STATEMENT OF ENVIRONMENTAL EFFECTS

Chisholm Chapel

Development of a new School Chapel facility for existing Primary School and High School use in Chisholm, NSW

REVISION 01

PROJECT NO. 3655

November 2021

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SUMMARY OF REVISIONS

Revision	By	Review	Date	Comment
A	JW	EB	26.11.21	First issue

Checked By: EB

Author: JW

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QMS Template: 610.01 Rev 10 [Mar 2016]

Contents

Introduction

SHAC Pty Ltd have been engaged by the Catholic Diocese of Maitland Newcastle (CDMN) to prepare a Statement of Environmental Effects (SEE) and design for the new proposed chapel building on the site of St Aloysius and St Bede's schools at 24 Heritage Drive, Chisholm (the site).

The SEE has been prepared in coordination with CDMN to demonstrate the environmental impacts associated with the proposed chapel building. The SEE examines the existing development onsite and the sites' location, how the proposed development relates to the location and the environment, as well as the planning merits of the development with respect to relevant legislation, regulation, and other requirements.

The SEE seeks to provide all the relevant data to give a suitable level of certainty to the consent authority that the proposal has a positive impact on the immediate area, the wider surrounds, but particularly the staff and students of both St Aloysius and St Bede's schools.

PROJECT OVERVIEW

This Statement of Environmental Effects forms part of a Development Application for a new construction of a School Chapel for use by St Aloysius Catholic Primary School and St Bede's Catholic College in Chisholm, NSW, and should be read in conjunction with the following documents. Please note that the chapel will not have a dedicated parish but is a liturgical place of worship for the two schools. A letter stating this intent is included as Appendix A of this report.

a) Architectural drawings noted as DA1001, DA1002, DA1003, DA2001, DA3001, DA3002, DA4101, DA4102, DA4201, DA9001, DA9002, DA9003 & DA9004 prepared by SHAC (14 pages total).
b) Civil drawings noted as DA-05-C01, DA-05-C02, DA-05-C03, DA-05-C04, DA-05-C05 (5 pages total) prepared by Northrop Consulting Engineers.
c) Landscape drawings noted as 12717.5-DA-L00, 12717.5-DA-L01, 12717.5-DA-L02 to 12717.5-DA-L03 (4 pages total) prepared by Terras Landscape Architects.

Site Details

Address of Development Site

24 Heritage Drive
Chisholm NSW 2322

Real Property Address

Lot 2, DP 1247459

Site Area

81,740m^2 (8.174ha) entire site area (including area occupied by St Aloysius Primary School, St Bede's Catholic College & St Nicholas Early Learning Centre)

Applicant Details

Applicant

SHAC Pty Ltd
224 Maitland Road
Islington NSW 2296
Attention: Elizabeth Brown
Phone: 02 4961 5888
Email: elizabeth@shac.com.au

Owners

Trustees of the Roman Catholic Church for the Diocese of Maitland Newcastle
984 Hunter St
Newcastle West NSW 2300
Attention: John Tobin
Phone: 02 4979 1243
Email: john.tobin@mn.catholic.edu.au

Planning Instruments & Statutory Controls

The design and planning of the chapel space detailed within this submission has been undertaken with reference to the following documents (current at the date of submission). Please note that both the existing PS and HS have standing DA approvals associated with their operation. The High School site is underway with the final two stages of their construction, associated with Maitland City Council Approval DA16-1592. This approved DA did note the proposed location of a chapel space, but no further details were included.

State Environmental Planning Policies (SEPP)

The following State Environmental Planning Policies (SEPPs) apply to the site and the proposed development. Note SEPPs which are not applicable (e.g. manufactured home estates) have not been listed.

- State Environmental Planning Policy No 55 – Remediation of Land
  This SEPP addresses the remediation of contaminated land for the purpose of reducing risk of harm to humans or the environment.
  Clause 7 of SEPP 55 requires a consent authority to consider whether the land to which a development application relates is contaminated and if the land is contaminated to be satisfied that the land is suitable in its contaminated state, or will be suitable after remediation, prior to granting consent.
  SHAC Response: A number of contamination studies have been undertaken on the site over the past 8 years of Catholic Diocese ownership. The latest, which addressed the proposed site of the chapel in particular was completed in August 2021 by Hunter Civilab. Based on the desktop study and limited intrusive sampling conducted on the Site, no indication of gross contamination has been identified which would constrain the development of the Site for its proposed development.

- State Environmental Planning Policy No 64 – Adversity & Signage
  This SEPP aims to ensure that advertising signage is compatible with the desired amenity and visual character of an area, to provide effective communication in suitable locations and to ensure signage is of high-quality design and finish.
  Clause 8 of SEPP 64 requires that a consent authority must not grant development consent to a proposal unless it is satisfied it is consistent with the objectives set out in Clause 3(1)(a) and the assessment criteria outlined in Schedule 1 of the Policy.
  SHAC Response: The signage proposed for the chapel is associated with the built form only and includes subtle references to the liturgical nature of the building with crucifix forms set as reliefs in the building. There is no dedicated building identification signage proposed facing the main street or at the boundary of the site, other than the existing school signage. The proposed signage is of a high quality of design and finish, is low key and in scale with the proposed building, does not affect adversely the surrounding area, nor the safety of cyclists, drivers or pedestrians, will not affect views of vistas, it is appropriate to the function of the site and any lighting associated will be in accordance with AS4282.

- State Environmental Planning Policy (Education Establishments and Child Care Facilities) 2017
  The SEPP has provisions that will make it easier for child-care providers, schools, TAFEs and Universities to build new facilities and improve existing ones by streamlining approval processes and consistency of development requirements and improve information about all national and state requirements for new child care services.
  SHAC Response: The Proposal will comply with the SEPP.

- State Environmental Planning Policy (Koala Habitat Protection) 2019
  This SEPP encourages the conservation and management of koala habitat to ensure populations remain in their present range and the trend of population decline is reversed. The SEPP replaces the previous State Environmental Planning Policy No 44 - Koala Habitat Protection.
  SHAC Response: The proposal site is larger than 1hectare and therefore this act applies, although the chapel site itself does not have any existing tree vegetation that needs to be removed for the development. Previous arborist reports have been undertaken on the limited vegetation on both the primary school and high school site, without any loss of koala habitat being considered.

- State Environmental Planning Policy (State and Regional Development)
  The SEPP aims to identify development and infrastructure that is State significant and Regionally significant It identifies that all new schools, and/or alterations and additions for a new school with a value of more than $20 million is State Significant Development (SSD), and that development of child care centres and educational establishments with a value of more than $5 million is regionally significant development.
  Under the Clause 4.5 of the Act a regional planning panel is the consent authority for regionally significant development, and the independent planning commissions is the consent authority for State significant development.
  SHAC Response: The proposed development subject to development applications is less than $5 million in value, and therefore this SEPP does not impact the development approval process.

- State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017
  The Vegetation SEPP applies to clearing of:
  a) native vegetation above the Biodiversity Offset Scheme (BOS) threshold where a proponent will require an approval from the Native Vegetation Panel established under the Local Land Services Amendment Act 2016; and
  b) vegetation below the BOS threshold where a proponent will require a permit from Council if that vegetation is identified in the council's development control plan (DCP).
  The Vegetation SEPP applies to the Sydney and Newcastle metropolitan areas, and to all other land in NSW that is zoned for urban purposes or for environmental conservation/ management under the Standard Instrument – Principal Environmental Plan. The Site is zoned for urban purposes.
  SHAC Response: There is no proposed clearing of vegetation with this proposal, and therefore this SEPP does not impact the development approval process.
- State Environmental Planning Policy (State and Regional Development) 2011
  The aims of this Policy are:
  a) to identify development that is State significant development.
  b) to identify development that is State significant infrastructure and critical State significant infrastructure, and
  c) to confer functions on joint regional planning panels to determine development applications.
  SHAC Response: Not applicable the proposed development is not of a class or description included in Schedule 4A to the Act and therefore the development consent function remains with Council.

Maitland Local Environmental Plan 2011

The Maitland LEP identifies the land as being within the R1 – General Residential zone and located within the Thornton North Urban Release Area. The objective of the zone is:

- To provide for the housing needs of the community.
- To provide for a variety of housing types and densities.
- To enable other land uses that provide facilities or services to meet the day to day needs of residents.

The proposed development is within the existing school site of St Bede's Catholic College and St Aloysius Catholic Primary School and is defined as a Place of Worship, which is permissible with consent in the R1 zone.

Map data obtained through Maitland City Council LEP mapping (Map 006A) identifies the site as:

- Having a 450sqm minimum lot size limit
- Having no maximum height
- Having no maximum floor space ratio
- Not affected by land acquisition
- Not located in a Heritage Conservation Area or contains a Heritage Item
- Class 5 acid sulphate soils
- Not affected by flood prone land
- Is identified within the Bushfire Hazard maps as Vegetation Buffer

Clause 7.1 – Acid Sulphate Soils

With Acid Sulphate Soils classification notes Class 5 as areas 'within 500m of adjacent 1, 2, 3 or 4 land that is between 5m AHD and by which the water table is likely to be lowered below 1m AHD on adjacent 1, 2, 3 or 4 land. No works of this nature are proposed and the completed geotechnical report on the site does not list any concerns with Acid Sulphate Soil. This report is included in Appendix C of the SEE.

Clause 7.2 – Earthworks

The objective of this clause is to ensure that earthworks for which development consent is required will not has a detrimental impact on environmental functions and processes, neighbouring uses, cultural heritage items of features of the surrounding land, and to allow earthworks of a minor nature without requiring separate development consent. Please refer to provided civil engineer drawings by Northrop Engineers, which addresses this requirement.

Maitland Development Control Plan 2011

The Maitland Development Control Plan 2011 provides guidelines for development within the Maitland LGA in conjunction with the Maitland LEP 2011 as stated above. Of direct influence from the DCP on the proposed site is Part F – Urban Release Areas – F.7 – Thornton North Urban Release Area.

Ref	DCP Section	Status
A.1-6	ADMINISTRATION	Noted
B.1	Introduction	Noted
B.2	Domestic Stormwater Management	N/A
B.3	Hunter River Floodplain Management	N/A
B.4	On-site Sewage Management Systems	N/A
B.5	Tree Management	Refer following section
B.6	Waste Not – Site Waste Minimisation & Management	Refer following section
B.7	Riparian land and Waterways	N/A
C.1	Accessible Living	Refer following section
C.2	Child Care Centres	N/A
C.3	Exhibition Homes & Villages	N/A
C.4	Heritage Conservation	N/A
C.5	Industrial Land	N/A
C.6	Outdoor advertising	N/A
C.7	Outdoor Dining	N/A

C.8	Residential Design	N/A
C.9	Sex Services Premises & Restricted Premises	N/A
C.10	Subdivision	N/A
C.11	Vehicular Access & Parking	Refer following section
C.12	Crime Prevention Through Environmental Design (CPTED)	Refer following section
D.1-11	LOCALITY PLANS	N/A
E.1-3	SPECIAL PRECINCTS	N/A
F.1	General Requirements	Noted
F.2	Residential Urban Release Areas	Noted
F.3	Aberglasslyn	N/A
F.4	Anambah Employment Area	N/A
F.5	Gillieston Heights	N/A
F.6	Largs	N/A
F.7	Thornton North	Refer following section
F.8	Anambah Road	N/A
F.9	Lochinvar	N/A
F.10	Louth Park	N/A
F.11	Farley	N/A

Site Suitability

The subject site within 24 Heritage Drive is located within a growing residential suburb of Chisholm. Already existing on the site are two schools, St Bede's Catholic College and St Aloysius Catholic Primary School, with a direct catchment to the developing residential area as well as the greater Maitland LGA surrounds. Also included on the site is an early child care centre also administered by the Catholic Diocese of Maitland Newcastle.

Image courtesy of Nearmaps – edited by SHAC

As stated above, the site is currently developed with two schools and an early learning centre. From this section onwards, unless noted otherwise, this SEE will report of the area of the site that is to be dedicated to the Chapel facility only.

Image courtesy of Nearmaps – edited by SHAC

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The area of site proposed for the development of Chisholm Chapel is currently an undeveloped portion of land between the two existing schools. The proposed development includes the new construction of a single-storey chapel building and associated landscape & gardens for use by students and staff of St Bede's Catholic College and St Aloysius Catholic Primary School. The chapel will include a narthex (entry), sanctuary with altar, ambo and chair, sacristy, vestry, store and an accessible WC and cleaner's room. A small mezzanine is also provided within the space. The large open floor plate provides a capacity for 200 seats.

The subject site is generally rectangular in shape with a large 240m street frontage to Heritage Drive along St Bede's Catholic College, and an additional 140m street frontage continues along Heritage Drive in front of St Aloysius Catholic Primary School. The views from the subject site to the west include the surrounding residential area and distant views to mountain ranges. The site rises from Heritage Drive up towards the north and east to future residential lots behind.

Sewer, water, electricity, and telecommunications are already provided to the site to both school campuses.

The site sits within a Class 5 Acid Sulphate Soils area.

The site is not located within a Mine Subsidence District. The closest area of mine subsidence is the East Maitland area and is located surrounding the suburb of Ashtonfield. It is therefore unlikely that the site or the project will be affected by mines issues.

Present & Previous Uses

Prior to the establishment of the subdivision of land at Waterford County, the site was occupied by turkey farms. The site consisted of undulating pasture with a small number of trees, sloping to the west towards Four Mile Creek. Any previous structures from the farming uses, have since been removed from the subject site, however, there may therefore be the possibility of buried waste on the projects proposed site. There may also be the possibility that the site contains areas used as burial pits (turkey carcasses).

A geotechnical investigation was undertaken prior to the development of St Bede's Catholic College in 2003, however a new geotechnical report was undertaken for the specific site location of the proposed Chapel. The summary of the site findings are as follows:

The report was completed by Hunter Civilab under the request of the Catholic Schools Office, dated 1st October 2021. The purpose of the report was to provide recommendations on surface and sub-surface conditions, site classification and detailed construction considerations. The report consisted of a desktop study, a visual site assessment, and intrusive excavations and testing.

> *The desktop study indicated that the site lies within an area of no known occurrence of acid sulphate soils however a high probability zone lies immediately to the northwest, southwest of the site.*
>
> *The desktop study also indicated that the site does not lie within a mine subsidence district.*
>
> *The site gradually slopes towards the southwest boundary.*
>
> *The subsurface profile generally consisted of up to 1.5m of varying fill, overlying sandy clay residual soils.*
>
> *A site classification was undertaken based on the laboratory testing results and the subsurface profile encountered at the time of investigation. The results indicated a Class P site with a reactivity of Class H1, having a characteristic free surface movement of 40-60 mm. Therefore, a site classification of Class P-H1 is recommended for the site.*
>
> *The site would be suitable for the use of deep footings.*

The full report can be accessed in Appendix C in this report.

Operational Details

As mentioned in the previous sections, this SEE and the accompanying Development Application relates to the approval of a new Chapel facility for use by both St Bede's Catholic College and St Aloysius Catholic Primary School, located in the central portion of the site between both schools.

At its full capacity, St Bede's Catholic College will have 1,200 students and 120 staff, and St Aloysius will have 630 students and 42 staff. The schools generally operate from 8am-4pm Monday to Friday, with some extended hours of operation when the school sits host community events during weeknights and weekend activities. It is not intended that the proposed Chapel will be open to the general public outside of approved school operation times. The chapel proposal also does not increase the capacity of either school site.

There is no additional plant or machinery proposed with this development, with the waste management of the building included within the current St Bede's High School operations. It is also not proposed for any hazardous materials to be stored within the building.

Architectural Design Principles

Our team's interpretation and vision is a sensitive yet exciting new addition to the Catholic School's campus in Chisholm, for use by staff and students in conjunction with their faithful journey in education. Continuing the key ordering principles from St Bede's Catholic College, the following points translated this vision into the built environment. By incorporating these principles into our design methodology and approach, they become markers by which we can test and measure our outcomes.

CONNECTIVITY

- Establish links between Primary School and High School students in a communal location.
- Central communal landscaping and playground areas – representing town squares within the village.

REGIONAL VALUES

- Ensuring the proposed development embodies the values of its context, people, and place.

FLEXIBILITY

- Variety of interior and exterior spaces for gathering and worship.
- Mezzanine space for smaller group sessions.

ADAPTABILITY

- Large, open volume with no obscuring structure allows for a range of furniture layouts depending on the size and type of session.

EFFICIENCY

- Economies of scale – similar materiality to adjoining buildings from both schools.

SUSTAINABILITY

- Harness the natural energy, light, shade, breezes, and landscape of the existing site.
- Utilising sustainable materials in major construction elements.
- Utilising natural site features, orientation, solar access, views and topography.

MATERIALITY & DESIGN

- The building is proposed to be constructed with limestone rammed earth walls to the chapel building.
- The surrounding landscape utilises sandstone retaining walls, which are used on both the primary school and high school site.
- The chapel is circular in floor plan to reflect the unique nature of the building in this environment. It stands alone with an importance and status for the two schools.

Building Parameters

Building Envelope & Height

Maitland City Council LEP does not specify any building height limits in the near vicinity of the subject site. In relation to the buildings surrounding the proposed Chapel, the development will be well under the heights achieved by the adjacent school buildings. The chapel building is 8m tall at its highest point. The tallest development on the site will be the campanile structure which will rise 12m above existing ground levels located to the east of the proposed chapel site. The additional 4m height, as opposed to the chapel building, allows for the structure to be visible above the building, from Heritage Drive. The intention of this structure is to signify the importance of the chapel building on the site, as a reflection of the religious nature of the sites use.

Building Setbacks

The proposed development is to be behind the existing building line, maintaining the rhythm of the street and its built form. The chapel building will be over 85m from the Heritage Drive boundary.

Given that Maitland City Council does not list specific requirements regarding building height or setbacks within an educational facility, as part of the subdivision development, the proposed Chapel facility has followed the existing approved alignments for the high school and primary school to limit the impact associated with the development on the surrounding residential lots.

Vehicle Access & Traffic

As the proposed development is intended to be used by staff and students at St Bede's Catholic College and St Aloysius Catholic Primary School during regular school hours, there are no expected changes to access or parking.

Prior to the occupation of the Chapel building, the complete proposed carpark for St Bede's Catholic College will be completed, allowing for access by chapel users in accordance with the provided carpark spaces. This includes the external roadworks to Heritage Drive, which includes concrete medians to heritage drive which establishes both the high school and primary school entries as left in and left out only.

As there is no expected increase in the approved capacities of both the Primary School and High School, not additional traffic impact reports have been undertaken.

Accessible parking along a new kiss & drop loop between the primary school and high school has been provided to the immediate west of the Chapel, as well as accessible ramps to all built areas.

Privacy, Views & Overshadowing

Visual Privacy

As previously stated, the proposed works are substantially setback from adjoining neighbours. The overall setback allows for the visual privacy of both the occupants of the high school and the neighbouring residences to be deemed as 'considered'.

Due to the centralised location of the proposed development, the western elevation of the Chapel will be the only visually accessible elevation, approximately 85m from the western boundary. As stated earlier, the scale and materiality of the proposed building is sensitive to its immediate surroundings, therefore reducing any significant visual impact to the street frontage.

The proposed 12m campanile located to the north-east of the main Chapel building is to be designed to diminish as it rises, and significant tree planting surrounding has been intended to reduce its visual impact from Heritage Drive and adjacent residential viewpoints, without losing the fact that the structure is designed to make an impact.

Acoustic Privacy

The combination of the materiality and location of the proposed development being adjacent an existing playground area has been selected to minimise the overall acoustic impacts from the Chapel.

Due to the natural of the functions being held in the Chapel, the noise levels are not likely to be significantly above normal noise levels of an operational school. As stated previously, the 90m setback from Heritage Drive and proposed landscaping also reduces the amount of noise toward the main residential neighbours.

Views

The proposed works will have a negligible impact on views from adjoining or nearby properties given the natural fall of the existing site and the design parameters utilised in the above section, maintaining the views and visual privacy of neighbours.

Overshadowing

The proposed development will affect the existing overshadowing conditions of the subject site which is currently unoccupied. There is to be no impact to adjoining neighbours outside of the school boundaries, however some overshadowing will occur on the existing primary school playground east of the existing kiss & drop road.

Lighting

Due to the use of the proposed development limited during school operational hours, external lighting will be installed in accordance with standard practice, and in keeping with adjacent building security lighting levels.

Signage

Wayfinding and arrival signage to be included in proximity to the proposed Chapel, in keeping with existing school signage and overall aesthetic of proposed development.

Statutory signage to be provided where necessary in accordance with Australian Standards.

Air & Noise

The proposed chapel will not produce any undue air or noise pollution, outside of normal operational use.

Noise during construction will be minimised wherever possible and hours of construction will comply with Council's requirements.

Flooding and Drainage

The Site is located above Council's Flood Planning Level.

In relation to local flooding, the Site is not located on or near a watercourse. The Site generally slopes downwards to the southwest towards the intersection of Heritage Drive and Longtail Street. The proposed chapel building and site will be incorporated into the civil solution proposed for Stage 4 of the high school site, including the collection of roof water. This rainwater is being used as grey water for toilet and amenity use, as well as landscape irrigation.

Geotechnical Information

Soil

A geotechnical investigation has been carried out on the site and found that the subject property has indicated that the clay soils onsite are moderately reactive.

The structural design and Construction Certificate documentation for the proposed chapel building will be executed by a qualified structural engineer in conjunction in accordance with the included reports findings.

A full copy of the report undertaken by Hunter Civilab is included in this report as Appendix C.

Erosion & Sediment Control

A qualified civil engineer has been engaged to undertake design and documentation works associated with the Chisholm Chapel project. Please refer to included civil documentation by Northrop Consulting Engineers.

Flora, Fauna & Landscape Concept

The subject site is not listed within an area of flora & fauna management. The subject site had previously been cleared for farm pastures and currently a swale is present in the location of the proposed development. Following the completion of Stage 4 works at St Bede's Catholic College, the swale is proposed to be removed during the construction of the Chapel.

No existing trees are present on the subject site.

The proposed project includes consultation with landscape architects, Terras Landscape Architects. Terras have been involved with the design and execution of the Stage 2, 3 & 4 works to St Bede's Catholic College adjacent so any proposed landscape design will take into consideration the overall design intent of the schools' site in its entirety.

Refer to included site plan nominating landscaped areas and concept design included in the DA application, in conjunction with landscape design and documentation from Terras Landscape Architects attached in this submission.

Bushfire Threat Assessment

The chapel building is considered to be an 'infill' development on the already approved sites of the Primary School and High School. The whole site is mapped as bushfire prone. The site mapping has not been updated since the establishment of the first Stage of the Chisholm suburb subdivision and development. The most significant change since this time is the establishment and clearing of land to the east of our subject site, for the construction of Settlers Boulevarde. This is the source of the vegetation which creates the vegetation

buffer on our site. The chapel building has been designed in accordance with the same requirements as the high school development, despite the possible reduction in fire source proximity.

As an educational facility, the project is also listed as a special fire protection purpose under the NSW Rural Fires Act 1997.

A Bushfire Assessment Report was undertaken with the St Bede's development by Newcastle Bushfire Consulting and is included as Appendix D of this SEE. The conclusion and recommendations of the report are as follows:

Based upon an assessment of the plans and information received for the proposal, it is recommended that development consent be granted subject to the following conditions:

1. *The proposed building works shall comply with the Building Code of Australia 2015 Structural Fire provisions.*
2. *At the commencement of building works and in perpetuity the entire property shall be managed as an inner protection area (IPA) as outlined within section 4.1.3 and Appendix 5 of Planning for Bush Fire Protection 2006 and the NSW Rural Fire Service's document Standards for asset protection zones.*
3. *Water, electricity and gas are to comply with section 4.2.7 of Planning for Bush Fire Protection 2006.*
4. *The property access is to comply with section 4.2.7 of Planning for Bush Fire Protection 2006.*
5. *Landscaping is to be undertaken in accordance with Appendix 5 of Planning for Bushfire Protection 2006 and managed and maintained in perpetuity.*
6. *The facility shall have an emergency management plan developed in accordance with AS 3745-2002 'Emergency control organisation and procedures for buildings, structures and workplaces'.*

Acoustic assessment

Councils Pre-lodgement minutes state that a detailed acoustic report is required. This advice is being finalised now which may result in the below measures being amended slightly.

The areas of the Proposal requiring low ambient noise levels are located away from other noise generators, such as the road, and/or have acoustic treatments to ensure students and staff are not exposed to excessive noise. The existing school buildings will also work as a buffer for the chapel to surrounding neighbours.

The chapel space will be exposed to the north, east and south by the existing schools. Given the use of the chapel by these two schools the impact is not seen as being adversely affected by its location onsite. The car park of the Chapel is located adjacent to the western boundary of the school, as it will be a reuse of the existing carparks onsite.

Construction phase hours of operation, type of equipment, and predicted noise levels will be provided in a Construction Site Management Plan with the Construction Certificate documentation.

Subject to the acoustic treatments discussed above, it is considered that the operations of the chapel will have a minimal impact on the adjacent uses and vice versa.

Access

The Proposal will comply with the provisions of this Section, including but not limited to:

- Section objectives
- Planning Principles
- AS1428.1 General Requirements.
- Car parking provision and dimensions
- Ramps and Walkways
- Building design, e.g. doorway widths, disabled toilet
- Building fitout, handrails
- Signage

CPTED

According to the Educational Facilities Standards and Guidelines (EFSG) "major problems affecting schools, with enormous cost, are arson, theft and vandalism. The impact of these activities is not only measured in financial terms but also in the effect on student learning outcomes, interruptions to operations and emotional trauma experienced by student, teachers and parents."

The security risk for all projects must be minimised, as such the proposed Chapel building will follow these principles.

Crime Prevention Through Environmental Design (CPTED) guidelines have been outlined by the Crime Prevention & the Assessment of Development Application report published in 2001 by the former Department of Urban Affairs & Planning, (now the Department of Planning, Industry and Environment)

CPTED seeks to influence the design of buildings & places to:

- increase the perception of risk to criminals by increasing the possibility of detection, challenge & capture.
- increase the effort required to commit crime by increasing the time, energy, or resources which need to be expended.
- reduce the potential rewards of crime by minimising, removing or concealing 'crime benefits'.
- remove conditions that create confusion about required norms of behaviour.

The four principles of CPTED are:

- surveillance
- access control
- territorial reinforcement
- space management

Surveillance

As well as deterring crime, surveillance is important for ensuring the safety of the students. Natural & technical surveillance allows:

- staff to see what students are doing
- students to see what students are doing

- the community to detect potential trespassers out of hours

Design considerations that achieve deterrence in the NGS project include:

- S1 clear sightlines between public & private spaces
- S2 clear sightlines to toilets
- S3 effective lighting of public spaces
- S4 landscaping that makes the place attractive, but does not provide offenders with places to hide or entrap victims

Access Control

Physical & symbolic barriers can be used to attract, channel, or restrict the movement of people. They minimise the opportunities for crime & increase the effort required to commit crime.

Physical barriers (fencing, walls, locked doors etc.) & symbolic boundaries (landscaping, level changes etc.) are important to clearly indicate where people are & are not permitted to go. However, these barriers must not be overly hostile.

Effective access control will be incorporated on the NGS Park Campus site by creating:

- AC1 landscapes & physical locations that channel & group pedestrians into targeted areas
- AC2 public spaces which attract, rather than discourage people from gathering
- AC3 restricted access to internal areas or high-risk areas

Territorial Reinforcement

Areas that are well-maintained & well-used generate a feeling of "ownership" which encourages people to inhabit the space, reducing the opportunity for crime & increasing the risk to criminals. Community ownership also increases the likelihood that people who witness crimes will report it.

Territorial reinforcement included in this design are:

- TR1 design that encourages people to gather in public space & to feel some responsibility for its use & condition
- TR2 design with clear transitions & boundaries between public & private space
- TR3 clear design cues on who is to use space & what it is to be used for

Space Management

Related to territorial reinforcement, space management ensures that spaces are appropriately utilised & maintained.

Space management strategies utilised in the NGS project include:

- activity coordination
- site cleanliness
- rapid repair of vandalism & graffiti
- the replacement of burned-out pedestrian & car park lighting - the removal or refurbishment of decayed physical assets

Waste Management

The proposed construction is not likely to significantly increase waste production on site. Due to the nature of the building's use and functions, waste will be collected in relation to adjacent buildings on the high school site.

Waste from St Bede's Catholic College is to be stored at the northern end of the High School site, in accordance with the approved conditions of its development consent, and all waste collection and truck movements are to be undertaken outside of school hours.

The existing High School has a policy to minimise resource usage and waste and maximise recycling and this policy will also apply to the Proposal.

During the Construction Phase demolition and construction waste management measures will be carried out and carefully monitored. Construction related liquid trade waste and chemical storage measures will be carried out to best practice and carefully monitored

The Site is connected to Hunter Water's reticulated sewerage system, and suitable liquid wastes will be disposed to the sewer, consistent with Hunter Water's requirements.

A completed Site Waste Management and Minimisation Plan form will accompany the Construction Certificate.

Council Consultation

One meeting has been undertaken with Maitland City Council in regard to the enclosed DA application, a Pre-lodgement meeting on 23rd September 2021. At this stage SHAC have been issued with the minutes of the initial meeting and these have been included as Appendix E for reference.

Conclusion

The proposed construction is intended to enhance the amenity of the existing schools St Bede's Catholic College and St Aloysius Catholic Primary School to include a place of worship to be used by all staff and students. The design has been made in accordance with listed Council requirements, with conscious efforts made to minimise visual and acoustic impacts. No increase in traffic or access is expected, removing the requirements of additional parking or traffic management. The proposed works are designed within the acceptable DCP and LEP parameters and will therefore not have any detrimental impact on adjoining residences.

Appendix A – Diocese Letter – building use

Issued by Rev Andrew Doohan – Vicar General, Diocese of Maitland-Newcastle – dated 16th August 2021

Office of the Bishop
Rev Andrew Doohan VG
VICAR GENERAL, DIOCESE OF MAITLAND-NEWCASTLE
P 4979 1106 **F** 4979 1338 **M** 0412 405 671
E andrew.doohan@mn.catholic.org.au

16 August 2021

Elizabeth Brown,
SHAC
224 Maitland Road
Islington NSW 2296

Dear Elizabeth,

Re: Chisholm Chapel – St Aloysius Catholic Primary School & St Bede's Catholic College

Following our meeting held on 11 August 2021 via Microsoft Teams, I write to confirm that the chapel currently being designed for the site shared by the above schools will primarily be used as a chapel for those two schools.

There will be no regular use of the chapel by an associated parish community, with little to no utilisation of the facility outside scheduled school hours.

Please do not hesitate to contact me directly if you have any questions about the contents of this letter.

Yours sincerely,

Rev Andrew Doohan VG
VICAR GENERAL, DIOCESE OF MAITLAND-NEWCASTLE

Appendix B – Environmental Site Report

Undertaken by Hunter Civilab – 13th August 2021

Environmental Site Assessment

St Bede's Catholic College, 24a Heritage Drive, Chisholm

Report Ref: P21405-ESA-001-Rev0
Written by: Jake Duck (Environmental Scientist)
Reviewed by: Malcolm Adrien (Environmental Services Manager)
Email: office@huntercivilab.com.au
Client: the Catholic Schools Office

13 August 2021

Prepared for

the Catholic Schools Office
C/- SHAC Architects
224 Maitland Road
Islington NSW 2296
Ph: 02 4961 5888
Email: elizabeth@shac.com.au
Web: shac.com.au

Prepared by

Hunter Civilab
ABN 50 103 355 531
3/62 Sandringham Avenue
PO Box 3127
Thornton NSW 2322
Ph: (02) 4966 1844
Email: office@huntercivilab.com.au
Web: huntercivilab.com.au

Project Details

Site Address:	St Bede's Catholic College, 24a Heritage Drive, Chisholm	
Project Type:	Proposed Education Building	
Project no	**Report type**	**Report no**
P21405	ESA	001

Report Register

Revision Number	**Reported By**	**Reviewed By**	**Date**
Rev0	JD	MA	13/8/2021

We confirm that the following report has been produced for the Catholic Schools Office, based on the described methods and conditions within.

For and on behalf of Hunter Civilab,

Malcolm Adrien
Environmental Services Manager

Executive Summary

The following report details the environmental investigation undertaken by Hunter Civilab (HC) under the request of the Catholic Schools Office. The investigation was undertaken on the 5th of July 2021 and consisted of a visual site assessment with limited targeted sampling.

The site is currently proposed to undergo redevelopment to incorporate a new school building block (Block D). This ESA is required for due diligence purposes as part of the development application.

Limited soil sampling was also conducted to supplement the desktop assessment for contamination purposes. Soil sampling consisted of:

- Collection of thirteen (13) primary samples analysed for contaminants of concern;
- Collection of one (1) duplicate samples for QA/QC purposes; and
- Collection of one (1) rinsate sample for QA/QC purposes.

The results of the analysis of the thirteen (13) primary soil samples indicate that all analytes were acceptable under NEPM HIL/HSL-A assessment criteria.

In summary, based on site observations and limited soil sampling conducted on the Site, no indication of gross contamination has been identified which would constrain the development of the Site under the proposed land use.

Table of Contents

Annex List:

Annex A – Site Features Plan

Annex B – Borehole Logs

Annex C – Soil Tables

Annex D – Laboratory Reports

1 Introduction

1.1 Background

Hunter Civilab (HC) were engaged by the Catholic Schools Office to complete an Environmental Site Assessment (ESA) at St Bede's Catholic College, 24a Heritage Drive, Chisholm (here-in referred to as the site. The site is currently proposed to undergo redevelopment to incorporate a new school building block (Block D). This ESA is required for due diligence purposes as part of the development application.

2 Site works

2.1 Site Inspection

Hunter Civilab attended the Site 5th of July 2021. Non-intrusive site inspection identified the following key points:

- The area currently consists of a secondary school and associated infrastructure. The footprint of the planned development is within the existing school footprint.
- The area is predominantly grass and pathways between existing structures.
- No visual or olfactory contamination was observed during the field investigation.

2.2 Soil Sampling and Contaminants of Concern

A total of six (6) boreholes were advanced to a maximum depths of 1.3-4.5m BGL.

Collection of a total of thirteen (13) soil samples (Including one (1) duplicate sample for QA/QC purposes) were collected from across the site. Samples were analysed for the presence of the following analytes;

- Benzene, Toluene, Ethyl Benzene & Xylene (BTEX);
- Total Recoverable Hydrocarbons (TRH);
- Polycyclic Aromatic Hydrocarbons (PAH);
- Heavy metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg);
- Organochlorine Pesticides (OCP) & Organophosphorus Pesticides (OPP); and
- Polychlorinated Biphenyls (PCB).

A site features plan including sampling locations is presented as **Figure 1**, **Annex A.**

3 Quality Assurance / Quality Control

Quality assurance measures for sampling within this assessment were adopted to provide confidence in the analytical results to support determinations on material categorization and to facilitate satisfaction of project specific objectives. Adopted measures included complimentary regimes of field and laboratory-based quality assurance techniques and quality control sampling/analysis. Quality assurance measures, results and implications for data quality associated with this assessment are broadly defined within the following categories:

1. Sample collection, storage transport and analysis;
2. Laboratory quality control procedures and results; and
3. The occurrence of apparently unusual and anomalous results.

Quality Assurance comprised of the following;

- Collection of a duplicate sample at a rate of 1 per 20 samples; and
- One (1) rinsate solution.

Soil sampling was completed by suitably qualified scientists experienced in contaminated site assessments. All field equipment was decontaminated between sampling locations using a triple rinse procedure by washing with an approximately 5% solution of DeCon 90 phosphate free detergent, followed by tap water and finally rinsed with deionized water between sampling locations. Disposable nitrile gloves were worn during sampling and changed between locations. Samples were stored in jars provided by the NATA accredited laboratory sub-contracted to complete analysis (SGS) and were specific to targeted analytes. Samples were labelled with unique identifiers referencing the sampling location, depth and date of sampling then stored on ice during delivery to the Laboratory. Samples were transported under chain of custody to the laboratory and then analysed according to NATA accredited test methods.

Assessment of laboratory quality control is presented within the laboratory reports presented as **Annex E**.

The results of the Rinsate sample analysis were all found be to be below the laboratory Limit of Reporting for all analytes, indicating field decontamination procedures were adequate.

Results of the RPD analysis between primary and duplicate samples were all within allowable limits.

The analytical data is considered sufficiently complete, representative, comparable, accurate and precise to serve as an adequate basis for interpretation for the purposes of this project.

4 Results

4.1 Assessment Criteria

Analytical data was screened against relevant Tier 1 Trigger Values as defined or referenced within the NEPM 2013 Schedule B1 for Residential land use. Specifically:

1. Health Investigation Levels for Residential land use (HIL-A for heavy metals, PAHs and PCBs were derived from **Table 1A (1)**); and
2. Health Screening Levels were derived from CRC Care Technical Report 10 – Health screening levels for petroleum hydrocarbons in soil and groundwater – Summary (Friebel and Nadebaum 2011) for clay based soils in a Residential land use (HSL-A) for TRH, BTEX and Naphthalene.

HIL and HSL assessment criteria address potential health risks to receptors associated with potential contamination.

4.2 Targeted sampling results and interpretation

A tabulated assessment of analytical results against assessment criteria is presented in **Tables 1 - 2** within **Annex C** with laboratory reports presented in **Annex D**.

The results of the analysis of the thirteen (13) primary soils samples indicate that all analytes were below the Limit of Reporting (LOR) for TRH, BTEX, PAH, OC/OP Pesticides and PCBs.

All heavy metals concentrations were below the HIL-A criteria.

5 Discussion & Conclusion

Hunter Civilab (HC) were engaged by the Catholic Schools Office to complete an Environmental Site Assessment (ESA) at St Bede's Catholic College, 24a Heritage Drive, Chisholm (here-in referred to as the site. The site is currently proposed to undergo redevelopment to incorporate a new school building block (Block D). This ESA is required for due diligence purposes as part of the development application.

Collection of a total of thirteen (13) soil samples (including one (1) duplicate sample for QA/QC purposes) from six (6) borehole locations from the footprint of the proposed development for determining its suitability for the proposed land use.

The results of the analysis of the thirteen (13) primary soil samples indicate that all analytes were acceptable under NEPM HIL/HSL-A assessment criteria.

In summary, based on site observations and limited soil sampling conducted on the Site, no indication of gross contamination has been identified which would constrain the development of the Site under the proposed land use.

If you have any further questions about this report, please contact the undersigned.

For and on behalf of

Valley Civilab Pty Ltd, trading as Hunter Civilab

Reported by:

Jake Duck
Environmental Scientist

Reviewed by:

Malcolm Adrien
Environmental Services Manager

Limitations

Hunter Civilab (HC) considers that the objectives of the original scope as presented in quote Q2021_371 of the investigation have been achieved.

The analytical data and recommendations within the above report are subjected to the specific sampling and testing that was undertaken at the time of the current investigation. It should be noted that underlying site soil conditions can vary significantly across a site and the environment can change overtime. If conditions encountered during intrusive works are different to those contained in this report Hunter Civilab should be contacted immediately for site reassessment.

References:

Australian Standard AS 4482.1-2005 (2005) *Guide to the Sampling and Investigation of Potentially Contaminated Soil. Part 1 – Non-volatile and Semi-Volatile Compounds.*

National Environment Protection Council (NEPC), (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999, NEPM, Canberra. Schedule B2: Guideline On-site Characterisation*.

NSW EPA (1997) *Guidelines for Consultants Reporting on Contaminated Sites*.

NSW EPA (1997). *Contaminated Land Management Act 1997.*

HUNTER CIVILAB

Annex A

Geotechnical Investigation
St Bede's Catholic College, Chisholm
HC Ref: P21405

Note:
(1) Base layer sourced from NearMap (2021).
(2) Scale bar is approximate.

Figure 1: Site Plan

Legend
Borehole Location

Scale (m)
0 20 40

N
W E
S

Annex B

BOREHOLE LOG REPORT

HOLE NO: BH1
FILE / JOB NO: P21405
SHEET: 1 OF 1

CLIENT : Catholic Schools Office
PROJECT : Proposed New School Building
LOCATION : 24A Heritage Drive, Chisholm - St Bede's Catholic College

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Drill Rig	CONTRACTOR: HCL	DRILLER: SH
DATE LOGGED: 05/07/2021 DATE SAMPLED: 05/07/2021	LOGGED BY: ML	CHECKED BY: NR

TESTING & SAMPLING					MATERIAL						
Water	DCP AS 1289.6.3.2-1997 Depth (m)	DCP AS 1289.6.3.2-1997 Blows	Field Tests	Samples	Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
	0.0 - 0.1	4			0.2		SM	FILL: Sandy SILT, low plasticity, dark brown, fine grained sand, trace fine gravel	D to M		FILL
	0.1 - 0.2	3									
	0.2 - 0.3	2									
	0.3 - 0.4	4			0.4			0.40m			
	0.4 - 0.5	6						Silty CLAY, high plasticity, dark grey			RESIDUAL SOIL
	0.5 - 0.6	9		D 0.50-0.60	0.6		CH		>PL	VSt	
	0.6 - 0.7	13 Refusal			0.8			0.80m			
								Extremely Weathered SANDSTONE, fine grained, light brown / mottle orange, Inferred extremely low strength	D		ROCK
					1.0						
					1.2						
					1.4			1.50m			
								Refusal at 1.50 m			
					1.6						
					1.8						

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table

Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

BOREHOLE LOG REPORT

HOLE NO: BH2
FILE / JOB NO: P21405
SHEET: 1 OF 1

CLIENT : Catholic Schools Office
PROJECT : Proposed New School Building
LOCATION : 24A Heritage Drive, Chisholm - St Bede's Catholic College

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Drill Rig	CONTRACTOR: HCL	DRILLER: SH
DATE LOGGED: 05/07/2021 DATE SAMPLED: 05/07/2021	LOGGED BY: ML	CHECKED BY: NR

TESTING & SAMPLING					MATERIAL					
Water	DCP AS 1289.6.3.2-1997 Depth (m)	DCP AS 1289.6.3.2-1997 Blows	Field Tests	Samples	Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
	0.0 - 0.1	2			0.2		SP	TOPSOIL: Silty SAND, fine grained, brown	D		TOPSOIL
	0.1 - 0.2	3									
	0.2 - 0.3	3						0.30m			
	0.3 - 0.4	4			0.4			Silty CLAY, high plasticity, dark grey			RESIDUAL SOIL
	0.4 - 0.5	6									
	0.5 - 0.6	7		D 0.50-0.60	0.6						
	0.6 - 0.7	9									
	0.7 - 0.8	10			0.8		CH		>PL	St to VSt	
	0.8 - 0.9	15 Refusal									
					1.0						
					1.2			1.20m			
								Extremely Clayey SANDSTONE, fine grained, light brown / grey / mottled red, Inferred extremely low strength			ROCK
					1.4				D		
					1.6						
					1.8			1.80m			
								becoming light grey / mottle orange / mottle red			
					2.0				D		
					2.2			2.20m			
								Refusal at 2.20 m			
					2.4						

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table

Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

BOREHOLE LOG REPORT

HOLE NO: BH3
FILE / JOB NO: P21405
SHEET: 1 OF 1

CLIENT : Catholic Schools Office
PROJECT : Proposed New School Building
LOCATION : 24A Heritage Drive, Chisholm - St Bede's Catholic College

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Drill Rig	CONTRACTOR: HCL	DRILLER: SH
DATE LOGGED: 05/07/2021 DATE SAMPLED: 05/07/2021	LOGGED BY: ML	CHECKED BY: NR

TESTING & SAMPLING					MATERIAL						
Water	DCP AS 1289.6.3.2-1997 Depth (m)	DCP AS 1289.6.3.2-1997 Blows	Field Tests	Samples	Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
	0.0 - 0.1	10			0.0		GP	0.10m FILL: Silty Sandy Clayey GRAVEL, fine to medium gravel, grey	M		FILL
	0.1 - 0.2	6					CH	Silty CLAY, high plasticity	<PL	F	RESIDUAL SOIL
	0.2 - 0.3	3						0.30m			
	0.3 - 0.4	2		D 0.30-0.40				becoming Extremely Weathered SANDSTONE, fine grained, light brown, with bands of SILTSTONE, dark brown, Inferred very low strength			ROCK
	0.4 - 0.5	3			0.5						
	0.5 - 0.6	4									
	0.6 - 0.7	6							M		
	0.7 - 0.8	6									
	0.8 - 0.9	7									
	0.9 - 1.0	6			1.0						
	1.0 - 1.1	5									
	1.1 - 1.2	5						1.20m			
	1.2 - 1.3	6						becoming Silty CLAY, light brown / white			
	1.3 - 1.4	6									
	1.4 - 1.5	7			1.5						
	1.5 - 1.6	8							>PL		
	1.6 - 1.7	8									
	1.7 - 1.8	8									
	1.8 - 1.9	9									
	1.9 - 2.0	11			2.0			2.00m			
	2.0 - 2.1	13						becoming Extremely Weathered SANDSTONE / SILTSTONE, fine grained, light grey, Inferred very low strength			
	2.1 - 2.2	17 Terminated									
					2.5						
					3.0						
									D		
					3.5						
					4.0						
					4.5			4.50m			
								Terminated at 4.50 m			

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table

Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
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SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

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

BOREHOLE LOG REPORT

HOLE NO: BH4
FILE / JOB NO: P21405
SHEET: 1 OF 1

CLIENT : Catholic Schools Office
PROJECT : Proposed New School Building
LOCATION : 24A Heritage Drive, Chisholm - St Bede's Catholic College

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Drill Rig	CONTRACTOR: HCL	DRILLER: SH
DATE LOGGED: 05/07/2021 DATE SAMPLED: 05/07/2021	LOGGED BY: ML	CHECKED BY: NR

TESTING & SAMPLING					MATERIAL					
Water	DCP AS 1289.6.3.2-1997 Depth (m)	DCP AS 1289.6.3.2-1997 Blows	Field Tests	Samples	Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
	0.0 - 0.1	3					ML	TOPSOIL: Clayey SILT, low plasticity, dark brown	M		FILL
	0.1 - 0.2	3						0.10m			
	0.2 - 0.3	4						Silty CLAY, high plasticity, brown / mottled orange, with bands of dartk brown			RESIDUAL SOIL
	0.3 - 0.4	3									
	0.4 - 0.5	4					CH		>PL	St	
	0.5 - 0.6	6			0.5						
	0.6 - 0.7	7									
	0.7 - 0.8	7						0.80m			
	0.8 - 0.9	6						Silty CLAY, high plasticity, brown			
	0.9 - 1.0	6									
	1.0 - 1.1	6			1.0		CH		>PL	St to VSt	
	1.1 - 1.2	7						1.20m			
	1.2 - 1.3	9						Extremely Weathered SANDSTONE, fine grained, light brown / orange, Inferred very low strength			ROCK
	1.3 - 1.4	9									
	1.4 - 1.5	10			1.5						
	1.5 - 1.6	11									
	1.6 - 1.7	11 Terminated									
					2.0				D to M		
					2.5						
								2.80m			

Refusal at 2.80m

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table

Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
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CONSISTENCY/ RELATIVE DENSITY

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St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

BOREHOLE LOG REPORT

HOLE NO: BH5
FILE / JOB NO: P21405
SHEET: 1 OF 1

CLIENT : Catholic Schools Office
PROJECT : Proposed New School Building
LOCATION : 24A Heritage Drive, Chisholm - St Bede's Catholic College

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Drill Rig	CONTRACTOR: HCL	DRILLER: SH
DATE LOGGED: 05/07/2021 DATE SAMPLED: 05/07/2021	LOGGED BY: ML	CHECKED BY: NR

TESTING & SAMPLING					MATERIAL					
Water	DCP AS 1289.6.3.2-1997 Depth (m)	DCP AS 1289.6.3.2-1997 Blows	Field Tests	Samples	Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
	0.0 - 0.1	2						Silty CLAY, high plasticity, dark brown / grey			RESIDUAL SOIL
	0.1 - 0.2	4			0.2						
	0.2 - 0.3	7					CH		>PL	VSt	
	0.3 - 0.4	7			0.4						
	0.4 - 0.5	9						0.50m			
	0.5 - 0.6	10			0.6			Extremely Weathered SANDSTONE, fine grained, light grey / mottled orange / mottled red, Inferred very low strength			ROCK
	0.6 - 0.7	13 Refusal									
					0.8				D		
					1.0						
					1.2			1.30m			
								Refusal at 1.30 m			
					1.4						

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table

Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

BOREHOLE LOG REPORT

HOLE NO: BH6
FILE / JOB NO: P21405
SHEET: 1 OF 1

CLIENT : Catholic Schools Office
PROJECT : Proposed New School Building
LOCATION : 24A Heritage Drive, Chisholm - St Bede's Catholic College

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Drill Rig	CONTRACTOR: HCL	DRILLER: SH
DATE LOGGED: 05/07/2021 DATE SAMPLED: 05/07/2021	LOGGED BY: ML	CHECKED BY: NR

TESTING & SAMPLING					MATERIAL						
Water	DCP AS 1289.6.3.2-1997 Depth (m)	DCP AS 1289.6.3.2-1997 Blows	Field Tests	Samples	Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
	0.0 - 0.1	3					ML	TOPSOIL: Sandy Clayey SILT, low plasticity, dark brown	M		FILL
	0.1 - 0.2	4									
	0.2 - 0.3	4			0.2			0.20m Silty CLAY, high plasticity, dark brown / mottled red			RESIDUAL SOIL
	0.3 - 0.4	5					CH		>PL	St to VSt	
	0.4 - 0.5	5			0.4			0.50m becoming dark grey / mottle red			
	0.5 - 0.6	5									
	0.6 - 0.7	7			0.6						
	0.7 - 0.8	8					CH		>PL		
	0.8 - 0.9	8			0.8						
	0.9 - 1.0	10									
	1.0 - 1.1	11			1.0			1.00m becoming light grey / light brown / mottled orange			
	1.1 - 1.2	13 Terminated			1.2						
					1.4		CH		>PL		
					1.6						
					1.8						
					2.0			2.00m Terminated at 2.00 m			

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER
Water table
Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

Annex C

	Metals								TRH NEPM (2013)							BTEX			
	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Zinc	Mercury	TRH C6-C10 Fraction	TRH C6-C10 minus BTEX (F1)	TRH >C10-C16 Fraction	TRH >C10-C16 - Naphthalene (F2)	TRH >C16-C34 (F3)	TRH >C34-C40 (F4)	Napthalene	Benzene	Toluene	Ethylbenzene	Total Xylenes
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Limit of Reporting	1	0.3	0.5	0.5	1	0.5	2	0.05	25	25	25	25	90	120	0.1	0.1	0.1	0.1	0.3
EILs (NEPM 2013)	100				1100										170				
ESLs - Fine (NEPM 2013)										180		120	1300	5600		65	105	125	105
ESLs - Coarse (NEPM 2013)										180		120	300	2800		50	85	70	45
HIL A (NEPM 2013)	100	20	100	6000	300	400	7400	40											
HSL A - Soil Vapour Sand 0 - <1m (NEPM 2013)										45		110			3	0.5	160	55	40
HSL A - Soil Vapour Sand 1 - <2m (NEPM 2013)										70		240			NL	0.5	220	NL	60
HSL A - Soil Vapour Sand 2 - <4m (NEPM 2013)										110		440			NL	0.5	310	NL	95
HSL A - Soil Vapour Sand 4m+ (NEPM 2013)										200		NL			NL	0.5	540	NL	170
HSL A - Soil Vapour Silt 0 - <1m (NEPM 2013)										40		230			4	0.6	390	NL	95
HSL A - Soil Vapour Silt 1 - <2m (NEPM 2013)										65		NL			NL	0.7	NL	NL	210
HSL A - Soil Vapour Silt 2 - <4m (NEPM 2013)										100		NL			NL	1	NL	NL	NL
HSL A - Soil Vapour Silt 4m+ (NEPM 2013)										190		NL			NL	2	NL	NL	NL
HSL A - Soil Vapour Clay 0 - <1m (NEPM 2013)										50		280			5	0.7	480	NL	110
HSL A - Soil Vapour Clay 1 - <2m (NEPM 2013)										90		NL			NL	1	NL	NL	310
HSL A - Soil Vapour Clay 2 - <4m (NEPM 2013)										150		NL			NL	2	NL	NL	NL
HSL A - Soil Vapour Clay 4m+ (NEPM 2013)										290		NL			NL	3	NL	NL	NL
Management Limits - Fine Soil (NEPM 2013)									*800*		*1,000*		*3,500*	*10,000*					
Management Limits - Coarse Soil (NEPM 2013)									*700*		*1,000*		*2,500*	*10,000*					
HSL A - Direct Contact (CRC Care 2011)									**4,400**		**3,300**		**4,500**	**6,300**	**1,400**	**100**	**14,000**	**4,500**	**12,000**

Sample ID	Sampled Date																		
BH1-0.2-0.3	5/7/2021	**4**	<0.3	**3.2**	**4.4**	**17**	**1.5**	**33**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH1-0.7-0.8	5/7/2021	**7**	<0.3	**4.0**	<0.5	**9**	**0.6**	**7.4**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH1-1.0-1.1	5/7/2021	**11**	<0.3	**4.9**	**2.4**	**6**	**1.0**	**24**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH2-0.1-0.2	5/7/2021	**8**	<0.3	**5.1**	**19**	**19**	**1.6**	**32**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH2-0.6-0.7	5/7/2021	**11**	<0.3	**2.3**	<0.5	**7**	<0.5	**3.7**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH2-1.2-1.3	5/7/2021	**12**	<0.3	**1.9**	**0.8**	**6**	<0.5	**7.1**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH3-0.1-0.2	5/7/2021	**4**	<0.3	**4.3**	**4.8**	**5**	**2.0**	**17**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH3-0.4-0.5	5/7/2021	**10**	<0.3	**0.8**	**2.0**	**8**	**0.6**	**18**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH4-0.2-0.3	5/7/2021	**5**	<0.3	**1.4**	**1.8**	**5**	<0.5	**7.0**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH4-0.7-0.8	5/7/2021	**5**	<0.3	**2.5**	<0.5	**7**	**0.5**	**7.1**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH4-1.2-1.3	5/7/2021	**7**	<0.3	**2.1**	<0.5	**4**	**1.4**	**21**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH5-0.2-0.3	5/7/2021	**4**	<0.3	**3.2**	<0.5	**7**	**0.6**	**5.3**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3
BH6-0.7-0.8	5/7/2021	**14**	<0.3	**3.9**	<0.5	**11**	<0.5	**3.5**	<0.05	<25	<25	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.1	<0.3

Statistical Summary																			
Number of Results	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Number of Detects	13	0	13	7	13	9	13	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Detect	4	0	0.8	0.8	4	0.5	3.5	0	0	0	0	0	0	0	0	0	0	0	0
Maximum Detect	14	0	5.1	19	19	2	33	0	0	0	0	0	0	0	0	0	0	0	0
Average Concentration	7.84615	-	3.04615	5.02857	8.53846	1.08889	14.3154	-	-	-	-	-	-	-	-	-	-	-	-
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	PAH						OCP														OPP	PCB
	Naphthalene	Benzo(a)pyrene	Carcinogenic PAHs, BaP TEQ <LOR=0	Carcinogenic PAHs, BaP TEQ <LOR=LOR	Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	Total PAH	Aldrin	o,p'-DDE	o,p'-DDD	o,p'-DDT	Gamma Chlordane	Alpha Chlordane	Dieldrin	Alpha Endosulfan	Beta Endosulfan	Endrin	Heptachlor	Hexachlorobenzene (HCB)	Methoxychlor	Toxaphene	Chlorpyrifos (Chlorpyrifos Ethyl)	Total PCBs (Arochlors)
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Limit of Reporting	0.1	0.1	0.2	0.3	0.2	0.8	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	1	0.2	1
EILs (NEPM 2013)	170									180												
ESLs - Coarse/Fine (NEPM 2013)		0.7																				
HIL A (NEPM 2013)			3	3	3	300	6	240	240	240	50	50	6	270	270	10	6	10	300	20	160	1
HSL A - Direct Contact (CRC Care 2011)	**1,400**																					
Sample ID	**Sampled Date**																					
BH1-0.2-0.3	5/7/2021	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<1	<0.2	<1
BH1-0.7-0.8	5/7/2021	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
BH1-1.0-1.1	5/7/2021	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
BH2-0.1-0.2	5/7/2021	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<1	<0.2	<1
BH2-0.6-0.7	5/7/2021	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
BH2-1.2-1.3	5/7/2021	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
BH3-0.1-0.2	5/7/2021	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<1	<0.2	<1
BH3-0.4-0.5	5/7/2021	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
BH4-0.2-0.3	5/7/2021	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<1	<0.2	<1
BH4-0.7-0.8	5/7/2021	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
BH4-1.2-1.3	5/7/2021	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
BH5-0.2-0.3	5/7/2021	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
BH6-0.7-0.8	5/7/2021	<0.1	<0.1	<0.2	<0.3	<0.2	<0.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Statistical Summary																						
Number of Results	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Number of Detects	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minimum Detect	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximum Detect	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Average Concentration	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Number of Guideline Exceedances	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note:

(1) The NEPM presents a cumulative HIL for DDD, DDE and DDT (240 mg/kg). Concentrations for each of these compounds are presented separately above and conservatively assessed against the HIL.

(2) The NEPM presents a cumulative HIL for Aldrin and Dieldrin (6 mg/kg). Concentrations for each of these compounds are presented separately above and conservatively assessed against the HIL.

(3) The NEPM presents onee HIL for Endosulfan (270 mg/kg). Concentrations for Alpha Endosulfan and Beta Endosulfan are presented separately above and conservatively assessed against the HIL.

	LOR	Unit	Primary Sample	QA Sample	RPD
			BH2-1.2-1.3	DUP	
Metals					
Arsenic	2	mg/kg	**12**	**2**	142.9
Cadmium	0.4	mg/kg	0.15	0.15	0.0
Chromium	5	mg/kg	**1.9**	**0.7**	92.3
Copper	5	mg/kg	**0.8**	**3.1**	117.9
Lead	5	mg/kg	**6**	0.5	169.2
Nickel	5	mg/kg	0.25	0.25	0.0
Zinc	5	mg/kg	**7.1**	**4.8**	38.7
Mercury	0.1	mg/kg	0.025	0.025	0.0

Notes

RPD = Relative Percentage Difference.

RPD assessment criteria were adopted in general accordance with NEPM Schedule B3 Section 3.5 (NEPC 2013). RPDs where both primary and duplicate results were < 2.5 times the LOR were not considered. RPDs where primary and/or duplicate results were >2.5 times the LOR were assessed based on a threshold of +/- 30%. Exceedence of this trheshold triggered consideration of associated data quality.

	LOR	RINS
Date		
Unit of Measure	mg/L	mg/L
Metals		
Arsenic	0.001	<0.001
Cadmium	0.0002	<0.0002
Chromium	0.001	<0.001
Copper	0.001	<0.001
Lead	0.001	<0.001
Nickel	0.001	<0.001
Zinc	0.005	<0.005
Mercury	0.0001	<0.0001

Annex D

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Jake Duck & Malcolm Adrien
Client	VALLEY CIVILAB PTY LTD
Address	PO BOX 3127 THORNTON NSW 2322
Telephone	61 2 4966 1844
Facsimile	(Not specified)
Email	jd@huntercivilab.com.au
Project	**P21405 - St Bedes**
Order Number	**2368**
Samples	15

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
SGS Reference	**SE221514 R0**
Date Received	8/7/2021
Date Reported	15/7/2021

COMMENTS

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

No respirable fibres detected in all soil samples using trace analysis technique.

A portion of the sample supplied has been sub-sampled for asbestos analysis in soil according to SGS In-house procedures.
We therefore cannot guarantee that the sub-sample is representative of the entire sample supplied.
SGS Industries and Environment recommends supplying approximately 50-100g of sample in a separate container.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES

Akheeqar BENIAMEEN
Chemist

Bennet LO
Senior Organic Chemist/Metals Chemist

Kamrul AHSAN
Senior Chemist

Ly Kim HA
Organic Section Head

Ravee SIVASUBRAMANIAM
Hygiene Team Leader

Shane MCDERMOTT
Inorganic/Metals Chemist

VOC's in Soil [AN433] Tested: 15/7/2021

PARAMETER	UOM	LOR	BH1-0.2-0.3 SOIL - 5/7/2021 SE221514.001	BH1-0.7-0.8 SOIL - 5/7/2021 SE221514.002	BH1-1.0-1.1 SOIL - 5/7/2021 SE221514.003	BH2-0.1-0.2 SOIL - 5/7/2021 SE221514.004	BH2-0.6-0.7 SOIL - 5/7/2021 SE221514.005
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PARAMETER	UOM	LOR	BH2-1.2-1.3 SOIL - 5/7/2021 SE221514.006	BH3-0.1-0.2 SOIL - 5/7/2021 SE221514.007	BH3-0.4-0.5 SOIL - 5/7/2021 SE221514.008	BH4-0.2-0.3 SOIL - 5/7/2021 SE221514.009	BH4-0.7-0.8 SOIL - 5/7/2021 SE221514.010
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

PARAMETER	UOM	LOR	BH4-1.2-1.3 SOIL - 5/7/2021 SE221514.011	BH5-0.2-0.3 SOIL - 5/7/2021 SE221514.012	BH6-0.7-0.8 SOIL - 5/7/2021 SE221514.013
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1
Total Xylenes	mg/kg	0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1

Volatile Petroleum Hydrocarbons in Soil [AN433] Tested: 15/7/2021

PARAMETER	UOM	LOR	BH1-0.2-0.3 SOIL - 5/7/2021 SE221514.001	BH1-0.7-0.8 SOIL - 5/7/2021 SE221514.002	BH1-1.0-1.1 SOIL - 5/7/2021 SE221514.003	BH2-0.1-0.2 SOIL - 5/7/2021 SE221514.004	BH2-0.6-0.7 SOIL - 5/7/2021 SE221514.005
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	BH2-1.2-1.3 SOIL - 5/7/2021 SE221514.006	BH3-0.1-0.2 SOIL - 5/7/2021 SE221514.007	BH3-0.4-0.5 SOIL - 5/7/2021 SE221514.008	BH4-0.2-0.3 SOIL - 5/7/2021 SE221514.009	BH4-0.7-0.8 SOIL - 5/7/2021 SE221514.010
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	BH4-1.2-1.3 SOIL - 5/7/2021 SE221514.011	BH5-0.2-0.3 SOIL - 5/7/2021 SE221514.012	BH6-0.7-0.8 SOIL - 5/7/2021 SE221514.013
TRH C6-C9	mg/kg	20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 9/7/2021

PARAMETER	UOM	LOR	BH1-0.2-0.3 SOIL - 5/7/2021 SE221514.001	BH1-0.7-0.8 SOIL - 5/7/2021 SE221514.002	BH1-1.0-1.1 SOIL - 5/7/2021 SE221514.003	BH2-0.1-0.2 SOIL - 5/7/2021 SE221514.004	BH2-0.6-0.7 SOIL - 5/7/2021 SE221514.005
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	<110
TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	BH2-1.2-1.3 SOIL - 5/7/2021 SE221514.006	BH3-0.1-0.2 SOIL - 5/7/2021 SE221514.007	BH3-0.4-0.5 SOIL - 5/7/2021 SE221514.008	BH4-0.2-0.3 SOIL - 5/7/2021 SE221514.009	BH4-0.7-0.8 SOIL - 5/7/2021 SE221514.010
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	<110
TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	BH4-1.2-1.3 SOIL - 5/7/2021 SE221514.011	BH5-0.2-0.3 SOIL - 5/7/2021 SE221514.012	BH6-0.7-0.8 SOIL - 5/7/2021 SE221514.013
TRH C10-C14	mg/kg	20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100
TRH >C10-C16	mg/kg	25	<25	<25	<25
TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110
TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	<210

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 9/7/2021

PARAMETER	UOM	LOR	BH1-0.2-0.3 SOIL - 5/7/2021 SE221514.001	BH1-0.7-0.8 SOIL - 5/7/2021 SE221514.002	BH1-1.0-1.1 SOIL - 5/7/2021 SE221514.003	BH2-0.1-0.2 SOIL - 5/7/2021 SE221514.004	BH2-0.6-0.7 SOIL - 5/7/2021 SE221514.005
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	**0.1**	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	**0.1**	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8

PARAMETER	UOM	LOR	BH2-1.2-1.3 SOIL - 5/7/2021 SE221514.006	BH3-0.1-0.2 SOIL - 5/7/2021 SE221514.007	BH3-0.4-0.5 SOIL - 5/7/2021 SE221514.008	BH4-0.2-0.3 SOIL - 5/7/2021 SE221514.009	BH4-0.7-0.8 SOIL - 5/7/2021 SE221514.010
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8	<0.8	<0.8

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 9/7/2021 (continued)

PARAMETER	UOM	LOR	BH4-1.2-1.3 SOIL - 5/7/2021 SE221514.011	BH5-0.2-0.3 SOIL - 5/7/2021 SE221514.012	BH6-0.7-0.8 SOIL - 5/7/2021 SE221514.013
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8

OC Pesticides in Soil [AN420] Tested: 9/7/2021

PARAMETER	UOM	LOR	BH1-0.2-0.3 SOIL - 5/7/2021 SE221514.001	BH2-0.1-0.2 SOIL - 5/7/2021 SE221514.004	BH3-0.1-0.2 SOIL - 5/7/2021 SE221514.007	BH4-0.2-0.3 SOIL - 5/7/2021 SE221514.009
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Total CLP OC Pesticides	mg/kg	1	<1	<1	<1	<1

OP Pesticides in Soil [AN420] Tested: 9/7/2021

PARAMETER	UOM	LOR	BH1-0.2-0.3 SOIL - 5/7/2021 SE221514.001	BH2-0.1-0.2 SOIL - 5/7/2021 SE221514.004	BH3-0.1-0.2 SOIL - 5/7/2021 SE221514.007	BH4-0.2-0.3 SOIL - 5/7/2021 SE221514.009
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	<1.7	<1.7

PCBs in Soil [AN420] Tested: 9/7/2021

PARAMETER	UOM	LOR	BH1-0.2-0.3 SOIL - 5/7/2021 SE221514.001	BH2-0.1-0.2 SOIL - 5/7/2021 SE221514.004	BH3-0.1-0.2 SOIL - 5/7/2021 SE221514.007	BH4-0.2-0.3 SOIL - 5/7/2021 SE221514.009
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 9/7/2021

PARAMETER	UOM	LOR	BH1-0.2-0.3 SOIL - 5/7/2021 SE221514.001	BH1-0.7-0.8 SOIL - 5/7/2021 SE221514.002	BH1-1.0-1.1 SOIL - 5/7/2021 SE221514.003	BH2-0.1-0.2 SOIL - 5/7/2021 SE221514.004	BH2-0.6-0.7 SOIL - 5/7/2021 SE221514.005
Arsenic, As	mg/kg	1	4	7	11	8	11
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.5	3.2	4.0	4.9	5.1	2.3
Copper, Cu	mg/kg	0.5	4.4	<0.5	2.4	19	<0.5
Lead, Pb	mg/kg	1	17	9	6	19	7
Nickel, Ni	mg/kg	0.5	1.5	0.6	1.0	1.6	<0.5
Zinc, Zn	mg/kg	2	33	7.4	24	32	3.7

PARAMETER	UOM	LOR	BH2-1.2-1.3 SOIL - 5/7/2021 SE221514.006	BH3-0.1-0.2 SOIL - 5/7/2021 SE221514.007	BH3-0.4-0.5 SOIL - 5/7/2021 SE221514.008	BH4-0.2-0.3 SOIL - 5/7/2021 SE221514.009	BH4-0.7-0.8 SOIL - 5/7/2021 SE221514.010
Arsenic, As	mg/kg	1	12	4	10	5	5
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.5	1.9	4.3	0.8	1.4	2.5
Copper, Cu	mg/kg	0.5	0.8	4.8	2.0	1.8	<0.5
Lead, Pb	mg/kg	1	6	5	8	5	7
Nickel, Ni	mg/kg	0.5	<0.5	2.0	0.6	<0.5	0.5
Zinc, Zn	mg/kg	2	7.1	17	18	7.0	7.1

PARAMETER	UOM	LOR	BH4-1.2-1.3 SOIL - 5/7/2021 SE221514.011	BH5-0.2-0.3 SOIL - 5/7/2021 SE221514.012	BH6-0.7-0.8 SOIL - 5/7/2021 SE221514.013	DUP SOIL - 5/7/2021 SE221514.014
Arsenic, As	mg/kg	1	7	4	14	2
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.5	2.1	3.2	3.9	0.7
Copper, Cu	mg/kg	0.5	<0.5	<0.5	<0.5	3.1
Lead, Pb	mg/kg	1	4	7	11	<1
Nickel, Ni	mg/kg	0.5	1.4	0.6	<0.5	<0.5
Zinc, Zn	mg/kg	2	21	5.3	3.5	4.8

Mercury in Soil [AN312] Tested: 9/7/2021

PARAMETER	UOM	LOR	BH1-0.2-0.3 SOIL - 5/7/2021 SE221514.001	BH1-0.7-0.8 SOIL - 5/7/2021 SE221514.002	BH1-1.0-1.1 SOIL - 5/7/2021 SE221514.003	BH2-0.1-0.2 SOIL - 5/7/2021 SE221514.004	BH2-0.6-0.7 SOIL - 5/7/2021 SE221514.005
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05

PARAMETER	UOM	LOR	BH2-1.2-1.3 SOIL - 5/7/2021 SE221514.006	BH3-0.1-0.2 SOIL - 5/7/2021 SE221514.007	BH3-0.4-0.5 SOIL - 5/7/2021 SE221514.008	BH4-0.2-0.3 SOIL - 5/7/2021 SE221514.009	BH4-0.7-0.8 SOIL - 5/7/2021 SE221514.010
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05

PARAMETER	UOM	LOR	BH4-1.2-1.3 SOIL - 5/7/2021 SE221514.011	BH5-0.2-0.3 SOIL - 5/7/2021 SE221514.012	BH6-0.7-0.8 SOIL - 5/7/2021 SE221514.013	DUP SOIL - 5/7/2021 SE221514.014
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05

Moisture Content [AN002] Tested: 9/7/2021

PARAMETER	UOM	LOR	BH1-0.2-0.3 SOIL - 5/7/2021 SE221514.001	BH1-0.7-0.8 SOIL - 5/7/2021 SE221514.002	BH1-1.0-1.1 SOIL - 5/7/2021 SE221514.003	BH2-0.1-0.2 SOIL - 5/7/2021 SE221514.004	BH2-0.6-0.7 SOIL - 5/7/2021 SE221514.005
% Moisture	%w/w	1	22.2	22.7	18.5	12.1	22.1

PARAMETER	UOM	LOR	BH2-1.2-1.3 SOIL - 5/7/2021 SE221514.006	BH3-0.1-0.2 SOIL - 5/7/2021 SE221514.007	BH3-0.4-0.5 SOIL - 5/7/2021 SE221514.008	BH4-0.2-0.3 SOIL - 5/7/2021 SE221514.009	BH4-0.7-0.8 SOIL - 5/7/2021 SE221514.010
% Moisture	%w/w	1	16.8	8.4	24.3	19.8	19.1

PARAMETER	UOM	LOR	BH4-1.2-1.3 SOIL - 5/7/2021 SE221514.011	BH5-0.2-0.3 SOIL - 5/7/2021 SE221514.012	BH6-0.7-0.8 SOIL - 5/7/2021 SE221514.013	DUP SOIL - 5/7/2021 SE221514.014
% Moisture	%w/w	1	12.3	19.3	26.1	23.6

Fibre Identification in soil [AN602] Tested: 13/7/2021

PARAMETER	UOM	LOR	BH1-0.2-0.3 SOIL - 5/7/2021 SE221514.001	BH1-1.0-1.1 SOIL - 5/7/2021 SE221514.003	BH2-0.1-0.2 SOIL - 5/7/2021 SE221514.004	BH3-0.1-0.2 SOIL - 5/7/2021 SE221514.007	BH4-0.2-0.3 SOIL - 5/7/2021 SE221514.009
Asbestos Detected	No unit	-	No	No	No	No	No
Estimated Fibres*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01	<0.01

PARAMETER	UOM	LOR	BH5-0.2-0.3 SOIL - 5/7/2021 SE221514.012
Asbestos Detected	No unit	-	No
Estimated Fibres*	%w/w	0.01	<0.01

Trace Metals (Dissolved) in Water by ICPMS [AN318] Tested: 13/7/2021

PARAMETER	UOM	LOR	RIN WATER - 5/7/2021 SE221514.015
Arsenic, As	µg/L	1	<1
Cadmium, Cd	µg/L	0.1	<0.1
Copper, Cu	µg/L	1	<1
Chromium, Cr	µg/L	1	<1
Nickel, Ni	µg/L	1	<1
Lead, Pb	µg/L	1	<1
Zinc, Zn	µg/L	5	<5

Mercury (dissolved) in Water [AN311(Perth)/AN312] Tested: 13/7/2021

PARAMETER	UOM	LOR	RIN WATER - 5/7/2021 SE221514.015
Mercury	mg/L	0.0001	<0.0001

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.
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
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.
AN311(Perth)/AN312	Mercury by Cold Vapour AAS in Waters: 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.
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
AN318	Determination of elements at trace level in waters by ICP-MS technique,, referenced to USEPA 6020B and USEPA 200.8 (5.4).
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Recoverable Hydrocarbons - Silica (TRH-Si) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents .
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS /ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf) The fibres detected may or may not be asbestos fibres.
AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples, Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection/reporting limit (RL) of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."

AN602	The sample can be reported “no asbestos found at the reporting limit (RL) of 0.1 g/kg” (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if- (a) no trace asbestos fibres have been detected (i.e. no ‘respirable’ fibres): (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg: and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.

FOOTNOTES

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

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:

a. 1 Bq is equivalent to 27 pCi
b. 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.

STATEMENT OF QA/QC PERFORMANCE

SE221514 R0

CLIENT DETAILS

Contact	Jake Duck & Malcolm Adrien
Client	VALLEY CIVILAB PTY LTD
Address	PO BOX 3127 THORNTON NSW 2322
Telephone	61 2 4966 1844
Facsimile	(Not specified)
Email	jd@huntercivilab.com.au
Project	**P21405 - St Bedes**
Order Number	**2368**
Samples	15

LABORATORY DETAILS

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Laboratory	SGS Alexandria Environmental
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Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE221514 R0**
Date Received	08 Jul 2021
Date Reported	15 Jul 2021

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 (within the SGS Alexandria Environmental laboratory).

SAMPLE SUMMARY

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	Ice Bricks
Samples received in correct containers	Yes	Sample counts by matrix	14 Soil, 1 Water
Date documentation received	8/7/2021	Type of documentation received	COC
Samples received in good order	Yes	Samples received without headspace	Yes
Sample temperature upon receipt	12°C	Sufficient sample for analysis	Yes
Turnaround time requested	Standard		

HOLDING TIME SUMMARY

SE221514 R0

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

Fibre Identification in soil

Method: ME-(AU)-[ENV]AN602

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1-0.2-0.3	SE221514.001	LB228784	05 Jul 2021	08 Jul 2021	05 Jul 2022	13 Jul 2021	05 Jul 2022	14 Jul 2021
BH1-1.0-1.1	SE221514.003	LB228784	05 Jul 2021	08 Jul 2021	05 Jul 2022	13 Jul 2021	05 Jul 2022	14 Jul 2021
BH2-0.1-0.2	SE221514.004	LB228784	05 Jul 2021	08 Jul 2021	05 Jul 2022	13 Jul 2021	05 Jul 2022	14 Jul 2021
BH3-0.1-0.2	SE221514.007	LB228784	05 Jul 2021	08 Jul 2021	05 Jul 2022	13 Jul 2021	05 Jul 2022	14 Jul 2021
BH4-0.2-0.3	SE221514.009	LB228784	05 Jul 2021	08 Jul 2021	05 Jul 2022	13 Jul 2021	05 Jul 2022	14 Jul 2021
BH5-0.2-0.3	SE221514.012	LB228784	05 Jul 2021	08 Jul 2021	05 Jul 2022	13 Jul 2021	05 Jul 2022	14 Jul 2021

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
RIN	SE221514.015	LB228795	05 Jul 2021	08 Jul 2021	02 Aug 2021	13 Jul 2021	02 Aug 2021	13 Jul 2021

Mercury in Soil

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1-0.2-0.3	SE221514.001	LB228621	05 Jul 2021	08 Jul 2021	02 Aug 2021	09 Jul 2021	02 Aug 2021	13 Jul 2021
BH1-0.7-0.8	SE221514.002	LB228621	05 Jul 2021	08 Jul 2021	02 Aug 2021	09 Jul 2021	02 Aug 2021	13 Jul 2021
BH1-1.0-1.1	SE221514.003	LB228621	05 Jul 2021	08 Jul 2021	02 Aug 2021	09 Jul 2021	02 Aug 2021	13 Jul 2021
BH2-0.1-0.2	SE221514.004	LB228621	05 Jul 2021	08 Jul 2021	02 Aug 2021	09 Jul 2021	02 Aug 2021	13 Jul 2021
BH2-0.6-0.7	SE221514.005	LB228621	05 Jul 2021	08 Jul 2021	02 Aug 2021	09 Jul 2021	02 Aug 2021	13 Jul 2021
BH2-1.2-1.3	SE221514.006	LB228621	05 Jul 2021	08 Jul 2021	02 Aug 2021	09 Jul 2021	02 Aug 2021	13 Jul 2021
BH3-0.1-0.2	SE221514.007	LB228621	05 Jul 2021	08 Jul 2021	02 Aug 2021	09 Jul 2021	02 Aug 2021	13 Jul 2021
BH3-0.4-0.5	SE221514.008	LB228621	05 Jul 2021	08 Jul 2021	02 Aug 2021	09 Jul 2021	02 Aug 2021	13 Jul 2021
BH4-0.2-0.3	SE221514.009	LB228621	05 Jul 2021	08 Jul 2021	02 Aug 2021	09 Jul 2021	02 Aug 2021	13 Jul 2021
BH4-0.7-0.8	SE221514.010	LB228621	05 Jul 2021	08 Jul 2021	02 Aug 2021	09 Jul 2021	02 Aug 2021	13 Jul 2021
BH4-1.2-1.3	SE221514.011	LB228621	05 Jul 2021	08 Jul 2021	02 Aug 2021	09 Jul 2021	02 Aug 2021	13 Jul 2021
BH5-0.2-0.3	SE221514.012	LB228621	05 Jul 2021	08 Jul 2021	02 Aug 2021	09 Jul 2021	02 Aug 2021	13 Jul 2021
BH6-0.7-0.8	SE221514.013	LB228621	05 Jul 2021	08 Jul 2021	02 Aug 2021	09 Jul 2021	02 Aug 2021	13 Jul 2021
DUP	SE221514.014	LB228621	05 Jul 2021	08 Jul 2021	02 Aug 2021	09 Jul 2021	02 Aug 2021	13 Jul 2021

Moisture Content

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1-0.2-0.3	SE221514.001	LB228627	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	14 Jul 2021	12 Jul 2021
BH1-0.7-0.8	SE221514.002	LB228627	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	14 Jul 2021	12 Jul 2021
BH1-1.0-1.1	SE221514.003	LB228627	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	14 Jul 2021	12 Jul 2021
BH2-0.1-0.2	SE221514.004	LB228627	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	14 Jul 2021	12 Jul 2021
BH2-0.6-0.7	SE221514.005	LB228627	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	14 Jul 2021	12 Jul 2021
BH2-1.2-1.3	SE221514.006	LB228627	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	14 Jul 2021	12 Jul 2021
BH3-0.1-0.2	SE221514.007	LB228627	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	14 Jul 2021	12 Jul 2021
BH3-0.4-0.5	SE221514.008	LB228627	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	14 Jul 2021	12 Jul 2021
BH4-0.2-0.3	SE221514.009	LB228627	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	14 Jul 2021	12 Jul 2021
BH4-0.7-0.8	SE221514.010	LB228627	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	14 Jul 2021	12 Jul 2021
BH4-1.2-1.3	SE221514.011	LB228627	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	14 Jul 2021	12 Jul 2021
BH5-0.2-0.3	SE221514.012	LB228627	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	14 Jul 2021	12 Jul 2021
BH6-0.7-0.8	SE221514.013	LB228627	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	14 Jul 2021	12 Jul 2021
DUP	SE221514.014	LB228627	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	14 Jul 2021	12 Jul 2021

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1-0.2-0.3	SE221514.001	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	13 Jul 2021
BH1-0.7-0.8	SE221514.002	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH1-1.0-1.1	SE221514.003	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH2-0.1-0.2	SE221514.004	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	13 Jul 2021
BH2-0.6-0.7	SE221514.005	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH2-1.2-1.3	SE221514.006	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH3-0.1-0.2	SE221514.007	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	13 Jul 2021
BH3-0.4-0.5	SE221514.008	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH4-0.2-0.3	SE221514.009	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH4-0.7-0.8	SE221514.010	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH4-1.2-1.3	SE221514.011	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH5-0.2-0.3	SE221514.012	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH6-0.7-0.8	SE221514.013	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021

HOLDING TIME SUMMARY

SE221514 R0

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

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1-0.2-0.3	SE221514.001	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH1-0.7-0.8	SE221514.002	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	15 Jul 2021
BH1-1.0-1.1	SE221514.003	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	15 Jul 2021
BH2-0.1-0.2	SE221514.004	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH2-0.6-0.7	SE221514.005	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	15 Jul 2021
BH2-1.2-1.3	SE221514.006	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	15 Jul 2021
BH3-0.1-0.2	SE221514.007	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH3-0.4-0.5	SE221514.008	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	15 Jul 2021
BH4-0.2-0.3	SE221514.009	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH4-0.7-0.8	SE221514.010	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	15 Jul 2021
BH4-1.2-1.3	SE221514.011	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	15 Jul 2021
BH5-0.2-0.3	SE221514.012	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	15 Jul 2021
BH6-0.7-0.8	SE221514.013	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	15 Jul 2021

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1-0.2-0.3	SE221514.001	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH1-0.7-0.8	SE221514.002	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH1-1.0-1.1	SE221514.003	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH2-0.1-0.2	SE221514.004	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH2-0.6-0.7	SE221514.005	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH2-1.2-1.3	SE221514.006	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH3-0.1-0.2	SE221514.007	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH3-0.4-0.5	SE221514.008	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH4-0.2-0.3	SE221514.009	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH4-0.7-0.8	SE221514.010	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH4-1.2-1.3	SE221514.011	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH5-0.2-0.3	SE221514.012	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH6-0.7-0.8	SE221514.013	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1-0.2-0.3	SE221514.001	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	13 Jul 2021
BH1-0.7-0.8	SE221514.002	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH1-1.0-1.1	SE221514.003	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH2-0.1-0.2	SE221514.004	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	13 Jul 2021
BH2-0.6-0.7	SE221514.005	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH2-1.2-1.3	SE221514.006	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH3-0.1-0.2	SE221514.007	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	13 Jul 2021
BH3-0.4-0.5	SE221514.008	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH4-0.2-0.3	SE221514.009	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH4-0.7-0.8	SE221514.010	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH4-1.2-1.3	SE221514.011	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH5-0.2-0.3	SE221514.012	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021
BH6-0.7-0.8	SE221514.013	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	14 Jul 2021

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

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1-0.2-0.3	SE221514.001	LB228619	05 Jul 2021	08 Jul 2021	01 Jan 2022	09 Jul 2021	01 Jan 2022	13 Jul 2021
BH1-0.7-0.8	SE221514.002	LB228619	05 Jul 2021	08 Jul 2021	01 Jan 2022	09 Jul 2021	01 Jan 2022	13 Jul 2021
BH1-1.0-1.1	SE221514.003	LB228619	05 Jul 2021	08 Jul 2021	01 Jan 2022	09 Jul 2021	01 Jan 2022	13 Jul 2021
BH2-0.1-0.2	SE221514.004	LB228619	05 Jul 2021	08 Jul 2021	01 Jan 2022	09 Jul 2021	01 Jan 2022	13 Jul 2021
BH2-0.6-0.7	SE221514.005	LB228619	05 Jul 2021	08 Jul 2021	01 Jan 2022	09 Jul 2021	01 Jan 2022	13 Jul 2021
BH2-1.2-1.3	SE221514.006	LB228619	05 Jul 2021	08 Jul 2021	01 Jan 2022	09 Jul 2021	01 Jan 2022	13 Jul 2021
BH3-0.1-0.2	SE221514.007	LB228619	05 Jul 2021	08 Jul 2021	01 Jan 2022	09 Jul 2021	01 Jan 2022	13 Jul 2021
BH3-0.4-0.5	SE221514.008	LB228619	05 Jul 2021	08 Jul 2021	01 Jan 2022	09 Jul 2021	01 Jan 2022	13 Jul 2021
BH4-0.2-0.3	SE221514.009	LB228619	05 Jul 2021	08 Jul 2021	01 Jan 2022	09 Jul 2021	01 Jan 2022	13 Jul 2021
BH4-0.7-0.8	SE221514.010	LB228619	05 Jul 2021	08 Jul 2021	01 Jan 2022	09 Jul 2021	01 Jan 2022	13 Jul 2021
BH4-1.2-1.3	SE221514.011	LB228619	05 Jul 2021	08 Jul 2021	01 Jan 2022	09 Jul 2021	01 Jan 2022	13 Jul 2021
BH5-0.2-0.3	SE221514.012	LB228619	05 Jul 2021	08 Jul 2021	01 Jan 2022	09 Jul 2021	01 Jan 2022	13 Jul 2021
BH6-0.7-0.8	SE221514.013	LB228619	05 Jul 2021	08 Jul 2021	01 Jan 2022	09 Jul 2021	01 Jan 2022	13 Jul 2021

HOLDING TIME SUMMARY

SE221514 R0

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

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES (continued)

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

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
DUP	SE221514.014	LB228619	05 Jul 2021	08 Jul 2021	01 Jan 2022	09 Jul 2021	01 Jan 2022	13 Jul 2021

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
RIN	SE221514.015	LB228826	05 Jul 2021	08 Jul 2021	01 Jan 2022	13 Jul 2021	01 Jan 2022	14 Jul 2021

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1-0.2-0.3	SE221514.001	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	13 Jul 2021
BH1-0.7-0.8	SE221514.002	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	13 Jul 2021
BH1-1.0-1.1	SE221514.003	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	13 Jul 2021
BH2-0.1-0.2	SE221514.004	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	13 Jul 2021
BH2-0.6-0.7	SE221514.005	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	13 Jul 2021
BH2-1.2-1.3	SE221514.006	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	13 Jul 2021
BH3-0.1-0.2	SE221514.007	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	13 Jul 2021
BH3-0.4-0.5	SE221514.008	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	13 Jul 2021
BH4-0.2-0.3	SE221514.009	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	13 Jul 2021
BH4-0.7-0.8	SE221514.010	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	13 Jul 2021
BH4-1.2-1.3	SE221514.011	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	13 Jul 2021
BH5-0.2-0.3	SE221514.012	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	13 Jul 2021
BH6-0.7-0.8	SE221514.013	LB228625	05 Jul 2021	08 Jul 2021	19 Jul 2021	09 Jul 2021	18 Aug 2021	13 Jul 2021

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1-0.2-0.3	SE221514.001	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH1-0.7-0.8	SE221514.002	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH1-1.0-1.1	SE221514.003	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH2-0.1-0.2	SE221514.004	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH2-0.6-0.7	SE221514.005	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH2-1.2-1.3	SE221514.006	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH3-0.1-0.2	SE221514.007	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH3-0.4-0.5	SE221514.008	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH4-0.2-0.3	SE221514.009	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH4-0.7-0.8	SE221514.010	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH4-1.2-1.3	SE221514.011	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH5-0.2-0.3	SE221514.012	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH6-0.7-0.8	SE221514.013	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH1-0.2-0.3	SE221514.001	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH1-0.7-0.8	SE221514.002	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH1-1.0-1.1	SE221514.003	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH2-0.1-0.2	SE221514.004	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH2-0.6-0.7	SE221514.005	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH2-1.2-1.3	SE221514.006	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH3-0.1-0.2	SE221514.007	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH3-0.4-0.5	SE221514.008	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH4-0.2-0.3	SE221514.009	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH4-0.7-0.8	SE221514.010	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH4-1.2-1.3	SE221514.011	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH5-0.2-0.3	SE221514.012	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021
BH6-0.7-0.8	SE221514.013	LB229018	05 Jul 2021	08 Jul 2021	19 Jul 2021	15 Jul 2021	24 Aug 2021	12 Jul 2021

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 identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH1-0.2-0.3	SE221514.001	%	60 - 130%	111
	BH2-0.1-0.2	SE221514.004	%	60 - 130%	109
	BH3-0.1-0.2	SE221514.007	%	60 - 130%	105
	BH4-0.2-0.3	SE221514.009	%	60 - 130%	120

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH1-0.2-0.3	SE221514.001	%	60 - 130%	95
	BH2-0.1-0.2	SE221514.004	%	60 - 130%	90
	BH3-0.1-0.2	SE221514.007	%	60 - 130%	91
	BH4-0.2-0.3	SE221514.009	%	60 - 130%	96
d14-p-terphenyl (Surrogate)	BH1-0.2-0.3	SE221514.001	%	60 - 130%	98
	BH2-0.1-0.2	SE221514.004	%	60 - 130%	91
	BH3-0.1-0.2	SE221514.007	%	60 - 130%	94
	BH4-0.2-0.3	SE221514.009	%	60 - 130%	95

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH1-0.2-0.3	SE221514.001	%	70 - 130%	95
	BH1-0.7-0.8	SE221514.002	%	70 - 130%	92
	BH1-1.0-1.1	SE221514.003	%	70 - 130%	88
	BH2-0.1-0.2	SE221514.004	%	70 - 130%	90
	BH2-0.6-0.7	SE221514.005	%	70 - 130%	93
	BH2-1.2-1.3	SE221514.006	%	70 - 130%	96
	BH3-0.1-0.2	SE221514.007	%	70 - 130%	91
	BH3-0.4-0.5	SE221514.008	%	70 - 130%	92
	BH4-0.2-0.3	SE221514.009	%	70 - 130%	96
	BH4-0.7-0.8	SE221514.010	%	70 - 130%	96
	BH4-1.2-1.3	SE221514.011	%	70 - 130%	85
	BH5-0.2-0.3	SE221514.012	%	70 - 130%	91
	BH6-0.7-0.8	SE221514.013	%	70 - 130%	95
d14-p-terphenyl (Surrogate)	BH1-0.2-0.3	SE221514.001	%	70 - 130%	98
	BH1-0.7-0.8	SE221514.002	%	70 - 130%	94
	BH1-1.0-1.1	SE221514.003	%	70 - 130%	93
	BH2-0.1-0.2	SE221514.004	%	70 - 130%	91
	BH2-0.6-0.7	SE221514.005	%	70 - 130%	94
	BH2-1.2-1.3	SE221514.006	%	70 - 130%	94
	BH3-0.1-0.2	SE221514.007	%	70 - 130%	94
	BH3-0.4-0.5	SE221514.008	%	70 - 130%	96
	BH4-0.2-0.3	SE221514.009	%	70 - 130%	95
	BH4-0.7-0.8	SE221514.010	%	70 - 130%	94
	BH4-1.2-1.3	SE221514.011	%	70 - 130%	96
	BH5-0.2-0.3	SE221514.012	%	70 - 130%	93
	BH6-0.7-0.8	SE221514.013	%	70 - 130%	98
d5-nitrobenzene (Surrogate)	BH1-0.2-0.3	SE221514.001	%	70 - 130%	87
	BH1-0.7-0.8	SE221514.002	%	70 - 130%	89
	BH1-1.0-1.1	SE221514.003	%	70 - 130%	90
	BH2-0.1-0.2	SE221514.004	%	70 - 130%	88
	BH2-0.6-0.7	SE221514.005	%	70 - 130%	93
	BH2-1.2-1.3	SE221514.006	%	70 - 130%	91
	BH3-0.1-0.2	SE221514.007	%	70 - 130%	85
	BH3-0.4-0.5	SE221514.008	%	70 - 130%	87
	BH4-0.2-0.3	SE221514.009	%	70 - 130%	85
	BH4-0.7-0.8	SE221514.010	%	70 - 130%	90
	BH4-1.2-1.3	SE221514.011	%	70 - 130%	90
	BH5-0.2-0.3	SE221514.012	%	70 - 130%	89
	BH6-0.7-0.8	SE221514.013	%	70 - 130%	89

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH1-0.2-0.3	SE221514.001	%	60 - 130%	111
	BH2-0.1-0.2	SE221514.004	%	60 - 130%	109

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 identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PCBs in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH3-0.1-0.2	SE221514.007	%	60 - 130%	105
	BH4-0.2-0.3	SE221514.009	%	60 - 130%	120

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH1-0.2-0.3	SE221514.001	%	60 - 130%	102
	BH1-0.7-0.8	SE221514.002	%	60 - 130%	99
	BH1-1.0-1.1	SE221514.003	%	60 - 130%	101
	BH2-0.1-0.2	SE221514.004	%	60 - 130%	99
	BH2-0.6-0.7	SE221514.005	%	60 - 130%	100
	BH2-1.2-1.3	SE221514.006	%	60 - 130%	99
	BH3-0.1-0.2	SE221514.007	%	60 - 130%	101
	BH3-0.4-0.5	SE221514.008	%	60 - 130%	101
	BH4-0.2-0.3	SE221514.009	%	60 - 130%	100
	BH4-0.7-0.8	SE221514.010	%	60 - 130%	96
	BH4-1.2-1.3	SE221514.011	%	60 - 130%	100
	BH5-0.2-0.3	SE221514.012	%	60 - 130%	97
	BH6-0.7-0.8	SE221514.013	%	60 - 130%	99
d4-1,2-dichloroethane (Surrogate)	BH1-0.2-0.3	SE221514.001	%	60 - 130%	103
	BH1-0.7-0.8	SE221514.002	%	60 - 130%	101
	BH1-1.0-1.1	SE221514.003	%	60 - 130%	107
	BH2-0.1-0.2	SE221514.004	%	60 - 130%	107
	BH2-0.6-0.7	SE221514.005	%	60 - 130%	107
	BH2-1.2-1.3	SE221514.006	%	60 - 130%	105
	BH3-0.1-0.2	SE221514.007	%	60 - 130%	111
	BH3-0.4-0.5	SE221514.008	%	60 - 130%	106
	BH4-0.2-0.3	SE221514.009	%	60 - 130%	108
	BH4-0.7-0.8	SE221514.010	%	60 - 130%	103
	BH4-1.2-1.3	SE221514.011	%	60 - 130%	109
	BH5-0.2-0.3	SE221514.012	%	60 - 130%	105
	BH6-0.7-0.8	SE221514.013	%	60 - 130%	107
d8-toluene (Surrogate)	BH1-0.2-0.3	SE221514.001	%	60 - 130%	104
	BH1-0.7-0.8	SE221514.002	%	60 - 130%	104
	BH1-1.0-1.1	SE221514.003	%	60 - 130%	108
	BH2-0.1-0.2	SE221514.004	%	60 - 130%	108
	BH2-0.6-0.7	SE221514.005	%	60 - 130%	109
	BH2-1.2-1.3	SE221514.006	%	60 - 130%	108
	BH3-0.1-0.2	SE221514.007	%	60 - 130%	112
	BH3-0.4-0.5	SE221514.008	%	60 - 130%	107
	BH4-0.2-0.3	SE221514.009	%	60 - 130%	110
	BH4-0.7-0.8	SE221514.010	%	60 - 130%	103
	BH4-1.2-1.3	SE221514.011	%	60 - 130%	110
	BH5-0.2-0.3	SE221514.012	%	60 - 130%	107
	BH6-0.7-0.8	SE221514.013	%	60 - 130%	110

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH1-0.2-0.3	SE221514.001	%	60 - 130%	102
	BH1-0.7-0.8	SE221514.002	%	60 - 130%	99
	BH1-1.0-1.1	SE221514.003	%	60 - 130%	101
	BH2-0.1-0.2	SE221514.004	%	60 - 130%	99
	BH2-0.6-0.7	SE221514.005	%	60 - 130%	100
	BH2-1.2-1.3	SE221514.006	%	60 - 130%	99
	BH3-0.1-0.2	SE221514.007	%	60 - 130%	101
	BH3-0.4-0.5	SE221514.008	%	60 - 130%	101
	BH4-0.2-0.3	SE221514.009	%	60 - 130%	100
	BH4-0.7-0.8	SE221514.010	%	60 - 130%	96
	BH4-1.2-1.3	SE221514.011	%	60 - 130%	100
	BH5-0.2-0.3	SE221514.012	%	60 - 130%	97
	BH6-0.7-0.8	SE221514.013	%	60 - 130%	99
d4-1,2-dichloroethane (Surrogate)	BH1-0.2-0.3	SE221514.001	%	60 - 130%	103
	BH1-0.7-0.8	SE221514.002	%	60 - 130%	101

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 identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Volatile Petroleum Hydrocarbons in Soil (continued) — **Method: ME-(AU)-[ENV]AN433**

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d4-1,2-dichloroethane (Surrogate)	BH1-1.0-1.1	SE221514.003	%	60 - 130%	107
	BH2-0.1-0.2	SE221514.004	%	60 - 130%	107
	BH2-0.6-0.7	SE221514.005	%	60 - 130%	107
	BH2-1.2-1.3	SE221514.006	%	60 - 130%	105
	BH3-0.1-0.2	SE221514.007	%	60 - 130%	111
	BH3-0.4-0.5	SE221514.008	%	60 - 130%	106
	BH4-0.2-0.3	SE221514.009	%	60 - 130%	108
	BH4-0.7-0.8	SE221514.010	%	60 - 130%	103
	BH4-1.2-1.3	SE221514.011	%	60 - 130%	109
	BH5-0.2-0.3	SE221514.012	%	60 - 130%	105
	BH6-0.7-0.8	SE221514.013	%	60 - 130%	107
d8-toluene (Surrogate)	BH1-0.2-0.3	SE221514.001	%	60 - 130%	104
	BH1-0.7-0.8	SE221514.002	%	60 - 130%	104
	BH1-1.0-1.1	SE221514.003	%	60 - 130%	108
	BH2-0.1-0.2	SE221514.004	%	60 - 130%	108
	BH2-0.6-0.7	SE221514.005	%	60 - 130%	109
	BH2-1.2-1.3	SE221514.006	%	60 - 130%	108
	BH3-0.1-0.2	SE221514.007	%	60 - 130%	112
	BH3-0.4-0.5	SE221514.008	%	60 - 130%	107
	BH4-0.2-0.3	SE221514.009	%	60 - 130%	110
	BH4-0.7-0.8	SE221514.010	%	60 - 130%	103
	BH4-1.2-1.3	SE221514.011	%	60 - 130%	110
	BH5-0.2-0.3	SE221514.012	%	60 - 130%	107
	BH6-0.7-0.8	SE221514.013	%	60 - 130%	110

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 (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Number	Parameter	Units	LOR	Result
LB228795.001	Mercury	mg/L	0.0001	<0.0001

Mercury in Soil

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

Sample Number	Parameter	Units	LOR	Result
LB228621.001	Mercury	mg/kg	0.05	<0.05

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB228625.001		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
		Alpha BHC	mg/kg	0.1	<0.1
		Lindane	mg/kg	0.1	<0.1
		Heptachlor	mg/kg	0.1	<0.1
		Aldrin	mg/kg	0.1	<0.1
		Beta BHC	mg/kg	0.1	<0.1
		Delta BHC	mg/kg	0.1	<0.1
		Heptachlor epoxide	mg/kg	0.1	<0.1
		Alpha Endosulfan	mg/kg	0.2	<0.2
		Gamma Chlordane	mg/kg	0.1	<0.1
		Alpha Chlordane	mg/kg	0.1	<0.1
		p,p'-DDE	mg/kg	0.1	<0.1
		Dieldrin	mg/kg	0.2	<0.2
		Endrin	mg/kg	0.2	<0.2
		Beta Endosulfan	mg/kg	0.2	<0.2
		p,p'-DDD	mg/kg	0.1	<0.1
		p,p'-DDT	mg/kg	0.1	<0.1
		Endosulfan sulphate	mg/kg	0.1	<0.1
		Endrin Aldehyde	mg/kg	0.1	<0.1
		Methoxychlor	mg/kg	0.1	<0.1
		Endrin Ketone	mg/kg	0.1	<0.1
		Isodrin	mg/kg	0.1	<0.1
		Mirex	mg/kg	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	99

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB228625.001		Dichlorvos	mg/kg	0.5	<0.5
		Dimethoate	mg/kg	0.5	<0.5
		Diazinon (Dimpylate)	mg/kg	0.5	<0.5
		Fenitrothion	mg/kg	0.2	<0.2
		Malathion	mg/kg	0.2	<0.2
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2
		Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2
		Bromophos Ethyl	mg/kg	0.2	<0.2
		Methidathion	mg/kg	0.5	<0.5
		Ethion	mg/kg	0.2	<0.2
		Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	99
		d14-p-terphenyl (Surrogate)	%	-	101

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result
LB228625.001	Naphthalene	mg/kg	0.1	<0.1
	2-methylnaphthalene	mg/kg	0.1	<0.1
	1-methylnaphthalene	mg/kg	0.1	<0.1
	Acenaphthylene	mg/kg	0.1	<0.1
	Acenaphthene	mg/kg	0.1	<0.1
	Fluorene	mg/kg	0.1	<0.1
	Phenanthrene	mg/kg	0.1	<0.1
	Anthracene	mg/kg	0.1	<0.1

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.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB228625.001		Fluoranthene	mg/kg	0.1	<0.1
		Pyrene	mg/kg	0.1	<0.1
		Benzo(a)anthracene	mg/kg	0.1	<0.1
		Chrysene	mg/kg	0.1	<0.1
		Benzo(a)pyrene	mg/kg	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
		Dibenzo(ah)anthracene	mg/kg	0.1	<0.1
		Benzo(ghi)perylene	mg/kg	0.1	<0.1
		Total PAH (18)	mg/kg	0.8	<0.8
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	88
		2-fluorobiphenyl (Surrogate)	%	-	99
		d14-p-terphenyl (Surrogate)	%	-	101

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB228625.001		Arochlor 1016	mg/kg	0.2	<0.2
		Arochlor 1221	mg/kg	0.2	<0.2
		Arochlor 1232	mg/kg	0.2	<0.2
		Arochlor 1242	mg/kg	0.2	<0.2
		Arochlor 1248	mg/kg	0.2	<0.2
		Arochlor 1254	mg/kg	0.2	<0.2
		Arochlor 1260	mg/kg	0.2	<0.2
		Arochlor 1262	mg/kg	0.2	<0.2
		Arochlor 1268	mg/kg	0.2	<0.2
		Total PCBs (Arochlors)	mg/kg	1	<1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	99

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

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

Sample Number	Parameter	Units	LOR	Result
LB228619.001	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

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result
LB228826.001	Arsenic, As	µg/L	1	<1
	Cadmium, Cd	µg/L	0.1	<0.1
	Chromium, Cr	µg/L	1	<1
	Copper, Cu	µg/L	1	<1
	Lead, Pb	µg/L	1	<1
	Nickel, Ni	µg/L	1	<1
	Zinc, Zn	µg/L	5	<5

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB228625.001	TRH C10-C14	mg/kg	20	<20
	TRH C15-C28	mg/kg	45	<45
	TRH C29-C36	mg/kg	45	<45
	TRH C37-C40	mg/kg	100	<100
	TRH C10-C36 Total	mg/kg	110	<110

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB229018.001	Monocyclic Aromatic Hydrocarbons	Benzene	mg/kg	0.1	<0.1
		Toluene	mg/kg	0.1	<0.1
		Ethylbenzene	mg/kg	0.1	<0.1
		m/p-xylene	mg/kg	0.2	<0.2
		o-xylene	mg/kg	0.1	<0.1
	Polycyclic VOCs	Naphthalene	mg/kg	0.1	<0.1

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.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB229018.001	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	117
		d8-toluene (Surrogate)	%	-	118
		Bromofluorobenzene (Surrogate)	%	-	111
	Totals	Total BTEX	mg/kg	0.6	<0.6

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB229018.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	d4-1,2-dichloroethane (Surrogate)	%	-	117

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / 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 x SDL / Mean + 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 identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

Mercury in Soil

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE221514.005	LB228621.014	Mercury	mg/kg	0.05	<0.05	<0.05	200	0
SE221514.014	LB228621.024	Mercury	mg/kg	0.05	<0.05	<0.05	200	0

Moisture Content

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

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE221510.006	LB228627.022	% Moisture	%w/w	1	16.7	17.3	36	4
SE221510.008	LB228627.025	% Moisture	%w/w	1	16.0	17.4	36	9
SE221514.010	LB228627.011	% Moisture	%w/w	1	19.1	19.1	35	0

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE221514.009	LB228625.024		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Lindane	mg/kg	0.1	<0.1	<0.1	200	0
			Heptachlor	mg/kg	0.1	<0.1	<0.1	200	0
			Aldrin	mg/kg	0.1	<0.1	<0.1	200	0
			Beta BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Delta BHC	mg/kg	0.1	<0.1	<0.1	200	0
			Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	200	0
			o,p'-DDE	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
			Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
			Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	200	0
			trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	200	0
			p,p'-DDE	mg/kg	0.1	<0.1	<0.1	200	0
			Dieldrin	mg/kg	0.2	<0.2	<0.2	200	0
			Endrin	mg/kg	0.2	<0.2	<0.2	200	0
			o,p'-DDD	mg/kg	0.1	<0.1	<0.1	200	0
			o,p'-DDT	mg/kg	0.1	<0.1	<0.1	200	0
			Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	200	0
			p,p'-DDD	mg/kg	0.1	<0.1	<0.1	200	0
			p,p'-DDT	mg/kg	0.1	<0.1	<0.1	200	0
			Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	200	0
			Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	200	0
			Methoxychlor	mg/kg	0.1	<0.1	<0.1	200	0
			Endrin Ketone	mg/kg	0.1	<0.1	<0.1	200	0
			Isodrin	mg/kg	0.1	<0.1	<0.1	200	0
			Mirex	mg/kg	0.1	<0.1	<0.1	200	0
			Total CLP OC Pesticides	mg/kg	1	<1	<1	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.18	0.17	30	3

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE221514.009	LB228625.026		Dichlorvos	mg/kg	0.5	<0.5	<0.5	200	0
			Dimethoate	mg/kg	0.5	<0.5	<0.5	200	0
			Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	200	0
			Fenitrothion	mg/kg	0.2	<0.2	<0.2	200	0
			Malathion	mg/kg	0.2	<0.2	<0.2	200	0
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	200	0
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	200	0
			Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	200	0
			Methidathion	mg/kg	0.5	<0.5	<0.5	200	0
			Ethion	mg/kg	0.2	<0.2	<0.2	200	0
			Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	200	0
			Total OP Pesticides*	mg/kg	1.7	<1.7	<1.7	200	0
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	4
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate	Parameter	Units	LOR

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / 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 x SDL / Mean + 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 identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE221510.008	LB228625.022		Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthylene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
			Phenanthrene	mg/kg	0.1	<0.1	<0.1	200	0
			Anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Chrysene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=0	mg/kg	0.2	<0.2	<0.2	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	mg/kg	0.3	<0.3	<0.3	134	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	mg/kg	0.2	<0.2	<0.2	175	0
			Total PAH (18)	mg/kg	0.8	<0.8	<0.8	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.4	30	5
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.4	30	9
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.4	30	5
SE221514.009	LB228625.026		Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthylene	mg/kg	0.1	<0.1	<0.1	200	0
			Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
			Phenanthrene	mg/kg	0.1	<0.1	<0.1	200	0
			Anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Chrysene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=0	mg/kg	0.2	<0.2	<0.2	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	mg/kg	0.3	<0.3	<0.3	134	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	mg/kg	0.2	<0.2	<0.2	175	0
			Total PAH (18)	mg/kg	0.8	<0.8	<0.8	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.4	30	5
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	4
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	30	2

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE221514.009	LB228625.024	Arochlor 1016	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1221	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1232	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1242	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1248	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1254	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1260	mg/kg	0.2	<0.2	<0.2	200	0
		Arochlor 1262	mg/kg	0.2	<0.2	<0.2	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / 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 x SDL / Mean + 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 identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

PCBs in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE221514.009	LB228625.024		Arochlor 1268	mg/kg	0.2	<0.2	<0.2	200	0
			Total PCBs (Arochlors)	mg/kg	1	<1	<1	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	0	30	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 %
SE221514.005	LB228619.014		Arsenic, As	mg/kg	1	11	9	40	13
			Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
			Chromium, Cr	mg/kg	0.5	2.3	2.6	51	12
			Copper, Cu	mg/kg	0.5	<0.5	0.8	110	43
			Nickel, Ni	mg/kg	0.5	<0.5	<0.5	150	0
			Lead, Pb	mg/kg	1	7	8	44	10
			Zinc, Zn	mg/kg	2	3.7	4.1	81	11
SE221514.014	LB228619.024		Arsenic, As	mg/kg	1	2	3	71	54
			Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
			Chromium, Cr	mg/kg	0.5	0.7	0.9	89	23
			Copper, Cu	mg/kg	0.5	3.1	2.5	48	21
			Nickel, Ni	mg/kg	0.5	<0.5	<0.5	200	0
			Lead, Pb	mg/kg	1	<1	2	96	72
			Zinc, Zn	mg/kg	2	4.8	3.8	76	23

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE221510.008	LB228625.022		TRH C10-C14	mg/kg	20	<20	<20	200	0
			TRH C15-C28	mg/kg	45	<45	<45	200	0
			TRH C29-C36	mg/kg	45	<45	<45	200	0
			TRH C37-C40	mg/kg	100	<100	<100	200	0
			TRH C10-C36 Total	mg/kg	110	<110	<110	200	0
			TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	200	0
		TRH F Bands	TRH >C10-C16	mg/kg	25	<25	<25	200	0
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0
SE221514.009	LB228625.024		TRH C10-C14	mg/kg	20	<20	<20	200	0
			TRH C15-C28	mg/kg	45	<45	<45	200	0
			TRH C29-C36	mg/kg	45	<45	<45	200	0
			TRH C37-C40	mg/kg	100	<100	<100	200	0
			TRH C10-C36 Total	mg/kg	110	<110	<110	200	0
			TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	200	0
		TRH F Bands	TRH >C10-C16	mg/kg	25	<25	<25	200	0
			TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	<25	<25	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE221510.008	LB229018.022	Monocyclic Aromatic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
			Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	10.5	9.0	50	16
			d8-toluene (Surrogate)	mg/kg	-	10.6	9.4	50	12
			Bromofluorobenzene (Surrogate)	mg/kg	-	9.8	9.1	50	8
		Totals	Total Xylenes	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX	mg/kg	0.6	<0.6	<0.6	200	0
SE221514.010	LB229018.014	Monocyclic Aromatic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
			Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / 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 x SDL / Mean + 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 identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

NOTE: The RPD reported is calculated from the unrounded data for the original and replicate result. Manual calculation of the RPD from the rounded data reported may

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE221514.010	LB229018.014	Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	10.3	10.7	50	4
			d8-toluene (Surrogate)	mg/kg	-	10.3	10.9	50	5
			Bromofluorobenzene (Surrogate)	mg/kg	-	9.6	10.2	50	6
		Totals	Total Xylenes	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX	mg/kg	0.6	<0.6	<0.6	200	0

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE221510.008	LB229018.022		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	10.5	9.0	30	16
			d8-toluene (Surrogate)	mg/kg	-	10.6	9.4	30	12
			Bromofluorobenzene (Surrogate)	mg/kg	-	9.8	9.1	30	8
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0
SE221514.010	LB229018.014		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	10.3	10.7	30	4
			d8-toluene (Surrogate)	mg/kg	-	10.3	10.9	30	5
			Bromofluorobenzene (Surrogate)	mg/kg	-	9.6	10.2	30	6
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0

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 %
LB228621.002	Mercury	mg/kg	0.05	0.19	0.2	70 - 130	97

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB228625.002		Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	103
		Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	106
		Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	99
		Dieldrin	mg/kg	0.2	<0.2	0.2	60 - 140	97
		Endrin	mg/kg	0.2	0.2	0.2	60 - 140	103
		p,p'-DDT	mg/kg	0.1	0.1	0.2	60 - 140	61
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.17	0.15	40 - 130	113

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB228625.002		Dichlorvos	mg/kg	0.5	1.4	2	60 - 140	71
		Diazinon (Dimpylate)	mg/kg	0.5	2.0	2	60 - 140	99
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	2.3	2	60 - 140	113
		Ethion	mg/kg	0.2	1.6	2	60 - 140	79
	Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	95
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	91

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB228625.002		Naphthalene	mg/kg	0.1	4.4	4	60 - 140	111
		Acenaphthylene	mg/kg	0.1	4.9	4	60 - 140	123
		Acenaphthene	mg/kg	0.1	4.0	4	60 - 140	100
		Phenanthrene	mg/kg	0.1	4.6	4	60 - 140	115
		Anthracene	mg/kg	0.1	4.4	4	60 - 140	109
		Fluoranthene	mg/kg	0.1	4.8	4	60 - 140	119
		Pyrene	mg/kg	0.1	4.7	4	60 - 140	117
		Benzo(a)pyrene	mg/kg	0.1	4.2	4	60 - 140	105
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	84
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	95
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	91

PCBs in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB228625.002	Arochlor 1260	mg/kg	0.2	0.5	0.4	60 - 140	133

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 %
LB228619.002	Arsenic, As	mg/kg	1	340	318.22	80 - 120	108
	Cadmium, Cd	mg/kg	0.3	3.8	4.81	70 - 130	78
	Chromium, Cr	mg/kg	0.5	38	38.31	80 - 120	99
	Copper, Cu	mg/kg	0.5	310	290	80 - 120	106
	Nickel, Ni	mg/kg	0.5	190	187	80 - 120	102
	Lead, Pb	mg/kg	1	94	89.9	80 - 120	105
	Zinc, Zn	mg/kg	2	280	273	80 - 120	101

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB228826.002	Arsenic, As	µg/L	1	21	20	80 - 120	103
	Cadmium, Cd	µg/L	0.1	21	20	80 - 120	103
	Chromium, Cr	µg/L	1	19	20	80 - 120	95
	Copper, Cu	µg/L	1	19	20	80 - 120	95
	Lead, Pb	µg/L	1	22	20	80 - 120	108
	Nickel, Ni	µg/L	1	21	20	80 - 120	104
	Zinc, Zn	µg/L	5	22	20	80 - 120	108

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.

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB228625.002		TRH C10-C14	mg/kg	20	37	40	60 - 140	93
		TRH C15-C28	mg/kg	45	<45	40	60 - 140	83
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	80
	TRH F Bands	TRH >C10-C16	mg/kg	25	36	40	60 - 140	90
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	83
		TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	80

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB229018.002	Monocyclic	Benzene	mg/kg	0.1	5.1	5	60 - 140	102
	Aromatic	Toluene	mg/kg	0.1	5.1	5	60 - 140	102
		Ethylbenzene	mg/kg	0.1	4.9	5	60 - 140	98
		m/p-xylene	mg/kg	0.2	9.8	10	60 - 140	98
		o-xylene	mg/kg	0.1	4.9	5	60 - 140	98
	Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	12.1	10	70 - 130	121
		d8-toluene (Surrogate)	mg/kg	-	11.7	10	70 - 130	117
		Bromofluorobenzene (Surrogate)	mg/kg	-	11.1	10	70 - 130	111

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB229018.002		TRH C6-C10	mg/kg	25	90	92.5	60 - 140	97
		TRH C6-C9	mg/kg	20	78	80	60 - 140	98
	Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	12.1	10	70 - 130	121
		Bromofluorobenzene (Surrogate)	mg/kg	-	11.1	10	70 - 130	111
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	60	62.5	60 - 140	96

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 identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE221514.015	LB228795.004	Mercury	mg/L	0.0001	0.0020	<0.0001	0.008	100

Mercury in Soil

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE221513.001	LB228621.004	Mercury	mg/kg	0.05	0.22	<0.05	0.2	102

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE221514.001	LB228625.004		Dichlorvos	mg/kg	0.5	1.5	<0.5	2	74
			Dimethoate	mg/kg	0.5	<0.5	<0.5	-	-
			Diazinon (Dimpylate)	mg/kg	0.5	1.9	<0.5	2	96
			Fenitrothion	mg/kg	0.2	<0.2	<0.2	-	-
			Malathion	mg/kg	0.2	<0.2	<0.2	-	-
			Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	2.3	<0.2	2	115
			Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	-	-
			Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	-	-
			Methidathion	mg/kg	0.5	<0.5	<0.5	-	-
			Ethion	mg/kg	0.2	1.8	<0.2	2	90
			Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	-	-
			Total OP Pesticides*	mg/kg	1.7	7.5	<1.7	-	-
		Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	-	97
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	-	92

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE221514.001	LB228625.004		Naphthalene	mg/kg	0.1	4.4	<0.1	4	111
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
			Acenaphthylene	mg/kg	0.1	4.7	<0.1	4	118
			Acenaphthene	mg/kg	0.1	3.7	<0.1	4	92
			Fluorene	mg/kg	0.1	<0.1	<0.1	-	-
			Phenanthrene	mg/kg	0.1	4.8	<0.1	4	119
			Anthracene	mg/kg	0.1	4.5	<0.1	4	111
			Fluoranthene	mg/kg	0.1	4.8	<0.1	4	118
			Pyrene	mg/kg	0.1	4.5	<0.1	4	111
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
			Chrysene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(a)pyrene	mg/kg	0.1	4.2	<0.1	4	105
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	-	-
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	4.2	<0.2	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	4.4	<0.3	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	4.3	<0.2	-	-
			Total PAH (18)	mg/kg	0.8	36	<0.8	-	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.4	-	86
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.5	0.5	-	97
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	-	92

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%
SE221513.001	LB228619.004	Arsenic, As	mg/kg	1	51	4	50	94
		Cadmium, Cd	mg/kg	0.3	44	<0.3	50	89
		Chromium, Cr	mg/kg	0.5	53	5.7	50	94
		Copper, Cu	mg/kg	0.5	58	11	50	95
		Nickel, Ni	mg/kg	0.5	51	4.6	50	94

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 identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES (continued)

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

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE221513.001	LB228619.004	Lead, Pb	mg/kg	1	57	11	50	92
		Zinc, Zn	mg/kg	2	93	41	50	105

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE221514.015	LB228826.004	Arsenic, As	µg/L	1	21	<1	20	104
		Cadmium, Cd	µg/L	0.1	20	<0.1	20	101
		Chromium, Cr	µg/L	1	19	<1	20	94
		Copper, Cu	µg/L	1	19	<1	20	96
		Lead, Pb	µg/L	1	20	<1	20	101
		Nickel, Ni	µg/L	1	21	<1	20	104
		Zinc, Zn	µg/L	5	22	<5	20	109

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE221514.001	LB228625.004		TRH C10-C14	mg/kg	20	34	<20	40	85
			TRH C15-C28	mg/kg	45	<45	<45	40	95
			TRH C29-C36	mg/kg	45	<45	<45	40	93
			TRH C37-C40	mg/kg	100	<100	<100	-	-
			TRH C10-C36 Total	mg/kg	110	<110	<110	-	-
			TRH >C10-C40 Total (F bands)	mg/kg	210	<210	<210	-	-
		TRH F	TRH >C10-C16	mg/kg	25	34	<25	40	85
		Bands	TRH >C10-C16 - Naphthalene (F2)	mg/kg	25	34	<25	-	-
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	40	110
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	-	-

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE221514.001	LB229018.004	Monocyclic	Benzene	mg/kg	0.1	3.8	<0.1	5	76
		Aromatic	Toluene	mg/kg	0.1	4.2	<0.1	5	84
			Ethylbenzene	mg/kg	0.1	4.3	<0.1	5	86
			m/p-xylene	mg/kg	0.2	8.6	<0.2	10	86
			o-xylene	mg/kg	0.1	4.4	<0.1	5	87
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	7.8	10.3	10	78
			d8-toluene (Surrogate)	mg/kg	-	7.6	10.4	10	76
			Bromofluorobenzene (Surrogate)	mg/kg	-	8.6	10.2	10	86
		Totals	Total Xylenes	mg/kg	0.3	13	<0.3	-	-
			Total BTEX	mg/kg	0.6	25	<0.6	-	-

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE221514.001	LB229018.004		TRH C6-C10	mg/kg	25	77	<25	92.5	84
			TRH C6-C9	mg/kg	20	66	<20	80	82
		Surrogates	d4-1,2-dichloroethane (Surrogate)	mg/kg	-	7.8	10.3	10	78
			d8-toluene (Surrogate)	mg/kg	-	7.6	10.4	10	76
			Bromofluorobenzene (Surrogate)	mg/kg	-	8.6	10.2	-	86
		VPH F	Benzene (F0)	mg/kg	0.1	3.8	<0.1	-	-
		Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	52	<25	62.5	83

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / 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 x SDL / Mean + 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 identifer 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.

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Jake Duck & Malcolm Adrien
Client	VALLEY CIVILAB PTY LTD
Address	PO BOX 3127 THORNTON NSW 2322
Telephone	61 2 4966 1844
Facsimile	(Not specified)
Email	jd@huntercivilab.com.au
Project	**P21405 - St Bedes**
Order Number	**2368**
Samples	6

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
SGS Reference	**SE221514 R0**
Date Received	08 Jul 2021
Date Reported	15 Jul 2021

COMMENTS

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

No respirable fibres detected in all soil samples using trace analysis technique.

A portion of the sample supplied has been sub-sampled for asbestos analysis in soil according to SGS In-house procedures.
We therefore cannot guarantee that the sub-sample is representative of the entire sample supplied.
SGS Industries and Environment recommends supplying approximately 50-100g of sample in a separate container.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES

Akheeqar BENIAMEEN
Chemist

Bennet LO
Senior Organic Chemist/Metals Chemis

Kamrul AHSAN
Senior Chemist

Ly Kim HA
Organic Section Head

Ravee SIVASUBRAMANIAM
Hygiene Team Leader

RESULTS

Fibre Identification in soil — Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification	Est.%w/w*
SE221514.001	BH1-0.2-0.3	Soil	65g Clay,Sand,Soil, Rocks	05 Jul 2021	No Asbestos Found at RL of 0.1g/kg Organic Fibres Detected	<0.01
SE221514.003	BH1-1.0-1.1	Soil	70g Clay,Sand,Rock s	05 Jul 2021	No Asbestos Found at RL of 0.1g/kg	<0.01
SE221514.004	BH2-0.1-0.2	Soil	44g Sand,Soil,Rocks	05 Jul 2021	No Asbestos Found at RL of 0.1g/kg Organic Fibres Detected	<0.01
SE221514.007	BH3-0.1-0.2	Soil	62g Sand,Rocks	05 Jul 2021	No Asbestos Found at RL of 0.1g/kg	<0.01
SE221514.009	BH4-0.2-0.3	Soil	39g Clay,Sand,Rock s	05 Jul 2021	No Asbestos Found at RL of 0.1g/kg	<0.01
SE221514.012	BH5-0.2-0.3	Soil	49g Clay,Sand,Soil	05 Jul 2021	No Asbestos Found at RL of 0.1g/kg	<0.01

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf) The fibres detected may or may not be asbestos fibres.
AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples , Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection/reporting limit (RL) of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."
AN602	The sample can be reported “no asbestos found at the reporting limit (RL) of 0.1 g/kg” (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if- (a) no trace asbestos fibres have been detected (i.e. no ‘respirable ’ fibres): (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg: and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.

FOOTNOTES

Amosite	-	Brown Asbestos	NA	-	Not Analysed
Chrysotile	-	White Asbestos	LNR	-	Listed, Not Required
Crocidolite	-	Blue Asbestos	*	-	NATA accreditation does not cover the performance of this service .
Amphiboles	-	Amosite and/or Crocidolite	**	-	Indicative data, theoretical holding time exceeded.
			***	-	Indicates that both * and ** apply.

(In reference to soil samples only) This report does not comply with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment and Remediation and Management of Asbestos Contaminated sites in Western Australia - May 2009.

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.

Where reported: 'Asbestos Detected': Asbestos detected by polarised light microscopy, including dispersion staining.
Where reported: 'No Asbestos Found': No Asbestos Found by polarised light microscopy , including dispersion staining.
Where reported: 'UMF Detected': Mineral fibres of unknown type detected by polarised light microscopy, including dispersion staining. Confirmation by another independent analytical technique may be necessary.

Even after disintegration it can be very difficult, or impossible, to detect the presence of asbestos in some asbestos -containing bulk materials using polarised light microscopy. This is due to the low grade or small length or diameter of asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials.

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 .

CHAIN OF CUSTODY & ANALYSIS REQUEST

Page 1 of 2

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email: au.samplereceipt.sydney@sgs.com

Company Name:	Hunter Civilab	Project Name/No:	P21405 - St Bede's
Address:	3/62 Sandringham Avenue Thornton 2322	Purchase Order No:	2368
		Results Required By:	Std
		Telephone:	0499 151 225 / 0499 160 449
Contact Name:	Malcolm Adrien	Facsimile:	
		Email Results:	malcolm.adrien@huntercivilab.com.au; jake.duck@huntercivilab.com.au;

Client Sample ID	Date Sampled	Lab Sample ID	WATER	SOIL	PRESERVATIVE	NO OF CONTAINERS	CL10	CL17	CL2	Asbestos
BH1 - 0.2-0.3	5/7	1		X				X		X
BH1 - 0.7-0.8		2					X			
BH1 - 1.0-1.1		3					X			X
BH2 - 0.1-0.2		4						X		X
BH2 - 0.6-0.7		5					X			
BH2 - 1.2-1.3		6					X			
BH3 - 0.1-0.2		7						X		X
BH3 - 0.4-0.5		8					X			
BH3 - 1.1-1.2										
BH4 - 0.2-0.3		9						X		X

SGS EHS Sydney COC
SE221514

Relinquished By: M. Adrien	Date/Time:	Received By:	Date/Time 8.7.21 10:10
Relinquished By:	Date/Time:	Received By:	Date/Time
Samples Intact: Yes/ No	Temperature: Ambient / Chilled 12.0	Sample Cooler Sealed: Yes/ No	Laboratory Quotation No:
	Comments:		

CHAIN OF CUSTODY & ANALYSIS REQUEST

SGS Environmental Services
Unit 16, 33 Maddox Street
Alexandria NSW 2015
Telephone No: (02) 85940400
Facsimile No: (02) 85940499
Email: au.samplereceipt.sydney@sgs.com

Company Name:	Hunter Civilab	Project Name/No:	P21405
Address:	3/62 Sandringham Avenue Thornton 2322	Purchase Order No:	
		Results Required By:	Std.
		Telephone:	0499 151 225 / 0499 160 449
Contact Name:	Malcolm Adrien	Facsimile:	
		Email Results:	malcolm.adrien@huntercivilab.com.au; jake.duck@huntercivilab.com.au;

Client Sample ID	Date Sampled	Lab Sample ID	WATER	SOIL	PRESERVATIVE	NO OF CONTAINERS	CL10	CL17	CL2	Asbestos
BH4-0.7-0.8	10	10		X			X			
BH4-1.2-1.3	11	11		↓			X			
BH5-0.2-0.3	12	12		↓			X			X
BH6-0.7-0.8	13	13		↓			X			
DUP	14	14		X					X	
RIN	[redacted]	15	X						X	

Relinquished By:	Date/Time:	Received By: George Zhi	Date/Time 8/7/21 @ 10.10 am
Relinquished By:	Date/Time:	Received By:	Date/Time
Samples Intact: (Yes)/ No	Temperature: Ambient / (Chilled)	Sample Cooler Sealed: Yes/ No	Laboratory Quotation No:
	Comments:		

Yin, Emily (Sydney)

From: Malcolm Adrien (Hunter Civilab) <ma@huntercivilab.com.au>
Sent: Thursday, 8 July 2021 3:02 PM
To: AU.SampleReceipt.Sydney (Sydney); Jake Duck (Hunter Civilab)
Subject: [EXTERNAL] RE: P21405 St Bede's Samples

*** WARNING: this message is from an EXTERNAL SENDER. Please be cautious, particularly with links and attachments. ***

Hi Michael,
I will send the rin through with some samples leaving tomorrow. The BH6 sample isn't important, it can be kept on hold.

Thanks

Malcolm Adrien
Environmental Services Manager
p: 02 4966 1844 m: 0499 151 225
e: malcolm.adrien@huntercivilab.com.au
w: huntercivilab.com.au

From: AU.SampleReceipt.Sydney (Sydney) <AU.SampleReceipt.Sydney@sgs.com>
Sent: Thursday, 8 July 2021 11:08 AM
To: Malcolm Adrien (Hunter Civilab) <ma@huntercivilab.com.au>; Jake Duck (Hunter Civilab) <jd@huntercivilab.com.au>
Subject: P21405 St Bede's Samples

Hi All,

We've received the samples but don't have the RIN waters in the esky. Are they still on site, and should we be expecting them to come later? We also have an additional Sample BH6 - 0.1-0.2, please advise if you would like this analysed or kept on hold.

Attached is the COC for reference.

Regards,

Michael Bousquet
Sydney Sample Receipt Team
Environment, Health & Safety
Sample Receipt

SGS Australia Pty Ltd
Unit 16, 33 Maddox Street
Alexandria NSW 2015

Phone: +61 (0)2 8594 0400
Fax: +61 (0)2 8594 0499
E-mail: au.samplereceipt.sydney@sgs.com

Appendix C – Geotechnical Report

Undertaken by Hunter Civilab – 14th October 2021

Geotechnical Investigation

Saint Bede's Catholic College Chapel, Heritage Drive, Chisholm

Report Ref: C1173-R-001-Rev0
Written by: Joe Rabo (Geotechnical Engineering Technician)
Reviewed by: Nathan Roberts (Geotechnical Engineering Manager)
Email: office@huntercivilab.com.au
Client: Catholic Schools Office

14 October 2021

Prepared for

Catholic Schools Office
Diocese of Maitland - Newcastle
841 Hunter Street
Newcastle West NSW 2302
Ph: 4979 1200
Email: elliot@principlepm.com.au
Web: www.mn.catholic.org.au

Prepared by

Hunter Civilab
ABN 50 103 355 531
3/62 Sandringham Avenue
PO Box 3127
Thornton NSW 2322
Ph: (02) 4966 1844
Email: office@huntercivilab.com.au
Web: huntercivilab.com.au

Project Details

Site Address:	Saint Bede's Catholic College Chapel, Heritage Drive, Chisholm	
Project Type:	Proposed Chapel	
Project no	**Report type**	**Report no**
C1173	R	001

Report Register

Revision Number	Reported By	Reviewed By	Date
Rev0	JR	NR	14/10/2021

We confirm that the following report has been produced for Catholic Schools Office, based on the described methods and conditions within.

For and on behalf of Hunter Civilab,

Nathan Roberts
Geotechnical Engineering Manager

Executive Summary

The following report details the geotechnical investigation undertaken by Hunter Civilab (HC) under the request of Catholic Schools Office. The investigation was undertaken at Saint Bede's Catholic College Chapel, Heritage Drive, Chisholm on the 1st of October 2021 and consisted of a desktop study, a visual site assessment and intrusive excavations and testing.

The desktop study indicated that the site lies within an area of no known occurrence of acid sulfate soils however a high probability zone lies immediately to the northwest, southwest of the site.

The desktop study also indicated that the site does not lie within a mine subsidence district.

The site gradually slopes towards the southwest boundary.

The subsurface profile generally consisted of up to 1.5m of varying fill, overlying sandy clay residual soils.

A site classification was undertaken based on the laboratory testing results and the subsurface profile encountered at the time of investigation. The results indicated a Class P site with a reactivity of Class H1, having a characteristic free surface movement of 40-60 mm. Therefore, a site classification of Class P-H1 is recommended for the site.

The site would be suitable for the use of deep footings. Refer to **Section 8** for footing details and recommended allowable bearing capacity.

Table of Contents

Annex List:

Annex A – Borehole Location Plan

Annex B – Borehole & DCP Log Report

Annex C – Hunter Civilab Laboratory Test Reports

Annex D - BTF 18-2011- CSIRO - Foundation Maintenance and Footing Performance – A Homeowner's Guide

1 Introduction

At the request of Catholic Schools Office, Hunter Civilab (HC) have carried out a limited geotechnical investigation for the purpose of a site classification at Saint Bede's Catholic College Chapel, Heritage Drive, Chisholm. It is understood that the proposed development is to consist of the construction of the St Bede's Catholic College Chapel. The investigation works were undertaken in accordance with HC services agreement Q0298, dated the 27th of September 2021.

The purpose of the investigation was to provide recommendations on the following:

- surface and sub-surface conditions;
- geotechnical laboratory testing results;
- site preparation;
- excavation conditions;
- suitability of site soils for fill;
- site classification to AS 2870-2011;
- alternative footing types and foundation design parameters;
- retaining wall design parameters.

2 Site Description

The site was located at Saint Bede's Catholic College Chapel, Heritage Drive, Chisholm. The site was bordered by a carpark to the south west boundary, and classroom buildings to the north west and south east boundaries.

At the time of investigation, existing development consisted of school playground area.

Existing vegetation consisted of short kept grass.

Topographically the site slopes towards the southwest boundary.

3 Preliminary Site Investigation

3.1 Geological and Soil Landscape Setting

Reference to the 1:250,000 Newcastle Geological Map indicates that the site sits on the border of the Tomago Coal Measures that is underlain by shale, mudstone, sandstone, tuff, coal, and the Maitland Group, that consist of the Mulbring Siltstone subgroup which is underlain by siltstone, sandstone, and conglomerate.

Reference to the 1:100,000 Newcastle Soil Landscape Sheet indicates that the site is underlain by the Beresfield Landscape. The Landscape is characterized by undulating rises to rolling low hills on Permian sediments to the south east of the Hunter Region. Slope gradients are found to be between 3 to 15% on local reliefs of less than 50m with elevations between 10 to 90m. The soil is known to consist of shallow to moderately deep, imperfectly drained Brown and Yellow Kurosols (Yellow Podzolic Soils and Soloths); and moderately deep imperfectly drained Red, Brown and Yellow Kurosols (Red and Yellow Podzollic Soils and Soloths). The vegetation on the landscape is comprised of partially cleared tall-open forest.

3.2 Acid Sulfate Soils Risk Maps

Reference to the NSW Office of Environment and Heritage's online database 'ESPADE' indicates that the site lies in an area of no known occurences of acid sulfate soils, however immediately to the north west is an area of high probability of acid sulfate soils occuring within 3.0m below ground surface.

3.3 Mine Subsidence

Reference to Subsidence Advisory NSW Mine District Maps indicates that the site does not lie within a Mine Subsidence District.

4 Methodology

Fieldwork was undertaken on the 1st of October 2021 and consisted of:

- underground utility service clearances using a Telstra accredited locator;
- a visual assessment of the existing surface of the site and surrounding area;
- locating borehole by approximate measurements from existing site features;
- the drilling of 3 x boreholes (BH1 – BH3) to depths of up to 3.0m;
- the driving of 3 x Dynamic Cone Penetrometer (DCP) probes at BH locations to depths of up to 4.1m;
- recovery of 1 x undisturbed soil sample for laboratory testing.

Laboratory testing consisted of:

- 1 x Shrink Swell Index tests.

5 Subsurface Conditions

The subsurface soil conditions encountered at the site have been summarised into the following units:

UNIT 1 – FILL:

- TOPSOIL; Silty SAND, brown, with grass roots

UNIT 1A – FILL:

- Silty Sandy CLAY, dark brown / brown, firm
- Silty Sandy CLAY, orange / brown / grey, with fine to medium gravel, stiff
- Silty CLAY, brown, trace fine gravel / sand, stiff

UNIT 2 – Residual:

- Silty CLAY, pale brown / white, with fine gravel, stiff
- Silty CLAY, pale orange / white, with extremely weathered sandstone inclusions, very stiff
- Silty CLAY, red / pale brown / brown, with fine grained sand, very stiff to hard

A summary of the soil unit depths encountered in each borehole are presented below in **Table 5.1**.

Table 5.1 - Summary of the soil unit depths encountered

Borehole	Depth (m)	Depth (m)		
		UNIT 1	UNIT 1A	UNIT 2
BH1	0.0 – 3.0	0.0 – 0.05	0.05 – 1.3	1.3 – 3.0
BH2	0.0 – 3.0	0.0 – 0.05	0.05 – 1.7	1.7 – 3.0
BH3	0.0 – 3.0	0.0 – 0.05	0.05 – 1.6	1.6 – 3.0

Both groundwater and surface water were not encountered at the site.

Refer to **Annex A** for the borehole location plan and **Annex B** for detailed borehole logs.

6 Laboratory Test Results

1 x undisturbed sample were recovered from the boreholes. The sample were transported to Hunter Civilab's NATA accredited soil testing laboratory for analysis.

The laboratory test results are summarised below in **Table 6.1** below.

Table 6.1 - Shrink Swell Index test results

Borehole	Depth (m)	Soil description	Iss (%)
BH2	0.8 – 0.95	Silty CLAY	1.2

Laboratory test results from the soil sample can be found in **Annex C.**

7 Site Classification

7.1 Background Information

Site classification is based off the characteristic surface movements encountered at the site due to the moisture variations within the soil profile. Characteristic surface movements are estimated in accordance with AS2870-2011 "Residential Slabs & Footings". Surface movement calculation take into consideration the depth of the soil profile layers, the soil reactivity and the soil suction depth.

The site classification based on characteristic surface movements are summarised below in **Table 7.1**.

Table 7.1 - Summary of AS2870-2011 characteristic surface movement & site classification

Characteristic surface movement (y_s) (mm)	Site classification AS2870-2011	Underlying soil / geology
0	Class A	SAND or ROCK site (non-reactive)
0 – 20mm	Class S	CLAY (slightly reactive)
20 – 40mm	Class M	CLAY (moderately reactive)
40 – 60mm	Class H1	CLAY (highly reactive)
60 – 75mm	Class H2	CLAY (highly reactive)
> 75mm	Class E	CLAY (extremely reactive)

Sites subjected to deep-seated moisture change are modified with the addition of "-D". As defined by AS2870-2011 other sites should be classified as a Class P (Problem) site. These sites include sites with:

- inadequate bearing capacity;
- expected excessive foundation settlement due to loading on the foundation;
- significant moisture variations;
- mine subsidence risk;
- slope stability risk;
- erosion issues;
- greater than 0.8m of fill for sand sites and greater than 0.4m for other sites (in general).

7.2 Site Classification

The proposed development should be designed in accordance with AS2870-2011 "Residential Slabs and Footings". Based on the visual inspection, dynamic cone penetrometer tests and soil profile shown above in **Section 5**, the site classification is summarised below in **Table 7.2**.

Table 7.2 - Site classification & characteristic surface movement (y_s)

Site classification	Site reactivity	Characteristic surface movement (y_s)
Class P	Class H1	40 – 60 mm

The site was classified as a Class P due to the sloping profile of the site and presence of fill >0.4m that may create abnormal moisture conditions.

Based on the subsurface profile and the results of the laboratory testing a site reactivity of Class H1 has been assigned to the Class P site.

Classification of the site has not taken into account the effects of abnormal moisture conditions. If the site undergoes any earthworks operations, the site shall be reclassified in accordance with AS2870-2011.

7.3 Abnormal Moisture Effects

Abnormal moisture conditions in the foundation can be caused by the following:

- existing development;
- leaking water services;
- prolonged periods of draught or heavy rainfall;
- trenches or other man-made water courses;
- poor roof plumbing or obstruction to the roof plumbing system;
- poor rainfall runoff control;
- corroded gutters or downpipes.

Abnormal moisture conditions specified above can cause adverse effects to the development's foundation such as:

- erosion significantly effecting the lateral and founding support of the structure's footing system;
- saturation of the founding material which can cause a significant decrease in the strength of the founding material;
- shrinkage creating subsidence of the founding material and causing additional stresses within the building structure;
- swelling which creates an upward force in the footings which causes additional stresses within the building structure.

7.4 Effects from Trees

The existence of trees within or adjacent to the building footprint can cause significant soil movement due to the following:

- roots growing within the foundation and causing an upward force on footings;
- roots drawing in and absorbing the moisture below a footing system causing subsidence due to shrinkage of the soil volume.

The site should take into account the tree score effect in accordance with and designed to AS2870-2011. The site was found to have a "Low" tree score effect and has been taken into consideration.

8 Footing Recommendations

Due to the presence of fill (assessed and assumed as uncontrolled fill) the site is suitable for the use of deep footing systems only. Refer to **Section 8.1** below for recommended allowable bearing pressure parameters.

8.1 Deep Footings

The site is suitable for bored piers with an approximate allowable end bearing pressures and shaft adhesion estimated below in **Table 8.1**.

Table 8.1 - Summary of allowable end bearing pressures and shaft adhesion for deep footings

Soil strata	Typical depth encountered (m)	Allowable shaft adhesion (kPa)	Allowable end bearing pressure (kPa)
UNIT 2 - RESIDUAL	1.3 – 3.0	30	250

The bearing pressures presented above have been correlated from Dynamic Cone Penetration (DCP) tests and should be considered as estimates only. Bearing pressures of all exposed foundation areas should be confirmed at the time of earthworks and prior to concrete pour by a qualified Geotechnical Engineer.

8.2 Footing Construction

All footings should be excavated, cleaned, and inspected by a qualified Geotechnical Engineer. Concrete should be poured with minimal delay. If delays in pouring mass concrete footings is anticipated, a concrete blinding layer should be provided to protect the foundation material.

Should softening of exposed foundation occur, the effected material should be over excavated and backfilled to design footing level by engineered fill or mass concrete.

8.3 Ongoing Footing Maintenance

Foundations including effective site drainage are required to be maintained over the life of the development to ensure footing performance. Refer to **Annex D** for the following:

- BTF 18-2011- CSIRO - Foundation Maintenance and Footing Performance – A Homeowner's Guide.

9 Retaining Walls

Recommended site soil parameters for retaining wall design at the site are provided in **Table 9.1** below.

Table 9.1 - Recommended retaining wall design soil parameters

Parameter	Supported material	
	UNIT 1A FILL Silty Sandy CLAY	**UNIT 2 RESIDUAL Silty CLAY**
γ (kN/m^3)	19	20
Φ' (°)	30	24
C' (kPa)	5	20
Cu (kPa)	-	100
K_a	0.33	0.44
K_p	3.00	2.28
K_o	0.50	0.61

Legend:

γ – unit weight

Φ' – angle of friction

C' – drained cohesion

Cu – undrained cohesion

Ka – coefficient of active earth pressure

Kp – coefficient of passive earth pressure

Ko – coefficient of at rest earth pressure

Parameters shown assume horizontal and free draining granular backfill behind the retaining wall.

For retaining walls surcharge loads from uphill structures should be considered and it is recommended that a minimum surcharge of 5kPa be adopted for this purpose. Retaining walls in excess of 1m high should be designed by a qualified structural engineer, with adequate subsurface and surface drainage provided behind the retaining wall.

10 Earthworks

Any earthworks conducted at the site should be controlled in accordance with AS3798-2007 and guided by the sections below.

10.1 Site Preparation

It is recommended that the following be undertaken where controlled filling is to be undertaken:

- remove all topsoil, root effected zones, material assessed as unsuitable and other deleterious zones (noting the stripped soil is not considered suitable as engineered fill but may be considered for landscaping purposes);
- exposed suitable foundation areas should then be ripped 300mm and re-compacted to 100% standard maximum dry density (SMDD) at ±2% of optimum moisture content (OMC);
- the foundation area should then be proof rolled under the supervision of an experienced geotechnical consultant and any soft spots / heaving areas identified. If identified these areas should be over excavated under the direction of the geotechnical consultant and replaced with engineered fill.

10.2 Controlled Fill

Any earthworks conducted at the site should be controlled in accordance with AS3798-2007. Based on the soil profile shown above in **Section 5**, visual observations and in-situ Dynamic Cone Penetrometer (DCP) testing, the material encountered at the site is deemed suitable for controlled fill. If the sub-surface conditions encountered at the site during construction differ from those discussed in **Section 5** HC should be consulted to determine if the material is suitable for controlled fill. Similarly, any won material imported from external sites should consult HC to determine if the fill is suitable for controlled fill.

10.2.1 Compaction Criteria

Fill material should be compacted in near-horizontal uniform layers with a maximum compacted thickness of 300mm. It is important to ensure layers are placed in such a way that provides adequate drainage and prevent ponding during construction. The thickness of fill placed during construction should take into account the compaction equipment available.

The moisture of the fill material should be controlled within a specified range of OMC in order to achieve the compaction criteria. In general, soils should be compacted within a moisture range of ±2% of OMC.

For commercial developments the following compaction criteria applies:

- cohesive soils – 98% Minimum Density Ratio (standard compactive effort);
- non-cohesive soils – 75% Minimum Density Index.

A suitably qualified geotechnical professional must be consulted to determine that the specified compaction has been achieved.

10.3 Excavations Conditions

Excavations within the fill, natural soils and extremely low to very low strength rock that was encountered during the investigations is thought to be achievable with conventional earthmoving equipment such excavators, backhoes and dozers. Very low to low strength rock may also require ripper tynes attached to excavator arms or dozers for effective excavation. Rock of low strength or greater may possibly require a 12-tonne excavator (or greater) with rock ripper or hydraulic rock hammer, depending on the degree of strength and fracturing in the rock. Excavations in rock would require minimising vibration to neighbouring residences and structures, else other methods may be required (for example pre-drilling the rock, rock sawing using diamond wire saw equipment, grinding or engaging a rock breaking and removal specialist).

Bored piers could be drilled using a 12-tonne excavator or greater with an attached auger. It is recommended that the bottom of bored pier holes should be cleaned out with the excavator fitted with a bucket attachment.

Excavations should be conducted in accordance with The Safe Work Australia "Excavation Work" Code of Practice March 2015.

https://www.safeworkaustralia.gov.au/system/files/documents/1705/mcop-excavation-work-v3.pdf

Excavations can seriously affect the stability of adjacent buildings. Careful consideration must be taken in order to prevent the collapse of partial collapse of adjacent structures.

Construction material and equipment should not be placed within the zone of influence of an excavation unless a suitably qualified geotechnical engineer has designed ground support structures to withstand these loads. The zone of influence is dependent on the material encountered at the site and is the area in which possible failures can occur.

Refer to Council development guidelines before conducting any excavation works.

10.4 Batter Slopes

10.4.1 Temporary Batter Slopes

Temporary excavations in natural material or extremely low to very low strength rock may be near vertical provided that:

- the depth does not exceed 1.5m;
- they are open for no more than 24hrs;
- no surcharge loading is applied to the surface within 2.5m of the excavation;
- no one enters the excavation e.g. workers.

All other temporary batter slopes during construction should not exceed 1H:1V in soils and 1H:4V in rock and benched, planned and managed in accordance with Safe Work Australia Excavation Work Code of Practice March 2015.

10.4.2 Permanent Batter Slopes

Recommended permanent batter slopes in general are as follows:

- 2H:1V in cohesive soils (e.g. clays) or extremely to very low weathered rock else retained by an engineered retaining wall;
- 3H:1V in non-cohesive soils (e.g. sands) else retained by an engineered retaining wall;
- 1H:1V in low strength rock or greater (permanent rock batters may be steepened to near vertical – subject to inspection by a qualified geotechnical engineer).

11 Report Limitations

This report has been prepared by Hunter Civilab (HC) for the specific site and purposes described within this report. HC will accept no responsibility or liability for the use of this report by any third party, without the express consent of HC or the Client, or for use at any other site or purpose than that described in this report.

This report and the services provided have been completed in accordance with relevant professional and industry standards of interpretation and analysis. This report must be read in its entirety without separation of pages or sections and without any alterations, other than those provided by HC.

The scope of the investigation described in this report is based on information and plans provided to HC by the Client as well as any additional limitations imposed by either the Client and / or site restraints. Such limitations may include but are not limited to budget restraints, the presence of underground services or accessibility issues to a site. Where the report has been prepared for a specific design proposal the information and interpretation may not be relevant if the design proposal is changed. HC should be consulted if site plans, or design proposal is changed as the recommendations and / or opinions presented may not be suitable for the new revisions or variations made.

The conclusions, recommendations and opinions expressed within this report are subject to the specific conditions encountered and the limited geotechnical data gathered at the site during the time of the current investigation. The sub-surface conditions and results presented in this report are indicative of the conditions encountered at the discrete sampling and testing locations within the site at the time of the investigation and within the depths investigated. Variations in ground conditions may exist between the locations that were investigated, and the subsurface profile cannot be inferred or extrapolated from the limited investigation conducted by HC. For this reason, the report must be regarded as interpretative, rather than a factual document.

Sub-surface conditions are subject to constant change and can vary abruptly as a result of human influences and /or natural geological and / or climatic processes and events. As such, conditions may exist at the site that could not be identified during or may develop after the current investigation has been conducted and as such, may impact the accuracy of this report. HC should be contacted for further consultation and site re-assessment should sub-surface conditions differ from those conditions identified in this report.

We are pleased to present this report and trust that the recommendations provided are sufficient for your present requirements. If you have any further questions about this report, please contact the undersigned.

For and on behalf of

Valley Civilab Pty Ltd, trading as Hunter Civilab

Reported by:

Jonacani Rabo
Geotechnical Engineering Technician
Bachelor of Engineering Technology (Mechanical)

Reviewed by:

Nathan Roberts
Geotechnical Engineering Manager
Bachelor of Engineering (Civil)

References:

Council of Standards Australia. (2009). *AS2159-2009 Piling - Design and Insallation.* Sydney: Standards Australia Limited.

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HUNTER CIVILAB

Annex A

*Note: Overhead Image taken from Nearmaps

Figure 1 – Plan of the Proposed Chapel Development at 24a Heritage Drive, Chisholm showing the approximate location of the Geotechnical boreholes.

Annex B

BOREHOLE LOG REPORT

HOLE NO: BH1
FILE / JOB NO: C1173
SHEET: 1 OF 1

CLIENT : Catholic Schools Office - Diocese of maitland-Necastle
PROJECT : St Bede's Catholic College Chapel
LOCATION : 24a Heritage Drive, Chisholm

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Drill Rig	CONTRACTOR: HCL	DRILLER: JC
DATE LOGGED: 01/10/2021 DATE SAMPLED: 01/10/2021	LOGGED BY: UM	CHECKED BY: NR

TESTING & SAMPLING					MATERIAL						
Water	DCP AS 1289.6.3.2-1997 Depth (m)	DCP AS 1289.6.3.2-1997 Blows	Field Tests	Samples	Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
	0.0 - 0.1	1					SM	0.05m FILL: TOPSOIL; Silty SAND, brown, with grass roots	M	L	FILL
	0.1 - 0.2	2						FILL: Sandy Silty CLAY, low to medium plasticity, brown, fine to coarse grained sand, with gravel			
	0.2 - 0.3	2									
	0.3 - 0.4	1					CL-CI		>PL to ~PL	F	
	0.4 - 0.5	2									
	0.5 - 0.6	2			0.5						
	0.6 - 0.7	1						0.60m FILL: Silty Sandy CLAY, low to medium plasticity, dark brown, fine grained sand			
	0.7 - 0.8	3									
	0.8 - 0.9	2									
	0.9 - 1.0	3					CL-CI		>PL to ~PL	F	
	1.0 - 1.1	4			1.0						
	1.1 - 1.2	3									
	1.2 - 1.3	4						1.30m			
	1.3 - 1.4	4						Silty CLAY, low to medium plasticity, pale brown / white, with fine gravel			RESIDUAL SOIL
	1.4 - 1.5	4					CI		<PL to ~PL	St	
	1.5 - 1.6	4			1.5			1.50m Silty CLAY, low to medium plasticity, pale orange / white, with fine grained sand, trace extremely weathered sandstone inclusions			
	1.6 - 1.7	4									
	1.7 - 1.8	6					CI		<PL to ~PL	St	
	1.8 - 1.9	8									
	1.9 - 2.0	8									
	2.0 - 2.1	8			2.0						
	2.1 - 2.2	8						2.10m Silty CLAY, low to medium plasticity, pale brown / red, trace fine gravel			
	2.2 - 2.3	7									
	2.3 - 2.4	8									
	2.4 - 2.5	7									
	2.5 - 2.6	14			2.5		CI		<PL	VSt to H	
	2.6 - 2.7	18 Refusal									
					3.0			3.00m Terminated at 3.00 m			

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER
Water table
Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

BOREHOLE LOG REPORT

HOLE NO: BH2
FILE / JOB NO: C1173
SHEET: 1 OF 1

CLIENT : Catholic Schools Office - Diocese of maitland-Necastle
PROJECT : St Bede's Catholic College Chapel
LOCATION : 24a Heritage Drive, Chisholm

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Drill Rig	CONTRACTOR: HCL	DRILLER: JC
DATE LOGGED: 01/10/2021 DATE SAMPLED: 01/10/2021	LOGGED BY: UM	CHECKED BY: NR

TESTING & SAMPLING					MATERIAL					
Water	DCP AS 1289.6.3.2-1997 Depth (m)	DCP Blows	Field Tests	Samples	Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
	0.0 - 0.1	2			0		SM	0.05m FILL: TOPSOIL; Silty SAND, brown, with grass roots	M	L	FILL
	0.1 - 0.2	4						FILL: Silty Sandy CLAY, medium to high plasticity, orange / brown / grey, fine to medium grained sand, with fine to medium gravel			
	0.2 - 0.3	4									
	0.3 - 0.4	7					CI-CH		<PL to ~PL	St	
	0.4 - 0.5	5			0.5						
	0.5 - 0.6	5						0.60m FILL: Silty Sandy CLAY, low to medium plasticity, brown, with fine grained sand, trace gravel			
	0.6 - 0.7	6									
	0.7 - 0.8	4									
	0.8 - 0.9	5		U 0.80-0.95							
	0.9 - 1.0	8			1.0						
	1.0 - 1.1	8					CL-CI		<PL to ~PL	St	
	1.1 - 1.2	12									
	1.2 - 1.3	4									
	1.3 - 1.4	6									
	1.4 - 1.5	5			1.5			1.50m			
	1.5 - 1.6	5					CL-CI	FILL: Silty Sandy CLAY, low to medium plasticity, brown, with fine grained sand, trace gravel	<PL to ~PL	St	
	1.6 - 1.7	5						1.70m			
	1.7 - 1.8	4						Silty CLAY, medium to high plasticity, pale brown / white			RESIDUAL SOIL
	1.8 - 1.9	8									
	1.9 - 2.0	10			2.0						
	2.0 - 2.1	10					CI-CH		<PL to ~PL	St to VSt	
	2.1 - 2.2	4									
	2.2 - 2.3	5									
	2.3 - 2.4	12									
	2.4 - 2.5	7			2.5			2.50m			
	2.5 - 2.6	5						Silty CLAY, low to medium plasticity, white, with extremely weathered sandstone inclusions / gravel			
	2.6 - 2.7	5									
	2.7 - 2.8	5					CL-CI		<PL	VSt	
	2.8 - 2.9	6									
	2.9 - 3.0	8						3.00m			
	3.0 - 3.1	12			3.0			Terminated at 3.00 m			
	3.1 - 3.2	9									
	3.2 - 3.3	12									
	3.3 - 3.4	12									
	3.4 - 3.5	7			3.5						
	3.5 - 3.6	10									
	3.6 - 3.7	14									
	3.7 - 3.8	12									
	3.8 - 3.9	13									
	3.9 - 4.0	18			4.0						
	4.0 - 4.1	20 Refusal									

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table

Water inflow

SAMPLES & FIELD TESTS

U	-	Undisturbed Sample
D	-	Disturbed Sample
ES	-	Environmental Sample
B	-	Bulk Disturbed Sample
MC	-	Moisture Content
PP	-	Pocket Penetrometer
SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
>PL	-	Moist, above PL
~LL	-	Wet, approx. LL
>LL	-	Wet, above LL
PL	-	Plastic Limit
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CONSISTENCY/ RELATIVE DENSITY

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St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

BOREHOLE LOG REPORT

HOLE NO: BH3
FILE / JOB NO: C1173
SHEET: 1 OF 1

CLIENT : Catholic Schools Office - Diocese of maitland-Necastle
PROJECT : St Bede's Catholic College Chapel
LOCATION : 24a Heritage Drive, Chisholm

POSITION:	SURFACE ELEVATION:	INCLINATION: 90°
DRILLING METHOD: Drill Rig	CONTRACTOR: HCL	DRILLER: JC
DATE LOGGED: 01/10/2021 DATE SAMPLED: 01/10/2021	LOGGED BY: UM	CHECKED BY: NR

TESTING & SAMPLING				MATERIAL						
Water	DCP AS 1289.6.3.2-1997 Depth (m)	DCP AS 1289.6.3.2-1997 Blows	Field Tests	Samples	Depth (m)	Graphic Log	Classification Symbol	MATERIAL DESCRIPTION Soil Type, Plasticity or Particle Characteristic, Colour, Secondary and Minor Components	Moisture Condition	Consistency/ Relative Density	STRUCTURE & Other Observations
	0.0 - 0.1	2			0		SM	0.05m FILL: TOPSOIL; Silty SAND, brown, with grass roots	M	L	FILL
	0.1 - 0.2	3						FILL: Silty CLAY, medium to high plasticity, brown, with fine grained sand, trace gravel			
	0.2 - 0.3	2									
	0.3 - 0.4	3					CI-CH		<PL to ~PL	F	
	0.4 - 0.5	2									
	0.5 - 0.6	2			0.5						
	0.6 - 0.7	2						0.70m			
	0.7 - 0.8	2						FILL: Silty CLAY, medium to high plasticity, brown			
	0.8 - 0.9	2									
	0.9 - 1.0	3									
	1.0 - 1.1	4			1.0						
	1.1 - 1.2	4					CL-CI		>PL to ~PL	F	
	1.2 - 1.3	7									
	1.3 - 1.4	9									
	1.4 - 1.5	11									
	1.5 - 1.6	11			1.5						
	1.6 - 1.7	11						1.60m			
	1.7 - 1.8	10						Silty Sandy CLAY, low to medium plasticity, pale brown / white, fine grained sand, with fine gravel			RESIDUAL SOIL
	1.8 - 1.9	9					CL-CI		>PL to ~PL	St to VSt	
	1.9 - 2.0	11						1.90m			
	2.0 - 2.1	14 Refusal						Silty CLAY, medium to high plasticity, pale brown / red / brown, with fine to medium grained sand			
					2.0		CI-CH		<PL to ~PL	VSt	
								2.40m			
								Silty Sandy CLAY, low to medium plasticity, pale brown, fine grained sand			
					2.5		CL-CI		<PL	VSt to H	
								3.00m			
					3.0			Terminated at 3.00 m			

Additional Comments

CLASSIFICATION SYMBOLS & SOIL DESCRIPTION
Based on Unified Classification System

WATER

Water table

Water inflow

SAMPLES & FIELD TESTS

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SPT	-	Standard Penetration Test
VS	-	Vane Shear

MOISTURE

D	-	Dry
M	-	Moist
W	-	Wet
<PL	-	Moist, below PL
~PL	-	Moist, approx. PL
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>LL	-	Wet, above LL
PL	-	Plastic Limit
LL	-	Liquid Limit

CONSISTENCY/ RELATIVE DENSITY

VS	-	Very Soft
S	-	Soft
F	-	Firm
St	-	Stiff
VSt	-	Very Stiff
H	-	Hard
VL	-	Very Loose
L	-	Loose
MD	-	Medium Dense
D	-	Dense
VD	-	Very Dense

Annex C

Material Test Report

Report Number:	**P21557-36**
Issue Number:	1
Date Issued:	07/10/2021
Client:	Hunter Civilab
	3/62 Sandringham Avenue, Thornton New South Wales 2322
Contact:	Nathan Roberts
Project Number:	P21557
Project Name:	Geotechnical Consulting Services
Project Location:	St Bede's Catholic College Chapel, Heritage Drv, Chisholm
Client Reference:	C1173
Work Request:	5516
Sample Number:	21-5516A
Date Sampled:	01/10/2021
Dates Tested:	01/10/2021 - 07/10/2021
Sampling Method:	Sampled by Engineering Department
	The results apply to the sample as received
Remarks:	Variation to the test method: Readings between some shrink & swell measurements exceed 12 hours.
Sample Location:	**BH2, Depth: 0.8-0.95m**
Material Source:	U50

Hunter Civilab
62 Sandringham Avenue Thornton NSW 2322
Phone: (02) 4966 1844
Email: gb@huntercivilab.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

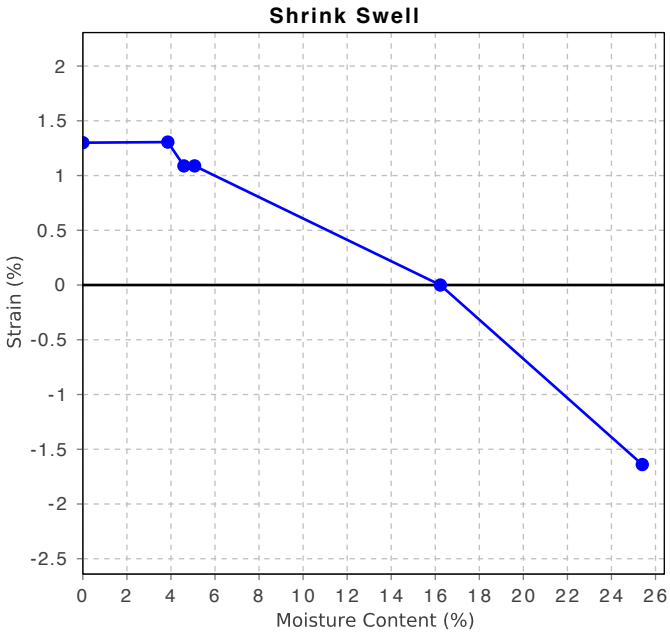
Approved Signatory: Grant Burgess
Geologist

NATA Accredited Laboratory Number: 14975

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	**1.2**
Visual Description	Sandy CLAY with silt & gravel, brown
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	**1.3**
Estimated % by volume of significant inert inclusions	5
Cracking	Slightly Cracked
Crumbling	Yes
Moisture Content (%)	16.2

Swell Test	
Initial Pocket Penetrometer (kPa)	300
Final Pocket Penetrometer (kPa)	100
Initial Moisture Content (%)	17.4
Final Moisture Content (%)	25.4
Swell (%)	**1.6**
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Annex D

Foundation Maintenance and Footing Performance:
A Homeowner's Guide

PUBLISHING

BTF 18-2011 replaces Information Sheet 10/91

Buildings can and often do move. This movement can be up, down, lateral or rotational. The fundamental cause of movement in buildings can usually be related to one or more problems in the foundation soil. It is important for the homeowner to identify the soil type in order to ascertain the measures that should be put in place in order to ensure that problems in the foundation soil can be prevented, thus protecting against building movement.

This Building Technology File is designed to identify causes of soil-related building movement, and to suggest methods of prevention of resultant cracking in buildings.

Soil Types

The types of soils usually present under the topsoil in land zoned for residential buildings can be split into two approximate groups – granular and clay. Quite often, foundation soil is a mixture of both types. The general problems associated with soils having granular content are usually caused by erosion. Clay soils are subject to saturation and swell/shrink problems.

Classifications for a given area can generally be obtained by application to the local authority, but these are sometimes unreliable and if there is doubt, a geotechnical report should be commissioned. As most buildings suffering movement problems are founded on clay soils, there is an emphasis on classification of soils according to the amount of swell and shrinkage they experience with variations of water content. The table below is Table 2.1 from AS 2870-2011, the Residential Slab and Footing Code.

Causes of Movement

Settlement due to construction

There are two types of settlement that occur as a result of construction:

- Immediate settlement occurs when a building is first placed on its foundation soil, as a result of compaction of the soil under the weight of the structure. The cohesive quality of clay soil mitigates against this, but granular (particularly sandy) soil is susceptible.
- Consolidation settlement is a feature of clay soil and may take place because of the expulsion of moisture from the soil or because of the soil's lack of resistance to local compressive or shear stresses. This will usually take place during the first few months after construction, but has been known to take many years in exceptional cases.

These problems are the province of the builder and should be taken into consideration as part of the preparation of the site for construction. Building Technology File 19 (BTF 19) deals with these problems.

Erosion

All soils are prone to erosion, but sandy soil is particularly susceptible to being washed away. Even clay with a sand component of say 10% or more can suffer from erosion.

Saturation

This is particularly a problem in clay soils. Saturation creates a bog-like suspension of the soil that causes it to lose virtually all of its bearing capacity. To a lesser degree, sand is affected by saturation because saturated sand may undergo a reduction in volume, particularly imported sand fill for bedding and blinding layers. However, this usually occurs as immediate settlement and should normally be the province of the builder.

Seasonal swelling and shrinkage of soil

All clays react to the presence of water by slowly absorbing it, making the soil increase in volume (see table below). The degree of increase varies considerably between different clays, as does the degree of decrease during the subsequent drying out caused by fair weather periods. Because of the low absorption and expulsion rate, this phenomenon will not usually be noticeable unless there are prolonged rainy or dry periods, usually of weeks or months, depending on the land and soil characteristics.

The swelling of soil creates an upward force on the footings of the building, and shrinkage creates subsidence that takes away the support needed by the footing to retain equilibrium.

Shear failure

This phenomenon occurs when the foundation soil does not have sufficient strength to support the weight of the footing. There are two major post-construction causes:

- Significant load increase.
- Reduction of lateral support of the soil under the footing due to erosion or excavation.

In clay soil, shear failure can be caused by saturation of the soil adjacent to or under the footing.

GENERAL DEFINITIONS OF SITE CLASSES

Class	Foundation
A	Most sand and rock sites with little or no ground movement from moisture changes
S	Slightly reactive clay sites, which may experience only slight ground movement from moisture changes
M	Moderately reactive clay or silt sites, which may experience moderate ground movement from moisture changes
H1	Highly reactive clay sites, which may experience high ground movement from moisture changes
H2	Highly reactive clay sites, which may experience very high ground movement from moisture changes
E	Extremely reactive sites, which may experience extreme ground movement from moisture changes

Notes

1. Where controlled fill has been used, the site may be classified A to E according to the type of fill used.
2. Filled sites. Class P is used for sites which include soft fills, such as clay or silt or loose sands; landslip; mine subsidence; collapsing soils; soil subject to erosion; reactive sites subject to abnormal moisture conditions or sites which cannot be classified otherwise.
3. Where deep-seated moisture changes exist on sites at depths of 3 m or greater, further classification is needed for Classes M to E (M-D, H1-D, H2-D and E-D).

Tree root growth
Trees and shrubs that are allowed to grow in the vicinity of footings can cause foundation soil movement in two ways:

- Roots that grow under footings may increase in cross-sectional size, exerting upward pressure on footings.
- Roots in the vicinity of footings will absorb much of the moisture in the foundation soil, causing shrinkage or subsidence.

Unevenness of Movement

The types of ground movement described above usually occur unevenly throughout the building's foundation soil. Settlement due to construction tends to be uneven because of:

- Differing compaction of foundation soil prior to construction.
- Differing moisture content of foundation soil prior to construction.

Movement due to non-construction causes is usually more uneven still. Erosion can undermine a footing that traverses the flow or can create the conditions for shear failure by eroding soil adjacent to a footing that runs in the same direction as the flow.

Saturation of clay foundation soil may occur where subfloor walls create a dam that makes water pond. It can also occur wherever there is a source of water near footings in clay soil. This leads to a severe reduction in the strength of the soil which may create local shear failure.

Seasonal swelling and shrinkage of clay soil affects the perimeter of the building first, then gradually spreads to the interior. The swelling process will usually begin at the uphill extreme of the building, or on the weather side where the land is flat. Swelling gradually reaches the interior soil as absorption continues. Shrinkage usually begins where the sun's heat is greatest.

Effects of Uneven Soil Movement on Structures

Erosion and saturation
Erosion removes the support from under footings, tending to create subsidence of the part of the structure under which it occurs. Brickwork walls will resist the stress created by this removal of support by bridging the gap or cantilevering until the bricks or the mortar bedding fail. Older masonry has little resistance. Evidence of failure varies according to circumstances and symptoms may include:

- Step cracking in the mortar beds in the body of the wall or above/below openings such as doors or windows.
- Vertical cracking in the bricks (usually but not necessarily in line with the vertical beds or perpends).

Isolated piers affected by erosion or saturation of foundations will eventually lose contact with the bearers they support and may tilt or fall over. The floors that have lost this support will become bouncy, sometimes rattling ornaments etc.

Seasonal swelling/shrinkage in clay
Swelling foundation soil due to rainy periods first lifts the most exposed extremities of the footing system, then the remainder of the perimeter footings while gradually permeating inside the building footprint to lift internal footings. This swelling first tends to create a dish effect, because the external footings are pushed higher than the internal ones.

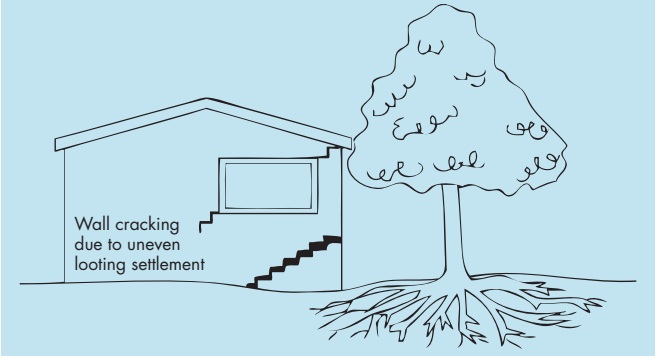
The first noticeable symptom may be that the floor appears slightly dished. This is often accompanied by some doors binding on the floor or the door head, together with some cracking of cornice mitres. In buildings with timber flooring supported by bearers and joists, the floor can be bouncy. Externally there may be visible dishing of the hip or ridge lines.

As the moisture absorption process completes its journey to the innermost areas of the building, the internal footings will rise. If the spread of moisture is roughly even, it may be that the symptoms will temporarily disappear, but it is more likely that swelling will be uneven, creating a difference rather than a disappearance in symptoms. In buildings with timber flooring supported by bearers and joists, the isolated piers will rise more easily than the strip footings or piers under walls, creating noticeable doming of flooring.

As the weather pattern changes and the soil begins to dry out, the external footings will be first affected, beginning with the locations where the sun's effect is strongest. This has the effect of lowering the external footings. The doming is accentuated and cracking reduces or disappears where it occurred because of dishing, but other cracks open up. The roof lines may become convex.

Doming and dishing are also affected by weather in other ways. In areas where warm, wet summers and cooler dry winters prevail, water migration tends to be toward the interior and doming will be accentuated, whereas where summers are dry and winters are cold and wet, migration tends to be toward the exterior and the underlying propensity is toward dishing.

Trees can cause shrinkage and damage



Movement caused by tree roots
In general, growing roots will exert an upward pressure on footings, whereas soil subject to drying because of tree or shrub roots will tend to remove support from under footings by inducing shrinkage.

Complications caused by the structure itself
Most forces that the soil causes to be exerted on structures are vertical – i.e. either up or down. However, because these forces are seldom spread evenly around the footings, and because the building resists uneven movement because of its rigidity, forces are exerted from one part of the building to another. The net result of all these forces is usually rotational. This resultant force often complicates the diagnosis because the visible symptoms do not simply reflect the original cause. A common symptom is binding of doors on the vertical member of the frame.

Effects on full masonry structures
Brickwork will resist cracking where it can. It will attempt to span areas that lose support because of subsided foundations or raised points. It is therefore usual to see cracking at weak points, such as openings for windows or doors.

In the event of construction settlement, cracking will usually remain unchanged after the process of settlement has ceased.

With local shear or erosion, cracking will usually continue to develop until the original cause has been remedied, or until the subsidence has completely neutralised the affected portion of footing and the structure has stabilised on other footings that remain effective.

In the case of swell/shrink effects, the brickwork will in some cases return to its original position after completion of a cycle, however it is more likely that the rotational effect will not be exactly reversed, and it is also usual that brickwork will settle in its new position and will resist the forces trying to return it to its original position. This means that in a case where swelling takes place after construction and cracking occurs, the cracking is likely to at least partly remain after the shrink segment of the cycle is complete. Thus, each time the cycle is repeated, the likelihood is that the cracking will become wider until the sections of brickwork become virtually independent.

With repeated cycles, once the cracking is established, if there is no other complication, it is normal for the incidence of cracking to stabilise, as the building has the articulation it needs to cope with the problem. This is by no means always the case, however, and monitoring of cracks in walls and floors should always be treated seriously.

Upheaval caused by growth of tree roots under footings is not a simple vertical shear stress. There is a tendency for the root to also exert lateral forces that attempt to separate sections of brickwork after initial cracking has occurred.

The normal structural arrangement is that the inner leaf of brickwork in the external walls and at least some of the internal walls (depending on the roof type) comprise the load-bearing structure on which any upper floors, ceilings and the roof are supported. In these cases, it is internally visible cracking that should be the main focus of attention, however there are a few examples of dwellings whose external leaf of masonry plays some supporting role, so this should be checked if there is any doubt. In any case, externally visible cracking is important as a guide to stresses on the structure generally, and it should also be remembered that the external walls must be capable of supporting themselves.

Effects on framed structures
Timber or steel framed buildings are less likely to exhibit cracking due to swell/shrink than masonry buildings because of their flexibility. Also, the doming/dishing effects tend to be lower because of the lighter weight of walls. The main risks to framed buildings are encountered because of the isolated pier footings used under walls. Where erosion or saturation causes a footing to fall away, this can double the span which a wall must bridge. This additional stress can create cracking in wall linings, particularly where there is a weak point in the structure caused by a door or window opening. It is, however, unlikely that framed structures will be so stressed as to suffer serious damage without first exhibiting some or all of the above symptoms for a considerable period. The same warning period should apply in the case of upheaval. It should be noted, however, that where framed buildings are supported by strip footings there is only one leaf of brickwork and therefore the externally visible walls are the supporting structure for the building. In this case, the subfloor masonry walls can be expected to behave as full brickwork walls.

Effects on brick veneer structures
Because the load-bearing structure of a brick veneer building is the frame that makes up the interior leaf of the external walls plus perhaps the internal walls, depending on the type of roof, the building can be expected to behave as a framed structure, except that the external masonry will behave in a similar way to the external leaf of a full masonry structure.

Water Service and Drainage

Where a water service pipe, a sewer or stormwater drainage pipe is in the vicinity of a building, a water leak can cause erosion, swelling or saturation of susceptible soil. Even a minuscule leak can be enough to saturate a clay foundation. A leaking tap near a building can have the same effect. In addition, trenches containing pipes can become watercourses even though backfilled, particularly where broken rubble is used as fill. Water that runs along these trenches can be responsible for serious erosion, interstrata seepage into subfloor areas and saturation.

Pipe leakage and trench water flows also encourage tree and shrub roots to the source of water, complicating and exacerbating the problem. Poor roof plumbing can result in large volumes of rainwater being concentrated in a small area of soil:

- Incorrect falls in roof guttering may result in overflows, as may gutters blocked with leaves etc.
- Corroded guttering or downpipes can spill water to ground.
- Downpipes not positively connected to a proper stormwater collection system will direct a concentration of water to soil that is directly adjacent to footings, sometimes causing large-scale problems such as erosion, saturation and migration of water under the building.

Seriousness of Cracking

In general, most cracking found in masonry walls is a cosmetic nuisance only and can be kept in repair or even ignored. The table below is a reproduction of Table C1 of AS 2870-2011.

AS 2870-2011 also publishes figures relating to cracking in concrete floors, however because wall cracking will usually reach the critical point significantly earlier than cracking in slabs, this table is not reproduced here.

Prevention/Cure

Plumbing
Where building movement is caused by water service, roof plumbing, sewer or stormwater failure, the remedy is to repair the problem. It is prudent, however, to consider also rerouting pipes away from the building where possible, and relocating taps to positions where any leakage will not direct water to the building vicinity. Even where gully traps are present, there is sometimes sufficient spill to create erosion or saturation, particularly in modern installations using smaller diameter PVC fixtures. Indeed, some gully traps are not situated directly under the taps that are installed to charge them, with the result that water from the tap may enter the backfilled trench that houses the sewer piping. If the trench has been poorly backfilled, the water will either pond or flow along the bottom of the trench. As these trenches usually run alongside the footings and can be at a similar depth, it is not hard to see how any water that is thus directed into a trench can easily affect the foundation's ability to support footings or even gain entry to the subfloor area.

Ground drainage
In all soils there is the capacity for water to travel on the surface and below it. Surface water flows can be established by inspection during and after heavy or prolonged rain. If necessary, a grated drain system connected to the stormwater collection system is usually an easy solution.

It is, however, sometimes necessary when attempting to prevent water migration that testing be carried out to establish watertable height and subsoil water flows. This subject is referred to in BTF 19 and may properly be regarded as an area for an expert consultant.

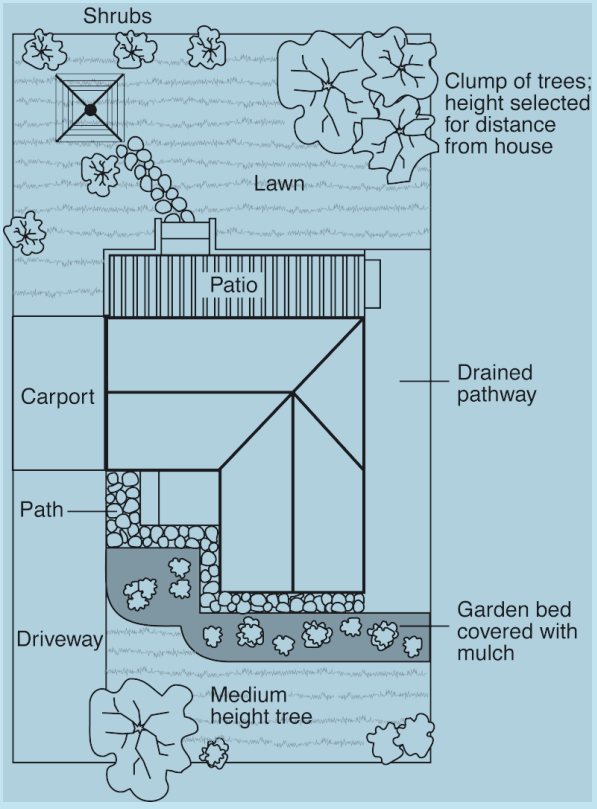
Protection of the building perimeter
It is essential to remember that the soil that affects footings extends well beyond the actual building line. Watering of garden plants, shrubs and trees causes some of the most serious water problems.

For this reason, particularly where problems exist or are likely to occur, it is recommended that an apron of paving be installed around as much of the building perimeter as necessary. This paving should

CLASSIFICATION OF DAMAGE WITH REFERENCE TO WALLS

Description of typical damage and required repair	Approximate crack width limit (see Note 3)	Damage category
Hairline cracks	<0.1 mm	0
Fine cracks which do not need repair	<1 mm	1
Cracks noticeable but easily filled. Doors and windows stick slightly.	<5 mm	2
Cracks can be repaired and possibly a small amount of wall will need to be replaced. Doors and windows stick. Service pipes can fracture. Weathertightness often impaired.	5–15 mm (or a number of cracks 3 mm or more in one group)	3
Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. Window and door frames distort. Walls lean or bulge noticeably, some loss of bearing in beams. Service pipes disrupted.	15–25 mm but also depends on number of cracks	4

Gardens for a reactive site



extend outwards a minimum of 900 mm (more in highly reactive soil) and should have a minimum fall away from the building of 1:60. The finished paving should be no less than 100 mm below brick vent bases.

It is prudent to relocate drainage pipes away from this paving, if possible, to avoid complications from future leakage. If this is not practical, earthenware pipes should be replaced by PVC and backfilling should be of the same soil type as the surrounding soil and compacted to the same density.

Except in areas where freezing of water is an issue, it is wise to remove taps in the building area and relocate them well away from the building – preferably not uphill from it (see BTF 19).

It may be desirable to install a grated drain at the outside edge of the paving on the uphill side of the building. If subsoil drainage is needed this can be installed under the surface drain.

Condensation

In buildings with a subfloor void such as where bearers and joists support flooring, insufficient ventilation creates ideal conditions for condensation, particularly where there is little clearance between the floor and the ground. Condensation adds to the moisture already present in the subfloor and significantly slows the process of drying out. Installation of an adequate subfloor ventilation system, either natural or mechanical, is desirable.

Warning: Although this Building Technology File deals with cracking in buildings, it should be said that subfloor moisture can result in the development of other problems, notably:

- Water that is transmitted into masonry, metal or timber building elements causes damage and/or decay to those elements.
- High subfloor humidity and moisture content create an ideal environment for various pests, including termites and spiders.
- Where high moisture levels are transmitted to the flooring and walls, an increase in the dust mite count can ensue within the living areas. Dust mites, as well as dampness in general, can be a health hazard to inhabitants, particularly those who are abnormally susceptible to respiratory ailments.

The garden

The ideal vegetation layout is to have lawn or plants that require only light watering immediately adjacent to the drainage or paving edge, then more demanding plants, shrubs and trees spread out in that order.

Overwatering due to misuse of automatic watering systems is a common cause of saturation and water migration under footings. If it is necessary to use these systems, it is important to remove garden beds to a completely safe distance from buildings.

Existing trees

Where a tree is causing a problem of soil drying or there is the existence or threat of upheaval of footings, if the offending roots are subsidiary and their removal will not significantly damage the tree, they should be severed and a concrete or metal barrier placed vertically in the soil to prevent future root growth in the direction of the building. If it is not possible to remove the relevant roots without damage to the tree, an application to remove the tree should be made to the local authority. A prudent plan is to transplant likely offenders before they become a problem.

Information on trees, plants and shrubs

State departments overseeing agriculture can give information regarding root patterns, volume of water needed and safe distance from buildings of most species. Botanic gardens are also sources of information. For information on plant roots and drains, see Building Technology File 17.

Excavation

Excavation around footings must be properly engineered. Soil supporting footings can only be safely excavated at an angle that allows the soil under the footing to remain stable. This angle is called the angle of repose (or friction) and varies significantly between soil types and conditions. Removal of soil within the angle of repose will cause subsidence.

Remediation

Where erosion has occurred that has washed away soil adjacent to footings, soil of the same classification should be introduced and compacted to the same density. Where footings have been undermined, augmentation or other specialist work may be required. Remediation of footings and foundations is generally the realm of a specialist consultant.

Where isolated footings rise and fall because of swell/shrink effect, the homeowner may be tempted to alleviate floor bounce by filling the gap that has appeared between the bearer and the pier with blocking. The danger here is that when the next swell segment of the cycle occurs, the extra blocking will push the floor up into an accentuated dome and may also cause local shear failure in the soil. If it is necessary to use blocking, it should be by a pair of fine wedges and monitoring should be carried out fortnightly.

This BTF was prepared by John Lewer FAIB, MIAMA, Partner, Construction Diagnosis.

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Appendix D – Bushfire Assessment Report

Undertaken by Newcastle Bushfire Consulting – 26th February 2016

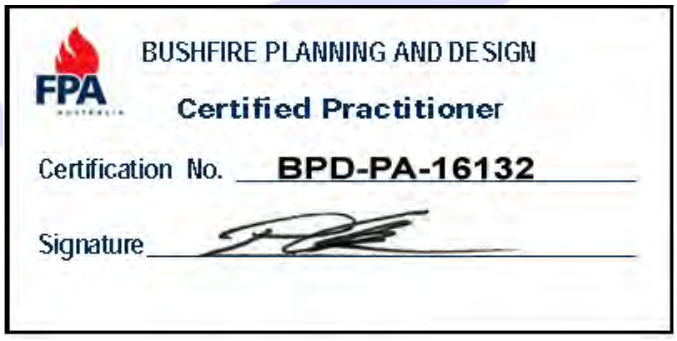
BUSHFIRE ASSESSMENT REPORT

PROPOSED HIGH SCHOOL

Lot 1718 DP 1206108
24 Heritage Drive, Chisholm

Date: **26/02/2016**

Prepared for: **Catholic Schools Office, Diocese of Maitland Newcastle**



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1.0 EXECUTIVE SUMMARY AND COMPLIANCE TABLES

The report has assessed the proposed school against the requirements of s100B of the *Rural Fires Act 1997,* AS3959 (2009) Building in Bushfire Prone Areas and Planning for Bushfire Protection, 2006.

The report establishes that the school is capable of complying with the acceptable solutions of Planning for Bushfire Protection 2006.

TABLE 1 – PROPERTY DETAILS AND TYPE OF PROPOSAL

Applicant Name	Catholic Schools Office		
Site Address	24 Heritage Drive, Chisholm	**Lot/Sec/DP**	Lot 1718 DP 1206108
Local Government Area	Maitland	**FDI**	100
Bushfire Prone Land	Yes – within the 100 metre buffer of a Category 1 Vegetation		
Type of development	New Building	**Type of Area**	Urban
Special Fire Protection Purpose	Yes	**Flame Temperature**	1200K
Application Complies with DTS Provisions	Yes	**Referral to RFS required**	Yes. Bushfire Safety Authority Required

TABLE 2 – BUSHFIRE THREAT ASSESSMENT

	North	**South, West**	**East**	**Southeast**
AS3959 (2009) Vegetation Structure	Grassland	Managed Lands	Woodland	Remnant Vegetation < 50 metre fire run
Asset Protection Zone	>50 metres	>140 metres	126 metres	93 metres
Accurate Slope Measure	2 degrees downslope	N/A	4 degrees downslope	2 degrees downslope
Slope Range	1 to 5 degrees downslope	N/A	1 to 5 degrees downslope	1 to 5 degrees downslope
PBP (2006) Table A2.6 Minimum Setbacks	N/A	N/A	50 metres	40 metres
AS3959 (2009) Bushfire Attack Level (BAL)	BAL-LOW	BAL-LOW	BAL-LOW	BAL-12.5

Note: Low threat vegetation surrounds the site to the North with Waterford County Bushfire Management Plan shown in Appendix 2.0 identifying the grass will remain either low threat or managed.

TABLE 3 – PLANNING FOR BUSHFIRE PROTECTION (2006) 4.2.7 COMPLIANCE

Performance Criteria	Proposed Development Determinations	Method of Assessment
Asset Protection Zone	Minimum setbacks have been determined in accordance with Planning for Bushfire Protection (2006) Table A2.6 and are able to be achieved within the subject site and neighbouring road reserve considered equivalent to an Asset Protection Zone.	Acceptable Solution
Access – Internal Roads	The internal access roads are to comply with Planning for Bushfire Protection (2006) Section 4.2.7.	Acceptable Solution
Water Supply	Hydrant network to be installed in accordance with Planning for Bushfire Protection (2006) Section 4.2.7.	Acceptable Solution
Electrical Supply	The electrical transmission lines will be located underground and require no additional protection measures.	Acceptable Solution
Gas Supply	Any proposed gas supply will be located underground.	Acceptable Solution
Emergency and Evacuation Planning	The facility shall have an emergency management plan developed in accordance with AS 3745-2002 'Emergency control organisation and procedures for buildings, structures and workplaces' incorporating the additional buildings.	Acceptable Solution

2.0 INTRODUCTION

2.1 PURPOSE OF REPORT

The purpose of this report is to establish suitable bushfire mitigation measures for the proposed primary school to be constructed at Lot 1718 DP 1206108, 24 Heritage Drive, Chisholm. The assessment acknowledges the requirements of s100B of the Rural Fires Act 1997 and Planning for Bushfire Protection 2006 to protect persons, property and the environment from danger that may arise from a bushfire.

Under the provisions of section 100B of the Rural Fires Act 1997 as amended, a Bushfire Safety Authority (BFSA) is required from the Commissioner of the NSW Rural Fire Service.

This report complies with Rural Fires Regulation 2008 Clause 44 Application for Bushfire Safety Authority. The assessment encompasses the subject site and neighbouring areas.

The recommendations within this report address the aim and objectives of Planning for Bushfire Protection 2006 to reduce the risk of ignition of the school in a bushfire event.

2.2 PROPOSED DEVELOPMENT

The proposed development includes the construction of high school additions with an existing public school occupying a large portion of the site. The subject site is zoned R1 residential and is aprroximately 8 hectares in size.

2.3 SIGNIFICANT ENVIRONMENTAL FEATURES

There are no known significant environmental features on the subject site. The site is a predominantly cleared allotment.

2.4 ENVIRONMENTAL ASSETS

There are no known environmental assets on the subject site.

2.5 ABORIGINAL HERITAGE

Searches of National Parks and Wildlife database identify no known aboriginal relics or aboriginal places as defined by National Parks and Wildlife Act 1974 to exist on the site. The site is a cleared residential allotment.

PHOTOGRAPH 1 – SITE PHOTO

View of the proposed development site. The site presently contains grass with an existing primary school occupying the southern portion of the site. Significant residential development and a playground surround the site.

PHOTOGRAPH 2 – VEGETATIVE THREAT

View of remnant vegetation in the foreground interfacing grassland. Dry sclerophyll forest is visible in the distance. Eucalypts dominate the upper stratum with a low density shrub layer of native shrubs. This vegetation will be significantly reduced by future development.

FIGURE 1 – SITE CONSTRAINTS MAP

3.0 BUSHFIRE ATTACK ASSESSMENT

3.1 VEGETATION CLASSIFICATION

Potential bushfire hazards were identified from Maitland Council bushfire prone mapping as occurring within the investigation area. Aerial mapping and inspection of the site reveals that the bushfire prone land map is reasonably accurate in respect to the current bushfire hazard.

The major vegetative threats have been determined using Keith (2004) to derive vegetation structures listed in Planning for Bushfire Protection (2006). General vegetation structures have been translated to AS3959 (2009) groupings.

Primary Vegetation Structures have been identified in Figure 1 – Site Constraints Map and separation distances shown in Table 2 – Bushfire Attack Assessment.

3.2 EFFECTIVE SLOPE

Effective slope was measured using 2 metre contour data obtained from Department of Lands and verified by a laser hypsometer on site. The laser hypsometer verified slope within the vegetation calculating effective fire run slope from 5 separate measurements in each dominant direction.

Effective Slopes have been identified in Figure 1 – Site Constraints Map and slope ranges are shown in Table 2 – Bushfire Threat Assessment.

3.3 MINIMUM SETBACKS AND ASSET PROTECTION ZONES

Minimum setbacks have been determined in accordance with Table A2.6 (Planning for Bushfire Protection). The minimum Asset Protection Zone for the school has been demonstrated in Section 1 Executive Summary and Compliance Tables, Table 2 Bushfire Threat Assessment.

The required asset protection zone is available within the subject site, road reserve and surrounding lands managed by a bushfire management plan.

3.4 BUSHFIRE ATTACK LEVELS

Bushfire attack levels and relevant construction levels in accordance with AS3959 (2009) have been demonstrated in Section 1 Executive Summary and Compliance Tables, Table 2 Bushfire Threat Assessment.

FIGURE 2 – LOCALITY MAP
Courtesy of OpenStreetMap

FIGURE 3 – COUNCIL'S BUSHFIRE PRONE LAND MAP

PHOTOGRAPH 3 – SITE ACCESS

View of existing unformed access located on the eastern boundary of the site which will support parallel and direct firefighting efforts within the adjacent vegetation. Future road network and residential properties will ameliorate the vegetation that is visible in this photograph.

FIGURE 4 – SITE PLAN

4.0 UTILITY SERVICES AND INFRASTRUCTURE

4.1 WATER SERVICES

A reticulated water supply and street hydrant access is available in the local street network. A hydrant system shall be designed for the school in accordance with AS 2419.1 – 2005.

4.2 ELECTRICITY SERVICES

The existing electrical transmission lines are overhead however will be replaced with underground transmission lines prior to occupation of the site by the Catholic Schools Office.

4.3 GAS SERVICES

- Reticulated or bottled gas installed and maintained in accordance with AS 1596 -2002 and the requirements of the relevant authorities. Metal piping is to be used.
- Fixed gas cylinders to be kept clear of flammable material by a distance of 10m and shielded on the hazard side of the installation.
- Gas cylinders close to the dwelling are to have the release valves directed away from the building and at least 2m from flammable material with connections to and from the gas cylinder being of metal.
- Polymer sheathed flexible gas supply lines to gas meters adjacent to the buildings are not to be used.

5.0 PROPERTY ACCESS

Public Road Access

The subject site is accessed via Heritage Drive being a dual carriageway road. Emergency Services are expected to have good access to the area at most times.

The existing and proposed Public Road network is deemed adequate to handle increased volumes of traffic in the event of a bush fire emergency. No new public roads are proposed for this development.

Fire Trails

Fire Trails do not intersect the vegetation in the local area however an unsealed access road presently spans along the western boundary of the site. No new fire trails are proposed for this development.

Property Access

Property access provides access from the public road system directly to the private land.

Property access roads shall comply with sections 4.1.3 and 4.2.7 of Planning for Bush Fire Protection 2006 as detailed below:

- Internal roads are two-wheel drive, sealed, all-weather roads.
- Internal perimeter roads are provided with at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb) and shoulders on each side, allowing traffic to pass in opposite directions.
- Roads are through roads. Dead end roads are not more than 100 metres in length from a through road, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end.
- Traffic management devices are constructed to facilitate access by emergency services vehicles.
- Curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress.
- The minimum distance between inner and outer curves is six metres.
- Maximum grades do not exceed 15 degrees and average grades are not more than 10 degrees.
- Crossfall of the pavement is not more than 10 degrees.
- Roads do not traverse through a wetland or other land potentially subject to periodic inundation (other than flood or storm surge).
- Roads are clearly sign-posted and bridges clearly indicate load ratings.
- The internal road surfaces and bridges have a capacity to carry fully-loaded firefighting vehicles (15 tonnes).

6.0 LANDSCAPING MAINTENANCE

It is recommended that landscaping is undertaken in accordance Appendix 5 of Planning for Bushfire Protection 2006 and maintained for the life of the development.

Trees should be located greater than 2 metres from any part of the roofline of a building. Garden beds of flammable shrubs are not to be located under trees and should be no closer than 10 metres from an exposed window or door. Trees should have lower limbs removed up to a height of 2 metres above the ground.

The landscaped area should be maintained free of leaf litter and debris. The gutter and roof should be maintained free of leaf litter and debris.

Landscaping should be managed so that flammable vegetation is not located directly under windows.

Ground fuels such as fallen leaves, twigs (less than 6mm in diameter) and branches should be removed on a regular basis, and grass needs to be kept closely mown and where possible green.

7.0 EMERGENCY AND MAINTENANCE PLANS

7.1 BUSHFIRE MAINTENANCE PLANS

A fire management plan is to be prepared that addresses the following requirements:

a) Contact person / department and details; and
b) Schedule and description of works for the construction of asset protection zones and their continued maintenance.
c) Landscaping shall be managed as outlined within section 4.1.3 and Appendix 5 of Planning for Bush Fire Protection 2006 and the NSW Rural Fire Service's document Standards for asset protection zones.

7.2 FIRE EMERGENCY PROCEDURES

Arrangements for emergency and evacuation are to comply with section 4.2.7 of Planning for Bush Fire Protection 2006.

An Emergency /Evacuation Plan is to be prepared in accordance with the NSW Rural Fire Service Guidelines for the Preparation of Emergency/Evacuation Plan and comply with Australian Standard AS 3745 -2002 'Emergency Control Organisation and Procedures for Buildings Structures and Workplaces for Residential Accommodation'.

8.0 RECOMMENDATIONS

Based upon an assessment of the plans and information received for the proposal, it is recommended that development consent be granted subject to the following conditions:

1. The proposed building works shall comply with the Building Code of Australia 2015 Structural Fire provisions.
2. At the commencement of building works and in perpetuity the entire property shall be managed as an inner protection area (IPA) as outlined within section 4.1.3 and Appendix 5 of Planning for Bush Fire Protection 2006 and the NSW Rural Fire Service's document Standards for asset protection zones.
3. Water, electricity and gas are to comply with section 4.2.7 of Planning for Bush Fire Protection 2006.
4. The property access is to comply with section 4.2.7 of Planning for Bush Fire Protection 2006.
5. Landscaping is to be undertaken in accordance with Appendix 5 of Planning for Bushfire Protection 2006 and managed and maintained in perpetuity.
6. The facility shall have an emergency management plan developed in accordance with AS 3745-2002 ‘Emergency control organisation and procedures for buildings, structures and workplaces’.

9.0 CONCLUSION

The final recommendation is that there is buildable area onsite for the development with appropriate services and asset protection zones available. The proposed development can comply with the requirements of “Planning for Bushfire Protection 2006” guidelines as required under section 100b of the Rural Fires Act 1997. This report should be referred to NSW Rural Fire Service for the issue of a Bushfire Safety Authority.

10.0 APPENDIX 1.0 – ASSET PROTECTION ZONES SUMMARY

Below is a summary of Asset Protection Zones outlined in Appendix 5 of Planning for Bushfire Protection (2006) and the NSW Rural Fire Services "Standards for Asset Protection Zones". The property owner should obtain these two documents and familiarise themselves with their content.

Generally

Asset Protection Zones (APZ) refers to the area between the bushfire threat and the asset (ie building). The APZ may contain two areas; the Inner Protection Area (IPA) and the Outer Protection Area (OPA). Some areas should be managed entirely as an Inner Protection Area (IPA). Refer to the plans for locations of APZ and distances from Assets.

Inner Protection Area (IPA)

The inner protection area is located adjacent to the asset and is identified as a fuel free zone.

A. Shrubs (consisting of plants that are not considered to be trees)

1. Shrubs must be located away from a buildings glazing and vent openings.
2. Avoid planting around entry ways if the vegetation is flammable.
3. A maximum 30% of the Inner Protection Area may contain shrubs.
4. A minimum 1.5 metre separation of shrubby vegetation from the building shall be maintained.
5. Shrubs must not have a connection with the tree canopy layer; remove/trim shrubs or underprune trees.
6. Ensure turf is suitably mown and/or grasslands are continually slashed to restrict to max 100mm high.

B. Trees: Maintain a minimum 2-5 metre canopy separation.

1. Trees are allowed in the inner protection area however they should not touch or overhang buildings. No tree should be within 2 metres of the roofline.
2. Underprune branches between the shrub layer and the canopy layer.
3. Ensure branches do not overhang buildings.
4. Ensure all trees in the IPA within 3m of buildings do not provide a serious fire threat.
5. Trees should have lower limbs removed up to a height of 2 metres above the ground.

Outer Protection Area (OPA)

The Outer Protection Area (OPA) is located adjoining vegetation threat. The OPA should be maintained as a fuel reduced area. This assumes trees may remain but with a significantly reduced shrub, grass, and leaf litter layer. In many situations leaf litter and the shrub layer may not require maintenance at all.

A. Shrubs:

1. Reduce or trim large stands of shrubs

B. Trees:

1. Existing trees can be retained.
2. Ensure a separation is available between shrubs and tree canopy.
3. Reduce tree canopy so there is no interlocking canopy.

11.0 APPENDIX 2.0 – BUSHFIRE MANAGEMENT PLAN

20th September 2010

Newcastle Bushfire Consulting
5 Chartley Street
Warner's Bay NSW 2282

Attn: Phil Couch

Dear Sir,

Re: **Waterford County**
Raymond Terrace Road – Chisholm
Bushfire Management

We refer to our discussions concerning the management of grassland risk to vacant allotments/englobo land at Waterford County.

We would confirm that as the Developers of the Waterford County project we undertake a regular maintenance regime of the grasslands and vacant allotments, this entails the mowing / slashing / removal of rubbish.

This maintenance program plays an important role in the marketing of Waterford County, together with the fire mitigation of the grasslands for the project. This task is undertaken on a weekly rotation basis within the project.

In the event that should you observe in your regular assessments at Waterford County you believe that additional protection is required please do not hesitate to call me.

Yours faithfully

Christopher R Bean
Director

Sydney Office:
Suite 3, 57 Avalon Pde,
Avalon Beach NSW 2107
P O Box 116,
Avalon Beach NSW 2107
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Merewether NSW 2291
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w: www.countyproperty.com.au
ABN 99 071 655 288

county
PROPERTY GROUP

12.0 REFERENCES AND DISCLAIMER

References

Standards Australia (2009) AS3959 Construction of Buildings in Bushfire-Prone Areas

Keith D. (2004) "Ocean Shores to Desert Dunes", Department of Environment and Conservation, Sydney.

Environmental Planning and Assessment Act (1979)

New South Wales Rural Fire Service (2006) Planning for Bushfire Protection

New South Wales Rural Fire Service (2010) Planning for Bushfire Protection Appendix 3 Amendment

Rural Fires Act (1997)

Rural Fire Regulation (2008)

Disclaimer

Despite the recommendations in this report, it is impossible to remove the risk of fire damage to the building entirely. This report assesses and provides recommendations to reduce that risk to a manageable level. It is of paramount importance that the recommendations are adhered to for the life of the structure and that all maintenance is performed, to ensure a level of protection is provided to the building, occupants and fire fighters.

Planning for Bushfire Protection (2006) states that not withstanding the precautions adopted, it should always be remembered that bushfires burn under a wide range of conditions and an element of risk, no matter how small always remains.

AS3959 (2009) Building in Bushfire Prone Areas states that the standard is designed to lessen the risk of damage to buildings occurring in the event of the onslaught of bushfire. There can be no guarantee, because of the variable nature of bushfires, that any one building will withstand bushfire attack on every occasion.

Appendix E – Council Pre-DA Meeting Minutes

Pre-lodgement meeting minutes – 23rd September 2021

Pre-Lodgement Meeting Minutes

MEETING DETAILS:	
Meeting Date:	23 September 2021
Commenced & Completed:	10:00-10:30am
Proposed Development:	The proposed development includes the following: • School use chapel space on the site of an existing high school & primary school site. Issues for Discussion: • Confirmation of the approval pathway needs and key considerations given the development doesn't increase student population levels already approved under DA16-1592.
Attendee(s):	
Council Officers:	Jessica Stockham – Senior Development Planner Jorjia Hampton – Business Support Officer
Applicant/ Proponent(s):	Elizabeth Brown - SHAC Elliot McLeod – Principle Project Management
Attachments and Plans:	Status of Chapel – 16 August 2021 Sketch Design – Chisholm Chapel – pages 1-10 - Revision C – 2 September 2021

PROPERTY DETAILS:	

Property Address:	24 Heritage Drive Chisholm
Lot and DP:	Lot 2 DP 1247459
Zoning:	The subject site is zoned R1 General Residential pursuant to the Maitland Local Environmental Plan (MLEP) 2011. The proposed development is defined as a Place of Public Worship which is permissible with consent in the R1 zone.
Site Constraints:	The site is surrounded by R1 General Residential Land and located within the Thornton North Urban Release Area and comprises 8.174 Ha of land. The existing site contains St Aloysius Primary School to the south, the St Bede's Catholic College to the north and 77 place childcare centre in the south-east corner. The site is identified as Acid Sulfate Soils Class 5.
Aerial Map:	

STATUTORY CONSIDERATIONS:	
Legislation/ Policy/ Guidelines Applicable – (including, but not limited to):	• *Environmental Planning & Assessment Act 1979;* • *Environmental Planning & Assessment Regulation 2000;* • *SEPP 55 (Remediation of Land);* • *Maitland Local Environmental Plan 2011 (MLEP);* • *Maitland Development Control Plan 2011: A.4 – Community Participation, B.6 – Waste Not – Site Waste Minimisation and Management, C.1 Accessible Living, C.11 Vehicular Access & Traffic and F.7 Thornton North Urban Release Area.* *[However please note that all relevant areas of the DCP should be visited and any other possible legislation, policies and/or guidelines that may be applicable included in any application submitted to Council];* • *Section 7.11 – Maitland Wide Development Contributions Plan and Thornton North Contributions Plan 2008.*
Additional MLEP Clauses:	• Clause 4.3 – Height of Buildings • Clause 7.1 – Acid Sulfate Soils • Clause 7.2 – Earthworks
Development Classification:	The proposed development may be classed as integrated development, noting: • RFS – (100B Bushfire Safety Authority).
Capital Investment Value/ Cost of Works	Any DA lodged with Council must clearly state the estimated cost of works (COW) of the proposed development. Please refer to the Department of Planning, Industry and Environment's Planning Circular PS 10-008 which describes what items must be included and excluded when calculating the COW/Capital Investment Value (CIV) for development. Depending upon the COW/CIV, the DA may be determined by the Hunter Central Coast Regional Planning Panel (HCCRPP) or reported to a full Council meeting should it exceed the delegations of Council officers.
Site History	DA13/1109 - St Aloysius Catholic Primary School has consent for 630 and 42 full time staff DA16/1592 - St Bede's Catholic College as consent for 1,200 students and 120 staff DA16/1585 - Childcare Centre – 77 places

Planning Advice

1. The subject site is zoned R1 General Residential pursuant to the Maitland Local Environmental Plan (LEP) 2011. A Place of Public Worship is a permissible land use on this site, subject to Council consent.
2. A place of Public Worship means: *a building or place used for the purposes of religious worship, whether or not the place is also used for counselling, social events, instruction or religious training*
3. The DCP requires car parking at a rate of 1 space per 10sqm of public area or 1 space per 10 seats, whichever is greater. Council may consider reduced parking requirements generally where it can be demonstrated that a particular development generates its peak parking demand outside of 9am to 6pm and is generally situated in an area where public parking facilities are in close proximity. Given the proposal, please ensure the SoEE details the justification for no changes to access or parking. Should the proposal include groups outside of the students then the application should be accompanied by a basic traffic and parking analysis which addresses traffic movements, parking and vehicle manoeuvrability on the site.

4. A landscape plan will be required to consider visual impacts from Heritage Drive. The building is well set back from the property boundaries which will be helpful in reducing amenity impacts. The Plan should show the location of all areas of planting and hard surface areas.
5. A basic acoustic assessment will be required as part of the application.
6. It is recommended that you touch base with Hunter Water in terms of augmentation of any necessary services.
7. Architecturally the building is of a high standard and will make a positive contribution to the built environment of Chisholm.
8. A Visual Impact Assessment should be provided for the proposed campanile. Concern is raised on its dominance in the landscape.
9. A detailed statement of environmental effects (SoEE) is required that fully addresses the likely environmental impacts of the development (including impacts on both the natural and built environments), the social and economic impacts in the locality, and how the environmental impacts of the development have been identified. The SoEE should have particular regard to number of people, hours of operation, lighting and signage. The SoEE should confirm no events/patrons outside of school students use and being used during school hours. It should also identify impacts and how they will be mitigated. The SoEE must also address site suitability and demonstrate that in designing the proposal you have fully considered and responded to the applicable site constraints legislative provisions. Any departures from Council's policies and DCP should be justified with appropriate reasons for justification.
10. A detailed bulk earthworks plan is required that responds sensitively to the topography of the land to restrict and control excessive earthworks. Cut and fill should minimise land shaping outside of the building footprints and ensure that the amount of cut and fill does not concentrate surface flows onto adjoining properties or impact the riparian area. The plan should indicate the total amount of cut and fill across with inclusion of existing levels of the land for such works, including the construction of building and those areas of the site external to building platforms. Any cut/fill batters or retaining along boundary lines shall be clearly indicated in regard to heights and offsets to boundaries. Earthworks and the treatment of edges will require detailed consideration.
11. The proposal will need to be advertised and notified in accordance with Council policy. If any submissions are received, it will be determined at full Council.

Engineering Advice

1. Drainage – connect to existing internal pipe network. If site coverage is under 60% there is no need for detention.
2. Note that some of the blade walls were close to the footpath where the kiss and drop is. Ensure there is sufficient space so kids don't accidently get pushed/bumped into the parking spaces.
3. Access – no change to access or parking is noted.

Building Advice

1. Ensure the building meets energy efficiency, accessibility and fire safety standards under both the BCA, Australian Standards and Guidelines and the requirements of Maitland DCP 2011 (where applicable). This will include disabled access and accessible paths of travel.

External Referrals

1. The application may be referred to the following external agencies for comment:

- Rural Fire Services as it is development of an existing SFPP facility. The draft bushfire maps still include the site as bushfire prone land. The applicant should consider Planning for Bushfire Protection regarding submission requirements and consultation with NSW RFS early in the design stage prior to lodgement.

Plans:	Should include but not limited to;
	• Development Plans including:
	  o Notification Plan;
	  o Waste Management Plan (construction and operational waste management plan)
	  o Survey Plan to investigate the existing site boundaries and any infrastructure restrictions,
	  o Detailed site analysis that identifies constraints, prevailing characteristics of the locality and an understanding of the site and context,
	  o Proposed site plan, floor plans, elevations, sections,
	  o Landscaping Plan with detail regarding plantings height at maturity, pot size and include details of retaining walls and fencing,
	  o Erosion and Sedimentation Control Plan,
	  o Bulk Earthworks Plan,
	  o Stormwater Management Plan,
	  o Photomontages
	  o Visual Impact Assessment
	• Schedule of colours, materials and finishes,
	• Notification plan with site plan, elevations and floor plan.

General:	• Owners Consent from all owners of the property is required. • Discussion with neighbouring properties regarding the proposed development should be undertaken. • Contributions – A quote can be obtained upon request for approximate Section 7.11 and 7.12 fees when the concept is closer to finalisation. • Note: If any submissions are received during the notification/exhibition period, it will be determined at full Council.
Advice Note:	This advice is based on the proposed development as described by the applicant. Should the development or any relevant planning policy change in any way prior to the lodgement of a development application (DA) then this advice may no longer be fully accurate or complete. Please note that this advice is preliminary in nature and that no detailed assessment of the site or proposed development has been undertaken. Following lodgement of the DA and a detailed assessment, additional issues may arise that are not detailed in this correspondence that may require the proposed development to be modified or additional information to be provided. Council may also determine that the proposed development cannot be supported on the site.

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Chairperson

NOTE: ANY ADVICE PROVIDED BY THE DCU SHOULD NOT BE CONSTRUED AS GRANTING APPROVAL, IN PRINCIPLE OR OTHERWISE, TO ANY PROPOSED ACTIVITY OR DEVELOPMENT. THE DETERMINATION OF ANY PROPOSAL CAN ONLY BE MADE ONCE A DEVELOPMENT APPLICATION HAS BEEN LODGED WITH THE COUNCIL AND THIS APPLICATION COMPREHENSIVELY ASSESSED AGAINST ALL RELEVANT LEGISLATION AND COUNCIL POLICY