

Stage 2 Detailed Site Investigation

1 Bibbenluke Avenue, Duffys Forest, NSW

5046200086 – R02

Prepared for Mr Brian Anschau
7/10/2020

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Further Advice: CS would be pleased to further discuss how any of the above issues could affect a specific project. We would also be pleased to provide further advice or assistance including:

- Assessment of suitability of designs and construction techniques;
- Contract documentation and specification;
- Construction control testing (earthworks, pavement materials, concrete);
- Construction advice (foundation assessments, excavation support).

Executive Summary

Construction Sciences Pty Ltd (CS) was engaged by Mr Brian Anschau (the client), to undertake a stage 2 detailed site investigation (DSI) for a portion of land located at 1 Bibbenluke Avenue, Duffys Forest, NSW (the property).

At the commencement of this work, CS understood the following:

- > The property is currently owned by Mr Brian Anschau.
- > The property comprises of a residential dwelling to the west and an animal boarding facility (Hanrob Pet Hotels) to the east. This report concerns the portion of the property occupied by the animal boarding facility, which is referred to as 'the site' from hereon. The site and the property are shown on Figures 1 and 2.
- > The site consists of an office building, animal boarding houses, driveways and other animal boarding features such as kennels, animal enclosures (bays), open areas, etc.
- > The property is proposed for a residential subdivision into two lots whereby the areas occupied by the site is being proposed for residential land use scenario¹ comprising:
 - Residential with accessible soil, including garden with home grown produce contributing less than 10% fruit and vegetable intake (excluding home grown poultry and/or eggs).
- > No demolition or removal of existing site features are proposed as part of the proposed subdivision. However, features such as animal boarding bays are proposed for reconfiguration to make it suitable for the proposed residential use. CS also understands that the existing office building for the animal boarding facility is proposed to be used as a residential premise by the future occupants.
- > The proposed land use scenario assumes a reticulated potable water supply will be available at the site, however the future development will not have access to town sewer.

This DSI is required to address:

- > the findings of the stage 1 preliminary site investigation prepared by Jessica Brodie in 2020; and
- > development consent planning decision making processes referred to in State Environmental Planning Policy (SEPP) No. 55.

The objectives of this project were to:

- > Assess the contamination status of the areas of environmental concern identified in the Stage 1 PSI;
- > Provide advice on whether the site is suitable, in the context of land contamination, for the proposed land use scenario; and
- > Provide recommendations for supplementary investigations, contamination management, or remedial works.

For the purpose of addressing the objectives of this project, where the proposed land use includes residential with accessible soil, CS has assumed that home grown produce (fruit and vegetable) consumption is not likely to constitute more than 10% of the diet, and that consumption of home grown poultry and/or eggs is not likely to occur².

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

- > A desktop review of site history;
- > A walkover of the site; and
- > Data assessment and reporting.

The scope of works was undertaken with reference to the relevant sections of NEPC (2013), NSW EPA (2020), WA DOH (2009), and HEPA (2020).

¹ Adopted from Section 2.2 of NEPC (2013a) and Section 3 of NEPC (2013e)

² Adopted from Section 4.6 of NEPC (2013c).

A number of areas of environmental concern (AEC) on the site, where potential land contaminating activities may have occurred, have been identified for the site, based on the site history review and site walkover observations.

The identified AEC are presented in Figure 3, and the COPC associated with those AEC are presented in the table below.

ID	AEC	Source	COPC
AEC02	Demolished former buildings	Uncontrolled demolition	Metals, asbestos
AEC04	Shallow fill area	Uncontrolled filling	Metals, PAH and asbestos

Based on CS's assessment of desktop review information, fieldwork observations and laboratory analytical data, CS makes the following conclusions:

- > the site is considered to be **suitable** for the following land use scenario:
 - Residential with accessible soil, including garden with home grown produce contributing less than 10% fruit and vegetable intake (excluding home grown poultry and/or eggs).
- > Specific assumptions applicable to that land use scenario are presented in Section 5 of this report.

This report must be read in conjunction with the Information About This Report page at the front of this report.

Table of Contents

1	Introduction	9
1.1	Background	9
1.2	Objectives	9
1.3	Scope of Work	10
2	Site Identification	11
2.1	Site Locality	11
2.2	Site Layout	11
2.3	Lot Number and Deposited Plan	11
2.4	Local Government Authority	11
2.5	Zoning	11
2.6	Geographic Coordinates	11
2.7	Detail and Level Survey	11
3	Geology, Topography, Elevation, Hydrogeology, Hydrology and Acid Sulfate Soils	12
3.1	Geology	12
3.2	Topography and Elevation	12
3.3	Hydrogeology and Hydrology	12
3.4	Acid Sulfate Soils	12
4	Previous Contamination Assessments	14
4.1	CS (2020)	14
5	Conceptual Site Model	15
5.1	Sources of Contamination	15
5.2	Land Use Scenario	15
5.2.1	Adopted Land Use Scenario	15
5.2.2	Assumptions for Adopted Land Use Scenario	15
5.3	Receptors	15
5.3.1	Identified Receptors	15
5.3.2	Assumptions for Identified Receptors	15
5.4	Exposure Pathways	16
5.4.1	Human Health	16
5.4.2	Aesthetics	17
5.4.3	Management Limits for Petroleum Hydrocarbons	17
5.4.4	Groundwater	18
5.4.5	Terrestrial Ecosystems	18
5.5	Conceptual Site Model	19
5.5.1	AEC01 – Gravel Driveways	19
5.5.2	AEC02 – Demolished former Buildings	19
5.5.3	AEC03 – Disposal of Treated Septic Effluent	19
5.5.4	AEC04 – Shallow Fill Areas	19
5.5.5	Revised CSM	20
6	Data Quality Objectives	21
6.1	Step 1: State the problem	21
6.2	Step 2: Identify the goal of the study	21
6.3	Step 3: Identify the information inputs	21
6.4	Step 4: Define the boundaries of the study	22
6.5	Step 5: Develop the analytical approach	22

6.5.1	Duplicates and Triplicates	22
6.5.2	Trip Blanks and Trip Spikes	22
6.5.3	Rinsate Blanks	22
6.5.4	Field Blanks	23
6.5.5	Laboratory Quality Assurance and Quality Control	23
6.5.6	Data Quality Indicators	23
6.5.7	If/Then Statements	24
6.6	Step 6: Specify the performance or acceptance criteria	25
6.6.1	If / Then Decisions	25
6.7	Step 7: Develop the plan for obtaining data	25
6.7.1	Sampling Point Density and Locations	25
6.7.2	Sampling Method – Soils	26
6.7.3	Field Screening	26
6.7.4	Decontamination	26
6.7.5	Sample Identification, Preservation, Handling and Transport	26
6.7.6	Laboratory Selection	26
6.7.7	Laboratory Analytical Schedule	26
6.7.9	Laboratory Holding Times, Analytical Methods and Limits of Reporting	27
7	Fieldwork	28
7.1	Soils	28
7.1.1	Sampling	28
7.1.2	Site Specific Geology	30
7.1.3	Potential Asbestos Containing Materials	30
7.1.4	Odours	30
7.1.5	Staining	30
7.1.6	Headspace Screening	31
8	Laboratory	32
9	Assessment of Data Quality Indicators	33
9.1	Completeness DQI	33
9.2	Comparability DQI	33
9.3	Representativeness DQI	34
9.4	Precision DQI	34
9.5	Accuracy (bias) DQI	35
10	Discussion	36
10.1	Human Health - Dermal Contact / Ingestion / Dust Inhalation	36
10.2	Human Health - Asbestos	36
10.2.1	Bonded Asbestos Containing Materials	36
10.2.2	Fibrous Asbestos / Asbestos Fines	36
10.3	Terrestrial Ecosystems	36
11	Revised Conceptual Site Model	37
12	Conclusions and Recommendations	38
13	References	39

Figures

Figure 1 Site Locality Plan

Figure 2 Site Layout Plan

Figure 3 Areas of Environmental Concern and Sampling Point Layout Plan

Appendices

Appendix A SITE SURVEY

Appendix B LOGS

Appendix C CALIBRATION

Appendix D HYDROLOGY/HYDROGEOLOGY

Appendix E LABORATORY

Appendix F METEOROLOGICAL DATA

1 Introduction

1.1 Background

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- > The site consists of an office building, animal boarding houses, driveways and other animal boarding features such as kennels, animal enclosures (bays), open areas, etc.
- > The property is proposed for a residential subdivision into two lots whereby the areas occupied by the site is being proposed for residential land use scenario³ comprising:
 - Residential with accessible soil, including garden with home grown produce contributing less than 10% fruit and vegetable intake (excluding home grown poultry and/or eggs).
- > No demolition or removal of existing site features are proposed as part of the proposed subdivision. However, features such as animal boarding bays are proposed for reconfiguration to make it suitable for the proposed residential use. CS also understands that the existing office building for the animal boarding facility is proposed to be used as a residential premise by the future occupants.
- > The proposed land use scenario assumes a reticulated potable water supply will be available at the site, however the future development will not have access to town sewer.

This DSI is required to address:

- > the findings of the stage 1 preliminary site investigation prepared by Jessica Brodie in 2020; and
- > development consent planning decision making processes referred to in State Environmental Planning Policy (SEPP) No. 55.

1.2 Objectives

The objectives of this project were to:

- > Assess the contamination status of the areas of environmental concern identified in the Stage 1 PSI;
- > Provide advice on whether the site is suitable, in the context of land contamination, for the proposed land use scenario; and
- > Provide recommendations for supplementary investigations, contamination management, or remedial works.

For the purpose of addressing the objectives of this project, where the proposed land use includes residential with accessible soil, CS has assumed that home grown produce (fruit and vegetable) consumption is not likely to constitute more than 10% of the diet, and that consumption of home grown poultry and/or eggs is not likely to occur⁴.

³ Adopted from Section 2.2 of NEPC (2013a) and Section 3 of NEPC (2013e)

⁴ Adopted from Section 4.6 of NEPC (2013c).

1.3 Scope of Work

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

- > A desktop review of site history;
- > A walkover of the site; and
- > Data assessment and reporting.

The scope of works was undertaken with reference to the relevant sections of NEPC (2013), NSW EPA (2020), WA DOH (2009), and HEPA (2020).

2 Site Identification

2.1 Site Locality

The locality of the site is presented in Figure 1.

2.2 Site Layout

The site covers an area of approximately 6,600m².

The general layout of the site is present in Figure 2. The layout plan also includes locations on site of:

- > Established site access points.
- > Previous and current buildings / structures.
- > Chemical storage areas.
- > Septic tanks and treated effluent discharge areas.
- > Rainwater storage tanks.

2.3 Lot Number and Deposited Plan

The site is identified as a portion of Lot 392 in DP 752017.

2.4 Local Government Authority

The local government authority for the site is Northern Beaches Council.

2.5 Zoning

A Section 10.7 (2) planning certificate for the site indicates that the site is currently zoned RU4 – Primary Production Small Lots.

2.6 Geographic Coordinates

The geographic coordinates of the general centre of the site obtained from Google Earth were 33°40'48" S and 151°10'47" E.

2.7 Detail and Level Survey

A copy of a detail and level survey of the site is presented in Appendix A.

3 Geology, Topography, Elevation, Hydrogeology, Hydrology and Acid Sulfate Soils

3.1 Geology

The Department of Mineral Resources Geological Survey of NSW Sydney 1:100,000 Geological Series Sheet 9130 (Edition 1) 1983, indicated that the site is likely to be underlain by Hawkesbury Sandstone, comprising medium to coarse grained quartz sandstone, very minor shale and laminite lenses.

3.2 Topography and Elevation

A detail and level survey plan of the site indicated that:

- > the topography of the site is generally flat with a minor north west facing down slope towards Wyong Road; and
- > the site elevation was approximately 175m Australian Height Datum (AHD) in the north and northwest and 179m AHD in the south.

3.3 Hydrogeology and Hydrology

A search of <https://realtime.data.waternsw.com.au/water.stm> indicated that there were seven registered groundwater features located within a 500m radius of the site. Authorised uses of these groundwater wells include:

- > Domestic; and
- > Domestic Stock;

Summary information presented for these registered groundwater wells, indicated that the depth to standing water level in those wells ranged from 63m to 80m. Registered groundwater well boreholes were drilled to depths of between 120m and 222m below ground level. The geology encountered during drilling (using rotary methods) included fill/topsoil to depths up to 2.5m underlain by bedrock which comprised of sandstone, with fine quartz and occasional shale bedding.

All registered groundwater wells identified were currently in use.

A copy of the search record is presented in Appendix D.

A review of readily available maps held on file by CS, indicated that surface water bodies near the site included:

- > Cowan Creek, located approximately 800m to the west;
- > Waterfall Gully, located approximately 1000m to the east; and
- > Kierans Creek, located approximately 1000m to the southwest.

Based on the location of the identified surface water courses and site topography, the inferred groundwater flow direction at the site is considered likely to be towards the north and northwest.

Based on site surface topography and elevation, the inferred general surface water flow direction on the site is considered likely to follow the site topography (i.e. flowing towards the north and west).

3.4 Acid Sulfate Soils

A review of the NSW Department of Land and Water Conservation's Acid Sulfate Soil Risk Map for Hornsby/Mona Vale (Edition 2, 1997), indicated that:

- > the site is located in a map class description of 'no known occurrence' where acid sulfate soils are not known or expected to occur in these environments; and
- > land management activities are not likely to be affected by acid sulfate soil materials.

Acid sulfate soils typically occur at elevations of below 10m AHD, which is not within with the elevation ranges of the site.

Further assessment of acid sulfate soils, in the context of this project is considered not warranted.

4 Previous Contamination Assessments

CS previously prepared the following reports in relation to the site:

- > CS 2020, 'Stage 1 Preliminary Site Investigation, 1 Bibbenluke Avenue, Duffys Forest, NSW' dated 15 July 2020.

4.1 CS (2020)

The objective of CS (2020) was to assess potential contamination risks at the site, arising from past and present land uses.

The scope of work undertaken to address the project objective included a site walkover and desktop review.

Based on the observations made during the site walkover and information obtained during the desktop review, CS (2020) made the following conclusions:

- > There was historical uncontrolled demolition of at least one building in the centre of the site, presenting a potential contamination risk for the site.
- > The enviro-cycle septic system was considered to be a potential contaminating factor for down-gradient groundwater wells primarily used for domestic stock
- > Small areas of potential uncontrolled filling were also noted as potential sources of contamination.

5 Conceptual Site Model

The site history review and the observations made during the site walkover were assessed in the context of the project objectives, in order to develop a conceptual site model (CSM) for the site.

5.1 Sources of Contamination

A number of potential land contaminating activities have been identified for the site, based on the site history review and site walkover observations. These include:

- > Disposal of septic effluent;
- > Uncontrolled filling; and
- > Uncontrolled demolition.

Table J1 in Appendix J of AS 4482.1-2005 and Appendix A in DUAP (1998) provides guidance on chemicals associated with the land uses activities. That guidance provides a basis for deciding on contaminants of potential concern (COPC) for each relevant land use activity. Information on COPC adopted for this investigation is presented in Section 5.5 of this report.

5.2 Land Use Scenario

5.2.1 Adopted Land Use Scenario

For the purpose of this investigation, CS understands that the proposed land use scenario for the site includes:

- > Residential with accessible soil, including garden with home grown produce contributing less than 10% fruit and vegetable intake (excluding poultry).

5.2.2 Assumptions for Adopted Land Use Scenario

Section 3 of NEPC (2013e) advises that the residential with accessible soil land use scenario includes a variety of building densities, ranging from separate low-density dwellings to high-density unit blocks. The residential land use scenario considered in this investigation is low-density residential, including a sizeable garden (referring to the presence of sufficiently large areas of soil in a garden that may be accessible on a daily basis by young children and adults).

This land use scenario assumes typical residential properties, consisting of single storey dwellings supported by ground-level slabs or multistorey dwellings where living areas are on the ground floor and there is accessible soil in the front and backyard areas.

These residences may have private gardens, consisting of lawns, garden beds and small vegetable gardens and areas of fruit trees, but no poultry.

5.3 Receptors

5.3.1 Identified Receptors

Based on the adopted land use scenario, CS considers receptors at the site may include residents and terrestrial ecosystems.

5.3.2 Assumptions for Identified Receptors

For residential with accessible soil, this investigation considers the preliminary assessment of potential risks at sites where children are likely to be the most sensitive human receptors, including childcare centres, kindergartens, preschools and primary schools and their integral playgrounds. The scenario is designed to represent a typical residential land use. The scenario also considers circumstances where less exposure to soil would be likely (for example, older people, or without fruit and vegetable gardens).

The occupants of the dwellings include adults, children and infants, who spend the majority of their time on the residential properties and use the outdoor areas of the residences on a frequent basis, for activities such as gardening or recreation.

It is noted that for people within sensitive sub-populations; for example, the immunosuppressed, those with pre-existing illness, or those with pica behaviour, the scenario may not be sufficiently protective of health and a site-specific risk assessment (or criteria) or management strategies may be required.

5.4 Exposure Pathways

5.4.1 Human Health

5.4.1.1 Dermal Contact / Ingestion / Dust Inhalation

Site history information and walkover observations indicated a potential for contaminants to be present in soils at the site, which may present a dermal contact or ingestion risk to human health.

The proposed land use scenario is likely to include unsealed and open space areas, where a pathway between identified receptors and direct contact / ingestion contaminant sources, is likely to be complete. Effluent expulsion onto the site presents a direct risk to receptors, and therefore further assessment of dermal contact and ingestion risk is considered warranted.

5.4.1.2 Vapour Intrusion / Inhalation

Vapour intrusion / inhalation exposure risks to human health can occur when a primary or secondary vapour source⁵ is present.

Site history information and walkover observations did not indicate a potential for vapour sources to be present at the site.

Site history information and walkover observations indicated a potential for historical uncontrolled filling. However, CS considers that the:

- > the transport, placement and spreading of uncontrolled filling typically includes significant disturbance of soils, which would typically result in the volatilisation of contaminants that might normally present an intrusion / inhalation risk; and
- > potential for contaminants to be present in uncontrolled filling at concentrations which could present an intrusion / inhalation risk, is low.

Further assessment of vapour intrusion / inhalation risks associated with the uncontrolled filling, is considered not warranted.

5.4.1.3 Asbestos

Bonded asbestos containing materials (ACM) comprises asbestos which is in sound condition, although possibly broken or fragmented, and where the asbestos is bound in a matrix such as cement or resin.

Fibrous asbestos (FA) comprises friable asbestos material and includes severely weathered cement sheet, insulation products and woven asbestos material, which can be broken or crumbled by hand pressure.

Asbestos fines (AF) include free fibres, small fibre bundles and small fragments of bonded ACM that can pass through a 7mm x 7mm sieve.

Asbestos poses a risk to human health when asbestos fibres are made airborne and inhaled. The assessment of sites contaminated with asbestos in soil should aim to describe the nature and quantity of asbestos in soil in sufficient detail to enable a risk management plan to be developed for the proposed land use scenario.

⁵ Primary sources can include underground storage tanks, while secondary sources can include significantly contaminated soil or groundwater.

Site history information and walkover observations indicate a potential for bonded ACM, FA and/or AF to be present in soils at the site, due to historical uncontrolled demolition and in areas of the site where uncontrolled filling has occurred.

The proposed land use scenario is likely to include unsealed and open space areas, where a pathway between identified receptors and asbestos in soils, may be complete. Further investigation is warranted.

5.4.2 Aesthetics

CS has used the guidance in Section 3.6.2 and Section 3.6.3 of NEPC (2013a) to facilitate an assessment of site history review information and site walkover observations, in the context of aesthetics risk and the sensitivity of the proposed land use. For example, higher expectations apply to residential properties with gardens compared with industrial settings.

Table 5.4.2 Preliminary Aesthetics Risk Screening

Preliminary Aesthetics Risk Screening Questions	Potential
Is there a potential for highly malodorous soils or extracted groundwater (e.g. strong residual petroleum hydrocarbon odours, hydrogen sulphide in soil or extracted groundwater, organosulfur compounds) to be present on site?	No
Is there a hydrocarbon sheen on surface waters on site?	Not applicable
Is there potential for discoloured chemical deposits or soil staining with chemical waste other than of a very minor nature, on be present in site soils;	No
Is there potential for large monolithic deposits of otherwise low risk material, e.g. gypsum as powder or plasterboard or cement kiln dust, to be present in site soils;	No
Is there potential for the presence of putrescible refuse including material that may generate hazardous levels of methane such as a deep fill profile of green waste or large quantities of timber waste, in site soils?	No
Is there potential for soils containing residue from animal burial (e.g. former abattoir sites) to be onsite.	No
Is there a potential for large quantities of non-hazardous inert material to be present in site soils?	No
Is there a potential for high odour residue material to be present in site soils	No
Is there a potential for large quantities of various fill types and demolition rubble to be present in site soils proposed for residential land use?	No

The historical records review, observations made during the site walkover and results of the preliminary risk screening, did not identify a potential for unacceptable aesthetics risks to be present on the site. Further assessment of aesthetic risks on site, is considered not warranted.

5.4.3 Management Limits for Petroleum Hydrocarbons

Section 2.9 of NEPC (2013a) indicates that there are a number of policy considerations which reflect the nature and properties of petroleum hydrocarbons:

- > Formation of observable light non-aqueous phase liquids (LNAPL);
- > Fire and explosive hazards; and
- > Effects on buried infrastructure e.g. penetration of, or damage to, in-ground services by hydrocarbons.

Section 2.9 of NEPC (2013a) notes that CME (2008) includes management limits to avoid or minimise these potential effects. Application of management limits requires consideration of site specific factors such as depth of building basements and services, and depth to groundwater, to determine the maximum depth to which the limits should apply. NEPC (2013a) also states that:

- > management limits may have less relevance at operating industrial sites (including mine sites) which have no or limited sensitive receptors in the area of potential impact.
- > the presence of site total petroleum hydrocarbon (TPH) contamination at the levels of the management limits does not imply that there is no need for administrative notification or controls in accordance with jurisdiction requirements.

Site history information and walkover observations did not indicate a potential for petroleum hydrocarbon contamination to be present on site. On that basis, further assessment of petroleum hydrocarbons in soils, in the context of those policy decisions, is considered not warranted.

5.4.4 Groundwater

Section 2.2 of NSW DEC (2007) provides guidance on the need for the potential for groundwater contamination to be assessed, for the purposes of evaluating whether it may pose an unacceptable risk to human health and/or the environment.

Section 3.2 of NEPC (2013d) provides guidance on the environmental values (that are conducive to public benefit, welfare, safety or health) and that require protection from the effects of pollution, waste discharge and deposits. These values include:

- > Ecosystem protection;
- > Aquaculture and human consumers of food;
- > Agricultural water (irrigation and stock water);
- > Recreation and aesthetics;
- > Drinking water; and
- > Industrial water.

Site history information and walkover observations did not indicate a potential for contaminated groundwater to be present onsite that may present unacceptable risk to human health or the environment based on the values listed above, with the exception of agricultural water (irrigation and stock watering) value.

Discussion regarding this value is provided in the following section.

5.4.4.1 *Agricultural water (irrigation and stock water)*

Section 3.3 of this report identified seven registered groundwater bores within a 500m radius of the site, authorised for domestic and domestic stock watering purposes.

Out of the seven groundwater bores, five are considered to be located at up-gradient of the site and two located at down-gradient of the site.

If contamination from the site has migrated into the groundwater and if such groundwater is migrating offsite where extraction of groundwater for agricultural purposes in the future is considered likely, such groundwater has the potential to present a risk to its receptors.

However, unless significant soil contamination that has a potential to contaminate the groundwater is identified, CS considers that further assessment of agricultural water as a groundwater value is not warranted at this stage.

5.4.5 Terrestrial Ecosystems

Site history information and walkover observations indicated a potential for contaminants, which may present an ecological risk, may be present on site.

Section 3.4.2 of NEPC (2013a) indicates that:

- > a pragmatic risk-based approach should be taken when assessing ecological risk in residential and commercial / industrial land use settings;
- > in existing residential and urban development sites, there are often practical considerations that enable soil properties to be improved by addition of ameliorants with a persistent modifying effect or by the common practice of backfilling or top dressing with clean soil;
- > in other cases, all of the site soils will be removed during site development works or relocated for the formation of new land forms;
- > sites may also be backfilled with clean soil/fill and the fate of any excavated contaminated soil should be considered in process; and

- > commercial and industrial sites may have large building structures and extensive areas covered with concrete, other pavement or hardstand materials and may have limited environmental values requiring consideration while in operational use.

The proposed land use scenario is likely to include unsealed, open space and landscaped areas, where an ecological exposure pathway is likely to complete.

On that basis, further assessment of terrestrial ecosystem exposure risks is considered warranted.

5.5 Conceptual Site Model

Based on:

- > the areas of environmental concern (AEC) at the site where sources of contamination may be present;
- > the contaminants of potential concern (COPC) identified for the site;
- > receptors identified for the site; and
- > the exposure pathways between those sources and receptors assessed as being potentially or actually complete,

a conceptual site model (CSM) was presented for the site in the Stage 1 PSI (CS, 2020).

Subsequent to the issuing of the Stage 1 PSI however, the client provided additional information for consideration. The information provided is summarised below.

5.5.1 AEC01 – Gravel Driveways

Stage 1 PSI (CS, 2020) considered that the existing gravel driveway could be a source of contamination due to the potential for uncontrolled filling.

The client informed that the on the driveway are 10MM washed river pebbles purchased from Australian Native Landscapes, and that they were laid on natural grade without any filling underneath. CS reviewed photos of the material and the observed elevations, and are satisfied that the potential for AEC01 to contain unacceptable contamination was low.

Based on the above, CS considered that AEC01 does not require additional assessment.

5.5.2 AEC02 – Demolished former Buildings

No change – requires assessment of surface soils.

5.5.3 AEC03 – Disposal of Treated Septic Effluent

Stage 1 PSI (CS, 2020) considered that the area where the treated effluent was sprayed could be a source of contamination.

The client subsequently provided reports from the technicians who service the treatment plant and test the effluent water quality. The information presented indicated that the effluent contains significant levels of free chlorine, which would be sufficient to destroy pathogens.

Based on the above, CS considered that AEC03 does not require additional assessment.

5.5.4 AEC04 – Shallow Fill Areas

Stage 1 PSI (CS, 2020) considered that the two small areas of shallow fill observed on site could be a source of contamination due to the potential for uncontrolled filling.

Similar to AEC01, the client informed that one of the areas of shallow fill identified comprised 10MM washed river pebbles purchased from Australian Native Landscapes.

Based on the above, CS considered that one of the two areas of shallow fill identified required further assessment, while the other that comprises river pebbles does not.

5.5.5 Revised CSM

Based on the above, the CSM presented in the Stage 1 PSI was revised as follows:

ID	AEC	Source	COPC	Exposure Pathway	Receptor
AEC02	Demolished former buildings	Uncontrolled demolition	Metals, asbestos	Dermal contact Soil Ingestion Direct Uptake Aesthetics	Residents Terrestrial Ecosystems
AEC04	Shallow fill area (excluding the river pebble area)	Uncontrolled filling	Metals, PAH and asbestos	Dermal contact Soil Ingestion Dust inhalation Direct Uptake	Residents Terrestrial Ecosystems

6 Data Quality Objectives

Appendix B in NEPC (2013b) provides guidance on the data quality objective (DQO) process, which is a seven step iterative planning approach that can be used to define the type, quantity and quality of data needed to inform decisions relating to the environmental condition of a site.

6.1 Step 1: State the problem

The reason the project is being undertaken, is set out in Section 1.1 of this report.

The objective of this project is set out in Section 1.2 of this report.

The project team and technical support experts identified for the project include the CS project director, CS project manager, CS field staff and CS's subcontractors.

The design and undertaking of this project will be constrained by the client's financial and time budgets.

The regulatory authorities associated with this project include NSW EPA, the local planning authority, and SafeWork NSW.

6.2 Step 2: Identify the goal of the study

The decisions that need to be made during this project, to address the project objectives, include:

- > Is the data collected for the project, suitable for assessing land contamination exposure risks?
- > Do the detected concentrations of contaminants of potential concern identified in the CSM, present an unacceptable exposure risk to the receptors identified in the CSM, based on the proposed land use scenario?
- > Is the site suitable, in the context of land contamination, for the proposed land use scenario?

6.3 Step 3: Identify the information inputs

The information inputs required to make the decisions for the project set out in Section 6.2, include:

- > Data obtained during the site history review and site walkover;
- > Identification of sample media that needs to be collected, as set out in Section 6.7;
- > Parameters that will be measured in each relevant sample, as set out in Section 6.7;
- > The analytical methods required for each identified COPC, so that assessment can be made relative to adopted site criteria. These are set out in Section 6.7 of this report; and
- > The basis for decisions to be made from field screening, including photo-ionisation detector (PID) data, and what action is to be taken if a defined concentration is attained, as set out in Section 6.7; and
- > The site criteria for the media of concern. These criteria are set out in Table 6.3.1 and will be adopted based on the proposed land use scenario⁶ and identified receptors.

Table 5.3.1 Adopted Site Assessment Criteria

Exposure Pathway	Land Use Setting ⁷	Reference
Human health direct contact	HIL A - Residential with accessible soil	Table 1A(1) in NEPC (2013a)
Human health (asbestos)	Residential A	Table 7 in NEPC (2013a) ⁸

⁶ The land use scenarios in Section 2.2 of NEPC (2013a) will be considered when adopting human health assessment criteria. The land use scenarios in Section 2.5 of NEPC (2013a) will be considered when adopting ecological assessment criteria.

⁷ Consideration will be given to soil type, soil texture, soil depth, groundwater depth and appropriate species protection levels.

⁸ A depth of up to 10cm below ground level is adopted to define 'surface soil'.

Exposure Pathway	Land Use Setting ⁷	Reference
Terrestrial Ecosystems	Urban Residential and Public Open Space	Table 1B(5) in NEPM (2013) Table 1B(6) in NEPM (2013)

6.4 Step 4: Define the boundaries of the study

The geographical and spatial extent of the project will be limited to:

- > the site as defined by the boundaries set out in Section 2; and
- > any physical constraints or existing infrastructure on site that prevents safe and reasonable access by the project team and/or typical industry equipment used for projects of this nature.

The time and budget constraints of the project will be as per those set out in the contract (and subsequent variations) between CS and the client.

The temporal boundaries of the project will include:

- > Weather conditions including rain, wind, heat and cold, which may adversely affect execution of fieldwork tasks and/or data quality;
- > Availability of the site for access to execute fieldwork tasks; and
- > Availability of project team members to execute the project.

The lateral and vertical intervals in which contamination distribution is believed to be uniformly distributed, based on the CSM, will be:

- > The inferred lateral boundaries of each AEC, including groundwater down gradient of primary / secondary sources (where applicable);
- > The inferred vertical extent of each AEC, likely to be to the base of fill material.

The scale of the decisions required will be based on the site, as defined by its boundaries.

6.5 Step 5: Develop the analytical approach

6.5.1 Duplicates and Triplicates

Field duplicates and triplicates will be collected at a rate of one set per 20 samples collected (an equivalent of 5%), and one set per 10 samples collected (an equivalent of 10%) where PFAS is a contaminant of concern. Sample collection will include splitting of one bulk sample across three separate sample containers. Soil samples will not be homogenised, particularly where the COPC are volatile or semi volatile in nature.

Analysis of the duplicate and triplicates will be based on at least one of the analytes that the parent sample is being analysed for (excluding asbestos).

The relative percent difference (RPD) of the detected concentrations in the parent and duplicate, and the parent and triplicate, will be calculated.

6.5.2 Trip Blanks and Trip Spikes

One trip blank and trip spike will be used for each day of sampling⁹. A minimum of one trip blank and one trip spike will be scheduled for BTEX analysis, during the project, provide sample handling, preservation and storage procedures the same for each day of sampling.

6.5.3 Rinsate Blanks

One rinsate blank will be used for each day of sampling¹⁰. A minimum of one trip blank and one trip spike will be scheduled for BTEX analysis, during the project, provided sample handling, preservation and storage procedures are the same for each day of sampling.

⁹ Only where samples being collected on that day are expected to be analysed for BTEX and/or TRH C6-C10.

¹⁰ Only where non-disposable sampling equipment is being used on that day.

Analysis of the rinsate blank will be based on at least one of the analytes that the parent sample is being analysed for (excluding asbestos).

6.5.4 Field Blanks

One field blank will be used for each day of sampling¹¹. A minimum of one field blank will be scheduled for PFAS analysis, during the project, provided sample handling, preservation and storage procedures the same for each day of sampling.

6.5.5 Laboratory Quality Assurance and Quality Control

The quality assurance and quality control (QA/QC) program of the primary analytical laboratory will typically include analysis of method blanks, matrix spikes, surrogate spikes, laboratory control samples and laboratory duplicates. The laboratory will report on whether the QA/QC analysis meets the laboratory's adopted data quality objectives.

6.5.6 Data Quality Indicators

Data quality indicators (DQI) will be adopted to facilitate an assessment of the completeness, comparability, representativeness, precision and accuracy (bias) of the field and laboratory data collected. These DQI are set out in Table 6.5.6.

Table 6.5.6 Data Quality Indicators

Completeness			
Field Considerations	Target	Laboratory Considerations	Target
Experienced sampling team used	Yes	Complete SRA and COA attached	Yes
Sampling devices and equipment set out in sampling plan were used (refer Section 6.7.1).	Yes	Critical samples identified in sampling plan, analysed	Yes
Critical locations in sampling plan, sampled (refer Section 6.7.1).	Yes	Analysis undertaken addresses COPC in sampling plan (refer Section 6.7.7)	Yes
Critical samples in sampling plan, collected (refer Section 6.7.1).	Yes	Analytical methods reported in laboratory documentation and appropriate LOR used	Yes
Completed field and calibration logs attached	Yes	Sample holding times met (refer Section 6.7.9)	Yes
Completed COC attached	Yes		

Comparability			
Field Considerations	Target	Laboratory Considerations	Target
Same sampling team used for all work.	Yes	Same laboratory used for all analysis (refer Section 6.7.6).	Yes
Weather conditions suitable for sampling.	Yes	Comparable methods if different laboratories used Refer Section 6.7.9).	Yes
Same sample types collected and preserved in same way (refer Section 6.7.5).	Yes	Comparable LORs if different laboratories used.	Yes
Relevant samples stored in insulated containers and chilled (refer Section 6.7.5).	Yes	Comparable units of measure if different laboratories used (refer Section 6.7.9).	Yes

¹¹ Only where PFAS is a contaminant of concern for samples collected on that day.

Representativeness			
Field Considerations	Target	Laboratory Considerations	Target
Media identified in sampling plan, sampled (refer Section 6.7.1).	Yes	Samples identified in sampling plan, analysed.	Yes
Samples required by sampling plan, collected (refer Section 6.7.1).	Yes		

Precision			
Field Considerations	Target	Laboratory Considerations	Target
Minimum 5% duplicates and triplicates collected and analysed (refer Section 6.5.1).	Yes	All laboratory duplicate RPDs within laboratory acceptance criteria (refer Section 6.5.5).	Yes
Minimum 10% duplicates and triplicates collected and analysed where PFAS is a contaminant of concern (refer Section 6.5.1).	Yes		
RPD unlimited where detected concentrations are <10 times the LOR.	Yes		
RPD within 30% where detected concentrations are 10-20 times the LOR.	Yes		
RPD within 50% where detected concentrations are >20 times the LOR.	Yes		

Accuracy (bias)			
Field Considerations	Target	Laboratory Considerations	Target
Trip blank analyte results less than LOR (refer Section 6.5.2).	Yes	Laboratory method blank results within laboratory acceptance limits (refer Section 6.5.5).	Yes
Trip spike analyte results less between 60% and 140% (refer Section 6.5.2).	Yes	Laboratory control sample results within laboratory acceptance limits (refer Section 6.5.5).	Yes
Rinsate blank analyte results less than LOR (refer Section 6.5.3).	Yes	Laboratory spike sample results within laboratory acceptance limits.	Yes
Field (PFAS) blank analyte results less than LOR (refer Section 6.5.4).	Yes		

6.5.7 If/Then Statements

If field and laboratory analytical dataset is within the DQI assessment parameters, then the data may be considered to be adequately complete, comparable, representative, precise and accurate, for decision making within the objectives of this project.

If field and laboratory analytical dataset is outside the DQI assessment parameters, then additional data may be collected to address identified data gaps.

If field and laboratory analytical results are within adopted contamination assessment criteria, then the site may be considered suitable for the proposed land use scenario.

If field and laboratory analytical results are outside adopted contamination assessment criteria, then the site may be considered unsuitable for the proposed land use scenario, or additional data collected to further inform the decision making process.

6.6 Step 6: Specify the performance or acceptance criteria

6.6.1 If / Then Decisions

There are two types of decision error:

- > sampling errors occur when the sampling program does not adequately detect the variability of a contaminant from point to point across the site. That is, the samples collected are not representative of site conditions (e.g. an appropriate number of representative samples have not been collected from each stratum to account for estimated variability); and
- > measurement errors occur during sample collection, handling, preparation, analysis and data reduction.

In the assessment of land contamination, these errors can result in either:

- > a Type I error, where contamination exposure risks are considered to be acceptable, when they are not; or
- > a Type II error, where contamination exposure risks are considered to be not acceptable, when they are.

In order for decision rules to be sound, they should be designed to minimise decision errors. The risk of decision error will be mitigated by:

- > Ensuring fieldwork tasks are undertaken by suitably experienced field staff and sub-contractors, with reference to the DQO presented in this report;
- > Ensuring laboratory analyses are undertaken by NATA accredited laboratories; and
- > Ensuring interpretation of data is undertaken by suitably experienced environmental consultants and/or outsourcing interpretation to technical experts (if warranted).

6.7 Step 7: Develop the plan for obtaining data

6.7.1 Sampling Point Density and Locations

Table A in NSW EPA (1995) includes guidance on minimum sampling point densities required characterising a site, based on detecting circular hot spots by using a systematic sampling pattern. Application of this guidance is recommended when:

- > There is little knowledge about the probable locations of the contamination;
- > The distribution of the contamination is expected to be random (e.g. landfill sites); or
- > The distribution of the contamination is expected to be fairly homogenous (e.g. agricultural lands).

Section 3.1 of NSW EPA (1995) states that judgemental or stratified sampling methods can be used if there is sufficient information about the probable distribution of the contamination. Additionally, Section 6.2.1 in NEPC (2013b) states that judgemental sampling, the selection of samples (number, location, timing, etc) is based on knowledge of the site and professional judgement. Sampling would be expected to be localised to known or potentially contaminated areas identified from knowledge of the site either from the site history or an earlier phase of site assessment. Judgemental sampling can be used to investigate sub-surface contamination issues in site assessment.

Section 4.1 and Table 1 of WA DOH (2009) provides guidance on asbestos in soil sampling densities, relative to the likelihood of asbestos being present on the site.

The scope of this project has included collection of data that provides an understanding of:

- > site history;
- > the locations of potentially contaminated areas;
- > the identified COPC;
- > laydown mechanisms for COPC in each AEC;
- > the likely lateral and vertical extent of potential contamination in each AEC; and
- > constraints on site which may restrict the use of certain sampling techniques.

On that basis, it is considered reasonable to adopt a mix of grid based and judgemental sampling patterns, using the sampling point densities set out in Table 6.7.1 and Figure 3.

Table 6.7.1 Sampling Point Densities and Locations

ID	AEC	Sampling Point ID	Method	Target Depth (mbgs)
AEC02	Demolished former buildings (~1000m ²)	TP01-TP08	Grab sample	0.1m
AEC04	Shallow fill area (~10m ²)	TP09	Grab sample	0.1m

6.7.2 Sampling Method – Soils

Soil samples will be collected from relevant sampling points at the surface.

When identified COPC include volatiles (e.g. BTEX, TRH or VOC), collected soil samples will be screening for ionisable volatile organic compounds using a photo-ionisation detector (PID). A sub sample from each sample collected at each sampling point will be placed in a zip lock bag, sealed, and shaken. Each zip lock bag will then be pierced with the tip of a PID and the results recorded on the relevant sampling point log.

Samples requiring asbestos gravimetric screening will be 10L in volume, and will be collected and screened with reference to Table 5 in WA DOH (2009).

Samples requiring calculation of asbestos fines (AF) and fibrous asbestos (FA), will be collected as separate samples to the 10L bulk samples.

6.7.3 Field Screening

When identified COPC include volatiles (e.g. BTEX, TRH or VOC), collected soil samples will be screening for ionisable volatile organic compounds using a photo-ionisation detector (PID). A sub sample from each sample collected at each sampling point will be placed in a zip lock bag, sealed, and shaken. Each zip lock bag will then be pierced with the tip of a PID and the results recorded on the relevant sampling point log.

6.7.4 Decontamination

Non-disposable sampling equipment will be decontaminated between sampling points to mitigate potential for cross contamination of samples. The decontamination method to be used will be:

- > Wash off the non-disposable sampling equipment with a solution of potable water and phosphate free detergent (e.g. Decon 90), noting that Decon 90 will not be used on equipment used for collection of samples that will be analysed for PFAS compounds;
- > Rinse the washed equipment with distilled or de-ionised water; and
- > Air dry the rinsed equipment.

6.7.5 Sample Identification, Preservation, Handling and Transport

Soil samples will be identified using the CS project number, sampling point identification number and sampling depth interval (e.g. TP01/0.0-1.0), and date the sample was collected.

Samples will be placed in laboratory prepared containers (containing preservatives as appropriate), bulk sample bags and zip lock bags.

Soil samples will be stored in insulated containers with ice.

Samples will be transported to the analytical laboratory by CS field staff or a third party courier, using the analytical laboratory's chain of custody (COC) documentation.

6.7.6 Laboratory Selection

Analytical laboratories used for this project will be NATA accredited for the analytical methods used.

6.7.7 Laboratory Analytical Schedule

Samples scheduled for laboratory analysis will be selected based on:

- > The COPC identified for the AEC the sample was collected from;
- > Observations made of the sample when collected (including staining, odour and discolouration); and
- > The results of PID headspace screening (if applicable).

The proposed laboratory analytical schedule (including upper limiting sample quantities) for the project is set out in Table 6.7.7.

Table 6.7.7 Laboratory Analytical Schedule

ID	AEC	Sampling Point ID	TRH / BTEX	PAH	OCP	Metals (8)	Asbestos (ID)	Asbestos (0.001%)	CEC / pH
AEC02	Demolished former buildings	TP01 – TP08	4	4	2	8	2	8	2
AEC04	Shallow fill area	TP09	1	1	-	1	-	1	-

6.7.9 Laboratory Holding Times, Analytical Methods and Limits of Reporting

Sample holding times, laboratory analytical methods and limits of reporting applicable to this project, are set out in Table 6.7.9.

Table 6.7.9 Laboratory Holding Times, Analytical Methods and Limits of Reporting

Analyte	Holding Time	Method	LOR (mg/kg)	LOR (µg/L)
BTEX and TRH C6-C10	14 days	USEPA 5030, 8260B and 8020	0.2-0.5	1-2 and 50
TRH C10-C40	14 days	USEPA 8015B & C	20-100	50-500
PAH	14 days	USEPA 8270	0.1-0.2	0.5-10
OCP	14 days	USEPA 8081	0.2	-
Metals	6 months	USEPA 8015B & C	0.05-2	0.1-5
pH	On receipt	APHA 4500 pH	-	0.1 pH unit
Asbestos ID	No limit	AS4926	Absence / presence	-
Asbestos (WA DOH)	No limit	Inhouse	0.001% w/w	-

7 Fieldwork

7.1 Soils

7.1.1 Sampling

Soil sampling works were undertaken by CS on 22 September 2020. These works included:

- > Excavation of nine test pits (TP01A to TP09) using hand tools. TP01A was excavated for the purpose of gravimetric analysis.

Soil samples were collected at each sampling point, at the surface (0-0.1m)

Samples were collected directly from excavated soils as grab samples, using a fresh pair of nitrile gloves.

Samples were placed in suitable laboratory prepared containers and labelled.

The 10L bulk samples were screened using a combination of spreading on contrasting plastic. Potential asbestos containing materials >7mm in size were weighed, the weigh recorded on the relevant sampling point log, and the potential ACM placed in separate zip lock bags.

Test pits were backfilled with excavated soils.

Duplicate and triplicate samples were collected by splitting the primary sample across three sample containers (without homogenising, to avoid loss of volatiles).

Gravimetric soil analysis was undertaken by CS on 24 September 2020.

Sampling point locations were confirmed on a site plan. The sampling point location plan is presented in Figure 3.

Image 7.1.1.1 View of test pit at sampling point TP02



Image 7.1.1.2 View of test pit at sampling point TP04



7.1.2 Site Specific Geology

Observations made of soils encountered during intrusive investigation works were recorded on logs. These logs are presented in Appendix B.

The observations indicated the presence of a shallow fill layer (<0.05m) in a number of test pit, underlain by natural clayey sand. Fill material in test pits TP01 and TP06 contained frags of tiles and terracotta.

7.1.2.1 View of fill soils encountered at TP01



7.1.3 Potential Asbestos Containing Materials

There was no visual evidence of potential asbestos containing materials (ACM) encountered during sampling, including on the surface and within the test pits.

The bulk 10L soil samples collected from fill materials were screened for the presence of asbestos containing materials greater than 7mm in size. No materials were suspected of containing ACM.

7.1.4 Odours

There was no olfactory evidence of odours observed in the soil samples collected.

7.1.5 Staining

There was no visual evidence of staining observed in the soil samples collected.

7.1.6 Headspace Screening

Headspace screening was undertaken, by placing a sub sample from each relevant sample at each relevant sampling point, in a zip lock bag, sealing it, shaking it, then piercing the bag with the tip of the PID and results recorded.

The results of the headspace screening are presented on the logs in Appendix B.

A copy of the PID calibration certificate is presented in Appendix C.

8 Laboratory

The samples were transported to the analytical laboratory using chain of custody protocols. A selection of those samples were scheduled for laboratory analysis, taking into consideration the laboratory analytical schedule presented in Table 6.7.7 and observations made in the field.

A copy of the sample receipts and certificates of analysis, is presented in Appendix G.

The relevant laboratory analytical results were tabulated and presented in the attached Table LR1.

9 Assessment of Data Quality Indicators

An assessment of performance against the data quality indicators (DQI) set out in Section 9.1 to Section 9.5.

9.1 Completeness DQI

Field Considerations	Target	Actual	Pass / Fail / Comment
Experienced sampling team used	Yes	Yes	Pass
Sampling devices and equipment set out in sampling plan were used	Yes	Yes	Pass
Critical locations in sampling plan, sampled	Yes	Yes	Pass
Critical samples in sampling plan, collected	Yes	Yes	Pass
Completed test pit logs attached	Yes	Yes	Pass
Completed calibration logs attached.	Yes	Yes	Pass
Completed sample COC attached	Yes	Yes	Pass
Laboratory Considerations	Target	Actual	Pass / Fail / Comment
Complete SRA and COA attached	Yes	Yes	Pass
Critical samples identified in sampling plan, analysed	Yes	Yes	Pass
Analysis undertaken addresses COPC in sampling plan	Yes	Yes	Pass
Analytical methods reported in laboratory documentation and appropriate LOR used	Yes	Yes	Pass
Sample holding times met	Yes	Yes	Pass

The data is considered to be adequately complete.

9.2 Comparability DQI

Field Considerations	Target	Actual	Pass / Fail / Comment
Same sampling team used for all work.	Yes	Yes	Pass
Weather conditions suitable for sampling.	Yes	Yes	Pass
Relevant samples stored in insulated containers and chilled.	Yes	Yes	Pass
Laboratory Considerations	Target	Actual	Pass / Fail / Comment
Same laboratory used for all analysis.	Yes	Yes	Pass
Comparable methods if different laboratories used.	N/A	N/A	N/A

Comparable LORs if different laboratories used.	N/A	N/A	N/A
Comparable units of measure if different laboratories used.	N/A	N/A	N/A

The data is considered to be adequately comparable.

9.3 Representativeness DQI

Field Considerations	Target	Actual	Pass / Fail / Comment
Media identified in sampling plan, sampled.	Yes	Yes	Pass
Samples required by sampling plan, collected.	Yes	Yes	Pass
Laboratory Considerations	Target	Actual	Pass / Fail / Comment
Samples identified in sampling plan, analysed.	Yes	Yes	Pass

The data is considered to be adequately representative.

9.4 Precision DQI

Field Considerations Based on Table 4 of AS 4482.1-2005	Target	Actual	Pass / Fail / Comment
Minimum 5% duplicates collected and analysed.	Yes	Yes	Duplicates were split from a parent sample in the laboratory.
Minimum 5% triplicates collected and analysed.	Yes	Yes	Triplicates were split from a parent sample in the laboratory.
Minimum 10% duplicates collected and analysed (where PFAS is a COPC)	N/A	N/A	Pass
RPD unlimited where detected concentrations are <10 times the LOR.	Yes	Yes	Pass
RPD within 30% where detected concentrations are 10-20 times the LOR.	Yes	No	RPDs reported were between 50 and 100%. The RPD exceedances are considered likely attributable to sample heterogeneity. Samples were not homogenised prior to splitting, as volatiles were identified as a COPC. Performance against DQI considered acceptable.
RPD within 50% where detected concentrations are >20 times the LOR.	Yes	No	RPDs reported were between 50 and 100%. The RPD exceedances are considered likely attributable to sample heterogeneity. Samples were not homogenised prior to splitting, as volatiles were identified as a COPC. Performance against DQI considered acceptable.
Laboratory Considerations	Target	Actual	Pass / Fail / Comment
All laboratory duplicate RPDs within laboratory acceptance criteria.	Yes	No	Two RPD exceedances were reported to be outside the laboratory acceptance criterion, due to sample heterogeneity. Performance against DQI considered acceptable.

The data is considered to be adequately precise.

9.5 Accuracy (bias) DQI

Field Considerations	Target	Actual	Pass / Fail / Comment
Trip blank analyte results less than LOR.	Yes	Yes	Pass
Trip spike analyte results less between 60% and 140%.	Yes	Yes	Pass
Rinsate blank analyte results less than LOR.	Yes	Yes	Pass A rinsate blank was not used for this project. The samples were collected either directly from the base/wall of the test pits, using a fresh pair of nitrile gloves for each sample. On that basis, the risk of cross contamination during sampling is considered negligible.
Field blank analyte results less than LOR (where PFAS is a COPC),	Yes	Yes	Pass
Laboratory Considerations	Target	Actual	Pass / Fail / Comment
Laboratory method blank results within laboratory acceptance limits.	Yes	Yes	Pass
Laboratory control sample results within laboratory acceptance limits.	Yes	Yes	Pass
Laboratory spike sample results within laboratory acceptance limits.	Yes	Yes	Pass

The data is considered to be adequately accurate.

10 Discussion

10.1 Human Health - Dermal Contact / Ingestion / Dust Inhalation

The detected concentrations of the relevant COPC in the soil samples analysed, were less than the adopted human health direct contact assessment criteria.

Further assessment of dermal contact, dust inhalation and ingestion risk is considered not warranted.

10.2 Human Health - Asbestos

10.2.1 Bonded Asbestos Containing Materials

Fragments of bonded ACM greater than 7mm in size were not observed during field screening of relevant bulk soil samples.

Further assessment of bonded ACM human health exposure risks is considered not warranted.

10.2.2 Fibrous Asbestos / Asbestos Fines

The concentration of FA and AF detected in the samples analysed were less than the adopted health screening level of 0.001% w/w.

Further assessment of fibrous asbestos / asbestos fines human health exposure risks is considered not warranted.

10.3 Terrestrial Ecosystems

The detected concentrations of the relevant COPC in the soil samples were compared against the ecological investigation limits (EILs) and ecological screening limits (ESLs) outlined in NEPC (2013a) Table 1B(5) Generic EIL – Urban Residential & Public Open Space.

The detected concentrations of the relevant COPC in the soil samples, were less than the adopted terrestrial ecosystems assessment criteria.

Further assessment of soil related terrestrial ecosystem exposure risks is considered not warranted.

11 Revised Conceptual Site Model

A conceptual site model (CSM) is a representation of site-related information regarding contamination sources and receptors, and exposure pathways between those sources and receptors. The CSM at the completion of the stage 2 detailed site investigation works, is presented for the site in Table 11.1.

Table 11.1 Revised Conceptual Site Model

ID	AEC	Source	COPC	Exposure Pathway	Receptor	Outcome
AEC02	Demolished former buildings	Uncontrolled demolition	Metals, asbestos	Dermal contact Soil Ingestion Direct Uptake Aesthetics	Residents Terrestrial Ecosystems	All analytes were below the quantities outlined in NEPM (2013). No further assessment required.
AEC04	Shallow fill area	Uncontrolled filling	Metals, PAH and asbestos	Dermal contact Soil Ingestion Dust inhalation Direct Uptake	Residents Terrestrial Ecosystems	All analytes were below the quantities outlined in NEPM (2013). No further assessment required.

12 Conclusions and Recommendations

Based on CS's assessment of desktop review information, fieldwork observations and laboratory analytical data, CS makes the following conclusions:

- > the site is considered to be **suitable** for the following land use scenario:
 - Residential with accessible soil, including garden with home grown produce contributing less than 10% fruit and vegetable intake (excluding home grown poultry and/or eggs).

This report must be read in conjunction with the ***Information About This Report*** page at the front of this report.

13 References

HEPA 2020, 'PFAS National Environmental Management Plan', dated January 2020, version 2.0

National Environment Protection Council (NEPC) 2013c, 'Schedule B(5) Guideline on Ecological Risk Assessment', National Environment Protection (Assessment of Site Contamination) Measure (NEPM) as amended in May 2013.

National Environment Protection Council (NEPC) 2013d, 'Schedule B(6) Guideline on The Framework for Risk-Based Assessment of Groundwater Contamination', National Environment Protection (Assessment of Site Contamination) Measure (NEPM) as amended in May 2013.

National Environment Protection Council (NEPC) 2013e, 'Schedule B(7) Guideline on Derivation of Health-Based Investigation Levels', National Environment Protection (Assessment of Site Contamination) Measure (NEPM) as amended in May 2013.

NSW EPA 1995, 'Contaminated Sites: Sampling Design Guidelines', dated September 1995, ref: EPA 95/59.

NSW EPA 2015, 'Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997' dated September 2015, ref: EPA 2015/0164.

NSW EPA 2020, 'Contaminated Land Guidelines: Consultants reporting on contaminated land' dated April 2020, ref: EPA2020P2233.

VIC EPA 2009 'Industrial Waste Resource Guidelines' dated June 2009, ref: IWRG702.

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

1 Bibbenluke Avenue,
Duffys Forest, NSW

FIGURES



LEGEND:

- Site Location
- Approximate Site Boundary



**Construction
Sciences**

31 Anvil Road
SEVEN HILLS NSW 2147
Tel: (02) 8646 2000
Fax: (02) 8646 2025
Web: www.constructionsciences.net

Not to scale

Date: 21 September 2020

Drawn By: JGB

Drawing No: 5046200086 - R02 - F1

Client: Mr. Brian Anschau

Project: Stage 2 Detailed Site Investigation

Location: 1 Bibbenluke Avenue, Duffys Forest NSW

Sheet:

1 of 1

Site Location

LEGEND

-  Approximate site boundary
-  Septic tanks/EnviroCycle system
-  Septic/EnviroCycle effluent discharge line
-  Rainwater tanks
-  Site access entry/exit ways
-  Approximate extent of former building footprint
-  Fence
-  Stockpile of mulch



31 Anvil Road
SEVEN HILLS NSW 2147
Tel: (02) 8646 2000
Fax: (02) 8646 2025
Web: www.constructionsciences.net

Scale:  30.00 m

Date: 21 September 2020

Drawn By: JGB

Drawing No: 5046200086 - R01 - F2

Client: Mr. Brian Anschau

Project: Stage 2 Detailed Site Investigation

Location: 1 Bibbenluke Avenue, Duffys Forest NSW

Sheet:

1 of 1

Site Layout

**LEGEND:**

- AEC02 - Demolished Former Building Footprints
- AEC04 - Shallow Fill Area
- Approximate site boundary
- Sample Locations



**Construction
Sciences**

31 Anvil Road
SEVEN HILLS NSW 2147
Tel: (02) 8646 2000
Fax: (02) 8646 2025
Web: www.constructionsciences.net

Scale:
←
→
 30.00 m

Client: Mr. Brian Anschau

Date: 21 September 2020

Project: Stage 2 Detailed Site Investigation

Drawn By: JGB

Location: 1 Bibbenluke Avenue, Duffys Forest NSW

Drawing No: 5046200086 - R02 - F3

Sheet:

1 of 1

AECs and Site Sample Plan

1 Bibbenluke Avenue,
Duffys Forest, NSW

APPENDIX

A

SITE SURVEY

INTERESTS RELATING TO THE SUBJECT SITE:
The Certificate of Title for Lot 392 DP752017 ordered on 13.09.2019 identified the following interests (refer to the original 888 Instrument or Dealing creating the interest for specific terms - we recommend this be undertaken prior to design or construction).
•Land excludes minerals and is subject to Reservations and conditions in favour of the Crown - See Crown Grant(s).
•Excepting land below a depth from the surface of 15.24 metres (Not investigated).
•Lease to Hamro Northern Sydney PTY limited being 1 Bibbenluke Avenue, Duffys Forest. Expires: 5/6/2021.
•Commencing 6 June 2016 Terminating 5 June 2021 (AG583327).
•Mortgage of lease AG53327 to Westpac Banking Corporation (AK695584) - (Not investigated).

- NOTES
- Do not scale from this plan.
 - The purpose of this Detail Survey plan is to show detail and levels for planning and design. Do not use the information shown for any other purpose.
 - Contours are an indication of the topography and should only be used for planning purposes. Spot levels only should be used for detailed design.
 - A preliminary fixation of subject site boundaries has been made. Boundary dimensions and areas have been compiled from the current subject site Deposited Plan. If any work is to be undertaken on or adjacent to a boundary then a Boundary Survey is recommended to define the boundaries of the site.
 - The relationship of built form and natural features to boundaries is diagrammatic and if critical should be confirmed by a Boundary Survey. Boundary setbacks (if shown) are approximate only.
 - Building and feature descriptions are to be used for general identification purposes only and may require further investigation.
 - No services search has been undertaken. Only those services visible at the time of survey have been located. It is recommended to contact Dial Before You Dig and the relevant service authority prior to commencement of any work.
 - Tree information and canopy location is approximate (and not necessarily symmetrical) and if critical may require further assessment.
 - The DWG format file for this plan is integral and contains additional spatial information not able to be displayed in the PDF file.
 - This drawing and the information it contains is copyright and remains the property of SurveyPlus Pty Ltd. It must not be copied, used or altered without the express authority of SurveyPlus.
 - These notes and interests noted in the Certificate of Title form an integral part of this plan and must not be erased.

LEGEND

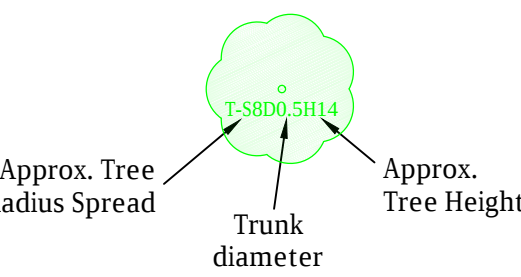
- FL - Floor Level
G XX.XX - Gutter RL XX.XX
ICV - Irrigation Control Valve
IL XX.XX - Invert Level RL XX.XX
LP - Light Pole
PP - Power Pole
R XX.XX - Ridge/Roof RL XX.XX
SI - Sign
SL XX.XX - Surface Level RL XX.XX
STW - Stormwater
TPIT - Telecommunication Pit
UPIT - Unknown Pit
- Overhead Comms/Electricity Wires



393
DP 752017

392
DP 752017
1.84ha
(BY C7261-2030)

TREE DIAGRAM



0m 1 2 3 4 5 10 15 20
SCALE 1:200 @A1



CLIENT
Brian Anschau

REVISION / DATE	REVISION DETAILS	SURVEY BY	DRAWN BY	CHECKED BY
A 15.10.2019	AS SURVEYED ON SITE	DO	RS	DO



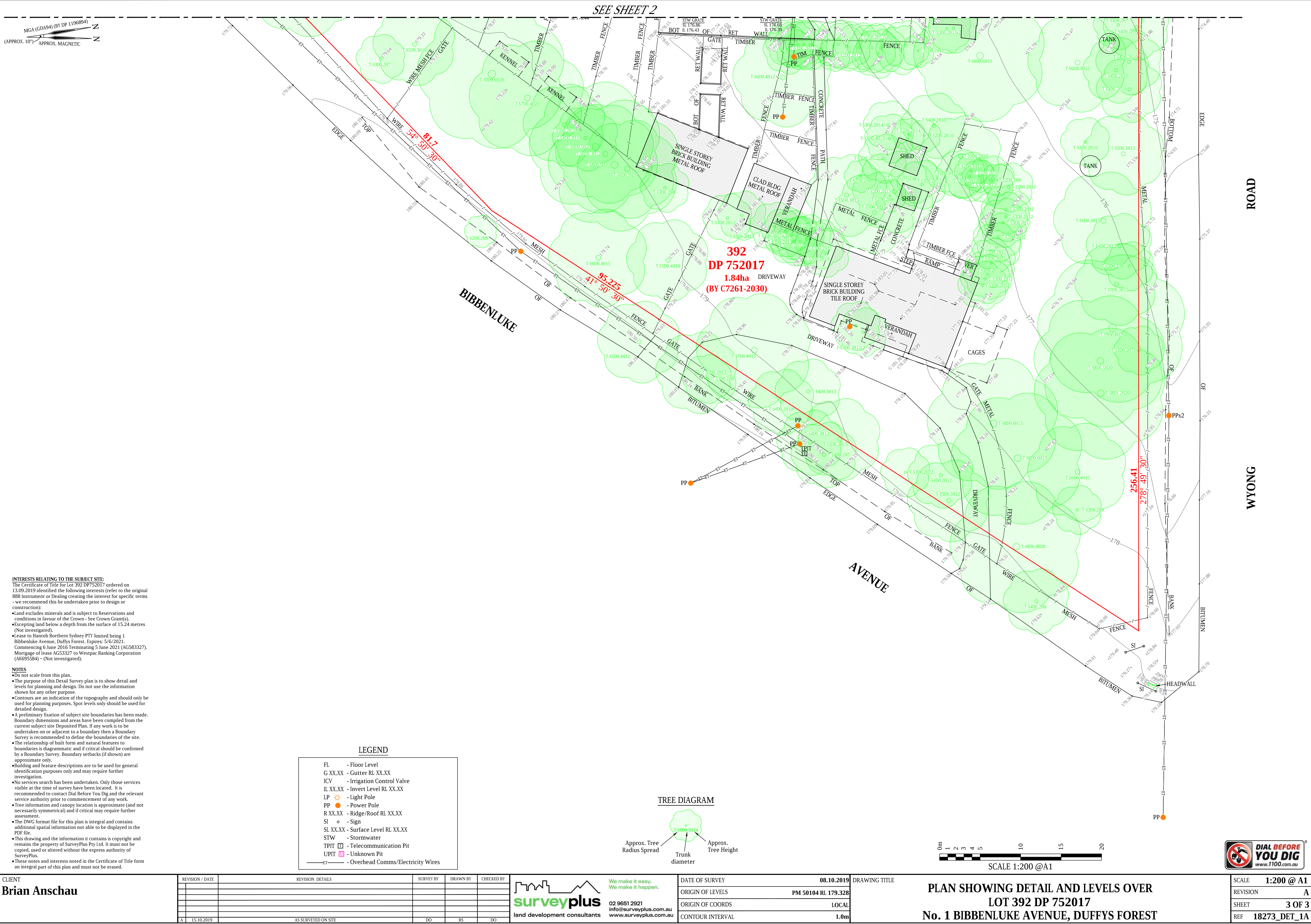
We make it easy.
We make it happen.
02 9651 2921
info@surveyplus.com.au
www.surveyplus.com.au

DATE OF SURVEY	08.10.2019
ORIGIN OF LEVELS	PM 50104 RL 179.328
ORIGIN OF COORDS	LOCAL
CONTOUR INTERVAL	1.0m

DRAWING TITLE

PLAN SHOWING DETAIL AND LEVELS OVER
LOT 392 DP 752017
No. 1 BIBBENLUKE AVENUE, DUFFYS FOREST

SCALE	1:200 @ A1
REVISION	A
SHEET	2 OF 3
REF	18273_DET_1A



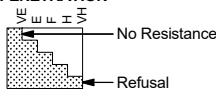
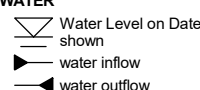
1 Bibbenluke Avenue,
Duffys Forest, NSW

APPENDIX

B

LOGS

Client: Mr Brian Anschau Project: Stage 2 Detailed Site Investigation Location: 1 Bibbenluke Avenue, Duffys Forest				Job No: 5046200086 Sheet: 1 of 1				Hole No: TP01					
Position:				Angle from Horizontal: 90°				Surface Elevation:					
Machine Type: Hand Tools				Excavation Method: HT									
Excavation Dimensions:				Contractor: N/A									
Date Excavated: 22/9/20				Logged By: JGB				Checked By:					
Excavation			Water	Sampling & Testing		Depth (m)	Graphic Log	Classification	Material Description			STRUCTURE & Other Observations	
Method	Resistance	Stability		Sample or Field Test	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure				Moisture Condition	Consistency Relative Density			
			Not Encountered	TP01 0.00 - 0.10 m PID: 0.4				0.05m	TOPSOIL: fine, dark brown, no odour, no staining		M	L	FILL
								0.10m	FILL: Clayey SAND: fine grained, brown with yellow mottle, with aggregate gravels and tile fragments, no odour, no staining		M	D	
									TERMINATED AT 0.10 m Target depth				

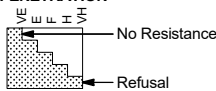
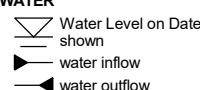
METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION  WATER 	FIELD TESTS SPT - Standard Penetration Test HP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Phito Ionization Detector VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)	SAMPLES B - Bulk disturbed sample D - Disturbed sample ES - Environmental sample U - Thin wall tube 'undisturbed' MOISTURE D - Dry M - Moist W - Wet PL - Plastic limit LL - Liquid limit w - Moisture content	SOIL CONSISTENCY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff H - Hard RELATIVE DENSITY VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense
--	--	---	---	---

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Mr Brian Anschau Project: Stage 2 Detailed Site Investigation Location: 1 Bibbenluke Avenue, Duffys Forest				Job No: 5046200086 Sheet: 1 of 1			
Position:				Angle from Horizontal: 90°		Surface Elevation:	
Machine Type: Hand Tools				Excavation Method: HT			
Excavation Dimensions:				Contractor: N/A			
Date Excavated: 24/9/20				Logged By: JGB		Checked By:	

Excavation			Water	Sampling & Testing		Depth (m)	Material Description				
Method	Resistance	Stability		Sample or Field Test	Graphic Log		Classification	Soil Type, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
			Not Encountered					TOPSOIL: fine, dark brown, no odour, no staining 0.05m			FILL
							SC	FILL: Clayey SAND: fine grained, brown with yellow mottle, with aggregate gravels and tile fragments, no odour, no staining 0.10m			
							TERMINATED AT 0.10 m Target depth				

METHOD
 EX Excavator bucket
 R Ripper
 HA Hand auger
 PT Push tube
 SON Sonic drilling
 AH Air hammer
 PS Percussion sampler
 AS Short spiral auger
 AD/V Solid flight auger: V-Bit
 AD/T Solid flight auger: TC-Bit
 HFA Hollow flight auger
 WB Washbore drilling
 RR Rock roller

PENETRATION

WATER


FIELD TESTS
 SPT - Standard Penetration Test
 HP - Hand/Pocket Penetrometer
 DCP - Dynamic Cone Penetrometer
 PSP - Perth Sand Penetrometer
 MC - Moisture Content
 PBT - Plate Bearing Test
 IMP - Borehole Impression Test
 PID - Phito Ionization Detector
 VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)

SAMPLES
 B - Bulk disturbed sample
 D - Disturbed sample
 ES - Environmental sample
 U - Thin wall tube 'undisturbed'

MOISTURE
 D - Dry
 M - Moist
 W - Wet
 PL - Plastic limit
 LL - Liquid limit
 w - Moisture content

SOIL CONSISTENCY
 VS - Very Soft
 S - Soft
 F - Firm
 St - Stiff
 VSt - Very Stiff
 H - Hard

RELATIVE DENSITY
 VL - Very Loose
 L - Loose
 MD - Medium Dense
 D - Dense
 VD - Very Dense

CONSTRUCTION SCIENCES

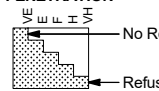
Client: Mr Brian Anschau				Job No: 5046200086				Sheet: 1 of 1			
Project: Stage 2 Detailed Site Investigation											
Location: 1 Bibbenluke Avenue, Duffys Forest											
Position:				Angle from Horizontal: 90°				Surface Elevation:			
Machine Type: Hand Tools				Excavation Method: HT							
Excavation Dimensions:								Contractor: N/A			
Date Excavated: 22/9/20				Logged By: JGB				Checked By:			

Excavation			Water	Sampling & Testing		Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test	Graphic Log		Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations	
			Not Encountered	TP02 0.00 - 0.10 m PID: 0.3				FILL: Clayey SAND: fine grained, dark brown, with sandstone graves, no odours, no staining	M	L	FILL	
								Concrete Boulder				
								Clayey SAND: fine grained, yellow with brown/white mottle, with trace sandstone gravels, no odours, no staining	M	D		
								TERMINATED AT 0.10 m Target depth				

METHOD

EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION



No Resistance
Refusal

WATER

Water Level on Date shown
water inflow
water outflow

FIELD TESTS

SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
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PBT - Plate Bearing Test
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VSt - Very Stiff
H - Hard

RELATIVE DENSITY

VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

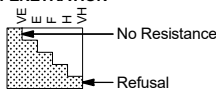
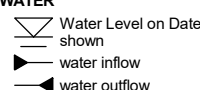
Refer to explanatory notes for details of abbreviations and basis of descriptions

CONSTRUCTION SCIENCES

Client: Mr Brian Anschau				Job No: 5046200086				Sheet: 1 of 1			
Project: Stage 2 Detailed Site Investigation											
Location: 1 Bibbenluke Avenue, Duffys Forest											
Position:				Angle from Horizontal: 90°				Surface Elevation:			
Machine Type: Hand Tools				Excavation Method: HT							
Excavation Dimensions:								Contractor: N/A			
Date Excavated: 22/9/20				Logged By: JGB				Checked By:			

Excavation			Water	Sampling & Testing		Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test	Graphic Log		Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations	
			Not Encountered	TP03 0.00 - 0.10 m PID: 0.2				Fine, Topsoil, dark brown, no odours, no staining	M	L	FILL	
								0.08m Clayey SAND: fine grained, yellow, with tree roots, no odours, no staining	M	D		
								0.10m TERMINATED AT 0.10 m Target depth				

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION

WATER


FIELD TESTS
SPT - Standard Penetration Test
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DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Phito Ionization Detector
VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
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ES - Environmental sample
U - Thin wall tube 'undisturbed'
MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
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SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard
RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
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VD - Very Dense

CONSTRUCTION SCIENCES

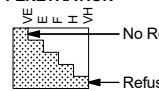
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Project: Stage 2 Detailed Site Investigation											
Location: 1 Bibbenluke Avenue, Duffys Forest											
Position:				Angle from Horizontal: 90°				Surface Elevation:			
Machine Type: Hand Tools				Excavation Method: HT							
Excavation Dimensions:								Contractor: N/A			
Date Excavated: 22/9/20				Logged By: JGB				Checked By:			

Excavation			Water	Sampling & Testing		Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test	Graphic Log		Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations	
			Not Encountered	TP04 0.00 - 0.10 m PID: 0.4			SC	Clayey SAND: fine grained, brown, with rootlets, no odour, no staining	M	L		
							0.10m	TERMINATED AT 0.10 m Target depth				

METHOD

EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION



No Resistance
Refusal

WATER

Water Level on Date shown
water inflow
water outflow

FIELD TESTS

SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
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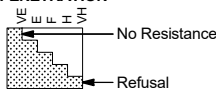
RELATIVE DENSITY

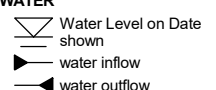
VL - Very Loose
L - Loose
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D - Dense
VD - Very Dense

Client: Mr Brian Anschau Project: Stage 2 Detailed Site Investigation Location: 1 Bibbenluke Avenue, Duffys Forest				Job No: 5046200086 Sheet: 1 of 1			
Position:				Angle from Horizontal: 90°		Surface Elevation:	
Machine Type: Hand Tools				Excavation Method: HT			
Excavation Dimensions:				Contractor: N/A			
Date Excavated: 22/9/20				Logged By: JGB		Checked By:	

Excavation			Water	Sampling & Testing		Depth (m)	Material Description				
Method	Resistance	Stability		Sample or Field Test	Graphic Log		Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
			Not Encountered	TP05 0.00 - 0.10 m PID: 0.3		SC	Clayey SAND: fine grained, brown, with trace roots and trace sandstone gravels, no odour, no staining	M	L		
							0.10m	TERMINATED AT 0.10 m Target depth			

METHOD
 EX Excavator bucket
 R Ripper
 HA Hand auger
 PT Push tube
 SON Sonic drilling
 AH Air hammer
 PS Percussion sampler
 AS Short spiral auger
 AD/V Solid flight auger: V-Bit
 AD/T Solid flight auger: TC-Bit
 HFA Hollow flight auger
 WB Washbore drilling
 RR Rock roller

PENETRATION

 No Resistance
 Refusal

WATER

 Water Level on Date shown
 water inflow
 water outflow

FIELD TESTS
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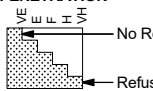
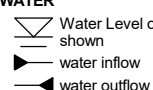
MOISTURE
 D - Dry
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 W - Wet
 PL - Plastic limit
 LL - Liquid limit
 w - Moisture content

SOIL CONSISTENCY
 VS - Very Soft
 S - Soft
 F - Firm
 St - Stiff
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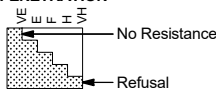
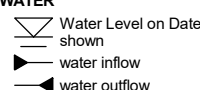
RELATIVE DENSITY
 VL - Very Loose
 L - Loose
 MD - Medium Dense
 D - Dense
 VD - Very Dense

Client: Mr Brian Anschau				Job No: 5046200086				Sheet: 1 of 1			
Project: Stage 2 Detailed Site Investigation											
Location: 1 Bibbenluke Avenue, Duffys Forest											
Position:				Angle from Horizontal: 90°				Surface Elevation:			
Machine Type: Hand Tools				Excavation Method: HT							
Excavation Dimensions:								Contractor: N/A			
Date Excavated: 22/9/20				Logged By: JGB				Checked By:			

Excavation			Water	Sampling & Testing		Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test	Graphic Log		Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations	
			Not Encountered	TP06 0.00 - 0.10 m PID: 0.2		SC	FILL: Clayey SAND: fine grained, yellow with brown mottle, with some terracotta tile and plastic, with trace roots, no odour, no staining	M	D	FILL		
							0.10m TERMINATED AT 0.10 m Target depth					

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION  No Resistance Refusal WATER  Water Level on Date shown water inflow water outflow	FIELD TESTS SPT - Standard Penetration Test HP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Phito Ionization Detector VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)	SAMPLES B - Bulk disturbed sample D - Disturbed sample ES - Environmental sample U - Thin wall tube 'undisturbed' MOISTURE D - Dry M - Moist W - Wet PL - Plastic limit LL - Liquid limit w - Moisture content	SOIL CONSISTENCY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff H - Hard RELATIVE DENSITY VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense
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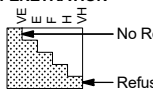
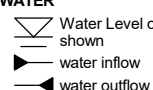
Client: Mr Brian Anschau Project: Stage 2 Detailed Site Investigation Location: 1 Bibbenluke Avenue, Duffys Forest				Job No: 5046200086 Sheet: 1 of 1				Hole No: TP07				
Position:				Angle from Horizontal: 90°				Surface Elevation:				
Machine Type: Hand Tools				Excavation Method: HT								
Excavation Dimensions:				Contractor: N/A								
Date Excavated: 22/9/20				Logged By: JGB				Checked By:				
Excavation			Water	Sampling & Testing		Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test	Graphic Log		Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations	
			Not Encountered	TP07 0.00 - 0.10 m PID: 0.3			0.02m	Surface Aggregate, no odour, no staining	D		FILL	
								0.10m	Clayey SAND: fine grained, brown, with trace roots, no odour, no staining	M	L to MD	
								TERMINATED AT 0.10 m Target depth				

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION  WATER 	FIELD TESTS SPT - Standard Penetration Test HP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Phito Ionization Detector VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)	SAMPLES B - Bulk disturbed sample D - Disturbed sample ES - Environmental sample U - Thin wall tube 'undisturbed' MOISTURE D - Dry M - Moist W - Wet PL - Plastic limit LL - Liquid limit w - Moisture content	SOIL CONSISTENCY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff H - Hard RELATIVE DENSITY VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense
--	--	---	---	---

Refer to explanatory notes for details of abbreviations and basis of descriptions

Client: Mr Brian Anschau Project: Stage 2 Detailed Site Investigation Location: 1 Bibbenluke Avenue, Duffys Forest				Job No: 5046200086 Sheet: 1 of 1			
Position:				Angle from Horizontal: 90°		Surface Elevation:	
Machine Type: Hand Tools				Excavation Method: HT			
Excavation Dimensions:				Contractor: N/A			
Date Excavated: 22/9/20				Logged By: JGB		Checked By:	

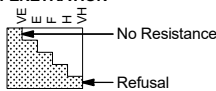
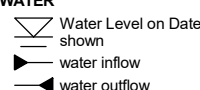
Excavation			Sampling & Testing		Material Description						
Method	Resistance	Stability	Water	Sample or Field Test	Depth (m)	Graphic Log	Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations
			Not Encountered	TP08 0.00 - 0.10 m PID: 0.2				Surface Aggregate, no odour, no staining	D		FILL
							SC	Clayey SAND: fine grained, yellow with brown mottle, with trace roots and sandstone gravels, no odour, no staining	M	MD	
								TERMINATED AT 0.10 m Target depth			

METHOD EX Excavator bucket R Ripper HA Hand auger PT Push tube SON Sonic drilling AH Air hammer PS Percussion sampler AS Short spiral auger AD/V Solid flight auger: V-Bit AD/T Solid flight auger: TC-Bit HFA Hollow flight auger WB Washbore drilling RR Rock roller	PENETRATION  WATER 	FIELD TESTS SPT - Standard Penetration Test HP - Hand/Pocket Penetrometer DCP - Dynamic Cone Penetrometer PSP - Perth Sand Penetrometer MC - Moisture Content PBT - Plate Bearing Test IMP - Borehole Impression Test PID - Phito Ionization Detector VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)	SAMPLES B - Bulk disturbed sample D - Disturbed sample ES - Environmental sample U - Thin wall tube 'undisturbed' MOISTURE D - Dry M - Moist W - Wet PL - Plastic limit LL - Liquid limit w - Moisture content	SOIL CONSISTENCY VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff H - Hard RELATIVE DENSITY VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense
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Client: Mr Brian Anschau				Job No: 5046200086				Sheet: 1 of 1			
Project: Stage 2 Detailed Site Investigation											
Location: 1 Bibbenluke Avenue, Duffys Forest											
Position:				Angle from Horizontal: 90°				Surface Elevation:			
Machine Type: Hand Tools				Excavation Method: HT							
Excavation Dimensions:								Contractor: N/A			
Date Excavated: 22/9/20				Logged By: JGB				Checked By:			

Excavation			Water	Sampling & Testing		Depth (m)	Material Description					
Method	Resistance	Stability		Sample or Field Test	Graphic Log		Classification	SOIL TYPE, plasticity or particle characteristic, colour, secondary and minor components ROCK TYPE, grain size and type, colour, fabric & texture, strength, weathering, defects and structure	Moisture Condition	Consistency Relative Density	STRUCTURE & Other Observations	
			Not Encountered	TP09 0.00 - 0.10 m PID: 0.3			0.05m	Gravel Aggregate, no odours, no staining, no odour, no staining	D	D	FILL	
						0.10m	Clayey SAND: fine grained, brown with yellow mottle, with some tree roots, no odour, no staining	M	L to MD			
TERMINATED AT 0.10 m Target depth												

METHOD
EX Excavator bucket
R Ripper
HA Hand auger
PT Push tube
SON Sonic drilling
AH Air hammer
PS Percussion sampler
AS Short spiral auger
AD/V Solid flight auger: V-Bit
AD/T Solid flight auger: TC-Bit
HFA Hollow flight auger
WB Washbore drilling
RR Rock roller

PENETRATION

WATER


FIELD TESTS
SPT - Standard Penetration Test
HP - Hand/Pocket Penetrometer
DCP - Dynamic Cone Penetrometer
PSP - Perth Sand Penetrometer
MC - Moisture Content
PBT - Plate Bearing Test
IMP - Borehole Impression Test
PID - Phito Ionization Detector
VS - Vane Shear; P=Peak, R=Residual (uncorrected kPa)

SAMPLES
B - Bulk disturbed sample
D - Disturbed sample
ES - Environmental sample
U - Thin wall tube 'undisturbed'

MOISTURE
D - Dry
M - Moist
W - Wet
PL - Plastic limit
LL - Liquid limit
w - Moisture content

SOIL CONSISTENCY
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard

RELATIVE DENSITY
VL - Very Loose
L - Loose
MD - Medium Dense
D - Dense
VD - Very Dense

CONSTRUCTION SCIENCES

1 Bibbenluke Avenue,
Duffys Forest, NSW

APPENDIX

C

CALIBRATION

PID Calibration Certificate

Instrument **PhoCheck Tiger**
Serial No. **T-105435**



Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments			
Battery	Charge Condition	✓				
	Fuses	✓				
	Capacity	✓				
	Recharge OK?	✓				
Switch/keypad	Operation	✓				
Display	Intensity	✓				
	Operation (segments)	✓				
Grill Filter	Condition	✓				
	Seal	✓				
Pump	Operation	✓				
	Filter	✓				
	Flow	✓				
	Valves, Diaphragm	✓				
PCB	Condition	✓				
Connectors	Condition	✓				
Sensor	PID	✓	10.6 ev			
Alarms	Beeper	✓	Low	High	TWA	STEL
	Settings	✓	50ppm	100ppm	N/A	N/A
Software	Version	✓				
Data logger	Operation	✓				
Download	Operation	✓				
Other tests:						

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Serial no	Calibration gas and concentration	Certified	Gas bottle No		Instrument Reading
PID Lamp		92 PPM	NATA	SY245		89.3 PPM

Calibrated by: Sarah Lian

Calibration date: **26/08/2020**

Next calibration due: **25/09/2020**

1 Bibbenluke Avenue, Duffys
Forest, NSW

APPENDIX

D

HYDROGEOLOGY
/HYDROLOGY

State Overview

[State Overview](#)

Rivers and Streams

[favourites](#) [search](#) [download sites](#) [find a site](#)[Real Time Data - Rivers And Streams](#)

Daily River Reports

[Daily River Reports](#)

Dams

[favourites](#) [search](#) [download sites](#) [find a site](#)[Real Time Data - Major Dams](#)

Groundwater (Telemetered data)

[favourites](#) [search](#) [download sites](#) [find a site](#)[Real Time Data - Bores](#)

All Groundwater Site details

[search](#) [download sites](#) [find a site](#)[search by licence](#)[All Groundwater Map](#)

Meteorology

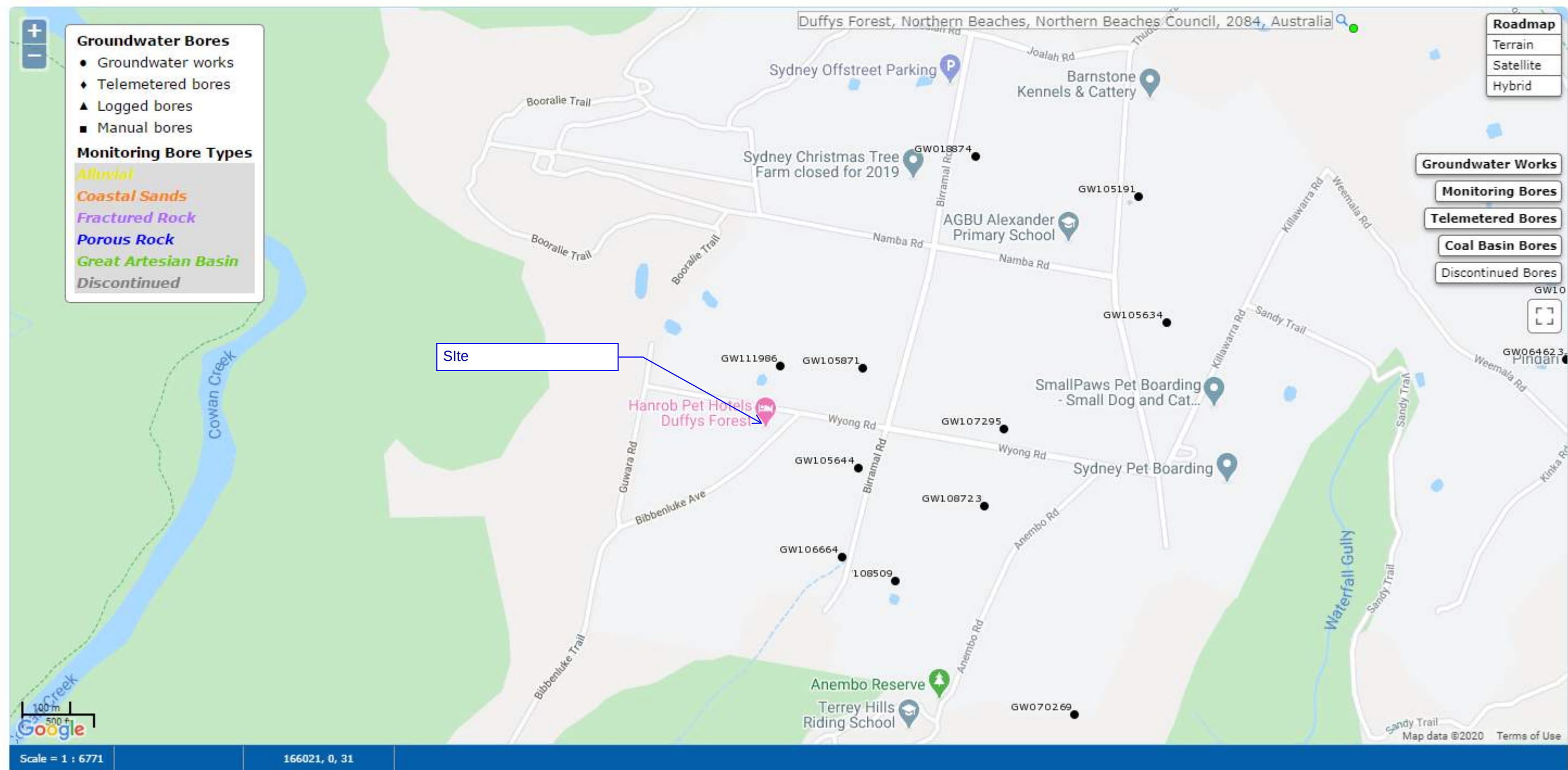
[favourites](#) [search](#) [download sites](#) [find a site](#)[Real Time Data - Weather Stations](#)

Hunter Integrated Telemetry System

[Hunter Integrated Telemetry System](#)[glossary and metadata](#)[All Groundwater Site Details](#)

ALL GROUNDWATER MAP

All data times are Eastern Standard Time

[Map](#) [Info](#)[bookmark this page](#)

WaterNSW

Work Summary

GW105644

Licence: 10WA108655

Licence Status: CURRENT

Authorised Purpose(s): STOCK,DOMESTIC
Intended Purpose(s): STOCK, DOMESTIC

Work Type: Bore

Work Status: Supply Obtained

Construct.Method: Down Hole Hamm

Owner Type: Private

Commenced Date:
Completion Date: 30/01/2004

Final Depth: 204.00 m
Drilled Depth: 204.00 m

Contractor Name: INTERTEC DRILLING SERVICES

Driller: Damian Paranihi

Assistant Driller:

Property: BALCOMB 394 Wyong Rd DUFFYS
FOREST 2084 NSW

Standing Water Level (m): 80.000

GWMA: -
GW Zone: -

Salinity Description:
Yield (L/s): 0.300

Site Details

Site Chosen By:

County
Form A: CUMBERLAND
Licensed: CUMBERLAND

Parish
BROKEN BA
BROKEN BAY

Cadastre
394//752017
Whole Lot 394//752017

Region: 10 - Sydney South Coast

CMA Map: 9130-4S

River Basin: 212 - HAWKESBURY RIVER
Area/District:

Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)

Northing: 6271789.000
Easting: 331568.000

Latitude: 33°40'49.8"S
Longitude: 151°10'58.8"E

GS Map: -

MGA Zone: 56

Coordinate Source: GIS - Geogra

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	5.60	205			Down Hole Hammer
1		Hole	Hole	5.60	204.00	159			Down Hole Hammer
1		Annulus	Concrete	0.00	5.60	205	168		
1	1	Casing	Pvc Class 9	-0.40	83.60	140			Driven into Hole, Screwed and Glued
1	1	Casing	Steel	-0.40	5.60	168	158		Driven into Hole, Cemented
1	1	Opening	Slots - Diagonal	29.60	35.60	125		0	PVC Class 9, Screwed and Glued, SL: 0.1mm, A: 4.00mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
33.00	33.50	0.50	Unknown		36.00	0.20			127.00
126.10	128.00	1.90	Unknown	80.00	132.00	0.01			131.00

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	1.20	1.20	clay, brown red	Clay	
1.20	14.10	12.90	sandstone, brown, grey	Sandstone	
14.10	49.00	34.90	sandstone, grey	Sandstone	
49.00	54.50	5.50	sandstone, grey & siltstone	Sandstone	
54.50	61.00	6.50	siltstone	Siltstone	
61.00	61.50	0.50	siltstone	Siltstone	
61.50	67.50	6.00	sandstone, grey	Sandstone	
67.50	68.20	0.70	sandstone, dk grey	Sandstone	
68.20	70.10	1.90	sandstone, grey dark grey	Sandstone	
70.10	71.00	0.90	sandstone, grey lt grey	Sandstone	
71.00	74.10	3.10	sandstone, lt grey	Sandstone	
74.10	74.30	0.20	sandstone, dark grey	Sandstone	
74.30	113.00	38.70	sandstone, grey lt grey	Sandstone	
113.00	126.10	13.10	sandstone, grey lt grey	Sandstone	
126.10	128.00	1.90	quartz	Quartz	
128.00	168.00	40.00	sandstone, lt grey & quartz	Sandstone	
168.00	193.50	25.50	sandstone, grey dark grey	Sandstone	
193.50	198.00	4.50	sandstone, grey & quartz	Sandstone	
198.00	200.20	2.20	sandstone, grey dark grey	Sandstone	
200.20	201.00	0.80	sandstone lt grey	Sandstone	
201.00	204.00	3.00	sandstone, grey	Sandstone	

Remarks

04/11/2009: updated from original form A

*** End of GW105644 ***

Warning To Clients: This raw data has been supplied to the WaterNSW by drillers, licensees and other sources. WaterNSW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

WaterNSW

Work Summary

GW105871

Licence: 10WA108569

Licence Status: CURRENT

Authorised Purpose(s): STOCK_DOMESTIC
Intended Purpose(s):

Work Type: Bore

Work Status:

Construct.Method:

Owner Type:

Commenced Date:

Completion Date: 06/05/2006

Final Depth:

Drilled Depth:

Contractor Name: (None)

Driller:

Assistant Driller:

Property: ELIZABETH PARK 385 Wyong Rd
DUFFYS FOREST 2084 NSW

GWMA: -

GW Zone: -

Standing Water Level
(m):

Salinity Description:

Yield (L/s):

Site Details

Site Chosen By:

County
Form A: CUMBERLAND
Licensed: CUMBERLAND

Parish
BROKEN BA
BROKEN BAY

Cadastral
385 752017
Whole Lot
385/752017

Region: 10 - Sydney South Coast

River Basin: 212 - HAWKESBURY RIVER
Area/District:

CMA Map: 9130-4S

Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: (Unknown)

Northing: 6271971.000
Easting: 331573.000

Latitude: 33°40'43.8"S
Longitude: 151°10'59.1"E

GS Map: -

MGA Zone: 56

Coordinate Source: Unknown

*** End of GW105871 ***

Warning To Clients: This raw data has been supplied to the WaterNSW by drillers, licensees and other sources. WaterNSW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

WaterNSW

Work Summary

GW106664

Licence: 10WA108767

Licence Status: CURRENT

Authorised Purpose(s): STOCK, DOMESTIC
Intended Purpose(s): STOCK, DOMESTIC

Work Type: Bore

Work Status: Supply Obtained

Construct.Method: Down Hole Hamm

Owner Type: Private

Commenced Date:
Completion Date: 16/11/2004

Final Depth: 180.00 m
Drilled Depth: 180.00 m

Contractor Name: INTERTEC DRILLING SERVICES

Driller: William Crump

Assistant Driller:

Property: CLOROS 13 Birramal Rd DUFFYS
FOREST 2084 NSW

Standing Water Level (m): 73.000

GWMA: -
GW Zone: -

Salinity Description:
Yield (L/s): 0.200

Site Details

Site Chosen By:

County: CUMBERLAND
Form A: CUMBERLAND
Licensed: CUMBERLAND
Parish: BROKEN BA
BROKEN BAY
Cadastre: 396/752017
Whole Lot 396/752017

Region: 10 - Sydney South Coast

CMA Map: 9130-4S

River Basin: 212 - HAWKESBURY RIVER
Area/District:

Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown

Northing: 6271626.000
Easting: 331540.000

Latitude: 33°40'55.0"S
Longitude: 151°10'57.6"E

GS Map: -

MGA Zone: 56

Coordinate Source: GIS - Geogra

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure

Cemented: S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	5.50	204			Rotary Air
1		Hole	Hole	5.50	180.00	157			Down Hole Hammer
1	1	Casing	Pvc Class 9	-0.50	29.50	140			Suspended in Clamps, Screwed and Glued
1	1	Casing	Steel	-0.50	5.50	168	158		Driven into Hole

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
26.00	32.00	6.00	Unknown			0.05		00:25:00	120.00
70.00	73.00	3.00	Unknown			0.05		00:25:00	132.00
106.00	109.00	3.00	Unknown		73.00	0.05		00:25:00	167.00
134.00	137.00	3.00	Unknown			0.05		00:25:00	151.00

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	2.00	2.00	sand, silty	Sand	
2.00	19.00	17.00	sandstone, soft light brown	Sandstone	
19.00	26.00	7.00	sandstone, grey	Sandstone	
26.00	32.00	6.00	sandstone, brown ironstone bands	Sandstone	
32.00	64.00	32.00	sandstone, grey	Sandstone	
64.00	70.00	6.00	sandstone, shale bedding	Sandstone	
70.00	73.00	3.00	sandstone, fractured quartz	Sandstone	
73.00	103.00	30.00	sandstone, grey	Sandstone	
103.00	106.00	3.00	sandstone, dark grey	Sandstone	
106.00	109.00	3.00	sandstone, fractured quartz	Sandstone	
109.00	134.00	25.00	sandstone, grey	Sandstone	
134.00	137.00	3.00	sandstone, quartz	Sandstone	
137.00	152.50	15.50	sandstone, grey	Sandstone	
152.50	156.00	3.50	sandstone, dark grey	Sandstone	
156.00	180.00	24.00	sandstone, grey	Sandstone	

Remarks

21/01/2010: updated from original form a

*** End of GW106664 ***

Warning To Clients: This raw data has been supplied to the WaterNSW by drillers, licensees and other sources. WaterNSW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

WaterNSW

Work Summary

GW107295

Licence: 10WA108760		Licence Status: CURRENT	
		Authorised Purpose(s): DOMESTIC Intended Purpose(s): DOMESTIC	
Work Type: Bore			
Work Status: Supply Obtained			
Construct.Method: Down Hole Hamm			
Owner Type: Private			
Commenced Date:		Final Depth: 120.00 m	
Completion Date: 08/09/2004		Drilled Depth: 120.00 m	
Contractor Name: JH ISELT PTY LTD			
Driller: Paul John Iselt			
Assistant Driller:			
Property: SHACKLADY 390 Wyong Rd DUFFYS FOREST 2084 NSW		Standing Water Level (m): 70.000	
GWMA: -		Salinity Description:	
GW Zone: -		Yield (L/s): 0.230	

Site Details

Site Chosen By:			
		County	Parish
		Form A: CUMBERLAND	BROKEN BA
		Licensed: CUMBERLAND	BROKEN BAY
			Cadastre
			390//752017
			Whole Lot 390//752017
Region: 10 - Sydney South Coast			
River Basin: 212 - HAWKESBURY RIVER			
Area/District:			
Elevation: 0.00 m (A.H.D.)		CMA Map: 9130-4S	
Elevation Source: Unknown		Grid Zone:	Scale:
		Northing: 6271864.000	Latitude: 33°40'47.5"S
		Easting: 331833.000	Longitude: 151°11'09.2"E
GS Map: -		MGA Zone: 56	Coordinate Source: GPS - Global

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	6.00	240			Down Hole Hammer
1		Hole	Hole	6.00	120.00	150			Down Hole Hammer
1		Annulus	Concrete	-0.20	6.00	240	161		
1	1	Casing	Pvc Class 9	-0.40	6.00	161	148		Seated on Bottom

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
49.10	49.60	0.50	Unknown	49.00		0.05		01:00:00	
106.80	107.40	0.60	Unknown	70.00		0.18		02:00:00	

Drillers Log

From	To	Thickness	Drillers Description	Geological Material	Comments
------	----	-----------	----------------------	---------------------	----------

Drillers Log

From	To	Thickness	Drillers Description	Geological Material	Comments
(m)	(m)	(m)			
0.00	0.30	0.30	topsoil	Topsoil	
0.30	1.60	1.30	sandstone, coarsed grained yellow light	Sandstone	
1.60	1.90	0.30	clay, white	Clay	
1.90	18.20	16.30	sandstone, coarse grained yellow light	Sandstone	
18.20	49.60	31.40	sandstone, medium grained yellow light	Sandstone	
49.60	83.10	33.50	sandstone, medium grained grey light	Sandstone	
83.10	88.70	5.60	sandstone, fine grained grey dark	Sandstone	
88.70	107.40	18.70	sandstone, medium grained grey lighth	Sandstone	
107.40	120.00	12.60	sandstone, fine grained grey light	Sandstone	

Remarks

25/03/2010: Updated from original form A. GPS provided by driller.

*** End of GW107295 ***

Warning To Clients: This raw data has been supplied to the WaterNSW by drillers, licensees and other sources. WaterNSW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

WaterNSW

Work Summary

GW108509

Licence: 10WA109088

Licence Status: CURRENT

Authorised Purpose(s): DOMESTIC
Intended Purpose(s): DOMESTIC

Work Type: Bore

Work Status: Supply Obtained

Construct.Method: Down Hole Hamm

Owner Type: Private

Commenced Date:
Completion Date: 08/12/2006

Final Depth: 180.00 m
Drilled Depth: 180.00 m

Contractor Name: INTERTEC DRILLING SERVICES

Driller: William Crump

Assistant Driller:

Property: FENN 12 Birramal Rd DUFFYS FOREST
2084 NSW

Standing Water Level (m): 63.000

GWMA: -
GW Zone: -

Salinity Description:
Yield (L/s): 0.230

Site Details

Site Chosen By:

County
Form A: CUMBERLAND
Licensed: CUMBERLAND

Parish
BROKEN BA
BROKEN BAY

Cadastre
401//752017
Whole Lot 401//752017

Region: 10 - Sydney South Coast

CMA Map: 9130-4S

River Basin: 212 - HAWKESBURY RIVER
Area/District:

Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Source: Unknown

Northing: 6271584.000
Easting: 331638.000

Latitude: 33°40'56.4"S
Longitude: 151°11'01.4"E

GS Map: -

MGA Zone: 56

Coordinate Source: GIS - Geogra

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	2.50	204			Down Hole Hammer
1		Hole	Hole	2.50	120.00	162			Down Hole Hammer
1		Hole	Hole	120.00	180.00	156			Down Hole Hammer
1		Annulus	Concrete	-0.10	2.70	162			
1	1	Casing	Pvc Class 9	-0.30	29.70	140			Suspended in Clamps, Screwed and Glued
1	1	Casing	Steel	-0.30	2.70	162	152		Suspended in Clamps, Driven into Hole

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
76.00	76.50	0.50	Unknown			0.15		00:25:00	110.00
128.50	129.00	0.50	Unknown			0.05		00:25:00	130.00
171.00	171.50	0.50	Unknown			0.03		00:25:00	160.00

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	2.00	2.00	Sand	Sand	
2.00	19.00	17.00	Sandstone, soft Ironstone bands	Sandstone	
19.00	23.00	4.00	Sandstone, light brown	Sandstone	
23.00	24.00	1.00	Sandstone, fine Quartz	Sandstone	
24.00	37.00	13.00	Sandstone, Ironstone bands	Sandstone	
37.00	41.00	4.00	Sandstone, Shale bedding	Sandstone	
41.00	66.50	25.50	Sandstone, grey	Sandstone	
66.50	67.00	0.50	Shale	Shale	
67.00	72.00	5.00	Sandstone, Shale bedding	Sandstone	
72.00	73.00	1.00	Sandstone, grey	Sandstone	
73.00	76.50	3.50	Sandstone-Quartz	Sandstone	
76.50	93.00	16.50	Sandstone, grey	Sandstone	
93.00	93.30	0.30	Sandstone-Quartz	Sandstone	
93.30	128.50	35.20	Sandstone, grey	Sandstone	
128.50	129.00	0.50	Sandstone, fine Quartz	Sandstone	
129.00	153.50	24.50	Sandstone, grey	Sandstone	
153.50	171.00	17.50	Sandstone, grey with dark grey bands	Sandstone	
171.00	171.50	0.50	Sandstone, fine Quartz	Sandstone	
171.50	180.00	8.50	Sandstone, grey	Sandstone	

Remarks

26/02/2010: updated from original form a

*** End of GW108509 ***

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WaterNSW

Work Summary

GW108723

Licence: 10WA109133	Licence Status: CURRENT
Authorised Purpose(s): DOMESTIC Intended Purpose(s): DOMESTIC	
Work Type: Bore	
Work Status: Supply Obtained	
Construct.Method: Down Hole Hamm	
Owner Type: Private	
Commenced Date:	Final Depth: 180.00 m
Completion Date: 21/05/2007	Drilled Depth: 180.00 m
Contractor Name: INTERTEC DRILLING SERVICES	
Driller: Paul Sheehy	
Assistant Driller:	
Property: TOLW 405 Wyong Rd DUFFYS FOREST 2084 NSW	Standing Water Level (m): 67.000
GWMA: -	Salinity Description:
GW Zone: -	Yield (L/s): 0.600

Site Details

Site Chosen By:	County	Parish	Cadastre
	Form A: CUMBERLAND	BROKEN BA	405/752017
	Licensed: CUMBERLAND	BROKEN BAY	Whole Lot 405/752017
Region: 10 - Sydney South Coast	CMA Map:		
River Basin: - Unknown	Grid Zone:	Scale:	
Area/District:			
Elevation: 0.00 m (A.H.D.)	Northing: 6271724.000	Latitude: 33°40'52.0"S	
Elevation Source: Unknown	Easting: 331799.000	Longitude: 151°11'07.7"E	
GS Map: -	MGA Zone: 56	Coordinate Source: GIS - Geogra	

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	2.60	203			Down Hole Hammer
1		Hole	Hole	2.60	180.00	165			Down Hole Hammer
1		Annulus	Concrete	0.00	2.60	203			
1	1	Casing	Pvc Class 9	-0.40	47.60	140			Suspended in Clamps, Screwed and Glued
1	1	Casing	Steel	-0.40	2.60	168	158		Driven into Hole

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
47.00	48.00	1.00	Unknown			0.40		00:25:00	75.00
148.00	158.00	10.00	Unknown	67.00		0.20		00:25:00	110.00

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	1.50	1.50	sandstone, weathered	Sandstone	
1.50	12.00	10.50	sandstone, pink	Sandstone	
12.00	34.00	22.00	sandstone, yellow	Sandstone	
34.00	35.00	1.00	clay, grey bands	Clay	
35.00	42.00	7.00	sandstone, grey	Sandstone	
42.00	42.50	0.50	ironstone	Ironstone	
42.50	47.00	4.50	sandstone, grey	Sandstone	
47.00	48.00	1.00	sandstone, quartz	Sandstone	
48.00	51.00	3.00	sandstone, ironstone	Sandstone	
51.00	60.00	9.00	sandstone, grey	Sandstone	
60.00	64.00	4.00	siltstone	Siltstone	
64.00	74.00	10.00	sandstone, grey	Sandstone	
74.00	83.00	9.00	sandstone, quartz	Sandstone	
83.00	108.00	25.00	sandstone, grey	Sandstone	
108.00	114.00	6.00	sandstone, quartz	Sandstone	
114.00	119.00	5.00	sandstone, grey	Sandstone	
119.00	129.00	10.00	sandstone, quartz	Sandstone	
129.00	131.00	2.00	siltstone	Siltstone	
131.00	148.00	17.00	sandstone, grey	Sandstone	
148.00	158.00	10.00	sandstone, quartz	Sandstone	
158.00	164.00	6.00	sandstone, grey	Sandstone	
164.00	168.00	4.00	sandstone, quartz	Sandstone	
168.00	180.00	12.00	sandstone, grey	Sandstone	

Remarks

12/03/2010: updated from original form A

*** End of GW108723 ***

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WaterNSW

Work Summary

GW111986

Licence: 10WA109308

Licence Status: CURRENT

Authorised Purpose(s): DOMESTIC,STOCK
Intended Purpose(s): STOCK, DOMESTIC

Work Type: Bore

Work Status: Supply Obtained

Construct.Method: Down Hole Hamm

Owner Type: Private

Commenced Date:
Completion Date: 13/09/2012

Final Depth: 222.00 m
Drilled Depth: 222.00 m

Contractor Name: INTERTECH

Driller: William Crump

Assistant Driller:

Property: OVERTON 10 Wyong Rd DUFFYS
FOREST 2084 NSW

Standing Water Level (m):

GWMA: -
GW Zone: -

Salinity Description:
Yield (L/s): 0.050

Site Details

Site Chosen By:

County	Parish	Cadastre
Form A: CUMBERLAND	BROKEN BA	384//752017
Licensed: CUMBERLAND	BROKEN BAY	Whole Lot 384//752017

Region: 10 - Sydney South Coast

CMA Map:

River Basin: - Unknown

Grid Zone:

Scale:

Area/District:

Elevation: 0.00 m (A.H.D.)

Northing: 6271972.000

Latitude: 33°40'43.7"S

Elevation Source: Unknown

Eastings: 331421.000

Longitude: 151°10'53.2"E

GS Map: -

MGA Zone: 56

Coordinate Source: Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	5.50	219			Down Hole Hammer
1		Hole	Hole	5.50	150.00	158			Down Hole Hammer
1		Hole	Hole	150.00	222.00	156			Down Hole Hammer
1	1	Casing	Pvc Class 9	-0.40	35.60	140			Suspended in Clamps, Screwed and Glued
1	1	Casing	Steel	-0.40	5.60	156	146		Driven into Hole
1	1	Opening	Slots - Diagonal	28.50	30.00	140		0	Sawn, PVC Class 9, SL: 0.1mm, A: 3.00mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
27.00	30.00	3.00	Unknown			0.10			120.00
93.00	95.00	2.00	Unknown			0.04			128.00
148.70	149.30	0.60	Unknown			0.03			112.00
165.00	165.50	0.50	Unknown			0.05			128.00
195.00	195.50	0.50	Unknown			0.03			128.00

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	2.50	2.50	FILL / ROCKS	Fill	
2.50	15.00	12.50	SANDSTONE SOFT	Sandstone	
15.00	18.00	3.00	SANDSTONE MOIST	Sandstone	
18.00	27.00	9.00	SANDSTONE GREY	Sandstone	
27.00	30.00	3.00	SANDSTONE/IRONSTONE,CLAY (W)	Sandstone	
30.00	32.00	2.00	SANDSTONE / IRONSTONE	Sandstone	
32.00	85.00	53.00	SANDSTONE / SILTSTONE	Sandstone	
85.00	86.50	1.50	SILTSTONE	Siltstone	
86.50	93.00	6.50	SANDSTONE GREY	Sandstone	
93.00	95.00	2.00	SANDSTONE FINE QUARTZ (W)	Sandstone	
95.00	144.00	49.00	SANDSTONE/SILTSTONE BANDS	Sandstone	
144.00	144.50	0.50	SANDSTONE D/GREY/FINE QUARTZ	Sandstone	
144.50	148.70	4.20	SANDSTONE GREY	Sandstone	
148.70	149.30	0.60	SANDSTONE / QUARTZ (W)	Sandstone	
149.30	158.00	8.70	SANDSTONE GREY	Sandstone	
158.00	159.00	1.00	SANDSTONE FINE QUARTZ	Sandstone	
159.00	165.00	6.00	SANDSTONE GREY	Sandstone	
165.00	165.50	0.50	SANDSTONE / QUARTZ (W)	Sandstone	
165.50	195.00	29.50	SANDSTONE GREY	Sandstone	
195.00	195.50	0.50	SANDSTONE/ SILT (W)	Sandstone	
195.50	222.00	26.50	SANDSTONE GREY, HARD	Sandstone	

Remarks

17/07/2014: Nat Carling, 17-July-2014; Updated status.

*** End of GW111986 ***

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1 Bibbenluke Avenue,
Duffys Forest, NSW

APPENDIX

E

LABORATORY

	Asbestos								Mass							
	ACM - Comment	AF - Comment	Asbestos from ACM	Asbestos from FA & AF	Asbestos Reported Result	FA- Comment	Respirable Fibres - Comment	Synthetic Fibres - Comment	Approximate Sample Mass	Mass ACM	Mass AF	Mass Asbestos in ACM	Mass asbestos in AF	Mass Asbestos in FA	Mass Asbestos in FA & AF	Mass FA
	Comment	Comment	%w/w	%w/w	Comment	Comment	Comment	Comment	g	g	g	g	g	g	g	g
EQL																
NEPM 2013 Table 1B(5) Generic EIL - Urban Res & Public Open Space																
NEPM 2013 Table 1B(6) ESLs for Urban Res, Coarse Soil																
NEPM 2013 Table 1A(1) HILs Res A Soil																

Field ID	Date																
DUP01	22/09/2020																
DUP01A	22/09/2020																
TP01-0.0-0.1	22/09/2020	ND	ND	0.0000	0.0000	ND	ND	ND	ND	518	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TP02-0.0-0.1	22/09/2020	ND	ND	0.0000	0.0000	ND	ND	ND	ND	553	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TP03-0.0-0.1	22/09/2020	ND	ND	0.0000	0.0000	ND	ND	ND	ND	517	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TP04-0.0-0.1	22/09/2020	ND	ND	0.0000	0.0000	ND	ND	ND	ND	382	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TP05-0.0-0.1	22/09/2020	ND	ND	0.0000	0.0000	ND	ND	ND	ND	390	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TP06-0.0-0.1	22/09/2020	ND	ND	0.0000	0.0000	ND	ND	ND	ND	464	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TP07-0.0-0.1	22/09/2020	ND	ND	0.0000	0.0000	ND	ND	ND	ND	596	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TP08-0.0-0.1	22/09/2020	ND	ND	0.0000	0.0000	ND	ND	ND	ND	550	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TP09-0.0-0.1	22/09/2020	ND	ND	0.0000	0.0000	ND	ND	ND	ND	509	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Statistics																	
Number of Results	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Number of Detects	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
Minimum Concentration	1	1	0	0	1	1	0	1	1	382	0	0	0	0	0	0	0
Minimum Detect	1	1	ND	ND	1	1	1	1	1	382	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration	1	1	0	0	1	1	1	1	1	596	0	0	0	0	0	0	0
Maximum Detect	1	1	0	0	1	1	1	1	1	596	0	0	0	0	0	0	0
Average Concentration *	1	1	0	0	1	1	0.89	1	1	498	0	0	0	0	0	0	0
Median Concentration *	1	1	0	0	1	1	1	1	1	517	0	0	0	0	0	0	0
Standard Deviation *	0	0	0	0	0	0	0.33	0	0	73	0	0	0	0	0	0	0
95% UCL (Student's-t) *	1	1	0	0	1	1	1.096	1	1	542.8	0	0	0	0	0	0	0

* A Non Detect Multiplier of 0.5 has been applied.

Particulates	TRH		Inorganics					Metals						Organochlorine Pesticides		TPH			
Organic Fibres - Comment	>C16-C34 Fraction (F3)	>C10-C40 Fraction (Sum)	Conductivity (1:5 aqueous extract)	% Moisture	Cation Exchange Capacity	Moisture Content (dried @ 103°C)	pH (1:5 aqueous extract)	Arsenic	Chromium (III+VI)	Copper	Lead	Nickel	Zinc	Aldrin + Dieldrin	Dieldrin	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum)
Comment	mg/kg	mg/kg	µS/cm	mg/kg	meq/100g	%	-	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
	100	100	10	10,000	0.05	1	0.1	1	0.5	0.5	1	0.5	2	0.05	0.05	20	50	50	50
								100											
	300																		
								100		6,000	300	400	7,400	6					

						13			8.9	9.8	21		250						
				330,000				2	8.1	14	13	6.4	100						
1	130	130				32		3.3	17	20	27	9.9	180			22	72	81	175
1						11		4.3	17	11	16	8.0	60						
1			31		1.7	16	6.0	3.0	17	11	23		120						
1						18		5.5	13	19	19		89						
1						12		3.0	9.4	12	14		80						
1						11			9.9	7.8	21		270	0.17	0.17				
1						11		3.5	12	21	16	5.3	85						
1			19		2.8	12	6.0		8.7		9.1		28						
1	130	130				17		2.4	9.3	6.0	11		19				73	71	144

9	5	5	2	1	2	10	2	11	11	11	11	11	11	5	5	5	5	5	5
9	2	2	2	1	2	10	2	8	11	10	11	4	11	1	1	1	2	2	2
1	<100	<100	19	330,000	1.7	11	6	2	8.1	<5	9.1	<5	19	<0.05	<0.05	<20	<50	<50	<50
1	130	130	19	330,000	1.7	11	6	2	8.1	6	9.1	5.3	19	0.17	0.17	22	72	71	144
1	130	130	31	330,000	2.8	32	6	5.5	17	21	27	9.9	270	0.17	0.17	22	73	81	175
1	130	130	31	330,000	2.8	32	6	5.5	17	21	27	9.9	270	0.17	0.17	22	73	81	175
1	82	82	25		2.2	15	6	2.7	12	12	17	4.3	116	0.054	0.054	12	44	45	79
1	50	50	25	330,000	2.25	12.5	6	3	9.9	11	16	2.5	89	0.025	0.025	10	25	25	25
0	44	44	8.5		0.78	6.4	0	1.4	3.6	5.9	5.4	2.7	83	0.065	0.065	5.4	26	28	74
1	123.8	123.8	62.88		5.723	19.03	6	3.516	13.82	15.42	20.26	5.76	162	0.116	0.116	17.52	68.81	72.24	149.8



Sydney Laboratory
Unit F3 Bk. F 16 Murr Road Lane Cove West NSW 2055
02 9900 8400 EnviroSapientSW@eurofin.com

Unit 1 21 Smallwood Place Murrumbidgee QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

Unit 291 Leach Highway Kewdale WA 6105
08 9251 9600 EnvirosamplesWA@eufofins.com

Melbourne Laboratory
6 Montefly Road Dandenong South VIC 3175
03 8564 5900 Envirosamplevic@eurofins.com

[illegible]

Received: 22/09/20 3.30 PM

21.9°C

745829



Sydney Laboratory
Unit F3 Bldg F 16 Mers Road Lane Cove West NSW 2055
02 9900 8400 EnviroSampleNSW@eurofins.com

Laboratory
Unit 1 21 Smallwood Place Murrie QLD 4172
07 3902 4600 EnviroSampleQLD@neurofins.com

Unit 291 Leach Highway Kennewick WA 98505
EnviroSampleWA@eurolabs.com 08 9251 9600

Enviromental Health Laboratory
6 Monterey Road Dandenong South VIC 3175
03 8564 5000 EnviroSampleV@deurolins.com

[illegible]

Received: 22/09/20 3:30 PM

21.9°C

五折

#AU04_Enviro_Sample_NSW

Subject: FW: Samples delivered today

From: Jessica Brodie <jessica.brodie@constructionsciences.net>

Sent: Wednesday, 23 September 2020 5:18 PM

To: Ursula Long <UrsulaLong@eurofins.com>

Subject: Re: Samples delivered today

EXTERNAL EMAIL*

Hi Ursula,

So sorry for all the back and forth.

My manager has advised me to request the same for a dup. Can we halve TP06 and make a duplicate?

Thanks heaps,

Get [Outlook for Android](#)

Jessica Brodie

Graduate Environmental Scientist
CONSTRUCTION SCIENCES



Phone 1300 165 769

Address 31 Anvil Road, Seven Hills, NSW 2147

Email jessica.brodie@constructionsciences.net Web www.constructionsciences.net

From: Jessica Brodie <jessica.brodie@constructionsciences.net>

Sent: Wednesday, September 23, 2020 11:49:03 AM

To: UrsulaLong@eurofins.com <UrsulaLong@eurofins.com>

Subject: RE: Samples delivered today

Hi Ursula,

I have realised that I forgot to take a dup and a trip.

To remedy this, would you mind halving TP01-0.0-0.1 and sending a half to SGS as a triplicate for Metals (8)?

Let me know if this can be done, thanks!

Jessica Brodie

Graduate Environmental Scientist
CONSTRUCTION SCIENCES



Phone 1300 165 769

Address 31 Anvil Road, Seven Hills, NSW 2147

Email jessica.brodie@constructionsciences.net Web www.constructionsciences.net

From: UrsulaLong@eurofins.com <UrsulaLong@eurofins.com>
Sent: Wednesday, 23 September 2020 10:42 AM
To: Jessica Brodie <jessica.brodie@constructionsciences.net>
Subject: RE: Samples delivered today

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

Great thanks Jessica.

Kind regards,

Ursula Long
Analytical Services Manager

Eurofins | Environment Testing

Unit F3, Parkview Building
16 Mars Road
LANE COVE WEST NSW 2066
AUSTRALIA
Phone : +61 2 9900 8420
Mobile: +61 428 845 495

Email : UrsulaLong@eurofins.com
Website: www.eurofins.com.au/environmental-testing

From: Jessica Brodie <jessica.brodie@constructionsciences.net>
Sent: Wednesday, 23 September 2020 10:38 AM
To: Ursula Long <UrsulaLong@eurofins.com>
Subject: RE: Samples delivered today

EXTERNAL EMAIL*

Hi Ursula,

Thanks for your patience. Here is the COC for yesterday's samples.

Kind regards,

Jessica Brodie
Graduate Environmental Scientist
CONSTRUCTION SCIENCES



Phone 1300 165 769
Address 31 Anvil Road, Seven Hills, NSW 2147
Email jessica.brodie@constructionsciences.net Web www.constructionsciences.net

From: UrsulaLong@eurofins.com <UrsulaLong@eurofins.com>
Sent: Tuesday, 22 September 2020 3:42 PM

To: Jessica Brodie <jessica.brodie@constructionsciences.net>
Subject: RE: Samples delivered today

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

No problem Jessica.

Kind regards,

Ursula Long
Analytical Services Manager

Eurofins | Environment Testing

Unit F3, Parkview Building
16 Mars Road
LANE COVE WEST NSW 2066
AUSTRALIA
Phone : +61 2 9900 8420
Mobile: +61 428 845 495

Email : UrsulaLong@eurofins.com
Website: www.eurofins.com.au/environmental-testing

From: Jessica Brodie <jessica.brodie@constructionsciences.net>
Sent: Tuesday, 22 September 2020 3:30 PM
To: Ursula Long <UrsulaLong@eurofins.com>
Subject: Samples delivered today

EXTERNAL EMAIL*

Hi Ursula,

CS is having server issues and I am unable to access the COC I prepared for the samples I dropped off today.
Am I able to send it through first thing in the morning?

Sorry for the inconvenience,

Jessica Brodie
Graduate Environmental Scientist
CONSTRUCTION SCIENCES



Phone 1300 165 769
Address 31 Anvil Road, Seven Hills, NSW 2147
Email jessica.brodie@constructionsciences.net Web www.constructionsciences.net

CONNECT WITH CONSTRUCTION SCIENCES  

Construction Sciences management systems are certified to ISO9001 (quality) and ISO45001 (occupational health and safety)

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Tax Invoice

Construction Sciences P/L (Seven Hills)
 31 Anvil Road
 Seven Hills
 NSW 2147

Purchase Order #: Not provided
 Invoice #: 583340
 Date: Sep 25, 2020
 Report #: 745829
 Project Name: STAGE 2 DSI
 Project ID: 5046200086
 Contact: Jessica Brodie

Description	Quantity	Price	Total	Notes
Solid Samples				
Asbestos - WA guidelines	9	\$60.00	\$540.00	
Cation Exchange Capacity	2	\$33.80	\$67.60	
Eurofins Suite B9	5	\$91.80	\$459.00	
Metals M8	5	\$20.80	\$104.00	
pH (1:5 Aqueous extract at 25°C as rec.)	2	\$3.80	\$7.60	
Handling Charge	1	\$30.00	\$30.00	
Split sample couriered to external lab	1	\$45.00	\$45.00	

	Nett Total	\$1,253.20
	GST	\$125.32
	Total Inc GST	\$1,378.52

This invoice is subject to Eurofins General Terms of Sales. Copies available on request or at <http://environment.eurofins.com.au>

Please detach and return with payment to:

Postal:
 Eurofins Environment Testing
 6 Monterey Road
 Dandenong South
 Victoria, 3175

Please EFT Payments to:
 Eurofins Environment Testing
 BSB 063-498
 Acct No: 10057019
 e.mail Remittances:
 EnviroRemittances@eurofins.com

Invoice Number : 583340
Amount Inc GST : \$1,378.52

TERMS STRICTLY 30 DAYS

Australia
Melbourne

6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney

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Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane

1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth

2/91 Leach Highway
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NATA # 1261
Site # 23736

Newcastle

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Mayfield East NSW 2304
PO Box 60 Wickham 2293
Phone : +61 2 4968 8448

New Zealand
Auckland

35 O'Rorke Road
Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

Christchurch

43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Sample Receipt Advice

Company name: Construction Sciences P/L (Seven Hills)
Contact name: Jessica Brodie
Project name: STAGE 2 DSI
Project ID: 5046200086
Turnaround time: 5 Day
Date/Time received: Sep 22, 2020 3:30 PM
Eurofins reference: 745829

Sample Information

- ✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ✓ All samples have been received as described on the above COC.
- ✓ COC has been completed correctly.
- ✓ Attempt to chill was evident.
- ✓ Appropriately preserved sample containers have been used.
- ✓ All samples were received in good condition.
- ✓ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ✓ Appropriate sample containers have been used.
- ✓ Sample containers for volatile analysis received with zero headspace.
- ✓ Split sample sent to requested external lab.
- ✗ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Subsample for sample sample TP01-0.0-0.1 forwarded to SGS.

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Ursula Long on phone : or by email: UrsulaLong@eurofins.com

Results will be delivered electronically via email to Jessica Brodie - jessica.brodie@constructionsciences.net.

Note: A copy of these results will also be delivered to the general Construction Sciences P/L (Seven Hills) email address.

Australia

Melbourne
6 Monterey Road
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NATA # 1261
Site # 1254 & 14271

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Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Company Name: Construction Sciences P/L (Seven Hills)
Address: 31 Anvil Road
Seven Hills
NSW 2147
Project Name: STAGE 2 DSI
Project ID: 5046200086

Order No.:
Report #: 745829
Phone: 1300 165 769
Fax:

Received: Sep 22, 2020 3:30 PM
Due: Sep 29, 2020
Priority: 5 Day
Contact Name: Jessica Brodie

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Asbestos - WA guidelines	HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	Polycyclic Aromatic Hydrocarbons	Organochlorine Pesticides	Metals M8	Moisture Set	Cation Exchange Capacity	Eurofins Suite B1
Melbourne Laboratory - NATA Site # 1254 & 14271													X	
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794														
Perth Laboratory - NATA Site # 23736														
Mayfield Laboratory														
External Laboratory														
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID									
1	TP01-0.0-0.1	Sep 22, 2020		Soil	S20-Se38593	X			X	X	X	X		X
2	TP02-0.0-0.1	Sep 22, 2020		Soil	S20-Se38594	X					X	X		
3	TP03-0.0-0.1	Sep 22, 2020		Soil	S20-Se38595	X		X			X	X	X	
4	TP04-0.0-0.1	Sep 22, 2020		Soil	S20-Se38596	X			X	X	X	X		X
5	TP05-0.0-0.1	Sep 22, 2020		Soil	S20-Se38597	X					X	X		
6	TP06-0.0-0.1	Sep 22, 2020		Soil	S20-Se38598	X			X	X	X	X		X
7	TP07-0.0-0.1	Sep 22, 2020		Soil	S20-Se38599	X			X	X	X	X		X
8	TP08-0.0-0.1	Sep 22, 2020		Soil	S20-Se38600	X		X			X	X	X	
9	TP09-0.0-0.1	Sep 22, 2020		Soil	S20-Se38601	X			X	X	X	X		X

Australia

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ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Company Name: Construction Sciences P/L (Seven Hills)
Address: 31 Anvil Road
Seven Hills
NSW 2147

Project Name: STAGE 2 DSI
Project ID: 5046200086

Order No.:
Report #: 745829
Phone: 1300 165 769
Fax:

Received: Sep 22, 2020 3:30 PM
Due: Sep 29, 2020
Priority: 5 Day
Contact Name: Jessica Brodie

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Asbestos - WA guidelines	HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	Polycyclic Aromatic Hydrocarbons	Organochlorine Pesticides	Metals M8	Moisture Set	Cation Exchange Capacity	Eurofins Suite B1
Melbourne Laboratory - NATA Site # 1254 & 14271													X	
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794														
Perth Laboratory - NATA Site # 23736														
Mayfield Laboratory														
External Laboratory														
10	DUP01	Sep 22, 2020		Soil	S20-Se38602						X	X		
11	TRIP BLANK	Sep 22, 2020		Soil	S20-Se38603		X							
12	TRIP SPIKE	Sep 22, 2020		Soil	S20-Se38604		X							
13	TRIP SPIKE LAB	Sep 22, 2020		Soil	S20-Se38605		X							
Test Counts						9	3	2	5	5	10	10	2	5

Construction Sciences P/L (Seven Hills)

31 Anvil Road
Seven Hills
NSW 2147



NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025—Testing
The results of the tests, calibrations and/or
measurements included in this document are traceable
to Australian/national standards.

Attention: Jessica Brodie
Report 745829-AID
Project Name STAGE 2 DSI
Project ID 5046200086
Received Date Sep 22, 2020
Date Reported Sep 29, 2020

Methodology:

Asbestos Fibre
Identification

Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques.

NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.

Unknown Mineral
Fibres

Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity.

NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.

Subsampling Soil
Samples

The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) is employed.

NOTE: Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis, in accordance with AS 4964-2004.

Bonded asbestos-
containing material
(ACM)

The material is first examined and any fibres isolated for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination. The resultant material is then further examined in accordance with AS 4964 - 2004.

NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.

Limit of Reporting

The performance limitation of the AS 4964 (2004) method for non-homogeneous samples is around 0.1 g/kg (equivalent to 0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis, this is considered to be at the nominal reporting limit of 0.01% (w/w).

The NEPM screening level of 0.001% (w/w) is intended as an on-site determination, not a laboratory Limit of Reporting (LOR), per se. Examination of a large sample size (e.g. 500 mL) may improve the likelihood of detecting asbestos, particularly AF, to aid assessment against the NEPM criteria. Gravimetric determinations to this level of accuracy are outside of AS 4964 and hence NATA Accreditation does not cover the performance of this service (non-NATA results shown with an asterisk).

NOTE: NATA News March 2014, p.7, states in relation to AS 4964: "This is a qualitative method with a nominal reporting limit of 0.01 % " and that currently in Australia "there is no validated method available for the quantification of asbestos". This report is consistent with the analytical procedures and reporting recommendations in the NEPM and the WA DoH.

Project Name STAGE 2 DSI
Project ID 5046200086
Date Sampled Sep 22, 2020
Report 745829-AID

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
TP01-0.0-0.1	20-Se38593	Sep 22, 2020	Approximate Sample 518g Sample consisted of: Brown coarse-grained soil, cement, brick, fragments of ceramic tile, rocks and organic debris	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
TP02-0.0-0.1	20-Se38594	Sep 22, 2020	Approximate Sample 553g Sample consisted of: Brown fine-grained sandy soil, cement and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
TP03-0.0-0.1	20-Se38595	Sep 22, 2020	Approximate Sample 517g Sample consisted of: Brown fine-grained sandy soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
TP04-0.0-0.1	20-Se38596	Sep 22, 2020	Approximate Sample 382g Sample consisted of: Brown fine-grained sandy soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
TP05-0.0-0.1	20-Se38597	Sep 22, 2020	Approximate Sample 390g Sample consisted of: Brown fine-grained sandy soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
TP06-0.0-0.1	20-Se38598	Sep 22, 2020	Approximate Sample 464g Sample consisted of: Brown fine-grained sandy soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
TP07-0.0-0.1	20-Se38599	Sep 22, 2020	Approximate Sample 596g Sample consisted of: Brown fine-grained sandy soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.
TP08-0.0-0.1	20-Se38600	Sep 22, 2020	Approximate Sample 550g Sample consisted of: Brown fine-grained sandy soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
TP09-0.0-0.1	20-Se38601	Sep 22, 2020	Approximate Sample 509g Sample consisted of: Brown fine-grained sandy soil and rocks	No asbestos detected at the reporting limit of 0.001% w/w.* Organic fibre detected. No trace asbestos detected.

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported. A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description

Asbestos - LTM-ASB-8020

Testing Site

Sydney

Extracted

Sep 23, 2020

Holding Time

Indefinite

Company Name: Construction Sciences P/L (Seven Hills)
Address: 31 Anvil Road
Seven Hills
NSW 2147

Project Name: STAGE 2 DSI
Project ID: 5046200086

Order No.:
Report #: 745829
Phone: 1300 165 769
Fax:

Received: Sep 22, 2020 3:30 PM
Due: Sep 29, 2020
Priority: 5 Day
Contact Name: Jessica Brodie

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Asbestos - WA guidelines	HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	Polycyclic Aromatic Hydrocarbons	Organochlorine Pesticides	Metals M8	Moisture Set	Cation Exchange Capacity	Eurofins Suite B1
Melbourne Laboratory - NATA Site # 1254 & 14271													X	
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794														
Perth Laboratory - NATA Site # 23736														
Mayfield Laboratory														
External Laboratory														
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID									
1	TP01-0.0-0.1	Sep 22, 2020		Soil	S20-Se38593	X			X	X	X	X		X
2	TP02-0.0-0.1	Sep 22, 2020		Soil	S20-Se38594	X					X	X		
3	TP03-0.0-0.1	Sep 22, 2020		Soil	S20-Se38595	X		X			X	X	X	
4	TP04-0.0-0.1	Sep 22, 2020		Soil	S20-Se38596	X			X	X	X	X		X
5	TP05-0.0-0.1	Sep 22, 2020		Soil	S20-Se38597	X					X	X		
6	TP06-0.0-0.1	Sep 22, 2020		Soil	S20-Se38598	X			X	X	X	X		X
7	TP07-0.0-0.1	Sep 22, 2020		Soil	S20-Se38599	X			X	X	X	X		X
8	TP08-0.0-0.1	Sep 22, 2020		Soil	S20-Se38600	X		X			X	X	X	
9	TP09-0.0-0.1	Sep 22, 2020		Soil	S20-Se38601	X			X	X	X	X		X

Australia

Melbourne
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Company Name: Construction Sciences P/L (Seven Hills)
Address: 31 Anvil Road
Seven Hills
NSW 2147
Project Name: STAGE 2 DSI
Project ID: 5046200086

Order No.:
Report #: 745829
Phone: 1300 165 769
Fax:

Received: Sep 22, 2020 3:30 PM
Due: Sep 29, 2020
Priority: 5 Day
Contact Name: Jessica Brodie

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Asbestos - WA guidelines	HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	Polycyclic Aromatic Hydrocarbons	Organochlorine Pesticides	Metals M8	Moisture Set	Cation Exchange Capacity	Eurofins Suite B1
Melbourne Laboratory - NATA Site # 1254 & 14271													X	
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794														
Perth Laboratory - NATA Site # 23736														
Mayfield Laboratory														
External Laboratory														
10	DUP01	Sep 22, 2020		Soil	S20-Se38602						X	X		
11	TRIP BLANK	Sep 22, 2020		Soil	S20-Se38603		X							
12	TRIP SPIKE	Sep 22, 2020		Soil	S20-Se38604		X							
13	TRIP SPIKE LAB	Sep 22, 2020		Soil	S20-Se38605		X							
Test Counts						9	3	2	5	5	10	10	2	5

Internal Quality Control Review and Glossary

General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
5. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Advice.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

Units

% w/w: weight for weight basis	grams per kilogram
Filter loading:	fibres/100 graticule areas
Reported Concentration:	fibres/mL
Flowrate:	L/min

Terms

Dry	Sample is dried by heating prior to analysis
LOR	Limit of Reporting
COC	Chain of Custody
SRA	Sample Receipt Advice
ISO	International Standards Organisation
AS	Australian Standards
WA DOH	Reference document for the NEPM. Government of Western Australia, Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2009), including supporting document Recommended Procedures for Laboratory Analysis of Asbestos in Soil (2011)
NEPM	National Environment Protection (Assessment of Site Contamination) Measure, 2013 (as amended)
ACM	Asbestos Containing Materials. Asbestos contained within a non-asbestos matrix, typically presented in bonded and/or sound condition. For the purposes of the NEPM, ACM is generally restricted to those materials that do not pass a 7mm x 7mm sieve.
AF	Asbestos Fines. Asbestos containing materials, including friable, weathered and bonded materials, able to pass a 7mm x 7mm sieve. Considered under the NEPM as equivalent to "non-bonded / friable".
FA	Fibrous Asbestos. Asbestos containing materials in a friable and/or severely weathered condition. For the purposes of the NEPM, FA is generally restricted to those materials that do not pass a 7mm x 7mm sieve.
Friable	Asbestos-containing materials of any size that may be broken or crumbled by hand pressure. For the purposes of the NEPM, this includes both AF and FA. It is outside of the laboratory's remit to assess degree of friability.
Trace Analysis	Analytical procedure used to detect the presence of respirable fibres in the matrix.

Comments

S20-Se38596 to S20-Se38598: Samples received were less than the nominal 500mL as recommended in Section 4.10 of the NEPM Schedule B1 - Guideline on Investigation Levels for Soil and Groundwater.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N/A	Not applicable

Asbestos Counter/Identifier:

Laxman Dias Senior Analyst-Asbestos (NSW)

Authorised by:

Chamath JHM Annakkage Senior Analyst-Asbestos (NSW)



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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Construction Sciences P/L (Seven Hills)
31 Anvil Road
Seven Hills
NSW 2147



NATA Accredited
Accreditation Number 1261
Site Number 18217

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The results of the tests, calibrations and/or
measurements included in this document are traceable
to Australian/national standards.

Attention: Jessica Brodie

Report 745829-S
Project name STAGE 2 DSI
Project ID 5046200086
Received Date Sep 22, 2020

Client Sample ID			TP01-0.0-0.1	TP02-0.0-0.1	TP03-0.0-0.1	TP04-0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Se38593	S20-Se38594	S20-Se38595	S20-Se38596
Date Sampled			Sep 22, 2020	Sep 22, 2020	Sep 22, 2020	Sep 22, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	-	-	< 20
TRH C10-C14	20	mg/kg	22	-	-	< 20
TRH C15-C28	50	mg/kg	72	-	-	< 50
TRH C29-C36	50	mg/kg	81	-	-	< 50
TRH C10-C36 (Total)	50	mg/kg	175	-	-	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	-	-	< 0.1
Toluene	0.1	mg/kg	< 0.1	-	-	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	-	-	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	-	-	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	-	-	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	-	-	< 0.3
4-Bromofluorobenzene (surr.)	1	%	50	-	-	74
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene ^{N02}	0.5	mg/kg	< 0.5	-	-	< 0.5
TRH C6-C10	20	mg/kg	< 20	-	-	< 20
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	< 20	-	-	< 20
TRH >C10-C16	50	mg/kg	< 50	-	-	< 50
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	< 50	-	-	< 50
TRH >C16-C34	100	mg/kg	130	-	-	< 100
TRH >C34-C40	100	mg/kg	< 100	-	-	< 100
TRH >C10-C40 (total)*	100	mg/kg	130	-	-	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	-	-	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	-	-	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	-	-	1.2
Acenaphthene	0.5	mg/kg	< 0.5	-	-	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	-	-	< 0.5
Anthracene	0.5	mg/kg	< 0.5	-	-	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	-	-	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	-	-	< 0.5
Benzo(b&j)fluoranthene ^{N07}	0.5	mg/kg	< 0.5	-	-	< 0.5
Benzo(g,h,i)perylene	0.5	mg/kg	< 0.5	-	-	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	-	-	< 0.5
Chrysene	0.5	mg/kg	< 0.5	-	-	< 0.5

Client Sample ID			TP01-0.0-0.1	TP02-0.0-0.1	TP03-0.0-0.1	TP04-0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Se38593	S20-Se38594	S20-Se38595	S20-Se38596
Date Sampled			Sep 22, 2020	Sep 22, 2020	Sep 22, 2020	Sep 22, 2020
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Dibenz(a,h)anthracene	0.5	mg/kg	< 0.5	-	-	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	-	-	< 0.5
Fluorene	0.5	mg/kg	< 0.5	-	-	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	-	-	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	-	-	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	-	-	< 0.5
Pyrene	0.5	mg/kg	< 0.5	-	-	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	-	-	< 0.5
2-Fluorobiphenyl (surr.)	1	%	97	-	-	69
p-Terphenyl-d14 (surr.)	1	%	124	-	-	90
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	-	-	< 0.1
4,4'-DDD	0.05	mg/kg	< 0.05	-	-	< 0.05
4,4'-DDE	0.05	mg/kg	< 0.05	-	-	< 0.05
4,4'-DDT	0.05	mg/kg	< 0.05	-	-	< 0.05
α-BHC	0.05	mg/kg	< 0.05	-	-	< 0.05
Aldrin	0.05	mg/kg	< 0.05	-	-	< 0.05
β-BHC	0.05	mg/kg	< 0.05	-	-	< 0.05
δ-BHC	0.05	mg/kg	< 0.05	-	-	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	-	-	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	-	-	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	-	-	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	-	-	< 0.05
Endrin	0.05	mg/kg	< 0.05	-	-	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	-	-	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	-	-	< 0.05
γ-BHC (Lindane)	0.05	mg/kg	< 0.05	-	-	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	-	-	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	-	-	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	-	-	< 0.05
Methoxychlor	0.2	mg/kg	< 0.2	-	-	< 0.2
Toxaphene	1	mg/kg	< 1	-	-	< 1
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	-	-	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	-	-	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.2	-	-	< 0.2
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.2	-	-	< 0.2
Dibutylchloroendate (surr.)	1	%	135	-	-	102
Tetrachloro-m-xylene (surr.)	1	%	102	-	-	91
Heavy Metals						
Arsenic	2	mg/kg	3.3	4.3	3.0	5.5
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	17	17	17	13
Copper	5	mg/kg	20	11	11	19
Lead	5	mg/kg	27	16	23	19
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	9.9	8.0	< 5	< 5
Zinc	5	mg/kg	180	60	120	89

Client Sample ID			TP01-0.0-0.1	TP02-0.0-0.1	TP03-0.0-0.1	TP04-0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Se38593	S20-Se38594	S20-Se38595	S20-Se38596
Date Sampled			Sep 22, 2020	Sep 22, 2020	Sep 22, 2020	Sep 22, 2020
Test/Reference	LOR	Unit				
% Moisture	1	%	32	11	16	18
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	-	-	31	-
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	-	-	6.0	-
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	-	1.7	-

Client Sample ID			TP05-0.0-0.1	TP06-0.0-0.1	TP07-0.0-0.1	TP08-0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Se38597	S20-Se38598	S20-Se38599	S20-Se38600
Date Sampled			Sep 22, 2020	Sep 22, 2020	Sep 22, 2020	Sep 22, 2020
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	-	< 20	< 20	-
TRH C10-C14	20	mg/kg	-	< 20	< 20	-
TRH C15-C28	50	mg/kg	-	< 50	< 50	-
TRH C29-C36	50	mg/kg	-	< 50	< 50	-
TRH C10-C36 (Total)	50	mg/kg	-	< 50	< 50	-
BTEX						
Benzene	0.1	mg/kg	-	< 0.1	< 0.1	-
Toluene	0.1	mg/kg	-	< 0.1	< 0.1	-
Ethylbenzene	0.1	mg/kg	-	< 0.1	< 0.1	-
m&p-Xylenes	0.2	mg/kg	-	< 0.2	< 0.2	-
o-Xylene	0.1	mg/kg	-	< 0.1	< 0.1	-
Xylenes - Total*	0.3	mg/kg	-	< 0.3	< 0.3	-
4-Bromofluorobenzene (surr.)	1	%	-	79	71	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene ^{N02}	0.5	mg/kg	-	< 0.5	< 0.5	-
TRH C6-C10	20	mg/kg	-	< 20	< 20	-
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	-	< 20	< 20	-
TRH >C10-C16	50	mg/kg	-	< 50	< 50	-
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	-	< 50	< 50	-
TRH >C16-C34	100	mg/kg	-	< 100	< 100	-
TRH >C34-C40	100	mg/kg	-	< 100	< 100	-
TRH >C10-C40 (total)*	100	mg/kg	-	< 100	< 100	-
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	-	< 0.5	< 0.5	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	-	0.6	0.6	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	-	1.2	1.2	-
Acenaphthene	0.5	mg/kg	-	< 0.5	< 0.5	-
Acenaphthylene	0.5	mg/kg	-	< 0.5	< 0.5	-
Anthracene	0.5	mg/kg	-	< 0.5	< 0.5	-
Benz(a)anthracene	0.5	mg/kg	-	< 0.5	< 0.5	-
Benzo(a)pyrene	0.5	mg/kg	-	< 0.5	< 0.5	-
Benzo(b&j)fluoranthene ^{N07}	0.5	mg/kg	-	< 0.5	< 0.5	-
Benzo(g,h,i)perylene	0.5	mg/kg	-	< 0.5	< 0.5	-
Benzo(k)fluoranthene	0.5	mg/kg	-	< 0.5	< 0.5	-
Chrysene	0.5	mg/kg	-	< 0.5	< 0.5	-
Dibenz(a,h)anthracene	0.5	mg/kg	-	< 0.5	< 0.5	-

Client Sample ID			TP05-0.0-0.1	TP06-0.0-0.1	TP07-0.0-0.1	TP08-0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Se38597	S20-Se38598	S20-Se38599	S20-Se38600
Date Sampled			Sep 22, 2020	Sep 22, 2020	Sep 22, 2020	Sep 22, 2020
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Fluoranthene	0.5	mg/kg	-	< 0.5	< 0.5	-
Fluorene	0.5	mg/kg	-	< 0.5	< 0.5	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	-	< 0.5	< 0.5	-
Naphthalene	0.5	mg/kg	-	< 0.5	< 0.5	-
Phenanthrene	0.5	mg/kg	-	< 0.5	< 0.5	-
Pyrene	0.5	mg/kg	-	< 0.5	< 0.5	-
Total PAH*	0.5	mg/kg	-	< 0.5	< 0.5	-
2-Fluorobiphenyl (surr.)	1	%	-	102	98	-
p-Terphenyl-d14 (surr.)	1	%	-	115	121	-
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	-	< 0.1	< 0.1	-
4,4'-DDD	0.05	mg/kg	-	< 0.05	< 0.05	-
4,4'-DDE	0.05	mg/kg	-	< 0.05	< 0.05	-
4,4'-DDT	0.05	mg/kg	-	< 0.05	< 0.05	-
a-BHC	0.05	mg/kg	-	< 0.05	< 0.05	-
Aldrin	0.05	mg/kg	-	< 0.05	< 0.05	-
b-BHC	0.05	mg/kg	-	< 0.05	< 0.05	-
d-BHC	0.05	mg/kg	-	< 0.05	< 0.05	-
Dieldrin	0.05	mg/kg	-	0.17	< 0.05	-
Endosulfan I	0.05	mg/kg	-	< 0.05	< 0.05	-
Endosulfan II	0.05	mg/kg	-	< 0.05	< 0.05	-
Endosulfan sulphate	0.05	mg/kg	-	< 0.05	< 0.05	-
Endrin	0.05	mg/kg	-	< 0.05	< 0.05	-
Endrin aldehyde	0.05	mg/kg	-	< 0.05	< 0.05	-
Endrin ketone	0.05	mg/kg	-	< 0.05	< 0.05	-
g-BHC (Lindane)	0.05	mg/kg	-	< 0.05	< 0.05	-
Heptachlor	0.05	mg/kg	-	< 0.05	< 0.05	-
Heptachlor epoxide	0.05	mg/kg	-	< 0.05	< 0.05	-
Hexachlorobenzene	0.05	mg/kg	-	< 0.05	< 0.05	-
Methoxychlor	0.2	mg/kg	-	< 0.2	< 0.2	-
Toxaphene	1	mg/kg	-	< 1	< 1	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	-	0.17	< 0.05	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	-	< 0.05	< 0.05	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	-	< 0.2	< 0.2	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	-	< 0.2	< 0.2	-
Dibutylchloroendate (surr.)	1	%	-	120	137	-
Tetrachloro-m-xylene (surr.)	1	%	-	105	112	-
Heavy Metals						
Arsenic	2	mg/kg	3.0	< 2	3.5	< 2
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	9.4	9.9	12	8.7
Copper	5	mg/kg	12	7.8	21	< 5
Lead	5	mg/kg	14	21	16	9.1
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	< 5	5.3	< 5
Zinc	5	mg/kg	80	270	85	28
% Moisture	1	%	12	11	11	12
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	-	-	-	19
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	-	-	-	6.0

Client Sample ID			TP05-0.0-0.1	TP06-0.0-0.1	TP07-0.0-0.1	TP08-0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S20-Se38597	S20-Se38598	S20-Se38599	S20-Se38600
Date Sampled			Sep 22, 2020	Sep 22, 2020	Sep 22, 2020	Sep 22, 2020
Test/Reference	LOR	Unit				
Cation Exchange Capacity						
Cation Exchange Capacity	0.05	meq/100g	-	-	-	2.8

Client Sample ID			TP09-0.0-0.1	DUP01
Sample Matrix			Soil	Soil
Eurofins Sample No.			S20-Se38601	S20-Se38602
Date Sampled			Sep 22, 2020	Sep 22, 2020
Test/Reference	LOR	Unit		
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				
TRH C6-C9	20	mg/kg	< 20	-
TRH C10-C14	20	mg/kg	< 20	-
TRH C15-C28	50	mg/kg	73	-
TRH C29-C36	50	mg/kg	71	-
TRH C10-C36 (Total)	50	mg/kg	144	-
BTEX				
Benzene	0.1	mg/kg	< 0.1	-
Toluene	0.1	mg/kg	< 0.1	-
Ethylbenzene	0.1	mg/kg	< 0.1	-
m&p-Xylenes	0.2	mg/kg	< 0.2	-
o-Xylene	0.1	mg/kg	< 0.1	-
Xylenes - Total*	0.3	mg/kg	< 0.3	-
4-Bromofluorobenzene (surr.)	1	%	76	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				
Naphthalene ^{N02}	0.5	mg/kg	< 0.5	-
TRH C6-C10	20	mg/kg	< 20	-
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	< 20	-
TRH >C10-C16	50	mg/kg	< 50	-
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	< 50	-
TRH >C16-C34	100	mg/kg	130	-
TRH >C34-C40	100	mg/kg	< 100	-
TRH >C10-C40 (total)*	100	mg/kg	130	-
Polycyclic Aromatic Hydrocarbons				
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	-
Acenaphthene	0.5	mg/kg	< 0.5	-
Acenaphthylene	0.5	mg/kg	< 0.5	-
Anthracene	0.5	mg/kg	< 0.5	-
Benz(a)anthracene	0.5	mg/kg	< 0.5	-
Benzo(a)pyrene	0.5	mg/kg	< 0.5	-
Benzo(b,j)fluoranthene ^{N07}	0.5	mg/kg	< 0.5	-
Benzo(g,h,i)perylene	0.5	mg/kg	< 0.5	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	-
Chrysene	0.5	mg/kg	< 0.5	-
Dibenz(a,h)anthracene	0.5	mg/kg	< 0.5	-
Fluoranthene	0.5	mg/kg	< 0.5	-
Fluorene	0.5	mg/kg	< 0.5	-
Indeno(1,2,3-cd)pyrene	0.5	mg/kg	< 0.5	-
Naphthalene	0.5	mg/kg	< 0.5	-

Client Sample ID			TP09-0.0-0.1	DUP01
Sample Matrix			Soil	Soil
Eurofins Sample No.			S20-Se38601	S20-Se38602
Date Sampled			Sep 22, 2020	Sep 22, 2020
Test/Reference	LOR	Unit		
Polycyclic Aromatic Hydrocarbons				
Phenanthrene	0.5	mg/kg	< 0.5	-
Pyrene	0.5	mg/kg	< 0.5	-
Total PAH*	0.5	mg/kg	< 0.5	-
2-Fluorobiphenyl (surr.)	1	%	98	-
p-Terphenyl-d14 (surr.)	1	%	139	-
Organochlorine Pesticides				
Chlordanes - Total	0.1	mg/kg	< 0.1	-
4,4'-DDD	0.05	mg/kg	< 0.05	-
4,4'-DDE	0.05	mg/kg	< 0.05	-
4,4'-DDT	0.05	mg/kg	< 0.05	-
a-BHC	0.05	mg/kg	< 0.05	-
Aldrin	0.05	mg/kg	< 0.05	-
b-BHC	0.05	mg/kg	< 0.05	-
d-BHC	0.05	mg/kg	< 0.05	-
Dieldrin	0.05	mg/kg	< 0.05	-
Endosulfan I	0.05	mg/kg	< 0.05	-
Endosulfan II	0.05	mg/kg	< 0.05	-
Endosulfan sulphate	0.05	mg/kg	< 0.05	-
Endrin	0.05	mg/kg	< 0.05	-
Endrin aldehyde	0.05	mg/kg	< 0.05	-
Endrin ketone	0.05	mg/kg	< 0.05	-
g-BHC (Lindane)	0.05	mg/kg	< 0.05	-
Heptachlor	0.05	mg/kg	< 0.05	-
Heptachlor epoxide	0.05	mg/kg	< 0.05	-
Hexachlorobenzene	0.05	mg/kg	< 0.05	-
Methoxychlor	0.2	mg/kg	< 0.2	-
Toxaphene	1	mg/kg	< 1	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.2	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.2	-
Dibutylchlorobenzene (surr.)	1	%	INT	-
Tetrachloro-m-xylene (surr.)	1	%	114	-
Heavy Metals				
Arsenic	2	mg/kg	2.4	< 2
Cadmium	0.4	mg/kg	< 0.4	< 0.4
Chromium	5	mg/kg	9.3	8.9
Copper	5	mg/kg	6.0	9.8
Lead	5	mg/kg	11	21
Mercury	0.1	mg/kg	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	< 5
Zinc	5	mg/kg	19	250
% Moisture	1	%	17	13

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Eurofins Suite B1			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Sep 23, 2020	14 Days
BTEX - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Sep 23, 2020	14 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Sep 23, 2020	14 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Sep 23, 2020	
Polycyclic Aromatic Hydrocarbons - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Sydney	Sep 23, 2020	14 Days
Organochlorine Pesticides - Method: LTM-ORG-2220 OCP & PCB in Soil and Water	Sydney	Sep 23, 2020	14 Days
Metals M8 - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Sep 23, 2020	180 Days
pH (1:5 Aqueous extract at 25°C as rec.) - Method: LTM-GEN-7090 pH in soil by ISE	Sydney	Sep 25, 2020	7 Days
% Moisture - Method: LTM-GEN-7080 Moisture	Sydney	Sep 23, 2020	14 Days
Conductivity (1:5 aqueous extract at 25°C as rec.) - Method: LTM-INO-4030 Conductivity	Sydney	Sep 25, 2020	7 Days
Cation Exchange Capacity - Method: LTM-MET-3060 Cation Exchange Capacity by bases & Exchangeable Sodium Percentage	Melbourne	Sep 29, 2020	180 Days

Company Name: Construction Sciences P/L (Seven Hills)
Address: 31 Anvil Road
Seven Hills
NSW 2147
Project Name: STAGE 2 DSI
Project ID: 5046200086

Order No.:
Report #: 745829
Phone: 1300 165 769
Fax:

Received: Sep 22, 2020 3:30 PM
Due: Sep 29, 2020
Priority: 5 Day
Contact Name: Jessica Brodie

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						Asbestos - WA guidelines	HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	Polycyclic Aromatic Hydrocarbons	Organochlorine Pesticides	Metals M8	Moisture Set	Cation Exchange Capacity	Eurofins Suite B1
Melbourne Laboratory - NATA Site # 1254 & 14271													X	
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794														
Perth Laboratory - NATA Site # 23736														
Mayfield Laboratory														
External Laboratory														
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID									
1	TP01-0.0-0.1	Sep 22, 2020		Soil	S20-Se38593	X			X	X	X	X		X
2	TP02-0.0-0.1	Sep 22, 2020		Soil	S20-Se38594	X					X	X		
3	TP03-0.0-0.1	Sep 22, 2020		Soil	S20-Se38595	X		X			X	X	X	
4	TP04-0.0-0.1	Sep 22, 2020		Soil	S20-Se38596	X			X	X	X	X		X
5	TP05-0.0-0.1	Sep 22, 2020		Soil	S20-Se38597	X					X	X		
6	TP06-0.0-0.1	Sep 22, 2020		Soil	S20-Se38598	X			X	X	X	X		X
7	TP07-0.0-0.1	Sep 22, 2020		Soil	S20-Se38599	X			X	X	X	X		X
8	TP08-0.0-0.1	Sep 22, 2020		Soil	S20-Se38600	X		X			X	X	X	
9	TP09-0.0-0.1	Sep 22, 2020		Soil	S20-Se38601	X			X	X	X	X		X

Australia

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Company Name: Construction Sciences P/L (Seven Hills)
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Project Name: STAGE 2 DSI
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Sample Detail						Asbestos - WA guidelines	HOLD	pH (1:5 Aqueous extract at 25°C as rec.)	Polycyclic Aromatic Hydrocarbons	Organochlorine Pesticides	Metals M8	Moisture Set	Cation Exchange Capacity	Eurofins Suite B1
Melbourne Laboratory - NATA Site # 1254 & 14271													X	
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794														
Perth Laboratory - NATA Site # 23736														
Mayfield Laboratory														
External Laboratory														
10	DUP01	Sep 22, 2020		Soil	S20-Se38602						X	X		
11	TRIP BLANK	Sep 22, 2020		Soil	S20-Se38603		X							
12	TRIP SPIKE	Sep 22, 2020		Soil	S20-Se38604		X							
13	TRIP SPIKE LAB	Sep 22, 2020		Soil	S20-Se38605		X							
Test Counts						9	3	2	5	5	10	10	2	5

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	ug/L: micrograms per litre
ppm: Parts per million	ppb: Parts per billion	%: Percentage
org/100mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NC	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " - " in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total*	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g,h,i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a,h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4,4'-DDD	mg/kg	< 0.05			0.05	Pass	
4,4'-DDE	mg/kg	< 0.05			0.05	Pass	
4,4'-DDT	mg/kg	< 0.05			0.05	Pass	
a-BHC	mg/kg	< 0.05			0.05	Pass	
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-BHC	mg/kg	< 0.05			0.05	Pass	
d-BHC	mg/kg	< 0.05			0.05	Pass	
Dieldrin	mg/kg	< 0.05			0.05	Pass	
Endosulfan I	mg/kg	< 0.05			0.05	Pass	
Endosulfan II	mg/kg	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-BHC (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.2			0.2	Pass	
Toxaphene	mg/kg	< 1			1	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
Method Blank							
Conductivity (1:5 aqueous extract at 25°C as rec.)	uS/cm	< 10			10	Pass	
Method Blank							
Cation Exchange Capacity							
Cation Exchange Capacity	meq/100g	< 0.05			0.05	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	87			70-130	Pass	
TRH C10-C14	%	74			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	72			70-130	Pass	
Toluene	%	99			70-130	Pass	
Ethylbenzene	%	94			70-130	Pass	
m&p-Xylenes	%	96			70-130	Pass	
o-Xylene	%	95			70-130	Pass	
Xylenes - Total*	%	96			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	101			70-130	Pass	
TRH C6-C10	%	82			70-130	Pass	
TRH >C10-C16	%	76			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	108			70-130	Pass	
Acenaphthylene	%	97			70-130	Pass	
Anthracene	%	91			70-130	Pass	
Benz(a)anthracene	%	108			70-130	Pass	
Benzo(a)pyrene	%	102			70-130	Pass	
Benzo(b&j)fluoranthene	%	93			70-130	Pass	
Benzo(g,h,i)perylene	%	110			70-130	Pass	
Benzo(k)fluoranthene	%	115			70-130	Pass	
Chrysene	%	111			70-130	Pass	
Dibenz(a,h)anthracene	%	106			70-130	Pass	

Test		Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Fluoranthene		%	97			70-130	Pass	
Fluorene		%	111			70-130	Pass	
Indeno(1.2.3-cd)pyrene		%	107			70-130	Pass	
Naphthalene		%	102			70-130	Pass	
Phenanthrene		%	105			70-130	Pass	
Pyrene		%	105			70-130	Pass	
LCS - % Recovery								
Organochlorine Pesticides								
Chlordanes - Total		%	115			70-130	Pass	
4.4'-DDD		%	126			70-130	Pass	
4.4'-DDE		%	108			70-130	Pass	
4.4'-DDT		%	94			70-130	Pass	
a-BHC		%	118			70-130	Pass	
Aldrin		%	97			70-130	Pass	
b-BHC		%	117			70-130	Pass	
d-BHC		%	115			70-130	Pass	
Dieldrin		%	126			70-130	Pass	
Endosulfan I		%	128			70-130	Pass	
Endosulfan II		%	118			70-130	Pass	
Endosulfan sulphate		%	105			70-130	Pass	
Endrin		%	93			70-130	Pass	
Endrin aldehyde		%	119			70-130	Pass	
Endrin ketone		%	116			70-130	Pass	
g-BHC (Lindane)		%	76			70-130	Pass	
Heptachlor		%	103			70-130	Pass	
Heptachlor epoxide		%	112			70-130	Pass	
Hexachlorobenzene		%	121			70-130	Pass	
Methoxychlor		%	97			70-130	Pass	
LCS - % Recovery								
Heavy Metals								
Arsenic		%	94			80-120	Pass	
Cadmium		%	97			80-120	Pass	
Chromium		%	98			80-120	Pass	
Copper		%	98			80-120	Pass	
Lead		%	100			80-120	Pass	
Mercury		%	100			80-120	Pass	
Nickel		%	98			80-120	Pass	
Zinc		%	96			80-120	Pass	
LCS - % Recovery								
Conductivity (1:5 aqueous extract at 25°C as rec.)		%	91			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1		Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery								
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1				
TRH C6-C9	S20-Se36900	NCP	%	80		70-130	Pass	
TRH C10-C14	S20-Se41382	NCP	%	82		70-130	Pass	
Spike - % Recovery								
BTEX				Result 1				
Benzene	S20-Se36900	NCP	%	89		70-130	Pass	
Toluene	S20-Se36900	NCP	%	88		70-130	Pass	
Ethylbenzene	S20-Se36900	NCP	%	86		70-130	Pass	
m&p-Xylenes	S20-Se36900	NCP	%	87		70-130	Pass	
o-Xylene	S20-Se36900	NCP	%	89		70-130	Pass	
Xylenes - Total*	S20-Se36900	NCP	%	88		70-130	Pass	
Spike - % Recovery								

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S20-Se36900	NCP	%	98			70-130	Pass	
TRH C6-C10	S20-Se36900	NCP	%	78			70-130	Pass	
TRH >C10-C16	S20-Se41382	NCP	%	82			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
4,4'-DDD	S20-Se42472	NCP	%	81			70-130	Pass	
4,4'-DDT	S20-Se42472	NCP	%	74			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S20-Se38601	CP	%	107			70-130	Pass	
Acenaphthylene	S20-Se38601	CP	%	97			70-130	Pass	
Anthracene	S20-Se38601	CP	%	102			70-130	Pass	
Benz(a)anthracene	S20-Se38601	CP	%	108			70-130	Pass	
Benzo(a)pyrene	S20-Se38601	CP	%	103			70-130	Pass	
Benzo(b&j)fluoranthene	S20-Se38601	CP	%	106			70-130	Pass	
Benzo(g,h,i)perylene	S20-Se38601	CP	%	73			70-130	Pass	
Benzo(k)fluoranthene	S20-Se38601	CP	%	105			70-130	Pass	
Chrysene	S20-Se38601	CP	%	109			70-130	Pass	
Dibenz(a,h)anthracene	S20-Se38601	CP	%	89			70-130	Pass	
Fluoranthene	S20-Se38601	CP	%	106			70-130	Pass	
Fluorene	S20-Se38601	CP	%	117			70-130	Pass	
Indeno(1,2,3-cd)pyrene	S20-Se38601	CP	%	82			70-130	Pass	
Naphthalene	S20-Se38601	CP	%	102			70-130	Pass	
Phenanthrene	S20-Se38601	CP	%	106			70-130	Pass	
Pyrene	S20-Se38601	CP	%	109			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
Chlordanes - Total	S20-Se38601	CP	%	111			70-130	Pass	
4,4'-DDE	S20-Se38601	CP	%	113			70-130	Pass	
a-BHC	S20-Se38601	CP	%	122			70-130	Pass	
Aldrin	S20-Se38601	CP	%	95			70-130	Pass	
b-BHC	S20-Se38601	CP	%	121			70-130	Pass	
d-BHC	S20-Se38601	CP	%	124			70-130	Pass	
Dieldrin	S20-Se38601	CP	%	125			70-130	Pass	
Endosulfan I	S20-Se38601	CP	%	129			70-130	Pass	
Endosulfan II	S20-Se38601	CP	%	117			70-130	Pass	
Endosulfan sulphate	S20-Se38601	CP	%	105			70-130	Pass	
Endrin	S20-Se38601	CP	%	119			70-130	Pass	
Endrin aldehyde	S20-Se38601	CP	%	109			70-130	Pass	
Endrin ketone	S20-Se38601	CP	%	111			70-130	Pass	
g-BHC (Lindane)	S20-Se38601	CP	%	87			70-130	Pass	
Heptachlor	S20-Se38601	CP	%	98			70-130	Pass	
Heptachlor epoxide	S20-Se38601	CP	%	109			70-130	Pass	
Hexachlorobenzene	S20-Se38601	CP	%	119			70-130	Pass	
Methoxychlor	S20-Se38601	CP	%	78			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S20-Se38601	CP	%	99			75-125	Pass	
Cadmium	S20-Se38601	CP	%	102			75-125	Pass	
Chromium	S20-Se38601	CP	%	96			75-125	Pass	
Copper	S20-Se38601	CP	%	94			75-125	Pass	
Lead	S20-Se38601	CP	%	96			75-125	Pass	
Mercury	S20-Se38601	CP	%	101			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Nickel	S20-Se38601	CP	%	97			75-125	Pass	
Zinc	S20-Se38601	CP	%	95			75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	N20-Se36528	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	N20-Se36528	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	N20-Se36528	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	N20-Se36528	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	N20-Se36528	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	N20-Se36528	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	N20-Se36528	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	N20-Se36528	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	N20-Se36528	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S20-Se38594	CP	%	11	13	16	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S20-Se38595	CP	uS/cm	31	28	10	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S20-Se38595	CP	pH Units	6.0	5.9	Pass	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C10-C14	S20-Se38599	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S20-Se38599	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S20-Se38599	CP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	S20-Se38599	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S20-Se38599	CP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S20-Se38599	CP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S20-Se38599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S20-Se38599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S20-Se38599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S20-Se38599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S20-Se38599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S20-Se38599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g,h,i)perylene	S20-Se38599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S20-Se38599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S20-Se38599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a,h)anthracene	S20-Se38599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S20-Se38599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S20-Se38599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1,2,3-cd)pyrene	S20-Se38599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S20-Se38599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S20-Se38599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S20-Se38599	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate								
Organochlorine Pesticides				Result 1	Result 2	RPD		
Chlordanes - Total	S20-Se38599	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
4,4'-DDD	S20-Se38599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
4,4'-DDE	S20-Se38599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
4,4'-DDT	S20-Se38599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
a-BHC	S20-Se38599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Aldrin	S20-Se38599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
b-BHC	S20-Se38599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
d-BHC	S20-Se38599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Dieldrin	S20-Se38599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endosulfan I	S20-Se38599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endosulfan II	S20-Se38599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endosulfan sulphate	S20-Se38599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endrin	S20-Se38599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endrin aldehyde	S20-Se38599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Endrin ketone	S20-Se38599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
g-BHC (Lindane)	S20-Se38599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Heptachlor	S20-Se38599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Heptachlor epoxide	S20-Se38599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Hexachlorobenzene	S20-Se38599	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Methoxychlor	S20-Se38599	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic	S20-Se38600	CP	mg/kg	< 2	< 2	<1	30%	Pass
Cadmium	S20-Se38600	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass
Chromium	S20-Se38600	CP	mg/kg	8.7	8.8	2.0	30%	Pass
Copper	S20-Se38600	CP	mg/kg	< 5	< 5	<1	30%	Pass
Lead	S20-Se38600	CP	mg/kg	9.1	9.1	1.0	30%	Pass
Mercury	S20-Se38600	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Nickel	S20-Se38600	CP	mg/kg	< 5	< 5	<1	30%	Pass
Zinc	S20-Se38600	CP	mg/kg	28	27	5.0	30%	Pass

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

Authorised By

Ursula Long	Analytical Services Manager
Andrew Sullivan	Senior Analyst-Organic (NSW)
Emily Rosenberg	Senior Analyst-Metal (VIC)
Gabriele Cordero	Senior Analyst-Inorganic (NSW)
Gabriele Cordero	Senior Analyst-Metal (NSW)
Nibha Vaidya	Senior Analyst-Asbestos (NSW)



Glenn Jackson

General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

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Project **5046200086 Stage 2 DSI**
Order Number (Not specified)
Samples 1

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SGS Reference **SE211506 R0**
Date Received 23/9/2020
Date Reported 30/9/2020

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES



Dong LIANG
 Metals/Inorganics Team Leader

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 28/9/2020

			TP01_0.0-0.1
			SOIL
			-
			22/9/2020
			SE211506.001
PARAMETER	UOM	LOR	
Arsenic, As	mg/kg	1	2
Cadmium, Cd	mg/kg	0.3	<0.3
Chromium, Cr	mg/kg	0.5	8.1
Copper, Cu	mg/kg	0.5	14
Lead, Pb	mg/kg	1	13
Nickel, Ni	mg/kg	0.5	6.4
Zinc, Zn	mg/kg	2	100



ANALYTICAL RESULTS

SE211506 R0

Mercury in Soil [AN312] Tested: 28/9/2020

			TP01_0.0-0.1
			SOIL
			-
			22/9/2020
			SE211506.001
PARAMETER	UOM	LOR	
Mercury	mg/kg	0.05	<0.05



ANALYTICAL RESULTS

SE211506 R0

Moisture Content [AN002] Tested: 28/9/2020

			TP01_0.0-0.1
			SOIL
			-
			22/9/2020
			SE211506.001
PARAMETER	UOM	LOR	
% Moisture	%w/w	1	33.0

METHOD

METHODOLOGY SUMMARY

AN002

The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.

AN040/AN320

A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.

AN040

A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.

AN312

Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
**	Indicative data, theoretical holding time exceeded.	NVL	Not validated.	LOR	Limit of Reporting.
		IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
***	Indicates that both * and ** apply.	LNR	Sample listed, but not received.		

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the "Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.

Note that in terms of units of radioactivity:

- 1 Bq is equivalent to 27 pCi
- 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

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STATEMENT OF QA/QC PERFORMANCE

SE211506 R0

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Project **5046200086 Stage 2 DSI**
Order Number (Not specified)
Samples 1

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SGS Reference **SE211506 R0**
Date Received 23 Sep 2020
Date Reported 30 Sep 2020

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document.

This QA/QC Statement must be read in conjunction with the referenced Analytical Report.

The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Matrix Spike

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

1 item

SAMPLE SUMMARY

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the

Mercury in Soil

Method: ME-(AU)-ENVJAN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP01_0.0-0.1	SE211506.001	LB210130	22 Sep 2020	23 Sep 2020	20 Oct 2020	28 Sep 2020	20 Oct 2020	29 Sep 2020

Moisture Content

Method: ME-(AU)-ENVJAN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP01_0.0-0.1	SE211506.001	LB210124	22 Sep 2020	23 Sep 2020	06 Oct 2020	28 Sep 2020	03 Oct 2020	30 Sep 2020

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-ENVJAN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
TP01_0.0-0.1	SE211506.001	LB210127	22 Sep 2020	23 Sep 2020	21 Mar 2021	28 Sep 2020	21 Mar 2021	30 Sep 2020

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No surrogates were required for this job.

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result
LB210130.001	Mercury	mg/kg	0.05	<0.05

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result
LB210127.001	Arsenic, As	mg/kg	1	<1
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.5	<0.5
	Copper, Cu	mg/kg	0.5	<0.5
	Nickel, Ni	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Zinc, Zn	mg/kg	2	<2.0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: $RPD = | \text{OriginalResult} - \text{ReplicateResult} | \times 100 / \text{Mean}$

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: $MAD = 100 \times \text{SDL} / \text{Mean} + \text{LR}$

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Moisture Content

Method: ME-(AU)-(ENV)AN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE211670.003	LB210124.011	% Moisture	%w/w	1	5.03388189734.3336058871		51	15
SE211677.001	LB210124.016	% Moisture	%w/w	1	12.92442497282.5939849624		38	3

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-(ENV)AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE211630.001	LB210127.020	Zinc, Zn	mg/kg	2	7.11615504787.5715943597		57	6
SE211641.003	LB210127.014	Arsenic, As	mg/kg	1	2.42954351532.5124176179		70	3
		Cadmium, Cd	mg/kg	0.3	0.03056029570.0700026479		200	0
		Chromium, Cr	mg/kg	0.5	8.08145193406.8616143933		37	16
		Copper, Cu	mg/kg	0.5	33.52639078497.3705749087		31	11
		Nickel, Ni	mg/kg	0.5	16.58856513088.4671501706		33	11
		Lead, Pb	mg/kg	1	14.21883248004.1748587736		37	0
		Zinc, Zn	mg/kg	2	37.33944254830.1033879604		35	7

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-(ENV)QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-(ENV)AN312

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB210130.002	Mercury	mg/kg	0.05	0.23	0.2	70 - 130	115

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-(ENV)AN040-AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB210127.002	Arsenic, As	mg/kg	1	330	318.22	80 - 120	103
	Cadmium, Cd	mg/kg	0.3	4.9	5.41	80 - 120	90
	Chromium, Cr	mg/kg	0.5	39	38.31	80 - 120	102
	Copper, Cu	mg/kg	0.5	300	290	80 - 120	105
	Nickel, Ni	mg/kg	0.5	190	187	80 - 120	102
	Lead, Pb	mg/kg	1	95	89.9	80 - 120	106
	Zinc, Zn	mg/kg	2	280	273	80 - 120	103

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE211671.001	LB210130.004	Mercury	mg/kg	0.05	0.23	<0.05	0.2	101

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE211671.001	LB210127.004	Arsenic, As	mg/kg	1	50	6	50	89
		Cadmium, Cd	mg/kg	0.3	40	<0.3	50	80
		Chromium, Cr	mg/kg	0.5	62	19	50	86
		Copper, Cu	mg/kg	0.5	54	11	50	85
		Nickel, Ni	mg/kg	0.5	50	7.3	50	85
		Lead, Pb	mg/kg	1	63	22	50	83
		Zinc, Zn	mg/kg	2	69	36	50	66 @

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: $RPD = | \text{OriginalResult} - \text{ReplicateResult} | \times 100 / \text{Mean}$

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: $MAD = 100 \times \text{SDL} / \text{Mean} + \text{LR}$

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here : https://www.sgs.com.au/~media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022_QA_QC_Plan.pdf

- * NATA accreditation does not cover the performance of this service.
- ** Indicative data, theoretical holding time exceeded.
- *** Indicates that both * and ** apply.
- Sample not analysed for this analyte.
- IS Insufficient sample for analysis.
- LNR Sample listed, but not received.
- LOR Limit of reporting.
- QFH QC result is above the upper tolerance.
- QFL QC result is below the lower tolerance.
- ① At least 2 of 3 surrogates are within acceptance criteria.
- ② RPD failed acceptance criteria due to sample heterogeneity.
- ③ Results less than 5 times LOR preclude acceptance criteria for RPD.
- ④ Recovery failed acceptance criteria due to matrix interference.
- ⑤ Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
- ⑥ LOR was raised due to sample matrix interference.
- ⑦ LOR was raised due to dilution of significantly high concentration of analyte in sample.
- ⑧ Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
- ⑨ Recovery failed acceptance criteria due to sample heterogeneity.
- ⑩ LOR was raised due to high conductivity of the sample (required dilution).
- † Refer to relevant report comments for further information.

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This test report shall not be reproduced, except in full.

Eurofins | mol ABN 50 005 045 521

Melbourne Laboratory
 5 Manley Road Dandenong South VIC 3175
 03 8564 5000 EnviroSample.Vic@auonline.com



Received by: George Zhi
23/9/20 @ 2:15 pm

Received. 22/09/20 3.30 PM
2A, 9'C
745829

#AU04_Enviro_Sample_NSW

To: Ursula Long
Subject: RE: Samples delivered today

From: Ursula Long <UrsulaLong@eurofins.com>
Sent: Wednesday, 23 September 2020 12:02 PM
To: #AU04_Enviro_Sample_NSW <EnviroSampleNSW@eurofins.com>; #AU04_COCNSW <COCNSW@Eurofins.com>
Subject: FW: Samples delivered today
Importance: High

For Construction Sciences COC just sent through, please split sample TP01-0.0-0.1 into a new jar to send to SGS as triplicate for M8 with copy of COC & below email

Kind regards,

Ursula Long
Analytical Services Manager

Eurofins | Environment Testing
Unit F3, Parkview Building
16 Mars Road
LANE COVE WEST NSW 2066
AUSTRALIA
Phone : +61 2 9900 8420
Mobile: +61 428 845 495

Email : UrsulaLong@eurofins.com
Website: www.eurofins.com.au/environmental-testing

From: Jessica Brodie <jessica.brodie@constructionsciences.net>
Sent: Wednesday, 23 September 2020 11:49 AM
To: Ursula Long <UrsulaLong@eurofins.com>
Subject: RE: Samples delivered today

EXTERNAL EMAIL*

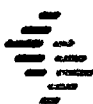
Hi Ursula,

I have realised that I forgot to take a dup and a trip.

To remedy this, would you mind halving TP01-0.0-0.1 and sending a half to SGS as a triplicate for Metals (8)?

Let me know if this can be done, thanks!

Jessica Brodie
Graduate Environmental Scientist
CONSTRUCTION SCIENCES

 **Construction
Sciences**

Phone 1300 165 769
Address 31 Anvil Road, Seven Hills, NSW 2147



SAMPLE RECEIPT ADVICE

SE211506

CLIENT DETAILS

Contact Jessica Brodie
Client CONSTRUCTION SCIENCES PTY LTD
Address 31 ANVIL ROAD
SEVEN HILLS NSW 2147

Telephone 0436 620 611
Facsimile 02 8438 0310
Email jessica.brodie@constructionsociences.net

Project **5046200086 Stage 2 DSI**
Order Number (Not specified)
Samples 1

LABORATORY DETAILS

Manager Huong Crawford
Laboratory SGS Alexandria Environmental
Address Unit 16, 33 Maddox St
Alexandria NSW 2015

Telephone +61 2 8594 0400
Facsimile +61 2 8594 0499
Email au.environmental.sydney@sgs.com

Samples Received Wed 23/9/2020
Report Due Wed 30/9/2020
SGS Reference **SE211506**

SUBMISSION DETAILS

This is to confirm that 1 sample was received on Wednesday 23/9/2020. Results are expected to be ready by COB Wednesday 30/9/2020. Please quote SGS reference SE211506 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provided	Client	Sample cooling method	None
Samples received in correct containers	Yes	Sample counts by matrix	1 Soil
Date documentation received	23/9/2020	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	18°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

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SAMPLE RECEIPT ADVICE

SE211506

CLIENT DETAILS

Client **CONSTRUCTION SCIENCES PTY LTD**

Project **5046200086 Stage 2 DSI**

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury in Soil	Moisture Content	Total Recoverable Elements in Soil/Waste
001	TP01_0.0-0.1	1	1	7

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

1 Bibbenluke Avenue,
Duffys Forest, NSW

APPENDIX

F

METEOROLOGICAL
DATA

Climate statistics for Australian locations

Monthly climate statistics

All years of record

[About Climate statistics](#) | [Data file of statistics for this site \(csv\)](#) | [Site selection menu](#)

Summary statistics TERREY HILLS AWS

A summary of the major climate statistics recorded at this site is provided below. There is also an extended table with more statistics available. More [detailed data for individual sites](#) is available.

Site information

Site name: TERREY HILLS AWS
Site number: 066059
Latitude: 33.69 °S Longitude: 151.23 °E
Elevation: 199 m
Commenced: 2004 Status: Open
Latest available data: 25 Jun 2020

Additional information

Additional site information

Nearest alternative sites

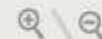
- 066035 MANLY TOWN HALL (13.9km)
- 066156 MACQUARIE PARK (WILLANDRA VILLAGE) (14.3km)
- 066047 PENNANT HILLS (YARRARA ROAD) (14.4km)



View: ☒ Main statistics ☐ All available



Period: 30 year period not available



Text size: ☒ Normal ☐ Large

Statistics		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years	Plot	Map	
Temperature																		
Mean maximum temperature (°C)		27.0	26.0	24.7	22.4	19.5	16.4	16.3	17.8	20.7	22.7	24.1	25.7	21.9	16	2004 2020		
Mean minimum temperature (°C)		18.5	18.2	16.9	14.0	10.7	8.9	7.7	8.3	11.1	13.2	15.3	16.7	13.3	16	2004 2020		
Rainfall																		
Mean rainfall (mm)		94.1	125.6	148.1	106.3	48.1	142.9	53.1	56.3	61.5	79.0	97.7	78.9	1077.1	11	2004 2020		
Decile 5 (median) rainfall (mm)		71.4	114.4	128.6	70.6	27.6	120.4	42.0	36.2	49.0	58.2	75.6	74.6	998.0	15	2004 2020		
Mean number of days of rain ≥ 1 mm		9.1	9.1	10.7	7.6	5.2	10.3	5.8	5.1	5.7	7.5	8.4	7.9	92.4	15	2004 2020		
Other daily elements																		
Mean daily sunshine (hours)																		
Mean number of clear days																		
Mean number of cloudy days																		
9 am conditions																		
Mean 9am temperature (°C)															6	2004		

Contact

31 Anvil Road
Seven Hills NSW 2147

Telephone: +612 8646 2000
Facsimile: +612 8646 2025

www.constructionsciences.net