004) Site Layout plan (only half plan provided) in Appendix B.

The results of testing of the six selected building material sample indicated the absence of asbestos. Lead concentrations in two paint flake samples varied from 117mg/kg to 4080 mg/kg.

It is noted that at the time of field work Coffey's noted that fuels, including diesel, ammonia and hydraulic oil were stored on banded pallets on the concrete floor of the Potting Shed and pesticides were held in compartmented metal boxes in the Chemical Store. No significant chemical leaks or spillages were noted and concrete floors in both sheds were noted to be in good condition.

Coffey's report subsequently concludes that significant contamination as a result of previous site usage has not occurred at the site.

The review of the Coffey (2004) report, while indicating the general absence of gross contaminating activities at the site has identified a number of localised potential contaminant sources including the following:

- Presence of a Chemical store, Machinery Shed and Potting shed which has been used to store fuels, fertilisers, pesticides and assumedly landscaping machinery (mowers, tractors etc) which may have resulted in localised spills / leaks of hydrocarbons, pesticides etc;
- Potential presence of filling up to a depth of 4 m (source unknown) in the bowling green and potentially in other areas of the site given the site uses described which may contain a range of potential contaminants depending on the source.

In addition, the site history review was limited to a title deed search and did not include discussions with personnel familiar with previous site usage to confirm site activities, potentially contaminating activities or the standard site searches including NSW EPA, Council searches, historical aerial photo reviews etc which may have identified other potentially contaminating activities requiring investigation.

Coffey (2009) – Phase 1 Environmental Site Assessment:

A Phase 1 environmental site assessment (desktop PSI) was carried out at the site by Coffey in March 2009 for RSM Bird Cameron Partners for due diligence purposes prior to purchase.

The assessment comprised a desktop study, site inspection and site history review (including title deed review, historical aerial photo review, review of Council's development application records and Section 149 planning certificate for the site to assess the likelihood of land contamination at the site from past or present activities.

The site at the time of the investigation was disused and still contained buildings / structures from the former TAFE, although in a derelict state.

Site history searches for the investigation identified the following pertinent information:

- The site was purchased from the Minister for Education in 2006 by Delta Developments (owner at the time of this assessment);
- LMCC development records identified three development applications (DA) including a college building relocation in 1984, storage compound in 1984 and additional classroom building in 1993;
- The Section 149 planning certificate indicated the land is not affected by matters required to be disclosed under the CLMA (1997), however, the site was within a proclaimed mine subsidence district;
- Historical aerial photos from 1954 to 2004 indicated the site was cleared but undeveloped in 1954 with low density residential surrounding the site. By 1983 the site has been developed as a TAFE, with buildings, internal pavements and landscape features (golf course etc) evident. Further buildings and carparking are evident by 1990;
- A NSW Work Cover (now WorkSafe NSW) search for the property did not identify the any dangerous goods licences for the site. It is noted that Appendix B, C and D of the Coffey report were not provided by the client to view the details of this search;
- EPA records indicate a number of properties with notices in the LMCC area, however, these properties were all > 2km west of the site and unlikely to be impacting on the site.

The site inspection for the preliminary investigation identified heavily degraded and vandalised former TAFE buildings, a cement lined drain in the eastern portion of the site, bitumen areas, an above ground storage tank (AST) in poor condition in the central portion of the site and a 'relatively large amount of anthropogenic rubbish was observed across the site'. Unfortunately, Appendix E was not provided to review site photos of these areas.

Data gaps in the site history review identified by Coffey's included the absence of details regarding the actual operation and activities conducted at the TAFE, the absence of detail on the locations and quantities of fuel and chemicals stored on site, the potential fuel that may have been stored in the AST was unknown and why the demolished buildings were removed from the site and by whom.

Based on the site history, Coffey's identified a number of potential areas of environmental concern and contaminants of concern and provided a risk rating for the likelihood of contamination. Potential contaminants identified were as follows:

- Fill of unknown origin and quality – driveways;
- Garden beds and old greenhouse – around perimeter of buildings and greenhouse in the north east corner of the site;
- AST – central portion of the site;
- Sterilisation, propagation and fertilisation activities – central portion site;
- Weathering/degrading of building materials and former demolition – former buildings;
- Anthropogenic rubbish – particularly the south east corner of the site;
- Contaminants of concern included hydrocarbons (TPH, PAH, BTEX), heavy metals, pesticides (OCP, OPP), PCB, Asbestos.

Coffey's also noted in their discussion that golf course, bowling green, garden beds and former green houses were another area of concern as they may have pesticide and fertilisers applied to them.

The report concludes that sampling and testing of areas of environmental concern not covered by the previous Coffey (2004) investigation would be required to assess the presence of contamination or otherwise.

The review of the Coffey (2009) report, identified a number of additional potential contaminant sources not previously identified in the Coffey (2004) report, including the presence of an AST, filling under roads, potential contamination associated with former horticultural practices, demolished / remaining buildings etc.

The report also identified a number of data gaps in the site history including the lack of detail regarding the operations and chemical storage/use at the TAFE, the absence of details regarding the AST use and the reason for the demolition of buildings conducted at the time of their inspection.

The report did not appear to mention filling in other areas of the site (previously noted in Coffey 2004).

Unfortunately, Appendix D site photographs were not provided for review, which may have assisted in assessing the quantity of anthropogenic materials, state of the buildings remaining and AST state.

In addition, information regarding former site operations including the use of the former AST or potential chemical use on the site was not available at the time of preparing this report.

6. Site History

6.1 Extent of Site History Review

A brief review of site history was conducted to assess potential contaminating land uses since the previous site investigation in 2009 and to potentially assess the data gaps previously identified (Coffey, 2009) and comprised the following:

- Search of LMCC records;
- Review of historical aerial photos since 2009;
- Searches with NSW EPA.

Details are presented in the following sections.

It is noted that a current copy of the Section 10.7 planning certificate was not provided for review at the time of preparing this report.

6.2 Council Records Search

A property search through LMCC for the site identified four development applications (DA) for the site as follows:

- DA -341 / 1984 – Relocation of College Buildings S226/12-14 (identified in Coffey (2009));
- DA – 558 / 1984 – Storage Compound 226/12-14 (2) (identified in Coffey (2009));
- DA – 224 / 1993 – Additional classroom building (identified in Coffey (2009));
- DA – 2031 / 2010 – Demolition.

The 1984 and 1993 DA's were all approved in the same year as they were applied for, however, no supporting documents were available on the LMCC website to confirm details of the developments.

The 2010 DA for demolition was applied for by The Uniting Church in Australia Property Trust NSW on 22 November 2010 and approved on 21 December 2010. The Statement of Environmental Effects prepared for by DWC (2010) is provided in Appendix B and was prepared on behalf of Uniting Care Ageing to support the DA for demolition of existing building on part of the site. Pertinent information from the report is provided as follows:

- The proposed demolition works were to be kept mainly to above ground structures in an attempt to clean up the site which had been subject to vandalism and theft of building materials;

- Due to demolition pertaining to above ground structures only, Council accepted that a contamination assessment would not be required, however, indicated this would be required for any future DA's. Council also indicated the demolition works would need to be undertaken with due regard to potential asbestos in accordance with relevant Australian Standards and WorkCover approvals;
- A plan of demolition shows the buildings remaining on the site in 2010 which were proposed for demolition which including the Chemical store, Machinery Shed and Potting shed (central portion site), Administration building (south east corner), tennis shed, greenhouse (north-east corner), two building in the north eastern portion of the site (possibly former classrooms) and a few smaller sheds;
- Hale Development Services provided a preliminary waste management plan for the demolition works. The plan indicates any fibre cement sheeting, lagging or any other material that may contain asbestos will be inspected and if found to be contaminated (assumed to contain asbestos) will be removed by a licensed asbestos remover. A total of 1.2 tonne of fibre cement sheeting was estimated to require disposal. The AST was proposed to be disposed to a metal recycler;
- DCP 1 required all services to the land to be sealed off prior to demolition;
- Photographs in the report of the remnant buildings indicate all structures have undergone significant vandalism with smashed windows, smashed walls including fibre cement sheeted walls and demolition waste strewn across the ground surface in the vicinity of the buildings. The photos also indicate the AST was situated within a concrete brick soil bay. While the photo resolution is poor, it appears the AST is sitting directly on the concrete ground slab with no obvious pipework, venting, dispensing unit (bowser), stand or bunding. It is therefore unclear what the AST was used for and if it was ever used below ground as it doesn't appear to have had a practical use in its current location / state.

6.3 Review of Historical Aerial Photos

A brief review of historical aerial photos was conducted for the investigation. The results of the historical aerial photo review indicated the following:

- In 1954 the site is undeveloped and largely cleared of vegetation with the exception of some scattered trees in the western and eastern portion of the site. Flaggy Creek appears to extend into the north eastern corner of the site approximately 50 m. Residential properties are present to the north, east and south of the site. Bushland is present to the west of Dudley Road and the parcel of land south of the site to the west of the drainage reserve is cleared with some trees;
- In the 1966 photo the site remains undeveloped, however, several tracks are evident through the site. There is also an area of disturbed ground in the central northern portion of the site and in the north western portion along James Street. Roads appear to be sealed now and further residential development has occurred to the south /south-west of the site;
- In 1976 several additional tracks are evident traversing the site and the majority of trees appear to have been removed from site. Some bare / disturbed ground is evident in the central northern portion of the site (possibly fill). An open drain is also present in the southern central portion of the site opposite the drainage reserve on the southern side of Tiral Street;

- In 1988 the site has been developed as the TAFE. The TAFE comprises multiple buildings (including the Administration building, Machinery shed, Potting Shed, Chemical Shed, Greenhouses, two buildings (classrooms?), tennis shed and bowling green shed) and landscape areas (including the golf green, fairway, tennis court, bowling green and gardens/trees along the western, southern and north western site boundaries. Internal asphalt sealed roads and carparking are evident. Bare ground is evident around the golf green, north of the chemical shed and in the north eastern portion of the site. A dark green / black area between the tennis court and building (classroom) is also evident. Surrounding properties remain similar, although two larger commercial buildings have now been built to the west of Dudley road with internal access roads;
- The site remains similar in 2001 to the 1988 image although vegetation along the southern and western boundaries have matured and no bare ground is evident along the northern portion of the site. Surrounding properties also remain similar;
- In 2007 the site has discontinued use as a TAFE and some of the buildings are evidently derelict, with missing roof sheeting in the chemical shed. The greenhouses on the western, central and north eastern corner of the site appear to have been removed;
- By 2010 the Machinery Shed and central greenhouse shed is also missing its roof sheeting and the Administration building appears to be missing its roof tiles;
- In 2012 the buildings have all been demolished, with concrete building slabs remaining where the Administration building, Machinery shed, Potting Shed, Chemical Shed and tennis shed were present. The grassed areas of the site appear to be mown;
- In 2016 the site remains similar to 2012, although vegetation has overgrown the former Administration building footprint;
- In October 2019, several trees along the western portion of the site appear to have been removed and stockpiles (mulch) are evident in the central portion of the site. A new commercial building and car park is also now evident to the west of Dudley Road.

It is noted that data obtained from aerial photos was limited due to the relatively small scale and poor resolutions.

The historical aerial photo review indicates that the site was largely vacant prior to utilisation as a TAFE and was in a derelict state prior to the buildings being demolished. Surrounding properties have been residential with the exception of the commercial buildings to the west of Dudley Road.

6.4 NSW EPA

A review of the NSW EPA contaminated land management register indicated the site and immediately surrounding properties have no notices issued under the Contaminated Land Management Register. A number of notices were, however, identified in Charlestown - 81 Pacific Highway Charlestown (Caltex Service Station), 91-93 Pacific Highway Charlestown (Caltex Woolworths (Former BP) Service Station) and 273 Charlestown Road Charlestown (Shell Service Station).

Further review of the two Pacific Highway service stations located approximately 200 m to 300 m north of the site indicates that the Caltex Woolworths site was formerly regulated under the CLMA, whereas the Caltex Service Station is currently regulated under the CLMA. The Caltex Service Station was declared a significantly contaminated land in August 2013, entered into a voluntary management proposal in 2013, which was amended in 2019. The voluntary management proposal indicated that off-site migration of TPH and BTEX has occurred and has impacted groundwater with concentrations above acceptable human health and ecological based acceptance criteria. Groundwater flow has been measured to be towards the north east to south east and regionally to the east towards Smith Street. The off-site impact was shown to be naturally attenuating with time.

Based on the regional groundwater flow direction and placement of registered wells around the service station, the potential for impact to groundwater at the subject site from the service stations is considered to be low.

A review of the list of contaminated sites notified to the NSW EPA indicated the site and immediately surrounding properties were not listed. Properties listed in Charlestown comprised the three service station sites noted above (ie 81 Pacific Highway, 91-93 Pacific Highway and 273 Charlestown Road) and the Ausgrid Depot at 8 Powell Street. The potential for impact to the subject site from these properties is considered to be low given the proximity to the site and topography.

A search of the NSW EPA POEO Public Register indicated that the site and immediately surrounding properties has no licences. The only POEO licence in Charlestown was an RMS licence for the West Charlestown Bypass in 1999 which was surrendered in 2003.

7. Site Condition

Site conditions observed during the site inspection on 21 January 2020 are summarised below.

Photos taken during the site inspection are shown in the photo plates in Appendix E.

The site was vacant at the time of the inspection and generally comprised a medium dense cover of mature trees along the western, southern and northern site boundaries with scattered trees located centrally and within the eastern portion of the site and grassed lawns in the central northern portion of the site in between remnants of the former TAFE infrastructure.

Internal asphalt sealed pavements were situated in the southern, central and eastern portion of the site, with entrances off Tiral street at three locations, a car parking area in the eastern portion of the site and an asphalt sealed hardstand between concrete slabs associated with the former Chemical shed, Machine shed and Potting shed. The asphalt was in relatively good condition across the majority of the site (ie only minor surface cracking) with the exception of the central hardstand where grass cover has protruded from the pavement and machinery (excavator tracks) appear to have ripped up the asphalt pavement in places (possible during demolition of buildings).

Two crib-lock retaining walls were present in the central portion of the site retaining the eastern side of the former bowling green and the south side of the former Potting shed. The western crib-lock wall was approximately 3 m high and filled with blast furnace slag (Photo 1), with the southern crib-lock wall approximately 1.5 m high and filled with soil and ash (Photo 2).

A bowling green was situated within the central western portion of the site immediately west of the former machine shed location (Photo 3 and 4). The bowling green appeared to be cut approximately 1m into the natural slope in the south western corner of the site and filled up to 3 m in the north eastern corner of the green. Brick, treated timber and natural rock retaining walls were situated along the western and southern sides of the bowling green and a natural rock batter was situated along the northern fill batter of the bowling green. Demolition waste (including brick, mortar, treated timber, glass and fibro fragments – potential asbestos containing materials (ACM) generally in sound condition, vegetation waste and silty sand fill was spread across the south western corner of the bowling green area (possibly associated with the partial demolition of the retaining walls and former bowling green shed (no longer evident) (Photo 5 and 6). Some electrical conduit was evident in this location protruding from the ground. The surface of the bowling green comprised an imported brown silty sand material.

A one-hole golf course was situated along the north boundary of the site in the western portion of the site. A sign showing the layout of the course indicated that the course comprised a 74 m fairway with a green in the north western corner of the site and a tee off adjacent the tennis court. The green comprised a raised fill platform approximately 1.5 m in height with an imported brown /grey silty sand with trace organics at the surface. The adjacent bunker, located immediately north of the green, comprised an imported pale grey sand (Photo 7). The fairway comprised a few slightly raised imported fill mounds which comprised brown silty sands at the surface.

A small area to the north of the sand bunker (possibly the location of a former structure) comprised disturbed ground with a silty sand fill intermixed with timber, vegetation waste, bricks, agricultural pipe, and PVC pipe (Photo 8).

Garden beds with some mature trees are situated along the western site boundary (Photo 9 and 10). Paved and concrete paths traverse the garden and soils in this area generally comprise imported silty sands with trace river gravels and some anthropogenic materials including asphalt fragments, agricultural drainage line, pavers, woodchips, vegetation. Some coal reject was located in the south western portion of the garden bed. The area appeared to have recently been disturbed with several large ground tree stumps evident in the garden beds.

A water tank and several concrete block walled soil bays were present within the south western corner of the site. The soil bays were partially filled with various sands, silty sand and organic materials. The soil bays were surrounded by small stockpile of fill (gravelly silty sand with trace clays) and some anthropogenic materials including concrete and brick fragments (Photo 11). Fill materials to the east of the water tank also comprised scattered fibro sheeting fragments - potential ACM (generally in sound condition) of various types (Photo 12).

A level area to the east of these fill stockpiles (Photo 13) and west of the bowling green (former greenhouse) comprised an area predominantly covered by blast furnace slag gravel at the surface (Photo 14) with a concrete path running south to north. River gravel and slag gravel were evident to the west of the concrete path. An approximate 0.5 m rock retaining wall was present on the western side of the level area, with a 1 m fill batter present on the eastern side.

The central portion of the site contains a relatively flat concrete and asphalt sealed hardstand area associated with the former Chemical shed, Potting shed and Machinery shed (Photo 15 and 16). The former buildings were situated on concrete slabs which were generally in good condition, although some cracking / displacement was evident in the western end of the former Potting shed and eastern end of the former Chemical shed (Photo 17). The central hardstand areas between the former buildings comprised an asphalt sealed pavement leading back up to the driveway entrance road. The pavement in this area was in poor condition in some areas, with thick grass cover in some areas and loose asphalt and gravel in other areas. The surface of the hardstand area was covered with demolition waste including brick, concrete, metal, tile fragments, glass, electrical cable and some fibro sheeting fragments (Photo 18). Former brick footings and concrete slabs were evident to the east of the former Chemical shed which are assumed to be associated with the former soil bays (including the former AST) evident in previous site photos (DWC, 2010). This area was largely overgrown with grass (Photo 19), however, no obvious staining was evident at the concrete or adjacent ground surface at the location of the former AST (Photo 20).

The eastern end of the hardstand area comprised a concrete and asphalt hardstand which was covered with stockpiles of what appeared to be recently placed mulch (likely from the recent tree removal within the western portion of the site) (Photo 21 and 22).

The south western corner of the hardstand area comprised a rock retaining wall which appeared to have not been partially demolished. This wall was situated between the two crib-lock walls described above (Photo 23).

A garden bed situated to the south of the hardstand area between the crib-lock wall and the entrance driveway comprised a partially mulched surface with scattered demolition waste including multiple fibro sheeting fragments in generally in sound condition (Photo 24). Fibro fragments (generally in sound condition) were also evident at the base of a small ramp leading from the entrance driveway onto the Potting shed building slab.

A garden area to the south of the central entrance driveway (Photo 25) comprises numerous mature trees and an undulating surface and was covered by mulch with intermixed building waste (including brick, concrete). A fibro fragment was observed at the surface in this area (Photo 26). Remnants of former sculptures (Photo 27) were also evident in this area. At the eastern end of this garden area an open stormwater drain, constructed with battered natural rock/cement walls and a concrete base, entered the site from Tiral Street (Photo 28). The open drain headed north, going under the entrance driveway to the former tennis court shed where the drain entered into a concrete stormwater pipe.

A former pool and water feature is located on the south eastern portion of the site adjacent to the central entrance driveway off Tiral Street. The water feature has been partially demolished but appeared to comprise a brick and concrete water feature (Photo 29) cascading down the slope into an in-ground pool (Photo 30).

The in-ground pool has been backfilled with soils comprising building wastes including brick, concrete, asphalt, PVC, tile, plastic and trace fibro sheeting fragments (generally in sound condition) and organic matter.

An asphalt sealed driveway entrance is situated along the eastern boundary of the site off Tiral Street and slopes down the hill to the north. Remnants of the former Administration building are located immediately west of this entrance road, including concrete slabs, brick footings, brick and treated timber retaining walls / garden beds terraced on the slope (Photo 31). Demolition waste was scattered across this area including brick, concrete, tile, glass, mortar, electrical cabling /conduit, roof tiles, pavers and some fibro sheeting fragments (Photo 32 and 33).

An asphalt sealed driveway and carparking area is situated to the north of the former Administration building (Photo 34) and slopes to the north east. The asphalt is in relatively good condition.

In the north eastern corner of the site (former greenhouse area) there is a mounded grass covered fill stockpile (Photo 35) with approximate dimension 5 m by 2 m by 0.5 m in height comprising silty sand with some clay, mulch, gravel, plastic, weed matting, and some building waste including treated timber and pavers at the surface. An easement is evident between the site and the adjoining residences. The site is raised above the easement level due to a retaining wall up to approximately 1 m along the fenced property line.

Remnants of square brick raised garden beds are evident to the west of this area (Photo 36). Silty sand fill was evident in the garden beds. A stormwater pit is located adjacent to one of these raised garden beds and indicated the invert for stormwater pipe underlying this area is approximately 1.5 m below ground level. Some ground settlement beside this pit suggest the pipe may be broken in the area.

An area to the west of these garden beds and north of the driveway (former classrooms) comprises a grassed area with remnants of former building slabs and footings (Photo 37 and 38). The area had a large amount of demolition waste at the surface including concrete, bricks, sandstone, pavers, PVC, agricultural pipe, PVC, metal and areas with multiple fibro fragments (Photo 39 and 40).

To the west of this area is the former tennis court and tennis shed (Photo 41). The area was grassed and the former shed concrete slab evident in the south eastern corner of the tennis court. Remnants of the former tennis court fence is situated on the northern boundary fence and brick retaining walls on the northern boundary indicate the area has been filled / levelled.

The surrounding properties largely comprise residential premises to the north, east and south of the site. Commercial (health related buildings and carparking facilities) are present to the west of the site.

The easement to the east of the site comprises a gravel filled surface with the occasional manhole (Photo 42). Some possible black slag fill (a by-product of the former Cockle Creek smelter at Boolaroo) was observed at the surface in the road shoulder near the drainage reserve road crossing on Tiral Street (Photo 43). Fibro sheeting fragments were also observed at the ground surface in the road shoulder (off-site) at this location (Photo 44) and to the north near the western driveway entrance / exit to the site (Photo 45).

In summary, the site inspection has identified a number of areas of environmental concern which may have led to contamination of the site. The main areas of concern identified by the inspection are as follows:

- Widespread presence of imported fill materials (source unknown) across the majority of the site. While this appears to be largely surficial in nature localised areas of deep fill are evident (ie crib-lock retaining walls up to 3 m in height, smaller retaining walls associated with the former western greenhouse, bowling green and along site boundaries, fill mounds associated with the golf course and potentially along the former creek alignment which has been levelled or backfilled after stormwater pipework installation);
- Presence of widespread building / demolition materials across the site (including the presence of fibro sheeting fragments – possible ACM in good condition), both at former building locations and also in other areas such as garden beds, fill mounds and general surficial fill areas;
- Presence of potential black slag fill materials in the road reserve adjacent to the culvert road crossing (off-site). Black slag has been widely used historically as a bedding material for underground services in the LMCC region. If the materials have been used for the culvert crossing the materials may also be present on-site, particularly along the former creek alignment, or existing stormwater drainage reserve;
- Presence of various horticultural training areas and former sheds associated with these activities which may have stored and utilised pesticides and other chemicals.

8. Potential Contaminants

On the basis of the desktop review, available site history information and observations made during the site inspection, the main sources of potential contamination which have been identified for the site as follows:

- Importation of filling (source unknown) and / or use of imported filling for backfill of retaining walls and service trenches etc. Filling (including ash, blast furnace slag, coal reject observed on-site and black slag observed off-site) can contain a range of potential contaminants including hydrocarbons, heavy metals, pesticides, PCBs, asbestos etc depending on the source;
- Weathering / degradation, vandalism and demolition of former structures on the site which may be a source of hazardous building materials including lead paint, asbestos or PCB's;
- Possible pesticide, herbicide and fertiliser use, application and storage on-site. Contaminants of concern would include OCP/OPP, nutrients and potentially acid herbicides;
- Storage and use of fuels and other horticultural chemicals. Contaminants of concern would include TPH, BTEX, PAH, heavy metals, pesticides;
- Opportunistic dumping of deleterious materials which may include imported fill materials. Contaminants of concern would include asbestos, but could include other potential contaminants depending on the source;
- Above ground storage tank (AST). If the AST was utilised for fuel storage contaminants of concern would include TRH, BTEX, heavy metals.

The potential for contamination from adjacent sites is generally considered to be low given the predominantly residential land use surrounding the site and the site topography and geology. It is noted that the former Caltex service station located across gradient and over 200 m from the subject site poses a low risk of contamination to the site).

9. Conceptual Site Model

A Conceptual Site Model (CSM) has been prepared for the site with reference to the National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 Schedule B2 (NEPC, 2013). The CSM identifies potential contaminant sources and contaminants of concern, contaminant release mechanisms, exposure pathways and potential receptors. The CSM is presented in Table 2 below.

Table 2: Conceptual Site Model

Known and Potential Primary Sources	Potential for Contamination	Potential Area Affected	Primary Release Mechanism	Secondary Release Mechanism	Potential Impacted Media	Contaminants of Concern	Exposure Pathway	Potential Receptors	
								Current	Future
Filling present within the site (including car park pavements, imported landscape materials, imported fill for retaining wall backfill and general land forming etc)	Low to Moderate (fill observed across the majority of the site)	Whole of site (generally shallow fill) with localised areas of potentially deeper fill (bowling green, golf green, former creek alignment etc)	Placement of filling on-site	Long-term leaching of contaminants via runoff, rain water infiltration / percolation and potential disturbance during development	Soil, groundwater, surface water	TRH, BTEX, PAH, Metals, Pesticides, PCB, asbestos	Dermal contact, inhalation (dust/vapours), ingestion	Maintenance workers, consultants, trespassers, surface water bodies, groundwater, neighbouring properties in the case of groundwater migration	Public (i.e. guests etc.), Residences, students, site workers, maintenance workers, construction workers, consultants, trespassers, surface water bodies, groundwater neighbouring properties in the case of groundwater migration
Former use and storage of pesticides, herbicides, fertilisers, fuels and associated chemicals	Low to moderate (contamination likely to be localised)	Whole site but in particular golf green, bowling green, tennis court, garden beds. Potential for localised impacts at Chemical shed, machinery shed, potting shed.	Application to ground surface/ surface soils and potential leaks / spills where stored or re-filling occurred	Long-term leaching of contaminants via runoff, rain water infiltration / percolation and potential disturbance during development	Soil, groundwater, surface water	OCP, OPP, heavy metals, TRH, BTEX, PAH, nutrients	Dermal contact, inhalation (dust/vapours), ingestion		
Opportunistic Dumping	Low to moderate	Whole site but more likely in areas of stockpiling / disturbed ground surface	Placement of anthropogenic (rubbish) and potential filling on site	Long-term leaching of contaminants via runoff, rain water infiltration / percolation and potential disturbance during development	Soil, groundwater, surface water	TRH, PAH, BTEX, PCB, OCP, OPP, Metals and Asbestos	Dermal contact, inhalation (dust/vapours), ingestion		
Weathering / Degradation and Demolition of former buildings	Moderate (observations of fibro fragments at surface and in surface filling across the site)	Typically in the vicinity of former buildings / structures	Weathering, vandalism and demolition of former buildings / structures	Long-term leaching of contaminants via runoff, rain water infiltration / percolation and potential disturbance during development	Soil, groundwater, surface water	Asbestos, PCBs, Metals, foreign matter	Dermal contact, inhalation (dust), ingestion		
Former Above Ground Storage Tank (AST)	Low to moderate (depending on whether the AST was ever user for fuel storage on site)	Adjacent chemical shed but potentially elsewhere if ever located underground	Potential leaks and spills associated with former AST and associated infrastructure (if any)	Long-term leaching of contaminants via runoff, rain water infiltration / percolation and potential disturbance during development	Soil, groundwater, surface water	TRH, BTEX, Metals	Dermal contact, inhalation (dust/vapours), ingestion		
Hazardous Ground Gases – Former Mine Workings	Low to moderate (depending on the depth to mine workings, soil /rock cover, nature of the seam mined etc)	Whole site	Migration from former underground mine workings	Migration via fractured rock	Soil vapour, groundwater	Methane, carbon monoxide, carbon dioxide, hydrogen sulphide	Inhalation, explosion and/or asphyxiation due to the accumulation of HGG in structures		

Notes to Table 2:
 BTEX – benzene, toluene, ethyl benzene and xylene
 Heavy Metals - arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc, iron, manganese, selenium, boron, cobalt, magnesium, aluminium, tin
 TRH - total recoverable hydrocarbons
 OCP - organochlorine pesticides OPP - organophosphorus pesticides
 PAH – polycyclic aromatic hydrocarbons
 PCB - polychlorinated biphenyls

10. Field Work

10.1 Sampling Rationale

A systematic and judgemental sampling procedure was conducted for the site assessment to further assess the principal sources of contamination identified in the previous and current assessments.

A total of 34 test pits were excavated and sampled at accessible locations for the assessment, which complies with the NSW EPA (1995) minimum sampling design guidelines for a 2.1 ha site.

The test pits were located to cover a broad area of the site, with the initial 100 series test pits (Pits 101 to 112), surface samples (S1, S2, CP1 and P107) and fibro fragment/underlying soil samples (A1 to A10) collected for the PSI to provide a targeted assessment of the main potential contaminant sources (ie AST, Chemical Store, Machinery Shed, Golf Course, Bowling Green, Greenhouses, Tennis Court, imported filling, retaining wall backfill, former buildings and demolition waste). The additional test pitting conducted for the DSI (Pits 201 to 221) were located at both targeted and systematic locations to further assess site conditions and identified contaminants (predominantly ACM materials and demolition materials) across the site.

Soil samples were selected for analysis on the basis of the likely presence of contamination, based on previous assessments, material type, visual or olfactory evidence of possible contamination (ie odour or staining), proximity to a known source of contamination, and whether generally representative of soil/fill conditions.

It is noted that sixteen boreholes (Bores G1 to G12 and M1, M1A, M2 and M3) to depths ranging from 20 m to 143 m were also drilled as part of the geotechnical site investigation and for mine subsidence assessment undertaken concurrently to the environmental assessment (DP, 2020a and 2020b).

10.2 Field Work Methods

Field work was undertaken in the period 21 January 2020 to 18 March 2020 and comprised the following:

Initial Preliminary Site Investigation

- Site inspection and walkover by a senior environmental engineer;
- Excavation of 12 test pits (101 to 112) using a 5 tonne excavator to depths of 0.5 m to 2.9 m;
- Logging of the subsurface profile, including visual and olfactory assessment of potential contaminants by a geo-environmental engineer from DP;
- Collection of soil samples for contamination and geotechnical testing purposes from the test pits;
- Collection of two asphalt samples (CP1 and P107 (Pit 107));
- Collection of two grab samples from retaining wall backfill (S1 and S2);
- Collection of fibro sheeting fragment samples and underlying near surface soil samples at ten locations across the site (A1 to A10).

Detailed Site Investigation

- Excavation of 22 test pits (201 to 206, 206a and 207 to 221) using a 5 tonne excavator to depths of 0.6 m to 2.0 m;
- Logging of the subsurface profile, including visual and olfactory assessment of potential contaminants by a geo-environmental engineer from DP;
- Collection of soil, asphalt and fibro fragment samples for contamination and geotechnical testing purposes;
- Bulk soil samples (10 L) were also collected to conduct sieving to aid in the identification of potential ACM;
- Field sieving of selected upper fill samples for ACM from test pits (<7 mm sieve) with reference to procedures in the WA DoH (2009) guidelines for assessment of asbestos.

The test pits were set out by an engineer from DP as permitted by services and site accessibility. The engineer also logged the subsurface profile and collected samples for identification and testing purposes.

It is noted that the collection of 10 L bulk samples and field sieving for the identification of ACM was only conducted on 200 series test pits where building rubble was encountered and does not constitute a detailed asbestos assessment with reference to NEPC (2013) and WA DoH (2019).

The process of obtaining samples and their transportation, storage and delivery to laboratories for analysis was documented on DP standard Chain of Custody (C-O-C) forms. Copies of completed forms are contained in Appendix D.

The locations of the pits were recorded using a differential GPS which generally has an accuracy of ± 0.01 m vertically and ± 0.1 m horizontally, depending on prevailing weather conditions and surrounding overhead conditions, to Map Grid of Australia (MGA). The location and surface levels of the bores are presented on the test pit logs in Appendix A.

10.3 Field Work Results

The subsurface conditions encountered in the pits are presented in detail in the attached test pit logs in Appendix A. A summary of the conditions encountered in the test pits are presented below. This should be read in conjunction with the accompanying notes in Appendix A, which explain the classification methods and define descriptive terms used on the logs and in this report. The logs relating to the deeper mine subsidence boreholes (M1, M1A, M2 and M3) are presented in the mine subsidence report (DP, 2020a) and included in Appendix A.

ASPHALT:

Encountered in Pits 107 and 204 from the surface to 0.05 m and Pit 206A from 0.5 m to 0.6 m.

FILLING:

Filling was generally observed across the site from depths of 0.2 m to 1.8 m, although generally observed to be <1 m in depth with the exception of lower lying areas in the north eastern corner of the site and obvious fill / retained areas (ie Golf Green, Bowling Green, Tennis Court) . Fill materials generally comprising gravel / sandy gravel / sand / sandy silt / gravelly clay / clayey silt / clay/ silty clay with anthropogenic inclusions including coal, ash, slag, brick, timber, fibro fragments and PVC in some pits (refer to Section 10.4).

SANDY SILT/CLAYEY SILT (ALLUVIAL):

Alluvial sandy silt topsoil, and typically stiff clayey silt were observed beneath filling within the north eastern portion of the site, generally in the area of the former creek alignment, from depths ranging from 0.2 m to 1.8 m.

SANDY CLAY/CLAYEY SAND / SILTY CLAY (RESIDUAL):

Residual soils, typically stiff to very stiff sandy clay / clayey sand and silty clay were encountered beneath filling and topsoil in most test pits from depths ranging from 0.2 m to 1.8 m to termination at depths of 0.6 m to 2.7 m.

The conditions encountered within the geotechnical boreholes were generally consistent with the test pits.

No free groundwater was observed in the Pits during the time that they remained open, although seepage was observed in Pit 205 at 1.4 m immediately below the overlying filling (possible localised perched seepage in fill). Groundwater was observed during the drilling of geotechnical bores from depths of 3.5 m to 8.7 m (DP, 2020b).

It should be noted that groundwater levels are affected by factors such as climatic conditions, soil permeability and will therefore vary with time.

10.4 Contaminant Observations

Observations of potential contamination within the test pits and geotechnical boreholes (DP, 2020a; 2020b) are summarised in Table 3 below:

Table 3: Potential Contamination Observations within the Test Pits and Geotechnical Bores

Potential Contamination Observation	Locations and Depths (m)
Filling ¹	All Pits and majority of boreholes (refer to logs for details)
Building Rubble (bricks, metal, ceramics, glass, concrete, wood, plastic) ²	Pits 101(0.8-1.6), 102 (0.25-1.0), 103 (0.3-0.9), 105(0-0.15), 110 (0.1-0.5), 111 (0-1.4), 112 (0-0.4), 201 (0-0.35), 203 (0-0.6), 205 (0.2-1.3), 206 (0-1.7), 207(0-1.2), 208(0-0.9), 212(0-0.3), 213(0-0.6), 214(0-0.45), 215(0-0.05), 216(0-0.2), 217(0-0.5), 218(0-0.7), 219 (surface), 221(surface) Bores G2(0-0.1), G6(surface), G8(0-0.4), G9 (0-0.3) and M2(0-0.5)
Fibro fragment ²	Pits 111(0.3-0.8), 112 (0-0.4), 212(0-0.3), 218(0-0.7), 219(surface),
Coal Reject / Coal Gravel	Pits 101 (0.8-1.6), 107(0.2->1.9), 108 (0-0.1), 202 (0.2-0.4), 208(0.2-0.9),
Charcoal	Pits 109 (0.4-1.3), 218(0-0.7), 221(surface)
Ash	Pits 206 (0-1.7), 213(0.3-0.6), 221(0-0.5)
Slag	Pits 102(0-1.0), 212 Bore M2(0-0.5)
Asphaltic lens at depth	Pit 206A (0.5-0.6)

Notes to Table 3:

1 - Potential presence of a range of contaminants (source unknown)

2 – Possible Presence of Asbestos Containing Material (ACM)

The observed bonded ACM was generally in sound condition. Where bonded ACM sheeting was encountered within test pits, the size and number of fragments observed were visually assessed to be at a concentration which would likely exceed the relevant WA DoH (2009) concentration guidelines (ie 0.04% w/w asbestos for bonded ACM for residential with minimal access to soil) which is equivalent to approximately one 40g fragment per 10L sample).

Sieving for the identification of potential ACM was conducted on 19 bulk samples collected in targeted filling which contained building rubble within the 22 test pits (200 series test pits) for the DSI. Trace fibro fragments were encountered in two of the 19 samples (ie Pits 212/0 – 0.3 m and 218/0 – 0.6 m). The results of laboratory testing on potential ACM and a summary of field sieving results are presented in Tables C2 and C4, Appendix C and discussed in Section 14.

There were no obvious indications of gross chemical contamination within the soils sampled (ie no obvious staining or odours). The results of PID screening on the soil samples suggested the absence of gross volatile hydrocarbon impact (<1 ppm).

11. Data Quality Objectives

11.1 Data Quality Objectives (DQOs)

Table 4 summarises the data quality indicators (DQIs) and the procedures designed to enable achievement of the data quality objective (DQOs).

Table 4: Data Quality Indicators

DQI	Achievement Evaluation Procedure
Documentation completeness	Completion of field and laboratory chain of custody documentation, completion of borehole / test pit logs.
Data completeness	Sampling density comparison with Table A, NSW EPA Sampling Design Guidelines (NSW EPA, 1995), and analysis of appropriate determinants based on site history and on-site observation.
Data comparability	Use of National Association of Testing Authorities, Australia (NATA) certified laboratory, use of consistent sampling technique.
Data Representativeness	Completion of logs describing conditions encountered, collection of samples representative of materials encountered at the site, appropriate sampling methodology, analysis of a range of materials encountered, appropriate collection, handling, storage and preservation.
Precision and accuracy for sampling and analysis	Achievement of 50% RPD for replicate analysis, acceptable levels for laboratory QC criteria.

11.2 Sampling and Analysis

11.2.1 Soil Sample Collection, Decontamination and Preservation

Soil and material samples for contamination testing were collected with reference to environmental sampling protocols and C-O-C documentation.

Samples for environmental purposes were generally collected from the near surface, and at regular depth intervals or changes in strata within each pit. Soil samples were collected directly from the test pits walls / excavator bucket (pits) using stainless steel sampling equipment and / or disposable gloves. Care was taken to remove any extraneous material deposited on the sample.

All sampling data was recorded on DP (C-O-C). The general sampling procedure comprised:

- Decontamination of sampling equipment using a 3% solution of phosphate free detergent (Decon 90) and tap water prior to collecting each sample;
- The use of new disposable gloves for each sampling event;
- Transfer of soil samples into laboratory-prepared jars and capping immediately;
- Transfer of fibro samples and underlying near surface samples into zip-lock plastic bags;

- Collection of replicate soil samples in zip-lock plastic bags at each depth for screening by PID;
- Collection of replicate samples for quality assurance / quality control (QA / QC) purposes;
- Labelling of sample containers with individual and unique identification, including project number, sample location and sample depth;
- Placement of the sample containers and replicate sample bags into a cooled, insulated and sealed container for transport to the laboratory.

The process of obtaining samples and their transportation, storage and delivery to laboratories for analysis was documented on a DP standard C-O-C. Copies of completed forms are provided in Appendix D.

Replicate samples for each soil sample were screened for the presence of VOCs, using a MiniRAE LITE PID or MiniRAE 3000 PID with a 10.6 eV lamp, calibrated to 100 ppm Isobutylene.

Information on quality assurance and quality control, including analysis of replicate samples, is found in Appendix D.

11.2.2 Laboratory QA / QC

The NATA accredited chemical laboratory undertook in-house QA / QC procedures involving the routine testing of:

- Reagent blanks;
- Spike recovery analysis;
- Laboratory duplicate analysis;
- Analysis of control standards;
- Calibration standards and blanks; and
- Statistical analysis of QC data.

An assessment of the overall data quality is presented in Appendix D.

12. Laboratory Testing

12.1 Analytical Program

Laboratory testing for the preliminary and detailed site investigation was undertaken by Envirolab Services Pty Ltd, a NATA registered laboratory. Analytical methods used are shown in the laboratory sheets in Appendix C.

A total of 48 soil samples (including one replicate soil sample) and 13 material samples were selected to provide an assessment of soil / fill conditions. The samples were selected to target the identified potential sources of contamination and were analysed for all or some of the following analytes:

- Total Recoverable Hydrocarbons (TRH);
- Benzene, Toluene, Ethyl Benzene, Xylene (BTEX);
- Polycyclic Aromatic Hydrocarbons (PAH);
- Polychlorinated Biphenyls (PCB);
- Organochlorine and Organophosphorus Pesticides (OCP/OPP);
- Phenoxy Acid Herbicides (detailed site assessment);
- Metals: Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Iron (Fe), Lead (Pb); Mercury (Hg), Nickel (Ni), Zinc (Zn) and Manganese (Mn), Iron (Fe), Aluminium (Al), Selenium (Se), Tin (Sn), Antimony (Sb), Magnesium (Mg), Cobalt (Co) and Boron;
- pH and Electrical Conductivity;
- Cation Exchange Capacity (CEC);
- Asbestos identification in soil and / or material; and
- Coal Tar Identification.

In addition to the above, two soil samples were also tested for leachability for lead or PAH in acid (TCLP).

QA / QC comprised analysis of one replicate soil samples (samples D5/JPS). The results of QA / QC testing are presented in Appendix D.

Following the results of the preliminary testing for the PSI, the laboratory used a Gas Chromatography - Tandem Mass Spectrometry to assist in the detection of other pesticides and carbamates, triazine herbicides, synthetic pyrethroids and triazole fungicides.

Phenoxy Acid Herbicides were also added to the suite of analytes to be tested for the DSI.

12.2 Analytical Results

The results of chemical analysis undertaken on soil and material samples are summarised in Tables C1 to C3 in Appendix C.

13. Site Assessment Criteria

The proposed development at 27 Tiral Street, Charlestown will comprise several buildings ranging in height from about 4 to 12 storeys and may include basements for high and low density residential (residential aged care units and buildings and potential early learning centre) purposes.

The Site Assessment Criteria (SAC) applied in the current investigation are informed by the CSM which identified human and ecological receptors to potential contamination on the site (refer to Section 9). Analytical results were assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 (NEPC, 2013). NEPC (2013) is endorsed by the NSW EPA under the CLM Act 1997.

The investigation and screening levels applied in the current investigation comprise levels adopted for a low density residential land use (i.e. HIL-A / HSL-A) due to the possible proposed early learning centre and residential with minimal access to soil (ie HIL-B / HSL-B) in regards to the senior living development.

13.1 Soils

13.1.1 Health Investigation and Screening Levels

The generic HIL and HSL are considered to be appropriate for the assessment of contamination at the site. The adopted soil HIL and HSL for the potential contaminants of concern are presented in Table 5.

Table 5: HIL and HSL in mg/kg Unless Otherwise Indicated

Contaminant		HIL - A	HIL - B	HSL A/B ³ - Sand ⁴			
				0-1m	1-2m	2-4m	>4m
Metals	Arsenic	100	500				
	Boron	4500	40000				
	Cadmium	20	150				
	Cobalt	100	600				
	Copper	6000	30000				
	Lead	300	1200				
	Manganese	3800	14000				
	Mercury	40	120				
	Nickel	400	1200				
	Selenium	200	1400				
	Zinc	7400	60000				
TRH	F2-NAPHTHALENE			110	240	440	NL
	C6-C10 less BTEX (F1)			45	70	110	200
BTEX	Benzene			0.5	0.5	0.5	0.5
	Ethylbenzene			55	NL	NL	NL
	Toluene			160	220	310	540
	Xylene Total			40	60	95	170
PAH/Phenols	Total Positive PAHs ¹	300	400				
	Benzo(a)pyrene TEQ calc (zero)	3	4				
	Benzo(a)pyrene TEQ calc (half)	3	4				
	Benzo(a)pyrene TEQ calc (PQL)	3	4				
	Naphthalene			3	NL	NL	NL
Polychlorinated biphenyls	Picloram	4500	6600				
	PCBs (Sum of total) ²	1	1				
Organochlorine pesticides	Endosulfan	270	400				
	Aldrin + Dieldrin	6	10				
	Chlordane (cis)	50	90				
	Chlordane (trans)	50	90				
	DDT+DDE+DDD	240	600				
	Endrin	10	20				
	Heptachlor	6	10				
	Methoxychlor	300	500				
Organophosphorous Pesticides	Chlorpyrifos	160	340				
Halogenated Benzenes	Hexachlorobenzene (HCB)	10	15				
Phenoxy Acid Herbicides	2,4,5-Trichlorophenoxy Acetic Acid	600	900				
	Hedonal	900	1600				
	2-Methyl-4-chlorophenoxyacetic acid	600	900				
	2-Methyl-4-Chlorophenoxy Butanoic Acid	600	900				
	Mecoprop	600	900				

Notes:

- 1 Sum of carcinogenic PAH
- 2 Non dioxin-like PCBs only.
- 3 The soil saturation concentration (C_{sat}) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds C_{sat}, a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'.
- 4 The HSL have been calculated for a potential vapour intrusion pathway, a sand based on the variable coarse fill identified across the site and an assumed depth to contamination of 0 m to <1 m / 1 m to <2 m / 2 m to <4 m / 4 m+.

As shown in Table 5 the adopted HSLs are predicated on a potential vapour intrusion pathway, as identified in the CSM. Although the CSM also identifies a direct contact pathway, and construction worker receptors, the corresponding HSLs are significantly higher than those for the vapour intrusion pathway and are therefore not drivers for further assessment and/or remediation. As such the direct contact and intrusive maintenance worker HSLs have not been listed.

13.1.2 Ecological Investigation Levels

EIL and Added Contaminant Limits (ACLs), where appropriate, have been derived in NEPC (2013) for only a short list of contaminants comprising As, Cu, Cr (III), DDT, naphthalene, Ni, Pb and Zn. The adopted EIL, derived using the NEPC (2010) *Interactive (Excel) Calculation Spreadsheet* (NEPC online ASC NEPM Toolbox) are shown in the following Table 6.

Table 6: EIL in mg/kg

Analyte		EIL	Comments
Metals	Arsenic	100	Adopted parameters pH = 4.5 (conservative value based on laboratory data) CEC = 2.5 cmol/kg (moderately conservative value based on laboratory data for sandy soils) assumed clay content 1% (conservative) "Aged" (>2 years) source of contamination low for traffic volumes in NSW Organic Carbon Content 1%
	Copper	60	
	Nickel	10	
	Chromium III	190	
	Lead	1100	
	Zinc	140	
PAH	Naphthalene	170	
OCP	DDT	180	

13.1.3 Ecological Screening Levels

ESL are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. The adopted ESL are shown in the following Table 7.

Table 7: ESL in mg/kg

Analyte		ESL ¹	Comments
TRH	C ₆ – C ₁₀ (less BTEX) [F1]	180*	All ESLs are low reliability apart from those marked with * which are moderate reliability
	>C ₁₀ -C ₁₆ (less Naphthalene) [F2]	120*	
	>C ₁₆ -C ₃₄ [F3]	300*	
	>C ₃₄ -C ₄₀ [F4]	2800	
BTEX	Benzene	50	
	Toluene	85	
	Ethylbenzene	70	
	Xylenes	105	
PAH	Benzo(a)pyrene	0.7 / 33	

Notes to Table 7:

- The ESL have been calculated for a coarse soil based on coarse filling being the predominant soil type (Section 10) and Urban residential development

The NEPM ESL of 0.7 mg/kg is understood to be based on a single invertebrate species referenced in the 1999 Canadian Soil Quality Guidelines (since updated) and is considered conservative in the Australian context. These guidelines were updated in 2010 and now suggest a B(a)P concentration of 20 mg/kg for the protection of environmental health based on the soil contact exposure pathway.

It is also noted that the benzo(a)pyrene ESL is a low reliability value. Higher reliability screening levels have been published in CRC CARE (2017), Risk-based Management and Remediation Guidance for Benzo(a)pyrene, CRCCARE Technical Report no. 39. The high reliability value of 33 mg/kg for aged contamination recommended in CRC CARE (2017) has therefore been adopted.

13.1.4 Management Limits

In addition to appropriate consideration and application of the HSL and ESL, there are additional considerations which reflect the nature and properties of petroleum hydrocarbons, including:

- Formation of observable light non-aqueous phase liquids (LNAPL);
- Fire and explosion hazards;
- Effects on buried infrastructure, eg penetration of, or damage to, in-ground services.

The adopted management limits from Schedule B1 of NEPC (2013) are shown in the following Table 8.

Table 8: Management Limits in mg/kg

Analyte		Management Limit	
TRH	C ₆ – C ₁₀ (F1) #	700	The management limits have been calculated for a coarse soil based on the coarse fill encountered on site and residential, parkland and public open space
	>C ₁₀ -C ₁₆ (F2) #	1,000	
	>C ₁₆ -C ₃₄ (F3)	2,500	
	>C ₃₄ -C ₄₀ (F4)	10,000	

Notes to Table 8:

- # Separate management limits for BTEX and naphthalene are not available hence these have not been subtracted from the relevant fractions to obtain F1 and F2

13.1.5 Asbestos in Soil

Asbestos only poses a risk to human health when asbestos fibres are made airborne and inhaled. If asbestos is bound in a matrix such as cement or resin, it is not readily made airborne except through substantial physical damage. Bonded ACM in sound condition represents a low human health risk, whilst both Fibrous Asbestos (FA) and Asbestos Fines (AF) materials have the potential to generate, or be associated with, free asbestos fibres. Consequently, FA and AF must be carefully managed to prevent the release of asbestos fibres into the air.

A detailed asbestos assessment was not undertaken as part of these works; however localised areas of the site comprised limited ACM testing.

NEPC (2013) defines the various asbestos types referred to above as follows:

- Bonded ACM:** Asbestos containing material which is in sound condition, bound in a matrix of cement or resin, and cannot pass a 7 mm x 7 mm sieve.
- FA:** Fibrous asbestos material including severely weathered cement sheet, insulation products and woven asbestos material. This material is typically unbonded or was previously bonded and is now significantly degraded and crumbling.
- AF:** Asbestos fines including free fibres, small fibre bundles and also small fragments of bonded ACM that pass through a 7 mm x 7 mm sieve.

Health Screening Levels (HSL) for asbestos in soil, which are based on likely exposure levels for different scenarios, have been adopted in NEPC (2013) from the Western Australian Department of Health (WA DoH) publication *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia 2009* (WA DoH 2009).

On the basis of the proposed land use(s), and in accordance with Schedule B1, NEPC (2013) the following asbestos HSL have been adopted:

Table 9: Health Screening Levels for Asbestos Contamination in Soil (% w/w)

Form of Asbestos	HSL	
	Residential use, day care centres, preschools	Residential, minimal soil access
Bonded ACM	0.01%	0.04%
FA and AF	0.001 %	
All Forms of Asbestos	No visible asbestos for surface soil	

13.2 Waste Classification

The results of chemical analyses were compared to the following NSW EPA Waste Classification Guidelines – Part 1: Classifying waste, November 2014 (EPA, 2014a) to assess offsite disposal and/or reuse to a licensed landfill. The Excavated Natural Material (ENM) Order (NSW EPA, 2014b) was also considered to assess possible beneficial reuse of soils.

14. Assessment of Contamination

The results of chemical analysis indicate the following:

Soil

The results of chemical analysis from the current investigation indicated the soil samples tested were generally within the health investigation and screening levels for low and high density residential landuse (HILA-B / HSLA/B) with the exception of the following:

- Elevated lead within sample Pit 218/0.5 m (fill materials in the south western portion of the site) which marginally exceeded the adopted HIL-A SAC, however was below the adopted HIL-B SAC;
- Elevated PAHs (Benzo(a)pyrene TEQ) within sample Pit 206a/0.55 m (a localised asphaltic fill lens identified in the north eastern portion of the site) which marginally exceeded both the adopted HIL-A and HIL-B SAC.

The results of chemical analysis from the current investigation also indicated the soil samples tested were generally within the adopted ecological investigation and screening levels for residential land use (EILs / ESLs) with the exception of the following:

- Elevated nickel within fill samples Pit 204/0.2 m and 210/0.4 m marginally exceeding the adopted EIL SAC;
- Elevated zinc within fill sample Pit 218/0.5 m exceeding the adopted EIL SAC;
- Elevated TRH (C₁₆ – C₃₄) within sample Pit 206a/0.55 m (localised asphaltic fill lens) above the adopted ESL SAC; and
- Elevated PAH (Benzo(a)pyrene) within sample Pit 206a/0.55 m (localised asphaltic fill lens) above the low reliability NEPC (2013) ESL. It is noted that Benzo(a)pyrene only marginally exceeded the low reliability NEPC (2013) ESL criteria but has not exceeded the CRC Care (2017) ESL high reliability criteria of 33 mg/kg.

The soil samples tested were all within the NEPC (2013) Management Limits for residential land use (coarse soils).

Concentrations of PCBs and OCP, OPP and Phenoxy Acid Herbicides in all samples tested were below the laboratory detection limits.

Contaminant exceedances are shown in Drawing 2, Appendix E.

Additional analysis of potential pesticides within 100 series samples by the laboratory, using Gas Chromatography - Tandem Mass Spectrometry, indicated that several 100 series pit samples had trace concentrations of DDE and DDT, however, the concentrations detected were below the laboratory reporting limits. The Gas Chromatography - Tandem Mass Spectrometry did not detect the presence of carbamates, triazine herbicides, synthetic pyrethroids or triazole fungicides.

Preliminary statistical analysis (ie 95% UCL calculation) of lead, nickel, zinc, TRH and B(a)P TEQ concentrations was undertaken to further assess the significance of the localised Tier 1 health investigation level and ecological investigation / screening exceedances noted above. This comprised consideration of all the test results across the site analysed for the DSI.

The analysis was conducted using USEPA ProUCL Version 5.1 and considered non-detects. The results of statistical analysis indicated the following:

- Maximum concentrations detected for lead (420 mg/kg) and B(a)P TEQ (5.0 mg/kg) are within 2.5 times the HIL-A (300 mg/kg and 3 mg/kg respectively) and are therefore not considered to represent a 'hot spot' with reference to NEPC (2013);
- Maximum concentrations detected for nickel (14mg/kg) is within 2.5 times the EIL/ESL criteria (10mg/kg) and therefore not considered to represent a 'hot spot' with reference to NEPC (2013);

- Maximum concentrations detected for zinc (460mg/kg) and TRH (C₁₆ – C₃₄) is marginally above 2.5 times the EIL/ESL criteria (140mg/kg, 300 mg/kg respectively) and could be considered hot spots with reference to NEPC (2013);
- The 95% UCL of the mean for B(a)P TEQ and TRH (C₁₆ – C₃₄) was not able to be determined given that the elevated B(a)P TEQ and TRH (C₁₆ – C₃₄) result detected was the only detectable concentration amongst the multiple samples analysed;
- The 95% UCL of the mean for Pb was 38.36 mg/kg well below the 300mg/kg HIL-A criteria. In addition, the standard deviation (SD of 68.25) was also <50% of the HIL-A;
- The 95% UCL of the mean for Ni was 5.8 mg/kg well below the conservative 10mg/kg EIL criteria. In addition, the standard deviation (SD of 3.2) was also <50% of the conservative EIL;
- The 95% UCL of the mean for Zn was 87.8 mg/kg well below the conservative 140mg/kg EIL criteria. The standard deviation (SD of 76.6) was slightly above 50% of the conservative EIL.

Based on the results of statistical analysis and the localised nature of the chemical contaminants identified, the following is noted:

- Given that no 'hot spots' were detected for lead and the 95% UCL values was well below the HIL-A criteria, the elevated lead result at Pit 218/0.5 m does not constitute significant contamination requiring remediation;
- Given that no 'hot spots' were detected for nickel and the 95% UCL values was well below the EIL criteria, the elevated nickel results at Pit 204/0.2 m and 210/0.4 m do not constitute significant contamination requiring remediation;
- While localised elevated zinc concentrations were detected at Pit 218/0.5 m, the 95% UCL value was well within the conservatively EIL. While the detected zinc concentrations in fill at this location would suggest the presence of a hot spot, site specific pH/CEC testing has not been conducted at this location to derive site specific EILs and the vegetation at this location did not indicate plant stress. Remediation for zinc to address conservative EIL is therefore not considered to be warranted.

It is noted that the elevated B(a)P TEQ and TRH (C₁₆ – C₃₄) detected in sample Pit 206a/0.55 m, collected from an asphaltic fill lense, is likely to be a result of the material origin (ie asphalt). Comparison of the TRH Chromatograph by the laboratory confirmed the material was an asphalt material and did not contain coal tar (ie petroleum derived asphalt which would naturally comprise elevated TRH and PAH in a bound form). NEPC (2013) Schedule B7 Appendix A2 indicates that elevated levels of B(a)P in relatively immobile sources, such as bitumen fragments, do not represent a significant health risk. In addition, leachability testing of the material indicated the material had a low propensity to leach. On the basis of the nature of the material and the localised occurrence of the material in filling, remediation of the localised asphaltic lense at Pit 206a containing elevated total concentrations of BaP TEQ HIL-A and TRH (C₁₆ – C₃₄) ESL is not considered to be warranted.

Asbestos Containing Materials

Testing was undertaken on selected fibro fragments encountered across the site. The location of the sampled fibro fragments are shown on Drawing 1, Appendix E.

It is noted that not all fibro fragments encountered on the surface of the site were tested for asbestos identification. Fibro fragments encountered on site were grouped based on visual characteristics and at least one sample from each group was tested for asbestos identification. A summary of the fibro fragments collected from the ground surface, sorted by grouping and tested for asbestos identification are presented below in Table 10. Additional fragments collected from filling within test pits is also included for completeness.

Table 10: Summary of Asbestos Testing within Fibro Fragments

Sample I.D / Groups	Samples Tested
A1/F	A2/F and A6/F
A2/F	
A5/F	
A6/F	
A3/F	A3/F
A4/F	A4/F
A7/F	A7/F
A8/F	A8/F
A11/F	
A9/F	A10/F
A10/F	
212/0-0.3F	NA
218/0.5F	NA
219/0.2F	NA

The results of laboratory testing are summarised in Table C2, Appendix D. In general, the majority of fibro fragments tested were confirmed to contain asbestos. The fibro fragments confirmed to contain asbestos by direct testing or by association based on visual characteristics are shown on Drawing 2, Appendix E. The drawing indicates the ACM are spread broadly across the site.

It is noted, however, that fibro fragments were generally encountered on the surface of the site or within near surface soils. Based on the historical information and observations made across the site, the near surface fibro fragments are likely to be associated with weathering, degradation, vandalism and demolition of former structures, although opportunistic dumping may also be a source based on the site history. Fibro fragments were also observed at depth in filling within several pits (Pits 111 (0.3-0.8), 112 (0-0.4), 212(0-0.3) and 218(0-0.7)). Where observed, fibro fragments were generally in sound condition.

The results of field sieving conducted on 19 bulk samples collected in targeted filling which contained building rubble within the 22 test pits (200 series test pits) for the DSI indicated fibro fragments were encountered in two of the 19 samples (ie Pits 212/0 – 0.3 m and 218/0 – 0.6 m). The results of field sieving results are presented in Table C4, Appendix C and indicated that the concentration of bonded ACM fragments within filling in Pit 212 and 218 were above the NEPC (2013) SAC for residential landuse.

Building rubble (ie bricks, metal, ceramics, glass, concrete, plastic, etc) were generally encountered within fill across the majority of the site. These anthropogenic inclusions are an indicator of the possible presence of ACM. There is therefore a risk that further ACM is present within underlying fill containing building rubble.

Asbestos identification testing within selected soil/fill samples, including soil samples collected directly beneath identified fibro fragments confirm to be ACM, indicated that the samples tested do not contain asbestos materials.

Due to the inherent variability of contaminated materials observed at the surface and encountered within subsurface filling across the site, it is difficult to accurately quantify the extent of contamination that will require remediation.

Hazardous Ground Gases (HGG)

A preliminary assessment of HGG was conducted due to the former coal mining activities within the site. The results and pertinent observations made during the mine subsidence and geotechnical investigations regarding HGG are summarised below:

- The mine subsidence investigation included the drilling of four boreholes (M1, M1A, M2 and M3) to the floor of the workings / base of the Victorina Tunnel Seam (up to depths of about 140 m), geophysical logging and CCTV downhole camera inspection of the mine void;
- A summary of the subsurface conditions encountered in the deep bores is presented in Table 2 from the mine subsidence report (reproduced in Section 4 above);
- A number of coal seams including the Montrose, Wave Hill, Fern Valley and Victoria Tunnel Coal Seams are present within the site;
- The Victoria Tunnel Seam (located from depths of generally greater than 130 m) is the only coal seam that contains abandoned mine workings and the workings are flooded;
- Upper soils generally comprised clays of relatively low permeability;
- General absence of significant drill fluid loss while rock coring suggesting the general absence of permeable strata between coal seams;
- Observations during drilling indicated the presence of gas vapour associated with Bores M1, M1a and M2 which intercepted the Victoria Tunnel Seam that that has been worked;
- Preliminary gas monitoring in Bore M2 detected gas in excess of the lower explosive limit. Oxygen(O₂) levels were observed to drop as low as 10.6% and Carbon monoxide (CO) was observed to reach 6 ppm. Hydrogen sulphide levels (H₂S) remained a 0 ppm.
- Whilst gas was observed to be rising from Bores M1 and M1a, the gas did not register on the gas monitor as CO, H₂S or exceed the lower explosive limit (5%) and Oxygen levels remained at the ambient levels;
- During the CCTV downhole camera inspection, gas bubbles were only observed from significant depths (ie generally greater that 80 m);
- It is understood that the proposed development does not include significant excavations or deep basements (ie maximum excavation depths are likely to be within about 2 m to 3 m of existing ground levels).

Based on the results and observations made during the geotechnical and mine subsidence investigations, including consideration of the site hydrogeology, the depth and condition of the mine workings, gas observations, and the proposed development, the risk of adverse impacts associated with the hazardous ground gases at the site is considered to be low. It is recommended that all mine subsidence investigation bores and any future bores that intersect the Victoria Tunnel Seam / Workings should be grouted to the surface in order to prevent gas from the workings / seam migrating to the surface as was observed in Bore M2.

Aesthetic Considerations

The results of the DSI generally indicate the absence of significant aesthetic issues at the site due to the following:

- General absence of gross staining or odours within soils observed at the site;
- General absence of significant HGG;
- General absence of significant anthropogenic inclusions within fill. Requirements for the remediation of ACM impacts which are predominantly associated with demolition wastes across the site will aid in address possible aesthetic issues associated with the localised anthropogenic inclusions within fill across the site.

15. Preliminary Waste Classification

The results of chemical analysis on soils also indicated the majority of soil samples tested were within the NSW EPA “General Solid Waste” criteria (NSW EPA, 2014a) based on total contaminant concentrations (CT1) with the exception of the following fill samples:

- Pit 218/0.5 m due to elevated total lead; and
- Pit 206a/0.55 m due to elevated total Benzo(a)pyrene.

Toxicity Characteristic Leachability Procedure testing (TCLP) was conducted on the above two samples and indicated the materials had a low propensity to leach in acid. The samples tested are therefore reclassified as ‘General Solid Waste’ (GSW) (SCC1 / TCLP1).

It is noted that ACM in the form of bonded fibro sheeting fragments was identified at the ground surface and within localised fill materials across the site. Asbestos or asbestos impacted soils are classified as ‘Special Waste (asbestos)’ in addition to the chemical classification (soils). It is noted that further ACM is likely to be present across the site within upper fill materials based on site observations and the presence of building waste.

It is noted that majority of the samples tested were within the Excavated Natural Material (ENM) absolute maximum criteria for the analytes tested, with the exception of fill samples Pit 218/0.5 m (due to elevated lead and zinc) and 206a/0.55 m (due to elevated TRH(C₁₀-C₃₆), Total PAHs and B(a)P). It is noted that the testing regime conducted for the DSI did not include foreign material testing or pH and EC on all samples which would be required to comply with the ENM RRO. Based on site observations, foreign materials content in some fill materials containing building / demolition materials are likely to exceed the non-natural material limit of 2% for classification as ENM.

It is noted that the underlying natural materials can be considered as VENM subject to appropriate segregation and validation of overlying filling. The natural samples tested comprised contaminant concentrations below the detection limit on all samples with the exception of minor naturally occurring metal concentrations.

It is also noted that the four coal tar samples tested across the site within surface asphalt and the buried asphaltic lens do not comprise coal tar materials. Asphalt materials which do not contain coal tar or asbestos can be considered for re-use on another site under the NSW EPA reclaimed asphalt resource recovery order (NSW EPA, 2014c).

16. Comments

16.1 Contamination

The results of the DSI generally indicated the following:

- Presence of fill within all test pits and several bores to depths of 0.2 m to 1.8 m across the site;
- Presence of ash, slag and asphalt within some fill materials;
- Presence of building materials (bricks, metal, ceramics, glass, concrete, plastic, wood) within some fill materials which may be an indicator of the presence of hazardous building materials (HBM) including asbestos;
- Presence of localised lead and PAHs (B(a)P TEQ) within fill/soil above the adopted human-health based SAC (ie HIL – A and HIL-B (PAHs)) at two locations. Given the lead concentration was not a 'hot spot' and considering the results of statistical analysis (ie 95%UCL <SAC), the lead concentration detected is not considered to be significant and as such remediation is not considered to be warranted. The elevated B(a)P TEQ was shown to be associated with a localised asphaltic lense within fill. Given the low leachability characteristics of the asphaltic materials (confirmed by TCLP testing) and NEPC (2013) guidance which indicates that elevated levels of B(a)P in relatively immobile sources, such as bitumen fragments, do not represent a significant health risk, remediation of the localised asphaltic lense at Pit 206a is not considered to be warranted;

- Several asbestos in material (fibro) fragments (ie bonded ACM) encountered at the ground surface across the site and also within filling at several locations (up to approximately 0.7 m depth) at concentrations exceeding NEPC (2013) and WA DoH (2009) acceptance limits for residential land use (at least two locations) which will require remediation. It is noted that no friable asbestos was detected in the soil samples analysed (ie only bonded ACM impact identified). It is noted, however, that given the presence of building materials within filling across the site, additional areas of bonded ACM impact within fill is likely;
- Presence of nickel, zinc, TRH (C₁₆ – C₃₄) or B(a)P within fill / soil above the adopted ecological based SAC (ie EIL / ESL) at several locations. It is noted that the exceedances were generally minor (shown to be statistically acceptable) or associated with asphaltic materials which were shown to have a low propensity to leach. On this basis and given the proposed development will comprise covering large portions of the site with buildings/structures, remediation of the site to address these minor EIL/ESL exceedances is not considered to be warranted;
- Fill materials tested generally met the criteria for classification as 'General Solid Waste' based on total and leachable chemical concentrations (ie GSW (CT1) or GSW (SCC1/TCLP1). Asbestos impacted soils would be classified as 'Special Waste' (asbestos waste) in addition to the classification of the soil matrix. Additional testing would be required to confirm the possible extent of asbestos impacted materials, and waste classification of materials if off-site disposal was considered due to the variable fill conditions present.

It is noted that ACM (ie bonded asbestos (fibro) fragments) generally in sound condition) were generally encountered on the surface of the site or within near surface soils. The results of the assessment suggest that the ACM impacts are predominantly associated with weathering, degradation, vandalism and demolition of former structures, although indiscriminate dumping may have also occurred locally based on site history information.

Fibro fragments, however, were also observed at greater depth in up to 0.7 m depth within the western and eastern portion of the site. Building rubble (ie bricks, metal, ceramics, glass, concrete, plastic, wood etc) were generally also encountered within fill across the entire site. These anthropogenic inclusions are an indicator of the possible presence of ACM. There is therefore a risk that further ACM is present within underling fill containing building rubble.

16.2 Hazardous Ground Gases

The preliminary assessment of HGG indicated that a number of coal seams including the Montrose, Wave Hill, Fern Valley and Victoria Tunnel Coal Seams are present within the site. The Victoria Tunnel Seam (located from depths of generally greater than 130 m) is the only coal seam that contains abandoned mine workings and the workings are flooded.

Although gas vapour was detected in some bores during the mine subsidence drilling from depths of greater than about 80 m, the risk of adverse impacts associated with the hazardous ground gases at the site is considered to be low, considering the site hydrogeology, the depth and condition of the mine workings, gas observations, and the proposed development.

17. Conclusions and Recommendations

Based on the findings of the DSI, remediation / management would be required to render the site suitable for the proposed seniors living development and possible early learning centre from a contamination perspective, predominantly due to the presence of bonded ACM at the surface and within upper soil / fill across the site. Localised remediation/ management of the identified elevated PAHs and heavy metals is not considered to be warranted as discussed above, however, it is noted that remediation of bonded ACM impacted soils is also likely to remove exposure pathways to some of these elevated chemical contaminants sources.

Due to the presence and distribution of ACM impacts at numerous locations across the site, management of the impacted fill / soil materials under a suitable capping layer to prevent access/exposure from a contamination perspective could be considered at the site. Alternatively, excavation and off-site disposal of all impacted soils could be conducted, subject to a feasibility assessment based on the estimated volume of soils requiring disposal.

While bonded asbestos impact has been identified at the surface and within localised filling across the site (associated with building materials identified within filling), a detailed asbestos assessment with reference to WA DoH (2009) (which would require double the NSW EPA (1995) sampling density) has not been conducted at this stage to confirm the concentration of asbestos within soils across the site. Given the wide-spread nature of fill and building materials encountered, it is likely that bonded ACM impacts are present within filling across the site.

Active remediation (ie removal of ACM impacts from within soils followed by validation of remediated soils) is not likely to be practical or feasible due to the distribution of ACM impacts across the site and presence of widespread building materials.

The adopted remediation approach should be aligned with the proposed development and should be detailed in a site-specific remediation action plan (RAP) for the site. It is noted that on-site management of contamination will attract a notice on the Section 10.7 planning certificate for the site and require the preparation of a long term site management plan (SMP) to outline management procedures for maintenance of the capping layer and procedures for future disturbance (if required). On-site management of site contamination will require regulatory approval (Council).

In summary, development of the site will require remediation and management of ACM impacts identified across the site, which should be conducted in accordance with a site-specific Remediation Action Plan (RAP).

The site is considered to be suitable for the proposed seniors living development and possible early learning centre from a contamination perspective, subject to appropriate remediation / management of contamination (where required) and regulatory approvals.

With regards to HGG, it is recommended that all mine subsidence investigation bores and any future bores that intersect the Victoria Tunnel Seam / Workings should be grouted to the surface in order to prevent gas from the workings / seam migrating to the surface.

18. References

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- NSW EPA (2019), *Assessment and Management of Hazardous Ground Gases, Contaminated Land Guidelines*, NSW Environment Protection Authority.
- WA DoH (2009), *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*, Western Australia Department of Health.

19. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for this project at 27 Tiral Street, Charlestown with reference to DP's proposal NCL190709.P.003.Rev0 dated 9 December 2019 and updated proposal NCL190709.P.003.Rev1 dated 3 March 2020 and acceptance received from David Hutchinson and Bel Rivera of The Uniting Church in Australia Property Trust (NSW) for Uniting (NSW.ACT) dated 6 January 2020 and 9 March 2020. The work was carried out under a Consultant Agreement dated 14 January 2020. This report is provided for the exclusive use of Uniting (NSW.ACT) for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

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

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

Asbestos has been detected by observation and by laboratory analysis, either on the surface of the site, or in filling materials at the test locations sampled and analysed. Building demolition materials, such as concrete, brick, were also located in surface filling and above-ground stockpiles, and these are considered as indicative of the possible presence of hazardous building materials (HBM), including asbestos.

Although the sampling plan adopted for this investigation is considered appropriate to achieve the stated project objectives, there are necessarily parts of the site that have not been sampled and analysed. This is either due to undetected variations in ground conditions or to budget constraints (as discussed above), or to vegetation preventing visual inspection and reasonable access. It is therefore considered possible that HBM, including asbestos, may be present in unobserved or untested parts of the site, between and beyond sampling locations, and hence no warranty can be given that additional areas of asbestos impact is not present.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the environmental components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

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Appendix A

About This Report
Sampling Methods
Soil Descriptions
Symbols and Abbreviations
Test Pit Logs (Pits 101 to 112)
Test Pit Logs (Pits 201 to 206, 206A, 207 to 221)
Borehole Logs (Bores G1 to G12 and M1, M1A, M2 and M3)

About this Report

Douglas Partners



Introduction

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

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

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This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

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

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

Groundwater

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

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;

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

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

Reports

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

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

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

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

About this Report

Site Anomalies

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

Information for Contractual Purposes

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

Site Inspection

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



Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low

reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:
4,6,7
N=13
- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:
15, 30/40 mm

Sampling Methods

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests /

Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.



Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are generally based on Australian Standard AS1726:2017, Geotechnical Site Investigations. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	19 - 63
Medium gravel	6.7 - 19
Fine gravel	2.36 - 6.7
Coarse sand	0.6 - 2.36
Medium sand	0.21 - 0.6
Fine sand	0.075 - 0.21

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

The proportions of secondary constituents of soils are described as follows:

In fine grained soils (>35% fines)

Term	Proportion of sand or gravel	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	>30%	Sandy Clay
With	15 - 30%	Clay with sand
Trace	0 - 15%	Clay with trace sand

In coarse grained soils (>65% coarse)

- with clays or silts

Term	Proportion of fines	Example
And	Specify	Sand (70%) and Clay (30%)
Adjective	>12%	Clayey Sand
With	5 - 12%	Sand with clay
Trace	0 - 5%	Sand with trace clay

In coarse grained soils (>65% coarse)

- with coarser fraction

Term	Proportion of coarser fraction	Example
And	Specify	Sand (60%) and Gravel (40%)
Adjective	>30%	Gravelly Sand
With	15 - 30%	Sand with gravel
Trace	0 - 15%	Sand with trace gravel

The presence of cobbles and boulders shall be specifically noted by beginning the description with 'Mix of Soil and Cobbles/Boulders' with the word order indicating the dominant first and the proportion of cobbles and boulders described together.

Soil Descriptions

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	VS	<12
Soft	S	12 - 25
Firm	F	25 - 50
Stiff	St	50 - 100
Very stiff	VSt	100 - 200
Hard	H	>200
Friable	Fr	-

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	Density Index (%)
Very loose	VL	<15
Loose	L	15-35
Medium dense	MD	35-65
Dense	D	65-85
Very dense	VD	>85

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Extremely weathered material – formed from in-situ weathering of geological formations. Has soil strength but retains the structure or fabric of the parent rock;
- Alluvial soil – deposited by streams and rivers;

- Estuarine soil – deposited in coastal estuaries;
- Marine soil – deposited in a marine environment;
- Lacustrine soil – deposited in freshwater lakes;
- Aeolian soil – carried and deposited by wind;
- Colluvial soil – soil and rock debris transported down slopes by gravity;
- Topsoil – mantle of surface soil, often with high levels of organic material.
- Fill – any material which has been moved by man.

Moisture Condition – Coarse Grained Soils

For coarse grained soils the moisture condition should be described by appearance and feel using the following terms:

- Dry (D) Non-cohesive and free-running.
- Moist (M) Soil feels cool, darkened in colour.
Soil tends to stick together.
Sand forms weak ball but breaks easily.
- Wet (W) Soil feels cool, darkened in colour.
Soil tends to stick together, free water forms when handling.

Moisture Condition – Fine Grained Soils

For fine grained soils the assessment of moisture content is relative to their plastic limit or liquid limit, as follows:

- 'Moist, dry of plastic limit' or 'w < PL' (i.e. hard and friable or powdery).
- 'Moist, near plastic limit' or 'w ≈ PL' (i.e. soil can be moulded at moisture content approximately equal to the plastic limit).
- 'Moist, wet of plastic limit' or 'w > PL' (i.e. soils usually weakened and free water forms on the hands when handling).
- 'Wet' or 'w ≈ LL' (i.e. near the liquid limit).
- 'Wet' or 'w > LL' (i.e. wet of the liquid limit).

Symbols & Abbreviations

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Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U ₅₀	Undisturbed tube sample (50mm)
W	Water sample
pp	Pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	Lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

Symbols & Abbreviations

Graphic Symbols for Soil and Rock

General



Asphalt



Road base



Concrete



Filling

Soils



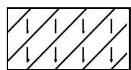
Topsoil



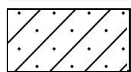
Peat



Clay



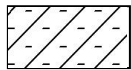
Silty clay



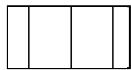
Sandy clay



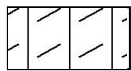
Gravelly clay



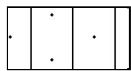
Shaly clay



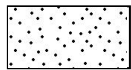
Silt



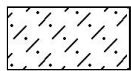
Clayey silt



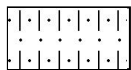
Sandy silt



Sand



Clayey sand



Silty sand



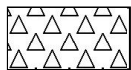
Gravel



Sandy gravel



Cobbles, boulders



Talus

Sedimentary Rocks



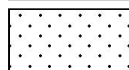
Boulder conglomerate



Conglomerate



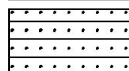
Conglomeratic sandstone



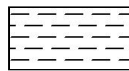
Sandstone



Siltstone



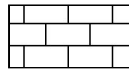
Laminite



Mudstone, claystone, shale

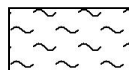


Coal

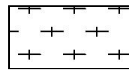


Limestone

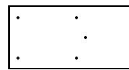
Metamorphic Rocks



Slate, phyllite, schist

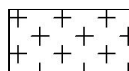


Gneiss

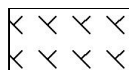


Quartzite

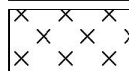
Igneous Rocks



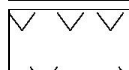
Granite



Dolerite, basalt, andesite



Dacite, epidote



Tuff, breccia



Porphyry

TEST PIT LOG

CLIENT: The Uniting Church in Australia Property Trust
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 96.3 AHD
EASTING: 378131.6
NORTHING: 6351368.2

PIT No: 101
PROJECT No: 102007.00
DATE: 24/1/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
96 <												

RIG: 5 tonne Kobelco excavator with 0.45mm bucket (teeth)

LOGGED: Pankhurst

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed whilst pit remained open

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: The Uniting Church in Australia Property Trust
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 95.9 AHD
EASTING: 378142.3
NORTHING: 6351344.1

PIT No: 102
PROJECT No: 102007.00
DATE: 24/1/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
	0.25	FILL / SANDY GRAVEL (slag) (GP): Fine to medium subangular slag gravel, pale grey, fine to medium grained, trace rootlets, moist		D	0.2	E	PID>1					
		FILL / SANDY CLAY (CI): Medium plasticity, dark brown, mottled orange, with fine to medium subangular gravel, trace slag, decomposed wood, W<PL		D	0.5	E	PID>1					
				D	0.8	E	PID>1					
	1.0	SILTY CLAY (CI): Medium plasticity, yellow brown, mottled orange, W<PL, very stiff, residual		D	1.2	E	pp = 500-600					
					1.3		pp = 500-600					
				U ₅₀								
		From 1.5m, becoming pale grey, mottled yellow brown, friable, hard		D	1.55							
				D	1.6	E	PID>1					
				D	1.65							
	1.7	Pit discontinued at 1.7m, limit of investigation										
	2											

RIG: 5 tonne Kobelco excavator with 0.45mm bucket (teeth)

LOGGED: Pankhurst

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed whilst pit remained open

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: The Uniting Church in Australia Property Trust
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 93.9 AHD
EASTING: 378162.6
NORTHING: 6351351

PIT No: 103
PROJECT No: 102007.00
DATE: 24/1/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
93 <												

RIG: 5 tonne Kobelco excavator with 0.45mm bucket (teeth)

LOGGED: Pankhurst

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed whilst pit remained open

REMARKS:

- ☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test ls(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test ls(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



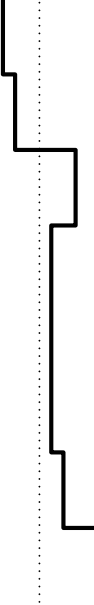
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TEST PIT LOG

CLIENT: The Uniting Church in Australia Property Trust
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 93.7 AHD
EASTING: 378179.8
NORTHING: 6351346.1

PIT No: 104
PROJECT No: 102007.00
DATE: 24/1/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)								
				Type	Depth	Sample	Results & Comments		5	10	15	20					
93	0.25	FILL / TOPSOIL / SAND (SP): Fine to medium grained brown, with silt, and rootlets, moist		D	0.1	E	PID>1		1								
	0.7	FILL / GRAVEL (GP): Fine subangular gravel, dark grey, trace sand, moist		D	0.5	E	PID>1 agg pipe 0.7m										
	1	FILL / SANDY CLAY (CI): Medium plasticity, grey mottled yellow brown, fine to medium grained sand, W<PL, trace rootlets		0.8		pp >500											
92	1.2	SANDY CLAY (CL-CI): Low to medium plasticity, orange brown mottled grey, fine to medium grained sand, W<PL, hard, residual		D	1.0	E	PID>1										
					1.3		pp >600										
	1.7	Pit discontinued at 1.7m, limit of investigation		D	1.5	E	PID>1										
91																	

TEST PIT LOG

CLIENT: The Uniting Church in Australia Property Trust
PROJECT: United Charlestown Development
LOCATION: 27 Tirral Street, Charlestown

SURFACE LEVEL: 91.6 AHD
EASTING: 378191.8
NORTHING: 6351361.6

PIT No: 105
PROJECT No: 102007.00
DATE: 24/1/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
91	0.15	FILL / TOPSOIL / SILTY SAND (SM): Fine to medium grained, brown, low plasticity, with rootlets, trace pavers, moist		D	0.1	E	PID>1 At 0.2m PVC pipe and black conduit with cable					
	0.35	FILL / GRAVEL (GP): Fine to medium, subangular to angular gravel, pale yellow, trace fine to medium grained sand, moist		D	0.3	E						
	0.9	POSSIBLE FILL / SANDY SILT (ML): Low plasticity, dark grey, fine to medium grained sand, W<PL, hard, possible alluvial			0.4	pp >600 PID>1						
				B	0.5							
					0.6							
	1	SILTY CLAY (CI): Medium plasticity, pale grey, mottled yellow, trace sand, W<PL, hard, residual			1.0	pp >600						
	D	1.3		E	PID>1							
90	1.6	Pit discontinued at 1.6m, limit of investigation										
89	2											

RIG: 5 tonne Kobelco excavator with 0.45mm bucket (teeth)

LOGGED: Pankhurst

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed whilst pit remained open

REMARKS:

- ☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



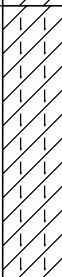
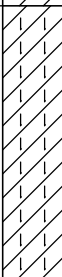
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TEST PIT LOG

CLIENT: The Uniting Church in Australia Property Trust
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 91.0 AHD
EASTING: 378205
NORTHING: 6351345.8

PIT No: 106
PROJECT No: 102007.00
DATE: 24/1/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing			Water	Dynamic Penetrometer Test (blows per 150mm)
				Type	Depth	Sample		
91		FILL / TOPSOIL / SANDY SILT (ML): Low plasticity, brown, fine to medium grained sand, W<PL		D	0.1	E	PID>1	
	0.25	FILL / SAND (SP): Fine to medium grained, grey, with fine subangular gravel and silt, moist		D	0.4	E		
	0.5	SILTY CLAY (CI): Medium plasticity, grey mottled yellow, with fine to medium grained sand, W<PL, very stiff, residual		D	0.6	E	PID>1	
	0.8	SILTY CLAY (CI): Medium plasticity, yellow mottled grey, W~PL, very stiff, residual		D	0.7		pp = 250-300	
				D	0.9	E	pp = 350	
90	1				1.0			1
				U ₅₀				
	1.35	Pit discontinued at 1.35m, limit of investigation			1.35			
89	2							2

RIG: 5 tonne Kobelco excavator with 0.45mm bucket (teeth)

LOGGED: Pankhurst

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed whilst pit remained open

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W _{seep}	Water seep
E	Environmental sample	W _{level}	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



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TEST PIT LOG

CLIENT: The Uniting Church in Australia Property Trust
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 91.1 AHD
EASTING: 378196.9
NORTHING: 6351334.9

PIT No: 107
PROJECT No: 102007.00
DATE: 24/1/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
	0.02	WEARING COURSE - Asphalt										
	0.1	FILL / PAVEMENT MATERIAL / SANDY GRAVEL (GP): Fine to medium, rounded to subrounded material, pale yellow, fine to medium grained sand, moist, with silt		D	0.1	E	PID>1					
	0.2	SILTY CLAY (CH): High plasticity, pale grey, mottled red, trace coal gravel, W<PL, stiff to very stiff, residual		D	0.3	E	PID>1					
					0.6		pp = 380					
					0.8		pp = 390					
				B								
	1			D	1.0	E	PID>1					
	1.9	Pit discontinued at 1.9m, limit of investigation										
	2											

RIG: 5 tonne Kobelco excavator with 0.45mm bucket (teeth)

LOGGED: Pankhurst

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed whilst pit remained open

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

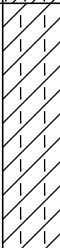
SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (s(50)) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (s(50)) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

TEST PIT LOG

CLIENT: The Uniting Church in Australia Property Trust
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 91.0 AHD
EASTING: 378218.1
NORTHING: 6351339.8

PIT No: 108
PROJECT No: 102007.00
DATE: 24/1/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
91.0	0.1	FILL / TOPSOIL / SANDY SILT (ML): Low plasticity, brown, fine to medium grained sand, trace coal reject, gravel, W<PL FILL / SANDY SILT (ML): Low plasticity, dark grey, fine to medium grained sand, W<PL (hard, possible alluvial)		D	0.05	E	PID>1					
					0.3		pp >600					
				D	0.4	E	PID>1					
	1.0	SILTY SANDY CLAY (CI-CL): Low to medium plasticity, grey, mottled orange, fine to medium grained sand, W<PL, hard, residual		D	1.1		pp >600					
					1.2	E	PID>1					
	1.4	SILTY CLAY (CI): Medium plasticity, orange brown, mottled grey, W>PL, stiff, residual		D	1.6	E	pp = 150 PID>1					
	1.9	Pit discontinued at 1.9m, limit of investigation										
89.2												

RIG: 5 tonne Kobelco excavator with 0.45mm bucket (teeth)

LOGGED: Pankhurst

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed whilst pit remained open

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test (s(50)) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test (s(50)) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

TEST PIT LOG

CLIENT: The Uniting Church in Australia Property Trust
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 91.8 AHD
EASTING: 378237.5
NORTHING: 6351354.4

PIT No: 109
PROJECT No: 102007.00
DATE: 24/1/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
	0.1	FILL / TOPSOIL / SANDY SILT (ML): Low plasticity, brown, fine to medium grained sand, trace rootlets, W<PL		D	0.05	E	PID>1					
		FILL / SANDY CLAY (CI): Medium plasticity, pale grey, with fine to medium grained sand, trace rootlets, W<PL		D	0.3	E	PID>1					
	0.4	SILTY CLAY (CH): High plasticity, grey, mottled yellow brown, trace fine to medium grained sand, trace charcoal, W<PL, hard, residual		D	0.5	E	PID>1					
					0.6		pp >600					
	1.3	CLAY (CH): High plasticity, grey, mottled yellow brown, W<PL, very stiff to hard, residual		D	1.4	E	PID>1					
					1.5		pp = 300-600					
		From 1.8m, W>PL, firm		B	1.7							
				D	1.8	E	PID>1					
					1.9							
	2.3	Pit discontinued at 2.3m, limit of investigation			2.1		pp = 50-60					

RIG: 5 tonne Kobelco excavator with 0.45mm bucket (teeth)

LOGGED: Pankhurst

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed whilst pit remained open

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test (s(50)) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test (s(50)) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

TEST PIT LOG

CLIENT: The Uniting Church in Australia Property Trust
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 89.4 AHD
EASTING: 378283.2
NORTHING: 6351354.2

PIT No: 110
PROJECT No: 102007.00
DATE: 24/1/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
	0.1	FILL / TOPSOIL / SANDY SILT (ML): Low plasticity, brown, fine to medium grained sand, W<PL, trace rootlets		D	0.05	E	PID>1					
		FILL / SANDY CLAY (CL): Low plasticity, brown, fine to medium grained sand, trace rootlets, brick, glass concrete, W<PL		D	0.3	E	pp >600 PID>1					
	0.5	FILL / SILTY CLAY (CI): Medium plasticity, pale grey, mottled yellow, W<PL		D	0.55	E	PID>1 pp >600					
	0.6	FILL / SANDY CLAY (CI): Medium plasticity, brown, mottled yellow, W<PL		D	0.7	E	pp >600 PID>1					
	0.8	CLAY (CH): High plasticity, grey, mottled orange, W<PL, very stiff, residual		D	1.0	E	pp = 300 PID>1					
					1.1							
				U ₅₀								
					1.5							
		From 1.6m, W>PL, stiff			1.6		pp = 150					
	2.1	Pit discontinued at 2.1m, limit of investigation										

RIG: 5 tonne Kobelco excavator with 0.45mm bucket (teeth)

LOGGED: Pankhurst

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed whilst pit remained open

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test (s(50)) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test (s(50)) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	Standard penetration test	
E Environmental sample	≡ Water level	S Shear vane (kPa)	

TEST PIT LOG

CLIENT: The Uniting Church in Australia Property Trust
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 89.2 AHD
EASTING: 378315.8
NORTHING: 6351345.9

PIT No: 111
PROJECT No: 102007.00
DATE: 24/1/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
		FILL / TOPSOIL / SANDY SILT (ML): Low plasticity, brown, fine to medium grained sand, trace rootlets, trace pavers, W<PL		D	0.1	E	PID>1					
	0.3	FILL / GRAVELLY CLAY (CI): Medium plasticity, brown, fine to coarse rounded to subrounded, with fine to medium grained sand, W<PL, trace fibro, concrete, pavers, abundant rootlets		D	0.4	E	pp >600 PID>1					
	0.8	FILL / SANDY CLAY (CI): Medium plasticity, orange brown, fine to medium grained sand, W~PL trace plastic		D	0.9	E	pp >600 PID>1					
	1.4	POSSIBLE FILL / SANDY SILT (ML): Low plasticity, dark grey / brown, fine to medium grained sand, W<PL, very stiff, possible alluvial		D	1.5	E	pp = 100-200 PID>1					
	1.8	SILTY CLAY (CI): Medium plasticity, grey, mottled orange, W>PL, firm, residual		B D	1.8 1.9 2.0	E	pp = 50-100 PID>1					
	2.7	Pit discontinued at 2.7m, limit of investigation										

RIG: 5 tonne Kobelco excavator with 0.45mm bucket (teeth)

LOGGED: Pankhurst

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed whilst pit remained open

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test (s(50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test (s(50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	W Water seep	S Standard penetration test	
E Environmental sample	W Water level	V Shear vane (kPa)	

TEST PIT LOG

CLIENT: The Uniting Church in Australia Property Trust
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.0 AHD
EASTING: 378262.5
NORTHING: 6351325.7

PIT No: 112
PROJECT No: 102007.00
DATE: 24/1/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per 150mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
89		FILL / SILTY CLAY (CI-CL): Low to medium plasticity, brown, W<PL, with fibro, brick, glass, PVC, pavers, timber, abundant tree roots		D	0.2	E	PID>1					
	0.4	SILTY CLAY (CI): Medium plasticity, grey, mottled yellow, W<PL, very stiff to hard, residual		D	0.8	E	PID>1					
					1.0		pp = 400					
89	1				1.2							
		From 1.3m, moisture content increasing, very stiff		U ₅₀	1.4							
				D	1.5	E	pp = 300 PID>1					
				B								
	1.9	Pit discontinued at 1.9m, limit of investigation			1.9							
88	2											

RIG: 5 tonne Kobelco excavator with 0.45mm bucket (teeth)

LOGGED: Pankhurst

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed whilst pit remained open

REMARKS:

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Uniting (NSW.ACT)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 92.19 AHD
EASTING: 378302.18
NORTHING: 6351279.87

PIT No: 201
PROJECT No: 102007.01
DATE: 17/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
92.0		FILL / Sandy Silt - Generally comprising fine to medium grained, brown and grey, moist, low plasticity		D	0.0	B	PID<1					
		- abundant organics, brick, tile and concrete boulders on surface (footings) and trace plastic and metals		D	0.3	E	PID<1					
	0.35	CLAYEY SAND - Fine to medium grained, pale brown, low plasticity, moist		D	0.4	E	PID<1					
	0.5	SANDY CLAY - Medium plasticity, pale brown and orange, M>PL										
0.7		Pit discontinued at 0.7m, limit of investigation										

RIG: 5T Hitachi Excavator with 450mm bucket (teeth)

LOGGED: Sebastian

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Co-ordinates and levels were obtained using DGPS

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (s(50)) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (s(50)) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	WL	Water level	V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Uniting (NSW.ACT)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 92.12 AHD
EASTING: 378289.72
NORTHING: 6351284.15

PIT No: 202
PROJECT No: 102007.01
DATE: 17/3/2020
SHEET 1 OF 1

[illegible]

RIG: 5T Hitachi Excavator with 450mm bucket (teeth)

LOGGED: Sebastian

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Co-ordinates and levels were obtained using DGPS

- ☐ Sand Penetrometer AS1289.6.3.3
- ☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test ls(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test ls(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



TEST PIT LOG

CLIENT: Uniting (NSW.ACT)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.85 AHD
EASTING: 378308.18
NORTHING: 6351300.54

PIT No: 203
PROJECT No: 102007.01
DATE: 17/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
	0.2	FILL / Sandy Silt - Generally comprising dark brown, low plasticity, M<PL with roots and rootlets, trace ceramic and glass on surface		D	0.1	E	PID<1					
		FILL / Sandy Clay - Medium plasticity, brown and orange, M>WP										
	0.6	At 0.5m, glass fragments		D	0.5	E	PID<1					
	0.7	SANDY CLAY - Medium plasticity, pale brown and orange, M>PL										
		Pit discontinued at 0.7m, limit of investigation										
89	1											
89	2											
88												

RIG: 5T Hitachi Excavator with 450mm bucket (teeth)

LOGGED: Sebastian

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Co-ordinates and levels were obtained using DGPS

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Uniting (NSW.ACT)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 89.66 AHD
EASTING: 378314.84
NORTHING: 6351321.4

PIT No: 204
PROJECT No: 102007.01
DATE: 17/3/2020
SHEET 1 OF 1

[illegible]

RIG: 5T Hitachi Excavator with 450mm bucket (teeth)

LOGGED: Sebastian

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Co-ordinates and levels were obtained using DGPS

☐ Sand Penetrometer AS1289.6.3.3

☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ls(50) (MPa)
		PL(D)	Point load diametral test ls(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



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TEST PIT LOG

CLIENT: Uniting (NSW.ACT)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 89.08 AHD
EASTING: 378298.86
NORTHING: 6351342.6

PIT No: 205
PROJECT No: 102007.01
DATE: 17/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
89		FILL / Silty Sand - fine to medium grained, dark brown, trace rootlets, moist		D	0.0							
				D	0.1	E	PID<1					
		From 0.2m, pale brown subangular and subrounded gravelly silty sand, trace brick and plastic, moist		D		B						
				D	0.7	E	PID<1					
88	1				1.0							
	1.3	Silty Clay - High plasticity, brown, M>WP, trace decomposed roots At 1.4m, seepage		D	1.5	E	PID<1	>				
		From 1.6m, pale grey										
87	2	Pit discontinued at 2.0m, limit of investigation										

RIG: 5T Hitachi Excavator with 450mm bucket (teeth)

LOGGED: Sebastian

SURVEY DATUM: MGA94

WATER OBSERVATIONS: Trace seepage at 1.4m

REMARKS: Co-ordinates and levels were obtained using DGPS

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test (s(50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test (s(50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	= Water level	V Shear vane (kPa)	

TEST PIT LOG

CLIENT: Uniting (NSW.ACT)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 89.92 AHD
EASTING: 378270.21
NORTHING: 6351349.15

PIT No: 206
PROJECT No: 102007.01
DATE: 17/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
89	1	FILL / Sandy Clay - Medium plasticity, W>WP, fine to medium grained, brown, with gravelly sand and silt, trace dark grey ash, plastic conduit, metal wire, brick fragments, moist			0.0							
				D	0.2	E	PID<1					
				D		B						
				D	0.7	E	PID<1					
					1.0		PID<1					
				D		B						
88	1.7	SILTY CLAY - High Plasticity, grey, M>WP, trace decomposed organics		D	1.5	E	PID<1					
					1.6							
				D	1.9	E	PID<1					
87	2	2.0										
		Pit discontinued at 2.0m, limit of investigation										

RIG: 5T Hitachi Excavator with 450mm bucket (teeth)

LOGGED: Sebastian

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Co-ordinates and levels were obtained using DGPS

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Uniting (NSW.ACT)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: --
EASTING:
NORTHING:

PIT No: 206A
PROJECT No: 102007.01
DATE: 17/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
		FILL / Silty Sand - Generally comprising fine to medium grained, with subrounded gravel, trace rootlets										
		From 0.5m to 0.6m, intermixed asphaltic lens		D	0.55	E						
	0.7	From 0.6m, exposed concrete stormwater service on southern face of pit										
		Pit discontinued at 0.7m, due to underground service										
	1											
	2											

RIG: 5T Hitachi Excavator with 450mm bucket (teeth)

LOGGED: Sebastian

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Co-ordinates and levels were obtained using DGPS. Pit 206A excavated first then moved to Pit 206A due to concrete pipe.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test $l_s(50)$ (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test $l_s(50)$ (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Uniting (NSW.ACT)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.55 AHD
EASTING: 378262.42
NORTHING: 6351360.98

PIT No: 207
PROJECT No: 102007.01
DATE: 17/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
90	0.0	FILL / Clayey Sand - Generally comprising fine to medium grained, low plasticity, brown with subrounded gravel, trace rootlets, brick fragments. Concrete boulder at northern side of pit, diameter 0.6m At 0.2m, plastic weed matting From 0m to 0.2m, fine grained, subrounded gravel and silt		D	0.1	E	PID<1					
	0.5			D	0.5	B E	PID<1					
	1.0				1.0							
1	1.2	SILTY CLAY - Low plasticity grey mottled red, M<WP		D	1.3	E	PID<1					
89	1.5	Pit discontinued at 1.5m, limit of investigation										
88	2											

RIG: 5T Hitachi Excavator with 450mm bucket (teeth)

LOGGED: Sebastian

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Co-ordinates and levels were obtained using DGPS

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (s(50)) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (s(50)) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	WL	Water level	V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Uniting (NSW.ACT)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.75 AHD
EASTING: 378241.84
NORTHING: 6351337.84

PIT No: 208
PROJECT No: 102007.01
DATE: 17/3/2020
SHEET 1 OF 1

[illegible]

RIG: 5T Hitachi Excavator with 450mm bucket (teeth)

LOGGED: Sebastian

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Co-ordinates and levels were obtained using DGPS

☐ Sand Penetrometer AS1289.6.3.3

☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W _s	Water seep
E	Environmental sample	W _l	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ls(50) (MPa)
		PL(D)	Point load diametral test ls(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



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TEST PIT LOG

CLIENT: Uniting (NSW.ACT)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 93.05 AHD
EASTING: 378162.54
NORTHING: 6351369.05

PIT No: 209
PROJECT No: 102007.01
DATE: 17/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
93	0.0	FILL / Silty Sand - Fine to medium grained brown, low plasticity, with rootlets, moist		D	0.0							
	0.1			D	0.1	B	PID<1					
	0.2				0.2							
	0.3	SANDY SILT - Low plasticity, pale brown, fine to medium grained sand, M<WP, trace clay		D	0.4	E	PID<1					
	0.5	SANDY CLAY - Medium plasticity, brown and mottled orange, M>WP, trace rootlets										
	0.7	Pit discontinued at 0.7m, limit of investigation										
92	1											
91	2											

RIG: 5T Hitachi Excavator with 450mm bucket (teeth)

LOGGED: Sebastian

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Co-ordinates and levels were obtained using DGPS

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50)) (MPa)
		PL(D)	Point load diametral test (s(50)) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Uniting (NSW.ACT)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 97.02 AHD
EASTING: 378113.38
NORTHING: 6351365.67

PIT No: 210
PROJECT No: 102007.01
DATE: 17/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
96	0.0	FILL / Sand - Generally comprising fine to medium grained brown and grey, moist		D	0.1	E	PID<1					
				D		B						
		From 0.3m, brown, fine to coarse grained and fine grained, subangular gravel										
	0.4			D	0.4	E	PID<1					
95	0.5	SANDY CLAY - Medium plasticity, M>WP, brown mottled orange, trace rootlets										
	0.7			D	0.7	E	PID<1					
	0.8	Pit discontinued at 0.8m, limit of investigation										

RIG: 5T Hitachi Excavator with 450mm bucket (teeth)

LOGGED: Sebastian

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Co-ordinates and levels were obtained using DGPS

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test $s(50)$ (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test $s(50)$ (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	WL	Water level	V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Uniting (NSW.ACT)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.34 AHD
EASTING: 378081.9
NORTHING: 6351386.98

PIT No: 211
PROJECT No: 102007.01
DATE: 17/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
98		FILL / Silty Sand - Generally comprising fine to medium grained, moist, with roots and trace subrounded, fine to medium sized gravel		D	0.0		PID<1					
				D	0.1	E						
				D		B						
		D	0.6	E								
	0.8	SANDY CLAY - Medium plasticity, brown and mottled orange, M>WP, trace rootlets			0.7							
	1											
	1.1	Pit discontinued at 1.1m, limit of investigation										
97												
2												
96												

RIG: 5T Hitachi Excavator with 450mm bucket (teeth)

LOGGED: Sebastian

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Co-ordinates and levels were obtained using DGPS

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test $s(50)$ (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test $s(50)$ (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	sp	Standard penetration test
E	Environmental sample	WL	Water level	S	Shear vane (kPa)

TEST PIT LOG

CLIENT: Uniting (NSW.ACT)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.88 AHD
EASTING: 378096.11
NORTHING: 6351353.23

PIT No: 212
PROJECT No: 102007.01
DATE: 17/3/2020
SHEET 1 OF 1

[illegible]

RIG: 5T Hitachi Excavator with 450mm bucket (teeth)

LOGGED: Sebastian

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Co-ordinates and levels were obtained using DGPS

- ☐ Sand Penetrometer AS1289.6.3.3
- ☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test ls(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test ls(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



TEST PIT LOG

CLIENT: Uniting (NSW.ACT)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.46 AHD
EASTING: 378115.45
NORTHING: 6351327.83

PIT No: 213
PROJECT No: 102007.01
DATE: 17/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
		FILL / Silty Sand - Generally comprising, fine to medium grained, brown, moist, with clay, trace rootlets, brick fragments and subrounded gravel		D	0.0							
				D	0.1	E	PID<1					
		From 0.2m to 0.3m, pale brown, subrounded gravelly silty sand		D	0.25	B E	PID<1					
		From 0.3m, sandy clay, trace ash		D	0.5	E	PID<1					
	0.6	SANDY CLAY - Medium plasticity, brown and mottled orange, M>WP, trace rootlets										
	0.8	Pit discontinued at 0.8m, limit of investigation										

RIG: 5T Hitachi Excavator with 450mm bucket (teeth)

LOGGED: Sebastian

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Co-ordinates and levels were obtained using DGPS

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test $s(50)$ (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test $s(50)$ (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	sp	Standard penetration test
E	Environmental sample	W	Water level	S	Shear vane (kPa)

TEST PIT LOG

CLIENT: Uniting (NSW.ACT)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 97.73 AHD
EASTING: 378124.38
NORTHING: 6351328.01

PIT No: 214
PROJECT No: 102007.01
DATE: 17/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
		FILL / Silty Sand - Generally comprising fine to medium grained, moist, with roots, trace metal			0.0							
		- abundant organics, timber, vegetation and trace plastic on surface		D		B						
				D	0.3	E	PID<1					
	0.45	At 0.4m, plastic pipe			0.4							
		SANDY CLAY - Medium plasticity, brown and mottled orange, M>WP, trace rootlets										
				D	0.6	E	PID<1					
	0.7	Pit discontinued at 0.7m, limit of investigation										
97												
1												
96												
2												
95												

RIG: 5T Hitachi Excavator with 450mm bucket (teeth)

LOGGED: Sebastian

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Co-ordinates and levels were obtained using DGPS

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test $s(50)$ (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test $s(50)$ (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	WL	Water level	V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Uniting (NSW.ACT)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 91.13 AHD
EASTING: 378226.79
NORTHING: 6351306.25

PIT No: 215
PROJECT No: 102007.01
DATE: 18/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
91	0.05	Concrete pavers covered with organics and silt on surface			0.1		PID<1					
		FILL / Sandy Silt - Generally comprising, brown fine to medium grained, low plasticity, M _{LE} Wp with roots		D	0.2	B						
				D	0.3	E						
	0.4	CLAYEY SAND - Fine to medium grained brown mottled orange, with silt, trace rootlets, moist		D	0.5	E	PID<1					
	0.8	Pit discontinued at 0.8m, limit of investigation										
90	1											
89	2											

RIG: 5T Hitachi Excavator with 450mm bucket (teeth)

LOGGED: Sebastian

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Co-ordinates and levels were obtained using DGPS

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (s(50)) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (s(50)) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Uniting (NSW.ACT)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 92.17 AHD
EASTING: 378207.35
NORTHING: 6351300.56

PIT No: 216
PROJECT No: 102007.01
DATE: 18/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
92	0.2	FILL / Sandy Silt - Generally comprising fine to medium grained, dark brown, low plasticity, M<WP, with organics and rootlets, trace brick fragments		D	0.0	B	PID<1					
		CLAYEY SAND - Fine to medium grained brown mottled orange, with silt, trace rootlets, moist		D	0.1	E						
91	0.6	Pit discontinued at 0.6m, limit of investigation										
1												
2												
90												

RIG: 5T Hitachi Excavator with 450mm bucket (teeth)

LOGGED: Sebastian

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Co-ordinates and levels were obtained using DGPS

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Uniting (NSW.ACT)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 96.04 AHD
EASTING: 378162.53
NORTHING: 6351299.28

PIT No: 217
PROJECT No: 102007.01
DATE: 18/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
96		FILL / Silty Sand - Generally comprising fine to medium grained, dark brown, moist, with rootlets, trace brick - Organics and plastic on surface. Note: Surface is top of fill mound 0.5m above ground level			0.0							
				D D	0.2	B E	PID<1					
					0.4							
	0.5	SANDY CLAY - Fine to medium grained, brown, medium plasticity, M>WP, trace rootlets										
	0.8	Pit discontinued at 0.8m, limit of investigation										
95	1											
94	2											

RIG: 5T Hitachi Excavator with 450mm bucket (teeth)

LOGGED: Sebastian

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Co-ordinates and levels were obtained using DGPS. Pit excavated through fill mound running parallel to Tiral Street

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Uniting (NSW.ACT)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 97.20 AHD
EASTING: 378137.96
NORTHING: 6351315.77

PIT No: 218
PROJECT No: 102007.01
DATE: 18/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
97		FILL / Silty Sand - Generally comprising fine to medium grained, dark brown, moist with fibro fragments, coal reject, concrete boulders up to 0.4m in diameter, metal, plastic, charcoal, roots, timber, glass and tile. Note: Abundant fibro fragments			0.0							
				D	0.2	E	PID<1					
				D		B						
				D	0.5	E	PID<1					
					0.6							
	0.7	SANDY CLAY - Fine to medium grained, brown mottled orange, medium plasticity M>WP, trace roots		D	0.9	E						
1	1.0	Pit discontinued at 1.0m, limit of investigation										
96												
2												

RIG: 5T Hitachi Excavator with 450mm bucket (teeth)

LOGGED: Sebastian

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Co-ordinates and levels were obtained using DGPS

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (s(50)) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (s(50)) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	WL	Water level	V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Uniting (NSW.ACT)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 94.13 AHD
EASTING: 378159.46
NORTHING: 6351315.44

PIT No: 219
PROJECT No: 102007.01
DATE: 18/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
94	0.0	FILL / Silty Sand - Generally comprising fine to medium grained, brown, moist with rootlets			0.0							
	0.2	- abundant brick and concrete on surface and trace fibro fragments		D	0.2	E	PID<1					
	0.4	From 0.4m, intermixed clay		D	0.5	E	PID<1					
	0.6	SILTY CLAY - Fine grained, medium plasticity, pale grey mottled red and orange, M>WP (tuffaceous clay) - intermixed bands of carbonaceous clay										
93	1.0			D	1.0	E						
	1.4	Pit discontinued at 1.4m, limit of investigation										
92	2.0											

RIG: 5T Hitachi Excavator with 450mm bucket (teeth)

LOGGED: Sebastian

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Co-ordinates and levels were obtained using DGPS. Fibro fragments collected at 0.2m

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (s(50)) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (s(50)) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	WL	Water level	V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Uniting (NSW.ACT)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 93.43 AHD
EASTING: 378186.16
NORTHING: 6351309.98

PIT No: 220
PROJECT No: 102007.01
DATE: 18/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
		FILL / Silty Sand - Generally comprising fine to medium grained, dark brown with roots, moist		D	0.0	B	PID<1					
				D	0.2	E						
	0.3	SANDY CLAY - Medium plasticity, fine to medium grained brown mottled orange, M>WP										
	0.5	Pit discontinued at 0.5m, limit of investigation										
93												
92												
91												
1												
2												

RIG: 5T Hitachi Excavator with 450mm bucket (teeth)

LOGGED: Sebastian

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Co-ordinates and levels were obtained using DGPS

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	WL	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50)) (MPa)
		PL(D)	Point load diametral test (s(50)) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

TEST PIT LOG

CLIENT: Uniting (NSW.ACT)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 92.54 AHD
EASTING: 378199.13
NORTHING: 6351308

PIT No: 221
PROJECT No: 102007.01
DATE: 18/3/2020
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing				Water	Dynamic Penetrometer Test (blows per mm)			
				Type	Depth	Sample	Results & Comments		5	10	15	20
92		FILL / Silty Sand - Fine to medium grained, brown, moist, with roots, trace ash - Abundant organics, pavers and charcoal on surface		D	0.3	E	PID<1					
	0.5	SANDY CLAY - Low plasticity, fine to medium grained, brown mottled orange, M>WP		D	0.6	E	PID<1					
	0.7	Pit discontinued at 0.7m, limit of investigation										
1												
91												
2												
90												

RIG: 5T Hitachi Excavator with 450mm bucket (teeth)

LOGGED: Sebastian

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Co-ordinates and levels were obtained using DGPS

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.8 AHD
EASTING: 378124.1
NORTHING: 6351307.8
DIP/AZIMUTH: 90°/-

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 1 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low		Medium	High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
	0.3	TOPSOIL / SANDY SILT (ML) - Low plasticity, dark brown, fine grained sand, trace rootlets, moist																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												</

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m
TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.8 AHD
EASTING: 378124.1
NORTHING: 6351307.8
DIP/AZIMUTH: 90°/--

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 2 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
		CARBONACEOUS CLAY (Cl) - Medium plasticity, black with tuffaceous bands with silt, W<PL, residual <i>(continued)</i>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m
TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 98.8 AHD
PROJECT: United Charlestown Development **EASTING:** 378124.1
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351307.8

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m

TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test ls(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test ls(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W _s	Water seep	S	Standard penetration test
E	Environmental sample	W _l	Water level	V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.8 AHD
EASTING: 378124.1
NORTHING: 6351307.8
DIP/AZIMUTH: 90°/--

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 4 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing									
			EW	HW	MW	SW	FS		FR	Ex	Low	Very Low	Low		Medium	High	Very High	Ex	High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments
		TUFFACEOUS SILTSTONE <i>(continued)</i>																												
	16	CARBONACEOUS SILTSTONE																												
83																														
	16.0																													
82																														
	17																													
81																														
	18																													
80																														
	19																													
79																														

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m
TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (s(50)) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (s(50)) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.8 AHD
EASTING: 378124.1
NORTHING: 6351307.8
DIP/AZIMUTH: 90°/--

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 5 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength						Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High	Very High		Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
		CARBONACEOUS SILTSTONE <i>(continued)</i>																								
	20.5	SANDSTONE																								
	78																									
	21																									
	77																									
	22																									
	76																									
	23																									
	75																									
	24																									
	74																									

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m
TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50)) (MPa)
		PL(D)	Point load diametral test (s(50)) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.8 AHD
EASTING: 378124.1
NORTHING: 6351307.8
DIP/AZIMUTH: 90°/--

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 6 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS	FR	Ex	Low	Very Low	Low	Medium	High	Very High	Ex				
		SANDSTONE (continued)																		
73																				
26																				
72																				
27																				
71																				
28																				
70																				
29	29.0	CONGLOMERATE																		
69																				

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m
TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50)) (MPa)
		PL(D)	Point load diametral test (s(50)) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.8 AHD
EASTING: 378124.1
NORTHING: 6351307.8
DIP/AZIMUTH: 90°/--

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 7 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing							
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low		Medium	High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
		CONGLOMERATE (continued)																									
68	31																										
67	32																										
66	33																										
65	34																										
64																											

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m
TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 138.18m

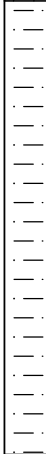
SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	▷	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50)) (MPa)
		PL(D)	Point load diametral test (s(50)) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.8 AHD
EASTING: 378124.1
NORTHING: 6351307.8
DIP/AZIMUTH: 90°/--

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 8 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
		CONGLOMERATE <i>(continued)</i>																								
	35.5	TUFFACEOUS SILTSTONE																								
	36																									
	37	37.0	COAL																							
	38																									
	39																									

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m
TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (s(50)) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (s(50)) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.8 AHD
EASTING: 378124.1
NORTHING: 6351307.8
DIP/AZIMUTH: 90°/--

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 9 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing						
			EW	HW	MW	SW	FS	FR		Ex	Low	Very Low	Low	Medium		High	Very High	Ex	High	Very High	Ex	High	Very High	Ex	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
		COAL <i>(continued)</i>																										
	40.4	SILTSTONE																										
58																												
41																												
	41.5	SANDSTONE																										
57																												
42																												
56																												
43	43.0	CONGLOMERATE																										
55																												
44																												
54																												

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m
TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50)) (MPa)
		PL(D)	Point load diametral test (s(50)) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.8 AHD
EASTING: 378124.1
NORTHING: 6351307.8
DIP/AZIMUTH: 90°/--

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 10 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
		CONGLOMERATE (continued)																								
53																										
	46																									
52																										
	47																									
																										</

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m
TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50)) (MPa)
		PL(D)	Point load diametral test (s(50)) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.8 AHD
EASTING: 378124.1
NORTHING: 6351307.8
DIP/AZIMUTH: 90°--

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 11 **OF** 29

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m

TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test ls(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test ls(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W _s	Water seep	S	Standard penetration test
E	Environmental sample	W _L	Water level	V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 98.8 AHD
PROJECT: United Charlestown Development **EASTING:** 378124.1
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351307.8

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 12 **OF** 29

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m

TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ls(50) (MPa)
		PL(D)	Point load diametral test ls(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

PROJECT: United Charlestown Development

EASTING: 378124.1

DIP/AZIMUTH: 90°/--

PROJECT No: 102007.00

SHEET 13 OF 29

[illegible]

DRILLER: Terratest

LOGGED: Pankhurst

CASING: HWT to 7.2m

TYPE OF BORING: Auger with tc bit to 5.65m. PCD rotary mud drilling to 143.75m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.8 AHD
EASTING: 378124.1
NORTHING: 6351307.8
DIP/AZIMUTH: 90°/--

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 14 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing								
			EW	HW	MW	SW	FS		FR	Ex	Low	Very Low	Low		Medium	High	Very High	Ex	High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
		TUFFACEOUS SILTSTONE <i>(continued)</i>																											
	66	SANDSTONE / SILTSTONE																											
		</																											

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m
TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (s(50)) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (s(50)) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.8 AHD
EASTING: 378124.1
NORTHING: 6351307.8
DIP/AZIMUTH: 90°--

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 15 OF 29

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m

TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ls(50) (MPa)
		PL(D)	Point load diametral test ls(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 98.8 AHD
PROJECT: United Charlestown Development **EASTING:** 378124.1
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351307.8
DIP/AZIMUTH: 90°/--

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 16 OF 29

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m

TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ls(50) (MPa)
		PL(D)	Point load diametral test ls(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.8 AHD
EASTING: 378124.1
NORTHING: 6351307.8
DIP/AZIMUTH: 90°/--

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 17 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
			EW	HW	MW	SW	FS		FR	Ex	Low	Very Low	Low		Medium	High	Very High	Ex	High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m
TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (50) (MPa)
		PL(D)	Point load diametral test (50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.8 AHD
EASTING: 378124.1
NORTHING: 6351307.8
DIP/AZIMUTH: 90°/--

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 18 **OF** 29

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m

TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ls(50) (MPa)
		PL(D)	Point load diametral test ls(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.8 AHD
EASTING: 378124.1
NORTHING: 6351307.8
DIP/AZIMUTH: 90°/--

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 19 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
			EW	HW	MW	SW	FS		FR	Ex	Low	Very Low	Low		Medium	High	Very High	Ex	High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m
TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (50) (MPa)
		PL(D)	Point load diametral test (50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.8 AHD
EASTING: 378124.1
NORTHING: 6351307.8
DIP/AZIMUTH: 90°/--

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 20 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
			EW	HW	MW	SW	FS		FR	Ex	Low	Very Low	Low		Medium	High	Very High	Ex	High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m
TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (s(50)) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (s(50)) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.8 AHD
EASTING: 378124.1
NORTHING: 6351307.8
DIP/AZIMUTH: 90°/--

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 21 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength						Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
			EW	HW	MW	SW	FS	FR		Ex	Low	Very Low	Low	Medium	High		Very High	Ex	High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m
TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test (50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test (50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 98.8 AHD
PROJECT: United Charlestown Development **EASTING:** 378124.1
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351307.8

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 22 **OF** 29

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m

TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test ls(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test ls(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W _s	Water seep	S	Standard penetration test
E	Environmental sample	W _l	Water level	V	Shear vane (kPa)



BOREHOLE LOG

PROJECT: United Charlestown Development

EASTING: 378124.1

DIP/AZIMUTH: 90°/--

PROJECT No: 102007.00

SHEET 23 OF 29

[illegible]

CASING: HWT to 7.2m

REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



Douglas Partners
Geotechnics | Environment | Groundwater

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.8 AHD
EASTING: 378124.1
NORTHING: 6351307.8
DIP/AZIMUTH: 90°/--

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 24 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing									
			EW	HW	MW	SW	FS		FR	Ex	Low	Very Low	Low		Medium	High	Very High	Ex	High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments
		SILTSTONE <i>(continued)</i>																												
	116.0	SILTSTONE / SANDSTONE																												

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m
TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50)) (MPa)
		PL(D)	Point load diametral test (s(50)) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 98.8 AHD
PROJECT: United Charlestown Development **EASTING:** 378124.1
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351307.8

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m

TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test ls(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test ls(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W _s	Water seep	S	Standard penetration test
E	Environmental sample	W _l	Water level	V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 98.8 AHD
PROJECT: United Charlestown Development **EASTING:** 378124.1
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351307.8

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 26 **OF** 29

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m

TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W _s	Water seep
E	Environmental sample	W _l	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 98.8 AHD
PROJECT: United Charlestown Development **EASTING:** 378124.1
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351307.8

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m

TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.8 AHD
EASTING: 378124.1
NORTHING: 6351307.8
DIP/AZIMUTH: 90°--

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 28 **OF** 29

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m

TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ls(50) (MPa)
		PL(D)	Point load diametral test ls(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.8 AHD
EASTING: 378124.1
NORTHING: 6351307.8
DIP/AZIMUTH: 90°/--

BORE No: M1
PROJECT No: 102007.00
DATE: 11 - 12/2/2020
SHEET 29 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex	Low	Very Low	Low			Medium	High	Very High	Ex	High	B - Bedding S - Shear	J - Joint F - Fault	Type
		COAL - (based on drill resistance, no water return, water loss at 138.18m) <i>(continued)</i>																					
	140.6	FLOOR - Based on drill resistance																					
	141																						
	142																						
	143																						
	143.75	Bore discontinued at 143.75m																					
	144																						
	145																						
	146																						

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 7.2m
TYPE OF BORING: Auger with tc bit to 5.65m, PCD rotary mud drilling to 143.75m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 138.18m

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.6 AHD
EASTING: 378122
NORTHING: 6351311.2
DIP/AZIMUTH: 90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 1 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
98	0.3	FILL / SANDY SILT (ML) - Low plasticity, dark brown, fine grained, trace rootlets and leaves, W<PL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-</

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m
TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (50) (MPa)
		PL(D)	Point load diametral test (50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.6 AHD
EASTING: 378122
NORTHING: 6351311.2
DIP/AZIMUTH: 90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 2 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
		CARBONACEOUS CLAY <i>(continued)</i>																								
93																										
6																										
92																										
7																										
91																										
8	8.0	TUFF and COAL																								
90																										
9																										
89																										
10.0																										

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m
TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.6 AHD
EASTING: 378122
NORTHING: 6351311.2
DIP/AZIMUTH: 90°--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 3 OF 29

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m

TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test ls(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test ls(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W _s	Water seep	S	Standard penetration test
E	Environmental sample	W _l	Water level	V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.6 AHD
EASTING: 378122
NORTHING: 6351311.2
DIP/AZIMUTH: 90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 4 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS	FR	Ex	Low	Very Low	Low	Medium	High	Very High	Ex				
		SILTSTONE and SANDSTONE (continued)																		
83																				
16																				
82																				
17																				
81																				
18																				
80																				
19																				
79																				

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m
TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.6 AHD
EASTING: 378122
NORTHING: 6351311.2
DIP/AZIMUTH: 90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 5 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
			EW	HW	MW	SW	FS		FR	Ex	Low	Very Low	Low		Medium	High	Very High	Ex	High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
		SILTSTONE and SANDSTONE (continued)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m
TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.6 AHD
EASTING: 378122
NORTHING: 6351311.2
DIP/AZIMUTH: 90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 6 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
		CONGLOMERATE (continued)																								

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m
TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50)) (MPa)
		PL(D)	Point load diametral test (s(50)) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.6 AHD
EASTING: 378122
NORTHING: 6351311.2
DIP/AZIMUTH: 90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 7 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
		CONGLOMERATE (continued)																								

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m
TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50)) (MPa)
		PL(D)	Point load diametral test (s(50)) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.6 AHD
EASTING: 378122
NORTHING: 6351311.2
DIP/AZIMUTH: 90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 8 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
		CONGLOMERATE <i>(continued)</i>																								
	36.0	SILTSTONE and SANDSTONE																								
	36.9	COAL																								

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m
TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.6 AHD
EASTING: 378122
NORTHING: 6351311.2
DIP/AZIMUTH: 90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 9 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength						Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS	FR		Ex	Low	Very Low	Low	Medium	High		Very High	Ex	High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
		COAL <i>(continued)</i>																										
	40.3	SANDSTONE																										
	58																											
	41																											
	57																											
	42																											
	56																											
	43																											
	55																											
	44																											
	54																											

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m
TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.6 AHD
EASTING: 378122
NORTHING: 6351311.2
DIP/AZIMUTH: 90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 10 OF 29

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m

TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ls(50) (MPa)
		PL(D)	Point load diametral test ls(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.6 AHD
EASTING: 378122
NORTHING: 6351311.2
DIP/AZIMUTH: 90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 11 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS	FR	Ex	Low	Very Low	Low	Medium	High	Very High	Ex				
		SANDSTONE (continued)																		
48																				
51																				
47																				
52																				
46																				
53																				
45																				
54	54.0	SILTSTONE																		
44																				

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m
TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.6 AHD
EASTING: 378122
NORTHING: 6351311.2
DIP/AZIMUTH: 90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 12 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS	FR	Ex	Low	Very Low	Low	Medium	High	Very High	Ex High				
		SILTSTONE (continued)																		
43																				
56	56.0	TUFFACEOUS SILTSTONE - (Slow cutting, pale grey)																		
42																				
57																				
41																				
58																				
40																				
58.7		COAL																		
59																				
39																				

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m
TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 98.6 AHD
PROJECT: United Charlestown Development **EASTING:** 378122
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351311.2

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m

TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test ls(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test ls(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W _s	Water seep	S	Standard penetration test
E	Environmental sample	W _l	Water level	V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.6 AHD
EASTING: 378122
NORTHING: 6351311.2
DIP/AZIMUTH: 90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 14 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS	FR	Ex	Low	Very Low	Low	Medium	High	Very High	Ex				
		TUFFACEOUS SILTSTONE / SANDSTONE - (Brown and white) (continued)																		
33																				
66																				
32																				
67	67.0	SANDSTONE - (Pale grey)																		
31																				
68																				
30																				
69	69.0	CONGLOMERATE																		
29																				

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m
TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (s(50)) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (s(50)) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.6 AHD
EASTING: 378122
NORTHING: 6351311.2
DIP/AZIMUTH: 90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 15 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
		CONGLOMERATE (continued)																								

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m
TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50)) (MPa)
		PL(D)	Point load diametral test (s(50)) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.6 AHD
EASTING: 378122
NORTHING: 6351311.2
DIP/AZIMUTH: 90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 16 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering	Graphic Log	Rock Strength	Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
								B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments
		CONGLOMERATE (continued)											
23													
76													
22													
77													
21													
78	78.0	TUFFACEOUS SILTSTONE											
20													
79													
19													

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m
TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test (s(50)) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test (s(50)) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	W Water seep	S Standard penetration test	
E Environmental sample	W Water level	V Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 98.6 AHD
PROJECT: United Charlestown Development **EASTING:** 378122
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351311.2
DIP/AZIMUTH: 90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 17 OF 29

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m

TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.6 AHD
EASTING: 378122
NORTHING: 6351311.2
DIP/AZIMUTH: 90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 18 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW		FS	FR	Ex	Low	Very Low		Low	Medium	High	Very High	Ex	High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
		TUFFACEOUS SILTSTONE <i>(continued)</i>																					

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m
TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.6 AHD
EASTING: 378122
NORTHING: 6351311.2
DIP/AZIMUTH: 90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 19 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
		SANDSTONE																								
	8																									
	91																									
	7																									
	92																									
	6																									
	93																									
	5																									
	94																									
	4																									

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m
TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50)) (MPa)
		PL(D)	Point load diametral test (s(50)) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.6 AHD
EASTING: 378122
NORTHING: 6351311.2
DIP/AZIMUTH: 90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 20 **OF** 29

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m

TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test ls(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test ls(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W _s	Water seep	S	Standard penetration test
E	Environmental sample	W _l	Water level	V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.6 AHD
EASTING: 378122
NORTHING: 6351311.2
DIP/AZIMUTH: 90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 21 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS	FR	Ex	Low	Very Low	Low	Medium	High	Very High	Ex				
		SANDSTONE (continued)																		
	101																			
	102																			
	103																			
	104.0	COAL - (Black)																		

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m
TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 98.6 AHD
PROJECT: United Charlestown Development **EASTING:** 378122
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351311.2

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 22 **OF** 29

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m

TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.6 AHD
EASTING: 378122
NORTHING: 6351311.2
DIP/AZIMUTH: 90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 23 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS	FR	Ex	Low	Very Low	Low	Medium	High	Very High	Ex High				
		SANDSTONE (continued)																		
	111																			
	111.4	COAL																		
	112																			
	113																			
	114																			
	114.5	SANDSTONE / SILTSTONE																		

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m
TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (s(50)) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (s(50)) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 98.6 AHD
PROJECT: United Charlestown Development **EASTING:** 378122
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351311.2
DIP/AZIMUTH: 90°--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 24 **OF** 29

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m

TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test ls(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test ls(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W _s	Water seep	S	Standard penetration test
E	Environmental sample	W _l	Water level	V	Shear vane (kPa)



BOREHOLE LOG

CLIENT:	Uniting Church in Australia Property Trust (NSW)	SURFACE LEVEL:	98.6 AHD
PROJECT:	United Charlestown Development	EASTING:	378122
LOCATION:	27 Tiral Street, Charlestown	NORTHING:	6351311.2
		DIP/AZIMUTH:	90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 25 **OF** 29

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m

TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.6 AHD
EASTING: 378122
NORTHING: 6351311.2
DIP/AZIMUTH: 90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 26 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW		FS	FR	Ex	Low	Very Low		Low	Medium	High	Very High	Ex	High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
		SANDSTONE / SILTSTONE <i>(continued)</i>																					
	-27																						
	126																						
	-28																						
	127																						
	-29																						
	128																						
	-30																						
	129																						
	-31																						

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m
TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (50) (MPa)
		PL(D)	Point load diametral test (50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 98.6 AHD

PROJECT: United Charlestown Development

LOCATION: 27 Tiral Street, Charlestown

5) SURFACE LEVEL: 98.6 AHD

EASTING: 378122

NORTHING: 6351311.2

DIP/AZIMUTH: 90°/--

BORE No: M1A

PROJECT No: 102007.00

DATE: 14 - 18/2/2020

SHEET 27 OF 29

[illegible]

RIG: Comacchio MC450 P1

DRILLER: Terratest

LOGGED: Pankhurst

CASING: HWT to 3.6m

TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 98.6 AHD

PROJECT: United Charlestown Development

LOCATION: 27 Tiral Street, Charlestown

1) SURFACE LEVEL: 98.6 AHD

EASTING: 378122

NORTHING: 6351311.2

DIP/AZIMUTH: 90°/--

BORE No: M1A

PROJECT No: 102007.00

DATE: 14 - 18/2/2020

SHEET 28 OF 29

[illegible]

RIG: Comacchio MC450 P1

DRILLER: Terratest

LOGGED: Pankhurst

CASING: HWT to 3.6m

TYPE OF BORING: Auger with tc bit to 2.5m. PCD rotary mud drilling to 143.67m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (s(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (s(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 98.6 AHD
EASTING: 378122
NORTHING: 6351311.2
DIP/AZIMUTH: 90°/--

BORE No: M1A
PROJECT No: 102007.00
DATE: 14 - 18/2/2020
SHEET 29 OF 29

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS	FR	Ex	Low	Very Low	Low	Medium	High	Very High	Ex				
		RUBBLE - Intermittent rotation required to advance rods (continued)																		
	140.42	FLOOR - Head closed, full rotation required to advance rods, consistent resistance																		
	141																			
	142																			
	143																			
	143.67	Bore discontinued at 143.67m																		
	144																			

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 3.6m
TYPE OF BORING: Auger with tc bit to 2.5m, PCD rotary mud drilling to 143.67m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 137.00m

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.2 AHD
EASTING: 378262.9
NORTHING: 6351322.3
DIP/AZIMUTH: 90°/-

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 1 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low			Medium	High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
90		FILL / SANDY SILT (ML) - Low plasticity, dark brown, fine to medium grained sand, trace brick and slag, rootlets, W<PL																D			
0.5		POSSIBLE FILL / CLAY (CI) - Medium plasticity, brown, with sand, W<PL																			
1																		D			
89		From 1.2m, becoming brown mottled grey																			
																		D			
1.8																					
2		SILTY CLAY (CH) - High plasticity, grey, W>PL, residual (firm based on tactile assessment)																D			
88																					
		From 2.4m, W<PL																			
2.8																					
3		SILTY CLAY																D			
87																					
4																					
4.0		CARBONACEOUS CLAY / COAL																			
86																					
		From 4.4m, interbedded tuffaceous clay																			

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m
TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.2 AHD
EASTING: 378262.9
NORTHING: 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 2 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing						
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
85		CARBONACEOUS CLAY / COAL <i>(continued)</i>																									
6																											
84																											
7																											
83																											
8																											
82																											
9	9.0	TUFF																									
81																											

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m
TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 90.2 AHD
PROJECT: United Charlestown Development **EASTING:** 378262.9
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 3 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing							
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low		Medium	High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
80		TUFF <i>(continued)</i>							<	<	<	<	<	<	<	<	<	<	<	<							
79									<	<	<	<	<	<	<	<	<	<	<	<							
11									<	<	<	<	<	<	<	<	<	<	<	<							
12									<	<	<	<	<	<	<	<	<	<	<	<							
78									<	<	<	<	<	<	<	<	<	<	<	<							
12.5		SANDSTONE							<	<	<	<	<	<	<	<	<	<	<	<							
13									.	.	.	.	.	.	.	.	.	.	.	.							
77									.	.	.	.	.	.	.	.	.	.	.	.							
14									.	.	.	.	.	.	.	.	.	.	.	.							
76									.	.	.	.	.	.	.	.	.	.	.	.							

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m

TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W _{seep}	Water seep
E	Environmental sample	W _{level}	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.2 AHD
EASTING: 378262.9
NORTHING: 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 4 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing									
			EW	HW	MW	SW	FS		FR	Ex	Low	Very Low	Low		Medium	High	Very High	Ex	High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments
		SANDSTONE <i>(continued)</i>																												
75																														
	15.4	COAL																												
16																														
74																														
	16.4	SILTSTONE / SANDSTONE																												
17																														
73																														
18																														
72																														
19																														
71																														
	19.3	COAL																												

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m
TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.2 AHD
EASTING: 378262.9
NORTHING: 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 5 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low			Medium	High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
70		COAL <i>(continued)</i>																			
21																					
69																					
22																					
68																					
22.7		SANDSTONE																			
23																					
67																					
24																					
66																					

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m
TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50)) (MPa)
		PL(D)	Point load diametral test (s(50)) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.2 AHD
EASTING: 378262.9
NORTHING: 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 6 OF 26

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m

TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ls(50) (MPa)
		PL(D)	Point load diametral test ls(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.2 AHD
EASTING: 378262.9
NORTHING: 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 7 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing						
			EW	HW	MW	SW		FS	FR	Ex	Low	Very Low		Low	Medium	High	Very High	Ex	High	B - Bedding	J - Joint	S - Shear	F - Fault	Type	Core Rec. %	RQD %
60		CONGLOMERATE																								
31																										
59																										
32																										
58																										
33																										
57																										
34																										
56																										
34.5		SANDSTONE																								

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m
TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test (50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test (50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	W Water seep	S Standard penetration test	
E Environmental sample	W Water level	V Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 90.2 AHD
PROJECT: United Charlestown Development **EASTING:** 378262.9
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 8 **OF** 26

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m

TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ls(50) (MPa)
		PL(D)	Point load diametral test ls(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.2 AHD
EASTING: 378262.9
NORTHING: 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 9 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low			Medium	High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
		SANDSTONE <i>(continued)</i>																			
	50																				
	41																				
	49																				
	42																				
	48																				
	43	43.0	TUFF																		
	47																				
	44																				
	46																				
	44.5	COAL																			

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m
TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50)) (MPa)
		PL(D)	Point load diametral test (s(50)) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.2 AHD
EASTING: 378262.9
NORTHING: 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 10 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing						
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
45		COAL <i>(continued)</i>																									
46																											
47																											
47.2		SANDSTONE / SILTSTONE																									
48																											
49																											

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m
TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test (50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test (50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 90.2 AHD
PROJECT: United Charlestown Development **EASTING:** 378262.9
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 11 **OF** 26

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m

TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ls(50) (MPa)
		PL(D)	Point load diametral test ls(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 90.2 AHD
PROJECT: United Charlestown Development **EASTING:** 378262.9
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 12 OF 26

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m

TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (s(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (s(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.2 AHD
EASTING: 378262.9
NORTHING: 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 13 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
			EW	HW	MW	SW	FS		FR	Ex	Low	Very Low	Low		Medium	High	Very High	Ex	High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
30		SANDSTONE / SILTSTONE <i>(continued)</i>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m
TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	>	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 90.2 AHD
PROJECT: United Charlestown Development **EASTING:** 378262.9
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 14 **OF** 26

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m

TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ls(50) (MPa)
		PL(D)	Point load diametral test ls(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.2 AHD
EASTING: 378262.9
NORTHING: 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 15 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
			EW	HW	MW	SW	FS		FR	Ex	Low	Very Low	Low		Medium	High	Very High	Ex	High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
20		SANDSTONE and SILTSTONE <i>(continued)</i>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												</

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m
TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test (50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test (50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 90.2 AHD
PROJECT: United Charlestown Development **EASTING:** 378262.9
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 16 OF 26

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m

TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.2 AHD
EASTING: 378262.9
NORTHING: 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 17 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS	FR	Ex	Low	Very Low	Low	Medium	High	Very High	Ex				
		SANDSTONE and SILTSTONE (continued)																		
	81																			
	82																			
	83																			
	84																			

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m
TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.2 AHD
EASTING: 378262.9
NORTHING: 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 18 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength						Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
			EW	HW	MW	SW	FS	FR		Ex	Low	Very Low	Low	Medium	High		Very High	Ex	High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
5		SANDSTONE and SILTSTONE <i>(continued)</i>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m
TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (50) (MPa)
		PL(D)	Point load diametral test (50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.2 AHD
EASTING: 378262.9
NORTHING: 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 19 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low			Medium	High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
	0	SANDSTONE and SILTSTONE <i>(continued)</i>																			
	90.9	COAL																			
	91																				
	92																				
	93																				
	93.2	SANDSTONE																			
	94																				

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m
TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test (50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test (50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 90.2 AHD
PROJECT: United Charlestown Development **EASTING:** 378262.9
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 20 **OF** 26

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m

TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m

WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid

REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.2 AHD
EASTING: 378262.9
NORTHING: 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 21 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength						Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High	Very High		Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
		COAL <i>(continued)</i>																								
	100.7	CARBONACEOUS SILTSTONE / SANDSTONE																								
	101																									
	102																									
	103.0	TUFFACEOUS SILTSTONE																								
	104																									

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m
TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PLD	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50)) (MPa)
		PL(D)	Point load diametral test (s(50)) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.2 AHD
EASTING: 378262.9
NORTHING: 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 22 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength						Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing						
			EW	HW	MW	SW	FS	FR		Ex	Low	Very Low	Low	Medium	High		Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments
-15		TUFFACEOUS SILTSTONE <i>(continued)</i>																											
	105.5	SANDSTONE / SILTSTONE																											
106																													
-16																													
107																													
-17																													
108																													
-18																													
109																													
-19																													

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m
TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.2 AHD
EASTING: 378262.9
NORTHING: 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 23 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS	FR	Ex	Low	Very Low	Low	Medium	High	Very High	Ex				
		SANDSTONE / SILTSTONE (continued)																		
-20																				
	111																			
-21																				
	112																			
-22																				
	113																			
-23																				
	114																			
-24																				

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m
TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (50) (MPa)
		PL(D)	Point load diametral test (50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.2 AHD
EASTING: 378262.9
NORTHING: 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 24 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
			EW	HW	MW	SW	FS		FR	Ex	Low	Very Low	Low		Medium	High	Very High	Ex	High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
-25		SANDSTONE / SILTSTONE <i>(continued)</i>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							</

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m
TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.2 AHD
EASTING: 378262.9
NORTHING: 6351322.3
DIP/AZIMUTH: 90°/--

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 25 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
			EW	HW	MW	SW	FS		FR	Ex	Low	Very Low	Low		Medium	High	Very High	Ex	High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
-30		SANDSTONE / SILTSTONE <i>(continued)</i>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m
TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (s(50)) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (s(50)) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 90.2 AHD
EASTING: 378262.9
NORTHING: 6351322.3
DIP/AZIMUTH: 90°/-

BORE No: M2
PROJECT No: 102007.00
DATE: 24/2/2020
SHEET 26 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
-35	125.31	VOID - 100% water loss, head drop, no rotation required to advance rods <i>(continued)</i>																								
		RUBBLE - Half rotation required to advance rods From 125.4m, no rotation required to advance rods																								
-36	126																									
		RUBBLE - Rotation required to advance rods, inconsistent resistance																								
-37	127																									
		FLOOR - Head closed, full rotation required to advance rods, consistent resistance																								
-38	128																									
	128.57	Bore discontinued at 128.57m, limit of investigation																								
-39	129																									

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 9.5m
TYPE OF BORING: Auger with tc bit to 2.8m, PCD rotary mud drilling to 128.57m
WATER OBSERVATIONS: No free groundwater observed whilst augering, then obscured by drilling fluid
REMARKS: 100% water loss at 124.07m

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50)) (MPa)
		PL(D)	Point load diametral test (s(50)) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 89.1 AHD
EASTING: 378307.8
NORTHING: 6351333.2
DIP/AZIMUTH: 90°/-

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 1 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing						
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
89	0.04	ASPHALTIC CONCRETE																									
	0.2	FILL / SANDY GRAVEL (GP) - Fine to medium subrounded gravel, brown, fine to coarse grained sand, trace silt, moist (pavement materials crushed conglomerate)																									
		FILL / SANDY CLAY (CI) - Medium plasticity, dark grey brown, fine to medium grained sand, trace fine subangular gravel, W>PL																									
1	1.0	TUFFACEOUS CLAY (CH) - High plasticity, pale grey, W<PL, residual, stiff to very stiff																									
88																											
2																											
87																											
3																											
86																											
3.5		CARBONACEOUS CLAY (CH) - High plasticity, black / dark brown, with silt W>PL, residual																									
4	4.0	SILTY CLAY (CI) - Medium plasticity, pale grey, with fine grained sand, W>PL, residual																									
85																											

pp = 300

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 8.64m
TYPE OF BORING: Auger with tc bit to 8.6m, HQ to 125.89m, PCD rotary mud drilling to 128.97m due to collapsing conditions
WATER OBSERVATIONS: Free groundwater observed at 7.8m, whilst augering
REMARKS: From 121.82m, 100% water loss

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (s(50)) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (s(50)) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 89.1 AHD
EASTING: 378307.8
NORTHING: 6351333.2
DIP/AZIMUTH: 90°/-

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 2 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
84		SILTY CLAY (CI) - Medium plasticity, pale grey, with fine grained sand, W>PL, residual (continued)																								
6																										
83																										
7																										
82																										
8		From 8.2m, becoming friable, pale yellow, W<PL																								
81																										
8.6																										
8.63		CORE LOSS - 0.03m																								
9		TUFFACEOUS SANDSTONE - Pale grey, indistinct bedding																								
9.27		CORE LOSS - 0.64m																								
9.91																										

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 8.64m
TYPE OF BORING: Auger with tc bit to 8.6m, HQ to 125.89m, PCD rotary mud drilling to 128.97m due to collapsing conditions
WATER OBSERVATIONS: Free groundwater observed at 7.8m, whilst augering
REMARKS: From 121.82m, 100% water loss

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ls(50) (MPa)
		PL(D)	Point load diametral test ls(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 89.1 AHD
PROJECT: United Charlestown Development **EASTING:** 378307.8
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351333.2

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 3 **OF** 26

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength						Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing						
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments
79		TUFFACEOUS SANDSTONE - Pale grey, 15° bedding (continued)														10.1m: Pt, 15°, pl, sm, cln 10.25m: Pt, 15°, pl, sm, stn, fe 10.3m: Pt, 15°, pl, sm, stn, fe 10.67m: Pt, 15°, pl, sm, stn, fe 11.03m: Pt, 15°, sm, cln, stn 11.12m: Pt, 15°, pl, sm, stn, fe, fg, 20mm 11.21m: Pt, 15°, pl, sm, stn, fe, fg, 20mm 11.35m: Pt, 15°, pl, sm, sn, fe	C	65	40	PL(D) = 0.1 PL(A) = 0.07				
11																							PL(A) = 0.04 PL(D) = 0.07	
78																								
	11.69	COAL - Dull																						
	11.87	CORE LOSS - 0.4m														11.87m: CORE LOSS: 400mm								
12																								
	12.27	SANDSTONE - Grey with interbedded siltstone spaced at 20mm to 50mm at 15°																						
	12.51	CORE LOSS - 0.2m																						
	12.71	SANDSTONE - Very thinly bedded siltstone at 15°														12.33m: Pt, sh, pl, sm, cbs 12.35m: J, sv, pl, sm, cln, 30mm 12.42m: J, sv, pl, sm, cln, 40mm 12.46m: Pt, 15°, pl, sm, cbs, fg 12.51m: CORE LOSS: 200mm 12.83m: Pt, 15°, pl, sm, cly, 2mm 12.93m: Pt, 15°, pl, sm, cly, 2mm 13.35m: Pt, sh, pl, sm, cln 13.5m: J, sh, pl, sm, cln, 630mm 14.02m: J, sv, pl, sm, cln 14.04m: Pt, 15°, pl, sm, cbs, fg, 20mm 14.07m: J, sv, un, sm, cln 14.24m: J, sh, stp, ti 14.8m: F, 45°, pl, he; 2mm throw	C	93	70	PL(A) = 0.13				
13																							PL(A) = 0.12 PL(A) = 0.08	
	14																							
	75																							

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 8.64m

TYPE OF BORING: Auger with tc bit to 8.6m, HQ to 125.89m, PCD rotary mud drilling to 128.97m due to collapsing conditions

WATER OBSERVATIONS: Free groundwater observed at 7.8m, whilst augering

REMARKS: From 121.82m, 100% water loss

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Blank sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



Douglas Partners
Geotechnics | Environment | Groundwater

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 89.1 AHD
EASTING: 378307.8
NORTHING: 6351333.2
DIP/AZIMUTH: 90°/-

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 4 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
74	15.34	SANDSTONE - Very thinly bedded siltstone at 15° (continued)																C	93	70	PL(A) = 0.29 PL(D) = 0.2	
		SANDSTONE - Grey, fine to medium grained, contains 20% interbedded siltstone																				
16	73																				PL(A) = 0.44 PL(D) = 0.32	
17	72																	C	100	90	PL(A) = 0.66 PL(D) = 0.29	
18	71																				PL(A) = 0.34 PL(D) = 0.18	
	18.14	COAL - Black																				
	18.27	CORE LOSS - 0.09m																				
	18.36	COAL - Black with interbedded tuffaceous and carbonaceous bands up to 70mm thick																				
19	70																	C	97	74	PL(A) = 0.12 PL(D) = 0.18	
																					PL(A) = 0.38	

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 8.64m
TYPE OF BORING: Auger with tc bit to 8.6m, HQ to 125.89m, PCD rotary mud drilling to 128.97m due to collapsing conditions
WATER OBSERVATIONS: Free groundwater observed at 7.8m, whilst augering
REMARKS: From 121.82m, 100% water loss

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 89.1 AHD
EASTING: 378307.8
NORTHING: 6351333.2
DIP/AZIMUTH: 90°/-

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 5 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength						Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
			EW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High	Very High			Ex High	B - Bedding	J - Joint	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
69		COAL - Black with interbedded tuffaceous and carbonaceous bands up to 70mm thick (continued)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 8.64m
TYPE OF BORING: Auger with tc bit to 8.6m, HQ to 125.89m, PCD rotary mud drilling to 128.97m due to collapsing conditions
WATER OBSERVATIONS: Free groundwater observed at 7.8m, whilst augering
REMARKS: From 121.82m, 100% water loss

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test ls(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test ls(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 89.1 AHD
EASTING: 378307.8
NORTHING: 6351333.2
DIP/AZIMUTH: 90°/-

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 6 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low			Medium	High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
64		SANDSTONE - Grey, medium grained, bedded at 15° (<i>continued</i>) From 25.01m to 25.06m, fine to medium pebbly band From 25.34m to 25.37m, fine to medium pebbly band														24.97m: V, sh, ir, cbs					PL(D) = 1.7	
26																25.4m: Pt, 10°, pl, ro, cbs 25.47m: Pt, cu, ro, cbs 25.68m: J, 10°, pl, sl, cbs					PL(A) = 2 PL(D) = 1.7	
63																		C	98	95		
																					PL(A) = 2.6 PL(D) = 2.2	
27		From 26.68m to 26.84m, fine to medium pebbly band																				PL(A) = 0.9 PL(D) = 0.8
62																						
																						PL(D) = 9
27.77		CONGLOMERATE - Grey, fine to coarse pebbles, indistinct bedding																				
28																						PL(A) = 1.1 PL(D) = 0.83
61																						
																						PL(A) = 0.25 PL(D) = 0.32
29																						
60																						PL(A) = 1.3 PL(D) = 1.09

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 8.64m
TYPE OF BORING: Auger with tc bit to 8.6m, HQ to 125.89m, PCD rotary mud drilling to 128.97m due to collapsing conditions
WATER OBSERVATIONS: Free groundwater observed at 7.8m, whilst augering
REMARKS: From 121.82m, 100% water loss

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test (50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test (50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	W Water seep	S Standard penetration test	
E Environmental sample	W Water level	V Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 89.1 AHD
EASTING: 378307.8
NORTHING: 6351333.2
DIP/AZIMUTH: 90°/-

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 7 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding	J - Joint	Type
59		CONGLOMERATE - Grey, fine to coarse pebbles, indistinct bedding (continued)																C	100	100	PL(A) = 1.9 PL(D) = 1.4
31		From 31.55m to 31.89m, sandstone band																C	100	100	PL(A) = 0.22 PL(D) = 0.11
32		From 32.37m to 32.79m, sandstone band																C	100	100	PL(A) = 2 PL(D) = 2.5
33		From 33.88m to 34.02m, carbonaceous laminations																C	98	86	PL(D) = 1.1 PL(A) = 0.82 PL(D) = 0.87
34		From 34.15m to 34.33m, carbonaceous laminations																C	98	86	PL(A) = 0.81 PL(D) = 0.67
34.5		SANDSTONE - Grey, fine grained, very thinly bedded siltstone at 5° to 10°																C	98	86	PL(A) = 3.2

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 8.64m
TYPE OF BORING: Auger with tc bit to 8.6m, HQ to 125.89m, PCD rotary mud drilling to 128.97m due to collapsing conditions
WATER OBSERVATIONS: Free groundwater observed at 7.8m, whilst augering
REMARKS: From 121.82m, 100% water loss

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test (50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test (50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 89.1 AHD
EASTING: 378307.8
NORTHING: 6351333.2
DIP/AZIMUTH: 90°/-

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 8 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
54		SANDSTONE - Grey, fine grained, very thinly bedded siltstone at 5° to 10° <i>(continued)</i>															cbs 34.91m: Pt, 10°, pl, sm, cly, fg 35m: Pt, 10°, pl, sm, cln	C	98	86	PL(A) = 2.4
36		From 35.86m to 35.36m, siderite																			
53																					
37		From 36.85m to 36.91m, siderite															36.76m: Pt, 10°, un, sm 36.77m: Pt, 10°, un, sm 36.81m: Pt, 10°, pl, ti, ca				PL(A) = 1.8 PL(D) = 0.36
52																					
37.66		SANDSTONE - Grey, medium grained, indistinct bedding															37.59m: Pt, sh, pl, sm, fg 37.63m: Pt, 5°, pl, sm 37.66m: Pt, 5°, pl, sm, fg 37.74m: Pt, 5°, pl, ro, cln 37.75m: Pt, 5°, un, ro, cln	C	100	94	PL(A) = 3.7 PL(D) = 3.04
38																					
51																					
39																					PL(A) = 7.5 PL(D) = 5.5
50																		C	100	100	
																		C	100	100	PL(A) = 2.3

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 8.64m
TYPE OF BORING: Auger with tc bit to 8.6m, HQ to 125.89m, PCD rotary mud drilling to 128.97m due to collapsing conditions
WATER OBSERVATIONS: Free groundwater observed at 7.8m, whilst augering
REMARKS: From 121.82m, 100% water loss

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test ls(50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test ls(50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	W Water seep	S Standard penetration test	
E Environmental sample	W Water level	V Shear vane (kPa)	

BOREHOLE LOG

PROJECT: United Charlestown Development

1) SURFACE LEVEL: 89.1 AHD

EASTING: 378307.8

NORTHING: 6351333.2

DIP/AZIMUTH: 90°/--

PROJECT No: 102007.00

DATE: 29/1 - 6/2/2020

SHEET 9 OF 26

[illegible]

DRILLER: Terratest

LOGGED: Pankhurst

CASING: HWT to 8.64m

TYPE OF BORING: Auger with tc bit to 8.6m. HQ to 125.89m. PCD rotary mud drilling to 128.97m due to collapsing conditions

WATER OBSERVATIONS: Free groundwater observed at 7.8m, whilst augering

REMARKS: From 121.82m, 100% water loss

SAMPLING & IN SITU TESTING LEGEND

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	▷	Water seep
E	Environmental sample	▽	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 89.1 AHD
EASTING: 378307.8
NORTHING: 6351333.2
DIP/AZIMUTH: 90°/--

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 10 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High			Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
44		COAL - Black <i>(continued)</i>																C	100	77	PL(A) = 1 PL(D) = 0.09	
45.57 45.62		CORE LOSS - 0.05m																				
46		SANDSTONE - Grey, fine to medium grained, very thinly to medium bedded siltstone at 0° to 5°																				PL(A) = 4.2 PL(D) = 1.7
47																		C	97	90	PL(A) = 1.9 PL(D) = 0.93	
48																						PL(A) = 2.3 PL(D) = 1.4
48.02		SANDSTONE - Grey, medium to coarse grained, with fine to medium size pebbly bands thickly bedded at 100mm to 400mm																				PL(A) = 1.8 PL(D) = 1.7
49																						
40																		C	100	100	PL(A) = 1.9 PL(D) = 1.6	

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 8.64m
TYPE OF BORING: Auger with tc bit to 8.6m, HQ to 125.89m, PCD rotary mud drilling to 128.97m due to collapsing conditions
WATER OBSERVATIONS: Free groundwater observed at 7.8m, whilst augering
REMARKS: From 121.82m, 100% water loss

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test (50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test (50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 89.1 AHD
EASTING: 378307.8
NORTHING: 6351333.2
DIP/AZIMUTH: 90°/-

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 11 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing							
			EW	HW	MW	SW	FS		FR	Ex	Low	Very Low	Low			Medium	High	Very High	Ex	High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
39		SANDSTONE - Grey, medium to coarse grained, with fine to medium size pebbly bands thickly bedded at 100mm to 400mm (continued)																						PL(A) = 1.8	
51																									PL(A) = 1.9 PL(D) = 2.3
38																									
52		From 52.96m to 53.28m, sandstone grey with interbedded siltstone																							PL(A) = 2.9 PL(D) = 2.1
37																									
53																									PL(A) = 1.4 PL(D) = 1.8
36																									
54		CONGLOMERATE - Grey, fine to coarse size pebbles, indistinct bedding																							PL(A) = 2.2 PL(D) = 1.5
35																									
54.76																									

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 8.64m
TYPE OF BORING: Auger with tc bit to 8.6m, HQ to 125.89m, PCD rotary mud drilling to 128.97m due to collapsing conditions
WATER OBSERVATIONS: Free groundwater observed at 7.8m, whilst augering
REMARKS: From 121.82m, 100% water loss

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test (s(50)) (MPa)	
BLK Bulk sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test (s(50)) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 89.1 AHD
PROJECT: United Charlestown Development **EASTING:** 378307.8
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351333.2

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 12 OF 26

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 8.64m

TYPE OF BORING: Auger with tc bit to 8.6m. HQ to 125.89m. PCD rotary mud drilling to 128.97m due to collapsing conditions

WATER OBSERVATIONS: Free groundwater observed at 7.8m, whilst augering

REMARKS: From 121.82m. 100% water loss

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W _{seep}	Water seep
E	Environmental sample	W _{level}	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test ls(50) (MPa)
		PL(D)	Point load diametral test ls(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

PROJECT: United Charlestown Development

1) SURFACE LEVEL: 89.1 AHD

EASTING: 378307.8

NORTHING: 6351333.2

DIP/AZIMUTH: 90°/--

BORE No: M3

PROJECT No: 102007.00

DATE: 29/1 - 6/2/2020

SHEET 13 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength						Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
29		SANDSTONE - Grey, fine to medium grained, with very thinly interbedded siltstone at 20mm to 50mm spacing at 5° (continued)														60.04m: J, sv, pl, ro, discontinuous, 120mm 60.12m: Pt, sh, pl, ro, fg, 20mm 60.22m: J, sv, pl, ro, cln, 40mm 60.38m: Pt, 5°, pl, sm, cbs	C	100	84	PL(A) = 2.5 PL(D) = 1.1 PL(A) = 1.8 PL(D) = 1	
61		From 60.79m to 60.98m, siderite														60.9m: J, sh, ir, he (60.85-60.91m) 61.03m: J, sh, un, he (60.99-61.08m) 61.11m: Pt, sh, pl, sm, cbs					PL(A) = 1.5 PL(D) = 2
61.31		SANDSTONE - Grey, fine to medium grained, indistinct bedding																			PL(A) = 3.7 PL(D) = 4 PL(A) = 3.1 PL(D) = 3.1
62																61.72m: J, 30°, pl, ro	C	100	97		
63		From 63.14m to 63.23m, carbonaceous inclusions at 30°														62.76m: J, 30°, pl, ro 62.91m: J, 30°, pl, ro, cly, 1mm					
63.32		TUFFACEOUS SANDSTONE - Pale grey, indistinct bedding From 63.32m to 63.46m, carbonaceous laminations at 15°																			PL(A) = 1.2 PL(D) = 0.47
64																					PL(A) = 2.5 PL(D) = 1.4
64		From 64.72m to 64.85m, fine to coarse size pebbles														64.19m: V, sh, pl, discontinuous, dbs 64.55m: Cz, sh-30°, ti (64.51-64.57m)	C	98	96	PL(A) = 1.9	

DRILLER: Terratest

LOGGED: Pankhurst

CASING: HWT to 8.64m

TYPE OF BORING: Auger with tc bit to 8.6m. HQ to 125.89m. PCD rotary mud drilling to 128.97m due to collapsing conditions

WATER OBSERVATIONS: Free groundwater observed at 7.8m, whilst augering

REMARKS: From 121.82m, 100% water loss

SAMPLING & IN SITU TESTING LEGEND

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	▷	Water seep
E	Environmental sample	▽	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



Douglas Partners

Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 89.1 AHD
PROJECT: United Charlestown Development **EASTING:** 378307.8
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351333.2
DIP/AZIMUTH: 90°/--

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 14 **OF** 26

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 8.64m

TYPE OF BORING: Auger with tc bit to 8.6m, HQ to 125.89m, PCD rotary mud drilling to 128.97m due to collapsing conditions

WATER OBSERVATIONS: Free groundwater observed at 7.8m, whilst augering

REMARKS: From 121.82m. 100% water loss

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

PROJECT: United Charlestown Development

1) SURFACE LEVEL: 89.1 AHD

EASTING: 378307.8

NORTHING: 6351333.2

DIP/AZIMUTH: 90°/--

PROJECT No: 102007.00

DATE: 29/1 - 6/2/2020

SHEET 15 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing								
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low		Medium	High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments
19		TUFFACEOUS SANDSTONE and SILTSTONE - Fine to medium grained, pale grey / green, very thinly to thinly bedded at 5° <i>(continued)</i>																										PL(A) = 1.5 PL(D) = 0.91
71																												PL(A) = 3.3 PL(D) = 0.41
18																												
72																												PL(A) = 2.5 PL(D) = 0.33
17																												
73																												
16																												
74		From 73.79m, grey																										
15		From 74.21m to 74.3m, tuff																										
74.33		SANDSTONE and SILTSTONE - Fine to medium grained, pale grey sandstone, dark grey siltstone, irregular bedding at ~0° to 5°																										PL(A) = 0.4 PL(D) = 0.32
																												PL(A) = 7.5 PL(D) = 0.83

DRILLER: Terratest

LOGGED: Pankhurst

CASING: HWT to 8.64m

TYPE OF BORING: Auger with tc bit to 8.6m. HQ to 125.89m. PCD rotary mud drilling to 128.97m due to collapsing conditions

WATER OBSERVATIONS: Free groundwater observed at 7.8m, whilst augering

REMARKS: From 121.82m, 100% water loss

SAMPLING & IN SITU TESTING LEGEND

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U _t	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	≧	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



Douglas Partners

Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 89.1 AHD
PROJECT: United Charlestown Development **EASTING:** 378307.8
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351333.2

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 16 OF 26

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 8.64m
TYPE OF BORING: Auger with tc bit to 8.6m, HQ to 125.89m, PCD rotary mud drilling to 128.97m due to collapsing conditions
WATER OBSERVATIONS: Free groundwater observed at 7.8m, whilst augering
REMARKS: From 121.82m. 100% water loss

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 89.1 AHD
EASTING: 378307.8
NORTHING: 6351333.2
DIP/AZIMUTH: 90°/-

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 17 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)			Discontinuities		Sampling & In Situ Testing								
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low		Medium	High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
9		SANDSTONE and SILTSTONE - Fine to medium grained, pale grey sandstone, dark grey siltstone, irregular bedding at ~0° to 5° (continued)																									PL(D) = 0.77
		From 80.48m to 80.81m, siltstone band																					C	100	99		PL(A) = 5 PL(D) = 2.5
		From 80.56m to 80.6m, siderite																									
		From 80.64m to 80.65m, siderite																									
81																											
8																											
															</												

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 8.64m
TYPE OF BORING: Auger with tc bit to 8.6m, HQ to 125.89m, PCD rotary mud drilling to 128.97m due to collapsing conditions
WATER OBSERVATIONS: Free groundwater observed at 7.8m, whilst augering
REMARKS: From 121.82m, 100% water loss

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test (50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test (50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	W Water seep	sp Standard penetration test	
E Environmental sample	W Water level	V Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 89.1 AHD
PROJECT: United Charlestown Development **EASTING:** 378307.8
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351333.2

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 18 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low		Medium	High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
4		LAMINITE - Dark grey, very thinly to thinly laminated, horizontally bedded <i>(continued)</i>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 8.64m

TYPE OF BORING: Auger with tc bit to 8.6m. HQ to 125.89m. PCD rotary mud drilling to 128.97m due to collapsing conditions

WATER OBSERVATIONS: Free groundwater observed at 7.8m, whilst augering

REMARKS: From 121.82m. 100% water loss

SAMPLING & IN SITU TESTING LEGEND

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	▷	Water seep
E	Environmental sample	▽	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 89.1 AHD
EASTING: 378307.8
NORTHING: 6351333.2
DIP/AZIMUTH: 90°/-

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 19 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength						Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High	Very High			Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
		STONE COAL - Black with carbonaceous siltstone (continued)																					
		From 90.28m to 90.37, carbonaceous siltstone band																					
		From 90.65m to 90.72m, carbonaceous siltstone band																					
		From 90.76m to 90.8m, tuff seam																					
		From 90.86m to 90.9m, tuff seam																					
91																							
		From 91.33m to 91.39m, carbonaceous siltstone																					
91.51		TUFFACEOUS SANDSTONE - Pale grey / green, fine grained, disturbed irregular bedding																					
		From 91.89m to 91.92m, tuffaceous siltstone																					
92																							
93																							
94																							

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 8.64m
TYPE OF BORING: Auger with tc bit to 8.6m, HQ to 125.89m, PCD rotary mud drilling to 128.97m due to collapsing conditions
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REMARKS: From 121.82m, 100% water loss

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A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test (50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test (50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	W Water seep	S Standard penetration test	
E Environmental sample	W Water level	V Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 89.1 AHD
EASTING: 378307.8
NORTHING: 6351333.2
DIP/AZIMUTH: 90°/-

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 20 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
-95	95.01	TUFFACEOUS SILTSTONE							✓									C	98	95	PL(A) = 0.75 PL(D) = 0.51
	95.36	SILTSTONE - Dark grey, thinly laminated, horizontally bedded From 95.36m to 95.46m, carbonaceous siltstone							✓									C	96	70	PL(A) = 5.7 PL(D) = 4
-96																					
-97	96.24	STONE COAL - Black, with medium bedded siltstone and tuff																			
		From 96.9m to 97.04m, siltstone band From 97.04m to 97.09m, tuff band																			
-98		From 97.3m to 97.33m, siltstone band																			
		From 97.61m to 97.68m, tuffaceous siltstone From 97.68m to 97.78m, carbonaceous siltstone From 97.78m to 97.98m, tuffaceous siltstone																			
-99		From 98.17m to 98.21m, carbonaceous siltstone																			
		From 98.54m to 98.57m, carbonaceous siltstone From 98.62m to 98.63m, carbonaceous siltstone From 98.7m to 98.74m, carbonaceous siltstone																			
-99	98.92	SILTSTONE - Dark grey, thinly laminated at 0° to 5°																			
		From 99.89m to 99.94m, siderite																			

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 8.64m
TYPE OF BORING: Auger with tc bit to 8.6m, HQ to 125.89m, PCD rotary mud drilling to 128.97m due to collapsing conditions
WATER OBSERVATIONS: Free groundwater observed at 7.8m, whilst augering
REMARKS: From 121.82m, 100% water loss

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A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test (50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test (50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	W Water seep	S Standard penetration test	
E Environmental sample	W Water level	V Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 89.1 AHD
EASTING: 378307.8
NORTHING: 6351333.2
DIP/AZIMUTH: 90°/-

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 21 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength						Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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-11		SILTSTONE - Dark grey, thinly laminated at 0° to 5° (continued)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							</

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REMARKS: From 121.82m, 100% water loss

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test (50) (MPa)	
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C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	W Water seep	S Standard penetration test	
E Environmental sample	W Water level	V Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 89.1 AHD
EASTING: 378307.8
NORTHING: 6351333.2
DIP/AZIMUTH: 90°/-

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 22 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
-16		SANDSTONE - Pale grey, with thinly bedded siltstone at 0° to 5° <i>(continued)</i>																C	99	92	PL(A) = 5.4 PL(D) = 4.2
106																					
106.35		SANDSTONE and SILTSTONE - Dark grey, medium to thickly bedded (subhorizontal) From 106.58m to 106.71m, carbonaceous siltstone with coal lenses up to 3mm																C	100	87	PL(A) = 2.4
107																					
-18		From 107.26m to 108.08m, tuffaceous siltstone																			PL(A) = 0.59 PL(D) = 0.25
108																					
-19																					PL(A) = 8 PL(D) = 4.6
109		From 108.89m to 110.24m, sandstone, grey, medium grained, indistinct bedding																C	100	99	PL(A) = 3.17
-20																					PL(A) = 3.2 PL(D) = 3.7

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 8.64m
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D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 89.1 AHD
EASTING: 378307.8
NORTHING: 6351333.2
DIP/AZIMUTH: 90°/-

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 23 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 89.1 AHD
EASTING: 378307.8
NORTHING: 6351333.2
DIP/AZIMUTH: 90°/-

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 24 OF 26

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex	Low	Very Low	Low			Medium	High	Very High	Ex	High	B - Bedding S - Shear	J - Joint F - Fault	Type
-26		SANDSTONE and SILTSTONE - Dark grey, medium to thickly bedded (subhorizontal) (continued)																					
116	-27	From 116.01m to 116.83m, carbonaceous laminations at 0° to 5°																	C	100	100	PL(A) = 4.6 PL(D) = 3.8	
117	-28																						
118	-29																						
119	-30																		C	100	100	PL(A) = 3.7 PL(D) = 1.7	

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 8.64m
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		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW)
PROJECT: United Charlestown Development
LOCATION: 27 Tiral Street, Charlestown

SURFACE LEVEL: 89.1 AHD
EASTING: 378307.8
NORTHING: 6351333.2
DIP/AZIMUTH: 90°/-

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 25 OF 26

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E Environmental sample	≡ Water level	V Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Uniting Church in Australia Property Trust (NSW) **SURFACE LEVEL:** 89.1 AHD
PROJECT: United Charlestown Development **EASTING:** 378307.8
LOCATION: 27 Tiral Street, Charlestown **NORTHING:** 6351333.2
DIP/AZIMUTH: 90°--

BORE No: M3
PROJECT No: 102007.00
DATE: 29/1 - 6/2/2020
SHEET 26 OF 26

[illegible]

RIG: Comacchio MC450 P1 **DRILLER:** Terratest **LOGGED:** Pankhurst **CASING:** HWT to 8.64m

TYPE OF BORING: Auger with tc bit to 8.6m. HQ to 125.89m. PCD rotary mud drilling to 128.97m due to collapsing conditions

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		S	Standard penetration test
		V	Shear vane (kPa)



Appendix B

Coffey (2004)
Coffey (2009)
DWC (2010)

Charleston

NSW DEPARTMENT OF EDUCATION AND TRAINING
FORMER CHARLESTOWN TAFE
LOT 233, DP551260, JAMES STREET, CHARLESTOWN
SITE CONTAMINATION ASSESSMENT

N08951/01-AC

24 March 2004


Coffey

N08951/01-AC KML
24 March 2004

NSW Department of Education and Training
Properties Directorate
Level 9 and 13
55 Market Street
SYDNEY NSW s2000

Attention: Dean Whittle

Dear Sir

**RE: FORMER CHARLESTOWN TAFE
LOT 233, DP551260, JAMES STREET, CHARLESTOWN
SITE CONTAMINATION ASSESSMENT**

Please find enclosed our report describing a site contamination and hazardous materials assessment undertaken at the above site.

If you have any questions regarding this matter please contact Kate Lyng or the undersigned.

For and on behalf of

COFFEY GEOSCIENCES PTY LTD



STEVE MORTON

Distribution:	Original	Coffey Geosciences Pty Ltd (File)
	1 Copy	Coffey Geosciences Pty Ltd (Library)
	3 Copies	NSW Department of Education and Training

Coffey 

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DRAWING

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1. INTRODUCTION

This report presents the results of a site contamination and hazardous materials assessment carried out by Coffey Geosciences Pty Ltd (Coffey) at the site of the former Charlestown TAFE in James Street, Charlestown. The work was commissioned by Dean Whittle of the NSW Department of Education and Training by letter dated 2 February 2004.

At the time of the assessment the site was not in use and had recently stopped operation as a TAFE campus. TAFE equipment was being removed from the buildings, a number of shade houses were in the process of being demolished and the site was being prepared for sale.

The purpose of the investigation was to assess the potential for site contamination with regard to previous site uses and to assess the site buildings for hazardous materials.

The contamination and hazardous materials assessment was based on the following:

- A brief review of site history;
- A walkover assessment of the site by a Coffey Environmental Engineer;
- Discussions with the current site owner;
- Limited soil sampling and analysis;
- Building materials sampling and analysis.

The assessment has been conducted in accordance with the relevant sections of NSW EPA, *Contaminated Sites, Guidelines for Consultants Reporting on Contaminated Sites* (Reference 1).

2. SITE IDENTIFICATION AND HISTORY

2.1 Location and Site Identification

The site is identified as Lot 223, Deposited Plan 551260 and is situated at James Street, Charlestown in Lake Macquarie Local Government Area (LGA).

The site is trapezoidal in shape bounded by James Street to the north, Dudley Road to the west, Tiral Street to the south and residential properties to the east, with a total area of 2.08 hectares.

The site is zoned 2(2) Residential (Urban Living) in accordance with the Lake Macquarie Draft Local Environment Plan, 2002 and is bounded by residential properties to the north, east and south and infrastructure development to the west across Dudley Road.

2.2 Land Use

At the time of the assessment the site was not in use and had discontinued operation as a TAFE campus.

The site had until the end of 2003 used by the Hunter Institute of TAFE for horticultural studies such as Green Keeping.

At the time of the assessment TAFE equipment was being removed from the buildings, a number of shade houses were in the process of being demolished and the site was being prepared for sale.

3. SITE HISTORY

The site history was compiled from Title deeds document.

Title deeds documents used in assessing the site history are presented in Appendix A.

The subject site was resumed by the Crown in November 1963 for the purposes of a Technical College. A Crown Grant was never issued for the site and prior to 1963 the site was Crown Land held by Gordon Bowden and William Schadel within Special Holding No 1923-14. The Minister for Education is the listed proprietor of the site.

Site development for a technical college began during the 1970's and a plaque within the administration building marks the official opening in May 1979.

4. SITE TOPOGRAPHY

Topographically the site is located on the undulating lower eastern facing slopes and base of a northerly trending gully. Site slopes are generally in the order of 5 to 10 %.

The site soils and vegetation have been significantly altered by the previous site use, however, the title deeds documents suggest that prior to site development the site consisted of 'poor soils' and stands of gum, mahogany, teatree, oak and bloodwood.

At the time of the assessment, site development included six buildings, tennis courts, bowling green, golf hole, swimming pool, native and tropical gardens, shade houses, driveways and car parking.

Site vegetation includes extensive grass areas in the tennis court, golf hole and bowling green areas, a native garden area, tropical swimming pool surrounds and general native and exotic garden areas.

Based on the topography and surface levels of the surrounding lots it does not appear that any significant filling has occurred at the site, with the exception of the rear of the chemical store and machinery sheds where up to 4m of fill may have been placed to form the bowling green area.

5. AREAS AND CHEMICALS OF CONCERN

Based on the site history the primary concern with regard to site contamination would be related to the use of pesticides and herbicides related to use of the site for teaching horticultural studies.

Also of concern would be the possible use of hazardous building materials, in particular asbestos and lead based paint, in the site buildings.

The chemicals of concern associated with herbicide and pesticide use would primarily be the Organochlorine and Organophosphate pesticides.

6. SCOPE OF WORKS

The purpose of the work described in this report is to assess the site for future usage with regard to potential health and environmental impacts of soil contamination resulting from the former site use.

The assessment has been conducted in accordance with the relevant sections of the following guidelines:

- NSW EPA Guidelines for Consultants Reporting on Contaminated Sites, 1997;
- NSW EPA Guidelines for the NSW Site Auditor Scheme, 1998;
- NEPM Guideline on Investigation levels for Soil & Groundwater, December, 1999.



7. FIELD WORK

Field work was carried out on 24 February 2004. The fieldwork involved limited sampling, focussing on areas where it is considered that use of pesticides and herbicides would be likely such as the golf fairway and green, tennis court, bowling green and greenhouse area.

The sampling consisted of sampling of surface soils at four locations across the site. The test locations were excavated using hand tools by an Engineer from Coffey who located the test locations and collected samples for analysis.

Samples of building materials identified as potentially containing asbestos or lead paint were collected from the permanent site buildings.

Soil samples were collected from the golf fairway (S1), tennis court (S2), bowling green (S3) and green house (S4) areas. Sampling locations are shown on Drawing N08951/01-2.

Soil samples were placed in glass jars and kept on ice during the fieldwork and during transit to the laboratory.

Building materials samples were placed in zip lock plastic bags and held at ambient air temperature during the fieldwork and during transit to the laboratory.

8. SITE DESCRIPTION

At the time of the assessment six buildings were present on the site. An assessment of each building was conducted focussing on potentially hazardous building materials and potential sources of site contamination.

The six buildings are identified on Drawing N08951/01-2.

8.1 Building A : Administration

The administration building is located in the south east of the site and was officially opened in May 1979. The building is of wooden frame construction with brick walls, a tiled roof and metal down pipes and guttering. The building has been designed to fit the site topography with a partial lower level to take advantage of the sloping block. Space underneath the upper level where there was insufficient height for a lower level is used for storage. Fibro-cement sheeting used as wall panelling in this area contained stamps indicating the material to be asbestos free.

The walls and ceiling are gyprock lined and the ceiling and wall cavities are vacant. The internal and external doors are of wood and glass construction and the floors in the upstairs are generally carpet over timber sheeting with the exception of the kitchen area which is vinyl roll over timber sheeting. The downstairs floor is covered with vinyl tiles. The building is fitted with sliding aluminium windows and there was evidence, including external brackets and unusually shaped vertical blinds, that air conditioning units have formerly been fitted in a number of the window cavities.

A switchboard constructed of black zelmonite board was located in the upstairs hallway. Historically switchboards have been known to contain asbestos however it is considered unlikely in this case due to the relatively recent building construction. As the switchboard was live at the time of the assessment no sample was available for analysis.

Samples were collected of vinyl tiles in the down stairs area (Sample 1) and of a fibrous growing medium stored underneath the building (Sample 3) to test for the presence of asbestos. One sample of paint was collected from the ceiling of the upstairs male toilet (Sample 2).

8.2 Building B : Classrooms

Building B is located in the north east of the site and was constructed in the early 1990's. Given the period of

construction it is considered unlikely that the building materials contain any asbestos or lead based paints as the use of such materials had been phased out prior to the construction period.

The building is clad with low profile metal sheeting externally and fibro cement sheeting internally. The wall and ceiling cavities are insulated with fibreglass batts and the floor is vinyl roll sheeting.

8.3 Building C : Library

Building C is a demountable building located in the eastern section of the site, with three rooms which were used as a students common room, library and a classroom. The building is constructed of fibro cement sheeting externally with timber panelling inside and polystyrene insulation. The internal partition walls are of gyprock construction with fibreglass insulation. One sample of the fibreglass insulation was taken to assess for the presence of asbestos (Sample 4). The floors are compressed wood sheeting with high traffic industrial style carpet. An electrical switchboard located on the external wall is of metal and plastic construction.

8.4 Tennis Shed

The tennis shed is located to the south west of Building B at the eastern end of the tennis court. The external walls of the shed are clad with Hardiplank and the internal walls are fibro cement sheeting.

Samples of the internal (Sample 6) and external (Sample 5) cladding materials were collected for analysis for asbestos.

8.5 Buildings D, E and F : Machinery Shed, Chemical Store and Potting Shed

The machinery shed, chemical store and potting shed are located towards the centre of the site and undertake a number of uses including lunchroom, fertiliser and chemical store and classrooms.

The buildings are of concrete block construction with concrete internal dividing walls, concrete slab floors and corrugated metal sheet roofing.

Building F is fitted with a suspended panel ceiling. A sampling of ceiling panel (Sample 7) was collected for analysis for asbestos. Fibrous cement shelving panels contains stamps indicating the materials to be asbestos free.

Building F is also fitted with heavy internal doors which may be fire rated doors. The doors were not sampled due to the risk of damaging the integrity of the doors.

At the time of the assessment fuels, including diesel, ammonia and hydraulic oil, were being stored on banded pallets on a concrete floor which was judged to be in generally good condition with no obvious cracking.

In the chemical store pesticides were held in compartmented metal boxes marked with the contents, use and guidelines for protection. The chemical store had a concrete floor which was judged to be in good condition and exhibited no signs of significant chemical leaks or spillage.

9. LABORATORY TESTING

9.1 Sample Selection and Analysis Suite

Samples were delivered under Chain of Custody conditions to Australian Laboratory Services, a specialist NATA registered chemical laboratory.

Soil samples were analysed for a wide range of organochlorine and organophosphate pesticides which were identified as the chemicals of concern for the site.

Samples of flaking paint and potentially asbestos containing materials were analysed for lead content and presence or absence of asbestos respectively.



9.2 Guidelines and Acceptance Criteria

For evaluation of soil contamination, reference was made to health based and phytotoxicity based soil investigation levels presented in NSW EPA 'Guidelines for the Site Auditor Scheme' (Reference 2), which offers several sets of guideline values based upon intended site usage. As the future site usage is not known at this stage the site was assessed against a range of guidelines for various site uses. Results were also assessed against phytotoxicity based investigation levels which are generally used to assess accessible soils in sensitive land uses such as residential sites with accessible soils and childcare centres.

For comparison with the above criteria it is also common to adopt the 95% Upper Confidence Limit (UCL) of mean concentrations of each analyte.

9.3 Quality Control

Samples were delivered to Australian Laboratory Services (ALS) on ice and under Chain of Custody (COC) conditions. A copy of the completed COC form is presented with laboratory test results in Appendix A. ALS is NATA accredited for the selected analysis. Analysis methods adopted are presented on the laboratory report sheets in Appendix A.

In addition to field quality control, the laboratory conducted internal quality control using laboratory duplicates, spikes and method blanks. The results are shown with laboratory report sheets in Appendix A. Analytical methods used for the laboratory testing are also indicated on the laboratory report sheets. The results of laboratory quality control testing are considered to be within acceptable limits. Evaluation of internal and laboratory QA/QC is presented in Appendix A.

On the basis of the field and laboratory quality control results discussed above, the field and laboratory methods are considered appropriate and the data obtained is considered to reasonably represent the concentrations at the sampling points at the time of sampling.

9.4 Results

The results of testing on samples of building materials collected during the assessment are summarised in Table 1.

TABLE 1 – SUMMARY OF LABORATORY TEST RESULTS

SAMPLE NO	LOCATION	DESCRIPTION	RESULTS
1	Downstairs of Building A	Vinyl floor tile	No Asbestos Detected
2	Ceiling of upstairs male toilet in Building A	Flaking Paint	Lead 117 mg/kg
3	Underneath storage area Building A	Planting medium	No Asbestos Detected
4	Wall of Building C	Fibreglass wall insulation	No Asbestos Detected
5	Tennis Shed – External wall	Hardiplank panel	No Asbestos Detected
6	Tennis Shed – Internal Wall	Fibro cement sheeting	No Asbestos Detected
7	Ceiling of Building F	Ceiling panel	No Asbestos Detected.
8	Roller door of Building D	Brown paint flakes	Lead 4080 mg/kg

From Table 1, the following points are noted:

- Asbestos was not detected in any of the samples collected from the building on site;
- Lead was detected at concentrations of 117mg/kg and 4080mg/kg in Samples 2 and 8 respectively.

The results of the soil testing are summarised and compared to guideline criteria in Table 2. The following points are noted:

- Laboratory limits of reporting were below adopted guideline values for all analytes;
- Organochlorine and organophosphate pesticide were within the adopted guideline concentrations in all samples;
- Cadmium, chromium, copper, lead, nickel, zinc and mercury concentrations were within the adopted guideline concentrations in all samples;
- Arsenic concentrations exceeded the adopted phytotoxicity based investigation level in two of the four samples analysed;
- Arsenic concentrations were within the health based investigation guidelines in all samples analysed.

10. DISCUSSION AND RECOMMENDATIONS

10.1 Limitations of Contamination Assessment

The findings of this assessment are the result of discrete and specific sampling methodologies, involving sampling from predetermined locations within the soil profile. Whilst it is considered that the results obtained are likely to be representative of conditions on the site, the existence of undetected contamination between sampling locations cannot be precluded.

10.2 General

The results of the investigation indicate some slightly elevated concentrations of arsenic in surface soils on the site. Samples S1 and S2 which exhibited the elevated arsenic concentrations were taken from the tennis court and golf fairway areas where it is considered that use of pesticides may have occurred. It is therefore considered possible that the arsenic concentrations may have resulted from small quantities of residual pesticides.

The concentrations encountered range up to 30mg/kg, which exceeds the NSW EPA phyto-toxicity based guideline of 20mg/kg. The results are well below the 100mg/kg limit of the most sensitive category of health based soil investigation guideline for residential land use (Ref 1). The concentrations encountered would therefore not be considered a health risk to future site users, assuming the land is used for standard residential, child care or some less sensitive site use. If arsenic sensitive plant species are likely to be used on the site, some further investigation should be undertaken.

It would be prudent to undertake validation sampling of surface soils within areas formerly used for green keeping, if those areas are to be used for residential purposes, to confirm that isolated hot spots of higher arsenic concentrations are not present.

Samples of building materials tested for asbestos were found to contain no detectable asbestos.

Two samples of paint from across the site were analysed for total lead concentrations. Sample 2 taken from the ceiling of the administration building returned a total lead concentration of 117mg/kg and is therefore not considered to be lead based paint.

Sample 8 taken from the roller door of the machinery storage shed returned a total lead concentration of 4080mg/kg. Based on the Australian guideline for lead in paint of 5000mg/kg this sample is not considered to be lead based paint. Due to the elevated levels of lead detected, however, it is recommended that relevant

precautions be adopted when causing any disturbance to the paint.

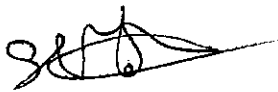
Based on the results of the investigation it is not considered that significant site contamination has occurred as a result of previous site usage.

REFERENCES:

1. NSW Environment Protection Authority, Contaminated Sites Sampling Design Guidelines, September 1995
2. NSW Environment Protection Authority, Guidelines for the NSW Site Auditor Scheme, June 1998
3. NSW Environment Protection Authority, Guidelines for Assessing Service Station Sites, December 1994

For and on behalf of

COFFEY GEOSCIENCES PTY LTD



STEVE MORTON



TABLE 2 - RESULTS OF CHEMICAL ANALYSES (concentrations in mg/kg)

Client:													
Project:													
Location: CHARLESTOWN TAFE													
SAMPLE LOCATION	DEPTH (m)	PID (ppm)	Pesticides (Total)		HEAVY METALS								
			OCF	OPP	As	Cd	Cr*	Cu	Pb	Ni	Zn	Hg	
Primary Sample:	S1	0.0-0.1	2	<1.35	<1.45	29	<1	4	7	35	4	138	0.2
	S2	0.0-0.1	3	<1.35	<1.45	30	<1	10	14	33	6	148	0.7
	S3	0.0-0.1	2	1.4	<1.45	11	<1	9	9	11	5	21	0.9
	S4	0.0-0.1	1	<1.35	<1.45	1	<1	12	20	23	5	172	<0.1
Sample size:			4	4	4	4	4	4	4	4	4	4	4
Mean:			1	1	18	0.5	9	13	26	5	120	0.5	
Maximum:			1	1	30	0.5	12	20	35	6	172	0.9	
Minimum:			1	1	1	0.5	4	7	11	4	21	0.1	
Standard Deviation:			0.3	0.0	12.3	0.0	2.9	5.0	9.5	0.7	58.3	0.3	
Student's t:			2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35	
95% UCL of Mean			1.2	0.7	32.2	0.5	12.2	18.4	36.7	5.8	188.4	0.9	
CRITERIA													
Environmental:					20	3	50	60	300	60	200	1	
Human Health(1):					100	20	100**	1000	300	600	7000	15	
Human Health(2):					200	40	200**	2000	600	600	14000	30	
Human Health (3):					400	80	400**	4000	1200	2400	28000	60	
Human Health (4):					500	100	500**	5000	1500	3000	35000	75	

NOTES:

<PQL Results Below Practical Quantifiable Limit

ITALIC Results Below PQL but half the detection limit has been adopted for statistical calculations

SHADED Value exceeds Environmental soil investigation guidelines from ANZECC 1992, Table 2

BOLD Value exceeds guideline criteria

* Total Chromium (digested by laboratory)

**Chromium VI (6+ oxidation state)

CRITERIA:

Phytotoxicity guidelines from NSW EPA 1998

Human Health(1) criteria for residential sites (NSW EPA 1994 & 1998)

Human Health (2) criteria - health based soil investigation levels for Parklands, recreational open space and playing fields (NSW EPA, 1998)

Human Health (3) criteria - health based soil investigation levels for residential sites with minimal access to soil (NSW EPA, 1998)

Human Health (4) criteria - health based soil investigation levels for commercial or industrial sites (NSW EPA, 1998)

Information

Important information about your **Coffey** Environmental Site Assessment



Uncertainties as to what lies below the ground on potentially contaminated sites can lead to remediation costs blow outs, reduction in the value of land and to delays in the redevelopment of land. These uncertainties are an inherent part of dealing with land contamination. The following notes have been prepared by Coffey to help you interpret and understand the limitations of your environmental site assessment report.

Your report has been written for a specific purpose

Your report has been developed on the basis of a specific purpose as understood by Coffey and applies only to the site or area investigated. For example, the purpose of your report may be:

- To assess the environmental effects of an on-going operation.
- To provide due diligence on behalf of a property vendor.
- To provide due diligence on behalf of a property purchaser.
- To provide information related to redevelopment of the site due to a proposed change in use, for example, industrial use to a residential use.
- To assess the existing baseline environmental, and sometimes geological and hydrological conditions or constraints of a site prior to an activity which may alter the sites environmental, geological or hydrological condition.

For each purpose, a specific approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible, quantify risks that both recognised and unrecognised contamination pose to the proposed activity. Such risks may be both financial (for example, clean up costs or limitations to the site use) and physical (for example, potential health risks to users of the site or the general public).

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man and may change with time. For example, groundwater levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of the subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Coffey to be advised how time may have impacted on the project and/or on the property.

Interpretation of factual data

Environmental site assessments identify actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from indirect field measurements and sometimes other reports on the site are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how well qualified, can

reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of Coffey through the development and use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other problems encountered on site.

Your report will only give preliminary recommendations

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered with redevelopment or on-going use of the site. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Coffey cannot be held responsible for such misinterpretation.

Your report is prepared for specific purposes and persons

To avoid misuse of the information contained in your report it is recommended that you confer with Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. In particular, a due diligence report for a property vendor may not be suitable for satisfying the needs of a purchaser. Your report should not be applied for any purpose other than that originally specified at the time the report was issued.

Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Coffey to work with other professionals who are affected by the report. Have Coffey explain the report implications to professionals affected by them and then review plans and specifications produced to see how they have incorporated the report findings.

N08951/01-AC
24 March 2004

APPENDIX A

Title Deeds

Coffey 

HISTORICAL SEARCH REPORT

DEPARTMENT OF LANDS – SYDNEY – NSW TORRENS TITLE BRANCH

LAND : Lot 233 in Deposited Plan 551260
At Charlestown
Local Government Area of Lake Macquarie
Parish of Kahibah
County of Northumberland

Certificate of Title & Land Description	Registered Proprietor	Date of Acquisition
--	------------------------------	----------------------------

Folio Identifier 233/551260 Lot 233 in DP551260	The Minister for Education	12 th . of September, 1988
--	----------------------------	---------------------------------------

Volume: 11765 Folio: 132 Portion 223 in DP551260	As above	28 th . of January, 1972
---	----------	-------------------------------------

NOTE : Prior to the issue of Certificate of Title Volume: 11765 Folio: 132 the Subject Land was part of the land resumed for the purpose of a Technical College under the provisions of the Public Works Act, 1912 pursuant to a Notice published in the Government Gazette dated the 1st. of November, 1963 Folio No.106

Prior to the aforesaid resumption the Subject Land was part of Portion 223 in the Parish of Kahibah County of Northumberland held by Gordon Bowden and William James Schadel within Special Holding No.1923-14 Land District of Newcastle being Crown Land.

DATED 11th.February, 2004.

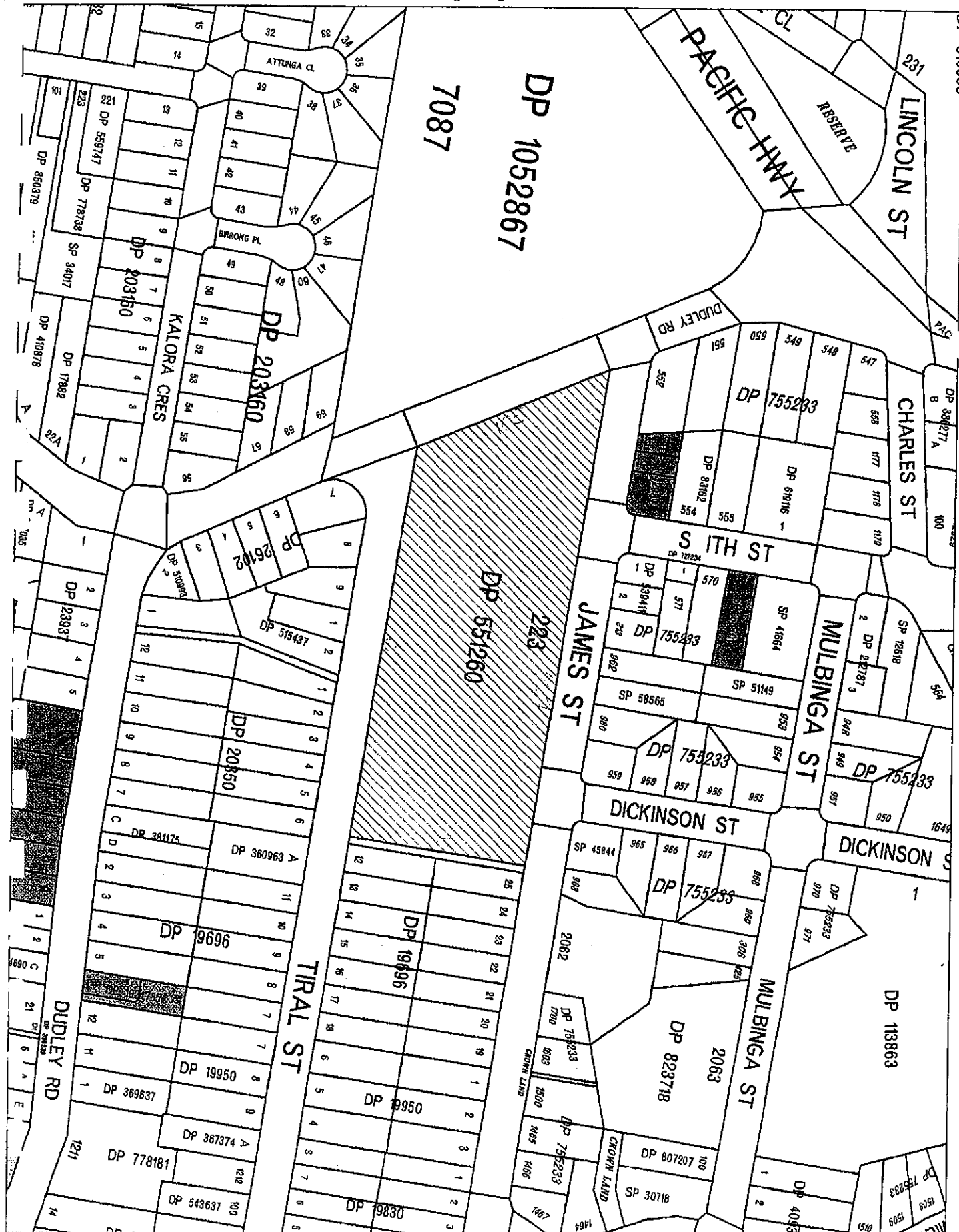
LEGALCO

Per:



Date: 04-FEB-04 3:52pm

Enquiry: Lot 223 DP551260



CDB PLANS ON CADASTRE (Report 3 of 3 Reports)

Date: 04-FEB-04 3:52 pm

Page 1 of 2

Enquiry: **Lot 223 DP551260**

<u>CDB Plans</u>	<u>Survey/Comp</u>	<u>Purpose</u>
DP17882	UNRESEARCHED	UNRESEARCHED
DP19696	UNRESEARCHED	UNRESEARCHED
DP19830	UNRESEARCHED	UNRESEARCHED
DP19950	UNRESEARCHED	UNRESEARCHED
DP20350	UNRESEARCHED	UNRESEARCHED
DP20738	UNRESEARCHED	UNRESEARCHED
DP23937	UNRESEARCHED	UNRESEARCHED
DP26102	UNRESEARCHED	UNRESEARCHED
DP26269	UNRESEARCHED	UNRESEARCHED
DP83162	UNRESEARCHED	UNRESEARCHED
DP113863	COMPILATION	DEPARTMENTAL
DP203160	SURVEY	SUBDIVISION
DP204736	SURVEY	SUBDIVISION
DP212787	SURVEY	SUBDIVISION
DP340758	UNRESEARCHED	UNRESEARCHED
DP354690	UNRESEARCHED	UNRESEARCHED
DP356207	UNRESEARCHED	UNRESEARCHED
DP360963	UNRESEARCHED	UNRESEARCHED
DP361401	UNRESEARCHED	UNRESEARCHED
DP367374	UNRESEARCHED	UNRESEARCHED
DP369637	UNRESEARCHED	UNRESEARCHED
DP370289	UNRESEARCHED	UNRESEARCHED
DP378510	UNRESEARCHED	UNRESEARCHED
DP381175	UNRESEARCHED	UNRESEARCHED
DP386277	UNRESEARCHED	UNRESEARCHED
DP396239	UNRESEARCHED	UNRESEARCHED
DP397035	UNRESEARCHED	UNRESEARCHED
DP409334	UNRESEARCHED	UNRESEARCHED
DP410878	UNRESEARCHED	UNRESEARCHED
DP505478	SURVEY	SUBDIVISION
DP510022	SURVEY	SUBDIVISION
DP510993	SURVEY	SUBDIVISION
DP515437	SURVEY	SUBDIVISION
DP539411	SURVEY	SUBDIVISION
DP543637	COMPILATION	SUBDIVISION
DP551260	COMPILATION	LEASE
DP559747	SURVEY	SUBDIVISION
DP561139	SURVEY	SUBDIVISION
DP619116	COMPILATION	CONSOLIDATION
DP658244	COMPILATION	DEPARTMENTAL
DP712929	COMPILATION	CONSOLIDATION
DP727234	COMPILATION	CROWN FOLIO CREATION
DP755233	UNRESEARCHED	CROWN ADMIN NO.
DP778181	COMPILATION	SUBDIVISION
DP778738	SURVEY	SUBDIVISION
DP807207	COMPILATION	CONSOLIDATION
DP810988	SURVEY	SUBDIVISION
DP823718	SURVEY	SUBDIVISION

**CDB PLANS ON CADASTRE** (Report 3 of 3 Reports)

ate:04-FEB-04 3:52 pm

Page 2 of 2

Enquiry: Lot 223 DP551260

<u>DCDB Plans</u>	<u>Survey/Comp</u>	<u>Purpose</u>
DP840119	SURVEY	SUBDIVISION
DP850379	SURVEY	SUBDIVISION
DP1024785	SURVEY	SUBDIVISION
DP1042987	SURVEY	SUBDIVISION
DP1052867	COMPILATION	DEPARTMENTAL
DP12618	COMPILATION	STRATA PLAN
DP20974	COMPILATION	STRATA PLAN
SP30718	COMPILATION	STRATA PLAN
DP34017	COMPILATION	STRATA PLAN
DP41664	COMPILATION	STRATA PLAN
SP45844	COMPILATION	STRATA PLAN
DP51149	COMPILATION	STRATA PLAN
DP58565	COMPILATION	STRATA PLAN
SP66187	COMPILATION	STRATA PLAN
DP68701	COMPILATION	STRATA PLAN

IST OF NOTATIONS (Report 2 of 3 Reports)

Locality: CHARLESTOWN

County: NORTHUMBERLAND

Date: 04-FEB-04 3:52 pm

Page 1 of 1

LGA: LAKE MACQUARIE

Parish: KAHIBAH

Enquiry: **Lot 223 DP551260**

<u>PLAN No.</u>	<u>STATUS</u>	<u>SURVEY/COMP</u>	<u>PURPOSE</u>
P26269			
Lot: 9,10,11,12,13,14			
DP1064403	PRE-EXAM	SURVEY	SUBDIVISION
P1024785			
Lot: 61,62			
DP19696	HISTORICAL	UNRESEARCHED	UNRESEARCHED
DP649677	REGISTERED	COMPILATION	EASEMENT
P1042987			
Lot: 5531,5532,5533			
DP83162	HISTORICAL	UNRESEARCHED	UNRESEARCHED
P66187			
DP204736	HISTORICAL	SURVEY	SUBDIVISION
P68701			
DP755233	HISTORICAL	UNRESEARCHED	CROWN ADMIN NO.



Department of Lands
Land and Property Information NSW

TITLE SEARCH

Computer Folio Certificate issued under
Section 96D of the Real Property Act 1900

No. B20

Search certified to:

4/2/2004 3:37 PM

COMPUTER FOLIO REFERENCE

223/551260

EDITION No. & DATE OF CURRENT CERTIFICATE OF TITLE

1

17/2/1994

Page 1

LAND

LOT 223 IN DEPOSITED PLAN 551260

AT CHARLESTOWN

LOCAL GOVERNMENT AREA: LAKE MACQUARIE

PARISH OF KAHIBAH COUNTY OF NORTHUMBERLAND

TITLE DIAGRAM: DP551260

FIRST SCHEDULE

THE MINISTER FOR EDUCATION

SECOND SCHEDULE (4 NOTIFICATIONS)

1. EXCEPTING THE DRAINAGE RESERVE SHOWN IN DP551260
2. LAND EXCLUDES MINERALS (S.141 PUBLIC WORKS ACT, 1912)
3. T952800 PART OF THE LAND WITHIN DESCRIBED BEING LOT 1 IN DP46759 IS
NOW PUBLIC ROAD EX LAND BELOW A DEPTH OF 20 METRES FROM THE SURFACE
4. DP648824 EASEMENT TO DRAIN WATER 3.6 WIDE AND VARIABLE AFFECTING
THE PART(S) SHOWN SO BURDENED IN DP648824

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

doccop4

PRINTED ON 4/2/2004 B20

The Registrar General certifies that at the date and time specified above the person(s) described in the First Schedule is/are the registered proprietor of an estate in fee simple (or other such estate or interest set out in the Schedule) in the land described, subject to any exceptions, encumbrances, interests, and entries which appear in the Second Schedule.

ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE
WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER.



Registrar General

HISTORICAL TITLE SEARCH

Certificate issued under Section 96G
of the Real Property Act 1900

No. B20

Search certified to: 4/2/2004 3:37PM

Computer Folio Reference: 223/551260

Page 1

First Title(s): SEE PRIOR TITLE(S)

Prior Title(s): VOL 11765 FOL 132

Recorded	Number	Type of Instrument	C.T. Issue
-----	-----	-----	-----
28/3/1988		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
12/9/1988		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
17/2/1994	DP648824	DEPOSITED PLAN	EDITION 1

*** END OF SEARCH ***

doccop4

PRINTED ON 4/2/2004 B20

The Registrar General certifies that at the date and time specified above the information set out in this search constitutes the historical record of all dealings recorded in or action taken in respect of the mentioned title which is required to be kept by the Registrar General under section 32(7) of the Real Property Act 1900.



Registrar General

00559

B20

/Req:K922845 /CT 11765-132

NEW SOUTH WALES

STATE OF TITLE
PROPERTY ACT, 1900

Vol. 11765 Fol. 132

Appin. No. 48652

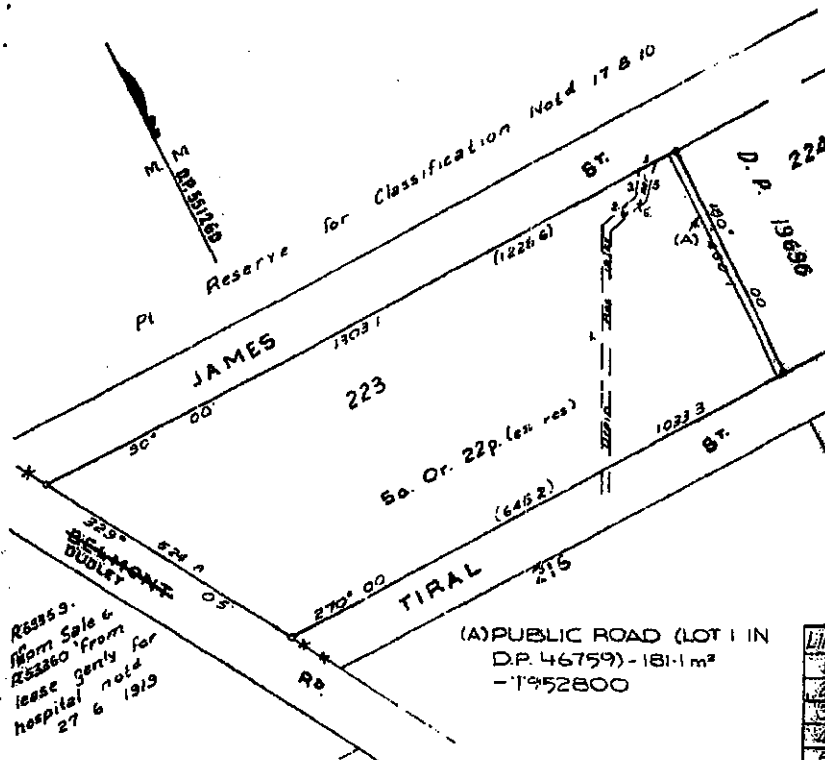


Edition Issued 28-1-1977

I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions (Easements and interests as are shown in the Second Schedule.

CANCELLED

Registrar General.

PLAN SHOWING LOCATION OF LAND**SEE AUTO FILE**

(A) PUBLIC ROAD (LOT 1 IN
D.P. 46759) - 181.1 m²
- 1952800

Line	Party	Area
1	223	223
2	224	224
3	225	225
4	226	226
5	227	227
6	228	228

ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Portion 223 as shown in Deposited Plan 551260 at Charlestown in the Shire of Lake Macquarie Parish of Kajibah and County of Northumberland being Land for which no Crown Grant has issued. EXCEPTING THEREOUT the drainage reserve shown in the plan hereon and the minerals specified in Section 141 Public Works Act, 1912.

FIRST SCHEDULE

THE MINISTER FOR EDUCATION.

SECOND SCHEDULE

NIL

Lawson
Registrar General

XC
GRN

REGISTERED PROPRIETOR

CANCELLED

THE NEW YORK PUBLIC LIBRARY

SECOND SCHEDULE (continued)				
NATURE	INSTRUMENT NUMBER	DATE	PARTICULARS	
19-2-2000	19-2-2000	21-2-1992	Re-survey. The land so indicated in the plan hereon being lot 1 in D446799 exclusive of the surface is now public road. Registered 13-3-1994.	ENTERED 2-8-1992 SIGNATURE OF REGISTER CONTROLLER <i>[Signature]</i> CANCELLATION R046687

Crown Instrument not liable to Stamp
or payment of Registration or other fees.

48652

R. J. McKAY
Crown Solicitor

48652

2/1/72

REAL PROPERTY ACT, 1900
APPLICATION UNDER SECTION 31A(2)(a)

The Registrar General,
SYDNEY

The parcel of land described in the Schedule hereto excluding all such mines and deposits thereunder as are mentioned in Section 141 of the Public Works Act, 1912, as amended, was resumed under the provisions of the Public Works Act, 1912, as amended for the purposes of a Technical College at Charlestown by Notification (a copy of which is hereto annexed) published in the Government Gazette of the First day of November 1963 and was vested in the MINISTER FOR EDUCATION as Constructing Authority on behalf of Her Majesty the Queen, not being under the provisions of the Real Property Act, 1900, application is hereby made in pursuance of Section 31A(2)(a) of the Real Property Act, 1900, for the issue to THE MINISTER FOR EDUCATION of a Certificate of Title under the provisions of the lastmentioned Act in respect of the said land excluding such mines and deposits as are the said land as aforesaid.

DATED at SYDNEY this 20th day of September 1972

SCHEDULE

ALL THAT piece or parcel of land having an area of 5 acres 0 roods and 22 perches situate in the Shire of Lake Macquarie, Parish of Kahibah and County of Northumberland and being Portion 223 shown on Deposited Plan No. 551260.

SIGNED by RAYMOND JAMES MCKAY
State Crown Solicitor, by
ERIC NORMAN McFARLANE, State
Crown Solicitor's Office, who
is personally known to me:

R. J. McKAY
State Crown Solicitor

Eric Norman McFarlane

Patricia J. Byrne

Cert. of T. issued Vol. 117654, 132
Dated 1 FEB 1972

[Published in Government Gazette No. 106 of 1st
November, 1963.]

**TECHNICAL EDUCATION AND UNIVERSITY OF NEW
SOUTH WALES ACT, 1949-1958.—PUBLIC WORKS
ACT, 1912, AS AMENDED**

ACQUISITION OF LAND

Technical College at Charlestown

IN pursuance of the provisions of section 49 of the Technical Education and University of New South Wales Act, 1949-1958, it is hereby notified and declared by His Excellency the Governor, acting with the advice of the Executive Council, that so much of the land described in the Schedule hereto as is Crown land is hereby appropriated, and so much of the said land as is private property is hereby resumed under the Public Works Act, 1912, as amended, for the purpose of a Technical College at CHARLESTOWN, and that the said land is vested in the Minister for Education as Constructing Authority on behalf of Her Majesty the Queen.

Dated at Sydney, this sixteenth day of October, one thousand nine hundred and sixty-three.

E. W. WOODWARD, Governor.

By His Excellency's Command.

ERN WETHERELL, Minister for Education.

THE SCHEDULE

All that piece of land being portion 223, parish of Kaituma, county of Northumberland, having an area of 5 acres 0 roods 22 perches, and being the land within Suburban Holding 1923-14, Land District of Newcastle, held by Gordon Bowden and William James Schadel. (3167)

Sydney: V. C. M. Blight, Crown

NO TENURE
CARD AVAILABLE
FOR THIS HOLDING.

This is the Notification referred to in the Application by THE
STATE CROWN SOLICITOR hereunto annexed dated the 24th
day of September 1971

[Signature]

budget by State Crown Solicitor
Goodsall Building
2-11 Chifley Square
Sydney
20365

[Handwritten notes:]

Post Jack Co. ref.
18/0008/3500
The...
2nd...
...
...

County of Northumberland Parish of Kahibah

LAND DISTRICT OF Newcastle

LAND BOARD DISTRICT OF Maitland

Occupation License N°:

Holding. Eastern Division.

Applied for under the ^(25A) *Section of the Crown Lands Consolidation Act 1923 by* ^(25B) *the*

[illegible]

Por No do CX No de

Approved and forwarded by the Director, 10/4/42 KDS:59.123. Areas boundaries amended.
Approved for Technical Village at the 25th Ave. 11/1/43.

50

300 300

From	pt	Reserve	for	Ch...	:

~~Newcast~~
 NEWCAST
 17. 8. 10
 CLASSIFICATION
 No. 4

R. 53359 from Sale

ROAD

329°

1303.1 (1228.2)

2722

2722

R. 53360 from Lease 2nd

for Hospital

Notified 27th June 1919.

10° 00' 22.48" N
90° 00' 22.48" W

(65-5-2) miles for Urain

T.J. McCarthy

216

John Searant

100a5L00347

B20

/Req:K933640

/CP 06054-2111

CL	LINKS	METRES
	0.1	0.020
	10	2.012
	29.7	5.975
	90.4	18.186
	95.1	19.131
	95.2	19.151
	100	20.117
	124.5	25.045
	145.6	29.290
	269	54.114
	284	57.132
	319.9	64.354



CONVERSION TABLE ADDED IN
DEPARTMENT OF LANDS

CL	LINKS	METRES
	0.1	0.020
	5	1.006
	19.4	3.903
	29.7	5.975
	33.2	6.679
	36.7	7.383
	46.2	9.294
	72.5	14.585
	86.2	17.341
	89.6	18.025
	160	20.117
	145.6	20.117



CONVERSION TABLE ADDED
DEPARTMENT OF LANDS

CL	LINKS	METRE
	0.1	0.02
	36.7	7.38
	50	10.05
	60.4	12.15
	95.2	19.15
	95.3	19.17
	100	20.11
	102.8	20.68
	115.7	23.27
	405.3	81.53
	500	100.58

N08951/01-AC
24 March 2004

APPENDIX B

Results of Laboratory Analysis

Coffey 



CERTIFICATE OF ANALYSIS

CONTACT: MS KATE LYNG
CLIENT: COFFEY GEOSCIENCES PTY LTD
ADDRESS:
13 MANGROVE ROAD
SANDGATE NSW 2304
ORDER No.: 56984
PROJECT: N08951/1

BATCH: NE13324
SUB BATCH: 0
LABORATORY: NEWCASTLE
DATE RECEIVED: 24/02/2004
DATE COMPLETED: 08/03/2004
SAMPLE TYPE: SOIL
No. of SAMPLES: 4

COMMENTS

Samples as received digested by USEPA method 200.2 (modified) prior to the determination of metals. Results reported on a dry weight basis.

All analysis and Laboratory QC conducted in accordance with Schedule B(3) NEPM Guideline on Laboratory Analysis of Potentially Contaminated Soil (December 1999). Analysis conducted by ALS Sydney, NATA Site No. 10911.

NOTES

This is the Final Report and supersedes any preliminary reports with this batch number. All pages of this report have been checked and approved for release.

ISSUING LABORATORY: NEWCASTLE

Address
5 Rosegum Close
WARABROOK NSW 2304

Phone: 61-2-4968 9433
Fax: 61-2-4968 0349
Email: ken.reid@alsenviro.com

Signatory

LABORATORIES

AUSTRALASIA

Brisbane
Melbourne
Sydney
Newcastle
Auckland
Hong Kong
Singapore
Kuala Lumpur
Bogor
Mumbai

AMERICAS

Vancouver
Santiago
Antofagasta
Lima



NATA Accredited Laboratory Number 825
Site: NEWCASTLE

This laboratory is accredited by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its scope of accreditation. This document shall not be reproduced, except in full.

Batch: NE13324
Sub Batch: 0
Date of Issue: 08/03/2004
Client: COFFEY GEOSCIENCES PTY LTD
Client Reference: N08951/1

CERTIFICATE OF ANALYSIS



METHOD	ANALYSIS DESCRIPTION	Laboratory I.D.		SAMPLE IDENTIFICATION			
		UNIT	LOR	1	2	3	4
				Date Sampled			
EA-055	Moisture Content (dried @ 103°C)	%	0.1	S1	S2	S3	S4
EG-005T	Arsenic - Total	mg/kg	1	26.9	11.6	11.7	8.6
EG-005T	Cadmium - Total	mg/kg	1	29	30	11	1
EG-005T	Chromium - Total	mg/kg	1	<1	<1	<1	<1
EG-005T	Copper - Total	mg/kg	1	4	10	9	12
EG-005T	Nickel - Total	mg/kg	1	7	14	9	20
EG-005T	Lead - Total	mg/kg	1	4	6	5	5
EG-005T	Zinc - Total	mg/kg	1	35	33	11	23
EG-035T	Mercury - Total	mg/kg	0.1	138	148	21	172
				0.2	0.7	0.9	<0.1

Batch: NE13324
 Sub Batch: 0
 Date of Issue: 08/03/2004
 Client: COFFEY GEOSCIENCES PTY LTD
 Client Reference: N08951/1

QUALITY CONTROL REPORT



SAMPLE IDENTIFICATION				
Laboratory I.D.		200	201	202
Date Sampled		24/02/2004	24/02/2004	24/02/2004
METHOD		METHOD	LCS	IMS
ANALYSIS DESCRIPTION		BLANK		
CHECKS AND SPIKES				
		UNIT	LOR	
EA-055	Moisture Content (dried @ 103°C)	%	0.1	
EG-005T	Arsenic - Total	mg/kg	1	94.0%
EG-005T	Cadmium - Total	mg/kg	1	87.0%
EG-005T	Chromium - Total	mg/kg	1	90.0%
EG-005T	Copper - Total	mg/kg	1	84.0%
EG-005T	Nickel - Total	mg/kg	1	87.0%
EG-005T	Lead - Total	mg/kg	1	86.0%
EG-005T	Zinc - Total	mg/kg	1	85.0%
EG-035T	Mercury - Total	mg/kg	0.1	103%



CERTIFICATE OF ANALYSIS

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13 MANGROVE ROAD
SANDGATE NSW 2304
ORDER No.: 56984
PROJECT: N08951/1

BATCH: NE13324
SUB BATCH: 1
LABORATORY: NEWCASTLE
DATE RECEIVED: 24/02/2004
DATE COMPLETED: 08/03/2004
SAMPLE TYPE: SOIL
No. of SAMPLES: 4

COMMENTS

Samples analysed on an as received basis. Results reported on a dry weight basis. All analysis and Laboratory QC conducted in accordance with Schedule B(3) NEPM Guideline on Laboratory Analysis of Potentially Contaminated Soil (December 1999). Analysis conducted by ALS Sydney, NATA Site No. 10911.

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Signatory

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Client Reference: N08951/1

CERTIFICATE OF ANALYSIS



METHOD	ANALYSIS DESCRIPTION	Laboratory I.D.		SAMPLE IDENTIFICATION			
		Date Sampled					
		UNIT	LOR	1	2	3	4
EA-055	Moisture Content (dried @ 103°C)	%	0.1	26.9	11.6	11.7	8.6
EP-068A-SS	ORGANOCHLORINE PESTICIDES						
EP-068A-SS	alpha-BHC	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068A-SS	HCB	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068A-SS	beta-BHC & gamma-BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
EP-068A-SS	delta-BHC	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068A-SS	Heptachlor	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068A-SS	Aldrin	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068A-SS	Heptachlor epoxide	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068A-SS	Chlordane - trans	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068A-SS	Endosulfan 1	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068A-SS	Chlordane - cis	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068A-SS	Dieldrin	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068A-SS	DDE	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068A-SS	Endrin	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068A-SS	Endosulfan 2	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068A-SS	DDD	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068A-SS	Endrin aldehyde	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068A-SS	Endosulfan sulfate	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068A-SS	DDT	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
EP-068A-SS	Endrin ketone	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068A-SS	Methoxychlor	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
EP-068B-SS	ORGANOPHOSPHORUS PESTICIDES						
EP-068B-SS	Dichlorvos	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068B-SS	Demeton-S-methyl	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068B-SS	Monocrotophos	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
EP-068B-SS	Dimethoate	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068B-SS	Diazinon	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068B-SS	Chlorpyrifos-methyl	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068B-SS	Parathion-methyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
EP-068B-SS	Malathion	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068B-SS	Fenthion	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068B-SS	Chlorpyrifos	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-068B-SS	Parathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2

Batch: NE13324
Sub Batch: 1
Date of Issue: 08/03/2004
Client: COFFEY GEOSCIENCES PTY LTD
Client Reference: N08951/1

CERTIFICATE OF ANALYSIS



METHOD	ANALYSIS DESCRIPTION	Laboratory I.D.		SAMPLE IDENTIFICATION			
		Date Sampled	LOR	1	2	3	4
		UNIT		S1	S2	S3	S4
EP-0688-SS	Phosphos-ethyl	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-0688-SS	Chlorfenvinphos E	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-0688-SS	Chlorfenvinphos Z	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-0688-SS	Bromophos-ethyl	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-0688-SS	Fenamiphos	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-0688-SS	Prothiofos	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-0688-SS	Ethion	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-0688-SS	Carbophenothion	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-0688-SS	Azinphos-methyl	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-0688-SS	ORGANOCHLORINE PESTICIDE SURROGATE	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05
EP-0688-SS	Dibromo-DDE	%	1	68	74	85	73
EP-0688-SS	ORGANOPHOSPHORUS PESTICIDE SURROGATE	%	1	83	97	115	84
EP-0688-SS	DEF	%					

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Client Reference: N08951/1

QUALITY CONTROL REPORT



METHOD	ANALYSIS DESCRIPTION	Laboratory I.D.		SAMPLE IDENTIFICATION						CHECKS AND SPIKES	
		UNIT	LOR	100	101	102	103	104			
				24/02/2004	24/02/2004	24/02/2004	24/02/2004	24/02/2004			
				METHOD	SCS	DCS	MS	MSD			
				BLANK	NOCOPS1593	NOCOPS1593	NOCOPS1593	NOCOPS1593			
EA-055	Moisture Content (dried @ 103°C)	%	0.1								
EP-068A-SS	ORGANOCHLORINE PESTICIDES										
EP-068A-SS	alpha-BHC	mg/kg	0.05	<0.05	103%	82.3%	---	---	---		
EP-068A-SS	HCB	mg/kg	0.05	<0.05	80.6%	65.5%	---	---	---		
EP-068A-SS	beta-BHC & gamma-BHC	mg/kg	0.1	<0.1	107%	105%	94.4%	85.2%	---		
EP-068A-SS	delta-BHC	mg/kg	0.05	<0.05	95.2%	101%	---	---	---		
EP-068A-SS	Heptachlor	mg/kg	0.05	<0.05	96.1%	97.9%	---	---	---		
EP-068A-SS	Aldrin	mg/kg	0.05	<0.05	96.9%	103%	91.4%	73.4%	---		
EP-068A-SS	Heptachlor epoxide	mg/kg	0.05	<0.05	95.7%	103%	71.6%	75.2%	---		
EP-068A-SS	Chlordane - trans	mg/kg	0.05	<0.05	97.8%	103%	---	---	---		
EP-068A-SS	Endosulfan 1	mg/kg	0.05	<0.05	88.5%	93.7%	---	---	---		
EP-068A-SS	Chlordane - cis	mg/kg	0.05	<0.05	95.0%	90.1%	---	---	---		
EP-068A-SS	Dieldrin	mg/kg	0.05	<0.05	95.9%	106%	87.8%	79.2%	---		
EP-068A-SS	DDE	mg/kg	0.05	<0.05	96.4%	102%	---	---	---		
EP-068A-SS	Endrin	mg/kg	0.05	<0.05	98.1%	109%	120%	109%	---		
EP-068A-SS	Endosulfan 2	mg/kg	0.05	<0.05	96.0%	108%	---	---	---		
EP-068A-SS	DDD	mg/kg	0.05	<0.05	95.5%	105%	---	---	---		
EP-068A-SS	Endrin aldehyde	mg/kg	0.05	<0.05	81.1%	89.9%	---	---	---		
EP-068A-SS	Endosulfan sulfate	mg/kg	0.05	<0.05	99.8%	111%	---	---	---		
EP-068A-SS	DDT	mg/kg	0.2	<0.2	97.0%	103%	93.5%	89.8%	---		
EP-068A-SS	Endrin ketone	mg/kg	0.05	<0.05	97.2%	106%	---	---	---		
EP-068A-SS	Methoxychlor	mg/kg	0.2	<0.2	122%	87.7%	---	---	---		
EP-068B-SS	ORGANOPHOSPHORUS PESTICIDES										
EP-068B-SS	Dichlorvos	mg/kg	0.05	<0.05	96.5%	82.8%	---	---	---		
EP-068B-SS	Demeton-S-methyl	mg/kg	0.05	<0.05	97.2%	86.3%	---	---	---		
EP-068B-SS	Monocrotophos	mg/kg	0.2	<0.2	115%	109%	---	---	---		
EP-068B-SS	Dimethoate	mg/kg	0.05	<0.05	105%	90.8%	---	---	---		
EP-068B-SS	Diazinon	mg/kg	0.05	<0.05	92.9%	91.4%	110%	93.6%	---		
EP-068B-SS	Chlorpyrifos-methyl	mg/kg	0.05	<0.05	96.1%	96.4%	102%	87.8%	---		
EP-068B-SS	Parathion-methyl	mg/kg	0.2	<0.2	94.1%	95.6%	---	---	---		
EP-068B-SS	Malathion	mg/kg	0.05	<0.05	98.9%	98.8%	---	---	---		
EP-068B-SS	Fenthion	mg/kg	0.05	<0.05	93.5%	97.9%	---	---	---		

Batch: NE13324
Sub Batch: 1
Date of Issue: 08/03/2004
Client: COFFEY GEOSCIENCES PTY LTD
Client Reference: N08951/1

QUALITY CONTROL REPORT



Laboratory I.D.		SAMPLE IDENTIFICATION					
Date Sampled		100	101	102	103	104	
METHOD		24/02/2004	24/02/2004	24/02/2004	24/02/2004	24/02/2004	
ANALYSIS DESCRIPTION		METHOD	SCS	DCS	MS	MSD	
UNIT		LOR	CHECKS AND SPIKES				
EP-068B-SS	Chlorpyrifos	mg/kg	0.05	<0.05	95.8%	95.2%	—
EP-068B-SS	Parathion	mg/kg	0.2	<0.2	88.9%	86.7%	—
EP-068B-SS	Phosphor-ethyl	mg/kg	0.05	<0.05	95.6%	99.3%	81.4%
EP-068B-SS	Chlorfenvirphos E	mg/kg	0.05	<0.05	---	---	---
EP-068B-SS	Chlorfenvirphos Z	mg/kg	0.05	<0.05	97.9%	105%	---
EP-068B-SS	Bromophos-ethyl	mg/kg	0.05	<0.05	96.0%	104%	63.6%
EP-068B-SS	Fenamiphos	mg/kg	0.05	<0.05	102%	---	---
EP-068B-SS	Prothiofos	mg/kg	0.05	<0.05	94.9%	88.5%	---
EP-068B-SS	Ethion	mg/kg	0.05	<0.05	90.2%	99.2%	74.8%
EP-068B-SS	Carbophenothion	mg/kg	0.05	<0.05	97.4%	94.7%	---
EP-068B-SS	Azinphos-methyl	mg/kg	0.05	<0.05	123%	107%	---
EP-068S-SS	ORGANOCHLORINE PESTICIDE SURROGATE	%	1	126	118	82	58
EP-068T-SS	Dibromo-DDE	%	1	121	113	81	60
EP-068T-SS	ORGANOPHOSPHORUS PESTICIDE SURROGATE	%	1	121	113	81	60
EP-068T-SS	DEF	%	1	121	113	81	60

**ORGANICS QUALITY CONTROL REPORT****BATCH NO:** NE13324**DATE BATCH RECEIVED:** 25/02/2004**CLIENT:** Coffey Geosciences Pty Ltd**DATE BATCH COMPLETED:** 06/03/2004**PROJECT:** n08951/1

Method Code	Test	Matrix	Method Reference		QC Lot Number	Date Samples Extracted	Date Samples Analysed
			Extraction	Analysis			
EP-068	Pesticides	Soil	Tumbler	USEPA 8270B	NOCOPS1593	27/02/04	01/03/04

Where applicable, internal standards are added to sample extracts prior to instrumental analysis. Absolute peak areas and retention times fall within the criteria specified in the individual methods. Continuing Calibration (CC) standards are run at the frequency of 1 in every 20 samples.

Abbreviations: SV = semivolatile, V = volatile

*: In-house methods

BATCH QUALITY CONTROL -- CONTROL SPIKE/DUPLICATE									
ALS EP-068 : Pesticides									
QC LOT No. :		NOCOPS1593				ANALYST ALICE TAT			
MATRIX:		Soils							
COMPOUND	Blank Conc	Spike Level	SPIKE QC RESULTS				Control Limits		
			SCS Rec.	DCS Rec.	Average Rec.	RPD	Rec.		RPD
	mg/kg	mg/kg	%		%	%	Low	High	%
EP068A : OC Pesticides									
a-BHC	<0.025	0.25	103	82.3	92.7	22.3 *	81.5	110	0 - 20
HCB	<0.025	0.25	80.8	65.5	73.1	20.7 *	73	111	0 - 20
b- & g-BHC	<0.05	0.5	107	105	106	1.89	80.5	114	0 - 20
d-BHC	<0.025	0.25	95.2	101	98.1	5.91	78.6	110	0 - 20
Heptachlor	<0.025	0.25	96.1	97.9	97	1.86	77.2	111	0 - 20
Aldrin	<0.025	0.25	96.9	103	100	6.1	79.2	108	0 - 20
Heptachlor epoxide	<0.025	0.25	95.7	103	99.4	7.35	81.9	105	0 - 20
Chlordane peak no 1	<0.025	0.25	97.8	103	100	5.18	80.7	105	0 - 20
Endosulfan 1	<0.025	0.25	88.5	93.7	91.1	5.71	74.5	107	0 - 20
Chlordane peak no. 2	<0.025	0.25	95	90.1	92.6	5.29	75.9	108	0 - 20
Dieldrin	<0.025	0.25	95.9	105	100	9.06	82	104	0 - 20
DDE	<0.025	0.25	96.4	102	99.2	5.65	78.1	106	0 - 20
Endrin	<0.025	0.25	98.1	109	104	10.5	71.9	112	0 - 20
Endosulfan 2	<0.025	0.25	96	108	102	11.8	74.2	107	0 - 20
DDD	<0.025	0.25	95.5	105	100	9.48	70.9	106	0 - 20
Endrin aldehyde	<0.025	0.25	81.1	89.9	85.5	10.3	76.8	107	1 - 20
Endosulfan sulfate	<0.025	0.25	99.8	111	105	10.6	76.7	108	0 - 20
DDT	<0.1	0.25	97	103	100	6	69.3	122	0 - 20
Endrin ketone	<0.025	0.25	97.2	106	102	8.66	70.5	117	0 - 20
Methoxychlor	<0.1	0.25	122	87.7	105	32.7 *	59	128	0 - 20
EP068B : OP Pesticides									
Dichlorvos	<0.025	0.25	96.5	82.8	89.7	15.3	72.7	99.2	0 - 20
Demeton-s-methyl	<0.025	0.25	97.2	86.3	91.8 *	11.9	28.5	85.7	0 - 20
Monocrotophos	<0.1	0.25	115	109	112	5.36	0	157	0 - 20
Dimethoate	<0.025	0.25	105	90.8	97.9	14.5	70	117	0 - 20
Diazinon	<0.025	0.25	92.9	91.4	92.2	1.63	78.5	105	0 - 20
Chlorpyrifos methyl	<0.025	0.25	96.1	96.4	96.3	0.31	79.9	105	0 - 20
Parathion methyl	<0.1	0.25	94.1	95.6	94.9	1.58	69.1	111	0 - 20
Malathion	<0.025	0.25	98.9	98.8	98.9	0.1	78.3	108	0 - 20
Fenthion	<0.025	0.25	93.5	97.9	95.7	4.6	89	112	0 - 20
Chlorpyrifos	<0.025	0.25	95.8	95.2	95.5	0.63	79.3	106	0 - 20
Parathion	<0.1	0.25	88.9	86.7	87.8	2.51	79.2	106	0 - 20
Pirimphos ethyl	<0.025	0.25	95.6	99.3	97.5	3.8	74.4	102	0 - 20
Chlorfenvinphos Z	<0.025	0.25	97.9	105	101	7	75	107	0 - 20
Bromophos ethyl	<0.025	0.25	96	104	100 *	8	106	138	0 - 20
Fenamiphos	<0.025	0.25	102	88.5	95.3	14.2	60.4	111	0 - 20
Prothiofos	<0.025	0.25	94.9	99.2	97.1	4.43	75.6	104	0 - 20
Ethion	<0.025	0.25	90.2	94.7	92.5	4.87	46.7	134	0 - 20
Carbofenthion	<0.025	0.25	97.4	107	102	9.39	68.4	110	0 - 20
Azinphos methyl	<0.025	0.25	123	94	109	26.7 *	29	122	0 - 20

BATCH QUALITY CONTROL -- CONTROL SPIKE/DUPLICATE									
ALS EP-068 : Pesticides									
QC LOT No. :		NOCOPS1593				ANALYST ALICE TAT			
MATRIX:		Soils							
COMPOUND	Blank Conc	Spike Level	SPIKE QC RESULTS				Control Limits		
			SCS Rec.	DCS Rec.	Average Rec.	RPD	Rec.		RPD
	mg/kg	mg/kg	%		%	%	Low	High	%
EP068C : Triazines									
Simazine	<0.025	0.25	95.9	89.9	82.9	31.4 *	59.2	129	0 - 20
Atrazine	<0.025	0.25	82	70.6	76.3	14.9	52.3	123	0 - 20
EP068D : Pyrethroids									
Cypermethrins(multi peaks)	<0.1	0.25	122	105	114	15	68.9	115	0 - 20
EP068S : OC Surrogate									
Dibromo-DDE	126%	0.5	118	81.9	100	36.1 *	56.5	124	0 - 20
EP068T : OP Surrogate									
DEF	121%	0.5	113	81.4	97.2	32.5 *	46.4	136	0 - 20

COMMENTS:

- 1) The recovery control limits are based on ALS laboratory statistical data. (Method QWI-ORG/07)
- 2) The control limits on RPD (relative percent deviation) are fixed.
- 3) * : Recovery or RPD falls outside of the recommended control limits.

BATCH QUALITY CONTROL -- DUPLICATE

ALS EP-068 : Pesticides

QC LOT No. : NOCOPS1593
 MATRIX : Soils
 ANALYST: ALICE TAT

COMPOUND	LOR mg/kg	QC DUPLICATE RESULTS			
		ES45604	ES45604	RPD	Cont. Limit
		8 mg/kg	8D mg/kg		%
EP068A : OC Pesticides					
a-BHC	0.025	<0.025	<0.025	n/a	
HCB	0.025	<0.025	<0.025	n/a	
b- & g-BHC	0.05	<0.05	<0.05	n/a	
d-BHC	0.025	<0.025	<0.025	n/a	
Heptachlor	0.025	<0.025	<0.025	n/a	
Aldrin	0.025	<0.025	<0.025	n/a	
Heptachlor epoxide	0.025	<0.025	<0.025	n/a	
Chlordane peak no 1	0.025	<0.025	<0.025	n/a	
Endosulfan 1	0.025	<0.025	<0.025	n/a	
Chlordane peak no. 2	0.025	<0.025	<0.025	n/a	
Dieldrin	0.025	<0.025	<0.025	n/a	
DDE	0.025	<0.025	<0.025	n/a	
Endrin	0.025	<0.025	<0.025	n/a	
Endosulfan 2	0.025	<0.025	<0.025	n/a	
DDD	0.025	<0.025	<0.025	n/a	
Endrin aldehyde	0.025	<0.025	<0.025	n/a	
Endosulfan sulfate	0.025	<0.025	<0.025	n/a	
DDT	0.1	<0.1	<0.1	n/a	
Endrin ketone	0.025	<0.025	<0.025	n/a	
Methoxychlor	0.1	<0.1	<0.1	n/a	
EP068B : OP Pesticides					
Dichlorvos	0.025	<0.025	<0.025	n/a	
Demeton-s-methyl	0.025	<0.025	<0.025	n/a	
Monocrotophos	0.1	<0.1	<0.1	n/a	
Dimethoate	0.025	<0.025	<0.025	n/a	
Diazinon	0.025	<0.025	<0.025	n/a	
Chlorpyrifos methyl	0.025	<0.025	<0.025	n/a	
Parathion methyl	0.1	<0.1	<0.1	n/a	
Malathion	0.025	<0.025	<0.025	n/a	
Fenthion	0.025	<0.025	<0.025	n/a	
Chlorpyrifos	0.025	<0.025	<0.025	n/a	
Parathion	0.1	<0.1	<0.1	n/a	
Pirimphos ethyl	0.025	<0.025	<0.025	n/a	
Chlorfenvinphos E	0.025	<0.025	<0.025	n/a	
Chlorfenvinphos Z	0.025	<0.025	<0.025	n/a	
Bromophos ethyl	0.025	<0.025	<0.025	n/a	
Fenamiphos	0.025	<0.025	<0.025	n/a	
Prothiofos	0.025	<0.025	<0.025	n/a	
Ethion	0.025	<0.025	<0.025	n/a	
Carbofenthion	0.025	<0.025	<0.025	n/a	
Azinphos methyl	0.025	<0.025	<0.025	n/a	

BATCH QUALITY CONTROL -- DUPLICATE					
ALS EP-068 : Pesticides					
QC LOT No. :		NOCOPS1593			
MATRIX :		Soils			
ANALYST:		ALICE TAT			
COMPOUND		QC DUPLICATE RESULTS			
		ES45604	ES45604	RPD	Cont. Limit
		8	8D		
LOR					
mg/kg		mg/kg	mg/kg		%
EP068C: Triazines					
Simazine	0.025	<0.025	<0.025	n/a	
Atrazine	0.025	<0.025	<0.025	n/a	
EP068D: Pyrethroids					
Cypermethrins(multipeaks)	0.1	<0.1	<0.1	n/a	
EP068S: OC Surrogate					
Dibromo-DDE	1%	88%	105%	17.6	0 - 20
EP068T: OP Surrogate					
DEF	1%	86%	103%	18	0 - 20

Note: The permitted range for RPD (relative percent deviation) is specified in ALS Method QWI-EN/38 and is dependent on the magnitude of results in comparison to the level of reporting:

Result < 10 times LOR, no limit.

Result between 10 and 20 times LOR, 0% - 50%.

Results > 20 times LOR, 0% - 20%.

BATCH QUALITY CONTROL -- DUPLICATE					
ALS EP-068 : Pesticides					
QC LOT No. :		NOCOPS1593			
MATRIX :		Soils			
ANALYST:		ALICE TAT			
COMPOUND	LOR mg/kg	QC DUPLICATE RESULTS			
		ES45604	ES45604	RPD	Cont. Limit
		9 mg/kg	9D mg/kg		%
EP068A : OC Pesticides					
a-BHC	0.025	<0.025	<0.025	n/a	
HCB	0.025	<0.025	<0.025	n/a	
b- & g-BHC	0.05	<0.05	<0.05	n/a	
d-BHC	0.025	<0.025	<0.025	n/a	
Heptachlor	0.025	<0.025	<0.025	n/a	
Aldrin	0.025	<0.025	<0.025	n/a	
Heptachlor epoxide	0.025	<0.025	<0.025	n/a	
Chlordane peak no 1	0.025	<0.025	<0.025	n/a	
Endosulfan 1	0.025	3.53	3.78	6.84	0 - 20
Chlordane peak no. 2	0.025	<0.025	<0.025	n/a	
Dieldrin	0.025	<0.025	<0.025	n/a	
DDE	0.025	<0.025	<0.025	n/a	
Endrin	0.025	0.0745	0.108	36.7	No limit
Endosulfan 2	0.025	2.71	2.91	7.12	0 - 20
DDD	0.025	<0.025	<0.025	n/a	
Endrin aldehyde	0.025	<0.025	<0.025	n/a	
Endosulfan sulfate	0.025	0.074	0.092	21.7	No limit
DDT	0.1	<0.1	<0.1	n/a	
Endrin ketone	0.025	<0.025	<0.025	n/a	
Methoxychlor	0.1	<0.1	<0.1	n/a	
EP068B : OP Pesticides					
Dichlorvos	0.025	<0.025	<0.025	n/a	
Demeton-s-methyl	0.025	<0.025	<0.025	n/a	
Monocrotophos	0.1	<0.1	<0.1	n/a	
Dimethoate	0.025	<0.025	<0.025	n/a	
Diazinon	0.025	<0.025	<0.025	n/a	
Chlorpyrifos methyl	0.025	<0.025	<0.025	n/a	
Parathion methyl	0.1	<0.1	<0.1	n/a	
Malathion	0.025	<0.025	<0.025	n/a	
Fenthion	0.025	<0.025	<0.025	n/a	
Chlorpyrifos	0.025	1.37	1.47	7.04	0 - 20
Parathion	0.1	<0.1	<0.1	n/a	
Pirimphos ethyl	0.025	<0.025	<0.025	n/a	
Chlorfenvinphos E	0.025	<0.025	<0.025	n/a	
Chlorfenvinphos Z	0.025	<0.025	<0.025	n/a	
Bromophos ethyl	0.025	<0.025	<0.025	n/a	
Fenamiphos	0.025	<0.025	<0.025	n/a	
Prothiofos	0.025	<0.025	<0.025	n/a	
Ethion	0.025	0.297	0.344	14.7	0 - 50
Carbofenthion	0.025	<0.025	<0.025	n/a	
Azinphos methyl	0.025	<0.025	<0.025	n/a	

BATCH QUALITY CONTROL -- DUPLICATE					
ALS EP-068 : Pesticides					
QC LOT No. :		NOCOPS1593			
MATRIX :		Soils			
ANALYST:		ALICE TAT			
COMPOUND	LOR mg/kg	QC DUPLICATE RESULTS			
		ES45604	ES45604	RPD	Cont. Limit
		g	gD		
		mg/kg	mg/kg		%
EP068C : Triazines					
Simazine	0.025	<0.025	<0.025	n/a	
Atrazine	0.025	<0.025	<0.025	n/a	
EP068D : Pyrethroids					
Cypermethrins(multipeaks)	0.1	<0.1	<0.1	n/a	
EP068S : OC Surrogate					
Dibromo-DDE	1%	126%	120%	4.88	0 - 20
EP068T : OP Surrogate					
DEF	1%	125%	123%	1.61	0 - 20

Note: The permitted range for RPD (relative percent deviation) is specified in ALS Method QWI-EN/38 and is dependent on the magnitude of results in comparison to the level of reporting:

Result < 10 times LOR, no limit.

Result between 10 and 20 times LOR, 0% - 50%.

Results > 20 times LOR, 0% - 20%.

BATCH QUALITY CONTROL -- MATRIX SPIKE/DUPLICATE							
ALS EP-068 : Semivolatile Organic Compounds							
QC LOT No. :		NOCOPS1593		ANALYST : ALICE TAT			
MATRIX:		Soils		Sample ID: ES45604-8			
COMPOUND	Sample Results	Spike Level	SPIKE QC RESULTS				Cont. Limit
			MS Rec.	MSD Rec.	Average Rec.	RPD	RPD
	mg/kg	mg/kg	%	%	%	%	%
EP068A : OC Pesticides							
b- & g-BHC	<0.05	0.25	94.4	85.2	89.8	10.2	0 - 20
Heptachlor	<0.025	0.25	81.4	73.4	82.4	21.8 *	0 - 20
Aldrin	<0.025	0.25	71.6	75.2	73.4	4.9	0 - 20
Dieldrin	<0.025	0.25	87.8	79.2	83.5	10.3	0 - 20
Endrin	<0.025	1	120	109	115	9.61	0 - 20
DDT	<0.1	1	93.5	89.8	91.7	4.04	0 - 20
EP068 : OP Pesticides							
Diazinon	<0.025	0.25	110	93.6	102	16.1	0 - 20
Chlorpyrifos methyl	<0.025	0.25	102	87.8	94.9	15	0 - 20
Pirimiphos ethyl	<0.025	0.25	92.8	81.4	87	12.9	0 - 20
Bromophos ethyl	<0.025	0.25	71.8	63.6	67.7	12.1	0 - 20
Prothiofos	<0.025	0.25	83	74.8	78.9	10.4	0 - 20
EP068S : OC Surrogate							
Dibromo-DDE	88%	0.5	88	58	63	15.9	0 - 20
EP068T : OP Surrogate							
DEF	86%	0.5	69	60	64.5	14	0 - 20

COMMENTS:

- 1) The RPD control limits are fixed.
- 2) *: RPD falls outside the recommended control limit.



Certificate of Analysis

LABORATORY REPORT NO: NE13347

CLIENT REFERENCE: -

CLIENT: Coffey Geosciences Pty Ltd (Sandgate)
13 Mangrove Road
SANDGATE NSW 2304

ATTENTION: Ms Kate Lyng

DATE REPORTED: 06/03/04

DATE RECEIVED: 26/02/04

TITLE: Lead and Asbestos Analysis

SAMPLES: 8 solid samples

Please find results for the above samples.

This report replaces Preliminary Report NE13347P1.

Sampled by Coffey Geosciences Pty Ltd (Sandgate), analysed as received.

Please do not hesitate to contact us if we can be of assistance.

Yours faithfully

Australian Laboratory Services Pty Ltd



NATA Accredited Laboratory
Number: 825 Site: Newcastle

This Laboratory is accredited by the National Association of Testing Authorities, Australia. The test(s) reported herein have been performed in accordance with its scope of accreditation. This document shall not be reproduced, except in full.


Authorising Chemist

Report No: NE13347

Client Reference: -

[illegible]

Lead analysis conducted by ALS Sydney, Site No. 10911.

Authorising Chemist:

Date 9/3/04

Page 2 of 4



AUSTRALIAN SAFER ENVIRONMENT & TECHNOLOGY PTY LTD

ABN 36 088 095 112

Our ref : ASET3689/ 5355 / 1 - 6
Your ref : NE13347
NATA Accreditation No: 14484

27 February 2004

Australian Laboratory Services Pty Ltd,
5, Rosegum Close,
Warabrook,
NSW 2304.

Fax No: 02-4968 0349
Attn: Mr. Ken Reid

Dear Ken,

This report presents the results of six samples, forwarded by Australian Laboratory Services Pty Ltd, on 27 February 2004, for analysis for asbestos.

1. Introduction: Six samples forwarded were examined and analysed for the presence of asbestos.

2. Methods : The samples were examined under a Stereo Microscope and selected fibres were analysed by Polarized Light Microscopy in conjunction with dispersion Staining method (Safer Environment Method 1.)

3. Results : **Sample No. 1. ASET3689 / 5355 / 1. #3 - NE13347**
Approx dimensions 5.0 cm x 2.0 cm x 0.35 cm
The sample consisted of a fragment of a hard floor tile.
No asbestos detected (An independent confirmatory analytical technique is advised due to the nature of the sample).

Sample No. 2. ASET3689 / 5355 / 2. #4 - NE13347
Approx dimensions 6.5 cm x 5.5 cm x 4.0 cm
The sample consisted of a fibrous mass of synthetic mineral fibre like fibres.
No asbestos detected.

Sample No. 3. ASET3689 / 5355 / 3. #5 - NE13347 .
Approx dimensions 6.5 cm x 2.0 cm x 0.3 cm
The sample consisted of a fibrous mass of synthetic mineral fibre like fibres.
No asbestos detected.

Sample No. 4. ASET3689 / 5355 / 4. #6 - NE13347.
Approx dimensions 8.5 cm x 3.5 cm x 0.4 cm
The sample consisted of a fragment of a fibro plaster cement material containing organic fibre like fibres.
No asbestos detected.

Sample No. 5. ASET3689 / 5355 / 5. #7 - NE13347.
Approx dimensions 4.0 cm x 1.25 cm x 0.3 cm
The sample consisted of a fragment of a fibro plaster cement material containing organic fibre like fibres.
No asbestos detected.



Sample No. 6. ASET3689 / 5355 / 6. #8 - NE13347.

Approx dimensions 7.0 cm x 3.5 cm x 0.3 cm

The sample consisted of a fragment of a fibro plaster cement material containing organic fibre like fibres.

No asbestos detected.



NATA Accredited Laboratory
Number: 14484

The tests, calibrations or measurements covered by this document have been performed in accordance with NATA requirements which include the requirements of ISO/IEC 17025 and are traceable to Australian national standards of measurement. This document shall not be reproduced, except in full.

Analysed and reported by,

Chameen Battagoda
Approved Analyst

Mahen De Silva . BSc. MSc. Grad Dip (Occ Hyg)
Occupational Hygienist / Approved Signatory.

Chain of Custody

No: 29390

Sheet of

Laboratory Quotation / Order No: 54686

Job No:

Consigning Officer:

Date Dispatched:

Carrier Service:

Consignment Note No:

Dispatch to:
(Address &
Phone No.)

Attention:

Relinquished by:

Project Manager:
(report results to)

Date:

Time:

Received by:

Date:

Time:

Date:

Time:

Comments

Sample Matrix

Container Type
and Preservative

Sample No.

Date Sampled

PAHs

TPHs

MAHs = BTEX

Metals:

Analyses Required

Sample
Condition
on Receipt

Batch No.	NE 3347	ORG
Batched Date:	26/6/02	
☐ Soil	☒ Ambient	
☐ Water	☐ Chilled	
☐ Other	☐ Subcontract Work	
☐ Bottle Return	☐ In situ Anal - retrieved	
8x PLASTIC BAGS		
OF SAND MATTER		

CONTRACT WORK

ASBEST

ASBESTOS 6x PLASTIC

BAGS

Special Laboratory Instructions:

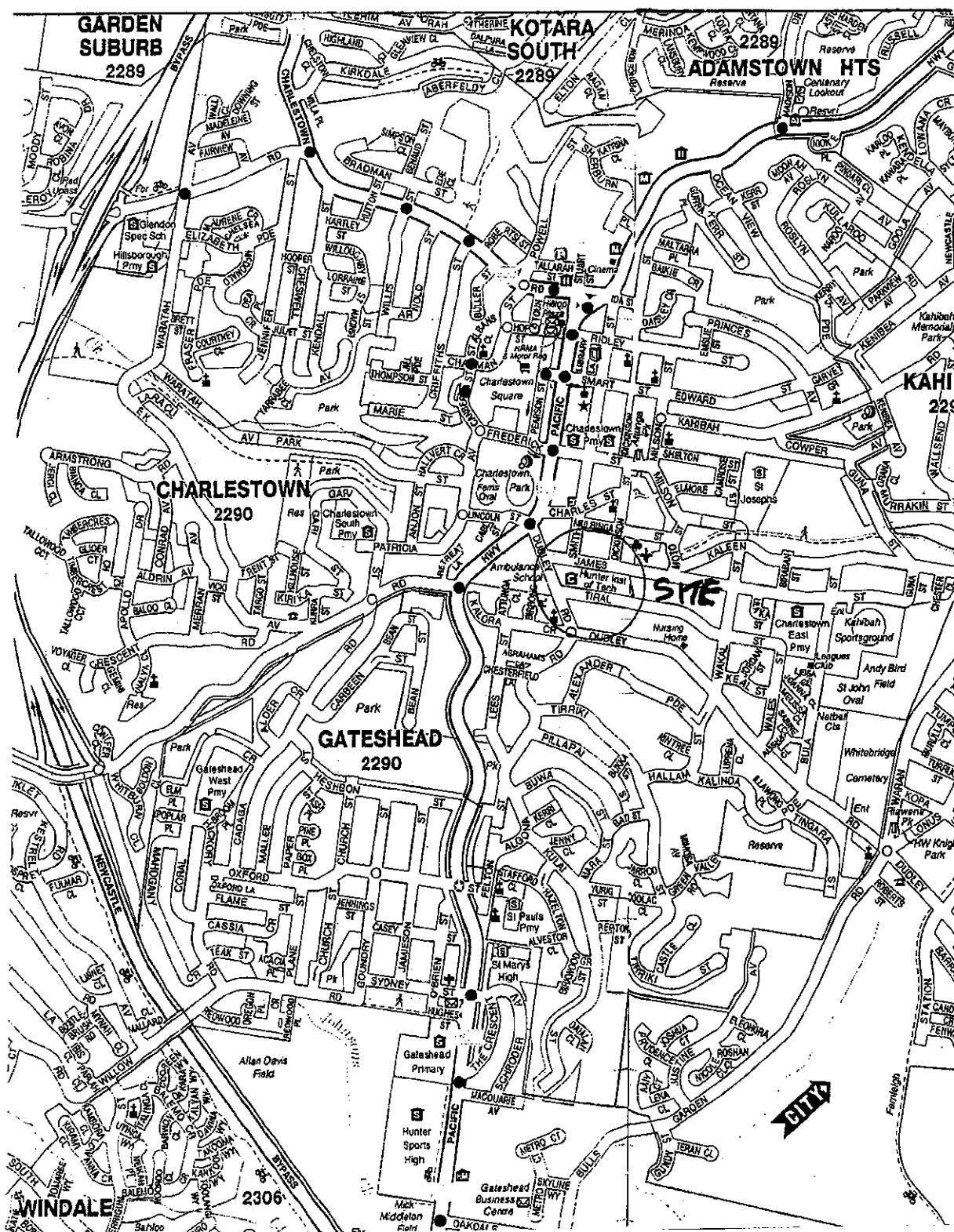
Detection Limits:

Turnaround Required:

Copies: WHITE: Sign on release. YELLOW: if dispatched to interstate Lab. Lab to sign on receipt and fax back to Coffey. BLUE: To be returned with results.

JOB NUMBER MUST BE
REFERENCED ON ALL
SUBSEQUENT PAGES





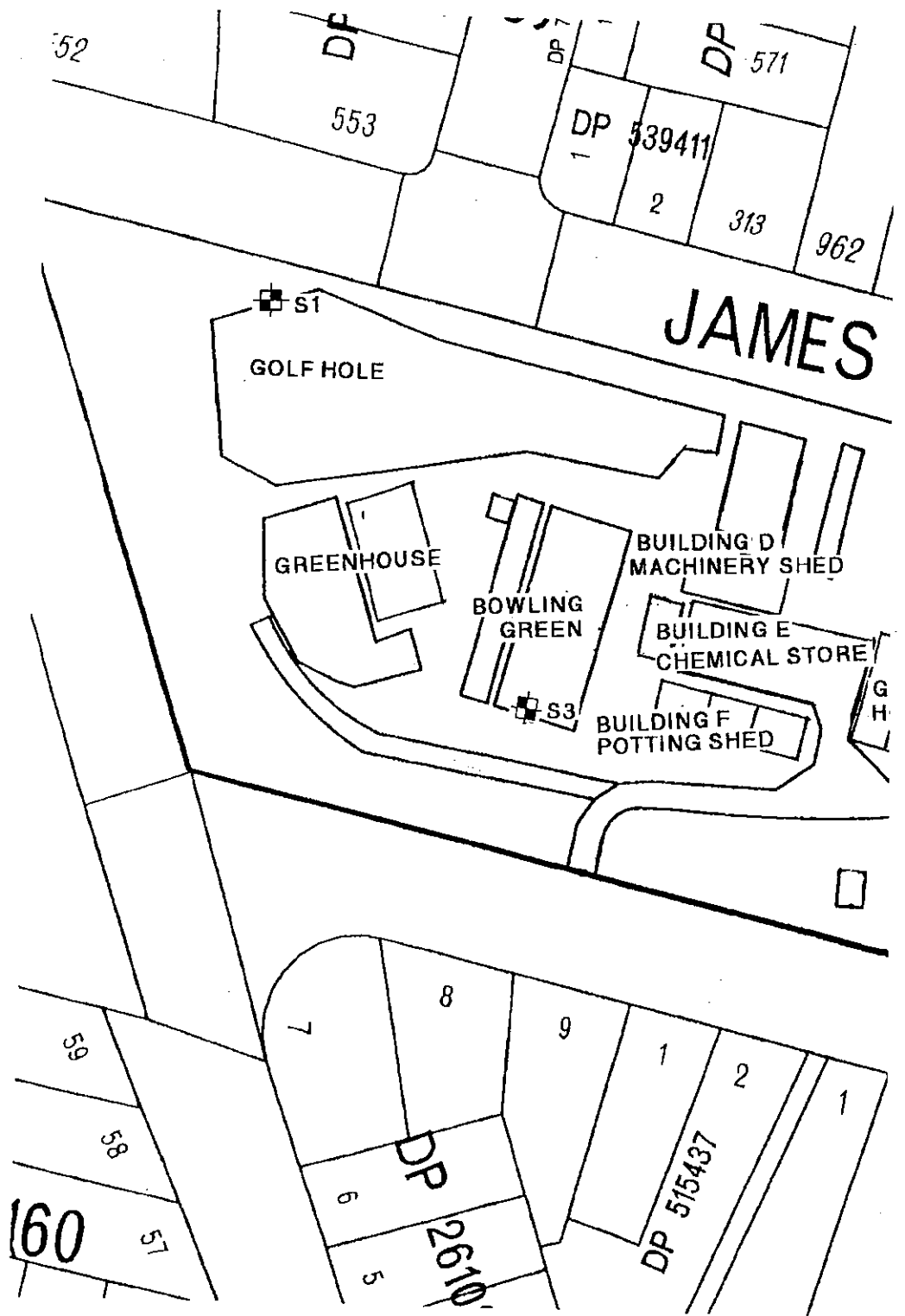
Coffey Geosciences Pty Ltd ACN 056 336 516

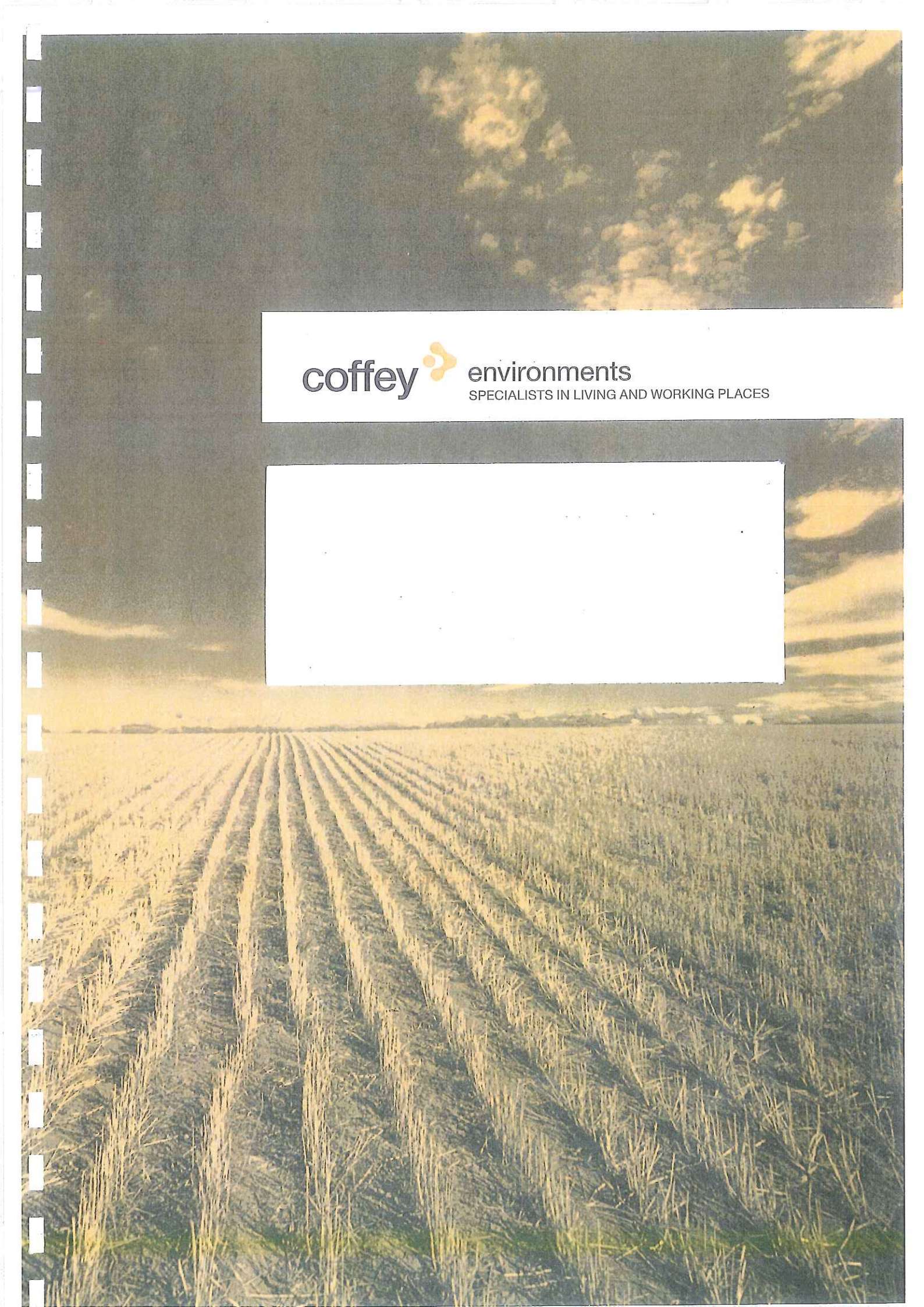
Geotechnical | Resources | Environmental | Technical | Project Management

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Approved	<i>[Signature]</i>
Date	15-3-04
Scale	

NSW DEPARTMENT OF EDUCATION AND TRAINING
FORMER CHARLESTOWN TAFE
JAMES STREET, CHARLESTOWN
SITE CONTAMINATION AND HAZARDOUS MATERIALS
ASSESSMENT

Drawing no:	N08951/01-1
Job no:	N08951/01 AC





coffey  **environments**
SPECIALISTS IN LIVING AND WORKING PLACES

**PHASE 1 ENVIRONMENTAL SITE
9 TIRAL STREET, CHARLESTOWN**

Prepared for:

RSM Bird Cameron Partners
C/- CB Richard Ellis (P) Pty Ltd
Level 26, 363 George St
SYDNEY NSW 2000

Report Date: 26 May 2009
Project Ref: ENVIWARA00381AA

Written/Submitted by:



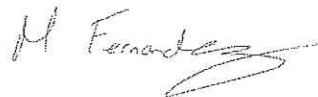
Elizabeth Richardson
Environmental Scientist

Written/Submitted by:



Andrew Hills
Environmental Engineer

Reviewed/Approved by:



Manuel Fernandez
Associate

26 May 2009

RSM Bird Cameron Partners
C/- CB Richard Ellis (P) Pty Ltd
Level 26, 363 George St
SYDNEY NSW 2000

Attention: Kristian Wiles

Dear Kristian

**RE: PHASE 1 ENVIRONMENTAL SITE
9 TIRAL STREET, CHARLESTOWN**

Coffey Environments Pty Ltd (Coffey) is pleased to provide our Phase 1 Environmental Site Assessment (ESA) report for the above site.

We draw your attention to the enclosed sheet entitled '*Important Information about your Coffey Environmental Report*' which should be read in conjunction with this report.

If you have any questions please do not hesitate to the undersigned

For and on behalf of Coffey Environments Pty Ltd



Andrew Hills
Environmental Engineer

RECORD OF DISTRIBUTION

No. of copies	Report File Name	Report Status	Date	Prepared for:	Initials
1	ENVIWARA00381AA-R01.doc	Final	26 May 2009	RSM Bird Cameron Partners C/- CB Richard Ellis (P) Pty Ltd	
1	ENVIWARA00381AA-R01.doc	Final	26 May 2009	Coffey Environments Pty Ltd	

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ABBREVIATIONS

AHD	Australian Height Datum
AST	Aboveground Storage Tank
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
COC	Chain of Custody
ESA	Environmental Site Assessment
NSW EPA	Environment Protection Authority of New South Wales
OCP	Organochlorine Pesticide
OPP	Organophosphorous Pesticide
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
TPH	Total Petroleum Hydrocarbon

1 INTRODUCTION

1.1 General

This report presents the results of a Phase 1 Environmental Site Assessment (ESA) carried out by Coffey Environments Pty Ltd (Coffey) for CB Richard Ellis (P) Pty Ltd (CBRE) on behalf of RSM Bird Cameron Partners (RSM) at 9 Tiral Street, Charlestown, NSW. The commission was in response to a fee proposal submitted by Coffey on 25 March 2009 (Ref: ENVIWARA00381AA-P01).

It is understood that the Phase 1 ESA will provide a due diligence review for potential purchasers of the site.

1.2 Objectives

The objectives of the Phase 1 Environmental Site Assessment (ESA) were to assess the likelihood for land contamination to exist on the site from past or present activities. This was achieved by the following:

- Identify potentially contaminating activities that are currently being performed on the site and that may have been performed on the site in the past;
- Assessing potential AEC's and associated potential Chemicals of Concern (COC's) for the site.

1.3 Scope of Works

The proposed scope of work included a desk study, data assessment and reporting.

The desk study included:

- A site visit by a Coffey Environmental Engineer/Scientist to visually assess potential sources of contamination, visually assess property boundaries, observe surrounding land uses, topography, drainage and nearby sensitive environments;
- A review of published information and information held in file by Coffey Environments related to soils, geology and hydrogeology including previous geotechnical and contamination assessments if relevant;
- A review of previous site ownership;
- A review of selected historical aerial photography over the past 40 to 50 years;
- A review of Council historical development application records and Section 149 Planning Certificate for the site;
- A review of NSW Department of Environment and Climate Change (DECC) notices under the Contaminated Land Management Act (1997) and a search of NSW Department of Water and Energy for records for nearby registered groundwater bores;
- A review of NSW Work Cover notices covering storage of dangerous goods; and
- Review and collation of the above work and summarising the potential AEC's and likely COC's.

The Phase 1 ESA has been conducted in general accordance with the relevant sections of NSW EPA (1997), *Contaminated Sites, Guidelines for Consultants Reporting on Contaminated Sites*.

2 SITE DESCRIPTION AND IDENTIFICATION

2.1 General

The site is identified as Lot 223 in DP 551260, Parish of Kahibah, County of Northumberland, and is within Lake Macquarie City Council municipality. The site is currently zoned "2(2) Residential (urban living) and No5 Special Use (Infrastructure)". The site is located on the northern side of Tiral St, Charlestown, NSW and occupies an area of approximately 2.079Ha. The site is currently disused and has buildings/structures from the former Hunter Institute of TAFE for horticultural studies'.

2.2 Current Surrounding Land Use

The site is located in a residential area. The site is bound by James St to the North, Tiral St to the South and Dudley St to the West. Residential properties immediately bound the site to the east.

2.3 Topography and Drainage

Topographically the site is located on the undulating lower eastern facing slopes and base of a northerly trending gully. The site slopes predominately north east ranging from approximately two to eight degrees over the site. According to the 1:25000 Wallsend Topographic map the site is located between 90m AHD and 100m AHD

Drainage is expected to follow the slope of the site towards a cement lined drainage channel that flows north east across the eastern portion of the site towards Flaggy Creek 250m north east of the site.

2.4 Local Geology, Hydrogeology and Local Groundwater Usage

According to the *Newcastle Coalfields Regional Geological* sheet, the site is underlain by Quaternary aged alluvial deposits comprising sand, gravel, silt and clay.

A groundwater bore search in a 3km radius of the site indicated that there were approximately 14 licensed bores located in the area. Licensed bore GW053072 located 3km to the south- south/west of the site presented the following details:

- The bore was drilled for recreational purposes;
- The bore encountered groundwater at 18m depth in sandstone.

It is anticipated that regional groundwater flow in the vicinity of the site would be towards Flaggy Creek, located approximately 250m to the north east of the site.

3 SITE HISTORY

3.1 Title Search

A list of past registered proprietors and lessors of the site was obtained from the Land Titles Office. The current title details and cadastral plan are included in Appendix A.

The title history search for Lot 223 DP 551260 revealed the following:

- Prior to 1963, the site was Crown Land;
- The Minister for Education owned the site between 1963 and 2006;
- Delta Developments, the current owner of Lot 223, acquired the site in 2006.

3.2 Lake Macquarie Council Records

Lake Macquarie Council holds information pertaining to historical building applications and development applications relating to properties in the Lake Macquarie Council area. Computerised records date back to the early 1980's.

A search of Lake Macquarie Council records revealed that three Development Applications (DA's) had been received by Council for Lot 223 DP 551260. A summary of the relevant information from these DA's is summarised as follows:

- DA for relocation of college building, S 226/12-14, approved June 1984;
- DA for storage compound, 226/12-14, approved November 1984;
- DA for additional classroom building, approved March 1993;

3.3 Section 149 Planning Certificate

A Section 149 Planning Certificate obtained from Lake Macquarie City Council indicated that the land is not affected by matters required to be disclosed under Section 59(2) of the Contaminated Land Management Act (1997).

Mine Subsidence

With regard to Mine Subsidence, the land is proclaimed to be within a mine subsidence district within the meaning of Section 15 of the Mine Subsidence Compensation Act 1961. The Section 149 Planning Certificate, Provided in Accordance with Section 149(2), Section 5 states *"The approval of the Mine Subsidence Board is required for all subdivision and building, except for certain minor structures. It is strongly recommended prospective purchasers consult with the Mine Subsidence Board regarding mine subsidence and any surface development guidelines."*

A copy of the Section 149 Certificate is presented in Appendix B.

3.4 Site Observations

A site visit was performed by an Environmental Scientist from our Newcastle office on 6 May 2009. Site observations are included on Figure 2, where appropriate. Site photographs are attached in Appendix C.

The following comments are made:

- The site was not in use. Some buildings from the former 'Hunter Institute of TAFE for horticultural studies' are still on site but heavily degraded and vandalised (see photo 1, attached);
- Large proportion of the site was grass covered and uncontrolled scrub (see photo 2, attached);
- Evidence of footings from former buildings that have been removed were evident (see photos 3 and 4, attached);
- There was a concrete lined drainage channel located in the eastern portion of the site draining north east, off site (see photo 5, attached);
- Some fill could be present under bitumen areas on the site, e.g. under bitumen driveways, bitumen car park located in eastern portion of site and the relatively large bitumen area located in central portion of site;
- An aboveground storage tank (AST) was located in central portion of the site and appeared to be in poor condition (see photo 6, attached);
- A former greenhouse (no longer in use) was noted in north east corner of site. Next to green house there were also built up garden beds (see photos 7 and 8, attached);
- The building in the centre of site appears to have been cut into the slope (see photo 9, attached), there are also two apparent landscape cuts in the western portion of the site, believed to be for former buildings and garden beds (see photos 10, attached). An area of approximately 450m² in size appeared to have been cut 150mm deep into the site and was believed to be once used for bowling green (see photo 11, attached);
- Buildings in the central part of the site may have been once used for fertiliser storage, as evident by sign 'Fertilization store' attached to the building. As this was a horticultural TAFE pesticides may have also been used in these buildings (see photo 14, attached);
- A semi enclosed walkway with timber framework was observed in the north west corner of the site, heavily overgrown with vegetation (see photo 12, attached);
- A water tank was observed in the western portion of the site;
- A relatively large amount of anthropogenic rubbish was observed across the site. This included mattresses, microwaves, child prams, and plastic chairs (See photo 13, attached);

- The Club house/ shed present in the north east of the site appeared to be for a former tennis court which was previously on site;
- Approximately eighty percent of the site is covered in vegetation, predominantly grasses, palm trees and native shrubs;
- Traffic access to the site is via 3 separate bitumen driveways;
- Broken fibro was observed in the former tennis club house (see photo 15, attached);

3.5 Aerial Photograph Review

Aerial Photographs of the site were purchased from the Department of Lands and reviewed by an Environmental Scientist from Coffey Environments. The results of the assessment are summarised in Table 1.

TABLE 1 – AERIALPHOTOGRAPH REVIEW

YEAR	SITE	SURROUNDING LAND
1954	The site appears to be undeveloped, however vegetation has been cleared in areas of the site	The surrounding land in the vicinity of the site appears to be predominantly low density residential. Roads surrounding the site have already been developed.
1966	There appears to be two small road or tracks cut across the middle of the site	The density of residential developments appears to have increased in the surrounding area.
1975	It appears that more vegetation has been cleared from the site	The density of residential developments appears to have continued to increase in the surrounding area.
1983	Buildings appear to have been erected in the central portion of the site. Driveways with access from Tiral St appear to be evident. There appears to have been a golf driving range or similar developed along the northern side of site, a sand pit evident and a relatively large area of vegetation disturbed to the west of buildings in the central part of the site.	Surrounding lands appear similar.
1990	Additional buildings appear to have been erected in centre and eastern portions of site, a car park has also been developed in the eastern portion of the site	Surrounding lands appear similar.
2004	The site appears similar to the previous photo except for increased vegetation along south and western boundaries of site.	Surrounding lands appear similar.

3.6 NSW Work Cover Search

A check with NSW Work Cover revealed that no dangerous Goods Licences relating to the storage of dangerous goods on the site was listed on the Stored Chemical Information Database (SCID). Information obtained from the Work Cover search is presented in Appendix B.

3.7 NSW EPA Records

A check with the NSW EPA website (www.environment.nsw.gov.au) revealed the following notices have been issued in the Lake Macquarie Local Government Area:

- 3 current notices for Cockle Creek and Cockle Bay Sediments (covering parts of Cockle Creek and Cockle Bay, Boolaroo);
- 2 current notices for Incitec Pivot, located at Boolaroo;
- 2 current notices for the Pasminco smelter, located at Boolaroo;
- 3 current notices for Mobil at Marks Point; and
- 1 current notice and 3 former notices for a scrap metal yard at Teralba.

These properties are located at least >2km from the site and are unlikely to have impacted the site in terms of contamination.

3.8 Previous Reports

A previous report prepared by Coffey Geosciences Pty Ltd (Coffey Geosciences) entitled '*Site Contamination Assessment*' (N08951/01-AC), dated: 24 March 2004. The report presented information based on the potential for site contamination with regard to previous site uses and also assessed the site buildings for hazardous materials.

The scope of works carried out included:

- A brief review of site history;
- A walkover assessment of the site by a Coffey Environmental Engineer;
- Discussions with the current site owner;
- Limited soil sampling and analysis;
- Building materials sampling and analysis.

Soil samples collected during a site visit by a Coffey Geosciences engineer, were analysed for heavy metals, organochlorine and organophosphate pesticides. Chemicals associated with herbicide and pesticide use, e.g. Organochlorine and organophosphate pesticides were identified as the main potential chemicals of concern for the site.

Samples of flaking paint and potentially asbestos containing materials were also collected and analysed for lead content and presence or absence of asbestos respectively.

From the previous report the demolished buildings appeared to have been greenhouses. The remaining existing buildings and site features were identified as:

- One hole golf driving range and bowling green;
- Administration building;
- Classrooms;
- Library;

- Potting shed, chemical store, and machinery shed;
- Tennis court and tennis shed.

The following statements were taken from the Coffey Geosciences report:

- Some slightly elevated concentrations of arsenic in surface soils on the site. The samples which exhibited the elevated arsenic concentrations were taken from the tennis court and golf fairway areas where it was considered that use of pesticides may have occurred. The concentrations encountered range up to 30mg/kg, which exceeded the adopted phytotoxicity based investigation level of 20mg/kg. The results were below the 100mg/kg health based soil investigation guideline for residential land use. The concentrations encountered would therefore not be considered a health risk to future site users, assuming the land is used for standard residential, child care or some less sensitive site use;
- Samples of building materials tested for asbestos were found to contain no detectable asbestos;
- Two samples of paint from across the site were analysed for total lead concentrations. Sample 2, taken from the ceiling of the administration building returned a total lead concentration of 117mg/kg and was therefore not considered to be lead based paint. Sample 8 taken from the roller door of the machinery storage shed returned a total lead concentration of 4080mg/kg. Based on the Australian guideline for lead in paint of 5000mg/kg this sample is not considered to be lead based paint. Due to the elevated levels of lead detected, however, it was recommended that relevant precautions be adopted when causing any disturbance to the paint.

Based on the results of the previous assessment it was considered that "significant site contamination had not occurred as a result of previous site usage".

3.9 Summary of the Site History

Based on the site history information gathered in the above sections, the following is a summary of the history of the site:

- Prior to 1963, the site was Crown Land; from 1963 to 2006 the land was owned by the Minister for education. In 2006 the current land owner Delta Developments Pty Ltd acquired the site;
- A search of Lake Macquarie City Council records indicated that three DA's for the site were lodged between 1984 and 1993. These were for commercial/ industrial developments and all three applications were approved by the council;
- A review of the Lake Macquarie City Council Section 149 Planning Certificate indicated that the land is not affected by matters required to be disclosed under Section 59(2) of the Contaminated Land Management Act (1997). However the land is proclaimed to be within a mine subsidence district within the meaning of Section 15 of the Mine Subsidence Compensation Act 1961, therefore "The approval of the Mine Subsidence Board is required for all subdivision and building, except for certain minor structures. It is strongly recommended prospective purchasers consult with the Mine Subsidence Board regarding mine subsidence and any surface development guidelines;"
- A site visit carried out by Coffey indicated that the site was in a disused state with all buildings on site extensively damaged. Vegetation on the site was also overgrown, and there were relatively large amounts of rubbish found across the site.

The main features of the site included; heavily degraded former TAFE buildings, a cement lined drainage channel located in the eastern portion of the site, bitumen areas and AST located in the centre

of the site;

- A review of aerial photographs of the site and surrounding areas indicated that the current TAFE buildings which remain on site today were developed between 1980 and 1990. The surrounding areas have been characterised by a gradual increase in residential density since the 1950's;
- A review of NSW EPA records for the Lake Macquarie Local Government Area indicated that there are no current or former records for properties near the site.

3.10 Gaps in the Site History

The following gaps in the site history are noted:

- The purpose of the previous contamination assessment carried out by Coffey Geosciences is not known;
- It is not known why the demolished buildings were removed from the site or by whom;
- Although it was known that the TAFE site was used for horticultural studies such as green keeping the actual operation and activities conducted on site are not known;
- It is assumed that chemicals and possibly fuel were stored on the site (as evident by a disused AST observed during the site visit), however the locations and quantities are unknown;
- The type of fuel that may have been potentially stored in the AST is unknown.

4 CHEMICALS OF CONCERN AND AREAS OF CONCERN

Based on the site history, potential AEC's and associated COC's identified for each portion of the site are presented in Table 2. The approximate locations of these areas are shown on Figure 2.

TABLE 2 - POTENTIAL AEC'S AND COC'S

AEC NO	POTENTIAL CONTAMINATING ACTIVITY and AECs	COC'S	LIKELIHOOD OF CONTAMINATION*
1	Fill of unknown origin and quality- Driveway along eastern boundary, centre of site and driveway on south of site	TPH, PAH, BTEX, Heavy Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn), PCB, OCP/OPP, Asbestos	Low
2	Garden Beds and old greenhouse- garden beds located around perimeter of all buildings on site and next to greenhouse located in north east corner of site	Heavy Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn), OCP/OPP, Asbestos	Medium
3	Above ground storage tank – Central portion of site	TPH, PAH, BTEX, Lead.	High
5	Contamination from sterilization, propagation and fertilization activities- central portion of site	OCP/OPP', Heavy Metals (AS, Cd, Cr, Cu, Pb, Hg, Ni, ZN)	Low to Medium
6	Weathering/degrading of building materials and former demolition – Areas surrounding former buildings (particularly club house at north east of site)	Lead, zinc.	Low to Medium
7	Anthropogenic rubbish – particularly the south east portion of the site	TPH, PAH, BTEX, Heavy Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn), OCP/OPP, Asbestos	Low to Medium

NOTE:

* It is important to note that this is not an assessment of the financial risk associated with the AEC in the event contamination is detected, but a qualitative assessment of the probability of contamination being detected at the potential AEC based on the site history study.

TPH = Total Petroleum Hydrocarbons BTEX = Benzene, Toluene, Ethyl benzene, total Xylene

PAH = Polycyclic Aromatic Hydrocarbons OCP = Organochlorine Pesticides

OPP = Organophosphorous Pesticides

5 DISCUSSION

The site, Lot 223 in DP 551260, is located in a residential area of Charlestown. The site is currently not in use. Some buildings from the former 'Hunter Institute of TAFE for horticultural studies' are still on site but heavily degraded and vandalised.

The site is underlain by sandstone, siltstone, conglomerate and coal from the Newcastle Coal Measures and generally slopes to the north-east. Surface drainage is likely to occur via infiltration or surface runoff. It is expected to follow the slope of the land in a north east direction. Also located in the eastern portion of the site is a cement lined drainage channel flowing north east. A registered groundwater bore was located approximately 3km south-east of the site and is used for recreational purposes.

A review of the site history indicated that the site was Crown Land until 1963 when the Minister for Education acquired the property, in 2006 the current land owner Delta Developments Pty Ltd purchased the site.

A review of Lake Macquarie Council records indicated that three Development Applications have been received by Council for the site. A review of the Section 149 Planning Certificate indicated that the land is not affected by matters required to be disclosed under Section 59(2) of the Contaminated Land Management Act (1997), and that the land is proclaimed to be within a mine subsidence district.

A review of historical aerial photography indicated that the current TAFE buildings which remain on site today were first developed between 1980 and 1990. A review of NSW EPA notices indicated that there are no current or former notices for properties near the site.

A site visit carried out by Coffey Environments indicated that the site in a disused state with all buildings on site extensively damaged. Vegetation on the site was also overgrown, and there were large amounts of rubbish found across the site.

A number of AEC's were identified on the site. These AEC's included the areas surrounding the buildings on site, lead in paint and zinc in the galvanised iron sheeting, and the source of the gravelly fill used under the bitumen across the site. Other AEC's included the golf course and bowling green, garden beds and the former green houses as these areas may have had pesticides and fertilizers applied to them, the anthropogenic rubbish, particularly in the south east portion of the site, the AST and sterilization, propagation and fertilization activities that were carried out in the central portion of the site.

6 CONCLUSIONS

Based on the site history review and site visit, potential contaminating activities/sources were identified at the site that could give rise to land contamination. Several potential AEC's and associated COC's were noted which related mainly to the presence of fill of unknown origin and quality, an AST, and fertilization storage and application areas. The likelihood of contamination at the AEC's was assessed to generally be low to medium. Sampling and testing of areas not covered by the previous Coffey Geosciences investigation would be required to assess the presence of contamination or otherwise.

7 LIMITATIONS

The work performed by Coffey Environments included a site history study and a site visit. Therefore, the assessments made in this report should be considered as preliminary only and could be subject to change based on the results of future sampling and analysis of site soils and/or groundwater.

8 REFERENCES

Advance Legal Search Pty Ltd (2008) Title Search, 9 Tiral St, Charlestown;

Coffey Geosciences Pty Ltd (2004) *Site Contamination Assessment, Lot 233 DP 551260, James Street, Charlestown* (Reference N08951/01-AC)

Geological Survey of NSW (1966) 1:100,000 Newcastle Geological Series Sheet, No. 9130 First Edition;

Lake Macquarie City Council (2008) Records for Development Applications, 9 Tiral St, Charlestown (<http://apptracking.lakemac.com.au/modules/ApplicationMaster/default.aspx?page=search>)

Lake Macquarie City Council (2008) Section 149 Planning Certificate, 9 Tiral St, Charlestown

Land and Property Information (2002) 1:25,000 Wallsend Topographic Map, Reference 9232-3S 3rd Edition;

NSW EPA (1995) Sampling Design Guidelines;

NSW EPA (1997) Guidelines for Consultants Reporting on Contaminated Sites;

NSW EPA (2006) Contaminated Land – Record of EPA Notices
(<http://www.environment.nsw.gov.au/clmapp/aboutregister.aspx>)

Important information about your Coffey Environmental Report

Uncertainties as to what lies below the ground on potentially contaminated sites can lead to remediation costs blow outs, reduction in the value of the land and to delays in the redevelopment of land. These uncertainties are an inherent part of dealing with land contamination. The following notes have been prepared by Coffey to help you interpret and understand the limitations of your report.

Your report has been written for a specific purpose

Your report has been developed on the basis of a specific purpose as understood by Coffey and applies only to the site or area investigated. For example, the purpose of your report may be:

- To assess the environmental effects of an on-going operation.
- To provide due diligence on behalf of a property vendor.
- To provide due diligence on behalf of a property purchaser.
- To provide information related to redevelopment of the site due to a proposed change in use, for example, industrial use to a residential use.
- To assess the existing baseline environmental, and sometimes geological and hydrological conditions or constraints of a site prior to an activity which may alter the sites environmental, geological or hydrological condition.

For each purpose, a specific approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible, quantify risks that both recognised and unrecognised contamination pose to the proposed activity. Such risks may be both financial (for example, clean up costs or limitations to the site use) and physical (for example, potential health risks to users of the site or the general public).

Scope of Investigations

The work was conducted, and the report has been prepared, in response to specific instructions from the client to whom this report is addressed, within practical time and budgetary constraints, and in reliance on certain data and information made available to Coffey. The analyses, evaluations, opinions and conclusions presented in this report are based on those instructions, requirements, data or information, and they could change if such instructions etc. are in fact inaccurate or incomplete.

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man and may change with time. For example, groundwater levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of the subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Coffey to be advised how time may have impacted on the project and/or on the property.

Interpretation of factual data

Environmental site assessments identify actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from indirect field measurements and sometimes other reports on the site are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how well qualified, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of Coffey through the development and use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other problems encountered on site.

Important information about your Coffey Environmental Report

Your report will only give preliminary recommendations

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered with redevelopment or on-going use of the site. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Coffey cannot be held responsible for such misinterpretation.

Your report is prepared for specific purposes and persons

To avoid misuse of the information contained in your report it is recommended that you confer with Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. In particular, a due diligence report for a property vendor may not be suitable for satisfying the needs of a purchaser. Your report should not be applied for any purpose other than that originally specified at the time the report was issued.

Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Coffey to work with other professionals who are affected by the report. Have Coffey explain the report implications to professionals affected by them and then review plans and specifications produced to see how they have incorporated the report findings.

Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel), field testing and laboratory evaluation of field samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

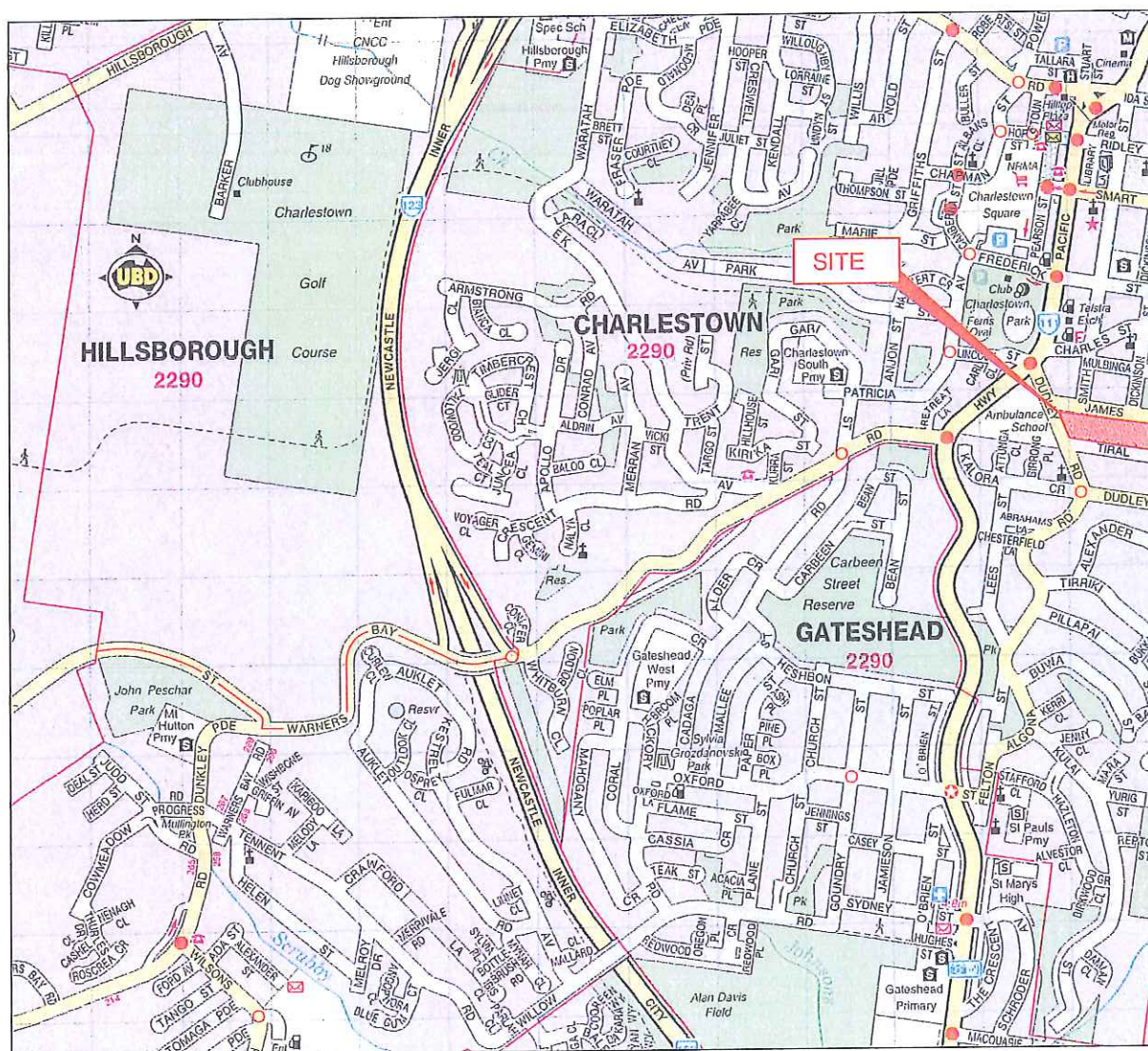
Contact Coffey for additional assistance

Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to land development and land use. It is common that not all approaches will be necessarily dealt with in your environmental site assessment report due to concepts proposed at that time. As a project progresses through planning and design toward construction and/or maintenance, speak with Coffey to develop alternative approaches to problems that may be of genuine benefit both in time and cost.

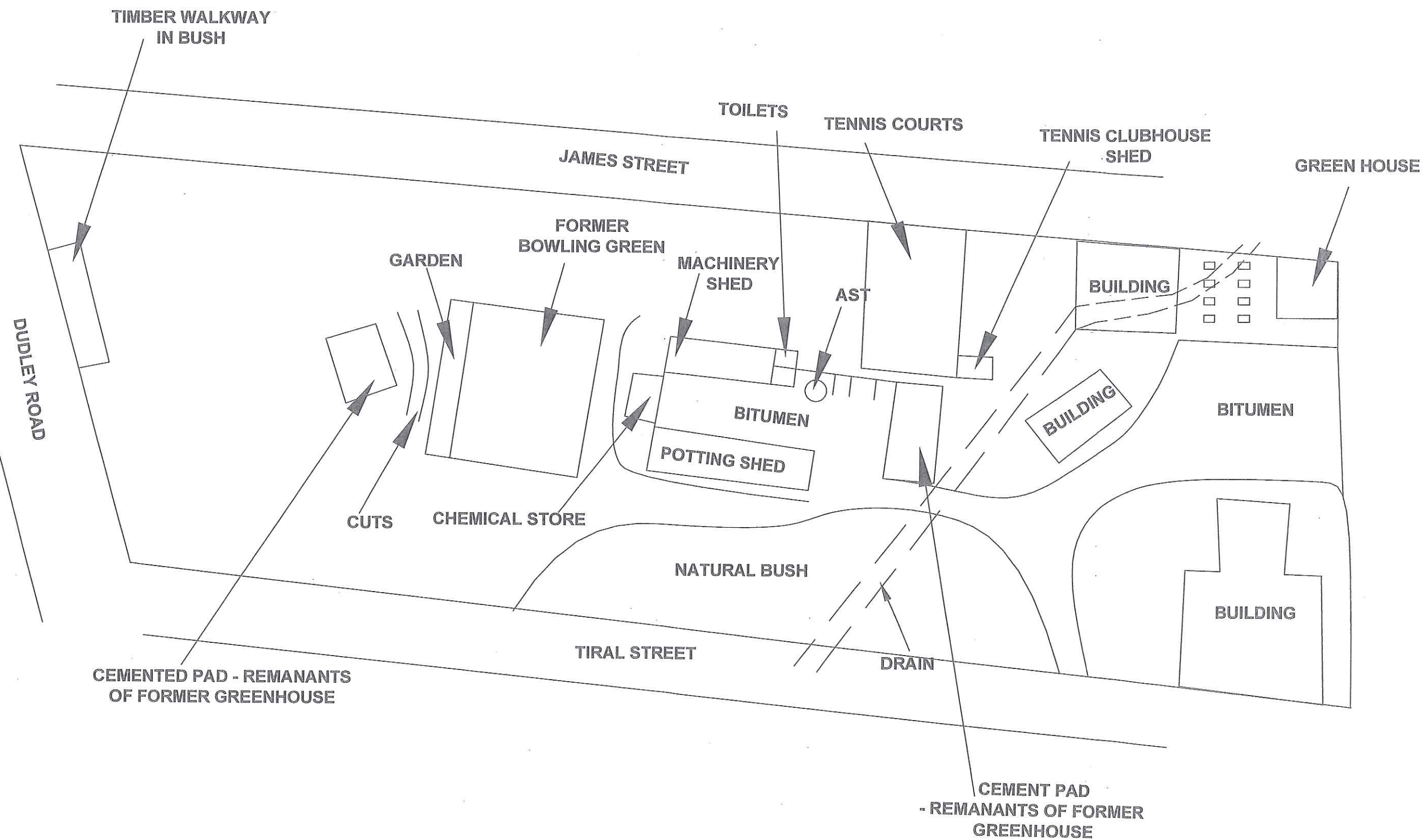
Responsibility

Environmental reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Coffey to other parties but are included to identify where Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Coffey closely and do not hesitate to ask any questions you may have.

Figures



drawn	ALR	 SPECIALISTS IN LIVING AND WORKING PLACES	client:	CBRE	
approved	EJR		project:	CHARLESTOWN PHASE 1 ESA 9 TIRAL STREET, CHARLESTOWN	
date	20-05-09		title:	SITE LOCATION	
scale	1:19000		project no:	ENVIWARA00381AA	figure no: FIGURE 1
original size	A4				



revision	description	drawn	approved	date	drawn	ALR	coffey environments SPECIALISTS IN LIVING AND WORKING PLACES	client:	CB RICHARD ELLIS	
						approved		project:	CHARLESTOWN PHASE 1 ESA 9 TIRAL STREET, CHARLESTOWN	
						date		title:	SITE LAYOUT	
						scale		project no:	ENVIWARA00381AA	figure no:
						original size				FIGURE 2
						NTS				
						A3				

Appendix A Title History Documents

ADVANCE LEGAL SEARCH PTY LIMITED

(ACN 077 067 068)

ABN 49 077 067 068

PO Box 149
Yagoona NSW 2199

Telephone: +612 9754 1590

Mobile: 0412 169 809

Facsimile: +612 9754 1364

Email: alsearch@optusnet.com.au

05th May 2009

COFFEY ENVIRONMENTS PTY LTD

Lot 101, 19 Warabrook Boulevard,
WARABROOK NSW 2304

Attention: Andrew Hills

RE:

**9 Tiral Street,
Charlestown
Ref: ENVIWARA00381AA
Purchase Order: S 20034**

Current Search

Folio Identifier 223/551260 (title attached)

DP 551260 (plan attached)

Dated 04 May 2009

Registered Proprietor:

DELTA DEVELOPMENTS AUSTRALIA PTY LTD

Title Tree
Lot 223 DP 551260

Folio Identifier 223/551260

Certificate of Title Volume 11765 Folio 132

PA 48652

Government Gazette 1 November 1963 Folio 106

Crown Land

Summary of Proprietors
Lot 223 DP 551260

Year

Proprietor

	(Lot 223 DP 551260)
2006 – todote	Delta Developments Australia Pty Ltd
1988 – 2006	The Minister for Education
	(Portion 223 shown in DP 551260 – CTVol 11765 Fol 132)
1972 – 1988	The Minister for Education
	(Portion 223 Parish Kahibah – Area 5 Acres 0 Roods 22 Perches)
1963 – 1972	The Minister for Education <i>(Resumed for a Technical College under provisions of the Public Works Act 1912)</i>
	(Portion 223 Parish Kahibah – Area 5 Acres 2 Roods 24 Perches)
Prior – 1963	Crown Land
<i>(1923 – 1963)</i>	<i>(Special Holding 1923/14 Newcastle to Gordon Bowden and William James Schadel)</i>

Requested Parcel : Lot 223 DP 551260

Identified Parcel : Lot 223 DP 551260

LGA: LAKE MACQUARIE

Parish : KAHIBAH

County : NORTHUMBERLAND

locality : CHARLESTOWN



(c) Copyright NSW Department of Lands. Map Projection: MGA Zone

This information is provided as a searching aid only. While every endeavour is made to ensure the current cadastral pattern is accurately reflected, the Registrar General cannot guarantee the information provided.

For all ACTIVITY PRIOR to SEPT 2002 you must refer to the RGs Charting and Reference Maps.

Report Generated 11:58:16 AM, 30 April, 2009

Information Provided Through
Advance Legal Search Pty Ltd
Ph. 0297541590 Fax. 0297541364

Title Search

LEAP Legal
An Approved LPI NSW
Information Broker

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 223/551260

SEARCH DATE	TIME	EDITION NO	DATE
-----	----	-----	----
4/5/2009	11:01 AM	3	26/7/2006

LAND

LOT 223 IN DEPOSITED PLAN 551260
AT CHARLESTOWN
LOCAL GOVERNMENT AREA LAKE MACQUARIE
PARISH OF KAHIBAH COUNTY OF NORTHUMBERLAND
TITLE DIAGRAM DP551260

FIRST SCHEDULE

DELTA DEVELOPMENTS AUSTRALIA PTY LTD (T AC483087)

SECOND SCHEDULE (7 NOTIFICATIONS)

- 1 EXCEPTING THE DRAINAGE RESERVE SHOWN IN DP551260
- 2 LAND EXCLUDES MINERALS (S.141 PUBLIC WORKS ACT, 1912)
- 3 T952800 PART OF THE LAND WITHIN DESCRIBED BEING LOT 1 IN DP46759
IS NOW PUBLIC ROAD EX LAND BELOW A DEPTH OF 20 METRES FROM THE
SURFACE
- 4 DP648824 EASEMENT TO DRAIN WATER 3.6 WIDE AND VARIABLE
AFFECTING THE PART(S) SHOWN SO BURDENED IN DP648824
- 5 AB510815 POSITIVE COVENANT
- 6 AC483088 MORTGAGE TO COMMONWEALTH BANK OF AUSTRALIA
- * 7 AD746499 CAVEAT BY SOUTH CANTERBURY FINANCE LIMITED

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

Coffey - Charlestown ALSP

PRINTED ON 4/5/2009

Information Provided Through
Advance Legal Search Pty Ltd
Ph. 0297541590 Fax. 0297541364

Historical Search

LEAP Legal
An Approved LPI NSW
Information Broker

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE

4/5/2009 11:02AM

FOLIO: 223/551260

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 11765 FOL 132

Recorded -----	Number -----	Type of Instrument -----	C.T. Issue -----
28/3/1988		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
12/9/1988		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
17/2/1994	DP648824	DEPOSITED PLAN	EDITION 1
27/5/2005	AB510815	REQUEST	EDITION 2
26/7/2006	AC483087	TRANSFER	EDITION 3
26/7/2006	AC483088	MORTGAGE	
2/8/2007	AD302735	REQUEST	
30/1/2008	AD677794	REQUEST	
5/2/2008	AD746499	CAVEAT	

*** END OF SEARCH ***

Coffey - Charlestown ALSP

PRINTED ON 4/5/2009

ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF TITLE. WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER. ADVANCE LEGAL SEARCH PTY LTD CERTIFIES THAT THE INFORMATION CONTAINED IN THIS DOCUMENT HAS BEEN PROVIDED ELECTRONICALLY BY THE REGISTRAR-GENERAL IN ACCORDANCE WITH SECTION 96B(2) OF THE REAL PROPERTY ACT, 1900.

4/05/2009

HISTORICAL SEARCH REPORT

DEPARTMENT OF LANDS – SYDNEY – NSW TORRENS TITLE BRANCH

LAND : Lot 233 in Deposited Plan 551260
At Charlestown
Local Government Area of Lake Macquarie
Parish of Kahibah
County of Northumberland

Certificate of Title & Land Description	Registered Proprietor	Date of Acquisition
Folio Identifier 233/551260 Lot 233 in DP551260	The Minister for Education	12 th . of September, 1988
Volume: 11765 Folio: 132 Portion 223 in DP551260	As above	28 th . of January, 1972

NOTE : Prior to the issue of Certificate of Title Volume: 11765 Folio: 132 the Subject Land was part of the land resumed for the purpose of a Technical College under the provisions of the Public Works Act, 1912 pursuant to a Notice published in the Government Gazette dated the 1st. of November, 1963 Folio No.106

Prior to the aforesaid resumption the Subject Land was part of Portion 223 in the Parish of Kahibah County of Northumberland held by Gordon Bowden and William James Schadel within Special Holding No.1923-14 Land District of Newcastle being Crown Land.

DATED 11th.February, 2004.

LEGALCO

Per:



Enquiry: Lot 223 DP551260

ADASTRE (Report 1 of 3 Reports)





Department of Lands
Land and Property Information NSW

TITLE SEARCH

Computer Folio Certificate issued under
Section 96D of the Real Property Act 1900

No. B20

Search certified to:

4/2/2004 3:37 PM

COMPUTER FOLIO REFERENCE

223/551260

EDITION No. & DATE OF CURRENT CERTIFICATE OF TITLE

1

17/2/1994

Page 1

LAND

LOT 223 IN DEPOSITED PLAN 551260

AT CHARLESTOWN

LOCAL GOVERNMENT AREA: LAKE MACQUARIE

PARISH OF KAHIBAH COUNTY OF NORTHUMBERLAND

TITLE DIAGRAM: DP551260

FIRST SCHEDULE

THE MINISTER FOR EDUCATION

SECOND SCHEDULE (4 NOTIFICATIONS)

1. EXCEPTING THE DRAINAGE RESERVE SHOWN IN DP551260
2. LAND EXCLUDES MINERALS (S.141 PUBLIC WORKS ACT, 1912)
3. T952800 PART OF THE LAND WITHIN DESCRIBED BEING LOT 1 IN DP46759 IS
NOW PUBLIC ROAD EX LAND BELOW A DEPTH OF 20 METRES FROM THE SURFACE
4. DP648824 EASEMENT TO DRAIN WATER 3.6 WIDE AND VARIABLE AFFECTING
THE PART(S) SHOWN SO BURDENED IN DP648824

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

doccop4

PRINTED ON 4/2/2004 B20

The Registrar General certifies that at the date and time specified above the person(s) described in the First Schedule
is the registered proprietor of an estate in fee simple (or other such estate or interest set out in the Schedule) in
the land described, subject to any exceptions, encumbrances, interests, and entries which appear in the Second Schedule.

ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE
WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER.



Registrar General

HISTORICAL TITLE SEARCH

Certificate issued under Section 96G
of the Real Property Act 1900

No. B20

Search certified to: 4/2/2004 3:37PM

Computer Folio Reference: 223/551260

Page 1

First Title(s): SEE PRIOR TITLE(S)

Prior Title(s): VOL 11765 FOL 132

Recorded -----	Number -----	Type of Instrument -----	C.T. Issue -----
28/3/1988		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
12/9/1988		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
17/2/1994	DP648824	DEPOSITED PLAN	EDITION 1

*** END OF SEARCH ***

doccop4

PRINTED ON 4/2/2004 B20

The Registrar General certifies that at the date and time specified above the information set out in this search
x stitutes the historical record of all dealings recorded in or action taken in respect of the mentioned title
x ch is required to be kept by the Registrar General under section 32(7) of the Real Property Act 1900.



Registrar General

00559

B20

/Req:K922845 /CT 11765-132

NEW SOUTH WALES

PROPERTY ACT, 1900

Vol. 11765 Fol. 132

Appln. No. 48652

Edition Issued 28-1-1972



I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions, encumbrances and interests as are shown in the Second Schedule.

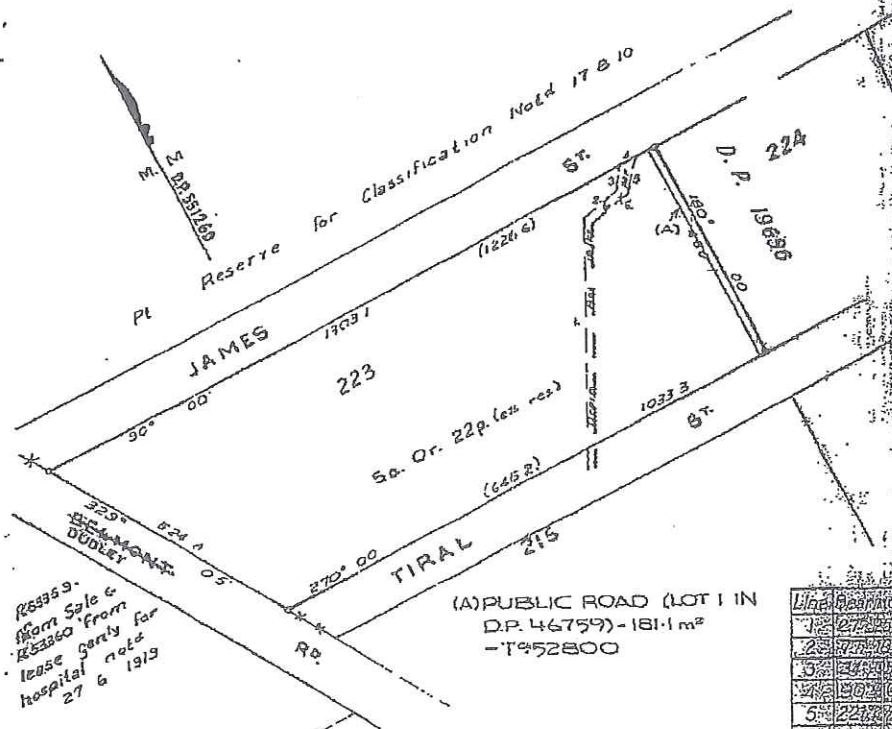
CANCELLED

Registrar General.

PLAN SHOWING LOCATION OF LAND

SEE AUTO FOLD

(Page 1) Vol. 11765 Fol. 132



ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Portion 223 as shown in Deposited Plan 551260 at Charlestown in the Shire of Lake Macquarie Parish of Kajibah and County of Northumberland being Land for which no Crown Grant has issued. EXCEPTING THEREOUT the drainage reserve shown in the plan hereon and the minerals specified in Section 141 Public Works Act, 1912.

FIRST SCHEDULE

THE MINISTER FOR EDUCATION.

SECOND SCHEDULE

NIL

Jawatson
Registrar General

XC
GRN

ಅನುಬಂಧ ೨: ಸ್ವಾತಂತ್ರ್ಯದ ಮೊರೆ

REGISTERED PROPRIETOR		INSTRUMENT NUMBER		NATURE	DATE	ENTERED	Signature of Registered Owner
CANCELLED							
SEE ADD PAGE							

SEE ALSO 5810

PARTICULARS

[illegible]

00210

B20 /Reg:K922759 /PA 048652

Crown Instrument not liable to Stamp Duty
or payment of Registration or other fees.

R. J. McKAY
Crown Solicitor

48652

REAL PROPERTY ACT, 1900

APPLICATION UNDER SECTION 31A(2)(a)

The Registrar General,
SYDNEY

The parcel of land described in the Schedule hereto excluding all such mines and deposits thereunder as are mentioned in Section 141 of the Public Works Act, 1912, as amended, was resumed under the provisions of the Public Works Act, 1912, as amended for the purposes of a Technical College at Charlestown by Notification (a copy of which is herewith annexed) published in the Government Gazette of the First day of November 1963 and was vested in the MINISTER FOR EDUCATION and CHARLESTOWN TECHNICAL COLLEGE as Constructing Authority on behalf of Her Majesty the Queen, not being under the provisions of the Real Property Act, 1900, application is hereby made in pursuance of Section 31A(2)(a) of the Real Property Act, 1900, for the issue to THE MINISTER FOR EDUCATION of a Certificate of Title under the provisions of the lastmentioned Act in respect of the said land (excluding mines and deposits under the said land as aforesaid).

DATED at SYDNEY this 28th day of September 1972

SCHEDULE

ALL THAT piece or parcel of land having an area of 5 acres 0 roods and 22 perches situate in the Shire of Lake Macquarie, Parish of Kahibah and County of Northumberland and being Portion 223 thereof as Deposited Plan No. 554260.

SIGNED by RAYMOND JAMES MCKAY
State Crown Solicitor, by
ERIC NORMAN MCKAY, State
Crown Solicitor's Office, who
is personally known to me:

R. J. MCKAY
State Crown Solicitor

Cert. of T. issued Vol. 11765, 132
Dated 1 FEB 1972

[Published in Government Gazette No. 106 of 1st
November, 1963.]

**TECHNICAL EDUCATION AND UNIVERSITY OF NEW
SOUTH WALES ACT, 1949-1958.—PUBLIC WORKS
ACT, 1912, AS AMENDED**

ACQUISITION OF LAND

Technical College at Charlestown

IN pursuance of the provisions of section 49 of the Technical Education and University of New South Wales Act, 1949-1958, it is hereby notified and declared by His Excellency the Governor, acting with the advice of the Executive Council, that so much of the land described in the Schedule hereto as is Crown land is hereby appropriated, and so much of the said land as is private property is hereby resumed under the Public Works Act, 1912, as amended, for the purpose of a Technical College at CHARLESTOWN, and that the said land is vested in the Minister for Education as Continuing Authority on behalf of Her Majesty the Queen.

Dated at Sydney, this sixteenth day of October, one thousand nine hundred and sixty-three.

E. W. WOODWARD, Governor.

By His Excellency's Command,
ERN WETHERELL, Minister for Education.

THE SCHEDULE

All that piece of land being portion 221, parish of Kaituma, county of Northumberland, having an area of 5 acres 0 roads 22 perches, and being the land within Suburban Holding 1923-14, Land District of Newcastle, held by Gordon Bowden and William James Schudel. (3167)

Sydney: V. C. M. Billett, Clerks

NO TENURE
CARD AVAILABLE
FOR THIS HOLDING.

This is the Notification referred to in the Application by THE
STATE CROWN SOLICITOR hereunto annexed dated the 24th
day of September 1971

[Signature]

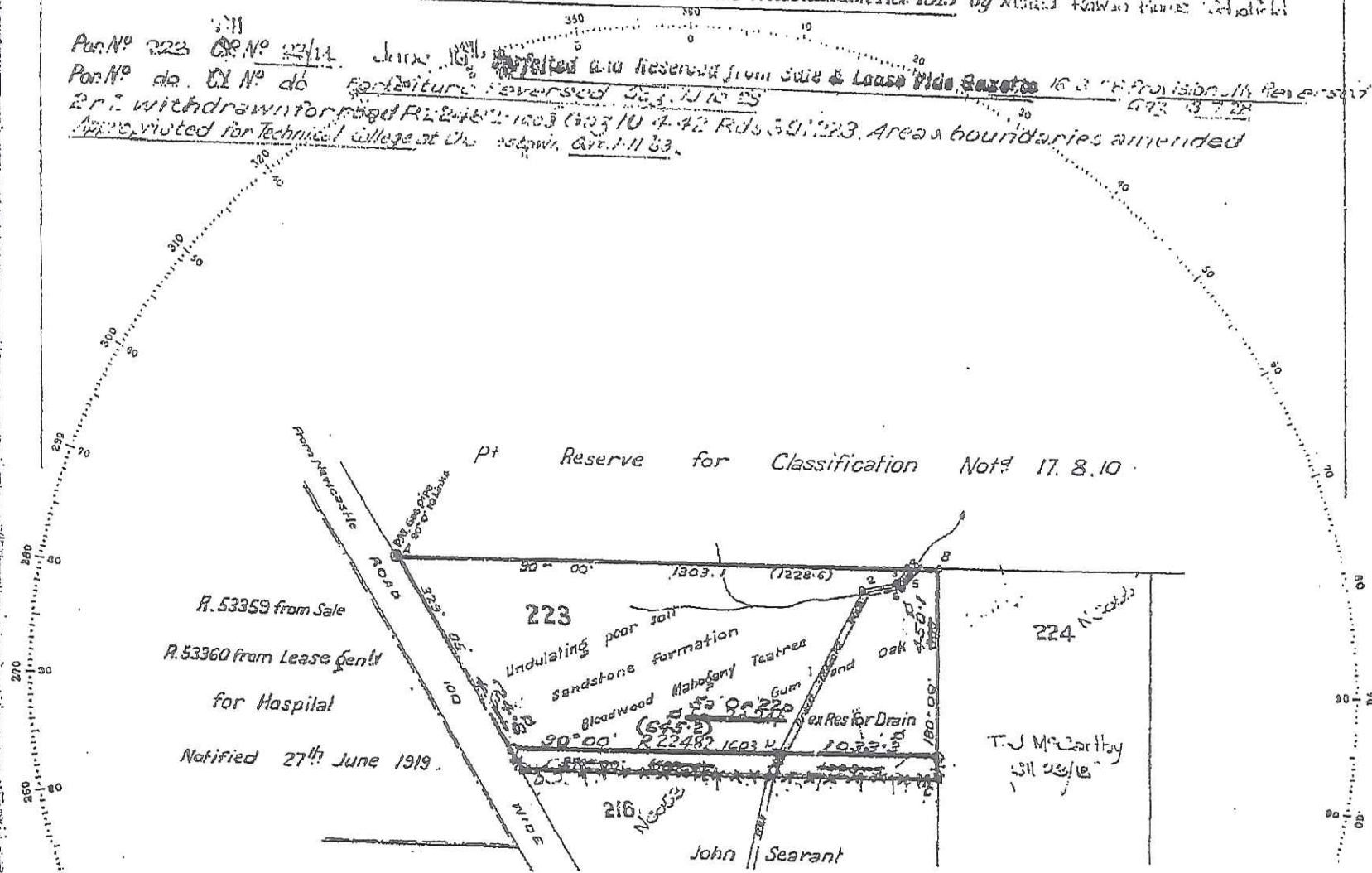
State Crown Solicitor
Goodell Building
8-12 Chifley Square
Sydney
20155

Al. supers

LAND BOARD DISTRICT OF Maitland

Holding. Eastern Division.

Plan No 223 CEN No 22/14 June 1971 ~~Refuted and reserved from sale & Lease vide Gazette No 3 Provisionally Reserved~~
 Plan No do CEN No do ~~Fortification reversed 26.1.1975~~
 RZ withdrawn formed RZ 24/12/1973 (Gaz 10.4.72 Rds 59, 123. Area boundaries amended)
 Approved for Technical College at Ch. Estwar, Oct. 1973.



100a5L00347

B20

/Req:K933640

/CP 06054-2111

CL	LINKS	METRES
	0-1	0-020
	10	2-012
	29-7	5-975
	90-4	18-186
	95-1	19-131
	95-2	19-151
	100	20-117
	124-5	25-045
	145-6	29-290
	269	54-114
	284	57-132
	319-9	64-354



CONVERSION TABLE ADDED IN
DEPARTMENT OF LANDS

CL	LINKS	METRES
	0-1	0-020
	5	1-006
	19-4	3-903
	29-7	5-975
	33-2	6-679
	36-7	7-383
	46-2	9-294
	72-5	14-585
	86-2	17-341
	89-6	18-025
	100	20-117
	145-6	29-290



CONVERSION TABLE ADDED
DEPARTMENT OF LANDS

CL	LINKS	METRE
	0-1	0-02
	36-7	7-38
	50	10-05
	60-4	12-15
	95-2	19-15
	95-3	19-17
	100	20-11
	102-8	20-68
	115-7	23-27
	405-3	81-53
	500	100-5A

STATEMENT OF ENVIRONMENTAL EFFECTS

PROPOSED DEMOLITION OF EXISTING BUILDINGS

FORMER CHARLESTOWN TAFE, TIRAL STREET, CHARLESTOWN

Prepared on behalf of:
UNITING CARE AGEING

Prepared for Submission to:
LAKE MACQUARIE CITY COUNCIL

Prepared by:



ABN 23 104 067 405
7 Canberra Street
PO Box 850 Charlestown NSW 2290
P 02 4942 5441
F 02 4942 5301
E admin@de Witt Consulting.com.au
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November 2010

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Appendix 4:	Plan of Demolition prepared by de Witt Consulting
Appendix 5:	Waste Management Plan prepared by Hale Development Services
Appendix 6:	Additional Photos taken around the site

1. INTRODUCTION

1.1 Overview of Proposed Development

This Statement of Environmental Effects ("SEE") has been prepared on behalf of Uniting Care Ageing ("the applicant") to accompany a development application ("DA") for the demolition of the existing buildings on Part Lot 223 DP 551260 being No. 27 Tiral Street, Charlestown ("the Site"). The site presently accommodates a number of derelict buildings which were previously used by the Hunter Institute of Technology Charlestown TAFE. The intent of this DA is to 'clean up the site' through the demolition and removal of existing structures.

The proposal has been formulated having full and proper regard to existing development controls and to the environmental qualities of the site and its surroundings. This SEE demonstrates that the proposal substantially complies with the development controls applying to the site.

1.2 Consent Authority

Lake Macquarie City Council ("Council") is the consent authority for the proposed development.

1.3 Integrated Development Provisions

The proposed development does **NOT** comprise Integrated Development pursuant to the provisions of Section 91 of the Environmental Planning and Assessment Act, 1979.

1.4 Scope of Statement of Environmental Effects

This Statement of Environmental Effects ("SEE") accompanies a development application for the proposed development. It has been prepared on behalf of the applicant and includes the matters referred to in Section 79C of the Act and the matters required to be considered by Council.

The purpose of this SEE is to:

- Describe the land to which the DA relates and the character of the surrounding area.
- Describe the proposed development.
- Define the statutory planning framework within which the DA is to be assessed and determined.
- Assess the proposed development in the light of all relevant heads of consideration.

The following drawings, documents and specialist reports have been prepared in support of the DA and are included in the appendices:

- Location Plan (Appendix 1).
- Aerial Photo of Locality (Appendix 2).
- Zoning – Lake Macquarie LEP 2004 (Appendix 3).
- Plan of Demolition prepared by de Witt Consulting (Appendix 4).

- Waste Management Plan prepared by Hale Development Services (Appendix 5).
- Additional photos taken around the site (Appendix 6).

1.5 Discussions with Council

The proposed development was the subject of a pre DA meeting with Council Officer Cameron Alexander, Peter Matheson (Uniting Care) and Matthew de Witt (de Witt Consulting) on 22 Wednesday, 2010. The discussions surrounded the simple nature of the proposed DA and relevant Council requirements.

At this meeting it was indicated to Council that demolition would be kept mainly to above ground structures, walls roof, sheds, internal fencing and the like. The intent of the demolition is to “clean up” the site which has been the subject of numerous vandalism attacks and theft of building materials. It is not intended to remove existing car parks, bitumen and subsurface structures that may result in significant soil exposure or disturbance, which may require additional consideration. It is not envisaged any significant vegetation would be removed as part of this DA. There may be some shrubs and the like that are ultimately removed as a result of being located adjacent to the existing structures, however, as indicated, no significant vegetation is identified for removal.

Council indicated, because of the number of buildings to be removed, the DA would be advertised and the neighbours notified. Council acknowledge demolition would be kept above ground and therefore would not require investigations with relation to contamination, however, as part of further DA's pertaining to the site this would be required. Traffic was raised as a potential issue if there were a significant amount of trucks required for the demolition.

In addition, Council indicated that demolition contractors would have to carry out the demolition work in accordance with the relevant Australian Standards and Work Cover approvals. In addition, any contractor on site would have to consider asbestos due to the nature of the site, however this would be required as part of their work cover approval.

It was indicated that further consideration of environmental factors would be required as part of any future DA's with relation to the development of the site.

2. THE SITE

2.1 Location

The site is the former Hunter Institute of Technology Charlestown TAFE which was utilised as a Horticultural Campus site and has been vacant for a number of years. The site is bound by James Street to the north, Dudley Road to the west and Tiral Street to the south (see Location Plan in Appendix 1).

2.2 Title Details

The site comprises Part Lot 223 DP 551260, being No 27 Tiral Street, Charlestown.

This is depicted on the Plan of Demolition (see Appendix 4).

2.3 Areas

The site has a total area of approximately 2.079 ha with frontage to James Street of approximately 260.15 metres, frontage to Dudley Road of approximately 105.57 metres and frontage to Tiral Street of approximately 205.87 metres.

2.4 Easements

The site is affected by the following easements, as shown on the Plan of Demolition (see Appendix 4).

- Easement A is a drainage reserve 3.62m wide and variable wide DP 551260.
- Easement B to drain water 3.6m wide and variable DP 648824.

2.5 Physical Features

2.5.1 Vegetation and Trees

The site was previously used by the Charlestown TAFE as a horticultural campus, however, has been vacant for a number of years. As can be seen on the aerial photo (see Appendix 2) and the photos within this report, the site is predominantly developed comprising hardstand areas and vacant buildings. There is limited vegetation around the perimeter of the site particularly overgrowth along the Dudley Road and Tiral Street frontages.

2.5.2 Bushfire Prone Land

The site has been mapped by Lake Macquarie City Council as being part bushfire prone land.

2.6 Heritage

Neither the site nor the surrounding area is listed as a heritage item or is within a Heritage Conservation Area pursuant to the provisions of Lake Macquarie Local Environmental Plan 2004.

The site is not listed on the State Heritage Register or an Interim Heritage Order that is in force under the Heritage Act 1977.

2.7 Mine Subsidence

The site is located within a Mine Subsidence District, however, demolition of buildings is a deemed approval.

2.8 Existing Development

The site presently accommodates a number of buildings previously utilised by Charlestown TAFE. The location of these buildings can be seen on the aerial photo (see Appendix 2) and Plan of Demolition (see Appendix 4) as well the photos throughout this report.

The existing development and state of these structures can be seen on the various photos throughout this report, the images on the Plan of Demolition (see Appendix 4) and images provided in Appendix 6.



Photo 1: Northern Elevation of Building 8 as identified on Plan of Demolition.



Photo 2: Eastern elevation of Building 7 as identified on Plan of Demolition.



Photo 3: Eastern elevation of Buildings 1, 2 and 3 as identified on the Plan of Demolition.

3. CONTEXT

The general character of the site and surrounding area is shown in the location plan (see Appendix 1), aerial photo (see Appendix 2) and the photos throughout this report. The site is the former Charlestown TAFE and has been vacant for a number of years. The site is bounded by James Street to the north, Tiral Street to the south and Dudley Road to the west. The site is approximately 400m to the southeast of the new extensions of Charlestown Square Shopping Centre and the Pacific Highway which is an arterial road linking the various centres along the east coast of NSW.

The site is zoned part 2(2) Residential (Urban Living) and part 5 Infrastructure. The site is adjoined by land to the north, west and a portion to the east of the same 2(2) zoning. A portion of the site adjoins land zoned 2(1) Residential to the east and to the south. Land to the west is zoned 5(Infrastructure).

The land to the north, east and south consists of residential development being a mix of one and two storey dwellings. To the west are the Wansey Dialysis Centre and an Ambulance Service of NSW facility.



Photo 4: View of existing development to the south.



Photo 5: No. 29 Tiral Street to the east of subject site



4. PROPOSED DEVELOPMENT

4.1 Overview

The proposed development consists of the demolition of all existing structures on site. The site is the former Charlestown TAFE site which has been vacant for a number of years. As detailed throughout this report and as evident in the photos all of the buildings are derelict and have been the subject of vandalism since the time of the TAFE operations ceasing. The buildings in their current condition are not considered safe. The proposed demolition will remove these structures and enable the cleanup of the site.

In addition, the site may be slashed and tidied further after the demolition work, however, this will consist of tidying up along Dudley Road and within the site, to reduce adverse visual impacts and impacts associated with bushfire or rodents over the coming summer.

4.2 Traffic

The number of trucks removing waste from the site will be minimal and therefore there will be no impact on traffic and parking within the area. It is likely there will only be a small number of truck movements at different times throughout any day for short periods of time. It is unlikely that the demolition of all structures will occur on a single day and result in a significant number of trucks and machinery.

4.3 Contamination

No earthworks are proposed as part of this DA. Demolition and removal of above ground structures is the extent of this proposal with relation to ground disturbance. There will be no significant subsurface disturbance. In addition, the bitumen and concrete associated with car parking and the like will remain until future development of the site. Any contamination on site will be addressed as part of any future DA for the redevelopment of the site. In addition, the work cover approval required by the demolition contractor will be required to address any potential asbestos on site.

4.4 Waste Management

A preliminary Waste Management Plan has been prepared by Hale Development Services for the demolition works and is included in Appendix 5.



5. STATUTORY PLANNING CONTROLS

5.1 Relevant State Environmental Planning Policies

5.1.1 State Environmental Planning Policy No. 55 – Remediation of Land

State Environmental Planning Policy No. 55 – Remediation of Land ("SEPP No. 55") provides a Statewide planning approach to the remediation of contaminated land. SEPP 55 requires consent authorities to consider contamination and remediation when determining applications. With regard to the provisions of SEPP No. 55 it is relevant to refer to Section 3.4.1 of the "Managing Land Contamination: Guidelines" prepared by NSW Department of Planning and NSW DECC. This states the following in paragraph 2:

"Stage 2 - Detailed Investigation. A detailed investigation is only necessary when a preliminary investigation indicates that the land is contaminated or that it is, or was, formerly used as an activity in Table 1 and a land use change is proposed that has the potential to increase the risk of exposure to contamination."

In other words, detailed contamination investigations are only required where a preliminary investigation indicates that the land is contaminated and a land use change is proposed that has the potential to increase the risk of exposure to contamination. As no land use change is being proposed, no detailed investigations are required.

No investigation of the site has taken place at this stage as no earthworks or subsurface disturbance are proposed as part of this DA. The demolition relates to the above ground structures, bitumen and subsurface footings will remain. Investigation into potential contamination of the site will take place as part of any future DA for the redevelopment of the site.

5.2 Lake Macquarie Local Environmental Plan 2004

5.2.1 Overview

The Lake Macquarie Local Environmental Plan 2004 ("LEP 2004") was gazetted in March 2004 and zoned the site 2(2) Residential (Urban Living).

5.2.2 Clause 15 – Zoning and Permissibility

The site is zoned part 2(2) Residential (Urban Living) and part 5 infrastructure pursuant to the provisions of LEP 2004 (see Appendix 3). The objectives of the 2(2) Zone are as follows:

- "(a) provide for medium and high density housing, and*
- (b) encourage development of good quality design within the zone, and*
- (c) provide an environment where people can live and work in home businesses and professional services whilst maintaining the residential amenity of the surrounding area, and*
- (d) provide residents with good access to a range of urban services and facilities, and*
- (e) encourage amalgamation of existing lots to facilitate well designed medium and high density development, and*
- (f) provide for sustainable water cycle management."*

The objectives of the 5 Zone are as follows



- "(a) provide land for future infrastructure needs such as roads, drainage and other utilities, and*
- (b) provide land required for the expansion of existing community facilities or the development of new community facilities, and*
- (c) provide for limited development within the zone where it can be demonstrated that the development will not prejudice or have the potential to prejudice the intended future infrastructure development of that land, and*
- (d) ensure that development on adjacent or adjoining land zoned infrastructure does not prejudice future infrastructure development within that zone, and*
- (e) provide for sustainable water cycle management"*

The proposal is for the demolition of the derelict buildings on site with the intent being to clean up the site. The proposal is not contrary to any of the zone objectives and will assist with future development of the site that can be consistent with the relevant zone objectives. Any future development of the site would be subject to a separate DA.

5.2.3 Clause 25 – Demolition

Clause 25 of LEP 2004 states that consent is required for demolition.

5.2.4 Clause 30 – Control of Pollution

Clause 30 of LEP 2004 applies to the control of pollution (air, noise or water – including nutrient and sediment loading) and requires Council to be satisfied that all reasonable and practicable control measures will be implemented to minimise pollution likely to arise from the development.

It is anticipated that the development will not result in any significant noise or impact on any sensitive land uses.

In relation to air pollution, it is considered that the proposed use is not of a nature that would result in any significant or unreasonable levels of air pollution.

5.2.5 Clause 31 - Erosion and Sediment Control

Clause 31 applies to development that gives rise to the exposure of the surface soil of land to the action of wind or water, including earthworks and the removal of vegetation. Clause 31(2)(a) requires the Council to be satisfied that all reasonable and practicable erosion and sediment control measures will be carried out. Clauses 34(2)(b) and (c) provide specific requirements relating to developments where the area of soil surface exposure will be greater than 250 square metres.

The appropriate erosion and sediment control measures will be in place prior to demolition. However, no major surface disturbance is proposed that would result in significant soil surface exposure. The existing bitumen, concrete surfaces and the like located on the ground will remain. The implementation of an Erosion and Sediment Control Plan can be dealt with as a condition of any consent granted.

5.2.6 Clause 60 – Development on land adjoining 5 Zone

Clause 60 states consent must not be granted for development on land adjoining land within Zone 5 unless the consent authority is satisfied that the proposed development will be consistent with the efficient operation of the



potential or existing infrastructure development within the zone. The proposed demolition is to enable the clean up of the site. Any future development of the site will be subject to a separate DA.

5.3 Lake Macquarie Development Control Plan No. 1 – Principles of Development

Lake Macquarie Development Control Plan No. 1 – Principles of Development ("DCP 1") provides guidance to development of land under LEP 2004 and is intended to act as an integrated planning document in conjunction with LEP 2004. The primary objective of DCP 1 is to implement the Lifestyle 2020 Strategy by facilitating Ecologically Sustainable Development. DCP 1 adopts a performance approach to managing development and is represented in the following 3 key components:

- Intent Statements - outlining the underlying purpose of the Council requirements.
- Performance Criteria - detailing what outcomes need to be met to achieve the intent.
- Acceptable Solutions - the means, recommended by Council, of satisfying the performance criteria.

In addition, DCP 1 includes Area Plans which provide detailed place-specific requirements with statements of Desired Future Character and specific design advice. DCP 1 is an extensive document only parts of which are relevant to the proposed development.

Section 2.1.17 of the DCP relates to Building Waste Management. The management and recycling of demolition waste can be dealt with as a condition of any consent granted. In this regard it is relevant to note the following:

- I. All demolition work will be carried out by a commercial demolition contractor in compliance with the relevant standard – AS 2601 – the Demolition of Structures.
- II. All demolition work will be undertaken in compliance with Workcover Authority requirements.
- III. All services to the land will be sealed off prior to demolition.
- IV. It is proposed that the nominated structures will be demolished with minimal disturbance of the land and thus sediment loss from the site will be minimal. Where necessary, temporary sediment control measures will be installed prior to the commencement of demolition, to contain sediment on site.

The above can be incorporated as conditions of any consent granted and will ensure compliance with the relevant requirements of DCP No. 1.

A Waste Management Plan has been prepared by Hale Development Services and can be found in Appendix 5.

The number of trucks removing waste from the site will be minimal and therefore there will be no impact on traffic and parking within the area. The demolition will most likely occur by a single contractor limiting truck movements to a few per day.



6. ASSESSMENT OF ENVIRONMENTAL EFFECTS

In determining the subject DA, Council is required to consider those relevant matters listed in Section 79C(1) of the Environmental Planning and Assessment Act, 1979. Each of the relevant matters is addressed below.

6.1 Section 79C(1)(a) – Statutory Planning Considerations

Section 79C(1)(a) requires the consent authority to take into consideration:

- “(a) the provision of:*
- (i) any environmental planning instrument, and*
 - (ii) any draft environmental planning instrument that is or has been placed on public exhibition and details of which have been notified to the consent authority (unless the Director-General has notified the consent authority that the making of the draft instrument has been deferred indefinitely or has not been approved), and*
 - (iii) any development control plan, and*
 - (iiia) any planning agreement that has been entered into under section 93F, or any draft planning agreement that a developer has offered to enter into under section 93F, and*
 - (iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph), that apply to the land to which the development application relates”*

These matters (and others) are addressed in Sections 5 and 6 of this SEE. No planning agreement that has been entered into between the owner of the site and the Council.

Clauses 92, 93 and 94 of the Environmental Planning and Assessment Regulations 2000 prescribe four matters that must be considered, where relevant, for all DA's.

Clause 92 relates to what additional matters a consent authority must take into consideration in determining a DA. Clause 92(1)(b) requires the consent authority to take into consideration the provisions of AS 2601 – The Demolition of Structures when a DA is for the demolition of a building. As stated in Section 5.3, this would be dealt with as a condition of any consent granted. In regard to Clauses 93 and 94, none of these are relevant to the proposed development.

6.2 Section 79C(1)(b) – Environmental, Social and Economic Impacts

Section 79C(1)(b) requires the consent authority to consider:

- “(b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality.”*

The relevant matters are addressed below:

6.2.1 Impacts on the Natural Environment



The site is the former Charlestown TAFE site and contains a number of derelict buildings. As seen on the aerial photo (Appendix 2) and in the photos throughout this report the site consists of a mix of hardstand areas, derelict buildings and grassed and vegetated areas. There will be no impacts on biodiversity. This proposal will enable the site to be cleaned up.

Sediment fences will be erected around the site to control soil erosion if required, however, as indicated no major soil surface is proposed for alteration. Demolition is proposed for the above surface structures.

6.2.2 Impacts on the Built Environment

The proposed development comprises the demolition of a number of derelict buildings within a developed area. The existing derelict buildings on site are not consistent with the built environment.

The proposed demolition complies with Council's planning controls and will not have an adverse impact on the built environment. Given the developed nature of the area, the existing character and amenity of this area will not be altered in any significant way.

6.2.3 Social and Economic Impacts

The proposal will ensure the derelict buildings, which are presently unsafe, are demolished and the site is tidied up thereby having a positive social impact. At this stage, other than the jobs created during the demolition process, the economic impacts are considered minimal.

6.2.4 Traffic and Parking Impacts

The number of trucks removing waste from the site will be minimal and therefore there will be no impact on traffic and parking within the area.

6.3 Section 79C(1)(c) – The Suitability of the Site

Section 79C(1)(c) requires the consent authority to consider:

“(c) the suitability of the site for the development.”

The suitability of the site for the proposed development is dealt with in Section 2 and the site has been found to be eminently suitable for the proposed development. The site is zoned accordingly and is located within the existing town centre. The proposal will enable the removal of a number of derelict buildings which will in turn result in a clean and safe site.

6.4 Section 79C(1)(d) – Submissions

Section 79C(1)(d) requires the consent authority to consider:

“(d) any submissions made in accordance with this Act or the regulations”.

Any relevant representations will need to be considered by the Council in the determination of a future development application.

6.5 Section 79C(1)(e) – Public Interest

Section 79C(1)(e) requires the consent authority to consider:



"(e) *the public interest*".

The public interest is best served by the orderly and economic use of land for purposes permissible under the relevant planning regime and predominantly in accordance with the prevailing planning controls. The proposal is for the demolition of a number of derelict buildings on site. The intent of this DA is to clean up the site.

This is considered to be in the public interest.



7. CONCLUSION

This SEE has been prepared on behalf of Uniting Care Ageing to accompany a DA for the demolition of the existing buildings on Part Lot 223 DP 551260 being No. 27 Tiral Street, Charlestown. The site presently accommodates a number of derelict buildings which were previously used by the Hunter Institute of Technology Charlestown TAFE which was utilised as the Horticultural Campus, however, have been vacant for a number of years. The intent of this DA is to 'clean up the site' through the removal of existing structures.

The proposal has been formulated having full and proper regard to existing development controls and to the environmental qualities of the site and its surroundings. It comprises a permissible form of development that complies with the provisions of the relevant environmental planning instruments, as well as the provisions of Council's Development Control Plan No. 1.

The proposal is reasonable and appropriate when considered under the relevant heads of consideration in Section 79C(1) of the Environmental Planning and Assessment Act, 1979, and is worthy of favourable consideration by Council.

APPENDICES

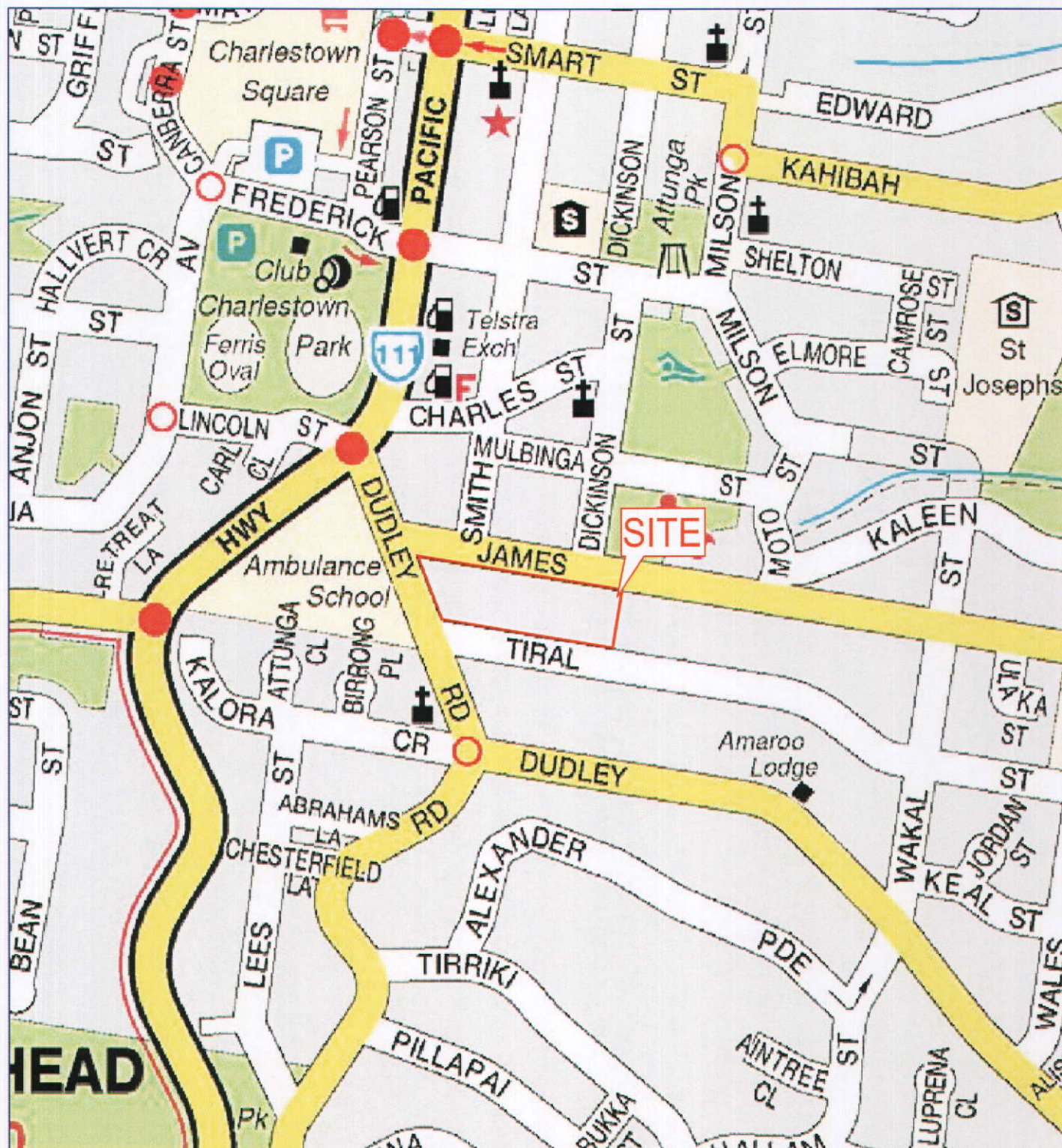
APPENDIX 1

Location Plan



PROPERTY REFERENCE :

PT. 223 D.P. 551260



de Witt Consulting

planning ■ surveying ■ project management

7 Canberra Street Charlestown NSW 2290 / PO Box 850 Charlestown NSW 2290
P 02 4942 5441 F 02 4942 5301 E admin@dwittconsulting.com.au
ABN 23 104 067 405

TITLE: LOCATION PLAN

JOB ADDRESS: TIRAL ST, CHARLESTOWN

CLIENT: UNITING CARE AGEING

SCALE: N/A

PLAN DATE: 23.09.10

CAD REF: N/A

DRAWN BT CHECKED MdeW
DESIGNED N/A APPROVED MdeW

DWG REF: 1180-LOCATION-23.09.10

JOB REF:

2243

DRAWING No.

1

APPENDIX 2

Aerial Photo of Locality



NORTH

PROPERTY REFERENCE :

PT. 223 D.P. 551260



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ABN 23 104 067 405

TITLE: AERIAL PHOTO

JOB ADDRESS: TIRAL ST, CHARLESTOWN

CLIENT: UNITING CARE AGEING

SCALE: N/A

PLAN DATE: 23.09.10

CAD REF: N/A

DRAWN BT CHECKED MdeW
DESIGNED N/A APPROVED MdeW

DWG REF: 1180-AERIAL-23.09.10

JOB REF:

2243

DRAWING No.

2

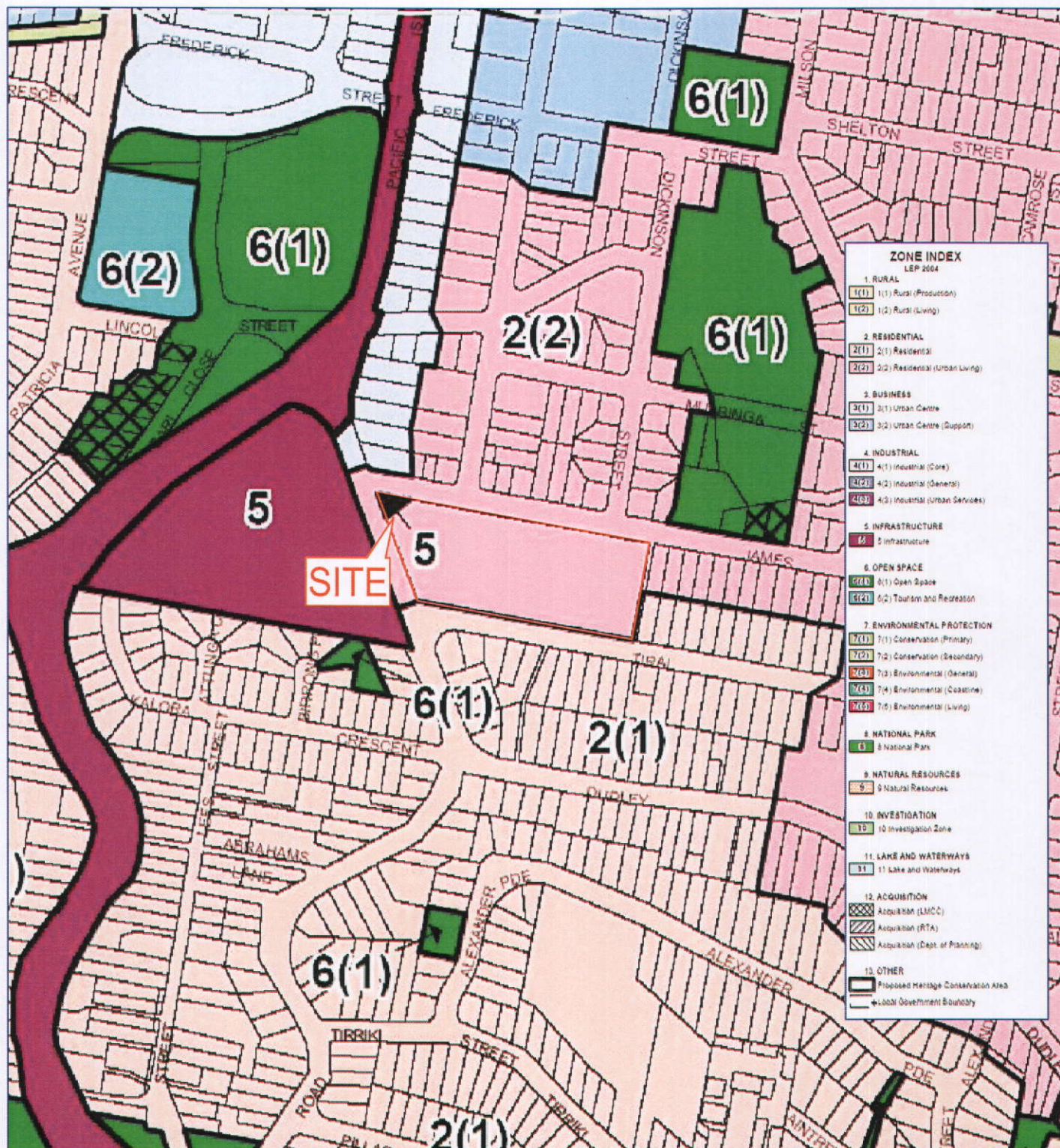
APPENDIX 3

Zoning – Lake Macquarie LEP 2004



PROPERTY REFERENCE :

PT. 223 D.P. 551260



ZONE INDEX	
LEP 2004	
1. RURAL	
1(1)	1(1) Rural (Production)
1(2)	1(2) Rural (Living)
2. RESIDENTIAL	
2(1)	2(1) Residential
2(2)	2(2) Residential (Urban Living)
3. BUSINESS	
3(1)	3(1) Urban Centre
3(2)	3(2) Urban Centre (Support)
4. INDUSTRIAL	
4(1)	4(1) Industrial (Core)
4(2)	4(2) Industrial (General)
4(3)	4(3) Industrial (Urban Services)
5. INFRASTRUCTURE	
5	5 Infrastructure
6. OPEN SPACE	
6(1)	6(1) Open Space
6(2)	6(2) Tourism and Recreation
7. ENVIRONMENTAL PROTECTION	
7(1)	7(1) Conservation (Primary)
7(2)	7(2) Conservation (Secondary)
7(3)	7(3) Environmental (General)
7(4)	7(4) Environmental (Coastline)
7(5)	7(5) Environmental (Living)
8. NATIONAL PARK	
8	8 National Park
9. NATURAL RESOURCES	
9	9 Natural Resources
10. INVESTIGATION	
10	10 Investigation Zone
11. LAKE AND WATERWAYS	
11	11 Lake and Waterway
12. ACQUISITION	
Acquisition (LMCC)	
Acquisition (RTA)	
Acquisition (Dept. of Planning)	
13. OTHER	
Proposed Heritage Conservation Area	
Local Government Boundary	



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ABN 23 104 067 405

TITLE: ZONING PLAN

JOB ADDRESS: TIRAL ST, CHARLESTOWN

CLIENT: UNITING CARE AGEING

SCALE: N/A

PLAN DATE: 23.09.10

CAD REF: N/A

DRAWN BT
DESIGNED N/A

CHECKED MdeW
APPROVED MdeW

DWG REF: 1180-ZONING-23.09.10

JOB REF:

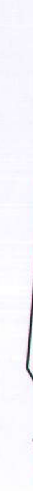
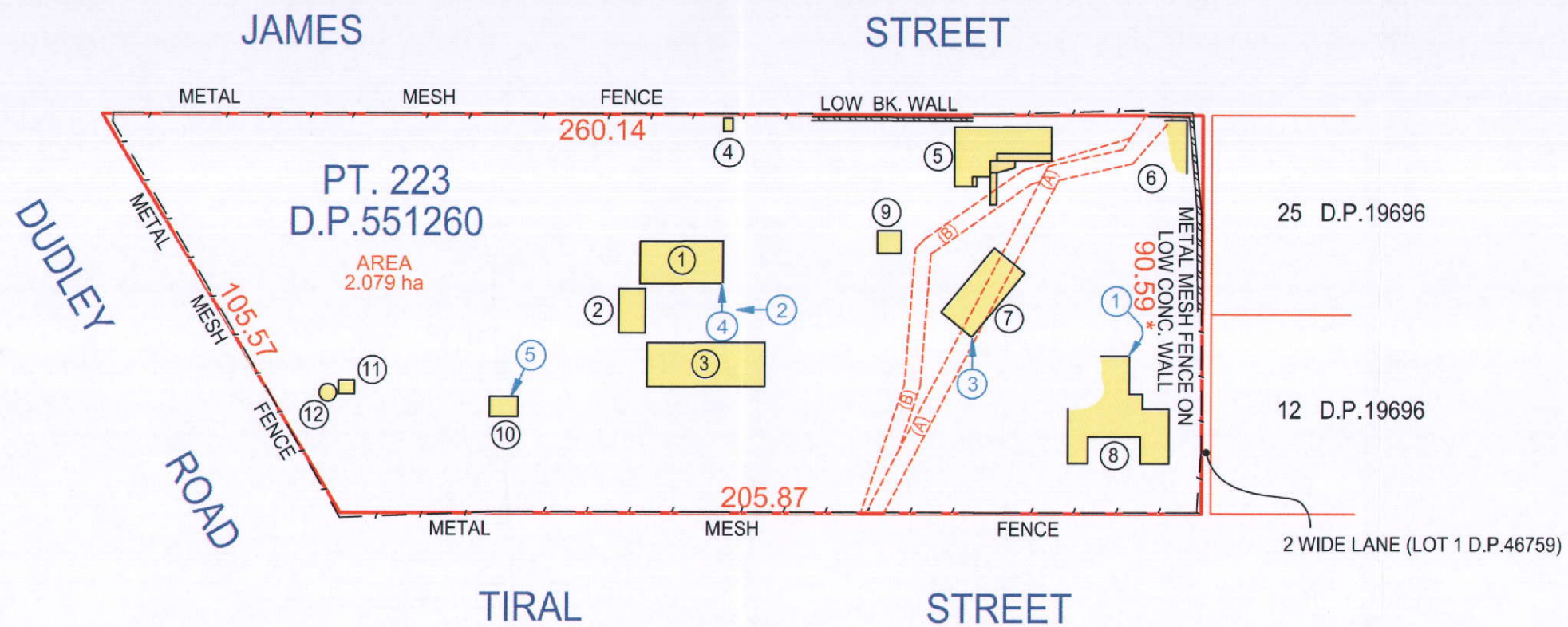
2243

DRAWING No.

3

APPENDIX 4

Plan of Demolition prepared by de Witt Consulting



PHOTOGRAPH 1



PHOTOGRAPH 2



PHOTOGRAPH 3



PHOTOGRAPH 4



PHOTOGRAPH 5

LEGEND

— / — FENCE LINE
— BOUNDARY LINE
- - - EASEMENT

BUILDING LEGEND

- | | | | |
|---|--------------------------------|--|-----------------|
| ① CONC. & METAL ROOF BUILDINGS (DERELICT) | ④ TIMBER PERGOLA | ⑦ BK. & TIMBER BUILDING (DERELICT) | ⑩ BRICK SHED |
| ② CONC. & METAL ROOF BUILDINGS (DERELICT) | ⑤ METAL CLAD DERELICT BUILDING | ⑧ 1 & 2 STOREY BK. BUILDING (DERELICT) | ⑪ METAL SHED |
| ③ CONC. & METAL ROOF BUILDINGS (DERELICT) | ⑥ TIMBER PERGOLA | ⑨ TIMBER SHED | ⑫ CONCRETE TANK |

(A) DRAINAGE RESERVE 3.62 WIDE & VARIABLE WIDE D.P.551260
(B) EASEMENT TO DRAIN WATER 3.6 WIDE & VARIABLE D.P.648824
* 90.59 D.P.648824 & SURVEY 90.55 TITLE

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ABN 23 104 067 406

TITLE

**PLAN OF DEMOLITION
FORMER CHARLESTOWN TAFE**

H		
G		
F		
E		
D		
C		
B		
A	14.09.10	INITIAL ISSUE
Ed.	Date	Amendment

JOB ADDRESS: No.27 TIRAL STREET CHARLESTOWN
CLIENT: UNITING CARE AGEING
SCALE: A3 1:750
SURVEY DATE: 20.01.10
PLAN DATE: 14.09.10
DATUM: N/A
CAD REF: -

ORIGIN OF LEVELS
N/A

DRAWN
SURVEYOR JL
CHECKED
APPROVED DH

DRAWING REF: 2243 Plan of Demolition 14.09.10

PLAN No
1

JOB REF:
2243

SHEET No
1/1

HUNTER WATER CORPORATION LTD
Lake Macquarie Customer Centre

- ☐ Building clear of Sewermain
- ☐ Building over/adjacent to sewer S85 form submitted
- ☐ Mains and boundaries subject to alterations
- ☐ No sewer available
- ☐ Section 50 Application taken and fee paid

☐ Return of the plans to HWC unnecessary

☐ If any of the following applications have been ticked,
you will be required to return to HWC and make the
relevant application(s) and pay the applicable fee(s)

Applications

- ☐ Water/sewer not yet available for connection
- ☐ Water connection ☐ Pre-laid
- ☐ Sewer connection (Council approved plans required)
- ☐ Sewer Service Access Charge
- ☐ Hydraulic Drawings (plans required)
- ☐ Trade Waste
- ☐ Pressure Sewer Connection
- ☒ Disconnection of Sewer ☐ Return Water Meter
- ☐ Systems Charge Applicable
- ☐ Other

Customer No: 9131300000

Checked by: VK Date: 22/11/10

APPENDIX 5

Waste Management Plan prepared by Hale Development Services

Waste Management Plan

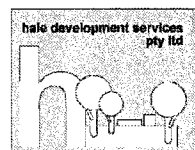
**For demolition and removal of
derelict structures associated with
the former Charlestown TAFE**

Lot 223 DP 551260

27 Tiral Street, Charlestown

by Uniting Care Ageing

September 2010



**Waste Management Plan
For a demolition and removal of
former TAFE buildings
at 27 Tiral Street, Charlestown
for Uniting Care Ageing**

Introduction

Uniting Care Ageing has acquired the property described above with a view to developing the site as an aged care facility. The existing structures are derelict and potentially dangerous and will be removed from the site. This application is for the demolition and removal of above ground structures. No new structures are proposed at this time.

The site

The site of the development is zoned 2(2) Urban (Living) apart from a small triangular section in the north-west corner that is zoned 5 Infrastructure. The site is located between the western ends of Tiral Street and James Street adjacent to Dudley Road. It was formerly used as a TAFE teaching facility for horticulture, landscaping, green keeping and associated subjects.

Description of proposal

The existing structures are derelict and potentially dangerous. They are attractive to vandals and arsonists and for safety reasons it is proposed to remove all significant above ground structures.

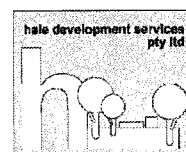
On-ground concrete slabs, road pavements, drainage structures, kerb and gutter and some minor retaining walls will remain for the time being.

Clearing of vegetation is not proposed and there is to be no earthworks.

Waste minimisation strategies

It is proposed to separate the materials during the work in order to maximise re-use and recycling opportunities. Bricks, concrete blocks and suspended concrete slabs will be broken up and taken to a crusher for re-sale as hard fill or road base as appropriate. Metal frames and roofing will be separated and taken to a metals recycler. Much of the timber on site has been assessed as unusable. It is not even suitable as firewood as some of it is treated timber. Fibre cement sheeting, lagging, or any other material that may contain asbestos, will be inspected and if found to be contaminated it will be removed by a licensed asbestos remover and disposed of to landfill in accordance with the requirements of the relevant council.

Food waste from workers on site during the demolition will be deposited in an on-site rubbish skip and removed by a commercial contractor.

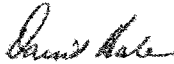


A schedule of demolition waste, indicating its estimated quantities and intended destination, is attached to this plan as Appendix 1.

Conclusion

This plan sets out the management of waste during the removal/demolition of derelict structures on Lot 223 DP 551260 at 27 Tiral Street, Charlestown. It describes the strategies to be put in place to minimise the amount of waste that will be disposed of to landfill as a result of the work. It is expected that an approximate total of 5 t of material will be disposed of to landfill as a result of the proposal. This very low amount is mainly due to the intention to crush and re-use concrete and bricks and to send metals to a recycler. It is not considered practical to reduce these quantities further. Of the estimated total of 271 t of materials to be removed it is expected that 266 t (98%) can be diverted away from landfill.

This plan demonstrates that the objective of minimising the quantity of material to be disposed of to landfill will be achieved.



David Hale

Hale Development Services Pty Ltd
September 2010

Demolition Waste Schedule

Material on site		Destination		
		Reuse and recycling		Disposal
Expected waste material	Expected volume/mass (m3)/(t)	On-site	Off-site	Location
Timber framing, flooring, minor structures	4.8/3.8			Place in general waste bin for removal to landfill - 3.8 t
Concrete blocks	72/87		Remove to concrete crusher/recycler - 87 t	
Concrete slabs	24/57		Break up and remove to concrete crusher/recycler - 57 t	
Metal frames, roofing, handrails, tennis fencing, light poles, tank	2/5.5		Remove to metals recycler - 5.5 t	
Fibre cement sheeting	0.6/1.2			Inspect to determine whether it contains asbestos. If so, remove by licensed asbestos remover and dispose of to landfill in accordance with Council's requirements. If it does not contain asbestos, place in general waste bin for removal to landfill - 1.2 t
Brick walls, footings, garden beds, etc	55/110		Break up and remove to concrete crusher/recycler - 110 t	
Tiles	4/6		Remove to concrete crusher/recycler - 6 t	
Glass	0.3/0.1			Place in general waste bin - 0.1 t
Food waste	0.12/0.03			Scraps placed in general waste bin and removed by contractor to landfill - say 0.03 t
Total	163/271	0	266	5

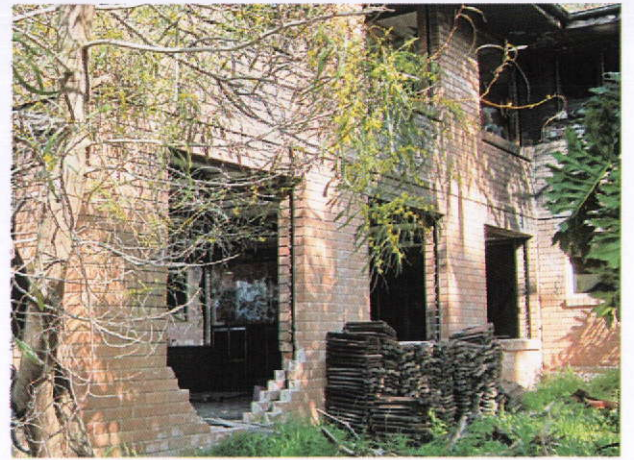
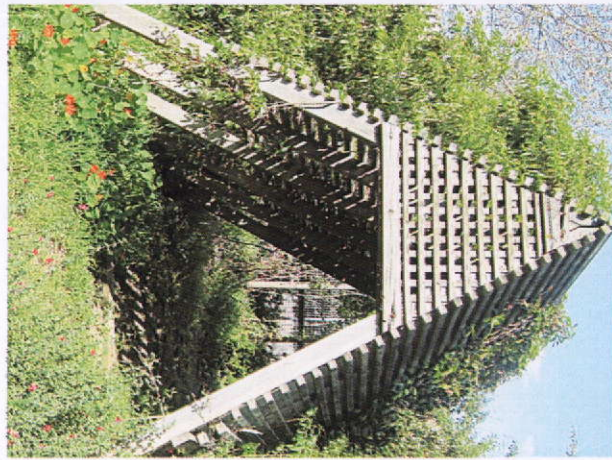
Note:

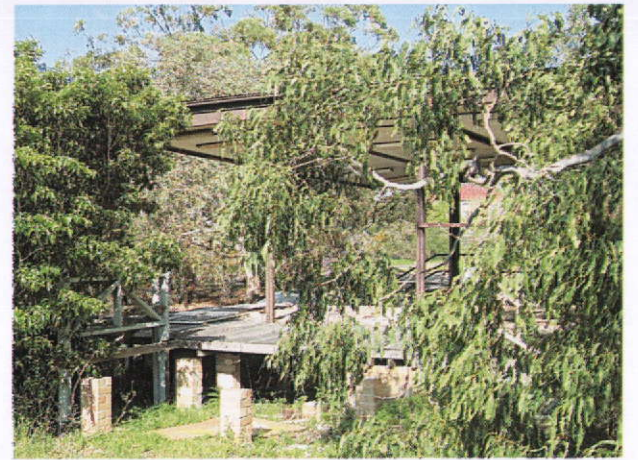
Any materials suspected of containing asbestos are to be inspected and if found to be contaminated they are to be removed by a licensed asbestos remover and disposed of to landfill in accordance with Council's directions/requirements.

APPENDIX 6

Additional site photos



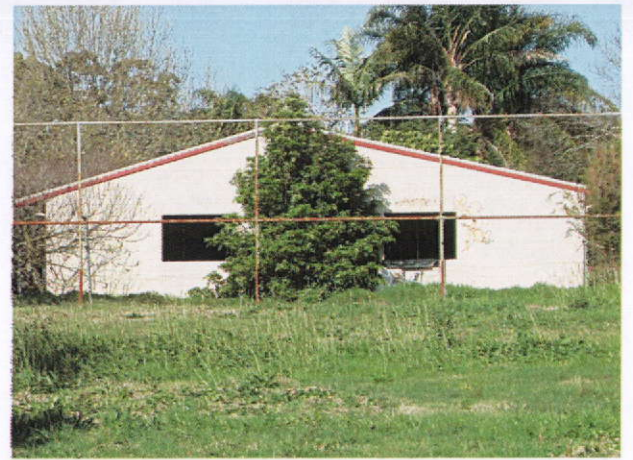














Appendix C

Laboratory Reports

Table C1 – Summary of Laboratory Testing

Table C2 – Summary of Asbestos Testing

Table C3 – Laboratory Results for TCLP Testing

Table C4 – Summary of Field Sieving Results

CERTIFICATE OF ANALYSIS 235714

Client Details

Client	Douglas Partners Newcastle
Attention	Matthew Blackert, Paulo Sebastian
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	<u>102007.01, Charlestown</u>
Number of Samples	25 Soil, 7 Material
Date samples received	31/01/2020
Date completed instructions received	31/01/2020

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
 Samples were analysed as received from the client. Results relate specifically to the samples as received.
 Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	07/02/2020
Date of Issue	11/02/2020
Reissue Details	This report replaces R00 created on 06/02/2020 due to: sample ID error
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Asbestos Approved By

Analysed by Asbestos Approved Identifier: Aida Marner, Lucy Zhu
 Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By

Josh Williams, Senior Chemist
 Loren Bardwell, Senior Chemist
 Lucy Zhu, Asbestos Supervisor
 Priya Samarawickrama, Senior Chemist

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil

Our Reference		235714-1	235714-2	235714-3	235714-4	235714-5
Your Reference	UNITS	101 / 0.2	101 / 1.0	102 / 0.2	102 / 0.5	103 / 0.4
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	97	89	85	84	81

vTRH(C6-C10)/BTEXN in Soil

Our Reference		235714-6	235714-7	235714-8	235714-9	235714-10
Your Reference	UNITS	104 / 0.1	104 / 1.0	105 / 0.1	105 / 0.6	106 / 0.4
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	100	85	93	93	79

vTRH(C6-C10)/BTEXN in Soil

Our Reference		235714-11	235714-12	235714-13	235714-14	235714-15
Your Reference	UNITS	107 / 0.1	107 / 0.3	108 / 0.05	109 / 0.3	110 / 0.3
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	98	97	94	90	95

vTRH(C6-C10)/BTEXN in Soil

Our Reference		235714-16	235714-17	235714-18	235714-19	235714-20
Your Reference	UNITS	111 / 0.4	112 / 0.2	112 / 0.8	S1	S2
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	88	94	90	89	97

svTRH (C10-C40) in Soil						
Our Reference		235714-1	235714-2	235714-3	235714-4	235714-5
Your Reference	UNITS	101 / 0.2	101 / 1.0	102 / 0.2	102 / 0.5	103 / 0.4
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	<100	<100	<100
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	<100	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	72	74	70	70	71

svTRH (C10-C40) in Soil						
Our Reference		235714-6	235714-7	235714-8	235714-9	235714-10
Your Reference	UNITS	104 / 0.1	104 / 1.0	105 / 0.1	105 / 0.6	106 / 0.4
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	<100	<100	<100
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	<100	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	70	70	70	73	71

svTRH (C10-C40) in Soil

Our Reference		235714-11	235714-12	235714-13	235714-14	235714-15
Your Reference	UNITS	107 / 0.1	107 / 0.3	108 / 0.05	109 / 0.3	110 / 0.3
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	<100	<100	<100
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	<100	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	67	64	73	74	69

svTRH (C10-C40) in Soil

Our Reference		235714-16	235714-17	235714-18	235714-19	235714-20
Your Reference	UNITS	111 / 0.4	112 / 0.2	112 / 0.8	S1	S2
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	<100	<100	<100
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	<100	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	75	63	73	75	70

PAHs in Soil						
Our Reference		235714-1	235714-2	235714-3	235714-4	235714-5
Your Reference	UNITS	101 / 0.2	101 / 1.0	102 / 0.2	102 / 0.5	103 / 0.4
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.3	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	0.5	<0.1	0.2	<0.1
Pyrene	mg/kg	0.1	0.5	<0.1	0.2	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.4	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	0.4	<0.1	0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	0.4	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.3	<0.05	0.06	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	0.2	3.1	<0.05	0.52	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	89	98	94	97	94

PAHs in Soil						
Our Reference		235714-6	235714-7	235714-8	235714-9	235714-10
Your Reference	UNITS	104 / 0.1	104 / 1.0	105 / 0.1	105 / 0.6	106 / 0.4
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.2
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	0.2
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	93	98	97	101	102

PAHs in Soil						
Our Reference		235714-11	235714-12	235714-13	235714-14	235714-15
Your Reference	UNITS	107 / 0.1	107 / 0.3	108 / 0.05	109 / 0.3	110 / 0.3
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
Naphthalene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	0.06
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	0.3	<0.05	0.06
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	97	102	95	97	97

PAHs in Soil						
Our Reference		235714-16	235714-17	235714-18	235714-19	235714-20
Your Reference	UNITS	111 / 0.4	112 / 0.2	112 / 0.8	S1	S2
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	0.2	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	103	93	103	97	98

Organochlorine Pesticides in soil						
Our Reference		235714-1	235714-2	235714-3	235714-4	235714-5
Your Reference	UNITS	101 / 0.2	101 / 1.0	102 / 0.2	102 / 0.5	103 / 0.4
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	94	113	96	116	96

Organochlorine Pesticides in soil						
Our Reference		235714-6	235714-7	235714-8	235714-9	235714-10
Your Reference	UNITS	104 / 0.1	104 / 1.0	105 / 0.1	105 / 0.6	106 / 0.4
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	94	96	97	103	98

Organochlorine Pesticides in soil						
Our Reference		235714-11	235714-12	235714-13	235714-14	235714-15
Your Reference	UNITS	107 / 0.1	107 / 0.3	108 / 0.05	109 / 0.3	110 / 0.3
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	97	99	96	97	96

Organochlorine Pesticides in soil				
Our Reference		235714-16	235714-17	235714-18
Your Reference	UNITS	111 / 0.4	112 / 0.2	112 / 0.8
Date Sampled		24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	102	89	99

Organophosphorus Pesticides in Soil

Our Reference		235714-1	235714-2	235714-3	235714-4	235714-5
Your Reference	UNITS	101 / 0.2	101 / 1.0	102 / 0.2	102 / 0.5	103 / 0.4
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	94	113	96	116	96

Organophosphorus Pesticides in Soil

Our Reference		235714-6	235714-7	235714-8	235714-9	235714-10
Your Reference	UNITS	104 / 0.1	104 / 1.0	105 / 0.1	105 / 0.6	106 / 0.4
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	94	96	97	103	98

Organophosphorus Pesticides in Soil

Our Reference		235714-11	235714-12	235714-13	235714-14	235714-15
Your Reference	UNITS	107 / 0.1	107 / 0.3	108 / 0.05	109 / 0.3	110 / 0.3
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	97	99	96	97	96

Organophosphorus Pesticides in Soil

Our Reference		235714-16	235714-17	235714-18
Your Reference	UNITS	111 / 0.4	112 / 0.2	112 / 0.8
Date Sampled		24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	102	89	99

PCBs in Soil						
Our Reference		235714-1	235714-2	235714-3	235714-4	235714-5
Your Reference	UNITS	101 / 0.2	101 / 1.0	102 / 0.2	102 / 0.5	103 / 0.4
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	94	113	96	116	96

PCBs in Soil						
Our Reference		235714-6	235714-7	235714-8	235714-9	235714-10
Your Reference	UNITS	104 / 0.1	104 / 1.0	105 / 0.1	105 / 0.6	106 / 0.4
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	94	96	97	103	98

PCBs in Soil						
Our Reference		235714-11	235714-12	235714-13	235714-14	235714-15
Your Reference	UNITS	107 / 0.1	107 / 0.3	108 / 0.05	109 / 0.3	110 / 0.3
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	97	99	96	97	96

PCBs in Soil				
Our Reference		235714-16	235714-17	235714-18
Your Reference	UNITS	111 / 0.4	112 / 0.2	112 / 0.8
Date Sampled		24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil
Date extracted	-	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	102	89	99

Acid Extractable metals in soil						
Our Reference		235714-1	235714-2	235714-3	235714-4	235714-5
Your Reference	UNITS	101 / 0.2	101 / 1.0	102 / 0.2	102 / 0.5	103 / 0.4
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Arsenic	mg/kg	<4	5	<4	7	5
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	4	9	5	16	10
Copper	mg/kg	6	14	3	15	<1
Lead	mg/kg	5	48	2	30	12
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	2	1	8	<1
Zinc	mg/kg	17	100	25	110	26
Manganese	mg/kg	37	51	1,100	250	3
Iron	mg/kg	4,300	14,000	2,400	29,000	27,000
Aluminium	mg/kg	1,700	8,700	15,000	11,000	16,000
Selenium	mg/kg	<2	<2	<2	<2	<2
Tin	mg/kg	<1	2	<1	1	1
Antimony	mg/kg	<7	<7	<7	<7	<7
Magnesium	mg/kg	510	620	9,100	1,800	430
Cobalt	mg/kg	1	<1	<1	4	<1
Boron	mg/kg	<3	<3	6	<3	<3

Acid Extractable metals in soil						
Our Reference		235714-6	235714-7	235714-8	235714-9	235714-10
Your Reference	UNITS	104 / 0.1	104 / 1.0	105 / 0.1	105 / 0.6	106 / 0.4
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Arsenic	mg/kg	<4	6	9	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	9	11	7	2	7
Copper	mg/kg	5	7	8	5	7
Lead	mg/kg	3	30	21	13	6
Mercury	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	7	2	6	<1	5
Zinc	mg/kg	17	43	61	22	53
Manganese	mg/kg	150	6	140	6	160
Iron	mg/kg	8,600	20,000	7,300	1,900	6,700
Aluminium	mg/kg	3,600	14,000	5,300	4,400	3,400
Selenium	mg/kg	<2	<2	<2	<2	<2
Tin	mg/kg	<1	2	<1	<1	<1
Antimony	mg/kg	<7	<7	<7	<7	<7
Magnesium	mg/kg	970	500	940	120	740
Cobalt	mg/kg	6	<1	3	<1	3
Boron	mg/kg	<3	<3	<3	<3	<3

Acid Extractable metals in soil						
Our Reference		235714-11	235714-12	235714-13	235714-14	235714-15
Your Reference	UNITS	107 / 0.1	107 / 0.3	108 / 0.05	109 / 0.3	110 / 0.3
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Arsenic	mg/kg	7	4	10	11	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	6	13	7	6	7
Copper	mg/kg	10	2	7	12	7
Lead	mg/kg	5	18	14	39	39
Mercury	mg/kg	<0.1	<0.1	0.4	<0.1	<0.1
Nickel	mg/kg	8	2	7	3	<1
Zinc	mg/kg	28	6	58	87	75
Manganese	mg/kg	210	95	210	110	34
Iron	mg/kg	11,000	15,000	7,900	16,000	5,100
Aluminium	mg/kg	4,100	15,000	4,100	8,600	9,200
Selenium	mg/kg	<2	<2	<2	<2	<2
Tin	mg/kg	<1	1	<1	2	<1
Antimony	mg/kg	<7	<7	<7	<7	<7
Magnesium	mg/kg	1,100	910	820	680	370
Cobalt	mg/kg	5	2	4	3	<1
Boron	mg/kg	<3	<3	<3	<3	<3

Acid Extractable metals in soil						
Our Reference		235714-16	235714-17	235714-18	235714-19	235714-20
Your Reference	UNITS	111 / 0.4	112 / 0.2	112 / 0.8	S1	S2
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Arsenic	mg/kg	<4	5	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	4	5	2	<1	4
Copper	mg/kg	5	9	<1	<1	6
Lead	mg/kg	19	25	6	1	6
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	1	<1	<1	4
Zinc	mg/kg	57	44	<1	2	20
Manganese	mg/kg	54	61	2	270	88
Iron	mg/kg	7,100	5,500	2,600	160	4,300
Aluminium	mg/kg	5,100	5,300	3,200	14,000	1,800
Selenium	mg/kg	<2	<2	<2	<2	<2
Tin	mg/kg	<1	<1	<1	<1	<1
Antimony	mg/kg	<7	<7	<7	<7	<7
Magnesium	mg/kg	290	410	210	8,500	590
Cobalt	mg/kg	1	<1	<1	<1	2
Boron	mg/kg	<3	<3	<3	10	<3

Acid Extractable metals in soil		
Our Reference		235714-33
Your Reference	UNITS	101 / 0.2 - [TRIPLICATE]
Date Sampled		24/01/2020
Type of sample		Soil
Date prepared	-	03/02/2020
Date analysed	-	03/02/2020
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	3
Copper	mg/kg	5
Lead	mg/kg	5
Mercury	mg/kg	<0.1
Nickel	mg/kg	2
Zinc	mg/kg	13
Manganese	mg/kg	31
Iron	mg/kg	3,400
Aluminium	mg/kg	1,300
Selenium	mg/kg	<2
Tin	mg/kg	<1
Antimony	mg/kg	<7
Magnesium	mg/kg	330
Cobalt	mg/kg	<1
Boron	mg/kg	<3

Misc Inorg - Soil			
Our Reference		235714-9	235714-12
Your Reference	UNITS	105 / 0.6	107 / 0.3
Date Sampled		24/01/2020	24/01/2020
Type of sample		Soil	Soil
Date prepared	-	04/02/2020	04/02/2020
Date analysed	-	04/02/2020	04/02/2020
pH 1:5 soil:water	pH Units	5.9	4.9
Electrical Conductivity 1:5 soil:water	µS/cm	28	120
Chloride, Cl 1:5 soil:water	mg/kg	<10	20
Sulphate, SO ₄ 1:5 soil:water	mg/kg	<10	170

Moisture						
Our Reference	UNITS	235714-1	235714-2	235714-3	235714-4	235714-5
Your Reference		101 / 0.2	101 / 1.0	102 / 0.2	102 / 0.5	103 / 0.4
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
Moisture	%	1.7	16	2.2	10	20

Moisture						
Our Reference	UNITS	235714-6	235714-7	235714-8	235714-9	235714-10
Your Reference		104 / 0.1	104 / 1.0	105 / 0.1	105 / 0.6	106 / 0.4
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
Moisture	%	4.0	17	4.4	5.2	7.8

Moisture						
Our Reference	UNITS	235714-11	235714-12	235714-13	235714-14	235714-15
Your Reference		107 / 0.1	107 / 0.3	108 / 0.05	109 / 0.3	110 / 0.3
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
Moisture	%	6.1	25	4.5	11	15

Moisture						
Our Reference	UNITS	235714-16	235714-17	235714-18	235714-19	235714-20
Your Reference		111 / 0.4	112 / 0.2	112 / 0.8	S1	S2
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	03/02/2020	03/02/2020	03/02/2020	03/02/2020	03/02/2020
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
Moisture	%	6.5	7.8	7.9	<0.1	4.5

Asbestos ID - soils						
Our Reference	UNITS	235714-2	235714-5	235714-8	235714-15	235714-16
Your Reference		101 / 1.0	103 / 0.4	105 / 0.1	110 / 0.3	111 / 0.4
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
Sample mass tested	g	Approx. 30g	Approx. 30g	Approx. 25g	Approx. 30g	Approx. 30g
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Beige fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference	UNITS	235714-17	235714-23	235714-25	235714-27	235714-30
Your Reference		112 / 0.2	A2/S	A3/S	A8/S	A7/S
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	04/02/2020	04/02/2020	04/02/2020	04/02/2020	04/02/2020
Sample mass tested	g	Approx. 30g	Approx. 10g	Approx. 35g	Approx. 20g	Approx. 60g
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils		
Our Reference	UNITS	235714-32
Your Reference		A10/S
Date Sampled		24/01/2020
Type of sample		Soil
Date analysed	-	04/02/2020
Sample mass tested	g	Approx. 15g
Sample Description	-	Brown fine-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected

Asbestos ID - materials						
Our Reference	UNITS	235714-21	235714-22	235714-24	235714-26	235714-28
Your Reference		A4/F	A2/F	A3/F	A8/F	A6/F
Date Sampled		24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020
Type of sample		Material	Material	Material	Material	Material
Date analysed	-	06/02/2020	06/02/2020	06/02/2020	06/02/2020	06/02/2020
Mass / Dimension of Sample	-	114x92x5mm	130x79x4mm	78x32x4mm	116x54x4mm	111x76x4mm
Sample Description	-	A)Beige fibre cement material B)Paint	Beige compressed fibre cement material	Grey compressed fibre cement material	Beige compressed fibre cement material	A)Grey fibre cement material B)Paint
Asbestos ID in materials	-	a)Chrysotile asbestos detected Amosite asbestos detected B)No asbestos detected	No asbestos detected Organic fibres detected	Chrysotile asbestos detected	Chrysotile asbestos detected Amosite asbestos detected	A)Chrysotile asbestos detected B)No asbestos detected
Trace Analysis	-	No asbestos detected	No asbestos detected	[NT]	[NT]	No asbestos detected

Asbestos ID - materials			
Our Reference		235714-29	235714-31
Your Reference	UNITS	A7/F	A10/F
Date Sampled		24/01/2020	24/01/2020
Type of sample		Material	Material
Date analysed	-	06/02/2020	06/02/2020
Mass / Dimension of Sample	-	67x36x5mm	74x51x4mm
Sample Description	-	Beige compressed fibre cement material	A)Beige fibre cement material B)Paint
Asbestos ID in materials	-	No asbestos detected Organic fibres detected	A)Chrysotile asbestos detected Amosite asbestos detected B)No asbestos detected
Trace Analysis	-	No asbestos detected	No asbestos detected

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
AT-008	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Waters samples are filtered on receipt prior to analysis. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-012/017	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS.

Method ID	Methodology Summary
Org-012/017	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS and/or GC-MS/MS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-012/017	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	235714-2
Date extracted	-			03/02/2020	1	03/02/2020	03/02/2020		03/02/2020	03/02/2020
Date analysed	-			03/02/2020	1	03/02/2020	03/02/2020		03/02/2020	03/02/2020
TRH C ₆ - C ₉	mg/kg	25	Org-016	<25	1	<25	<25	0	99	98
TRH C ₆ - C ₁₀	mg/kg	25	Org-016	<25	1	<25	<25	0	99	98
Benzene	mg/kg	0.2	Org-016	<0.2	1	<0.2	<0.2	0	94	94
Toluene	mg/kg	0.5	Org-016	<0.5	1	<0.5	<0.5	0	99	97
Ethylbenzene	mg/kg	1	Org-016	<1	1	<1	<1	0	101	100
m+p-xylene	mg/kg	2	Org-016	<2	1	<2	<2	0	100	100
o-Xylene	mg/kg	1	Org-016	<1	1	<1	<1	0	97	98
naphthalene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	90	1	97	93	4	87	85

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	03/02/2020	03/02/2020		[NT]	[NT]
Date analysed	-			[NT]	11	03/02/2020	03/02/2020		[NT]	[NT]
TRH C ₆ - C ₉	mg/kg	25	Org-016	[NT]	11	<25	<25	0	[NT]	[NT]
TRH C ₆ - C ₁₀	mg/kg	25	Org-016	[NT]	11	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-016	[NT]	11	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-016	[NT]	11	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-016	[NT]	11	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-016	[NT]	11	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-016	[NT]	11	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-014	[NT]	11	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	[NT]	11	98	85	14	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	235714-2
Date extracted	-			03/02/2020	1	03/02/2020	03/02/2020		03/02/2020	03/02/2020
Date analysed	-			04/02/2020	1	04/02/2020	04/02/2020		04/02/2020	04/02/2020
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-003	<50	1	<50	<50	0	85	79
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-003	<100	1	<100	<100	0	89	83
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-003	<100	1	<100	<100	0	123	72
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-003	<50	1	<50	<50	0	85	79
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-003	<100	1	<100	<100	0	89	83
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-003	<100	1	<100	<100	0	123	72
Surrogate o-Terphenyl	%		Org-003	70	1	72	70	3	106	107

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	03/02/2020	03/02/2020		[NT]	[NT]
Date analysed	-			[NT]	11	04/02/2020	04/02/2020		[NT]	[NT]
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-003	[NT]	11	<50	<50	0	[NT]	[NT]
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-003	[NT]	11	<100	<100	0	[NT]	[NT]
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-003	[NT]	11	<100	<100	0	[NT]	[NT]
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-003	[NT]	11	<50	<50	0	[NT]	[NT]
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-003	[NT]	11	<100	<100	0	[NT]	[NT]
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-003	[NT]	11	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-003	[NT]	11	67	71	6	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	235714-2
Date extracted	-			03/02/2020	1	03/02/2020	03/02/2020		03/02/2020	03/02/2020
Date analysed	-			04/02/2020	1	04/02/2020	04/02/2020		04/02/2020	04/02/2020
Naphthalene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	104	95
Acenaphthylene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	96	88
Phenanthrene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	102	71
Anthracene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012/017	<0.1	1	0.1	0.1	0	100	86
Pyrene	mg/kg	0.1	Org-012/017	<0.1	1	0.1	0.1	0	98	85
Benzo(a)anthracene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	112	90
Benzo(b,j,k)fluoranthene	mg/kg	0.2	Org-012/017	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012/017	<0.05	1	<0.05	<0.05	0	100	88
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012/017	93	1	89	89	0	94	89

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	03/02/2020	03/02/2020		[NT]	[NT]
Date analysed	-			[NT]	11	04/02/2020	04/02/2020		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j,k)fluoranthene	mg/kg	0.2	Org-012/017	[NT]	11	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012/017	[NT]	11	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012/017	[NT]	11	97	92	5	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	235714-2
Date extracted	-			03/02/2020	1	03/02/2020	03/02/2020		03/02/2020	03/02/2020
Date analysed	-			04/02/2020	1	04/02/2020	04/02/2020		04/02/2020	04/02/2020
alpha-BHC	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	108	96
HCB	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	106	96
gamma-BHC	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	102	92
delta-BHC	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	112	102
Heptachlor Epoxide	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	104	98
gamma-Chlordane	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	104	100
Dieldrin	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	112	106
Endrin	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	102	102
Endosulfan II	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	98	93
Endrin Aldehyde	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	104	93
Methoxychlor	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-012/017	95	1	94	95	1	96	108

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	03/02/2020	03/02/2020		[NT]	[NT]
Date analysed	-			[NT]	11	04/02/2020	04/02/2020		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-012/017	[NT]	11	97	93	4	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	235714-2
Date extracted	-			03/02/2020	1	03/02/2020	03/02/2020		03/02/2020	03/02/2020
Date analysed	-			04/02/2020	1	04/02/2020	04/02/2020		04/02/2020	04/02/2020
Dichlorvos	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	112	124
Dimethoate	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	100	95
Fenitrothion	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	84	90
Malathion	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	92	92
Chlorpyrifos	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	98	95
Parathion	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	96	98
Bromophos-ethyl	mg/kg	0.1	AT-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	88	92
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-012/017	95	1	94	95	1	96	108

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	03/02/2020	03/02/2020		[NT]	[NT]
Date analysed	-			[NT]	11	04/02/2020	04/02/2020		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	AT-008	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-012/017	[NT]	11	97	93	4	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	235714-2
Date extracted	-			03/02/2020	1	03/02/2020	03/02/2020		03/02/2020	03/02/2020
Date analysed	-			04/02/2020	1	04/02/2020	04/02/2020		04/02/2020	04/02/2020
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	70	98
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-006	95	1	94	95	1	96	108

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	03/02/2020	03/02/2020		[NT]	[NT]
Date analysed	-			[NT]	11	04/02/2020	04/02/2020		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-006	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-006	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-006	[NT]	11	97	93	4	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	235714-2
Date prepared	-			03/02/2020	1	03/02/2020	03/02/2020		03/02/2020	03/02/2020
Date analysed	-			03/02/2020	1	03/02/2020	03/02/2020		03/02/2020	03/02/2020
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	111	98
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	105	94
Chromium	mg/kg	1	Metals-020	<1	1	4	2	67	112	101
Copper	mg/kg	1	Metals-020	<1	1	6	5	18	113	110
Lead	mg/kg	1	Metals-020	<1	1	5	4	22	116	102
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	98	100
Nickel	mg/kg	1	Metals-020	<1	1	2	1	67	106	99
Zinc	mg/kg	1	Metals-020	<1	1	17	12	34	111	128
Manganese	mg/kg	1	Metals-020	<1	1	37	29	24	103	93
Iron	mg/kg	10	Metals-020	<10	1	4300	2900	39	100	#
Aluminium	mg/kg	10	Metals-020	<10	1	1700	1000	52	110	#
Selenium	mg/kg	2	Metals-020	<2	1	<2	<2	0	100	90
Tin	mg/kg	1	Metals-020	<1	1	<1	<1	0	104	97
Antimony	mg/kg	7	Metals-020	<7	1	<7	<7	0	97	76
Magnesium	mg/kg	10	Metals-020	<10	1	510	240	72	108	93
Cobalt	mg/kg	1	Metals-020	<1	1	1	<1	0	103	93
Boron	mg/kg	3	Metals-020	<3	1	<3	<3	0	96	##

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	03/02/2020	03/02/2020		[NT]	[NT]
Date analysed	-			[NT]	11	03/02/2020	03/02/2020		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	11	7	7	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	11	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	11	6	8	29	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	11	10	12	18	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	11	5	6	18	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	11	8	8	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	11	28	35	22	[NT]	[NT]
Manganese	mg/kg	1	Metals-020	[NT]	11	210	180	15	[NT]	[NT]
Iron	mg/kg	10	Metals-020	[NT]	11	11000	16000	37	[NT]	[NT]
Aluminium	mg/kg	10	Metals-020	[NT]	11	4100	5200	24	[NT]	[NT]
Selenium	mg/kg	2	Metals-020	[NT]	11	<2	<2	0	[NT]	[NT]
Tin	mg/kg	1	Metals-020	[NT]	11	<1	<1	0	[NT]	[NT]
Antimony	mg/kg	7	Metals-020	[NT]	11	<7	<7	0	[NT]	[NT]
Magnesium	mg/kg	10	Metals-020	[NT]	11	1100	1500	31	[NT]	[NT]
Cobalt	mg/kg	1	Metals-020	[NT]	11	5	5	0	[NT]	[NT]
Boron	mg/kg	3	Metals-020	[NT]	11	<3	<3	0	[NT]	[NT]

QUALITY CONTROL: Misc Inorg - Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	[NT]
Date prepared	-			04/02/2020	[NT]	[NT]	[NT]	[NT]	04/02/2020	[NT]
Date analysed	-			04/02/2020	[NT]	[NT]	[NT]	[NT]	04/02/2020	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	102	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	[NT]	[NT]	91	[NT]
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	[NT]	[NT]	101	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Acid Extractable Metals in Soil:

-The laboratory RPD acceptance criteria has been exceeded for 235714-1 for Al and Mg. Therefore a triplicate result has been issued as laboratory sample number 235714-33.

-# Percent recovery is not possible to report due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

-## Low spike recovery was obtained for this sample. Sample matrix interference is suspected. However, an acceptable recovery was obtained for the LCS

Asbestos: A portion of the supplied samples were sub-sampled for asbestos analysis according to Envirolab procedures.

We cannot guarantee that these sub-samples are indicative of the entire sample.

Envirolab recommends supplying 40-50g of sample in its own container.

Note: Samples 235714-2, 5, 8, 15, 16 & 17 were sub-sampled from jars provided by the client.

Asbestos: Excessive sample volumes were provided for asbestos analysis.

A portion of the supplied samples were sub-sampled according to Envirolab procedures.

We cannot guarantee that these sub-samples are indicative of the entire sample.

Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.

Note: Samples 235714-23, 25, 27, 30 & 32 were sub-sampled from bags provided by the client.

Samples 235714-21, 28, 31; The supplied samples were sub-sampled (A & B) in order to accurately report the analytical results representative of the entire sample, as per AS4964-2004.

pH analysed out of holding time.

CERTIFICATE OF ANALYSIS 235965

Client Details

Client	Douglas Partners Newcastle
Attention	Matthew. Blackert
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	<u>102007.01, Charlestown</u>
Number of Samples	2 solid
Date samples received	05/02/2020
Date completed instructions received	05/02/2020

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	12/02/2020
Date of Issue	07/02/2020
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Results Approved By

Priya Samarawickrama, Senior Chemist

Authorised By



Nancy Zhang, Laboratory Manager

Misc Inorg - Soil			
Our Reference		235965-1	235965-2
Your Reference	UNITS	CP1	P107
Date Sampled		29/01/2020	29/01/2020
Type of sample		solid	solid
Date prepared	-	07/02/2020	07/02/2020
Date analysed	-	07/02/2020	07/02/2020
Presence of Coal Tar*	-	Absent	Absent

Method ID	Methodology Summary
RTA T542	Determination of Phenol in core samples as per RTA test method T542. This procedure gives an indication of whether a sample of asphalt has been made with coal tar. The coal tar method gives an approximate result with a high degree of uncertainty.

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

CERTIFICATE OF ANALYSIS 239281

Client Details

Client	Douglas Partners Newcastle
Attention	Matthew Blackert, Paulo Sebastian, Dana Wilson
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	<u>102007.01, Charlestown</u>
Number of Samples	24 Soil, 4 Material
Date samples received	19/03/2020
Date completed instructions received	19/03/2020

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	26/03/2020
Date of Issue	26/03/2020
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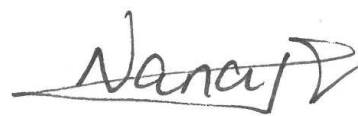
Asbestos Approved By

Analysed by Asbestos Approved Identifier: Panika Wongchanda
 Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By

Diego Bigolin, Team Leader, Inorganics
 Jaimie Loa-Kum-Cheung, Metals Supervisor
 Ken Nguyen, Reporting Supervisor
 Lucy Zhu, Asbestos Supervisor
 Priya Samarawickrama, Senior Chemist
 Ridwan Wijaya, Lab Team Leader
 Steven Luong, Organics Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil

Our Reference		239281-1	239281-2	239281-5	239281-6	239281-7
Your Reference	UNITS	201/0.3	202/0.3	204/0.2	205/0.1	206a/0.55
Date Sampled		17/03/2020	17/03/2020	17/03/2020	17/03/2020	17/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	25/03/2020	25/03/2020	25/03/2020	25/03/2020	25/03/2020
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	90	96	106	101	88

vTRH(C6-C10)/BTEXN in Soil

Our Reference		239281-11	239281-12	239281-13	239281-14	239281-16
Your Reference	UNITS	210/0.4	211/0.1	212/0.1	212/0.5	214/0.3
Date Sampled		17/03/2020	17/03/2020	17/03/2020	17/03/2020	17/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	25/03/2020	25/03/2020	25/03/2020	25/03/2020	25/03/2020
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	93	99	97	99	92

vTRH(C6-C10)/BTEXN in Soil

Our Reference		239281-18	239281-19	239281-20	239281-21	239281-23
Your Reference	UNITS	216/0.1	217/0.2	218/0.5	219/0.2	221/0.3
Date Sampled		18/03/2020	18/03/2020	18/03/2020	18/03/2020	18/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	25/03/2020	25/03/2020	25/03/2020	25/03/2020	25/03/2020
TRH C ₆ - C ₉	mg/kg	<25	<25	<25	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	<25	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	92	103	93	106	106

vTRH(C6-C10)/BTEXN in Soil

Our Reference		239281-24
Your Reference	UNITS	D5/JPS
Date Sampled		18/03/2020
Type of sample		Soil
Date extracted	-	23/03/2020
Date analysed	-	25/03/2020
TRH C ₆ - C ₉	mg/kg	<25
TRH C ₆ - C ₁₀	mg/kg	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<3
Surrogate aaa-Trifluorotoluene	%	93

svTRH (C10-C40) in Soil						
Our Reference		239281-1	239281-2	239281-5	239281-6	239281-7
Your Reference	UNITS	201/0.3	202/0.3	204/0.2	205/0.1	206a/0.55
Date Sampled		17/03/2020	17/03/2020	17/03/2020	17/03/2020	17/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	360
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	<100	<100	1,200
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	<100	<100	1,100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100	1,400
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	2,500
Surrogate o-Terphenyl	%	101	98	130	88	102

svTRH (C10-C40) in Soil						
Our Reference		239281-11	239281-12	239281-13	239281-14	239281-16
Your Reference	UNITS	210/0.4	211/0.1	212/0.1	212/0.5	214/0.3
Date Sampled		17/03/2020	17/03/2020	17/03/2020	17/03/2020	17/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	<100	<100	<100
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	<100	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	85	95	94	99	100

svTRH (C10-C40) in Soil

Our Reference		239281-18	239281-19	239281-20	239281-21	239281-23
Your Reference	UNITS	216/0.1	217/0.2	218/0.5	219/0.2	221/0.3
Date Sampled		18/03/2020	18/03/2020	18/03/2020	18/03/2020	18/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	23/03/2020	24/03/2020	24/03/2020	24/03/2020	23/03/2020
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	<100	<100	<100
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	<100	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	97	85	88	87	103

svTRH (C10-C40) in Soil

Our Reference		239281-24
Your Reference	UNITS	D5/JPS
Date Sampled		18/03/2020
Type of sample		Soil
Date extracted	-	23/03/2020
Date analysed	-	23/03/2020
TRH C ₁₀ - C ₁₄	mg/kg	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100
TRH >C ₁₀ -C ₁₆	mg/kg	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	95

PAHs in Soil						
Our Reference		239281-1	239281-2	239281-5	239281-6	239281-7
Your Reference	UNITS	201/0.3	202/0.3	204/0.2	205/0.1	206a/0.55
Date Sampled		17/03/2020	17/03/2020	17/03/2020	17/03/2020	17/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.5	<0.1	<0.1	4.2
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	1
Fluoranthene	mg/kg	<0.1	0.1	<0.1	0.2	13
Pyrene	mg/kg	<0.1	<0.1	<0.1	0.2	10
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	3.6
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	3.9
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	7.0
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	0.1	3.4
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	1.7
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.4
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	1.7
Total +ve PAH's	mg/kg	<0.05	0.65	<0.05	0.5	50
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	5.0
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	5.0
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	5.0
Surrogate <i>p</i> -Terphenyl-d14	%	80	74	82	72	77

PAHs in Soil						
Our Reference		239281-11	239281-12	239281-13	239281-14	239281-16
Your Reference	UNITS	210/0.4	211/0.1	212/0.1	212/0.5	214/0.3
Date Sampled		17/03/2020	17/03/2020	17/03/2020	17/03/2020	17/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	0.06
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	0.3
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	88	88	82	94	93

PAHs in Soil						
Our Reference		239281-18	239281-19	239281-20	239281-21	239281-23
Your Reference	UNITS	216/0.1	217/0.2	218/0.5	219/0.2	221/0.3
Date Sampled		18/03/2020	18/03/2020	18/03/2020	18/03/2020	18/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.2	<0.1	0.3	<0.1	<0.1
Pyrene	mg/kg	0.2	<0.1	0.3	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.1	<0.05	0.1	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	0.63	<0.05	1.3	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	100	98	95	94	94

PAHs in Soil		
Our Reference		239281-24
Your Reference	UNITS	D5/JPS
Date Sampled		18/03/2020
Type of sample		Soil
Date extracted	-	23/03/2020
Date analysed	-	23/03/2020
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j,k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Total +ve PAH's	mg/kg	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	92

Organochlorine Pesticides in soil						
Our Reference		239281-1	239281-2	239281-3	239281-5	239281-6
Your Reference	UNITS	201/0.3	202/0.3	203/0.1	204/0.2	205/0.1
Date Sampled		17/03/2020	17/03/2020	17/03/2020	17/03/2020	17/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	82	80	81	87	89

Organochlorine Pesticides in soil						
Our Reference		239281-7	239281-8	239281-9	239281-10	239281-11
Your Reference	UNITS	206a/0.55	207/01	208/0.3	209/0.1	210/0.4
Date Sampled		17/03/2020	17/03/2020	17/03/2020	17/03/2020	17/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	83	84	89	83	78

Organochlorine Pesticides in soil						
Our Reference		239281-12	239281-13	239281-14	239281-15	239281-16
Your Reference	UNITS	211/0.1	212/0.1	212/0.5	213/0.25	214/0.3
Date Sampled		17/03/2020	17/03/2020	17/03/2020	17/03/2020	17/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	81	75	97	92	94

Organochlorine Pesticides in soil						
Our Reference		239281-17	239281-18	239281-19	239281-20	239281-21
Your Reference	UNITS	215/0.2	216/0.1	217/0.2	218/0.5	219/0.2
Date Sampled		18/03/2020	18/03/2020	18/03/2020	18/03/2020	18/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	89	101	98	97	96

Organochlorine Pesticides in soil				
Our Reference		239281-22	239281-23	239281-24
Your Reference	UNITS	220/0.2	221/0.3	D5/JPS
Date Sampled		18/03/2020	18/03/2020	18/03/2020
Type of sample		Soil	Soil	Soil
Date extracted	-	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	23/03/2020	23/03/2020	23/03/2020
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	94	94	95

Organophosphorus Pesticides in Soil						
Our Reference		239281-1	239281-2	239281-3	239281-5	239281-6
Your Reference	UNITS	201/0.3	202/0.3	203/0.1	204/0.2	205/0.1
Date Sampled		17/03/2020	17/03/2020	17/03/2020	17/03/2020	17/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	82	80	81	87	89

Organophosphorus Pesticides in Soil						
Our Reference		239281-7	239281-8	239281-9	239281-10	239281-11
Your Reference	UNITS	206a/0.55	207/01	208/0.3	209/0.1	210/0.4
Date Sampled		17/03/2020	17/03/2020	17/03/2020	17/03/2020	17/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	83	84	89	83	78

Organophosphorus Pesticides in Soil

Our Reference		239281-12	239281-13	239281-14	239281-15	239281-16
Your Reference	UNITS	211/0.1	212/0.1	212/0.5	213/0.25	214/0.3
Date Sampled		17/03/2020	17/03/2020	17/03/2020	17/03/2020	17/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	81	75	97	92	94

Organophosphorus Pesticides in Soil

Our Reference		239281-17	239281-18	239281-19	239281-20	239281-21
Your Reference	UNITS	215/0.2	216/0.1	217/0.2	218/0.5	219/0.2
Date Sampled		18/03/2020	18/03/2020	18/03/2020	18/03/2020	18/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	89	101	98	97	96

Organophosphorus Pesticides in Soil				
Our Reference		239281-22	239281-23	239281-24
Your Reference	UNITS	220/0.2	221/0.3	D5/JPS
Date Sampled		18/03/2020	18/03/2020	18/03/2020
Type of sample		Soil	Soil	Soil
Date extracted	-	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	23/03/2020	23/03/2020	23/03/2020
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Chlorpyrifos	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	94	94	95

PCBs in Soil						
Our Reference	UNITS	239281-1	239281-2	239281-5	239281-6	239281-7
Your Reference		201/0.3	202/0.3	204/0.2	205/0.1	206a/0.55
Date Sampled		17/03/2020	17/03/2020	17/03/2020	17/03/2020	17/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	80	80	87	89	83

PCBs in Soil						
Our Reference	UNITS	239281-11	239281-12	239281-13	239281-14	239281-16
Your Reference		210/0.4	211/0.1	212/0.1	212/0.5	214/0.3
Date Sampled		17/03/2020	17/03/2020	17/03/2020	17/03/2020	17/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	78	81	75	97	94

PCBs in Soil						
Our Reference		239281-18	239281-19	239281-20	239281-21	239281-23
Your Reference	UNITS	216/0.1	217/0.2	218/0.5	219/0.2	221/0.3
Date Sampled		18/03/2020	18/03/2020	18/03/2020	18/03/2020	18/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	101	98	97	96	94

PCBs in Soil		
Our Reference		239281-24
Your Reference	UNITS	D5/JPS
Date Sampled		18/03/2020
Type of sample		Soil
Date extracted	-	23/03/2020
Date analysed	-	23/03/2020
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1
Surrogate TCMX	%	95

Acid Extractable metals in soil						
Our Reference		239281-1	239281-2	239281-5	239281-6	239281-7
Your Reference	UNITS	201/0.3	202/0.3	204/0.2	205/0.1	206a/0.55
Date Sampled		17/03/2020	17/03/2020	17/03/2020	17/03/2020	17/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	25/03/2020	25/03/2020	25/03/2020	25/03/2020	25/03/2020
Arsenic	mg/kg	<4	13	9	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	4	1	9	11	18
Copper	mg/kg	6	10	11	13	6
Lead	mg/kg	22	14	7	32	19
Mercury	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	<1	1	11	6	3
Zinc	mg/kg	58	34	32	120	77
Manganese	mg/kg	49	50	720	160	2,200
Iron	mg/kg	5,100	5,200	14,000	7,000	5,100
Aluminium	mg/kg	5,300	2,000	5,200	3,800	13,000
Selenium	mg/kg	<2	<2	<2	<2	<2
Tin	mg/kg	<1	<1	<1	<1	<1
Antimony	mg/kg	<7	<7	<7	<7	<7
Magnesium	mg/kg	280	650	2,300	880	3,300
Cobalt	mg/kg	<1	<1	7	3	2
Boron	mg/kg	<3	<3	<3	<3	10

Acid Extractable metals in soil						
Our Reference		239281-11	239281-12	239281-13	239281-14	239281-16
Your Reference	UNITS	210/0.4	211/0.1	212/0.1	212/0.5	214/0.3
Date Sampled		17/03/2020	17/03/2020	17/03/2020	17/03/2020	17/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	25/03/2020	25/03/2020	25/03/2020	25/03/2020	25/03/2020
Arsenic	mg/kg	5	5	<4	<4	34
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	0.5
Chromium	mg/kg	10	10	10	8	67
Copper	mg/kg	16	12	12	1	39
Lead	mg/kg	8	30	24	10	36
Mercury	mg/kg	<0.1	0.1	<0.1	<0.1	0.2
Nickel	mg/kg	14	7	8	<1	4
Zinc	mg/kg	50	68	52	9	110
Manganese	mg/kg	340	150	160	4	180
Iron	mg/kg	20,000	11,000	11,000	10,000	8,400
Aluminium	mg/kg	5,500	5,300	6,300	10,000	6,400
Selenium	mg/kg	<2	<2	<2	<2	<2
Tin	mg/kg	<1	<1	1	1	<1
Antimony	mg/kg	<7	<7	<7	<7	<7
Magnesium	mg/kg	1,600	930	1,200	630	660
Cobalt	mg/kg	8	3	4	<1	2
Boron	mg/kg	<3	<3	<3	<3	<3

Acid Extractable metals in soil						
Our Reference		239281-18	239281-19	239281-20	239281-21	239281-23
Your Reference	UNITS	216/0.1	217/0.2	218/0.5	219/0.2	221/0.3
Date Sampled		18/03/2020	18/03/2020	18/03/2020	18/03/2020	18/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	25/03/2020	25/03/2020	25/03/2020	25/03/2020	25/03/2020
Arsenic	mg/kg	<4	<4	11	<4	<4
Cadmium	mg/kg	<0.4	<0.4	0.7	<0.4	<0.4
Chromium	mg/kg	3	6	15	3	5
Copper	mg/kg	8	7	55	2	4
Lead	mg/kg	27	10	420	4	7
Mercury	mg/kg	<0.1	0.1	0.1	<0.1	<0.1
Nickel	mg/kg	2	3	8	2	3
Zinc	mg/kg	34	30	460	14	14
Manganese	mg/kg	29	74	340	52	130
Iron	mg/kg	3,900	5,600	13,000	2,800	9,100
Aluminium	mg/kg	2,600	3,200	6,600	1,300	5,600
Selenium	mg/kg	<2	<2	<2	<2	<2
Tin	mg/kg	<1	<1	3	<1	<1
Antimony	mg/kg	<7	<7	<7	<7	<7
Magnesium	mg/kg	350	450	910	430	470
Cobalt	mg/kg	<1	2	4	1	1
Boron	mg/kg	<3	<3	<3	<3	<3

Acid Extractable metals in soil			
Our Reference		239281-24	239281-29
Your Reference	UNITS	D5/JPS	201/0.3 - [TRIPLICATE]
Date Sampled		18/03/2020	17/03/2020
Type of sample		Soil	Soil
Date prepared	-	23/03/2020	23/03/2020
Date analysed	-	25/03/2020	25/03/2020
Arsenic	mg/kg	<4	<4
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	10	6
Copper	mg/kg	6	4
Lead	mg/kg	10	20
Mercury	mg/kg	<0.1	<0.1
Nickel	mg/kg	5	<1
Zinc	mg/kg	32	33
Manganese	mg/kg	410	37
Iron	mg/kg	13,000	7,700
Aluminium	mg/kg	7,200	8,400
Selenium	mg/kg	<2	<2
Tin	mg/kg	1	<1
Antimony	mg/kg	<7	<7
Magnesium	mg/kg	750	370
Cobalt	mg/kg	2	<1
Boron	mg/kg	<3	<3

Moisture						
Our Reference	UNITS	239281-1	239281-2	239281-3	239281-5	239281-6
Your Reference		201/0.3	202/0.3	203/0.1	204/0.2	205/0.1
Date Sampled		17/03/2020	17/03/2020	17/03/2020	17/03/2020	17/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	24/03/2020	24/03/2020	24/03/2020	24/03/2020	24/03/2020
Moisture	%	18	11	14	5.8	15

Moisture						
Our Reference	UNITS	239281-7	239281-8	239281-9	239281-10	239281-11
Your Reference		206a/0.55	207/01	208/0.3	209/0.1	210/0.4
Date Sampled		17/03/2020	17/03/2020	17/03/2020	17/03/2020	17/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	24/03/2020	24/03/2020	24/03/2020	24/03/2020	24/03/2020
Moisture	%	8.7	13	11	21	8.7

Moisture						
Our Reference	UNITS	239281-12	239281-13	239281-14	239281-15	239281-16
Your Reference		211/0.1	212/0.1	212/0.5	213/0.25	214/0.3
Date Sampled		17/03/2020	17/03/2020	17/03/2020	17/03/2020	17/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	24/03/2020	24/03/2020	24/03/2020	24/03/2020	24/03/2020
Moisture	%	11	10	21	11	16

Moisture						
Our Reference	UNITS	239281-17	239281-18	239281-19	239281-20	239281-21
Your Reference		215/0.2	216/0.1	217/0.2	218/0.5	219/0.2
Date Sampled		18/03/2020	18/03/2020	18/03/2020	18/03/2020	18/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	23/03/2020	23/03/2020	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	24/03/2020	24/03/2020	24/03/2020	24/03/2020	24/03/2020
Moisture	%	8.0	22	5.1	14	6.4

Moisture				
Our Reference	UNITS	239281-22	239281-23	239281-24
Your Reference		220/0.2	221/0.3	D5/JPS
Date Sampled		18/03/2020	18/03/2020	18/03/2020
Type of sample		Soil	Soil	Soil
Date prepared	-	23/03/2020	23/03/2020	23/03/2020
Date analysed	-	24/03/2020	24/03/2020	24/03/2020
Moisture	%	17	19	16

Asbestos ID - soils						
Our Reference	UNITS	239281-1	239281-2	239281-5	239281-6	239281-7
Your Reference		201/0.3	202/0.3	204/0.2	205/0.1	206a/0.55
Date Sampled		17/03/2020	17/03/2020	17/03/2020	17/03/2020	17/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	25/03/2020	25/03/2020	25/03/2020	25/03/2020	25/03/2020
Sample mass tested	g	Approx. 35g	Approx. 45g	Approx. 30g	Approx. 50g	Approx. 35g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
		Organic fibres detected	Organic fibres detected	Organic fibres detected	Organic fibres detected	Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference	UNITS	239281-11	239281-12	239281-13	239281-16	239281-18
Your Reference		210/0.4	211/0.1	212/0.1	214/0.3	216/0.1
Date Sampled		17/03/2020	17/03/2020	17/03/2020	17/03/2020	18/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	25/03/2020	25/03/2020	25/03/2020	25/03/2020	25/03/2020
Sample mass tested	g	Approx. 35g	Approx. 40g	Approx. 50g	Approx. 45g	Approx. 30g
Sample Description	-	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils					
Our Reference	UNITS	239281-19	239281-20	239281-21	239281-23
Your Reference		217/0.2	218/0.5	219/0.2	221/0.3
Date Sampled		18/03/2020	18/03/2020	18/03/2020	18/03/2020
Type of sample		Soil	Soil	Soil	Soil
Date analysed	-	25/03/2020	25/03/2020	25/03/2020	25/03/2020
Sample mass tested	g	Approx. 55g	Approx. 50g	Approx. 50g	Approx. 25g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown sandy soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - materials				
Our Reference	UNITS	239281-25	239281-26	239281-27
Your Reference		212/0-0.3F	218/0.5F	219/0.2F
Date Sampled		18/03/2020	18/03/2020	18/03/2020
Type of sample		Material	Material	Material
Date analysed	-	25/03/2020	25/03/2020	25/03/2020
Mass / Dimension of Sample	-	45x45x5mm	63x46x5mm	110x53x18mm
Sample Description	-	Brown fibre cement material	Grey fibre cement material	Beige fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected Amosite asbestos detected Crocidolite asbestos detected	Chrysotile asbestos detected Amosite asbestos detected	No asbestos detected Organic fibres detected
Trace Analysis	-	[NT]	[NT]	No asbestos detected

Phenoxy Acid Herbicides in Soil						
Our Reference		239281-6	239281-11	239281-12	239281-13	239281-16
Your Reference	UNITS	205/0.1	210/0.4	211/0.1	212/0.1	214/0.3
Date Sampled		17/03/2020	17/03/2020	17/03/2020	17/03/2020	17/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	24/03/2020	24/03/2020	24/03/2020	24/03/2020	24/03/2020
Date analysed	-	25/03/2020	25/03/2020	25/03/2020	25/03/2020	25/03/2020
Clpyralid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
3,5-Dichlorobenzoic acid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
o-chlorophenoxy acetic acid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
4-CPA	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dicamba	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
MCPP	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
MCPA	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorprop	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-D	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoxynil	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Triclopyr	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-TP	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-T	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
MCPB	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dinoseb	mg/kg	<1	<1	<1	<1	<1
2,4-DB	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ioxynil	mg/kg	<1	<1	<1	<1	<1
Picloram	mg/kg	<1	<1	<1	<1	<1
DCPA (Chlorthal) Diacid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acifluorfen	mg/kg	<2	<2	<2	<2	<2
2,4,6-T	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,6-D	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate 2,4- DCPA	%	120	120	120	120	120

Phenoxy Acid Herbicides in Soil						
Our Reference		239281-18	239281-19	239281-20	239281-21	239281-23
Your Reference	UNITS	216/0.1	217/0.2	218/0.5	219/0.2	221/0.3
Date Sampled		18/03/2020	18/03/2020	18/03/2020	18/03/2020	18/03/2020
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	24/03/2020	24/03/2020	24/03/2020	24/03/2020	24/03/2020
Date analysed	-	25/03/2020	25/03/2020	25/03/2020	25/03/2020	25/03/2020
Clopyralid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
3,5-Dichlorobenzoic acid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
o-chlorophenoxy acetic acid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
4-CPA	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dicamba	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
MCPP	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
MCPA	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorprop	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-D	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoxynil	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Triclopyr	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-TP	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-T	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
MCPB	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dinoseb	mg/kg	<1	<1	<1	<1	<1
2,4-DB	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ioxynil	mg/kg	<1	<1	<1	<1	<1
Picloram	mg/kg	<1	<1	<1	<1	<1
DCPA (Chlorthal) Diacid	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acifluorfen	mg/kg	<2	<2	<2	<2	<2
2,4,6-T	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
2,6-D	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate 2.4- DCPA	%	120	120	98	110	120

Coal Tar			
Our Reference		239281-4	239281-7
Your Reference	UNITS	204/0.01	206a/0.55
Date Sampled		17/03/2020	17/03/2020
Type of sample		Soil	Soil
Date prepared	-	24/03/2020	24/03/2020
Date analysed	-	24/03/2020	24/03/2020
Presence of Coal Tar*	-	Absent	Absent

Misc Inorg - Soil			
Our Reference		239281-5	239281-11
Your Reference	UNITS	204/0.2	210/0.4
Date Sampled		17/03/2020	17/03/2020
Type of sample		Soil	Soil
Date prepared	-	25/03/2020	25/03/2020
Date analysed	-	25/03/2020	25/03/2020
pH 1:5 soil:water	pH Units	9.0	6.0
Electrical Conductivity 1:5 soil:water	µS/cm	42	16

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
AT-008	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Ext-054	Analysed by MPL Envirolab
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-012/017	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS.
Org-012/017	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS and/or GC-MS/MS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.

Method ID	Methodology Summary
Org-012/017	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
RTA T542	Determination of Phenol in core samples as per RTA test method T542. This procedure gives an indication of whether a sample of asphalt has been made with coal tar. The coal tar method gives an approximate result with a high degree of uncertainty.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	239281-2
Date extracted	-			23/03/2020	1	23/03/2020	23/03/2020		23/03/2020	23/03/2020
Date analysed	-			25/03/2020	1	25/03/2020	25/03/2020		25/03/2020	25/03/2020
TRH C ₆ - C ₉	mg/kg	25	Org-016	<25	1	<25	<25	0	87	86
TRH C ₆ - C ₁₀	mg/kg	25	Org-016	<25	1	<25	<25	0	87	86
Benzene	mg/kg	0.2	Org-016	<0.2	1	<0.2	<0.2	0	92	96
Toluene	mg/kg	0.5	Org-016	<0.5	1	<0.5	<0.5	0	84	85
Ethylbenzene	mg/kg	1	Org-016	<1	1	<1	<1	0	87	84
m+p-xylene	mg/kg	2	Org-016	<2	1	<2	<2	0	87	82
o-Xylene	mg/kg	1	Org-016	<1	1	<1	<1	0	87	84
naphthalene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	105	1	90	95	5	95	97

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	23/03/2020	23/03/2020		[NT]	[NT]
Date analysed	-			[NT]	11	25/03/2020	25/03/2020		[NT]	[NT]
TRH C ₆ - C ₉	mg/kg	25	Org-016	[NT]	11	<25	<25	0	[NT]	[NT]
TRH C ₆ - C ₁₀	mg/kg	25	Org-016	[NT]	11	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-016	[NT]	11	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-016	[NT]	11	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-016	[NT]	11	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-016	[NT]	11	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-016	[NT]	11	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-014	[NT]	11	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	[NT]	11	93	94	1	[NT]	[NT]

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	21	23/03/2020	23/03/2020		[NT]	[NT]
Date analysed	-			[NT]	21	25/03/2020	25/03/2020		[NT]	[NT]
TRH C ₆ - C ₉	mg/kg	25	Org-016	[NT]	21	<25	<25	0	[NT]	[NT]
TRH C ₆ - C ₁₀	mg/kg	25	Org-016	[NT]	21	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-016	[NT]	21	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-016	[NT]	21	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-016	[NT]	21	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-016	[NT]	21	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-016	[NT]	21	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-014	[NT]	21	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	[NT]	21	106	94	12	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	239281-2
Date extracted	-			23/03/2020	1	23/03/2020	23/03/2020		23/03/2020	23/03/2020
Date analysed	-			23/03/2020	1	23/03/2020	23/03/2020		23/03/2020	23/03/2020
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-003	<50	1	<50	<50	0	85	119
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-003	<100	1	<100	<100	0	76	112
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-003	<100	1	<100	<100	0	106	119
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-003	<50	1	<50	<50	0	85	119
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-003	<100	1	<100	<100	0	76	112
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-003	<100	1	<100	<100	0	106	119
Surrogate o-Terphenyl	%		Org-003	112	1	101	107	6	106	129

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	23/03/2020	23/03/2020		[NT]	[NT]
Date analysed	-			[NT]	11	23/03/2020	23/03/2020		[NT]	[NT]
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-003	[NT]	11	<50	<50	0	[NT]	[NT]
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-003	[NT]	11	<100	<100	0	[NT]	[NT]
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-003	[NT]	11	<100	<100	0	[NT]	[NT]
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-003	[NT]	11	<50	<50	0	[NT]	[NT]
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-003	[NT]	11	<100	<100	0	[NT]	[NT]
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-003	[NT]	11	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-003	[NT]	11	85	95	11	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	21	23/03/2020	23/03/2020		[NT]	[NT]
Date analysed	-			[NT]	21	24/03/2020	24/03/2020		[NT]	[NT]
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-003	[NT]	21	<50	<50	0	[NT]	[NT]
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-003	[NT]	21	<100	<100	0	[NT]	[NT]
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-003	[NT]	21	<100	<100	0	[NT]	[NT]
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-003	[NT]	21	<50	<50	0	[NT]	[NT]
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-003	[NT]	21	<100	<100	0	[NT]	[NT]
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-003	[NT]	21	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-003	[NT]	21	87	89	2	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	239281-2
Date extracted	-			23/03/2020	1	23/03/2020	23/03/2020		23/03/2020	23/03/2020
Date analysed	-			23/03/2020	1	23/03/2020	23/03/2020		23/03/2020	23/03/2020
Naphthalene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	78	75
Acenaphthylene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	82	86
Phenanthrene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	88	115
Anthracene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	84	83
Pyrene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	80	74
Benzo(a)anthracene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	116	99
Benzo(b,j,k)fluoranthene	mg/kg	0.2	Org-012/017	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012/017	<0.05	1	<0.05	<0.05	0	82	64
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012/017	93	1	80	92	14	84	82

QUALITY CONTROL: PAHs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	23/03/2020	23/03/2020		[NT]	[NT]
Date analysed	-			[NT]	11	23/03/2020	23/03/2020		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j,k)fluoranthene	mg/kg	0.2	Org-012/017	[NT]	11	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012/017	[NT]	11	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012/017	[NT]	11	88	103	16	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	21	23/03/2020	23/03/2020		[NT]	[NT]
Date analysed	-			[NT]	21	23/03/2020	23/03/2020		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012/017	[NT]	21	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012/017	[NT]	21	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012/017	[NT]	21	94	96	2	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	239281-2
Date extracted	-			23/03/2020	1	23/03/2020	23/03/2020		23/03/2020	23/03/2020
Date analysed	-			23/03/2020	1	23/03/2020	23/03/2020		23/03/2020	23/03/2020
alpha-BHC	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	128	122
HCB	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	126	122
gamma-BHC	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	116	114
delta-BHC	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	118	130
Heptachlor Epoxide	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	116	114
gamma-Chlordane	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	110	124
Dieldrin	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	122	136
Endrin	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	112	116
Endosulfan II	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	118	134
Endrin Aldehyde	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	106	134
Methoxychlor	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-012/017	86	1	82	89	8	94	75

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	23/03/2020	23/03/2020		[NT]	[NT]
Date analysed	-			[NT]	11	23/03/2020	23/03/2020		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-012/017	[NT]	11	78	83	6	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	21	23/03/2020	23/03/2020		[NT]	[NT]
Date analysed	-			[NT]	21	23/03/2020	23/03/2020		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-012/017	[NT]	21	96	98	2	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	239281-2
Date extracted	-			23/03/2020	1	23/03/2020	23/03/2020		23/03/2020	23/03/2020
Date analysed	-			23/03/2020	1	23/03/2020	23/03/2020		23/03/2020	23/03/2020
Dichlorvos	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	76	82
Dimethoate	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	96	96
Fenitrothion	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	82	100
Malathion	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	108	65
Chlorpyrifos	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	104	122
Parathion	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	84	96
Bromophos-ethyl	mg/kg	0.1	AT-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	84	98
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-012/017	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-012/017	86	1	82	89	8	94	75

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	23/03/2020	23/03/2020		[NT]	[NT]
Date analysed	-			[NT]	11	23/03/2020	23/03/2020		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	AT-008	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-012/017	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-012/017	[NT]	11	78	83	6	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	21	23/03/2020	23/03/2020		[NT]	[NT]
Date analysed	-			[NT]	21	23/03/2020	23/03/2020		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos-methyl	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	AT-008	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-012/017	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-012/017	[NT]	21	96	98	2	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	239281-2
Date extracted	-			23/03/2020	1	23/03/2020	23/03/2020		23/03/2020	23/03/2020
Date analysed	-			23/03/2020	1	23/03/2020	23/03/2020		23/03/2020	23/03/2020
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	82	76
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-006	86	1	80	89	11	94	75

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	23/03/2020	23/03/2020		[NT]	[NT]
Date analysed	-			[NT]	11	23/03/2020	23/03/2020		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-006	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-006	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-006	[NT]	11	78	83	6	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	21	23/03/2020	23/03/2020		[NT]	[NT]
Date analysed	-			[NT]	21	23/03/2020	23/03/2020		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-006	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-006	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-006	[NT]	21	96	98	2	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	239281-2
Date prepared	-			23/03/2020	1	23/03/2020	23/03/2020		23/03/2020	23/03/2020
Date analysed	-			25/03/2020	1	25/03/2020	25/03/2020		25/03/2020	25/03/2020
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	109	#
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	100	104
Chromium	mg/kg	1	Metals-020	<1	1	4	7	55	114	116
Copper	mg/kg	1	Metals-020	<1	1	6	7	15	112	#
Lead	mg/kg	1	Metals-020	<1	1	22	20	10	114	125
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	85	#
Nickel	mg/kg	1	Metals-020	<1	1	<1	<1	0	106	115
Zinc	mg/kg	1	Metals-020	<1	1	58	25	80	106	#
Manganese	mg/kg	1	Metals-020	<1	1	49	35	33	110	#
Iron	mg/kg	10	Metals-020	<10	1	5100	8500	50	95	##
Aluminium	mg/kg	10	Metals-020	<10	1	5300	9200	54	117	##
Selenium	mg/kg	2	Metals-020	<2	1	<2	<2	0	102	106
Tin	mg/kg	1	Metals-020	<1	1	<1	<1	0	102	107
Antimony	mg/kg	7	Metals-020	<7	1	<7	<7	0	100	72
Magnesium	mg/kg	10	Metals-020	<10	1	280	540	63	106	##
Cobalt	mg/kg	1	Metals-020	<1	1	<1	<1	0	102	109
Boron	mg/kg	3	Metals-020	<3	1	<3	<3	0	103	###

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	239281-23
Date prepared	-			[NT]	11	23/03/2020	23/03/2020		[NT]	23/03/2020
Date analysed	-			[NT]	11	25/03/2020	25/03/2020		[NT]	25/03/2020
Arsenic	mg/kg	4	Metals-020	[NT]	11	5	4	22	[NT]	106
Cadmium	mg/kg	0.4	Metals-020	[NT]	11	<0.4	<0.4	0	[NT]	96
Chromium	mg/kg	1	Metals-020	[NT]	11	10	10	0	[NT]	104
Copper	mg/kg	1	Metals-020	[NT]	11	16	15	6	[NT]	113
Lead	mg/kg	1	Metals-020	[NT]	11	8	7	13	[NT]	105
Mercury	mg/kg	0.1	Metals-021	[NT]	11	<0.1	<0.1	0	[NT]	82
Nickel	mg/kg	1	Metals-020	[NT]	11	14	12	15	[NT]	103
Zinc	mg/kg	1	Metals-020	[NT]	11	50	51	2	[NT]	103
Manganese	mg/kg	1	Metals-020	[NT]	11	340	280	19	[NT]	91
Iron	mg/kg	10	Metals-020	[NT]	11	20000	19000	5	[NT]	##
Aluminium	mg/kg	10	Metals-020	[NT]	11	5500	6000	9	[NT]	##
Selenium	mg/kg	2	Metals-020	[NT]	11	<2	<2	0	[NT]	95
Tin	mg/kg	1	Metals-020	[NT]	11	<1	<1	0	[NT]	89
Antimony	mg/kg	7	Metals-020	[NT]	11	<7	<7	0	[NT]	84
Magnesium	mg/kg	10	Metals-020	[NT]	11	1600	1900	17	[NT]	##
Cobalt	mg/kg	1	Metals-020	[NT]	11	8	7	13	[NT]	99
Boron	mg/kg	3	Metals-020	[NT]	11	<3	<3	0	[NT]	###

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	21	23/03/2020	23/03/2020		[NT]	[NT]
Date analysed	-			[NT]	21	25/03/2020	25/03/2020		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	21	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	21	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	21	3	3	0	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	21	2	2	0	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	21	4	3	29	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	21	2	2	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	21	14	11	24	[NT]	[NT]
Manganese	mg/kg	1	Metals-020	[NT]	21	52	40	26	[NT]	[NT]
Iron	mg/kg	10	Metals-020	[NT]	21	2800	3700	28	[NT]	[NT]
Aluminium	mg/kg	10	Metals-020	[NT]	21	1300	1300	0	[NT]	[NT]
Selenium	mg/kg	2	Metals-020	[NT]	21	<2	<2	0	[NT]	[NT]
Tin	mg/kg	1	Metals-020	[NT]	21	<1	<1	0	[NT]	[NT]
Antimony	mg/kg	7	Metals-020	[NT]	21	<7	<7	0	[NT]	[NT]
Magnesium	mg/kg	10	Metals-020	[NT]	21	430	310	32	[NT]	[NT]
Cobalt	mg/kg	1	Metals-020	[NT]	21	1	1	0	[NT]	[NT]
Boron	mg/kg	3	Metals-020	[NT]	21	<3	<3	0	[NT]	[NT]

QUALITY CONTROL: Phenoxy Acid Herbicides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	239281-11
Date extracted	-			24/03/2020	6	24/03/2020	24/03/2020		24/03/2020	24/03/2020
Date analysed	-			25/03/2020	6	25/03/2020	25/03/2020		25/03/2020	25/03/2020
Clopyralid	mg/kg	0.5	Ext-054	<0.5	6	<0.5	<0.5	0	94	97
3,5-Dichlorobenzoic acid	mg/kg	0.5	Ext-054	<0.5	6	<0.5	<0.5	0	[NT]	[NT]
o-chlorophenoxy acetic acid	mg/kg	0.5	Ext-054	<0.5	6	<0.5	<0.5	0	[NT]	[NT]
4-CPA	mg/kg	0.5	Ext-054	<0.5	6	<0.5	<0.5	0	[NT]	[NT]
Dicamba	mg/kg	0.5	Ext-054	<0.5	6	<0.5	<0.5	0	[NT]	[NT]
MCPP	mg/kg	0.5	Ext-054	<0.5	6	<0.5	<0.5	0	[NT]	[NT]
MCPA	mg/kg	0.5	Ext-054	<0.5	6	<0.5	<0.5	0	[NT]	[NT]
Dichlorprop	mg/kg	0.5	Ext-054	<0.5	6	<0.5	<0.5	0	[NT]	[NT]
2,4-D	mg/kg	0.5	Ext-054	<0.5	6	<0.5	<0.5	0	70	79
Bromoxynil	mg/kg	0.5	Ext-054	<0.5	6	<0.5	<0.5	0	[NT]	[NT]
Triclopyr	mg/kg	0.5	Ext-054	<0.5	6	<0.5	<0.5	0	[NT]	[NT]
2,4,5-TP	mg/kg	0.5	Ext-054	<0.5	6	<0.5	<0.5	0	[NT]	[NT]
2,4,5-T	mg/kg	0.5	Ext-054	<0.5	6	<0.5	<0.5	0	82	85
MCPB	mg/kg	0.5	Ext-054	<0.5	6	<0.5	<0.5	0	[NT]	[NT]
Dinoseb	mg/kg	1	Ext-054	<1	6	<1	<1	0	[NT]	[NT]
2,4-DB	mg/kg	0.5	Ext-054	<0.5	6	<0.5	<0.5	0	[NT]	[NT]
Ioxynil	mg/kg	1	Ext-054	<1	6	<1	<1	0	[NT]	[NT]
Picloram	mg/kg	1	Ext-054	<1	6	<1	<1	0	[NT]	[NT]
DCPA (Chlorthal) Diacid	mg/kg	0.5	Ext-054	<0.5	6	<0.5	<0.5	0	[NT]	[NT]
Acifluorfen	mg/kg	2	Ext-054	<2	6	<2	<2	0	[NT]	[NT]
2,4,6-T	mg/kg	0.5	Ext-054	<0.5	6	<0.5	<0.5	0	[NT]	[NT]
2,6-D	mg/kg	0.5	Ext-054	<0.5	6	<0.5	<0.5	0	[NT]	[NT]
Surrogate 2,4- DCPA	%		Ext-054	120	6	120	120	0	112	122

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	[NT]
Date prepared	-			25/03/2020	[NT]	[NT]	[NT]	[NT]	25/03/2020	[NT]
Date analysed	-			25/03/2020	[NT]	[NT]	[NT]	[NT]	25/03/2020	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Acid Extractable Metals in Soil:

-The laboratory RPD acceptance criteria has been exceeded for 239281-1 for Cr, Zn, Fe, Al and Mg. Therefore a triplicate result has been issued as laboratory sample number 239281-29.

-# Percent recovery is not possible to report due to the inhomogeneous nature of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

-## Percent recovery is not possible to report due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

-### Low spike recovery was obtained for this sample. Sample matrix interference is suspected. However, an acceptable recovery was obtained for the LCS

Acid herbicides analysed by ELS Melbourne. Report no. 239281

CERTIFICATE OF ANALYSIS 239281-A

Client Details

Client	Douglas Partners Newcastle
Attention	Matthew. Blackert, Paulo Sebastian
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	<u>102007.01, Charlestown</u>
Number of Samples	24 Soil, 4 Material
Date samples received	19/03/2020
Date completed instructions received	30/03/2020

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	06/04/2020
Date of Issue	06/04/2020
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Results Approved By

Hannah Nguyen, Senior Chemist
Jaimie Loa-Kum-Cheung, Metals Supervisor
Josh Williams, Senior Chemist

Authorised By



Nancy Zhang, Laboratory Manager

Metals in TCLP USEPA1311			
Our Reference		239281-A-7	239281-A-20
Your Reference	UNITS	206a/0.55	218/0.5
Type of sample		Soil	Soil
Date extracted	-	03/04/2020	03/04/2020
Date analysed	-	03/04/2020	03/04/2020
pH of soil for fluid# determ.	pH units	8.4	7.3
pH of soil TCLP (after HCl)	pH units	1.7	1.7
Extraction fluid used	-	1	1
pH of final Leachate	pH units	5.1	5.0
Lead in TCLP	mg/L	[NA]	0.51

PAHs in TCLP (USEPA 1311)		
Our Reference		239281-A-7
Your Reference	UNITS	206a/0.55
Type of sample		Soil
Date extracted	-	02/04/2020
Date analysed	-	02/04/2020
Naphthalene in TCLP	mg/L	<0.001
Acenaphthylene in TCLP	mg/L	<0.001
Acenaphthene in TCLP	mg/L	<0.001
Fluorene in TCLP	mg/L	<0.001
Phenanthrene in TCLP	mg/L	0.002
Anthracene in TCLP	mg/L	<0.001
Fluoranthene in TCLP	mg/L	0.001
Pyrene in TCLP	mg/L	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001
Chrysene in TCLP	mg/L	<0.001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001
Total +ve PAH's	mg/L	0.0031
Surrogate <i>p</i> -Terphenyl-d14	%	89

CEC		
Our Reference		239281-A-11
Your Reference	UNITS	210/0.4
Type of sample		Soil
Date prepared	-	01/04/2020
Date analysed	-	01/04/2020
Exchangeable Ca	meq/100g	2.1
Exchangeable K	meq/100g	0.2
Exchangeable Mg	meq/100g	0.68
Exchangeable Na	meq/100g	<0.1
Cation Exchange Capacity	meq/100g	3.0

Method ID	Methodology Summary
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using in house method INORG-004. Please note that the mass used may be scaled down from the default based on sample mass available.
Metals-009	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Org-012/017	Leachates are extracted with Dichloromethane and analysed by GC-MS and/or GC-MS/MS.

Client Reference: 102007.01, Charlestown

QUALITY CONTROL: Metals in TCLP USEPA1311						Duplicate		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			03/04/2020	[NT]	[NT]	[NT]	[NT]	03/04/2020	[NT]
Date analysed	-			03/04/2020	[NT]	[NT]	[NT]	[NT]	03/04/2020	[NT]
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	[NT]	[NT]	[NT]	[NT]	93	[NT]

QUALITY CONTROL: PAHs in TCLP (USEPA 1311)					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			02/04/2020	[NT]	[NT]	[NT]	[NT]	02/04/2020	[NT]
Date analysed	-			02/04/2020	[NT]	[NT]	[NT]	[NT]	02/04/2020	[NT]
Naphthalene in TCLP	mg/L	0.001	Org-012/017	<0.001	[NT]	[NT]	[NT]	[NT]	116	[NT]
Acenaphthylene in TCLP	mg/L	0.001	Org-012/017	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene in TCLP	mg/L	0.001	Org-012/017	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene in TCLP	mg/L	0.001	Org-012/017	<0.001	[NT]	[NT]	[NT]	[NT]	110	[NT]
Phenanthrene in TCLP	mg/L	0.001	Org-012/017	<0.001	[NT]	[NT]	[NT]	[NT]	118	[NT]
Anthracene in TCLP	mg/L	0.001	Org-012/017	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene in TCLP	mg/L	0.001	Org-012/017	<0.001	[NT]	[NT]	[NT]	[NT]	102	[NT]
Pyrene in TCLP	mg/L	0.001	Org-012/017	<0.001	[NT]	[NT]	[NT]	[NT]	98	[NT]
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-012/017	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene in TCLP	mg/L	0.001	Org-012/017	<0.001	[NT]	[NT]	[NT]	[NT]	118	[NT]
Benzo(bjk)fluoranthene in TCLP	mg/L	0.002	Org-012/017	<0.002	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-012/017	<0.001	[NT]	[NT]	[NT]	[NT]	76	[NT]
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-012/017	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-012/017	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-012/017	<0.001	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012/017	95	[NT]	[NT]	[NT]	[NT]	97	[NT]

QUALITY CONTROL: CEC					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			01/04/2020	[NT]	[NT]	[NT]	[NT]	01/04/2020	[NT]
Date analysed	-			01/04/2020	[NT]	[NT]	[NT]	[NT]	01/04/2020	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Exchangeable K	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	101	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Exchangeable Na	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	[NT]	[NT]	116	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Table C1 - Summary of Laboratory Testing

Analyte		Units	PQL	ENM RRO 2014 - Abs Max	ENM RRO 2014 - Max Av	NSW EPA 2014 - General Solid Waste CT1 (No TCLP)	NSW EPA 2014 - Restricted Solid Waste CT2 (No TCLP)	NEPM 2013 Table 1A(1) Hills Res A Soil	NEPM 2013 Table 1A(1) Hills Res B Soil	NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand				NEPM 2013 EILs Res/Open Space Aged	NEPM 2013 Table 18(6) EILs for Urban Res, Coarse Soil	NEPM 2013 Table 18(7) Management Limits in Res / Parkland, Coarse Soil	Field ID	101 / 0.2	101 / 1.0	102 / 0.2	102 / 0.5	103 / 0.4	104 / 0.1	104 / 1.0	105 / 0.1	105 / 0.6	106 / 0.4	107 / 0.1	107 / 0.3	108 / 0.05	109 / 0.3	110 / 0.3	111 / 0.4	
										0-1m	1-2m	2-4m	>4m				Sampled Date	24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020	24/01/2020	
Coal Tar Identification	Coal Tar	mg/kg																-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Inorganics	Chloride	mg/kg	10															-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Sulphate	mg/kg	10															-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	pH 1:5 soil:water	pH		4.5 - 10	5.0 - 9.0													-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Electrical Conductivity 1:5 soil:water	uS/cm	1															-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Metals	Aluminium	mg/kg	10															1700	8700	15,000	11,000	16,000	3600	14,000	5300	4400	3400	4100	15,000	4100	8600	9200	5100	
	Antimony	mg/kg	7															<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	
	Arsenic	mg/kg	4	40	20	100	400	100	500					100				<4	5	<4	7	5	<4	6	9	<4	7	4	10	11	<4	<4	<4	<4
	Boron	mg/kg	3					4500	40000									<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
	Cadmium	mg/kg	0.4	1	0.5	20	400	80	150					190				<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
	Chromium (III+VI)	mg/kg	1	150	75	100	400	100	500									4	9	5	16	10	9	11	7	2	7	6	13	7	6	7	4	
	Cobalt	mg/kg	1						600									1	<1	<1	4	<1	6	<1	3	<1	3	5	2	4	3	<1	1	
	Copper	mg/kg	1	200	100			6000	30000					60				6	14	3	15	<1	5	7	8	5	7	10	2	7	12	7	5	
	Iron	mg/kg	10															4900	14,000	2400	29,000	27,000	8600	20,000	7300	1900	6700	5	11,000	7900	16,000	5100	7100	
	Lead	mg/kg	1	100	50	100	400	300	1200					1100				5	48	2	30	12	30	20	21	13	6	5	18	14	39	39	19	
	Magnesium	mg/kg	10															510	620	9100	1800	430	970	500	940	1100	910	820	680	370	290			
	Manganese	mg/kg	1						3800	14000								37	51	1100	250	3	150	6	140	6	160	210	95	210	110	34	54	
	Mercury	mg/kg	0.1	1	0.5	4	16	40	120									<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	<0.1	<0.1	<0.1	<0.1
	Nickel	mg/kg	1	60	30	40	160	400	1200					10				2	2	1	8	<1	7	2	6	<1	5	8	7	3	<1	2		
	Selenium	mg/kg	2			20	80	200	1400									<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
	Tin	mg/kg	1															<1	2	<1	1	<1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Zinc	mg/kg	1	300	150			7400	60000						140			17	100	25	110	26	17	43	61	22	53	28	6	38	87	75	57		
TRH	C10-C16	mg/kg	50															<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	
	C16-C34	mg/kg	100															<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	
	C34-C40	mg/kg	100															<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	
	P2-NAPHTHALENE	mg/kg	50							110	240	440	NL					<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C6-C9	mg/kg	25															<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	
	C10-C14	mg/kg	50															<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	C15-C28	mg/kg	100															<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	C29-C36	mg/kg	100															<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	<C10-C36 (Sum of total)	mg/kg																<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
	<C10-C40 (Sum of total)	mg/kg	50			500	250	10000	40000									<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
BTX	C6-C10 less BTEX (F1)	mg/kg	25							45	70	110	200					<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
	C6-C10	mg/kg	25															<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
	Benzene	mg/kg	0.2			0.5	40			0.5	0.5	0.5	0.5				<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Ethylbenzene	mg/kg	1	25																														

Notes
D5/JPS is duplicate sample of 221/0.3

Table C1 - Summary of Laboratory Testing (cont)

Analyte		Units	PQL	ENM RRO 2014 - Abs Max	ENM RRO 2014 - Max Av	NSW EPA 2014 - General Solid Waste CT1 (No TCLP)	NSW EPA 2014 - Restricted Solid Waste CT2 (No TCLP)	NEPM 2013 Table 1A(1) Hills Res A Soil	NEPM 2013 Table 1A(1) Hills Res B Soil	NEPM 2013 Table 1A(3) Res A/B Soil HSL for Vapour Intrusion, Sand	NEPM 2013 ELTs Res/Open Space Aged	NEPM 2013 Table 18(6) ELTs for Urban Res, Coarse Soil	NEPM 2013 Table 18(7) Management Limits in Res / Parkland, Coarse Soil	Field ID	212/0.5	213/0.25	214/0.3	215/0.2	216/0.1	217/0.2	218/0.5	219/0.2	220/0.2	221/0.3	05/PS	S1	S2	204/0.01	CP1	P107		
Coal Tar Identification	Coal Tar	mg/kg								0-1m 1-2m 2-4m >4m				Sampled Date	17/03/20	17/03/2020	17/03/2020	18/03/2020	18/03/2020	18/03/2020	18/03/2020	18/03/2020	18/03/2020	18/03/2020	24/01/2020	24/01/2020		17/03/2020	29/01/2020	29/01/2020		
Inorganics	Chloride	mg/kg	10												-	-	-	-	-	-	-	-	-	-	-	-	-	-	Non Detect	Non Detect	Non Detect	
	Sulphate	mg/kg	10												-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	pH 1:5 soil-water:1.5 soil-water	pH		4.5 - 10	5.0 - 9.0										-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Metals	Electrical Conductivity 1:5 soil-water	uS/cm	1												-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Aluminium	mg/kg	10												10,000	-	6400	-	2600	3200	6600	1300	-	5600	7200	14,000	1800	-	-	-	-	
	Antimony	mg/kg	7												<7	-	<7	-	<7	<7	<7	<7	-	<7	<7	<7	-	-	-	-	-	
	Arsenic	mg/kg	4	40	20	100	400	100	500			100			<4	-	34	-	<4	<4	11	<4	-	<4	<4	<4	<4	-	-	-	-	
	Boron	mg/kg	3						4500	4000					<-3	-	<-3	-	<-3	<-3	7	4	-	4	6	8	-	-	-	-	-	
	Cadmium	mg/kg	0.4	1	0.5	20	80	100	150						<0.4	-	0.5	-	<0.4	<0.4	0.7	<0.4	-	<0.4	<0.4	<0.4	<0.4	-	-	-	-	
	Chromium (III+VI)	mg/kg	1	150	75	100	400	100	500			190			8	-	67	-	3	6	15	3	-	5	10	<1	4	-	-	-	-	
	Cobalt	mg/kg	1						600	600					<1	-	2	-	<1	2	4	1	-	1	2	<1	2	-	-	-	-	
	Copper	mg/kg	1	200	100				6000	30000			60		1	-	39	-	8	7	95	2	-	4	6	8	-	-	-	-	-	
	Iron	mg/kg	100												10,000	-	8900	-	3900	5600	13,000	2800	-	9100	13,000	160	4300	-	-	-	-	
	Lead	mg/kg	1	100	50	100	400	300	1200			1100			10	-	36	-	27	10	420	4	-	7	10	1	6	-	-	-	-	
	Magnesium	mg/kg	10												630	-	660	-	350	450	910	430	-	470	750	8500	590	-	-	-	-	
	Manganese	mg/kg	1						3800	14000					4	-	180	-	29	74	340	52	-	130	410	270	88	-	-	-	-	
	Mercury	mg/kg	0.1	1	0.5	4	16	40	120						<0.1	-	0.2	-	<0.1	0.1	0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	
	Nickel	mg/kg	1	60	30	4	160	400	1200			10			<1	-	2	-	3	4	8	3	-	3	5	<1	4	-	-	-	-	
	Selenium	mg/kg	2			20	80	200	1400						<2	-	<2	-	<2	<2	<2	<2	-	<2	<2	<2	<2	-	-	-	-	
	Tin	mg/kg	1												1	-	<1	-	<1	<1	3	<1	-	<1	32	2	20	-	-	-	-	
	Zinc	mg/kg	1	300	150				7400	60000		140			9	-	110	-	34	30	460	14	-	14	32	2	20	-	-	-	-	
	TRH	C10-C16	mg/kg	50												<50	-	<50	-	<50	<50	<50	<50	-	<50	<50	<50	<50	-	-	-	-
C16-C34		mg/kg	100												<100	-	<100	-	<100	<100	<100	<100	-	<100	<100	<100	<100	-	-	-	-	
C34-C40		mg/kg	100												<100	-	<100	-	<100	<100	<100	<100	-	<100	<100	<100	<100	-	-	-	-	
F2-NAPHTHALENE		mg/kg	50												<50	-	<50	-	<50	<50	<50	<50	-	<50	<50	<50	<50	-	-	-	-	
C5-C9		mg/kg	25			650	2600								<25	-	<25	-	<25	<25	<25	<25	-	<25	<25	<25	<25	-	-	-	-	
C10-C14		mg/kg	50												<50	-	<50	-	<50	<50	<50	<50	-	<50	<50	<50	<50	-	-	-	-	
C15-C28		mg/kg	100												<100	-	<100	-	<100	<100	<100	<100	-	<100	<100	<100	<100	-	-	-	-	
C29-C36		mg/kg	100												<100	-	<100	-	<100	<100	<100	<100	-	<100	<100	<100	<100	-	-	-	-	
C10-C36 (Sum of total)		mg/kg													<250	-	<250	-	<250	<250	<250	<250	-	<250	<250	<250	<250	-	-	-	-	
C10-C40 (Sum of total)		mg/kg	50	500	250	10000	40000								<50	-	<50	-	<50	<50	<50	<50	-	<50	<50	<50	<50	-	-	-	-	
CE-C10 less BTEX (F1)		mg/kg	25												<25	-	<25	-	<25	<25	<25	<25	-	<25	<25	<25	<25	-	-	-	-	
C6-C10		mg/kg	25												<25	-	<25	-	<25	<25	<25	<25	-	<25	<25	<25	<25	-	-	-	-	
Benzene		mg/kg	0.2	0.5		10	40								<0.2	-	<0.2	-	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	-	-	-	-	
Ethylbenzene		mg/kg	1	25	600	2400	800								<1	-	<1	-	<1	<1	<1	<1	-	<1	<1	<1	<1	-	-	-	-	
Toluene		mg/kg	0.5	65		288	1152								<0.5	-	<0.5	-	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	
BTX		Xylene (m & p)	mg/kg	2												<2	-	<2	-	<2	<2	<2	<2	-	<2	<2	<2	<2	-	-	-	-
		Xylene (o)	mg/kg	1												<1	-	<1	-	<1	<1	<1	<1	-	<1	<1	<1	<1	-	-	-	-
		Xylene Total	mg/kg	3	15		1000	4000								<3	-	<3	-	<3	<3	<3	<3	-	<3	<3	<3	<3	-	-	-	-
		Total Positive PAHs	mg/kg	0.05	40	20	1000	800	300	400						<0.05	-	<0.3	-	0.63	<0.05	<0.3	<0.05	-	<0.05	<0.05	<0.05	<0.05	-	-	-	-
	Acenaphthene	mg/kg	0.1												<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	
	Acenaphthylene	mg/kg	0.1												<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	
	Anthracene	mg/kg	0.1												<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	
	Benzo[a]anthracene	mg/kg	0.1												<0.1	-	<0.1	-	<0.1	<0.1	0.2	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	
	Benzo[a] pyrene	mg/kg	0.05	1	0.5	0.8	3.2								<0.05	-	0.06	-	0.1	<0.05	0.1	<0.05	-	<0.05	<0.05	<0.05	<0.05	-	-	-	-	
	Benzo[a]pyrene TEQ calc (zero)	mg/kg	0.5												<0.5	-	<0.5	-	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	
	Benzo[a]pyrene TEQ calc(half)	mg/kg	0.5												<0.5	-	<0.5	-	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	
	Benzo[a]pyrene TEQ calc(PQL)	mg/kg	0.5												<0.5	-	<0.5	-	<0.5	<0.5	<0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	
	Benzo[b]fluoranthene	mg/kg	0.2												<0.2	-	<0.2	-	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	-	-	-	-	
	Benzo[k]fluoranthene	mg/kg	0.1												<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	
	Chrysene	mg/kg	0.1												<0.1	-	<0.1	-	<0.1	<0.1	0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	
	Dibenz[a,h]anthracene	mg/kg	0.1												<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	
	Fluoranthene	mg/kg	0.1												<0.1	-	0.2	-	<0.1	0.3	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	
	Fluorene	mg/kg	0.1												<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	
	Indeno[1,2,3-c,d]pyrene	mg/kg	0.1												<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-	
Naphthalene	mg/kg	0.1												<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-		
Phenanthrene	mg/kg	0.1												<0.1	-	<0.1	-	0.1	<0.1	<0.1	<0.1	-	<0.1	<0.1	<0.1	<0.1	-	-	-	-		
Picloram	mg/kg	1												<1	-	<1	-	<1	<1	<1	<1	-	<1	<1	<1	<1						

Notes
D5/JPS is duplicate sample of 221/0.3

Table C2 – Summary of Asbestos Testing

Sample I.D	Asbestos ID in soil	Trace Analysis	Sample Description	Asbestos ID in materials	Trace Analysis
101 / 1.0	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
103 / 0.2	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
105 / 0.2	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
110 / 0.2	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
111 / 0.2	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
112 / 0.2	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
A2/S	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
A3/S	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
A8/S	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
A7/S	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
A4/S	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
201/0.3	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
202/0.3	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
204/0.2	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
205/0.1	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
206a/0.55	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
210/0.4	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
211/0.1	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
212/0.1	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
214/0.3	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
216/0.1	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
217/0.2	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
218/0.5	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
219/0.2	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
221/0.3	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected	Soil	NA	NA
A4/F	NA	NA	Beige fibre cement material	Chrysotile asbestos detected and Amosite asbestos detected	No asbestos detected
A2/F	NA	NA	Beige compressed fibre cement material	No asbestos detected: Organic fibres detected	No asbestos detected
A3/F	NA	NA	Grey compressed fibre cement material	Chrysotile asbestos detected	NT
A8/F	NA	NA	Beige compressed fibre cement material	Chrysotile asbestos detected: Amosite asbestos detected	NT
A6/F	NA	NA	Grey fibre cement material	Chrysotile asbestos detected	No asbestos detected
A7/F	NA	NA	Beige compressed fibre cement material	No asbestos detected: Organic fibres detected	No asbestos detected
A10/F	NA	NA	Beige fibre cement material	Chrysotile asbestos detected and Amosite asbestos detected	No asbestos detected
212/0-0.3F	NA	NA	Brown fibre cement material	Chrysotile asbestos detected: Amosite asbestos detected: Crocidolite asbestos detected	NT
218/0.5F	NA	NA	Grey fibre cement material	Chrysotile asbestos detected: Amosite asbestos detected	NT
219/0.2F	NA	NA	Beige fibre cement material	No asbestos detected: Organic fibres detected	No asbestos detected

Table C3: Laboratory Results for TCLP Testing

Sample ID	Sample Depth	Fill (F) or Natural (N)	Benzo(a) Pyrene		Total PAH		Lead	
			Total	TCLP	Total	TCLP	Total	TCLP
			mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L
206a/0.55	0.2	F	3.4	<0.001	50	0.0031	NT	NT
218/0.5	0.15	F	NA	NT	NA	NIL (+)VE	420	0.51
Laboratory PQL			0.05	0.001	0.05	NA	1	0.01
NSW EPA - General Solid Waste Guidelines - CT1			0.8 / 10*	0.04	200	NC	100 / 1500*	5
NSW EPA - Restricted Solid Waste Guidelines - CT2			3.2 / 23*	0.16	800	NC	400 / 6000*	20

Notes to Table C3:

Total concentrations in mg/kg on a dry weight basis. TCLP results in mg/L.

CT – Concentration Threshold

TCLP – Toxicity Characteristic Leaching Procedure

Shaded results exceed NSW EPA Waste Classification Guidelines for General Solid Waste considering leachability testing

* Criteria when used in conjunction with leachability (TCLP) results

NC – No Criteria

Table C4 - Summary of Field Sieving Results

Test Pit	Sample Depth (m)	Soil Description	Soil Mass (kg)	No. Fragments	Fragment Condition	Fibro Size Range (mm)	Fibro Mass (g)	Fibro Mass (kg)	% Asbestos Content	% Asbestos Content
									Assumed 15% Asbestos	Assumed 30% Asbestos
201	0-0.3	Brown Sandy Clay	12.5	0	-	-	0	0	0.000%	0.000%
202	0-0.5	Brown Sandy Clay	11	0	-	-	0	0	0.000%	0.000%
205	0-1.0	Brown Sandy Clay	15	0	-	-	0	0	0.000%	0.000%
206	0-1.0	Brown Sandy Gravel	16	0	-	-	0	0	0.000%	0.000%
206	1.0-1.6	Brown Clayey Gravel	19	0	-	-	0	0	0.000%	0.000%
207	0-1.0	Brown Sandy Clay	17	0	-	-	0	0	0.000%	0.000%
208	0-0.8	Brown Sandy Clay	16	0	-	-	0	0	0.000%	0.000%
209	0-0.2	Brown Clayey Sand	11	0	-	-	0	0	0.000%	0.000%
210	0-0.4	Brown Gravelly Sand	17	0	-	-	0	0	0.000%	0.000%
211	0-0.7	Brown Clayey Sand	12	0	-	-	0	0	0.000%	0.000%
212	0-0.3	Brown Gravelly Sand	14	2	Good	20 - 30	15.1	0.02	0.016%	0.032%
213	0-0.5	Brown Clayey Sand	14	0	-	-	0	0.00	0.000%	0.000%
214	0-0.4	Brown Clayey Sand	13.5	0	-	-	0	0.00	0.000%	0.000%
215	0.1-0.3	Silty Sand	12	0	-	-	0	0.00	0.000%	0.000%
216	0-0.1	Silty Sand	12	0	-	-	0	0.00	0.000%	0.000%
217	0-0.4	Filling Silty Sand	12	0	-	-	0	0.00	0.000%	0.000%
218	0-0.6	Brown Clayey Sand	11	15	Good	20 - 60	103.98	0.104	0.142%	0.284%
219	0-0.5	Brown Sand	13.5	0	-	-	0	0	0.000%	0.000%
220	0-0.2	Silty Sand	12	0	-	-	0	0	0.000%	0.000%
Criteria		Residential use, day care centres, preschools, etc							0.01% w/w asbestos for ACM	
		Residential, minimal soil access							0.04% w/w asbestos for ACM	
		Parks, public open spaces, playing fields, etc							0.02% w/w asbestos for ACM	
		Commercial / Industrial							0.05% w/w asbestos for ACM	

Notes:

Criteria for all site uses is 0.001% asbestos for Friable asbestos or Asbestos Fines

ACM - Asbestos Containing Material

w/w - weight/weight

NT - Not Tested

NA - Not Applicable

Appendix D

Quality Assurance / Quality Control Report
Chain of Custody Sheets (Field and Despatch)
Sample Receipts

Quality Assurance / Quality Control Report

Detailed Site Investigation (Contamination)

27 Tiral Street, Charlestown

Quality Assurance (QA) was maintained by:

- Compliance with a Project Quality Plan written for the objectives of the study;
- Using qualified engineers/scientists to undertake the field supervision and sampling;
- Following the Douglas Partners Pty Ltd (DP) operating procedures for sampling, field testing and decontamination as presented in Table 1; and
- Using NATA registered laboratories for sample testing that generally utilise standard laboratory methods of the US EPA, the APHA and NSW EPA.

Table D1: Field Procedures

Abbreviation	Procedure Name
FPM DECONT	Decontamination of Personnel and Equipment
FPM ENVID	Sample Identification, Handling, Transport and Storage of Contamination Samples
FPM PIDETC	Operation of Field Analysers
FPM LOG	Logging

Notes to Table 1:

From DP Field Procedures Manual

Quality Control (QC) of the laboratory programme was achieved by the following means:

- Check replicate - a specific sample was split in the field, placed in separate containers and labelled with different sample numbers, and sent to the laboratory for analysis;
- Method blanks - the laboratory ran reagent blanks to confirm the equipment and standards used were uncontaminated;
- Laboratory replicates - the laboratory split samples internally and conducted tests on separate extracts;
- Laboratory spikes - samples were spiked by the laboratory with a known concentration of contaminants and subsequently tested for percent recovery.

Discussion

A. Check Replicate

The Relative Percent Difference (RPD) between replicate results is used as a measure of laboratory reproducibility and is given by the following:

$$RPD = \frac{ABS(Replicate\ result1 - Replicate\ result2)}{(Replicate\ result1 + Replicate\ result2)/2} \times 100$$

The RPD can have a value between 0% and 200%. An RPD data quality objective of up to 50% is generally considered to be acceptable for organic analysis, and 35% for inorganics (ie Metals).

A summary of the results of the replicate QA/QC testing is provided in Table D2,

RPDs for replicates ranged were generally within the acceptance limits (0% to 40%), however, slightly elevated RPDs up were identified up to 104%.

Elevated RPDs can generally be attributed to low concentrations for some analytes resulting in high RPDs for small changes in concentration and the heterogeneity of fill materials tested.

Table D2: Results of Quality Control Analysis

Analyte	221/0.3	D5/JPS	RPD (%)	Analyte	221/0.3	D5/JPS	RPD (%)
Aluminium	5600	7200	25	Fluoranthene	<0.1	<0.1	0
Antimony	<7	<7	0	Fluorene	<0.1	<0.1	0
Arsenic	<4	<4	0	Indeno(1,2,3-c,d)pyrene	<0.1	<0.1	0
Boron	<3	<3	0	Naphthalene	<0.1	<0.1	0
Cadmium	<0.4	<0.4	0	Phenanthrene	<0.1	<0.1	0
Chromium (III+VI)	5	10	67	Pyrene	<0.1	<0.1	0
Cobalt	1	2	67	Arochlor 1016	<0.1	<0.1	0
Copper	4	6	40	Arochlor 1221	<0.1	<0.1	0
Iron	9100	13,000	35	Arochlor 1232	<0.1	<0.1	0
Lead	7	10	35	Arochlor 1242	<0.1	<0.1	0
Magnesium	470	750	46	Arochlor 1248	<0.1	<0.1	0
Manganese	130	410	104	Arochlor 1254	<0.1	<0.1	0
Mercury	<0.1	<0.1	0	Arochlor 1260	<0.1	<0.1	0
Nickel	3	5	50	Endosulfan	<0.3	<0.3	0
Selenium	<2	<2	0	4,4-DDE	<0.1	<0.1	0
Tin	<1	1	0	a-BHC	<0.1	<0.1	0
Zinc	14	32	78	Aldrin	<0.1	<0.1	0
C10-C16	<50	<50	0	Aldrin + Dieldrin	<0.2	<0.2	0
C16-C34	<100	<100	0	b-BHC	<0.1	<0.1	0
C34-C40	<100	<100	0	Chlordane (cis)	<0.1	<0.1	0
F2-NAPHTHALENE	<50	<50	0	Chlordane (trans)	<0.1	<0.1	0
C6 - C9	<25	<25	0	d-BHC	<0.1	<0.1	0
C10 - C14	<50	<50	0	DDD	<0.1	<0.1	0
C15 - C28	<100	<100	0	DDT	<0.1	<0.1	0
C29-C36	<100	<100	0	DDT+DDE+DDD	<0.1	<0.1	0
+C10 - C36 (Sum of total)	<250	<250	0	Dieldrin	<0.1	<0.1	0
C10 - C40 (Sum of total)	<50	<50	0	Endosulfan I	<0.1	<0.1	0
C6-C10 less BTEX (F1)	<25	<25	0	Endosulfan II	<0.1	<0.1	0
C6-C10	<25	<25	0	Endosulfan sulphate	<0.1	<0.1	0
Benzene	<0.2	<0.2	0	Endrin	<0.1	<0.1	0
Ethylbenzene	<1	<1	0	Endrin aldehyde	<0.1	<0.1	0
Toluene	<0.5	<0.5	0	g-BHC (Lindane)	<0.1	<0.1	0
Xylene (m & p)	<2	<2	0	Heptachlor	<0.1	<0.1	0
Xylene (o)	<1	<1	0	Heptachlor epoxide	<0.1	<0.1	0
Xylene Total	<3	<3	0	Hexachlorobenzene (HCB)	<0.1	<0.1	0
Total Positive PAHs	<0.05	<0.05	0	Methoxychlor	<0.1	<0.1	0
Acenaphthene	<0.1	<0.1	0	Azinophos methyl	<0.1	<0.1	0
Acenaphthylene	<0.1	<0.1	0	Bromophos-ethyl	<0.1	<0.1	0
Anthracene	<0.1	<0.1	0	Chlorpyrifos	<0.1	<0.1	0
Benz(a)anthracene	<0.1	<0.1	0	Chlorpyrifos-methyl	<0.1	<0.1	0
Benzo(a) pyrene	<0.05	<0.05	0	Diazinon	<0.1	<0.1	0
Benzo(a)pyrene TEQ calc (zero)	<0.5	<0.5	0	Dichlorvos	<0.1	<0.1	0
Benzo(a)pyrene TEQ calc(half)	<0.5	<0.5	0	Dimethoate	<0.1	<0.1	0
Benzo(a)pyrene TEQ calc(PQL)	<0.5	<0.5	0	Ethion	<0.1	<0.1	0
Benzo(b,j+k)fluoranthene	<0.2	<0.2	0	Fenitrothion	<0.1	<0.1	0
Benzo(g,h,i)perylene	<0.1	<0.1	0	Malathion	<0.1	<0.1	0
Chrysene	<0.1	<0.1	0	Ronnel	<0.1	<0.1	0
Dibenz(a,h)anthracene	<0.1	<0.1	0	Parathion	<0.1	<0.1	0

Results expressed in mg/L unless otherwise stated

PQL - Practical Quantitation Limits

C. Method Blanks

All method blanks returned results lower than the laboratory detection limit, therefore are acceptable.

D. Laboratory Replicates

The average RPD for individual contaminants were within the laboratory acceptance limits.

E. Laboratory Spikes

Recoveries in the order of 70% to 130% are generally considered to be acceptable for inorganic material and 60% to 140% for organic material. The average percent recoveries for individual contaminants were within the quality control objectives. The results should however be qualified and may slightly under-estimate or over-estimate contaminant concentrations in certain samples (ie biased low or high respectively).

F. Sample Holding Times

No samples were analysed outside the recommended holding times and is therefore considered acceptable.

Conclusions

In summary, while some elevated results were found, they can generally be attributed to the relatively low concentration of contaminants.

It is also noted that the magnitude of RPDs for field replicates (i.e. blind replicates) are generally higher than those for laboratory replicates. Field replicates results generally show greater variability than laboratory replicates, because they measure both field and laboratory reproducibility.

The accuracy and precision of the soil testing procedures, as inferred by the laboratory QA/QC data is considered to be of sufficient standard to allow the data reported to be used in interpret site contamination conditions.

Project No:	102007.01	Client Project Name:	United Charlestown Development
Client:	The United Church in Australia Property Trust	Location:	27 Tiral Street, Chalrestown
Project Manager:	MJB	DP Lab Received	By: RLP Date: 24/11/20
Do samples contain 'potential' HBM? Yes ☒ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)			

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type	Container Type	ASS Samples	Sampling			Storage Locn *	Lab 1 ^A	Lab 2 ^B	Lab 3 ^C	
			S - soil W - water	G - glass P - plastic		By	Date	Time		Date 30/11/20	Date	Date	
101	0.2		S	G.P		JPS/RLP	24/11/20	8	Fridge	✓			
	0.5												
	1.0									✓			
	1.5												
	1.7												
	1.6-1.8			Bulk									
102	0.2			G.P						✓			
	0.5									✓			
	0.8												
	1.2												
	1.2-1.8			G.P									
	1.6			G.P									
	1.55-1.65			Bulk									
103	0.7			G.P									
	0.4									✓			
	0.7												
	1.1							5					

* Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

A Provide name of Lab 1 *EnviroLab*

B Provide name of Lab 2

C Provide name of Lab 3

Project No:		102007.01		Client Project Name:		United Charlestown Development							
Client:		The United Church in Australia Property Trust				Location:		27 Tiral Street, Chalrestown					
Project Manager:		MJB				DP Lab Received		By: <i>RLP</i>		Date: <i>24/1/20</i>			
Do samples contain 'potential' HBM? Yes ☒ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)													

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type	Container Type	ASS Samples	Sampling			Storage Locn *	Lab 1 ^A	Lab 2 ^B	Lab 3 ^C	
			S - soil W - water	G - glass P - plastic		By	Date	Time		Date	Date	Date	
103	1.2-1.4		S	450		SP/RLP	24/1/20	8	Ridley				
104	0.1			G.P						✓			
	0.5												
	1.0									✓			
	1.5												
105	0.1									✓			
	0.3												
	0.6									✓			
	0.4-0.6			Bulk									
	1.3			G.P									
106	0.1												
	0.4			D1						✓			
	1.0-1.35			450									
	0.6			G.P									
	0.9												
107	0.1			D2						✓			
	0.3			G.P				5		✓			

* Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

A Provide name of Lab 1 *EnviroLab*

B Provide name of Lab 2

C Provide name of Lab 3

Project No:	102007.01	Client Project Name:	United Charlestown Development
Client:	The United Church in Australia Property Trust	Location:	27 TiralStreet, Chalrestown
Project Manager:	MJB	DP Lab Received	By: <i>RLP</i> Date: <i>24/11/20</i>
Do samples contain 'potential' HBM? Yes ☒ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)			

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type	Container Type	ASS Samples	Sampling			Storage Locn *	Lab 1 ^A	Lab 2 ^B	Lab 3 ^C	
			S - soil W - water	G - glass P - plastic		By	Date	Time		Date	Date	Date	
107	1.0		S	h.p		<i>JRS/RLP</i>	<i>24/11/20</i>	<i>3</i>	<i>Fridge</i>				
	<i>0.8-1.0</i>			<i>Bulk</i>									
108	<i>0.05</i>			<i>h.p</i>						✓			
	<i>0.4</i>												
	<i>1.2</i>												
	<i>1.6</i>												
109	<i>0.05</i>	<i>D3</i>		<i>h.p</i>						✓			
	<i>0.3</i>												
	<i>0.5</i>												
	<i>1.4</i>												
	<i>1.7-1.9</i>			<i>Bulk</i>									
	<i>1.8</i>			<i>h.p</i>									
110	<i>0.05</i>									✓			
	<i>0.3</i>												
	<i>0.55</i>												
	<i>1.1-1.5</i>			<i>h.p</i>									
	<i>0.7</i>							<i>5</i>					

* Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

A Provide name of Lab 1 *EnviroLab*

B Provide name of Lab 2

C Provide name of Lab 3

Project No: 102007.01			Client Project Name: United Charlestown Development		
Client: The United Church in Australia Property Trust			Location: 27 Tiral Street, Chalrestown		
Project Manager: MJB			DP Lab Received By: <i>RLP</i>		Date: 24/1/20
Do samples contain 'potential' HBM? Yes ☐ No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)					

Field							DP Lab	For Despatch to			Notes		
Sample ID	Depth (m)	Duplicate Sample	Sample Type	Container Type	ASS Samples	Sampling			Storage Locn *	Lab 1 ^A		Lab 2 ^B	Lab 3 ^C
			S - soil W - water	G - glass P - plastic		By	Date	Time		Date		Date	Date
110	1.0		S	G.P		JPS/RLP	24/1/20	8	Fridge				
111	0.1												
	0.4									✓			
	0.9												
	1.5												
	1.9												
	1.8-2.0												
112	0.2									✓			
	0.8									✓			
	1.5												
	1.2-1.4												
	1.5-1.9												
112 IF	A 0.2		Fibro	P				3					

* Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

A Provide name of Lab 1 *Enviro*

B Provide name of Lab 2

C Provide name of Lab 3

Project No: 102007			Client Project Name: Proposed nited Charlestown Development		
Client: The Unitung Church of Australia			Location: 27 Tiral Street, Charlestown		
Project Manager: Daniel West			DP Lab Received		By: Date:
Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)					

Field						DP Lab	For Despatch to			Notes			
Sample ID	Depth (m)	Duplicate Sample	Sample Type	Container Type	ASS Samples	Sampling			Storage Locn *		Lab 1 ^A	Lab 2 ^B	Lab 3 ^C
			S - soil W - water	G - glass P - plastic		By	Date	Time			<i>EnviroLab</i> Date	Date	Date
S1	Surface	—	S	G		OSW	29/1/20	8:45	Fridge	✓			Slag
S2	Surface	—	S	G		OSW	29/1/20	8:50	Fridge	✓			ASH
CPI	Surface	—	A/C	P		RSP	29/1/20	6	6	4-2-2020			A/C
P107	Surface	—	A/C	P		RSP	29/1/20	6	6	4-2-2020			A/C

* Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

Project No: 102007.01		Client Project Name: United Charlestown Development	
Client: The Uniting Church in Australia Property Trust (NSW) for Uniting (NSW.ACT)		Location: 27 Tiral Street, Charlestown	
Project Manager: MJB		DP Lab Received	By: JPS Date: 18/3/20
Do samples contain 'potential' HBM? Yes ☒ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)			

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S-soil W water	Container Type G-glass P-plastic	ASS Samples	Sampling			Storage Locn*	Envid/ck 18/3/20			
						By	Date	Time					
201	0-0.3		S	B		JPS	17/3/20	7	Babs	✓			
	0.3		↓	↓ G.P		↓	↓	↓	↓	↓			
	0.4			↓									
202	0-0.5			B									
	0.1			↓ G.P									
	0.3												
	0.5												
	0.9												
203	0.1												
	0.5			↓									
204	0.01												
	0.1-0.7			B									
	0.2			↓ G.P									
205	0-1			B									
	0.7			↓ G.P									
	1.5			↓				↓					
206	0.1			B									
	0.2		↓	↓ G.P		↓	↓	4	↓	↓			

*Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

Project No: 102007.01		Client Project Name: United Charlestown Development	
Client: The Uniting Church in Australia Property Trust (NSW) for Uniting (NSW.ACT)		Location: 27 Tiral Street, Charlestown	
Project Manager: MJB		DP Lab Received	By: <i>JPS</i> Date: <i>18/3/20</i>
Do samples contain 'potential' HBM? Yes ☒ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)			

Field									DP Lab	For Despatch to			Notes	
Sample ID	Depth (m)	Duplicate Sample	Sample Type S-soil W water	Container Type G-glass P-plastic	ASS Samples	Sampling			Storage Locn*	Envirol 18/3/20				
						By	Date	Time						
206	1-1.6		S	B		JPS	17/3/20	7	ESky					
	0.7			G.P										
	1.5													
	1.9													
206A	0.55													
207	0.1													
	0.1			B										
	0.5			G.P										
	1.0													
	1.3													
208	0.8													
	0.3													
	0.7													
	1.0													
209	0.2			B										
	0.1			G.P										
	0.4													
210	0.1							4						

*Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

Project No: 102007.01		Client Project Name: United Charlestown Development	
Client: The Uniting Church in Australia Property Trust (NSW) for Uniting (NSW.ACT)		Location: 27 Tiral Street, Charlestown	
Project Manager: MJB		DP Lab Received	By: <i>JPS</i> Date: <i>13/3/20</i>
Do samples contain 'potential' HBM? Yes ☒ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)			

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S-soil W water	Container Type G-glass P-plastic	ASS Samples	Sampling			Storage Locn*	Garfield 18/3/20			
						By	Date	Time					
210	0-0.4		S	B		JPS	17/3/20	7	Esby	✓			
	0.4	D1/JPS	↓	G.P		↓	↓	↓	↓	↓			
	0.7		↓	↓		↓	↓	↓	↓	↓			
211	0.1		↓	↓		↓	↓	↓	↓	↓			
	0.7		↓	B		↓	↓	↓	↓	↓			
	0.6	D2/JPS	↓	G.P		↓	↓	↓	↓	↓			
212	0-0.3		↓	B		↓	↓	↓	↓	↓			
	0.1	D3/JPS	↓	G.P		↓	↓	↓	↓	↓			
	0.5		↓	↓		↓	↓	↓	↓	↓			
213	0.5		↓	B		↓	↓	↓	↓	↓			
	0.1		↓	G.P		↓	↓	↓	↓	↓			
	0.25		↓	↓		↓	↓	↓	↓	↓			
	0.5		↓	↓		↓	↓	↓	↓	↓			
214	0.4		↓	B		↓	↓	↓	↓	↓			
	0.3		↓	G.P		↓	↓	↓	↓	↓			
	0.6		↓	↓		↓	↓	↓	↓	↓			
215	0.1-0.3		↓	B		JPS	18/3/20	7	↓	↓			
	0.2		↓	G.P		↓	↓	12	↓	↓			

*Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

Project No: 102007.01		Client Project Name: United Charlestown Development	
Client: The Uniting Church in Australia Property Trust (NSW) for Uniting (NSW.ACT)		Location: 27 Tiral Street, Charlestown	
Project Manager: MJB		DP Lab Received	By: JPS Date: 18/3/20
Do samples contain 'potential' HBM? Yes ☒ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)			

Sample ID	Depth (m)	Duplicate Sample	Field			Sampling			DP Lab Storage Locn*	For Despatch to			Notes
			Sample Type S-soil W water	Container Type G-glass P-plastic	ASS Samples	By	Date	Time					
215	0.5		S	G.P		JPS	18/3/20	7	Enviro	✓			
216	0.1			B									
	0.1			G.P									
217	0.4			B									
	0.2			G.P									
218	0.6			B									
	0.2			G.P									
	0.5	D4/BPS		F									
	0.9			G.P									
219	0.5			B									
	0.2			F									
	0.5			G.P									
	1.0			G.P									
220	0.2			B									
	0.2			G.P									
221	0.3	D5/BPS											
	0.6							12					

*Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

Project No: 102007.01			Client Project Name: United Charlestown Development		
Client: The United Church in Australia Property Trust			Location: 27 Tiral Street, Chalrestown		
Project Manager: MJB			DP Lab Received By: RLP		Date: 24/1/20
Do samples contain 'potential' HBM? Yes ☐ No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)					

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type	Container Type	ASS Samples	Sampling			Storage Locn *	Lab 1 ^A	Lab 2 ^B	Lab 3 ^C	
			S - soil W - water	G - glass P - plastic		By	Date	Time		Date 30/1/20	Date	Date	
A1/F			Fibro	P		SPS	24/1/20	8	E3/15				
A1/S													
A2/F										✓			
A2/S										✓			
A3/F										✓			
A3/S										✓			
A4/F										✓			
A4/S													
A5/F													
A5/S													
A6/F										✓			
A6/S													
A7/F										✓			
A7/S										✓			
A8/F										✓			
A8/S										✓			
A9/F								5					

* Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

A Provide name of Lab 1 *EnviroLab*

B Provide name of Lab 2

C Provide name of Lab 3

* Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

A Provide name of Lab 1 *EnviroLab* B Provide name of Lab 2 C Provide name of Lab 3

Project No: 102007.01	Suburb/Town: Charlestown	To: Envirolab Services Pty Ltd	
DP Order No: 150330	DP Contact Person: Matthew Blackert / Paulo Sebastian	12 Ashley Street, CHATSWOOD NSW 2067	
Prior Storage: Esky ☒ Fridge ☒ Shelved ☐		Ph: (02) 9910 6200	Attn: Jacinta Hurst
Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)			

Sample				Analytes									Notes
DP ID	Date Sampled	Type S-soil W-water	Lab ID	TRH / BTEX	PAH	Metals (*)	OPP / OCP / PCB	pH	EC	Chloride	Sulphate	Asbest os I.D	
101/0.2	24/1/20	S	1	X	X	X	X						Combo G
101/1.0		S	2	X	X	X	X					X	Combo 6A
102/0.2		S	3	X	X	X	X						Combo G
102/0.5		S	4	X	X	X	X						↓
103/0.4		S	5	X	X	X	X					X	Combo 6A
104/0.1		S	6	X	X	X	X						Combo 6
104/1.0		S	7	X	X	X	X						↓
105/0.1		S	8	X	X	X	X					X	Combo 6A
105/0.6		S	9	X	X	X	X	X	X	X	X		Combo 6 + extras
106/0.4	✓	S	10	X	X	X	X						Combo 6
PQL (S) mg/kg													
PQL (W) mg/L ANZECC PQLs req'd for all water analytes ☐													
PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit. *Metals to Analyse (Please circle) (As, Cd, Cr, Cu, Pb, Zn, Hg, Ni, Mn, Fe, Al, Se, Sn, Sb, Mo, Co, B,				SAMPLES RECEIVED BY LAB Please sign and date to acknowledge receipt of samples and return by email Signature: <u><i>Matthew Blackert</i></u> Date: <u>31-01-2020</u> Lab Ref: <u>235714</u>					Send results to: Douglas Partners Pty Ltd Email: Matthew.Blackert@douglaspartners.com.au Paulo.Sebastian@douglaspartners.com.au  Envirolab Services 12 Ashley St Chatswood NSW 2067 Ph: (02) 9910 6200 Job No: <u>235714</u>				
Total number of samples in container: <u>32</u> Date relinquished: <u>30/01/20</u> By: <u>JRK</u> Results required by..... ☐ Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☒ Standard													

Project No: 102007.01	Suburb/Town: Charlestown	To: Envirolab Services Pty Ltd	
DP Order No: 150330	DP Contact Person: Matthew Blackert / Paulo Sebastian	12 Ashley Street, CHATSWOOD NSW 2067	
Prior Storage: Esky ☒ Fridge ☐ Shelved ☐		Ph: (02) 9910 6200	Attn: Jacinta Hurst
Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)			

Sample				Analytes									Notes
DP ID	Date Sampled	Type S-soil W-water	Lab ID	TRH / BTEX	PAH	Metals (*)	OPP / OCP / PCB	pH	EC	Chloride	Sulphate	Asbest os I.D	
107/0.1	24/1/20	S	11	X	X	X	X						Combo 6
107/0.3		S	12	X	X	X	X	X	X	X	X		+ extras
108/0.05		S	13	X	X	X	X						
109/0.3		S	14	X	X	X	X						
110/0.3		S	15	X	X	X	X					X	Combo 6 A
111/0.4		S	16	X	X	X	X					X	
112/0.2		S	17	X	X	X	X					X	
112/0.8		S	18	X	X	X	X						Combo 6
S1	29/1/20	S	19	X	X	X							Combo 3
S2	29/1/20	S	20	X	X	X							"
RQL (S) mg/kg													
PQL (W) mg/L				ANZECC PQLs req'd for all water analytes ☐									

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

*Metals to Analyse (Please circle) As, Cd, Cr, Cu, Pb, Zn, Hg, Ni, Mn, Fe, Al, Se, Sn, Sb, Mg, Co, B,

Total number of samples in container: 32

Date relinquished: 30/01/20 By: JRK

..... Results required

by.....
☐ Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☒ Standard

SAMPLES RECEIVED BY LAB
 Please sign and date to acknowledge receipt of samples and return by email

Signature: [Signature]

Date: 31.01.2020

Lab Ref: 235714

Send results to:

Douglas Partners Pty Ltd

Email: Matthew.Blackert@douglaspartners.com.au

Paulo.Sebastian@douglaspartners.com.au

Project No: 102007.01	Suburb/Town: Charlestown	To: Envirolab Services Pty Ltd 12 Ashley Street, CHATSWOOD NSW 2067	
DP Order No: 150330	DP Contact Person: Matthew Blackert / Paulo Sebastian		
Prior Storage: Esky ☒ Fridge ☐ Shelved ☐		Ph: (02) 9910 6200	Attn: Jacinta Hurst
Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)			

Sample				Analytes									Notes
DP ID	Date Sampled	Type S-soil W-water F-Fibro	Lab ID	TRH / BTEX	PAH	Metals (*)	OPP / OCP / PCB	pH	EC	Chloride	Sulphate	Asbestos I.D.	
A4/F	24/1/20	F 8	21									X	
A2/F		F 8	22									X	
A2/S		S	23									X	
A3/F		F 8	24									X	
A3/S		S	25									X	
A8/F		F 8	26									X	
A8/S		S	27									X	
A6/F		F 8	28									X	
A7/F		F 8	29									X	
A7/S	✓	S	30									X	
PQL (S) mg/kg													
PQL (W) mg/L ANZECC PQLs req'd for all water analytes ☐													
PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit *Metals to Analyse (Please circle) As, Cd, Cr, Cu, Pb, Zn, Hg, Ni, Mn, Fe, Al, Se, Sn, Sb, Mg, Co, B,						SAMPLES RECEIVED BY LAB Please sign and date to acknowledge receipt of samples and return by email Signature: <u><i>MB</i></u> Date: <u>21.01.2020</u> Lab Ref: <u>235714</u>				Send results to: Douglas Partners Pty Ltd Email: Matthew.Blackert@douglaspartners.com.au Paulo.Sebastian@douglaspartners.com.au			
Total number of samples in container: <u>32</u> Date relinquished: <u>30/01/20</u> By: JRK Results required by..... ☐ Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☒ Standard													

Project No: 102007.01	Suburb/Town: Charlestown	To: Envirolab Services Pty Ltd	
DP Order No: 150330	DP Contact Person: Matthew Blackert / Paulo Sebastian	12 Ashley Street, CHATSWOOD NSW 2067	
Prior Storage: Esky ☒ Fridge ☐ Shelved ☐		Ph: (02) 9910 6200	Attn: Jacinta Hurst
Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)			

Sample				Analytes									Notes
DP ID	Date Sampled	Type S-soil W-water	Lab ID	TRH / BTEX	PAH	Metals (*)	OPP / OCP / PCB	pH	EC	Chloride	Sulphate	Asbestos I.D	
A10/F	24/1/20	F S	31										X
A10/S	24/1/20	S	32										X
		S											
		S											
		S											
		S											
		S											
		S											
		S											
		S											
		S											
PQL (S) mg/kg													
PQL (W) mg/L				ANZECC PQLs req'd for all water analytes ☐									
PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit						SAMPLES RECEIVED BY LAB Please sign and date to acknowledge receipt of samples and return by email Signature: <u><i>Matthew Blackert</i></u> Date: <u>31.01.2020</u> Lab Ref: <u>235714</u>				Send results to: Douglas Partners Pty Ltd Email: Matthew.Blackert@douglaspartners.com.au Paulo.Sebastian@douglaspartners.com.au			
*Metals to Analyse (Please circle) As, Cd, Cr, Cu, Pb, Zn, Hg, Ni, Mn, Fe, Al, Se, Sn, Sb, Mg, Co, B, Total number of samples in container: <u>32</u> Date relinquished: <u>30/01/20</u> By: JRK Results required by..... ☐ Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☒ Standard													

Project No: 102007.01	Suburb/Town: Charles town	To: Envirolab Services Pty Ltd 12 Ashley Street, CHATSWOOD NSW 2067	
DP Order No: 150333	DP Contact Person: Matthew Blackert / Daniel West		
Prior Storage: Esky ☒ Fridge ☐ Shelved ☐		Ph: (02) 9910 6200	Attn: Jacinta Hurst
Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)			

Sample				Analytes								Notes
DP ID	Date Sampled	Type S-soil W-water	Lab ID	TRH / BTEX	PAH	Metals (8)	OPP / OCP / PCB	pH	CEC	Asbestos I.D	Coal Tar ID	
CP1	29/01/20	S	1								X	
P107	29/01/20	S	2								X	
PQL (S) mg/kg												
PQL (W) mg/L	ANZECC PQLs req'd for all water analytes ☐											

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

*Metals to Analyse (Please circle) As, Cd, Cr, Cu, Pb, Zn, Hg, Ni, Mn, Fe, Al, Se, Sn, Sb, Mg, Co, B,

Total number of samples in container: 2

Date relinquished: 04/02/2020 By: JRK

..... Results required by.....

☐ Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☒ **Standard**

SAMPLES RECEIVED BY LAB
Please sign and date to acknowledge receipt of samples and return by email

Signature: Claire Mullen

Date: 5/2/20 1030.

Lab Ref:

Send results to:
Douglas Partners Pty Ltd
Email: Matthew.Blackert@douglaspartners.com.au
Daniel.West@douglaspartners.com.au

10/3

CHAIN OF CUSTODY DESPATCH SHEET (2)

Project No: 102007.01		Suburb/Town: Charlestown		To: Envirolab Services Pty Ltd	
DP Order No: 149997		DP Contact Person: Paulo Sebastian / Dana Wilson / Matthew Blackert		12 Ashley Street, CHATSWOOD NSW 2067	
Prior Storage: Esky X Fridge ☐ Shelved ☐				Ph: (02) 9910 6200	
Do samples contain 'potential' HBM? Yes ☒ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)				Attn: Jacinta Hurst	

Sample				Analytes										Notes
DP ID	Date Sampled	Type S-soil W-water	Lab ID	TRH / BTEX	PAH	Metals	PCB	OPP / OCP	Acid Herbicides	Asbestos I.D	pH / EC	Coal Tar I.D		
1	201/0.3	19/3/20	S	1	✓	✓	✓	✓	✓		✓		Combo GA	
2	202/0.3			2	✓	✓	✓	✓	✓		✓		11	
3	203/0.1			3				✓						
4	204/0.1 (0.01)			4								✓		
5	204/0.2			5	✓	✓	✓	✓	✓		✓	✓	Combo GA + extra	
6	205/0.1			6	✓	✓	✓	✓	✓	✓			Combo GA extra	
7	206/0.55			7	✓	✓	✓	✓		✓		✓	Combo GA + extra	
8	207/0.1			8				✓						
9	208/0.3			9				✓						
10	209/0.1			10				✓						
PQL (S) mg/kg														
PQL (W) mg/L ANZECC PQLs req'd for all water analytes ☐														
PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit				SAMPLES RECEIVED BY LAB Please sign and date to acknowledge receipt of samples and return by email Signature: <u>Paulo Sebastian</u> Date: <u>19/3/20</u> 1038 Lab Ref: <u>239281</u>						Send results to: Douglas Partners Pty Ltd Email: paulo.sebastian@douglaspartners.com.au dana.wilson@douglaspartners.com.au Matthew Blackert @ douglaspartners.com.au Envirolab Services Chatswood NSW 2067 Ph: (02) 9910 6200 Job No: <u>239281</u> Date Received: <u>19/3/20</u> Time Received: <u>1038</u> Received by: <u>JD</u> Temp: <u>6.60</u> Ambient Cooling: <u>Ice</u> Icepack Security: <u>Unbroken/None</u>				
*Metals to Analyse (Please circle) As, Cd, Cr, Cu, Pb, Zn, Hg, Ni, Mn, Fe, Al, Se, Sn, Sb, Mg, Co, B, Total number of samples in container: <u>27</u> Date relinquished: <u>19/3/20</u> Results required by: ☐ Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☒ Standard														

pg 2 of 3

CHAIN OF CUSTODY DESPATCH SHEET (2)

Project No: 102007.01		Suburb/Town: Charlestown		To: Envirolab Services Pty Ltd	
DP Order No: 14997		DP Contact Person: Paulo Sebastian / Dana Wilson / Matthew Blackert		12 Ashley Street, CHATSWOOD NSW 2067	
Prior Storage: Esky ☒ Fridge ☐ Shelved ☐				Ph: (02) 9910 6200	
Do samples contain 'potential' HBM? Yes ☒ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)				Attn: Jacinta Hurst	

Sample				Analytes									Notes
DP ID	Date Sampled	Type S-soil W-water	Lab ID	TRH / BTEX	PAH	Metals	PCB	OPP / OCP	Acid Herbicides	Asbestos I.D	pH / EC	Coal Tar I.D	
1210/0.4	17/3/20	S	11	✓	✓	✓	✓	✓	✓	✓	✓		Combo GA + extra
1211/0.1			12	✓	✓	✓	✓	✓	✓	✓			Combo GA
1212/0.1			13	✓	✓	✓	✓	✓	✓	✓			"
1212/0.5			14	✓	✓	✓	✓	✓					Combo 6
1213/0.25			15					✓					
1214/0.3	17/3/20		16	✓	✓	✓	✓	✓	✓	✓			Combo GA + extra
1215/0.2	18/3/20		17					✓					
1216/0.1			18	✓	✓	✓	✓	✓	✓	✓			Combo GA + extra
1217/0.2			19	✓	✓	✓	✓	✓	✓	✓			"
1218/0.5			20	✓	✓	✓	✓	✓	✓	✓			"
PQL (S) mg/kg													
PQL (W) mg/L ANZECC PQLs req'd for all water analytes ☐													
PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit				SAMPLES RECEIVED BY LAB Please sign and date to acknowledge receipt of samples and return by email Signature: <u>[Signature]</u> Date: <u>19/3/20</u> Lab Ref: <u>ELS Sto 239781</u>					Send results to: Douglas Partners Pty Ltd Email: paulo.sebastian@douglaspartners.com.au dana.wilson@douglaspartners.com.au matthew.blackert@douglaspartners.com.au				
*Metals to Analyse (Please circle) As, Cd, Cr, Cu, Pb, Zn, Hg, Ni, Mn, Fe, Al, Se, Sn, Sb, Mg, Co, B,													
Total number of samples in container: <u>27</u> Date relinquished: <u>18/3/20</u> Results required by: _____ ☐ Same day ☐ 24 hours ☐ 48 hours ☒ 72 hours ☒ Standard													

pg 3 of 3

CHAIN OF CUSTODY DESPATCH SHEET (2)

Project No: 102007.01		Suburb/Town: Charlestown		To: Envirolab Services Pty Ltd	
DP Order No: 149997		DP Contact Person: Paulo Sebastian / Dana Wilson / Matthew Blackert		12 Ashley Street, CHATSWOOD NSW 2067	
Prior Storage: Esky ☒ Fridge ☐ Shelved ☐				Ph: (02) 9910 6200	
Attn: Jacinta Hurst					
Do samples contain 'potential' HBM? Yes ☒ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)					

Sample				Analytes									Notes
DP ID	Date Sampled	Type S-soil W-water	Lab ID	TRH / BTEX	PAH	Metals	PCB	OPP / OCP	Acid Herbicides	Asbestos I.D	pH / EC	Coal Tar I.D	
2219/0.2	18/3/20	S	21	✓	✓	✓	✓	✓	✓	✓			Combo 6A + extra
2220/0.2			22					✓					
2321/0.3			23	✓	✓	✓	✓	✓	✓	✓			Combo 6A + extra
2405/JPS			24	✓	✓	✓	✓	✓					
2512/0-0.3F		material	25							✓			
2618/0.5F		"	26							✓			
2719/0.2F	✓	"	27							✓			
2818/0-0.6	?	M	28	Extra - 30									
+ 32 Extra Jars B 2 Bags - 30													
PQL (S) mg/kg													
PQL (W) mg/L ANZECC PQLs req'd for all water analytes ☐													
PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit *Metals to Analyse (Please circle) As, Cd, Cr, Cu, Pb, Zn, Hg, Ni, Mn, Fe, Al, Se, Sn, Sb, Mg, Co, B.				SAMPLES RECEIVED BY LAB Please sign and date to acknowledge receipt of samples and return by email Signature: <u>Jason Day</u> Date: <u>19/3/20</u> <u>1038</u> Lab Ref: <u>ECS 510 239281</u>					Send results to: Douglas Partners Pty Ltd Email: paulo.sebastian@douglaspartners.com.au dana.wilson@douglaspartners.com.au matthew.blackert@douglaspartners.com.au				
Total number of samples in container: <u>27</u> Date relinquished: <u>18/3/20</u> Results required by: ☐ Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☒ Standard													

Project No: 102007.01	Suburb/Town: Charlestown	To: Envirolab Services Pty Ltd 12 Ashley Street, CHATSWOOD NSW 2067	
DP Order No: 150056	DP Contact Person: Paulo Sebastian/ Matthew Blackert		
Prior Storage: Esky ☒ Fridge ☐ Shelved ☐		Ph: (02) 9910 6200	Attn: Jacinta Hurst
Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)			

Sample				Analytes									Notes
DP ID	Date Sampled	Type S-soil W-water	Lab ID	TCLP PAH	TCLP Pb	CEC							
206a/0.55	17/03/20	S	239281-7	X									
210/0.4	17/03/20	S	239281-11			X							
218/0.5	18/03/20	S	239281-20		X								
PQL (S) mg/kg													
PQL (W) mg/L	ANZECC PQLs req'd for all water analytes ☐												
PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit						SAMPLES RECEIVED BY LAB Please sign and date to acknowledge receipt of samples and return by email					Send results to: Douglas Partners Pty Ltd Email: paulo.sebastian@douglaspartners.com.au matthew.blackert@douglaspartners.com.au		
*Metals to Analyse (Please circle) As, Cd, Cr, Cu, Pb, Zn, Hg, Ni, Mn, Fe, Al, Se, Sn, Sb, Mg, Co, B,													
Total number of samples in container: ...Already Recieved						Signature:							
Date relinquished:.....30/03/2020..... Results required by.....						Date:30/3/20.....							
Same day 24 hours 48 hours 72 hours X Standard						Lab Ref:239281-A..... Due: 6/4/20 Std Mnt							

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Matthew Blackert, Paulo Sebastian

Sample Login Details

Your reference	102007.01, Charlestown
Envirolab Reference	235714
Date Sample Received	31/01/2020
Date Instructions Received	31/01/2020
Date Results Expected to be Reported	07/02/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	25 Soil, 7 Material
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	21.1
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	Phone: 02 9910 6200
Fax: 02 9910 6201	Fax: 02 9910 6201
Email: ahie@envirolab.com.au	Email: jhurst@envirolab.com.au

Analysis Underway, details on the following page:

Sample ID	VTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBs in Soil	Acid Extractable metals in soil	Misc Inorg - Soil	Asbestos ID - soils	Asbestos ID - materials
101 / 0.2	✓	✓	✓	✓	✓	✓	✓			
101 / 1.0	✓	✓	✓	✓	✓	✓	✓		✓	
102 / 0.2	✓	✓	✓	✓	✓	✓	✓			
102 / 0.2	✓	✓	✓	✓	✓	✓	✓			
103 / 0.2	✓	✓	✓	✓	✓	✓	✓		✓	
104 / 0.2	✓	✓	✓	✓	✓	✓	✓			
104 / 0.2	✓	✓	✓	✓	✓	✓	✓			
105 / 0.2	✓	✓	✓	✓	✓	✓	✓		✓	
105 / 0.2	✓	✓	✓	✓	✓	✓	✓	✓		
106 / 0.2	✓	✓	✓	✓	✓	✓	✓			
107 / 0.2	✓	✓	✓	✓	✓	✓	✓			
107 / 0.2	✓	✓	✓	✓	✓	✓	✓	✓		
108 / 0.2	✓	✓	✓	✓	✓	✓	✓			
109 / 0.2	✓	✓	✓	✓	✓	✓	✓			
110 / 0.2	✓	✓	✓	✓	✓	✓	✓		✓	
111 / 0.2	✓	✓	✓	✓	✓	✓	✓		✓	
112 / 0.2	✓	✓	✓	✓	✓	✓	✓		✓	
112 / 0.2	✓	✓	✓	✓	✓	✓	✓			
S1	✓	✓	✓				✓			
S2	✓	✓	✓				✓			
A4/F										✓
A2/F										✓
A2/S									✓	
A3/F										✓
A3/S									✓	
A8/F										✓
A8/S									✓	
A6/F										✓
A7/F										✓
A7/S									✓	
A10/F										✓
A4/S									✓	

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Matthew. Blackert

Sample Login Details

Your reference	102007.01, Charlestown
Envirolab Reference	235965
Date Sample Received	05/02/2020
Date Instructions Received	05/02/2020
Date Results Expected to be Reported	12/02/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	2 solid
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	18.8
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie

Phone: 02 9910 6200
Fax: 02 9910 6201
Email: ahie@envirolab.com.au

Jacinta Hurst

Phone: 02 9910 6200
Fax: 02 9910 6201
Email: jhurst@envirolab.com.au

Analysis Underway, details on the following page:

Sample ID	
	Misc Inorg - Soil
CP1	✓
P107	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Matthew Blackert, Paulo Sebastian, Dana Wilson

Sample Login Details

Your reference	102007.01, Charlestown
Envirolab Reference	239281
Date Sample Received	19/03/2020
Date Instructions Received	19/03/2020
Date Results Expected to be Reported	26/03/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	24 Soil, 4 Material
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	28.0
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie

Phone: 02 9910 6200
Fax: 02 9910 6201
Email: ahie@envirolab.com.au

Jacinta Hurst

Phone: 02 9910 6200
Fax: 02 9910 6201
Email: jhurst@envirolab.com.au

Analysis Underway, details on the following page:

Sample ID	VTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBs in Soil	Acid Extractable metals in soil	Asbestos ID - soils	Asbestos ID - materials	Phenoxy Acid Herbicides in Soil	Coal Tar	Misc Inorg - Soil	On Hold
201/0.3	✓	✓	✓	✓	✓	✓	✓	✓					
202/0.3	✓	✓	✓	✓	✓	✓	✓	✓					
203/0.1				✓	✓								
204/0.01											✓		
204/0.2	✓	✓	✓	✓	✓	✓	✓	✓				✓	
205/0.1	✓	✓	✓	✓	✓	✓	✓	✓		✓			
206a/0.55	✓	✓	✓	✓	✓	✓	✓	✓			✓		
207/01				✓	✓								
208/0.3				✓	✓								
209/0.1				✓	✓								
210/0.4	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	
211/0.1	✓	✓	✓	✓	✓	✓	✓	✓		✓			
212/0.1	✓	✓	✓	✓	✓	✓	✓	✓		✓			
212/0.5	✓	✓	✓	✓	✓	✓	✓						
213/0.25				✓	✓								
214/0.3	✓	✓	✓	✓	✓	✓	✓	✓		✓			
215/0.2				✓	✓								
216/0.1	✓	✓	✓	✓	✓	✓	✓	✓		✓			
217/0.2	✓	✓	✓	✓	✓	✓	✓	✓		✓			
218/0.5	✓	✓	✓	✓	✓	✓	✓	✓		✓			
219/0.2	✓	✓	✓	✓	✓	✓	✓	✓		✓			
220/0.2				✓	✓								
221/0.3	✓	✓	✓	✓	✓	✓	✓	✓		✓			
D5/JPS	✓	✓	✓	✓	✓	✓	✓						
212/0-0.3F									✓				
218/0.5F									✓				
219/0.2F									✓				
218/0-0.6													✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Matthew. Blackert, Paulo Sebastian

Sample Login Details

Your reference	102007.01, Charlestown
Envirolab Reference	239281-A
Date Sample Received	19/03/2020
Date Instructions Received	30/03/2020
Date Results Expected to be Reported	06/04/2020

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	24 Soil, 4 Material
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	28.0
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	Phone: 02 9910 6200
Fax: 02 9910 6201	Fax: 02 9910 6201
Email: ahie@envirolab.com.au	Email: jhurst@envirolab.com.au

Analysis Underway, details on the following page:



Envirolab Services Pty Ltd

ABN 37 112 535 645

12 Ashley St Chatswood NSW 2067

ph 02 9910 6200 fax 02 9910 6201

customerservice@envirolab.com.au

www.envirolab.com.au

Sample ID	pH of soil for fluid#determ.	pH of soil TCLP (after HCl)	Extraction fluid used	pH of final Leachate	Lead in TCLP	Naphthalene in TCLP	Acenaphthylene in TCLP	Acenaphthene in TCLP	Fluorene in TCLP	Phenanthrene in TCLP	Anthracene in TCLP	Fluoranthene in TCLP	Pyrene in TCLP	Benzo(a)anthracene in TCLP	Chrysene in TCLP	Benzo(b)fluoranthene in TCLP	Benzo(a)pyrene in TCLP	Indeno(1,2,3-c,d)pyrene - TCLP	Dibenzo(a,h)anthracene in TCLP	Benzo(g,h,i)perylene in TCLP	Total +vePAH's	Surrogate p-Terphenyl-d14	CEC	On Hold
201/0.3																								✓
202/0.3																								✓
203/0.1																								✓
204/0.01																								✓
204/0.2																								✓
205/0.1																								✓
206a/0.55	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
207/01																								✓
208/0.3																								✓
209/0.1																								✓
210/0.4																						✓		
211/0.1																								✓
212/0.1																								✓
212/0.5																								✓
213/0.25																								✓
214/0.3																								✓
215/0.2																								✓
216/0.1																								✓
217/0.2																								✓
218/0.5	✓	✓	✓	✓	✓																			



Sample ID	pH of soil for fluid#determ.	pH of soil TCLP (after HCl)	Extraction fluid used	pH of final Leachate	Lead in TCLP	Naphthalene in TCLP	Acenaphthylene in TCLP	Acenaphthene in TCLP	Fluorene in TCLP	Phenanthrene in TCLP	Anthracene in TCLP	Fluoranthene in TCLP	Pyrene in TCLP	Benzo(a)anthracene in TCLP	Chrysene in TCLP	Benzo(b)fluoranthene in TCLP	Benzo(a)pyrene in TCLP	Indeno(1,2,3-c,d)pyrene - TCLP	Dibenzo(a,h)anthracene in TCLP	Benzo(g,h,i)perylene in TCLP	Total +vePAH's	Surrogate p-Terphenyl-d14	CEC	On Hold
219/0.2																								✓
220/0.2																								✓
221/0.3																								✓
D5/JPS																								✓
212/0-0.3F																								✓
218/0.5F																								✓
219/0.2F																								✓
218/0-0.6																								✓
201/0.3 - [TRIPLICATE]																								✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

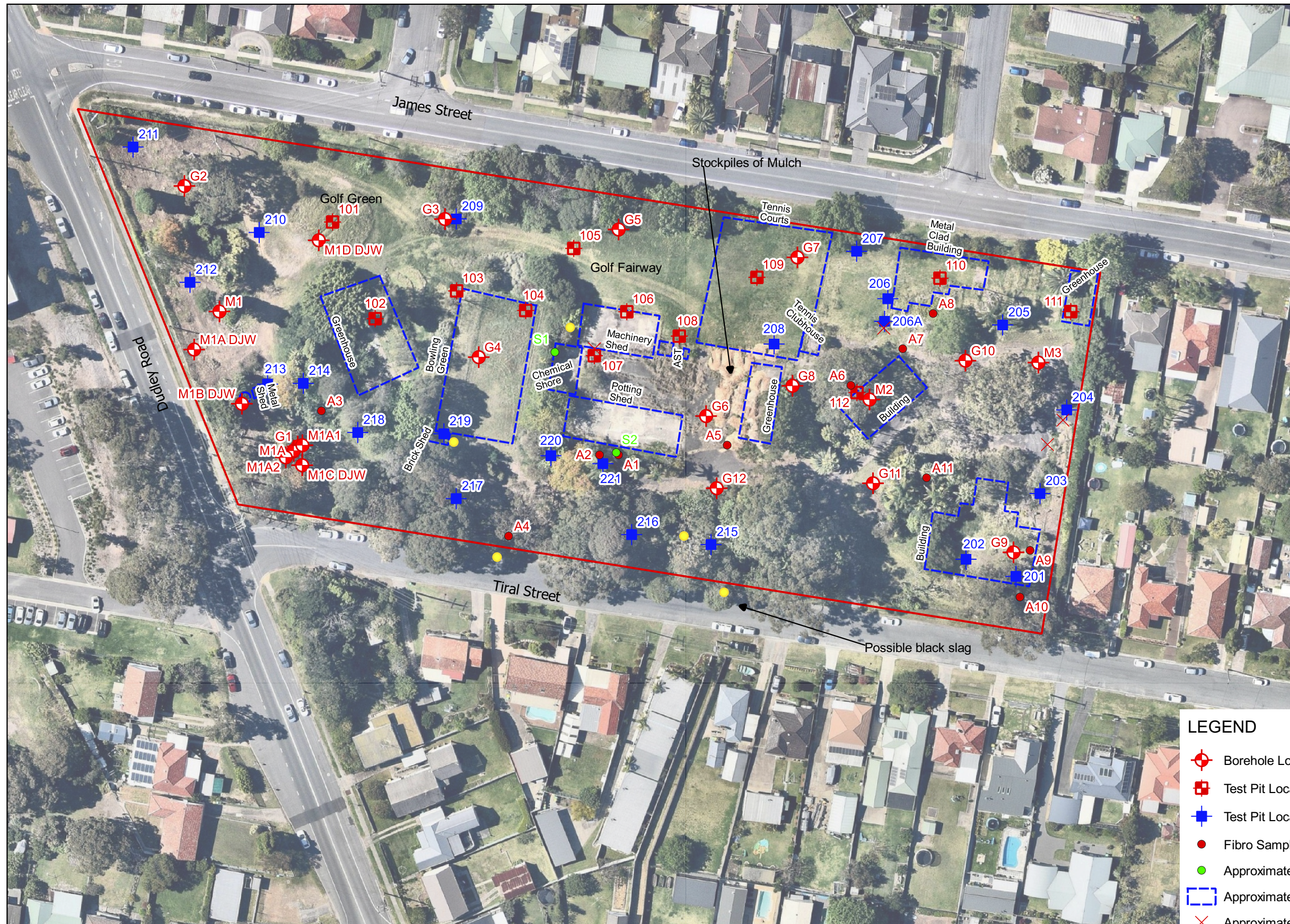
Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Appendix E

Drawing 1 – Test Location Plan
Drawing 2 – Test Location Plan and Summary of SAC Exceedances
Photoplates
Plus Architecture – Uniting Charlestown
– Design Development and Staging Plan
Plus Architecture – Uniting Charlestown
– Option C, ELC under Tower Plan
DWC – Plan of Demolition



Locality Plan

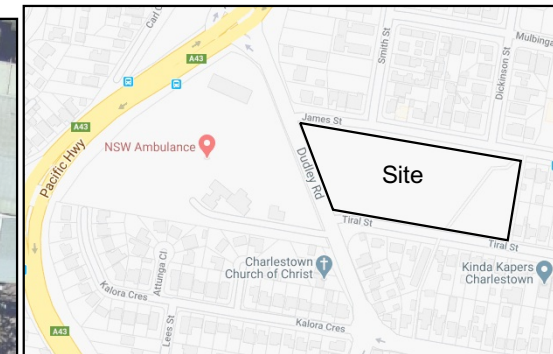
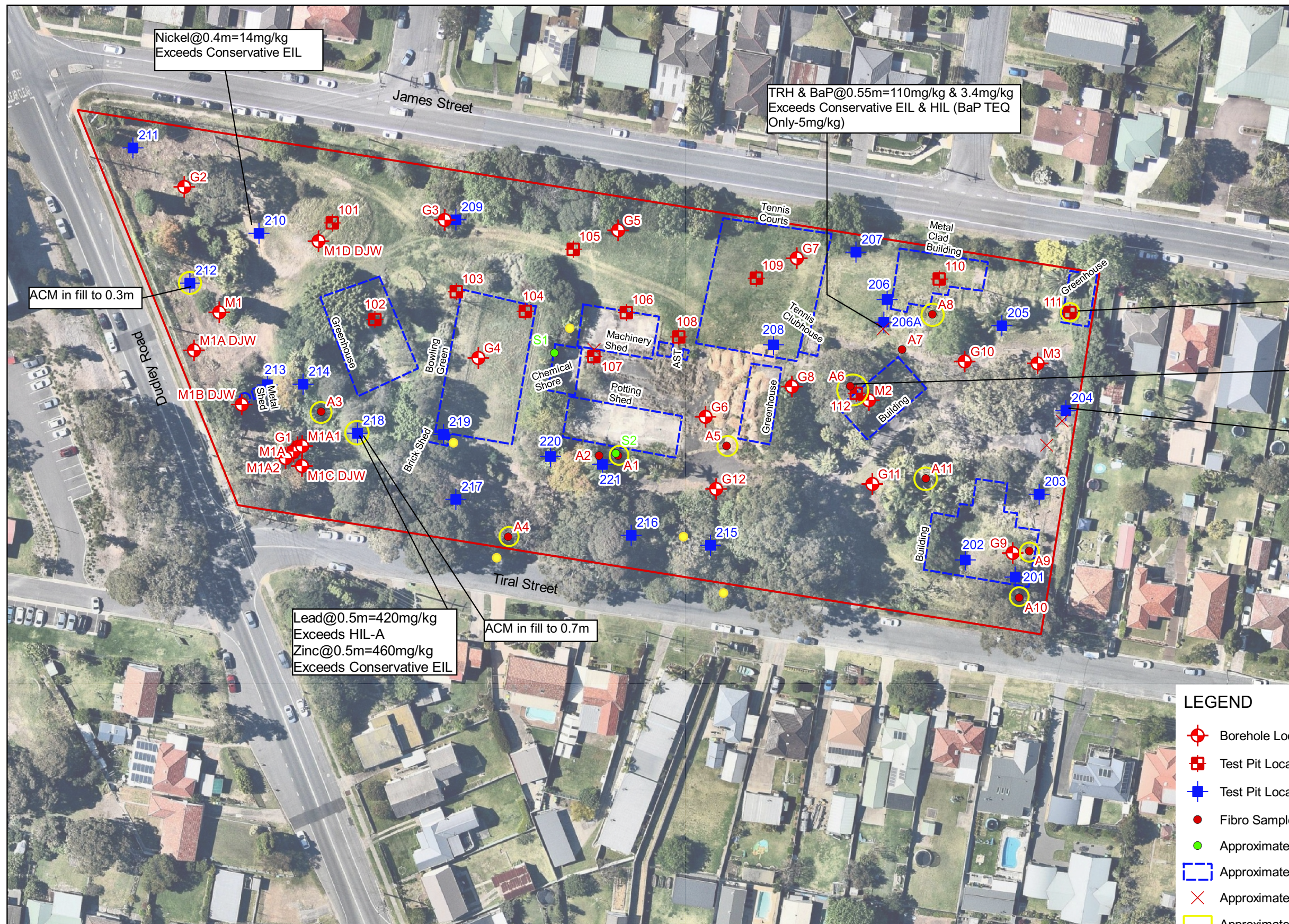
LEGEND

- Borehole Location (geotechnical/mine subsidence investigation)
- Test Pit Location (100 series for PSI)
- Test Pit Location (200 series for DSI)
- Fibro Sample Location
- Approximate Location of Retaining Wall Surface Sample
- Approximate Location of Previous Buildings
- Approximate Asphalt Sample Location
- Approximate Investigation Area
- Fibro Samples Observed during Site Walkover (not sampled)

0 25 50 75 100 m

Drawing adapted from Nearmap Image dated 22.10.2019





Locality Plan

Potential ACM in fill 0.3m-0.8m

ACM in fill to 0.4m

Nickel@ 0.2m=11mg/kg
Exceeds Conservative EIL

LEGEND

- Borehole Location (geotechnical/mine subsidence investigation)
- Test Pit Location (100 series pits for PSI)
- Test Pit Location (200 series for PSI)
- Fibro Sample Location
- Approximate Location of Retaining Wall Surface Sample
- Approximate Location of Previous Buildings
- Approximate Asphalt Sample Location
- Approximate Location of Confirmed Surface ACM Impact
- Approximate Investigation Area
- Fibro Samples Observed during Site Walkover (not sampled)

Drawing adapted from Nearmap Image dated 22.10.2019





Photo 1: Western crib-lock retaining wall comprising blast furnace slag, looking west.



Photo 2: Southern crib-lock retaining wall comprising soil and ash, looking south.



Site Photographs
Detailed Site Investigation
27 Tiral Street, Charlestown

CLIENT: The Uniting Church in
Australia Property Trust
(NSW) for Uniting
(NSW.ACT)

PROJECT: 102007.01

PLATE No: 1

REV: 0

DATE: 7-May-20



Photo 3: Area of former bowling green, looking north.



Photo 4: Area of former bowling green, looking south west.



Site Photographs
Detailed Site Investigation
27 Tiral Street, Charlestown

CLIENT: The Uniting Church in
Australia Property Trust
(NSW) for Uniting
(NSW.ACT)

PROJECT: 102007.01

PLATE No: 2

REV: 0

DATE: 7-May-20



Photo 5: Fibro fragments at the base of the retaining wall adjacent to the former bowling green.



Photo 6: Bricks, timber and metal (demolition waste) scattered adjacent to retaining wall and former bowling green, looking south west.



Site Photographs
Detailed Site Investigation
27 Tiral Street, Charlestown

CLIENT: The Uniting Church in
Australia Property Trust
(NSW) for Uniting
(NSW.ACT)

PROJECT: 102007.01

PLATE No: 3

REV: 0

DATE: 7-May-20



Photo 7: Former golf bunker adjacent to the former green comprising imported pale grey sand, looking west.



Photo 8: A disturbed area north of the former bunker, comprising silty sand fill intermixed with timber, vegetation waste, bricks, agricultural pipe, and PVC pipe.



Site Photographs
Detailed Site Investigation
27 Tiral Street, Charlestown

CLIENT: The Uniting Church in
Australia Property Trust
(NSW) for Uniting
(NSW.ACT)

PROJECT: 102007.01

PLATE No: 7

REV: 0

DATE: 7-May-20



Photo 9: Former fairway, fill embankment and garden area in western portion of site, looking east.



Photo 10: Garden beds with some mature trees are situated along the western site boundary, looking south.



Site Photographs

Detailed Site Investigation
27 Tiral Street, Charlestown

CLIENT: The Uniting Church in
 Australia Property Trust
 (NSW) for Uniting
 (NSW.ACT)

PROJECT: 102007.01

PLATE No: 5

REV: 0

DATE: 7-May-20



Photo 11: Soil bays and surrounding fill stockpiles in south western portion of site, looking south.



Photo 12: Fill materials to the east of the water tank comprising scattered fibro sheeting fragments of various types, looking north east.



Site Photographs
Detailed Site Investigation
27 Tiral Street, Charlestown

CLIENT: The Uniting Church in
Australia Property Trust
(NSW) for Uniting
(NSW.ACT)

PROJECT: 102007.01

PLATE No: 6

REV: 0

DATE: 7-May-20



Photo 13: Former greenhouse area comprising blast furnace slag and gravel, looking east.



Photo 14: Surface of former greenhouse area comprising blast furnace slag and gravel.



Site Photographs
Detailed Site Investigation
27 Tiral Street, Charlestown

CLIENT: The Uniting Church in
Australia Property Trust
(NSW) for Uniting
(NSW.ACT)

PROJECT: 102007.01

PLATE No: 7

REV: 0

DATE: 7-May-20



Photo 15: Central portion of site comprising a concrete and asphalt sealed hardstand area associated with the former chemical shed, potting shed and machinery shed, looking south. Note: Crib-lock wall in the background



Photo 16: Central portion of site comprising a concrete and asphalt sealed hardstand area associated with the former chemical shed, potting shed and machinery shed, looking west. Note: Crib-lock wall in the background



Site Photographs
Detailed Site Investigation
27 Tiral Street, Charlestown

CLIENT: The Uniting Church in
 Australia Property Trust
 (NSW) for Uniting
 (NSW.ACT)

PROJECT: 102007.01

PLATE No: 8

REV: 0

DATE: 7-May-20



Photo 17: Central asphalt sealed hardstand with thick grass cover and former soil bays east of the former chemical shed, looking north-east.



Photo 18: Fibro fragments on the surface of the hardstand in the south-western portion of the hardstand.



Site Photographs
Detailed Site Investigation
27 Tiral Street, Charlestown

CLIENT: The Uniting Church in
Australia Property Trust
(NSW) for Uniting
(NSW.ACT)

PROJECT: 102007.01

PLATE No: 9

REV: 0

DATE: 7-May-20



Photo 19: Looking north-east at location of former soil bays and former AST.



Photo 20: Location of former AST in central portion of the site, looking west.



**Site Photographs
Detailed Site Investigation
27 Tiral Street, Charlestown**

CLIENT: The Uniting Church in
Australia Property Trust
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(NSW.ACT)

PROJECT: 102007.01

PLATE No: 10

REV: 0

DATE: 7-May-20



Photo 21: Stockpiled mulch located on the eastern side of the central hardstand area, looking east.



Photo 22: Stockpiled mulch located on the eastern side of the central hardstand area, looking south east.



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Detailed Site Investigation
27 Tiral Street, Charlestown

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PROJECT: 102007.01

PLATE No: 11

REV: 0

DATE: 7-May-20



Photo 23: Partially demolished rock retaining wall located in the south western corner of the hardstand area, looking north east.



Photo 24: Garden bed south of the central hardstand area comprising abundant fibro sheeting fragments at the surface, looking east.



Site Photographs

Proposed New Residence

10 Burwood Road, Whitebridge

CLIENT:

The Uniting Church in
Australia Property Trust
(NSW) for Uniting
(NSW.ACT)

PROJECT: 102007.00

PLATE No: 12

REV: 0

DATE: 7-May-20



Photo 25: Garden area, comprising undulated ground with mature trees, buried pavers, brick and concrete adjacent to the central entrance, looking east.



Photo 26: Fibro fragment within the southern garden area west of the stormwater drain, looking east.



Site Photographs
Proposed New Residence
10 Burwood Road, Whitebridge

CLIENT: The Uniting Church in
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 (NSW.ACT)

PROJECT: 102007.00

PLATE No: 13

REV: 0

DATE: 7-May-20



Photo 27: Remnants of a former sculpture within the garden area adjacent to the central entrance, looking south.



Photo 28: Open stormwater drain, constructed with battered natural rock/cement walls and a concrete base located at the eastern end of the garden area, looking south.



Photo 29: Partially demolished pool and water feature, adjacent to the central driveway entrance, looking north east.



Photo 30: Backfilled inground pool, adjacent to the central driveway entrance. Note: Fibro sheeting fragments at surface



Site Photographs
Detailed Site Investigation
27 Tiral Street, Charlestown

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(NSW.ACT)

PROJECT: 102007.01

PLATE No: 15

REV: 0

DATE: 7-May-20



Photo 31: Former administration building located adjacent to eastern entrance, comprising concrete slabs, brick footings and terraced garden beds, looking south.



Photo 32: Scattered demolition waste and fibro sheeting within the to former administration building footprint.



Site Photographs
Detailed Site Investigation
27 Tiral Street, Charlestown

CLIENT: The Uniting Church in
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(NSW.ACT)

PROJECT: 102007.01

PLATE No: 16

REV: 0

DATE: 7-May-20



Photo 33: Scattered demolition waste and fibro sheeting adjacent to former administration building footprint, looking north.



Photo 34: Asphalt sealed driveway and carparking area situated to the north of the former Administration building, looking north.



Photo 35: Mounded fill area within north eastern portion of site, looking north.



Photo 36: Remnants of square brick raised garden beds in north eastern portion of site, looking north west.



Site Photographs
Proposed New Residence
10 Burwood Road, Whitebridge

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PROJECT: 102007.01

PLATE No: 18

REV: 0

DATE: 7-May-20



Photo 37: Area north of the driveway (former classrooms) comprising a grassed area with remnants of former building slabs and footings.



Photo 38: Area north of the driveway (former classrooms) comprising a grassed area with remnants of former building slabs and footings.



Photo 39: Demolition waste at the surface of former classrooms footprint including concrete, bricks, sandstone, pavers, PVC, agricultural pipe, PVC, metal and areas with multiple fibro fragments.



Photo 40: Demolition waste at the surface of former classrooms footprint including concrete, bricks, sandstone, pavers, PVC, agricultural pipe, PVC, metal and areas with multiple fibro fragments.



Photo 41: Footprint of former tennis court and tennis shed in the central northern portion of the site, looking west.



Photo 42: Easement to the east of the site comprises a gravel filled surface with the occasional manhole, looking north.



Photo 43: Possible black slag fill observed at the surface in the road shoulder near the drainage reserve road crossing on Tiral Street.



Photo 44: Fibro fragments observed on surface of road shoulder along Tiral Street.



Site Photographs
Proposed New Residence
10 Burwood Road, Whitebridge

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PROJECT: 102007.01

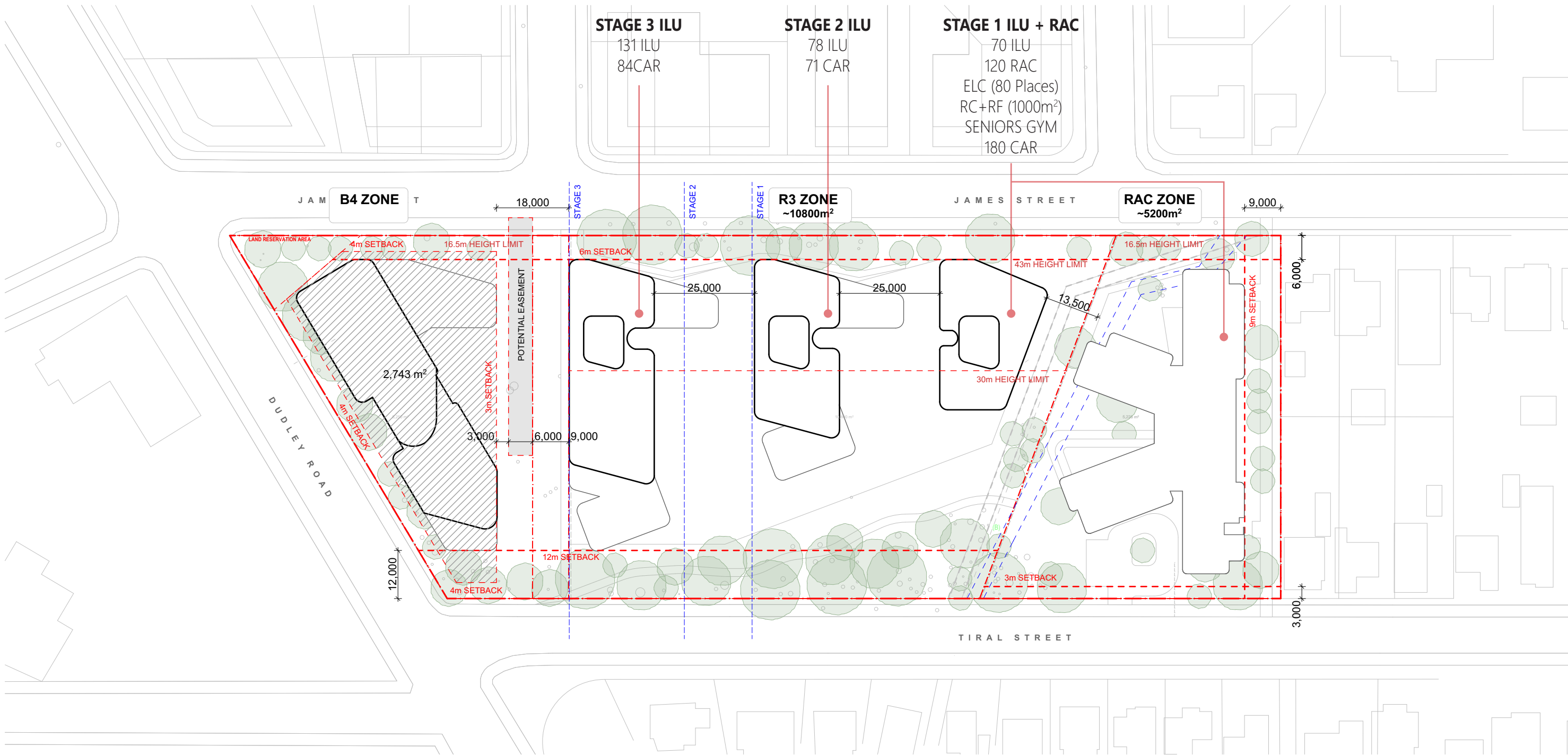
PLATE No: 22

REV: 0

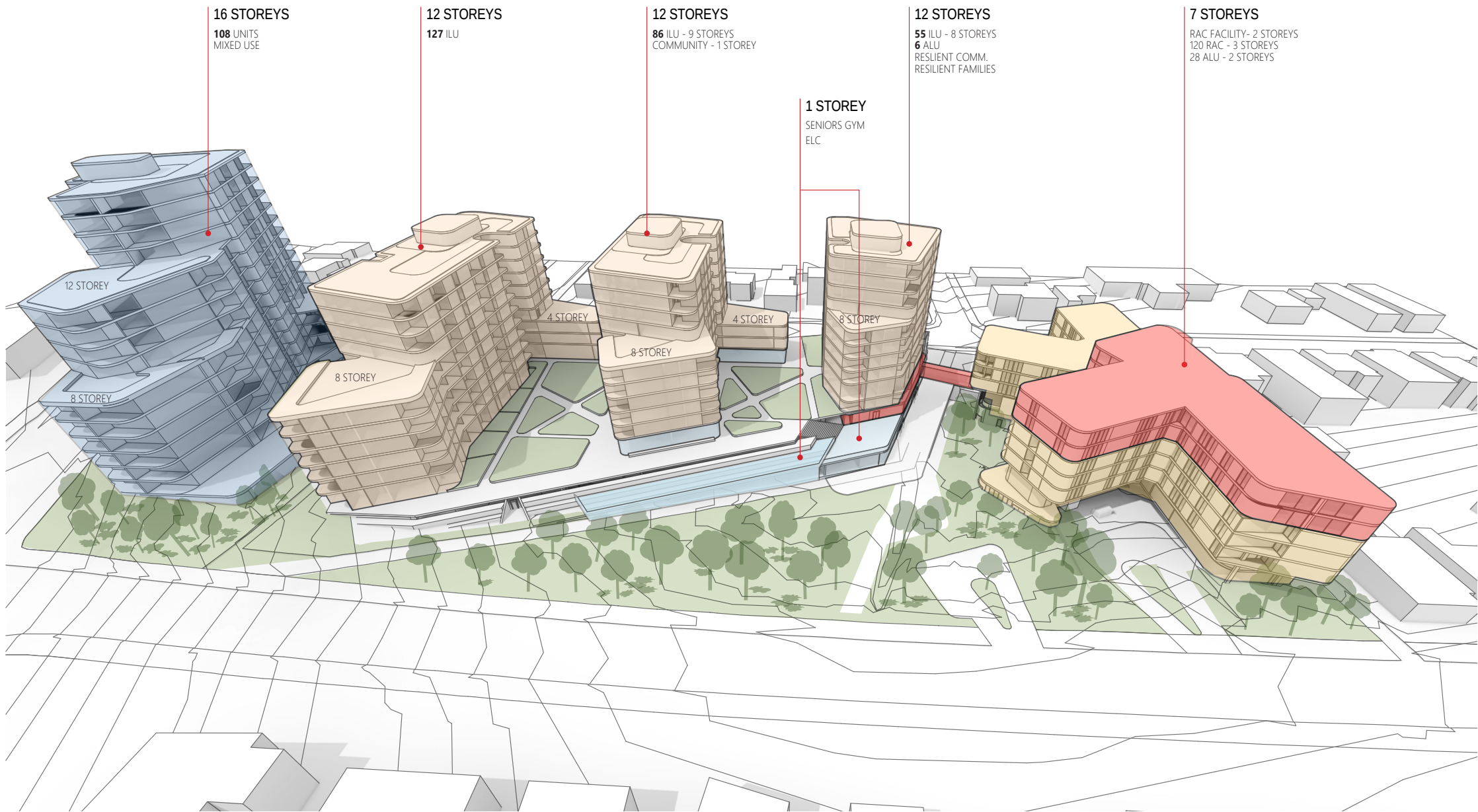
DATE: 7-May-20



Photo 45: Fibro fragments observed on surface of road shoulder along Tiral Street, looking west.



ZONING ADJUSTMENT
PREFERRED SCHEME



OPTION C

ELC under TOWER

TOTAL UNITS

TOTAL ILU	267
TOTAL RAC	120
TOTAL ALU	33

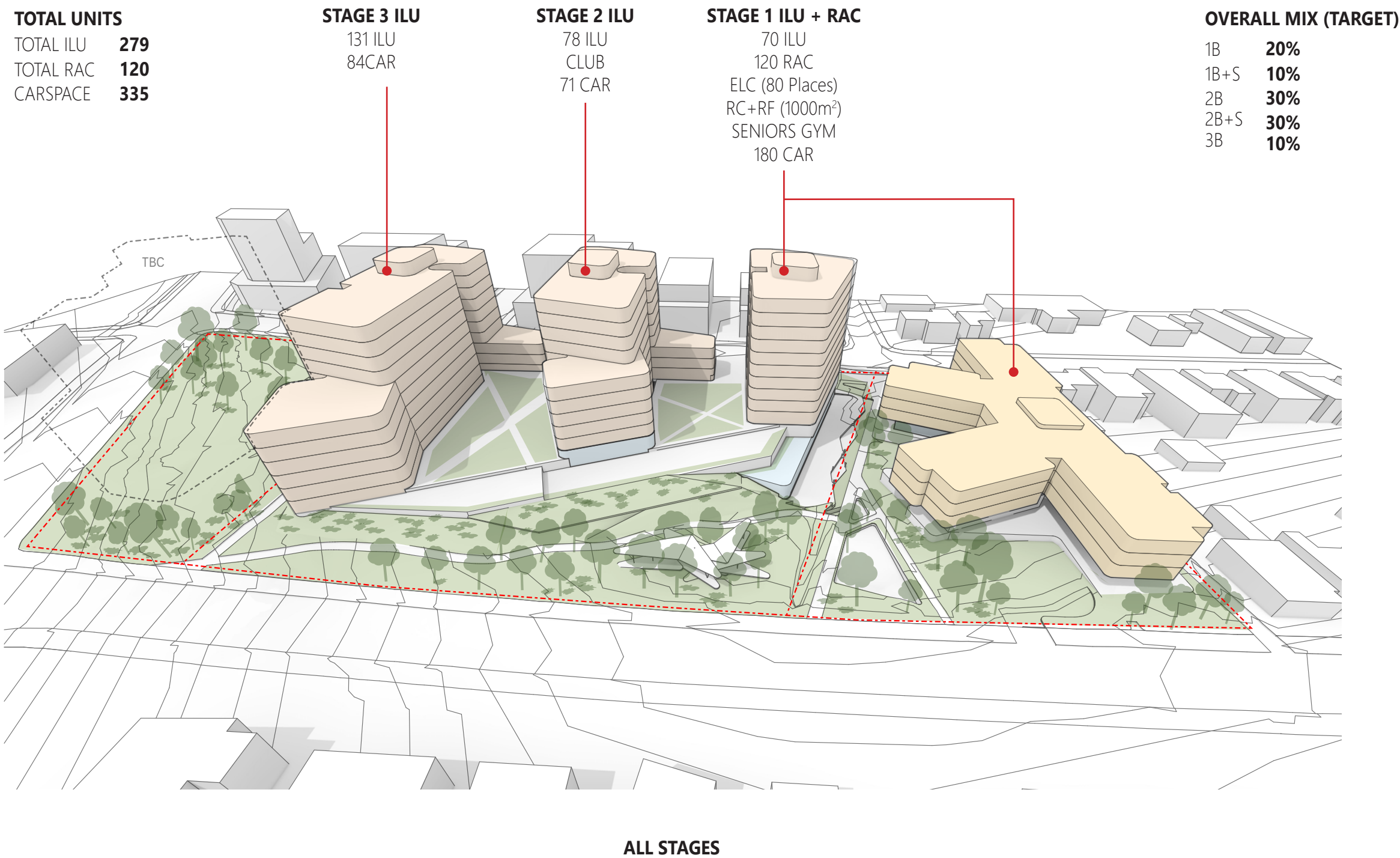
DESIGN ASSESSMENT

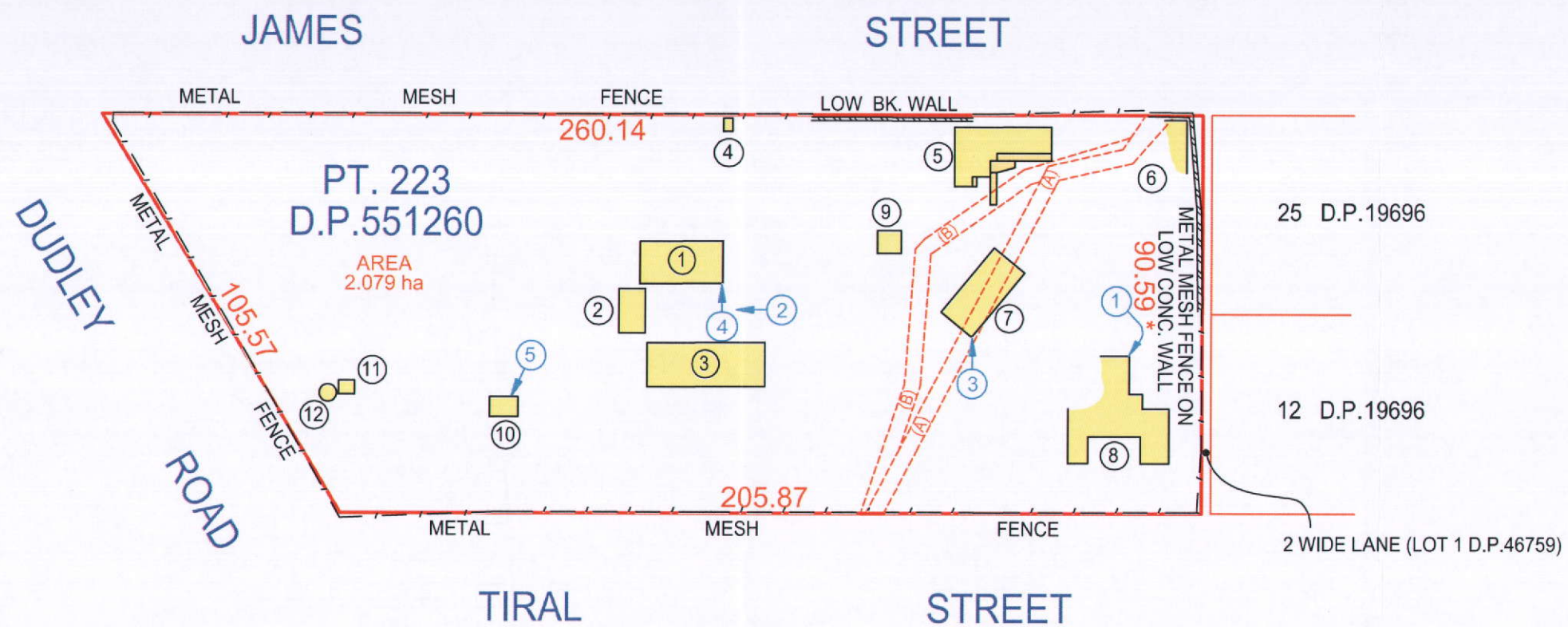
Pros

- ELC location allows trees along the Tiral St Pocket to be pre-served, opening further opportunity for natural park landscapes
- North-Facing orientation of ELC allows for good year-round solar access for outdoor play areas.
- ELC location close to drop-off zones along James St
- Opportunity for community interaction/activation between ELC and Seniors in the opposite RAC.
- Large open visual and physical interconnection of public forums maintained from top of Tiral St, ILU podium levels, down to RAC entry facilities and Resilient Family communities spaces , and bus connection along James St

Cons

- ELC outdoor location and shape encroaches into the communal heart intended for public access
- ELC location creates additional carparking requirements for Stage 1
- Limited opportunities for RACF connection with James St





PHOTOGRAPH 1



PHOTOGRAPH 2



PHOTOGRAPH 3



PHOTOGRAPH 4



PHOTOGRAPH 5

LEGEND

— / — FENCE LINE
— BOUNDARY LINE
- - - EASEMENT

BUILDING LEGEND

- | | | | |
|---|--------------------------------|--|-----------------|
| ① CONC. & METAL ROOF BUILDINGS (DERELICT) | ④ TIMBER PERGOLA | ⑦ BK. & TIMBER BUILDING (DERELICT) | ⑩ BRICK SHED |
| ② CONC. & METAL ROOF BUILDINGS (DERELICT) | ⑤ METAL CLAD DERELICT BUILDING | ⑧ 1 & 2 STOREY BK. BUILDING (DERELICT) | ⑪ METAL SHED |
| ③ CONC. & METAL ROOF BUILDINGS (DERELICT) | ⑥ TIMBER PERGOLA | ⑨ TIMBER SHED | ⑫ CONCRETE TANK |

(A) DRAINAGE RESERVE 3.62 WIDE & VARIABLE WIDE D.P.551260
(B) EASEMENT TO DRAIN WATER 3.6 WIDE & VARIABLE D.P.648824
* 90.59 D.P.648824 & SURVEY 90.55 TITLE

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TITLE

**PLAN OF DEMOLITION
FORMER CHARLESTOWN TAFE**

Ed.	Date	Amendment
A	14.09.10	INITIAL ISSUE

JOB ADDRESS:	No.27 TIRAL STREET CHARLESTOWN
CLIENT:	UNITING CARE AGEING
SCALE:	A3 1:750
SURVEY DATE:	20.01.10
PLAN DATE:	14.09.10
DATUM:	N/A
CAD REF:	-

ORIGIN OF LEVELS
N/A

DRAWN
SURVEYOR JL
CHECKED
APPROVED DH

DRAWING REF:2243Planofdemolition14.09.10

PLAN No
1

JOB REF:
2243

SHEET No
1/1