Douglas PARTNERS | GROUNDED EXPERTISE

UPG Wickham Pty Ltd
Level 10/ 11-15 Deane Street
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Attention: Matthew Choi
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Project 39961.18
31 March 2026
R.001.Rev1
MJD:PH:kd

Report on Contamination Review
Proposed Mixed Use Development
10 Dangar Street, Wickham

1. Introduction

This report, prepared by Douglas Partners Pty Ltd (Douglas), presents the results of a contamination review undertaken for a proposed mixed use development at 10 Dangar Street, Wickham (the site). The investigation was commissioned by UPG Wickham Pty Ltd and was undertaken in line with Douglas' proposal 39961.18.P.001.Rev0 dated 4 February 2026.

This contamination review report is submitted to the Department of Planning, Housing and Infrastructure (DPHI) on behalf UPG Wickham Pty. Ltd. (UPG) (the Applicant), to support a State Significant Development Application (SSDA) and concurrent Rezoning Report for the construction of a 43-storey mixed-use development at 10 Dangar Street, Wickham (the site). The site is located within the Newcastle local government area (LGA) and occupies a prominent corner position immediately north of the Newcastle Interchange.

The project has been selected by the NSW Housing Delivery Authority (HDA) as a key development to help accelerate the delivery of well-located, diverse and affordable housing in New South Wales. Commencing in early 2025, the HDA plays a coordinating role across government agencies, focusing on unlocking complex sites through strategic planning, infrastructure coordination, and streamlined assessment pathways.

Following the Applicant's expression of interest (EOI 240837), the HDA considered and recommended to the Minister for Planning and Public Spaces (the Minister) that the project be declared SSD under Section 4.36(3) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) on 23 June 2025. Following this recommendation, the development was declared by the Minister to be SSD pursuant to the *State Significant Development Declaration Order 2025 (No 10),* Part 2, Section 1(a), dated 30 June 2025.

Douglas has previously conducted contamination investigation and validation works for the site as part of a previous development application and approval. The intent of this report is to provide a summary of the work conducted and to assess the suitability of the previous assessments for the current proposed development.

The previous reports were prepared with reference to the following guidelines:

- NSW EPA, Guidelines for Consultants Reporting on Contaminated Land (NSW EPA, 2020);
- National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM] (NEPC, 2013);
- State Environmental Planning Policy (Resilience and Hazards) 2021 (NSW Government, 2021).

2. Scope of work

The scope of work for this contamination review was as follows:

- Review of proposed development plans (refer to attachments);
- Review of previous investigations conducted at the site to assess the suitability of the previous investigations and reports for the proposed development;
- A brief site inspection to assess the current site condition and to provide a visual assessment of the potential for additional contamination to have occurred at the site since completion of the previous assessments;
- Preparation of this brief letter report.

3. Site description

The site is identified as Lot 1, DP 1197377 and is known as 10 Dangar Street Wickham. The site is an irregular-shaped area of approximately 2,904 m^2.

The site is bounded to the east by Hannell Street, to the north by Dangar Street, and residential development, to the west by Charles Street, Station Street, residential and commercial development, and to the south by the Newcastle Transport Interchange.

The site boundary is shown in Figure 1 below.

Figure 1: Site boundary, shown in red (MetroMap aerial imagery dated 5 December 2026)

4. Proposed Development

The proposed development plans were provided by UPG Wickham Pty Ltd (Urban ref 7105 rev A dated 27 March 2026). Selected drawings (basement plan 03 and ground level 00) are attached.

Based on the provided architectural plans, the proposed development at the site will comprise the following:

- Construction of a 43-storey (+ plant) mixed-use tower, comprising:
  - 245 residential apartments
  - 99 co-living units
  - Ground floor retail premises, to all three street frontages
  - A hotel component within the podium
  - Basement car parking
- Associated landscaping and public domain improvements, including the provision of a pedestrian through-site link that runs east/west adjacent to the Newcastle Interchange.
- It is noted that the project will commit to providing 15% of the residential GFA as affordable housing for a minimum of 15 years, to be managed by a registered Community Housing Provider (CHP).

- The proposed SSDA will seek consent for the use of basement structures and enabling works approved under DA2018/01197 (as modified).

It is understood that the previous development (i.e. based on provided development plans which informed the previous investigations completed by Douglas) comprised construction of a 14-level retail, commercial and residential development with three basement levels. A review of the previous development plans indicated finished surface levels of RL-7.0 AHD were proposed for the three-level basement. A review of the previous and current proposed development plans also indicates that the proposed development footprint at the site has remained unchanged (ie the basement footprint remains the same as previous, and no additional excavation is proposed).

5. Review of previous investigations

5.1 Previous Development Plans

Douglas has previously conducted preliminary site investigation, detailed site investigation, geotechnical investigation, prepared a remediation action plan and completed validation of remediation at the site.

The previous investigations, remediation and validation works were conducted for a proposed 14-storey development that comprised the following:

- Three level basement across the majority of the lot footprint, with basement slab level between approximately RL -6.25 AHD and RL -7.0;
- Ground floor retail;
- Three levels of office/commercial;
- Ten levels of residential.

The approximate footprint of the basement and the overall development is shown in Figure 2 and Figure 3 below.

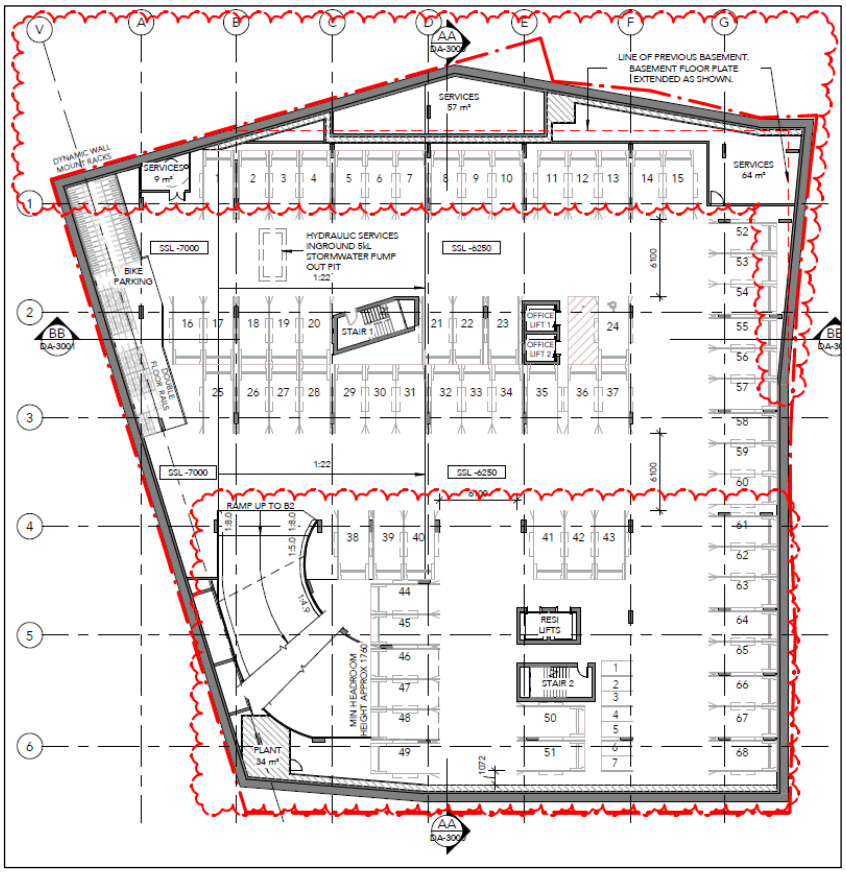

Figure 2: Approximate extent of former basement excavation (lot boundary in red dashed line)

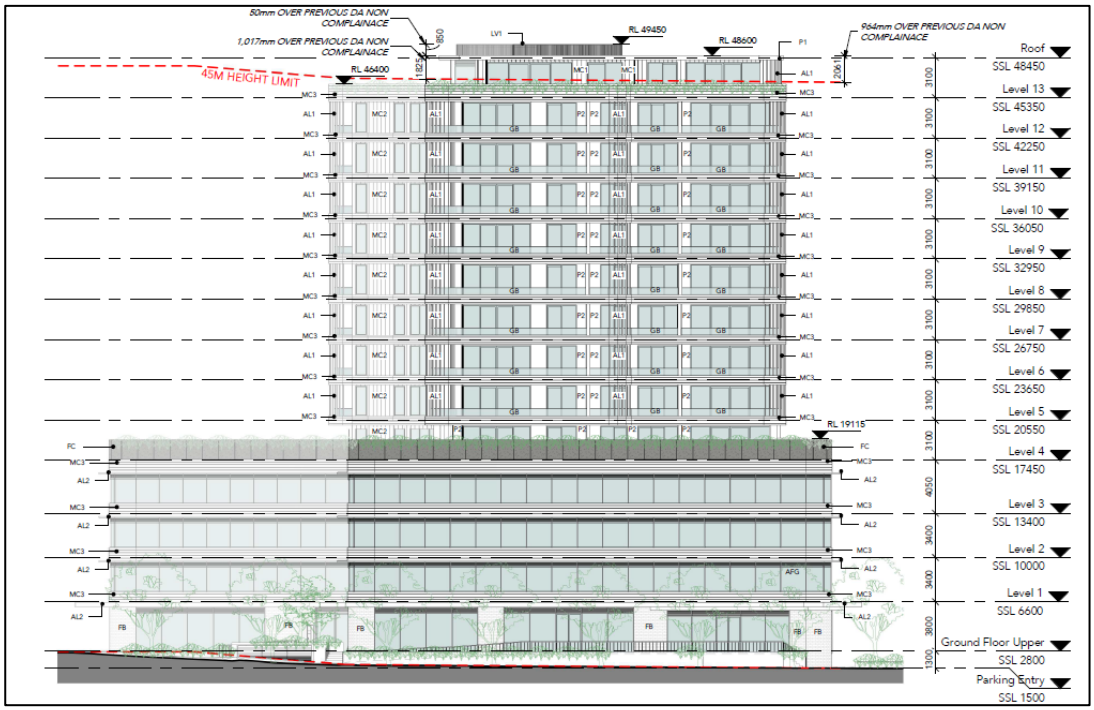

Figure 3: North elevation of former proposed development

Results of the assessments, remediation and validation etc are presented in the following sections.

5.2 Previous investigations

5.2.1 Introduction

The following previous investigations conducted at the site by Douglas are relevant to this contamination review:

- Report on Preliminary Site Investigation for Contamination, Desktop Geotechnical and Acid Sulfate Soil Assessment, Proposed Apartment Development, 10 Dangar Street, Wickham (Douglas, 2018a);
- Report on Detailed Site Investigation (Contamination), Proposed Apartment Development, 10 Dangar Street, Wickham (Douglas, 2018b);
- Remediation Action Plan, Proposed Apartment Development, 10 Dangar Street, Wickham (Douglas, 2021a);
- Report on Acid Sulfate Soil Management Plan, Proposed Apartment Development, 10 Dangar Street, Wickham (Douglas, 2021b);
- Report on Additional Contamination and Acid Sulfate Soil Testing, Proposed Apartment Development, 10 Dangar Street, Wickham (Douglas, 2020b);
- Report on Validation of Remediation, Proposed Apartment Development, 10 Dangar Street, Wickham (Douglas, 2022).

5.2.2 Preliminary Site Investigation for Contamination (PSI), Desktop Geotechnical and Acid Sulfate Soil Assessment (Douglas, 2018a)

Douglas undertook a preliminary site investigation (PSI), desktop geotechnical and acid sulfate soil assessment for a proposed mixed-use development at the site (Douglas, 2018a). The scope of works for the investigation comprised the following:

- Review of previous investigations conducted by Douglas at the site ((Douglas, 2008a) & (Douglas, 2008b));
- Brief review and update of previously assessed site history information;
- A site inspection;
- Preparation of a Preliminary Conceptual Site Model (CSM); and
- Preparation of a report presenting the findings of the PSI, with recommendations for further work.

A review of previous investigations conducted at the site within the report indicated the following:

- Douglas previously undertook a preliminary contamination and geotechnical assessment at the site (Douglas, 2008a) which indicated the following regarding potential contamination:
    - Site history indicated former commercial / industrial site uses and residential dwellings (i.e. prior to commercial site use), underground fuel storage in the north-western corner of the site and likely demolition of previous structures;

- A site walkover was conducted as part of the previous investigation and included observations of the presence of fibro fragments at the surface in the eastern portion of the site, fibro sheeting on the exterior cladding of the site structure, raised floor levels within the warehouse building (suggesting possible fill beneath the elevated floor), and fill in unpaved areas including ash, slag, rail ballast and building rubble at the surface;
- Potential contamination sources noted as part of the previous investigation in 2008 included imported filling, underground storage tanks (USTs), former bowsers and associated pipework in the north western portion of site, demolition of former site structures, vehicle parking on unsealed areas and former motor repair workshop operations;
- Preliminary subsurface investigation was conducted to investigate the identified potential contamination sources which comprised the drilling of eight boreholes using a drilling rig and hand tools, near surface sampling at two locations, sampling of observed potential ACM at the surface and installation of two groundwater monitoring wells;
- The results of subsurface investigation and laboratory testing indicated fill materials were generally observed to depths of up to 2m below ground level (bgl) within the site indicated:
  - Benzo(a)pyrene and PAH impact above the adopted land use criteria associated with near – surface soils and dumped stockpiles within the vacant south – western portion of the site;
  - Asbestos materials in near – surface filling within Bores 1,4,5 and 6; and
  - The presence of hydrocarbon impact in soil and groundwater in the northern portion of the site associated with the UST(s) and associated pipework, bowsers, etc.

- Additional subsurface investigation was conducted to further assess potential contamination and possible migration of hydrocarbon impacts from the UST in the north western portion of the site (Douglas, 2008b):
  - Additional subsurface investigation comprised the drilling, sampling and installation of groundwater monitoring wells at eight locations (Bores 101 – 108, refer drawing 1 attached), and laboratory analysis of selected samples for target contaminants;
  - The investigation indicated:
    - Hydrocarbon impacted soil and groundwater in the immediate vicinity of the UST(s) in the north western portion of site;
    - Minor off-site hydrocarbon impact in soil and groundwater (generally downgradient of the UST(s));
    - Minor PAH impact in groundwater to the north-east of the site;
    - Heavy metal impact in groundwater within and off site;
    - Site remediation was recommended for future residential or commercial development to address the identified contamination.

A preliminary CSM was prepared based on the available site history information which identified the principal sources of potential contamination were considered to be in line with the previous contamination sources identified with the previous investigations ((Douglas, 2008a) & (Douglas, 2008b)):

Additional subsurface investigation (soil and groundwater) was recommended to further asses the identified potential contamination sources as well as provide information on current site condition compared to previous assessments ((Douglas, 2008a) & (Douglas, 2008b))

5.2.3 Detailed Site Investigation (DSI) (Douglas, 2018b)

A DSI was conducted by Douglas at the site which included additional subsurface investigation at five locations (based on site accessibility), groundwater well installation, soil and groundwater sampling and analysis and preparation of a report presenting the results of the investigation. At the time of the DSI, the site was operating as a vehicle retailer. The existing structure from previous assessment remained on site, including the underground tanks. The structure had undergone some external and internal improvements.

The results of the DSI reinforced the results of previous investigation, indicating the presence of hydrocarbon impact in soil and groundwater in the vicinity of identified underground fuel storage tanks, along with PAH and metal impacted upper filling. The DSI also indicated the presence of potential acid sulfate soils (PASS) at the site within sand fill and underlying natural sands.

Active groundwater remediation was generally not considered to be necessary within the site based on the results of testing. Hydrocarbon impacts in groundwater were proposed to be addressed via the removal of the source of impacts (i.e. removal and remediation of underground fuel infrastructure and associated hydrocarbon-impacted soils).

5.2.4 Additional Contamination and Acid Sulfate Soil Testing (Douglas, 2020b)

Additional subsurface investigation and laboratory testing was undertaken at the site to provide further information on the contamination and ASS status of soils proposed to be excavated as part of the proposed development (Douglas, 2020b).

The additional information was gathered to supplement existing information at the site for the following purposes:

- Additional testing for waste classification of upper PAH, metal and asbestos impacted fill to confirm remediation and disposal requirements;
- Contamination and acid sulfate soil classification of underlying soils for assessment of possible reuse under an NSW EPA Specific Exemption.

The investigation was conducted with reference to the prepared Sampling, Analysis and Quality Plan (Douglas, 2020a) and approved by the NSW EPA as part the ongoing specific exemption application for the project.

The investigation comprised the drilling of five boreholes and laboratory testing of selected samples. The results of subsurface investigation for the assessment were consistent with previous investigations conducted at the site by Douglas, with subsurface conditions comprising fill containing ash and building rubble, underlain by sand fill and natural sands.

The results of ASS testing indicated the presence of potential ASS beneath the upper impacted filling at the test locations. Potential Acid Sulfate Soils (PASS) were interpreted to be present within possible sandy fill and natural sandy soils below RL 0.9/RL -0.5.

It was concluded that based on the assessments conducted at the site, the underlying sandy filling and natural sandy soils (i.e. PASS) generated as part of the proposed basement excavations would be considered suitable for beneficial off-site reuse from a contamination perspective, subject to the following:

- Excavation, segregation, disposal and validation of the removal of upper contaminated fill (i.e. containing elevated PAH, metals and asbestos-impact) and remediation and validation of identified hydrocarbon impact from historical underground fuel storage;
- Treatment and verification of the underlying PASS prior to transport to the proposed receipt site.

5.2.5 Remediation Action Plan (Douglas, 2021a)

A remediation action plan (RAP) was prepared for the site which detailed the aims, methods and procedures by which remediation and site validation would be achieved to enable the site to be declared suitable for the proposed residential development.

The RAP detailed the following proposed remediation methods:

- Decommission and removal of USTs, and associated infrastructure, remediation of localised hydrocarbon impacted soils with subsequent validation to confirm appropriate removal;
- Excavation and off-site disposal of soils impacted by PAHs and ACM as part of basement construction at the site;
- Validation of the remaining soils (ie sand/sand fill), following removal of upper impacted fill, to validate the removal of the impact, and confirm the suitability of the underlying soils to be suitable for on-site use and/or off-site reuse with reference to the NSW EPA specific exemption granted for the site.

5.2.6 Acid Sulfate Soil Management Plan (Douglas, 2021b)

An acid Sulfate Soil Management Plan (ASSMP) was prepared for the proposed development at the site. The ASSMP was commissioned as part of ongoing works at the site for the preparation of the NSW EPA specific exemption application for reuse of treated acid sulfate soils (ASS).

The ASSMP was prepared to provide methods and strategies to minimise the potential for adverse impact associated with the disturbance of ASS during construction works associated with the proposed development, and also to provide methodologies for treatment and verification to render the excavated ASS suitable for off-site reuse.

The ASSMP included a review of previous investigation conducted by Douglas at the site. The results of acid sulfate testing generally indicated that the majority of site soils below approximately RL 0.5 would be considered to be ASS.

The ASSMP detailed the requirements for neutralisation of potential acid generation via lime addition, along with proof of performance (POP) testing and ongoing processing and validation testing requirements to comply with the NSW EPA specific exemption.

Part of the specific exemption approval conditions noted that remediation and validation of contamination was completed prior to treatment and potential off-site reuse of treated ASS.

5.2.7 Validation of Remediation (Douglas, 2022)

Validation of remediation of identified PAH/metal/asbestos–impacted fill and hydrocarbon impacted soils at the site was undertaken (Douglas, 2022). The validation works were conducted to render the site suitable for the proposed high density residential land use, and also to allow for reuse of underlying natural acid sulfate soils with reference to the NSW EPA site-specific resource recovery order and exemption.

Remediation works generally comprised the following:

- Demolition of structures, slabs etc to expose the PAH/metal/asbestos-impacted upper fill;
- Excavation and direct loading of impacted upper fill into trucks for disposal as 'General Solid Waste' with asbestos at an appropriately licensed landfill;
- Excavation and direct loading of additional impacted upper fill following installation of sheet pile walls around the site boundary (ie to minimise potential impacts associated with excess soil collapse at the site boundaries);
- Removal of underground fuel storage tanks and associated piping in the north-western portion of the site by a licensed contractor;
- Excavation of hydrocarbon-impacted soils associated with fuel storage and dispensing.

Validation works comprised the following:

- inspections and collection of validation samples in a systematic grid pattern across the stripped surface following removal of upper fill;
- inspections and collection of validation samples from the former underground fuel storage tank locations (base and sides of excavation) following removal of hydrocarbon impacted soils;
- Waste classification testing and reporting for off-site disposal of impacted soils; and
- Preparation of a validation report presenting the results of remediation and validation of soils.

The results of validation inspections, sampling and analysis indicated the absence of gross contamination at the test locations, with contamination concentrations within the adopted remediation action criteria based on the proposed high density residential land use, and the resource recovery order limits for reuse of the soils.

Based on the remediation and validation works conducted the site was considered to be suitable for the proposed multi-storey residential and commercial development from a contamination perspective.

The underlying soils were considered to be suitable for potential re-use on another site as per the site- specific resource recovery order and exemption, subject to the treatment and validation of acid sulfate soils at the site as per the resource recovery order.

6. Site Inspection

A brief site inspection was undertaken by an environmental engineer on 26 March 2026 to assess current site conditions and assess the potential for additional contamination to have occurred at the site since completion of the previous contamination assessments.

Photographs of the current site condition at the time of inspection are provided in Figure 4 and 5. The following key site features are noted and summarised below:

- The site comprised a fenced construction site with a deep open excavation (approximately 9-10 m below existing ground levels), a crane was positioned in the north eastern portion of site;
- Secant pile walls were present from the base of excavation to ground level surrounding the perimeter of the excavation;
- Materials observed at the base of excavation comprised pale brown sand and geotextile fabric;
- Two sheet pile wall installations were present within the base of the excavation, including one around the crane pad;
- Installed concrete piles with steel reinforcement were observed at the base of the excavation;
- No obvious anthropogenic inclusions, soil staining or ponded water were observed at the base of the excavation.

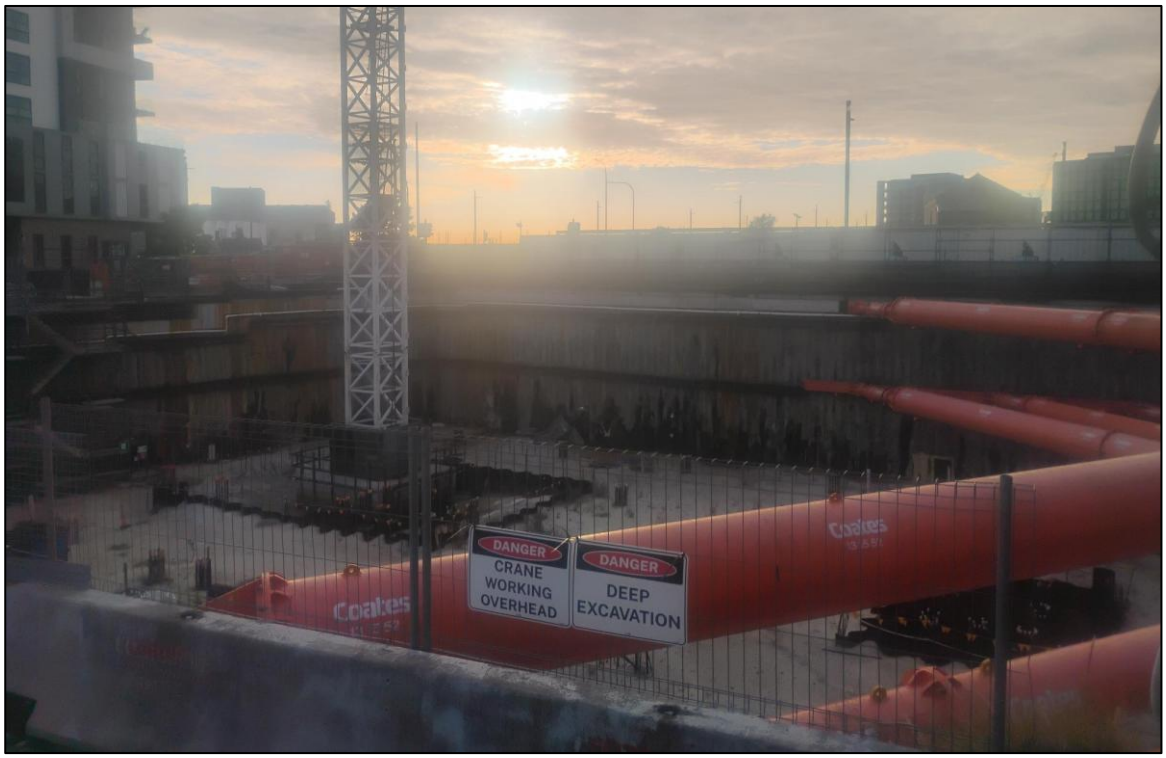

Figure 4: Looking north east towards site, from south western site boundary

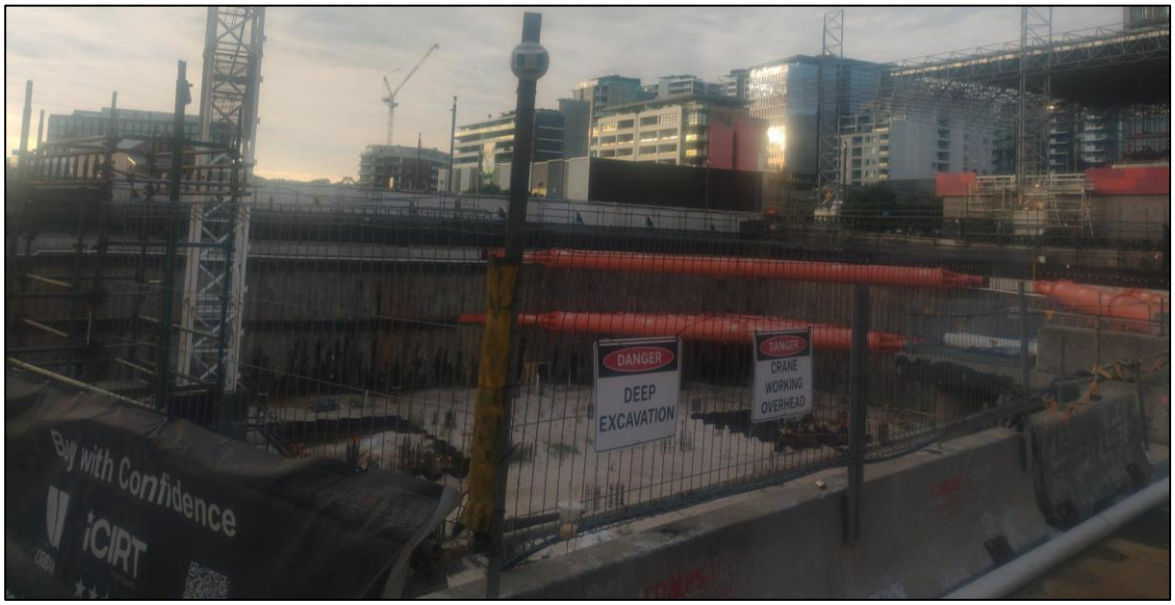

Figure 5; Looking south east towards site, from north western site boundary

7. Conclusion

Douglas has conducted a brief review of previous investigations at the subject site, comprising the following assessments:

- Preliminary site investigation;
- Detailed site investigation;
- Additional contamination and ASS sampling;
- Remediation action plan;
- Acid sulfate soil management plan;
- Validation of remediation.

The above assessments were conducted for the previously proposed development at the site which comprised a fourteen-storey retail, commercial and residential development with three basement levels. The assessments were conducted with reference to the relevant NSW EPA and national guidelines for contaminated land assessment (NSW EPA, 2020) (NEPC, 2013).

The previous investigations identified potential and actual contamination sources, provided methodologies for remediation and provided validation of the removal of contamination to render the site suitable for the proposed residential and commercial land use.

Validation works (Douglas, 2022) confirmed that impacted soils had been successfully removed, with validation samples meeting adopted remediation criteria for the intended retail/commercial and high-density residential land use. The site was deemed suitable for the proposed development from a contamination perspective.

Subsequent review of the current proposed development plans (Urban ref 7105 rev 17 dated 12 December 2025) indicate that the proposed building footprint and finished basement levels have remained unchanged from previous investigations (ie the basement footprint remains the same as previous, and no additional excavation is proposed). The proposed development comprises commercial/hotel and residential development, which is considered to be commensurate with the previous development on which the site was previously assessed and validated as being suitable for the proposed use.

Current site condition as of 26 March 2026 suggested the general absence of gross contamination within the site.

With respect to the SEARS requirements for assessment of contamination for the proposed development under part 4 of the SEPP Resilience and Hazards 2021 the previously completed investigation, remediation and validation works have rendered the site suitable for the proposed development from a contamination perspective. The proposed development does not impact the findings of the previous reports. The reports are considered to remain suitable to assess contamination on the site for the proposed development. The proposed basement footprint/extent has not changed from the previously approved development (ie no excavation or groundworks are proposed under this SSDA). Based on this review the site remains suitable for the proposed use.

8. References

Dear, S. E., Williams, K. M., McElnea, A. E., Ahern, C. R., Dobos, S. K., Moore, N. G., & O'Brien, L. E. (2024). *Queensland acid sulfate soil technical manual : soil management guidelines version 5.1.* Department of Environment, Science and Innovation.

Douglas. (2008a). *Report on Preliminary Contamination & Geotechnical Assessment, Proposed Multi-Storey Commercial Development, 10 Dangar Street, Wickham.* Ref: 39961: Douglas Partners Pty Ltd.

Douglas. (2008b). *Report on Additional Contamination Assessment, Proposed Multi-Storey Commerical Development, 10 Dangar Street, Wickham.* Ref:39961.01: Douglas Partners Pty Ltd.

Douglas. (2018a). *Report on Preliminary Site Investigation for Contamination, Desktop Geotechnical and Acid Sulfate Soil Assessment, Proposed Apartment Development, 10 Dangar Street, Wickham.* Ref: 39961.02.R.001.Rev1: Doouglas Partners Pty Ltd.

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Douglas. (2020b). *Report on Additional Contamination and Acid Sulfate Soil Testing, Proposed Apartment Development, 10 Dangar Street, Wickham.* Ref: 39961.08.R.002.Rev0: Douglas Partners Pty Ltd.

Douglas. (2021a). *Remediation Action Plan, Proposed Apartment Development, 10 Dangar Street, Wickham.* Ref: 39961.02.R.004.Rev3: Douglas Partners Pty Ltd.

Douglas. (2021b). *Report on Acid Sulfate Soil Managment plan, Proposed Apartment Development, 10 Dangar Street, Wickham.* Ref: 39961.02.R.005.Rev3: Douglas Partners Pty Ltd.

Douglas. (2022). *Report on Validation of Remediation, Proposed Apartment Development, 10 Dangar Street, Wickham.* Ref: 39961.11.R.002.Rev0: Douglas Partners Pty Ltd.

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NSW Government. (2021). *State Environmental Planning Policy (Resilience and Hazards) 2021.* NSW Government.

Sullivan, L., Ward, N., Toppler, N., & Lancaster, G. (2018). *National Acid Sulfate Soils Guidance: National Acid Sulfate Soils Identification and Laboratory Methods Manual.* Canberra ACT CC BY 4.0: Department of Agriculture and Water Resources.

9. Limitations

Douglas Partners Pty Ltd (Douglas) has prepared this report (or services) for this project at 10 Dangar Street, Wickham in line with Douglas' proposal dated 4 February 2026 and acceptance received from UPG Wickham Pty Ltd dated 16 March 2026. The work was carried out under a consultant agreement between Douglas and UPG Wickham Pty Ltd. This report is provided for the exclusive use of UPG Wickham Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of Douglas, does so entirely at its own risk and without recourse to Douglas for any loss or damage. In preparing this report Douglas has necessarily relied upon information provided by the client and/or their agents.

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

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

The assessment of atypical safety hazards arising from this advice is restricted to the environmental components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

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

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

Please contact the undersigned if you have any questions on this matter.

Yours faithfully
Douglas Partners Pty Ltd

for **Mitchell Date**
Environmental Engineer

Reviewed by

Patrick Heads
Senior Associate

Attachments:

About this Report
Architectural Plans Urban ref 7105 rev A dated 27 March 2026
- Basement plan 03
- Floor level 00

Report on Preliminary Site Investigation (Douglas, 2018a)
Report on Detailed Site Investigation (Douglas, 2018b)
Remediation Action Plan (Douglas, 2021a)
Report on Validation of Remediation (Douglas, 2022)

About this Report

October 2024

Introduction

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

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

Copyright

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

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

About this Report

Site Anomalies

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

Information for Contractual Purposes

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

Site Inspection

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

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GENERAL NOTES:

- Number of accessible and shared spaces awaiting access and traffic advice.
- Overall parking numbers TBC
- Basement structure location based on surveyed information

PARKING SCHEDULE	
Type	Count
CAR SHARE	
STANDARD 5400x2400	2
	2
HOTEL STAFF	
ACCESSIBLE 5400x2400	1
STANDARD 5400x2400	9
	10
RESIDENTIAL	
SMALL 5000x2300	18
STANDARD 5400x2400	179
	197
RETAIL STAFF	
ACCESSIBLE 5400x2400	1
STANDARD 5400x2400	5
	6
Grand total	215

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PRELIMINARY

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Nominated Architects: Adam Haddow-7188 | John Pradel-7004

Rev	Date	Revision	By	Chk.
A	27.03.2026	ISSUED FOR SSDA		

NOTE: MINOR CHANGES TO FORM AND CONFIGURATION MAY BE REQUIRED WHEN DRAWINGS ARE SUBSEQUENTLY PREPARED FOR CONSTRUCTION PURPOSES AFTER THE GRANT OF DEVELOPMENT CONSENT.

Client: URBAN PROPERTY

Project: UPG NEWCASTLE
10 DANGAR STREET, WICKHAM

Drawing Name: FLOOR PLAN - BASEMENT 03

Date	Scale	Sheet Size
27.03.2026	1 : 100	A0
Drawn	Chk.	Job No.
CN	WG	7105
Drawing No.		Revision
DA-1004		/ A

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EGRESS FROM TOWER LEVEL
BOOSTER 3.1 m²
MAIN LOBBY SUPPORT 38.0 m²
LUGGAGE STORE AND OFFICE
WC 5.1 m²
HOTEL LOBBY 103.1 m²
2400 CLEARANCE ABOVE
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Report on Preliminary Site Investigation for Contamination, Desktop Geotechnical and Acid Sulfate Soil Assessment

Proposed Apartment Development
10 Dangar Street, Wickham

Prepared for
Dangar Street Wickham Pty Ltd

Project 39961.02
October 2018

Douglas Partners
Geotechnics / Environment / Groundwater

Document History

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

	Signature	Date
Author		18 October 2018
Reviewer		18 October 2018

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Appendix A: About This Report

Appendix B: Drawing 1 – Test Location Plan

Ground Floor Plan by PBD Architects, Drawing No. DA102, Issue A

Report on Preliminary Site Investigation for Contamination
Proposed Apartment Development
10 Dangar Street, Wickham

1. Introduction

This report presents the results of a preliminary site investigation for contamination (PSI), desktop geotechnical and acid sulfate soil assessment undertaken for a proposed apartment development at 10 Dangar Street, Wickham. The investigation was commissioned in a signed services order dated 20 September 2018 by Matt Zappia of Dangar Street Wickham Pty Ltd and was undertaken with reference to Douglas Partners Pty Ltd (DP) proposal NCL180390 dated 5 July 2018.

It is understood that the development of the site will include construction of a 14-level retail, commercial and residential development with two basement levels. Preliminary development drawings indicate that the ground floor use comprises retail and car parking, with levels one to three comprising office and parking. Residential development is proposed for levels four to 13.

The PSI was undertaken to investigate past and present contaminating activities, report on site condition, and provide a preliminary assessment of site contamination.

The PSI was undertaken with reference to NSW EPA "Guidelines for Consultants Reporting on Contaminated Sites" (Ref 1), and comprised the following tasks:

- Brief review and update of previously assessed site history information (review of aerial photos, discussions with Newcastle City Council and a local business operator);
- Brief review of previous site investigations (Refs 2 and 3);
- Site inspection;
- Preparation of a Preliminary Conceptual Site Model (CSM); and
- Preparation of this report presenting the findings of the PSI, with recommendations for further work.

The PSI was undertaken with reference to NSW EPA Guidelines for Consultants Reporting on Contaminated Sites (August 2011, Ref 1) and the National Environment Protection (Site Contamination) Measure 1999 (amended 2013 – NEPM 2013, Ref 4).

For the purposes of the investigation, the client provided preliminary proposed development plans (unreferenced). The preliminary plans are provided in Appendix C.

2. Site Description

The site is identified as Lot 1, DP1197377 and is known as 10 Dangar Street Wickham. The site is an irregular-shaped area of approximately 2930 m^2.

The site is bounded to the east by Hannell Street, to the north by Dangar Street, and residential development, to the west by Charles Street, Station Street and commercial development, and to the south by the Newcastle Transport Interchange (i.e. former rail corridor).

The subject lot is shown in Figure 1 below.

Figure 1: Subject site, in yellow

The site is currently occupied by a vehicle retailer. It is understood that that the site is zoned B3 Commercial Core, which permits a range of landuses with consent, from childcare centres to commercial premises.

Reference to NSW LiDAR topographic imaging for the site indicates that surface levels are in the order of RL 1.5 m to 2.0 m AHD, with the site being generally flat.

The site was previously identified as the following lots, as presented in Ref 2:

- Lot 30, DP 635397;
- Lot 1, DP 735415; and
- Lots 34-39, DP 1086794.

3. Geology and Hydrogeology

Reference to the Newcastle Coalfield Regional Geology 1:100 000 Geological Series Sheet published by the Department of Mineral Resources indicates that the site is underlain by Quaternary aged alluvium which typically comprises gravel, sand, silt and clay.

Reference to the Newcastle Acid Sulphate Soil Risk Map prepared by the Department of Land & Water Conservation indicates that the site has a high probability of occurrence of acid sulphate soils between 1 and 3 m below the ground surface.

The regional groundwater flow regime is believed to be to the east-north-east of the site, towards Throsby Creek, which is approximately 180 m east-north-east of the site, and is considered to be the nearest sensitive receptor. Based on the site topography and previous assessment in the area, the depth to the water table is believed to be within 3 m of the ground surface. It should be noted that groundwater levels are affected by climatic conditions, soil permeability and tidal influences and will therefore vary with time.

An on-line records search of groundwater wells registered with the NSW Office of Water (NOW) indicated that there are four registered groundwater wells within 500 m of the site. Bores GW201711 and GW201710 are located immediately north-west and south-east of the investigation area respectively. The bore logs for these wells, drilled and installed to 6 m below ground surface, indicate there is approximately 0.5 m of localised filling overlying natural sands. The standing water level was noted at 1.3 – 1.4 m below the ground surface.

4. Background

DP has conducted geotechnical and contamination assessment on the site as follows:

- DP, 'Report on Preliminary Contamination and Geotechnical Assessment, Proposed Multi-storey Commercial Development, 10 Dangar Street Wickham', prepared for Valad Property Management, Project 39961, September 2008;
- DP, 'Report on Additional Contamination Assessment, Proposed Multi-storey Commercial Development, 10 Dangar Street Wickham', prepared for Valad Property Management, Project 39961.01, November 2008.

The assessments comprised the following:

- Desktop assessment of published information;
- Site history assessment, comprising review of historical aerial photos, discussions with previous site occupiers, Council records search and NSW EPA search;
- Drilling of boreholes across the site to target potential contamination sources and provided an overall assessment of site condition;
- Groundwater well installation and sampling to assess potential groundwater impacts and possible migration of hydrocarbon impact in groundwater; and
- Preparation of reports presenting the results of the assessments.

The results of site history indicated the following:

- Possible former site uses included a transport terminal, distribution centre, motor workshop, motor vehicle storage, motor vehicle auction warehouse, removalists, courier/freight terminal and residential dwellings (i.e. prior to commercial site use);
- Underground fuel storage is located in the north-western corner of the site (i.e. underground tank and possible bowsers in an alcove in the north-western corner of the structure); and
- Likely demolition of previous structures (e.g. residential dwellings) had occurred prior to construction of the warehouse structure.

A site walkover was conducted as part of the previous works. Relevant features included the following:

- Presence of fibro fragments (possible asbestos containing materials – ACM) at the surface in the eastern portion of the site;
- Fibro sheeting (possible ACM used as exterior cladding on the site structure;
- Raised floor levels within the warehouse building (i.e. possible filling beneath the structure); and
- Observations of filling in unpaved areas at the surface including ash, slag, rail ballast and building rubble.

As a result of site history review and assessment of site condition, the following potential contaminant sources were noted:

- Imported filling within surface and near-surface soils which may contain a range of potential contaminants including hydrocarbons, heavy metals, pesticides, PCBs and asbestos;
- Possible imported filling beneath the raised floor area which may contain a range of potential contaminants as above;
- Underground Storage Tanks (USTs), former bowsers and associated pipework situated in the north-western portion of the site which may be a source of hydrocarbon and heavy metal impact to soils and groundwater;
- Localised imported filling stockpiles situated in the south-western grassed area of the site which may contain a range of potential contaminants including hydrocarbons, heavy metals, pesticides, PCBs and asbestos;
- Surface filling (rail ballast) which may contain asbestos materials (external grassed area);
- Demolition of former site structures, and current damaged building materials which may be a source of asbestos materials within surface soils;
- Recent car parking on unsealed areas of the site which may have resulted in surface soil hydrocarbon and heavy metal impact from oil / fuel leaks; and
- Former motor repair workshop operations at the site (i.e. waste oils, fuels, liquids, possible former sumps and collection pits – location unknown), which may be a source of hydrocarbon and heavy metal impact.

Preliminary subsurface assessment was conducted to investigate the above potential contamination sources. Fieldwork conducted at the site as part of the Initial assessment in September 2008 comprised the following:

- Drilling of eight boreholes using a drilling rig and hand tools;
- Near-surface soil sampling at two locations;
- Sampling of observed potential ACM at the surface; and
- Installation of two groundwater monitoring wells (Bores 4 and 10) to assess groundwater depth and quality.

The results of initial subsurface investigation and laboratory testing indicated the following with respect to contamination:

- The presence of benzo(a)pyrene and PAH impact above the adopted landuse criteria associated with near-surface soils and dumped stockpiles within the vacant south-western portion of the site (generally 0.55 m thick – based on Bore 6);
- The presence of asbestos materials in near-surface filling within Bore 1, 4, 5 and 6, likely to be associated with demolition of former structures at the site (generally 0.2 m to 0.8 m thick); and
- The presence of hydrocarbon impact in soil and groundwater in the northern portion of the site associated with the underground fuel storage tank(s) and associated pipework, bowsers, etc. (impact observed in Bore 10 from 0.7 m depth to the depth of investigation).

Based on the results of the initial investigation, fill materials were generally observed to depths of up to about 2 m within the site, with an average of 1.3 m depth. Fill materials more likely to contain potential contamination (i.e. those observed to contain extraneous materials such as building rubble) were generally up to 0.8 m thick across the site, with an average thickness of 0.5 m. It is also noted that the raised floor area within the building contained fill with inclusions to a depth of 1.45 m (the raised floor level was about 1.1 m above the surrounding ground levels).

It was noted that there was potential for contamination to be present within all fill materials at the site due to the following:

- Absence of detailed information on the original source or quality of fill materials used at the site;
- Historical information indicating demolition of former structures at the site; and
- The results of the subsurface investigation, indicating the presence of imported fill materials at some locations, and potential for impact from former site activities.

Test locations from the initial investigation (test locations 1 to 10) are shown on Drawing 1, Appendix A.

Following initial subsurface investigation (Ref 2), additional subsurface investigation was conducted to further assess potential contamination and possible migration of hydrocarbon impacts from the underground fuel storage tank in the north-western portion of the site (Ref 3). The additional work comprised the following:

- Drilling of eight boreholes and installation of groundwater monitoring wells in each of the boreholes;
- Soil and groundwater sampling from each location;

- Laboratory analysis of selected sample for target contaminants; and
- Preparation of a report presenting the results of the assessment.

The additional boreholes were drilled in the vicinity of the underground fuel storage tank, and within the road pavement and footpath within Dangar Street, immediately north and north-east of the site. Test locations (Bores 101 to 108) are shown on Drawing 1, Appendix A.

The results of the additional investigation indicated the following with respect to contamination and possible off-site migration of hydrocarbon contamination associated with the UST(s) located within the north-western corner of the site:

- Presence of hydrocarbon-impacted soil and groundwater in the immediate vicinity of the UST(s) – Bore 10 (north-western portion of the site);
- Presence of minor off-site hydrocarbon impact in soil and groundwater (Bore 102 - approximately 5 m north-east (generally downgradient of the UST(s));
- Presence of minor PAH impact in groundwater to the north-east of the site (i.e. Bore 108);
- The presence of heavy metal impact in groundwater within the site and in off-site bores; and
- Groundwater flow is generally in an east-north-easterly direction (i.e. towards Throsby Basin).

The results suggested that hydrocarbon impact in soil and groundwater associated with the UST(s) had migrated beyond the site boundary, however, the extent of off-site migration appeared to be limited (i.e. only minor impact within Bore 102 located 5 m from the site boundary and approximately downgradient of the UST). Elevated petroleum hydrocarbons were not detected in the remaining bores.

The possible source of PAH impact on groundwater in Bore 108 is not certain. Such impact may be due to diffused sources other than the UST (i.e. regional presence of general fill materials). The potential for PAH impact to be a result of migration from the UST(s), however, cannot be discounted.

Based on the results of the previous investigations, on-site hydrocarbon contamination and minor off-site impact (associated with the UST(s)) was assessed to have occurred. Site remediation was recommended for future residential or commercial development, to address the following identified contamination:

- Hydrocarbon contamination associated with the UST(s) within the north-western corner of the site (Bores 10 & 102, Ref 3);
- PAH contamination present in near-surface fill materials within the south-western corner of the site (Bore 6 – generally 0.55m thick – Ref 2); and
- Asbestos contamination in near-surface soils at Bores 1, 4, 5 and 6 (0.2 m to 0.8 m thick – Ref 2).

It is noted that fill materials containing deleterious materials were generally 0.2 m to 0.8 m thick across the site (average of 0.5 m). There is a risk that such materials may also contain contaminants such as asbestos.

5. Site History

5.1 Site History Review

A brief review of site history was conducted for the previous assessment, and has been subsequently updated for the current assessment. The site history assessment comprised the following:

- Newcastle City Council (NCC) records search;
- Discussions with local residents, business operators and former site occupiers;
- Review of historical aerial photos; and
- Searches with NSW Department of Environment and Climate Change (DECC).

Details are presented in the following sections.

5.2 Council Records Search

Correspondence with NCC indicated the following Building Applications (BA), Development Application (DA), and general information for the site, as shown in Table 1.

Table 1: Council Records Search, 10 Dangar Street

Application ID	Lodgement Date	Date Determined	Description
DA2002/2672	25/11/2002	10/06/2003	Use of existing building as a depot for the receipt, storage and distribution of motor vehicles
DA2002/2672/02	1/07/2004	9/09/2004	Sale of retail vehicles from any point within the car lot, instead of specified set of 6 car spaces
DA2002/2672/03	30/06/2003	30/06/2003	To permit ancillary retail sale of motor vehicles
DA2006/2010	10/11/2006	4/06/2007	Change of use to a paintless dent repair business and two flush walls signs
	1/08/2013	6/01/2014	Alterations to commercial building and change of use to motor showroom
DA2014/0696	30/06/2014	6/08/2014	Signage
BA1983/0551	8/04/1983	19/05/1983	Alt & Add to Warehouse
BA1990/0395	9/02/1990	13/02/1990	BA0395/90 Rembel G & G Status (G) 13/02/90 a/a WA Rehouse (Earthquake)
BA1996/0260	19/02/1996	14/03/1996	Repairs to Fire Damaged Warehouse
DA1982/0379	5/08/1982	30/08/1982	Conversion of Transport Terminal to 3 Warehouses
DA1982/0379/02	5/08/1982		
DA1983/0405	10/08/1983	9/09/1983	Distribution Centre
DA1983/0405/02	10/08/1983		
DA1983/0533	7/11/1983	10/04/1984	Motor Repair Workshop
DA1983/0533/02	7/11/1983		

The search of NCC records also indicated a possible DA prior to 1980 for a Transport Depot & Store and another for additions to a Transport Terminal.

The search of Council records also indicated that underground fuel tanks may be present on the site, and that they were likely to have been installed prior to 1980.

An environmental audit was conducted at the site by NCC on 5 April 1993, as reported in the Council letter dated 5 July 1993. The letter (sent to a previous site occupier) indicated that a disused underground fuel storage tank was present at the site and that proper abandonment procedures may not have been undertaken for the tank, therefore “allowing possible contamination of ground waters in the event of leakage.”

At this stage it is unknown whether the tank was decommissioned or abandoned as per Council instructions.

Review of individual Section 149 Planning Certificate for the former lots indicated that the lot has no matters arising under the Contaminated Land Management Act 1997. The S149 certificate did, however, indicate that the site may be affected by contamination due to the presence of underground fuel tanks, and that the site may have been used for underground fuel storage and engine works.

5.3 Discussions with Former Occupier, Local Business Operator & Real Estate

The information presented below resulted from discussions with a former site occupier (Peter Ryan of Britz Moving & Storage), discussions with an adjacent business operator and also the property manager for the site (Colliers International). The discussions indicated that the site had been previously used for the following:

- Motor vehicle storage (occupied the site in the last few years);
- Auto auction warehouse (occupied the site in the last few years);
- IT companies (Volpex Pty Ltd, Xceltek Pty Ltd);
- Britz Moving and storage (i.e. removalist depot and storage) between approximately 1997 and 2001. it was noted that Britz did not use underground fuel storage facilities at the site; and
- Courier / Freight terminal (i.e. Discount Freight Express) – possibly commencing prior to 1980s.

5.4 Review of Historical Aerial Photos

A summary of the observations made from viewing historical aerial photos is provided in Table 2 below.

Table 2: Aerial Photo Review

Year	Scale / (Colour)	Main Observations
1954	1:30,000 (B&W)	The majority of the site is covered with structures (probably residential dwellings). Possible vegetation cover (trees) in north-western portion of the site
1966	1:40,000 (B&W)	A large commercial warehouse structure is located in the western/central portion of the site (similar to the current layout). The structure has a white roof. Possible residential dwellings to the east of the warehouse. Possible structure in the south-western corner of the site
1975	1:40,000 (B&W)	Similar to 1966 photo, possibly with a darker roof in some parts of the warehouse.
1983	1:16,000 (B&W)	Similar structures to 1975 (i.e. large commercial building and small building in the south-western portion). The roof on the warehouse is now black with skylights. A residential dwelling and possible shed is located to the east of the warehouse (possibly to the east of the subject site). The remainder of the eastern portion of the site is grassed.
1987	1:16,000 (colour)	Similar warehouse structure to previous. Structure in the south-western corner has been removed (area currently grassed). The southern portion of the warehouse roof is black with skylights. The central and northern portion of the roof is white. A bare area of land (i.e. no vegetation) is located immediately east of the warehouse (i.e. possible parking/access) with an unpaved track heading south from this area.
1993	1:25,000 (colour)	As 1987 photo, however, residence to the east of the site has been removed.
1996	1:54,000 (colour)	As 1993 photo. The southern portion of the warehouse roof is still black.
2001	1:25,000 (colour)	A new road alignment is observed to the east of the site (i.e. current Hannell Street alignment). Warehouse building is as previous except for all white roof. Eastern portion of the site is grassed.
2008 (Google Earth)	Not to Scale (colour)	As 2001 photo. Some possible disturbed ground in the south-western portion of the site.
2010	Not to Scale (colour)	Similar to 2008 photo
Oct 2013	Not to Scale (colour)	Similar to 2008 photo. South-western grassed area has been paved (concrete)
Jan 14	Not to Scale (colour)	Similar to 2013 photo. Possible earthworks being conducted in the eastern portion of the site
June 2014	Not to Scale (colour)	Eastern portion of the site has been paved (concrete).Vehicles are parked on the eastern portion of the site and the south-western paved portion of the site.

It is noted that the review of aerial photos was difficult due to the relatively small scale and poor resolutions.

5.5 NSW EPA

A review of the NSW EPA public register indicated the site has no statutory notices issued under the provision of the Contaminated Land and Management Act.

Review of the list of NSW contaminated sites notified to EPA indicated that 10 Dangar Street Wickham has been notified to the NSW EPA. The record states that regulation under the Contaminated Land Management Act is not required.

5.6 Review of Survey Report

A survey report for the site supplied by the client (dated 12 December 1984) indicates the presence of underground fuel storage tanks in the north-western corner of the site, with associated fuel bowsers located in an alcove on the exterior of the warehouse building in the north-western corner of the site. A copy of the survey plan is provided in Appendix B.

6. Site Condition

6.1 DP 2008 Site Walkover

The general site conditions observed during the previous investigation (Ref 2) are described and shown in Figures 1 to 4 below:

- Grassed area in the eastern portion of the site (Figure 1);
- Warehouse building covering the majority of the site (Figure 2 & 3); and
- Grassed area in the south-western portion of the site (Figure 4).

Photo locations and orientation are shown on Drawing 1 in Appendix B.

-

Figure 1: Grassed area in the eastern portion of the site (looking south), September 2008

Figure 2: Northern portion of the warehouse building (looking south)

Figure 3: Central portion of the interior of the warehouse (looking south-east)

Figure 4: Grassed area in the south-western portion of the site (looking south-east)

At the time of the investigation, the grassed area in the eastern portion of the site was vacant, and had been used for car parking. The area was generally grassed, with some bare areas and building rubble observed at the surface, as shown in Figure 5. Exposed surface soils were observed to generally comprise grey-brown silty sandy soils with some building rubble (e.g. bricks) and gravel. Fibro fragments, possibly containing asbestos, were also observed in the eastern portion of the site as shown in Figure 6 below.

Figure 5: Building rubble at the surface in the eastern portion of the site

Figure 6: Fibro fragments at the surface in the eastern portion of the site

The warehouse building generally comprised a concrete floor, combination of metal and timber framing, with a metal clad roof, and combination of masonry, metal clad and corrugated fibro clad walls. The corrugated fibro wall cladding is shown in Figure 7.

Figure 7: Fibro sheeting on the eastern wall of the warehouse

The majority of the central and western portions of the warehouse building comprised a raised floor level (i.e. approximately 1.1 m to 1.2 m above the external levels), as shown in Figure 3 above and Figure 8 below. There was no observed access to subfloor areas.

Figure 8: Raised floor in the northern portion of the warehouse

The ground level of the eastern portion of the warehouse building was commensurate with surrounding site levels, as shown in Figure 9 below.

Figure 9: Eastern portion of the warehouse (looking north – raised section to the west)

Localised oil staining was observed over the concrete floor in the central-eastern portion of the warehouse, as shown in Figure 10.

Figure 10: Localised oil staining in the central-eastern portion of the warehouse

Long grass and general rubbish (plastic, paper, computer printer) were observed in the vacant south-western portion of the site, as shown in Figure 4 above. Possible ash/slag materials were also observed in localised piles of surface filling, as shown in Figure 11 below.

Figure 11: Possible ash/slag in near-surface filling in the south-western portion of the site

An alcove in the exterior of the warehouse building was observed in the north-western corner of the building, as shown in Figure 12 (possible location of former bowsers).

Figure 12: Alcove in the north-western corner of the warehouse

Asphalt pavement had been laid at the surface in the north-western corner of the site, as shown in Figure 13. Asphalt patches were also observed in the northern portion of the site adjacent to the site boundary as shown in Figure 13. Fibro sheeting, likely to be associated with the damaged awning above, was observed at the surface in the northern portion of the site as shown in Figure 14.

Figure 13: Asphalt patches (foreground) and asphalt pavement (background), looking west

Figure 14: Fibro sheeting in the northern portion of the site

6.2 October 2018 (current investigation)

The current site condition is summarised as follows:

- Raised paved area in the eastern portion of the site (former grassed area) as shown in Figure 15;
- Paved area in the south-western portion of the site (former grassed area) as shown in Figure 16;
- Area of underground fuel storage tank (Figure 17) and possible bowser alcove (Figure 18), which has remained relatively unchanged since the previous investigation (Ref 2).

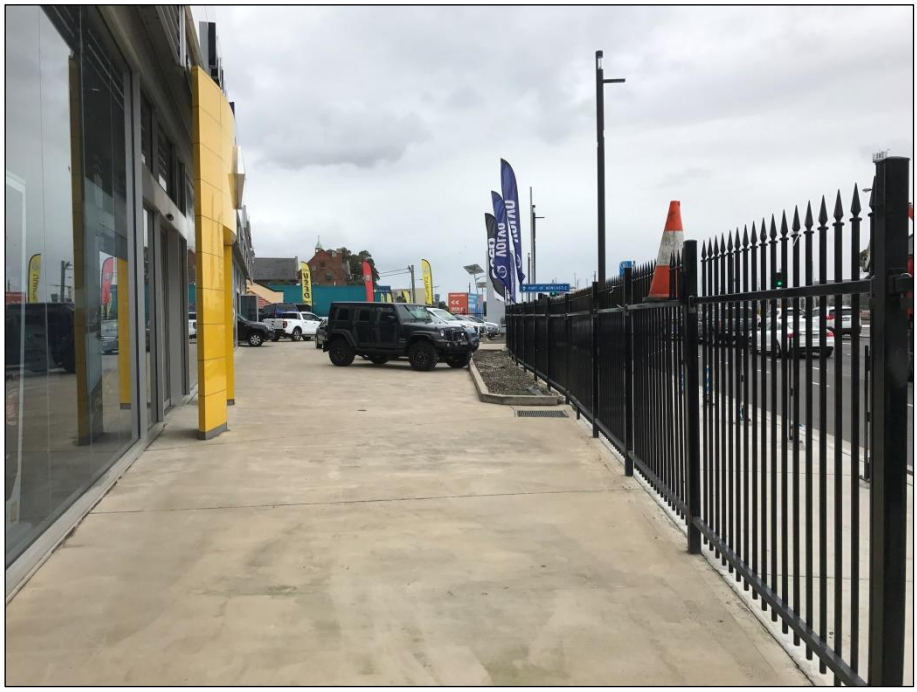


Figure 15: Paved area in the eastern portion of the site

Figure 16: Paved area in the south-western portion of the site

Figure 17: Underground fuel storage tank location in the north-western portion of the site

Figure 18: Possible former bowser alcove in the north-western portion of the site

7. Potential Contaminants

Based on the available site history information and observations made during the site inspection, the principal sources of potential contamination are considered to be:

- Imported filling within surface and near-surface soils which may contain a range of potential contaminants including hydrocarbons, heavy metals, pesticides, PCBs, asbestos etc.;
- Possible imported filling beneath the raised floor area which may contain a range of potential contaminants as above;
- USTs, former bowsers and associated pipework situated in the north-western portion of the site which may be a source of hydrocarbon and heavy metal impact to soils and groundwater;
- Localised imported filling stockpiles situated in the south-western grassed area of the site which may contain a range of potential contaminants including hydrocarbons, heavy metals, pesticides, PCBs and asbestos;
- Surface filling (rail ballast) which may contain asbestos materials (external grassed area);
- Demolition of former site structures, and current damaged building materials which may be a source of hazardous building materials, such as asbestos, within surface soils;
- Recent car parking on unsealed areas of the site which may have resulted in surface soil hydrocarbon and heavy metal impact from oil / fuel leaks; and
- Former motor repair workshop operations at the site (i.e. waste oils, fuels, liquids, possible former sumps and collection pits – location unknown), which may be a source of hydrocarbon and heavy metal impact.

The asphalt patches observed beneath the awning on the northern site boundary were commensurate with the size and dimensions of a fuel bowser. The number or locations of USTs or bowsers within the site is unknown. This area may also contain hydrocarbon impact if used for fuel storage or dispensing.

8. Conceptual Site Model

A Conceptual Site Model (CSM) has been prepared for the site with reference to the National Environment Protection (Assessment of Site Contamination) Measure 1999 (Amendment Measure 2013) Schedule B2 (Ref 4). The CSM identifies potential contaminant sources and contaminants of concern, contaminant release mechanisms, exposure pathways and potential receptors. The CSM is presented in Table 3.

Table 3: Conceptual Site Model

Known and Potential Primary Sources	Primary Release Mechanism	Secondary Release Mechanism	Potential Impacted Media	Contaminants of Concern	Exposure Pathway	Potential Receptors	
						Current	Future
Filling imported across the site (subject to source)	Placement of filling on-site	Long-term leaching of contaminants via runoff, rain water infiltration / percolation or exposure / disturbance during proposed development	Soil, groundwater, surface water	TRH, BTEX, PAH, Metals, Pesticides, PCB, asbestos	Dermal contact, inhalation (dust/vapours), ingestion	Site workers, maintenance workers, consultants, trespassers, surface water bodies, groundwater, neighbouring properties in the case of groundwater or surface water migration	Site workers, residents, maintenance workers, consultants, trespassers, surface water bodies, groundwater, neighbouring properties in the case of groundwater or surface water migration
USTs & associated Infrastructure on site and off site	Potential leaks and spills from USTs, bowsers and associated pipework	Long-term leaching of contaminants via runoff, rain water infiltration / percolation, through soil or cracks/joints in concrete, groundwater migration or exposure/disturbance during proposed development	Soil, groundwater, surface water	TRH, BTEX, PAH, Metals, VOC	Dermal contact, inhalation (dust/vapours), ingestion		
Demolition of former structures or renovations to existing / former buildings	Demolition of buildings / structures	Long-term leaching of contaminants via runoff, rain water infiltration / percolation or exposure / disturbance during proposed development	Soil, groundwater, surface water	Metals, PCB, asbestos	Dermal contact, inhalation (dust/vapours), ingestion		
Car Parking on unpaved areas	Spills and leaks	Long-term leaching of contaminants via runoff, rain water infiltration / percolation, through soil or cracks / joints in concrete or exposure/disturbance during proposed development	Soil, groundwater, surface water	TRH, BTEX, PAH, Metals, VOC, acids	Dermal contact, inhalation (dust/vapours), ingestion		

Table 3: Conceptual Site Model (continued)

Known and Potential Primary Sources	Primary Release Mechanism	Secondary Release Mechanism	Potential Impacted Media	Contaminants of Concern	Exposure Pathway	Potential Receptors	
						Current	Future
Repairs/servicing/storage of vehicles and storage of vehicles / parts	Spills and leaks, hydrocarbon sources and solvents	Long-term leaching of contaminants via runoff, rain water infiltration / percolation, through soil or cracks / joints in concrete or exposure/disturbance during proposed development	Soil, groundwater, surface water	TRH, BTEX, PAH, Metals, VOC	Dermal contact, inhalation (dust/vapours), ingestion		
Refurbishment of existing structure	Partial demolition of buildings / structures, removal of hazardous materials	Long-term leaching of contaminants via runoff, rain water infiltration / percolation or exposure / disturbance during proposed development	Soil, groundwater, surface water	Metals, PCB, Asbestos	Dermal contact, inhalation (dust/vapours), ingestion		

9. Contamination Assessment

The results of the site history review and site inspection indicated the site has been used for commercial / light industrial and residential landuse.

Site observations made during the previous assessment (Ref 2) indicated the presence of exposed filling on the eastern and south-western portions of the site, visible fibro fragments (potential ACM) at the surface the eastern portion of the site and variable floor heights within the warehouse building suggesting possible imported filling. In addition, a possible fuel bowser and underground fuel storage tank location was observed in the north-western portion of the site, which may indicate the potential for hydrocarbon contamination in soil and groundwater at the site.

A number of potential on-site sources of site contamination were identified due to former and current site activities.

Preliminary subsurface investigation conducted at the site previously by DP (Refs 2 and 3) indicated the following:

- Hydrocarbon contamination associated with the UST(s) within the north-western corner of the site (Bores 10 and 102, Ref 3);
- PAH contamination present in near-surface fill materials within the south-western corner of the site (Bore 6 – generally 0.55m thick – Ref 2); and
- Asbestos contamination in near-surface soils at Bores 1, 4, 5 & 6 (0.2 m to 0.8 m thick – Ref 2).

Additional subsurface investigation (soil and groundwater) is recommended to further assess the identified potential contamination sources as well as provide information on current site condition compared to the previous assessments (Refs 2 and 3).

On the basis of existing information, remediation of identified contamination will be required with reference to a site-specific remediation action plan (RAP) for the development with reference to NSW EPA guidelines. The above-mentioned additional investigation will provide information for the preparation of the RAP.

Based on the results of the assessments to date, it is considered that the site could be made suitable for the proposed commercial / residential development from a contamination perspective, subject to additional investigation described above and appropriate remediation and validation (as required).

10. Geotechnical Assessment

10.1 Subsurface Conditions

Based on the results of previous assessment (Ref 2), the pertinent subsurface conditions encountered at the site comprise the following:

- Filling (typically granular) was encountered to depths of up to 2.2 m;
- Upper profile of the filling was variable and comprised pavement materials (asphalt/sandy gravel), concrete and silt with some gravel, brick, slag;

- Sand fill was encountered beneath the upper profile to depths of up to 2.2 m, and continued to the depth of investigation (up to 4.45 m);
- Fill beneath raised floor contained sand with some brick/concrete rubble;
- The results of the standard penetration tests (SPT) indicated the underlying sand was very loose to loose; and
- Deeper investigations on nearby sites generally indicate the sand increases in strength at depth and overlies a clay layer which continues to the top of bedrock beyond 30 m depth.

Groundwater was encountered was encountered at depths between 1.1 m and 1.5 m below existing ground levels during drilling. Subsequent measurements from a piezometer installed at the site indicated a stabilised depth to groundwater of 1.68 m, corresponding to a reduced level of 0.42 AHD.

It should be noted that groundwater levels are affected by climatic conditions, soil permeability and possible tidal influence (due to proximity to Throsby Basin) and will therefore vary with time.

10.2 Footings

The very loose to loose sand is not expected to be suitable for the support of heavily loaded structures. Previous investigations on nearby sites have encountered a medium dense to dense sand layer at depths of 7 m to 10 m which has been used to support piles. Additional deeper investigations would be required to confirm that this sand layer is present and consistent beneath the subject site, and is of suitable thickness and strength for structural support.

The main options for the foundation system are likely to be:

- Continuous flight auger (CFA) piles;
- Screw-cast concrete (e.g. Atlas or Omega) piles;
- Jacked pre-cast concrete piles (e.g. G-pile);
- Raft slab; and
- Piled raft (if pile group settlements become significant).

Footing and settlement analysis etc. will be required as part of geotechnical investigation to further assess the possible footing types and their applicability to the proposed development and subsurface conditions.

10.3 Excavation Conditions

The upper soil profile is expected to comprise granular filling overlying sand and will therefore be readily excavated using conventional earthmoving equipment (backhoes and excavators).

10.4 Excavation Support/Dewatering

Shallow excavations could be either battered (where there is sufficient space) or installation of sheet piling could be provided. The use of battered slopes is only appropriate for excavations above the water table unless external dewatering is undertaken.

The water table is likely to be about 1.4 m to 1.8 m below current site levels, however, may rise above this level following prolonged or intense rainfall events. For basement and/or deeper excavations for construction, dewatering will be required and disposal of the water will require further assessment, regulatory approval and licences. Furthermore, seepage may destabilise any unprotected batter slopes.

10.5 Mine Subsidence

Based on previous discussions with Subsidence Advisory NSW, the site is not within a proclaimed Mine Subsidence District and accordingly, is not likely subject to any building restrictions imposed by the MSB.

10.6 Acid Sulfate Soils

Reference to the relevant acid sulfate mapping for the site indicates that there is a high probability of acid sulfate soils within the depth of investigation. The following additional assessment will be required as part of the proposed development:

- Acid sulfate soil assessment on materials proposed to be impacted by excavation and/or dewatering, whereby the soils are exposed to air;
- Preparation of an acid sulfate soil management plan (ASSMP) which outlines the procedures, methodology and contingency for treatment and management of acid sulfate soil and groundwater during construction.

11. References

1. NSW EPA Contaminated Sites (2011), 'Guidelines for Consultants Reporting on Contaminated Sites', August 2011.
2. Douglas Partners Pty Ltd, "Report on Preliminary Contamination and Geotechnical Assessment, Proposed Multi-Storey Commercial Development, 10 Dangar Street, Wickham, prepared for Valad Property Management, Project 39961, September 2008".
3. Douglas Partners Pty Ltd, "Report on Additional Contamination Assessment, Proposed Multi-Storey Commercial Development, 10 Dangar Street, Wickham, prepared for Valad Property Management, Project 39961.01, November 2008".
4. National Environment Protection Council (2013), 'National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013', 11 April 2013.

12. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for this project at 10 Dangar Street, Wickham in accordance with DP's proposal NCL180390 dated 5 July 2018 and acceptance received from Matt Zappia. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Dangar Street Wickham Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and / or their agents.

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

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

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

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

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

Douglas Partners Pty Ltd

Appendix A

About This Report

About this Report

Douglas Partners

Introduction

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

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

Copyright

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

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

About this Report

Site Anomalies

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

Information for Contractual Purposes

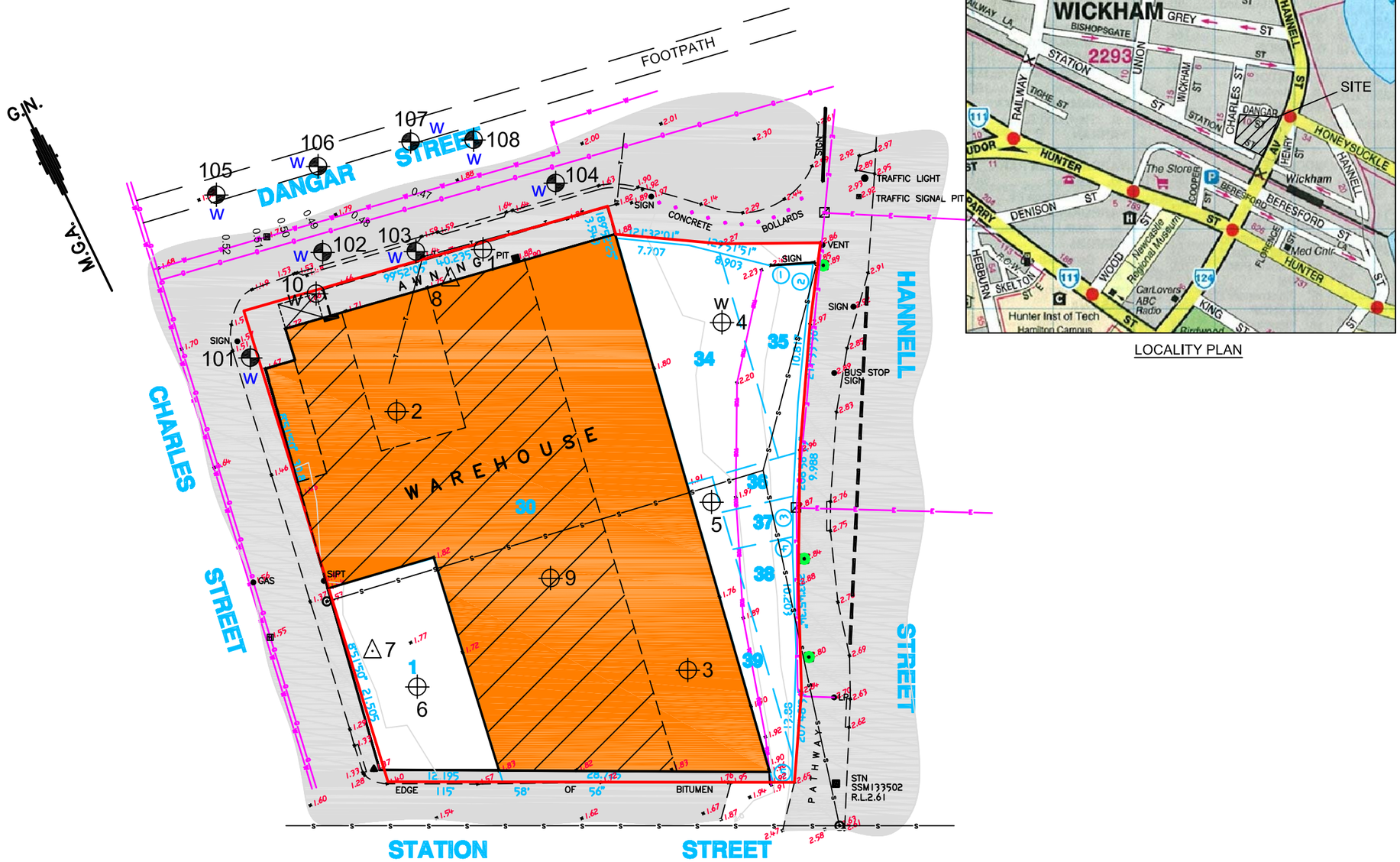
Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate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

Site Inspection

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

Appendix B

Drawing 1 – Test Location Plan
Ground Floor Plan by PBD Architects, Drawing No. DA102, Issue A



LOCALITY PLAN

LEGEND

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE BOREHOLE LOCATION
- APPROXIMATE BOREHOLE LOCATION (PREVIOUS INVESTIGATION - 39961)
- APPROXIMATE LOCATION OF RAISED CONCRETE FLOOR
- APPROXIMATE SURFACE/ NEAR SURFACE SAMPLING LOCATION (PREVIOUS INVESTIGATION - 39961)
- APPROXIMATE LOCATION OF POSSIBLE FORMER BOWSER(S)
- APPROXIMATE LOCATION OF POSSIBLE UNDERGROUND STORAGE TANK(S)
- W GROUNDWATER MONITORING WELL (CURRENT INVESTIGATION)
- W GROUNDWATER MONITORING WELL (PREVIOUS INVESTIGATION)

DRAWING ADAPTED FROM SURVEY PLAN BY PARKER SCANLON PTY LTD, REF B122, DATED 25TH JAN 2008

0m 5 10 15 20 25m

SCALE 1:500 (A3 SHEET)

Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: Dangar Street Wickham Pty Ltd		TITLE: **Preliminary Site Investigation for Contamination**	PROJECT No: 39961.02
OFFICE: Newcastle	DRAWN BY: PLH	**Proposed Apartment Development**	DRAWING No: 1
SCALE: As shown	DATE: 12.10.2018	**10 Dangar Street, Wickham**	REVISION: 0

RAIN WATER TANK (BELOW) (OSR)

RETAIL
RL 2.68

OFFICE LOBBY
RL 2.80

OFFICE LIFT
OFFICE LIFT

EXIT B2-B1

EXIT B2-G L1-L3

SUBSTATION

RESIDENTIAL GARBAGE ROOM

Baby Goods Waste Storage Room

RETAIL GARBAGE ROOM

RETAIL AMENITIES

ROLLER DOOR

CARPARK ENTRY
ROLLER DOOR

126@23.6M

LOADING BAY 6M X 3.5M

LIGTH COMMERCIAL VAN BAY

LIGTH COMMERCIAL VAN BAY

RETAIL
RL 2.80

RL 2.20

BOUNDARY

LEVEL 1.8 OVER

RL 2.80

RL 2.80

RL 2.68

BOUNDARY

RL 1.59

RL 1.89

18@2M

RL 2.15

17.1%@2.5M

RL 2.50

18@1.5M

RL 2.68

DOWN TO RESIDENTIAL PARKING

RL 2.68

18@2M

RL 2.44

14@12.15M

14@12.15M

R1

1 X RETAIL

RETAIL PARKING
9 CAR SPACES
RL 2.68

SERVICES

R6

14@12.25M

16.64@20.38M

15@14M

UP TO OFFICE PARKING

18@2M

RL 2.68

R8

RESI LIFT

RESI LIFT

RESI LOBBY
RL 2.80

SITE LINK

EXIT L1-L3

RL 2.80

EXIT B2-G
RL 2.00

RL 2.80

RL 2.60

RL 2.80

RL 2.80

RL 2.63

BOUNDARY

BOUNDARY

EXIT GROUND

A DA301

A DA301

B DA302

PRELIMINARY
WORK IN PROGRESS

GENERAL NOTES:

- ALL WORKS TO COMPLY WITH BUILDING CODE OF AUSTRALIA, REQUIREMENTS OF RELEVANT STATUTORY AUTHORITIES/ LOCAL GOVERNMENT & RELEVANT AUSTRALIAN BUILDING STANDARDS
- CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK- SHOULD A DISCREPANCY BE IDENTIFIED PLEASE CONFIRM WITH ARCHITECT PRIOR TO PROCEEDING (DO NOT SCALE FROM DRAWINGS)
- DRAWINGS FOR THE PURPOSES OF DA ONLY- FURTHER CONSULTANT/ AUTHORITY COORDINATION WILL BE REQUIRED AT CC STAGE WHICH MAY IMPACT ON DESIGN AND PLANNING LAYOUTS
- COPYRIGHT OF DESIGN SHOWN HEREON IS RETAINED BY PBD ARCHITECTS AND AUTHORITY IS REQUIRED FOR ANY REPRODUCTION

LEGEND:

AW	AWNING
HW	HIGHLIGHT WINDOW
OU	A/C CONDENSER UNITS
FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
FS	FIRE STAIRS
MV	MECHANICAL RISER TO FUTURE DETAIL
GC	GARBAGE CHUTE
MB	MAILBOX TO FUTURE DETAIL
R	240L RECYCLING BIN
SK	SKYLIGHT
ST	STORAGE
WT	HOT WATER UNITS

MATERIALS LEGEND:

AFG	ALUMINIUM FRAMED GLAZING
AFL	ALUMINIUM ELLIPTICAL FIXED LOUVERS
AW	AWNING TO FUTURE DETAILS
BS	BATTEN SCREEN (TO FUTURE DETAIL)
FB	FACE BRICK
GB	FRAMELESS TOUGHENED GLASS BALUSTRADE (TO BCA/AUSTRALIAN STANDARDS)
MC	METAL CLADDING
MF	METAL FENCING (TO FUTURE SELECTION)
PS	PRIVACY SCREEN (TO FUTURE SELECTION)
PTx	PAINT FINISH TYPEx
RD	ROLLER DOOR
RP	RIVER PEBBLES
RW	RENDERED WALL/SELECTED PAINT FINISH
TC	TIMBER CLADDING

ISSUE	DATE	DESCRIPTION

CLIENT:
MultiPart Property Group

ARCHITECT:
PBD | ARCHITECTS
ABN 36 147 035 550
P - 02 9698 8140 E - info@pbdarchitects.com.au W - www.pbdarchitects.com.au
Level 2, 52 Albion Street, Surry Hills NSW 2010

PROJECT:
PROPOSED RESIDENTIAL DEVELOPMENT
10 DANGAR ST, WICKHAM

SEPT 2018

DRAWING TITLE:
GROUND FLOOR PLAN

SCALE:	DRAWING NO:	ISSUE:
1:100@B1 / 1:250@A3	DA102	A
PROJECT NO: 1825		

Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Detailed Site Investigation (Contamination)

Proposed Apartment Development
10 Dangar Street, Wickham

Prepared for
Dangar Street Wickham Pty Ltd

Project 39961.02
November 2018

Document History

Document details

Project No.	39961.02	Document No.	R.002.Rev0
Document title	Report on Detailed Site Investigation (Contamination) Proposed Apartment Development		
Site address	10 Dangar Street, Wickham		
Report prepared for	Dangar Street Wickham Pty Ltd		
File name	39961.02.R.002.Rev0		

Document status and review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Patrick Heads	Chris Bozinovski	23 November 2018

Distribution of copies

Status	Electronic	Paper	Issued to
Revision 0	1	0	Matt Zappia, Dangar Street Wickham Pty Ltd

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

	Signature	Date
Author		23 November 2018
Reviewer		23 November 2018

FS 604853

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Report on Detailed Site Investigation (Contamination)
Proposed Apartment Development
10 Dangar Street, Wickham

1. Introduction

This report presents the results of a detailed site investigation (contamination) (DSI) undertaken for a proposed apartment development at 10 Dangar Street, Wickham. The investigation was commissioned in a signed services order dated 20 September 2018 by Matt Zappia of Dangar Street Wickham Pty Ltd and was undertaken with reference to Douglas Partners Pty Ltd (DP) proposal NCL180390 dated 5 July 2018.

It is understood that the development of the site will include construction of a 14-level retail, commercial and residential development with two basement levels. Preliminary development drawings indicate that the ground floor use comprises retail and car parking, with levels one to three comprising office and parking. Residential development is proposed for levels four to 13.

The DSI was undertaken to further assess the identified past and present contaminating activities, report on site condition and provide an assessment of site contamination conditions to support a development application to Council.

The DSI comprised the following:

- Brief review of previous assessments conducted by DP at the site (Refs 1, 2 and 3);
- Drilling of an additional five boreholes across the site and installation of three groundwater monitoring wells;
- Gauging of six previously installed groundwater monitoring wells located within and to the north of the site (i.e. in Dangar Street);
- Laboratory testing of selected soil and groundwater samples for a range of potential organic and inorganic contaminants and to assess acid sulfate soil (ASS) conditions; and
- Preparation of this reporting presenting the results of the assessment.

It is noted that the work was undertaken concurrently with a geotechnical investigation for the site which was reported separately.

The contamination assessment was undertaken with reference to NSW EPA “Guidelines for Consultants Reporting on Contaminated Sites” (Ref 4) and NEPC 2013 (Ref 5).

For the purposes of the investigation, the client provided preliminary proposed development plans (PDB Architects, Project 1825 dated 19 October 2018). The preliminary plans for the basement and ground floor are provided in Appendix D.

2. Site Description

The site is identified as Lot 1, DP1197377 and is known as 10 Dangar Street Wickham. The site is an irregular-shaped area of approximately 2930 m^2.

The site is bounded to the east by Hannell Street, to the north by Dangar Street, and residential development, to the west by Charles Street, Station Street and commercial development, and to the south by the Newcastle Transport Interchange (i.e. former rail corridor).

The subject lot is shown in Figure 1 below.

Figure 1: Subject site, in yellow

The site is currently occupied by a vehicle retailer. It is understood that that the site is zoned B3 Commercial Core, which permits a range of landuses with consent, from childcare centres to commercial premises.

Reference to NSW LiDAR topographic imaging for the site indicates that surface levels are in the order of RL1.5 to RL2.0 (AHD), with the site being generally flat.

The site was previously identified as the following lots, as presented in Ref 1:

- Lot 30, DP 635397;
- Lot 1, DP 735415; and
- Lots 34-39, DP 1086794.

3. Geology and Hydrogeology

Reference to the Newcastle Coalfield Regional Geology 1:100 000 Geological Series Sheet published by the Department of Mineral Resources indicates that the site is underlain by Quaternary aged alluvium which typically comprises gravel, sand, silt and clay.

Reference to the Newcastle Acid Sulfate Soil Risk Map prepared by the Department of Land & Water Conservation indicates that the site has a high probability of occurrence of ASS between 1 m and 3 m below the ground surface.

The regional groundwater flow regime is believed to be to the east-north-east of the site, towards Throsby Creek, which is approximately 180 m east-north-east of the site, and is considered to be the nearest sensitive receptor. Based on the site topography and previous assessment in the area, the depth to the water table is believed to be within 3 m of the ground surface. It should be noted that groundwater levels are affected by climatic conditions, soil permeability and tidal influences and will therefore vary with time.

An on-line records search of groundwater wells registered with the NSW Office of Water (NOW) indicated that there are four registered groundwater wells within 500 m of the site. Bores GW201711 and GW201710 are located immediately north-west and south-east of the investigation area respectively. The bore logs for these wells, drilled and installed to 6 m below ground surface, indicate there is approximately 0.5 m of localised filling overlying natural sands. The standing water level was noted at 1.3 m to 1.4 m below the ground surface.

4. Background

DP has conducted geotechnical and contamination assessment on the site as follows:

- DP, 'Report on Preliminary Contamination and Geotechnical Assessment, Proposed Multi-storey Commercial Development, 10 Dangar Street Wickham', Project 39961, September 2008 (Ref 1);
- DP, 'Report on Additional Contamination Assessment, Proposed Multi-storey Commercial Development, 10 Dangar Street Wickham', Project 39961.01, November 2008 (Ref 2);
- DP, 'Report on Preliminary Site Investigation, Desktop Geotechnical and Acid Sulfate Soil Assessment, Proposed Apartment Development, 10 Dangar Street Wickham', prepared for Dangar Street Wickham Pty Ltd, Project 39961.02 dated 18 October 2018 (Ref 3).

The assessments comprised the following:

- Desktop assessment of published information;
- Site history assessment, comprising review of historical aerial photos, discussions with previous site occupiers, Council records search and NSW EPA search;
- Drilling of boreholes across the site to target potential contamination sources and provided an overall assessment of site condition;
- Groundwater well installation and sampling to assess potential groundwater impacts and possible migration of hydrocarbon impact in groundwater; and
- Preparation of reports presenting the results of the assessments.

The results of site history indicated the following:

- Possible former site uses included a transport terminal, distribution centre, motor workshop, motor vehicle storage, motor vehicle auction warehouse, removalists, courier/freight terminal and residential dwellings (i.e. prior to commercial site use);
- Underground fuel storage is located in the north-western corner of the site (i.e. underground tank and possible bowsers in an alcove in the north-western corner of the structure); and
- Demolition of previous structures (e.g. residential dwellings) had occurred prior to construction of the warehouse structure.

A site walkover was conducted in 2008 as part of the previous works (i.e. prior to refurbishment of the site structure and pavements to the current configuration). Relevant features included the following:

- Presence of fibro fragments (possible asbestos containing materials – ACM) at the surface in the eastern portion of the site;
- Fibro sheeting (possible ACM) used as exterior cladding on the site structure;
- Raised floor levels within the warehouse building (i.e. possible filling beneath the structure); and
- Observations of filling in unpaved areas at the surface including ash, slag, rail ballast and building rubble.

As a result of site history review and assessment of site condition, the following potential contaminant sources were noted:

- Imported filling within surface and near-surface soils which may contain a range of potential contaminants including hydrocarbons, heavy metals, pesticides, PCBs and asbestos;
- Possible imported filling beneath the raised floor area which may contain a range of potential contaminants as above;
- Underground Storage Tanks (USTs), former bowsers and associated pipework situated in the north-western portion of the site which may be a source of hydrocarbon and heavy metal impact to soils and groundwater;
- Localised imported fill stockpiles situated in the south-western grassed area of the site which may contain a range of potential contaminants including hydrocarbons, heavy metals, pesticides, PCBs and asbestos. This part of the site has subsequently been paved;
- Surface filling (rail ballast) which may contain asbestos materials (external grassed area). This area has subsequently been paved as part of site refurbishment;
- Demolition of former site structures, and current damaged building materials which may be a source of asbestos materials within surface soils;
- Car parking on unsealed areas of the site which may have resulted in surface soil hydrocarbon and heavy metal impact from oil / fuel leaks (areas subsequently paved); and
- Former motor repair workshop operations at the site (i.e. waste oils, fuels, liquids, possible former sumps and collection pits – location unknown), which may be a source of hydrocarbon and heavy metal impact.

On the basis of the above, a conceptual site model (CSM) was prepared with reference to the National Environment Protection (Assessment of Site Contamination) Measure 1999 (Amendment Measure 2013) Schedule B2 (Ref 5). The CSM from Reference 3 is reproduced in Table 1 below.

Table 1: Conceptual Site Model

Known and Potential Primary Sources	Primary Release Mechanism	Secondary Release Mechanism	Potential Impacted Media	Contaminants of Concern	Exposure Pathway	Potential Receptors	
						Current	Future
Filling imported across the site (subject to source)	Placement of filling on-site	Long-term leaching of contaminants via runoff, rain water infiltration / percolation or exposure / disturbance during proposed development	Soil, groundwater, surface water	TRH, BTEX, PAH, Metals, Pesticides, PCB, asbestos	Dermal contact, inhalation (dust/vapours), ingestion	Site workers, maintenance workers, consultants, trespassers, surface water bodies, groundwater, neighbouring properties in the case of groundwater or surface water migration	Site workers, residents, maintenance workers, consultants, trespassers, surface water bodies, groundwater, neighbouring properties in the case of groundwater or surface water migration
USTs & associated Infrastructure on site and off site	Potential leaks and spills from USTs, bowsers and associated pipework	Long-term leaching of contaminants via runoff, rain water infiltration / percolation, through soil or cracks/joints in concrete, groundwater migration or exposure/disturbance during proposed development	Soil, groundwater, surface water	TRH, BTEX, PAH, Metals, VOC	Dermal contact, inhalation (dust/vapours), ingestion		
Demolition of former structures or renovations to existing / former buildings	Demolition of buildings / structures	Long-term leaching of contaminants via runoff, rain water infiltration / percolation or exposure / disturbance during proposed development	Soil, groundwater, surface water	Metals, PCB, asbestos	Dermal contact, inhalation (dust/vapours), ingestion		
Car Parking on unpaved areas	Spills and leaks	Long-term leaching of contaminants via runoff, rain water infiltration / percolation, through soil or cracks / joints in concrete or exposure/disturbance during proposed development	Soil, groundwater, surface water	TRH, BTEX, PAH, Metals, VOC, acids	Dermal contact, inhalation (dust/vapours), ingestion		

Table 1: Conceptual Site Model (continued)

Known and Potential Primary Sources	Primary Release Mechanism	Secondary Release Mechanism	Potential Impacted Media	Contaminants of Concern	Exposure Pathway	Potential Receptors	
						Current	Future
Repairs/servicing/ storage of vehicles and storage of vehicles / parts	Spills and leaks, hydrocarbon sources and solvents	Long-term leaching of contaminants via runoff, rain water infiltration / percolation, through soil or cracks / joints in concrete or exposure/disturbance during proposed development	Soil, groundwater, surface water	TRH, BTEX, PAH, Metals, VOC	Dermal contact, inhalation (dust/vapours), ingestion		
Refurbishment of existing structure	Partial demolition of buildings / structures, removal of hazardous materials	Long-term leaching of contaminants via runoff, rain water infiltration / percolation or exposure / disturbance during proposed development	Soil, groundwater, surface water	Metals, PCB, Asbestos	Dermal contact, inhalation (dust/vapours), ingestion		

Preliminary subsurface assessment was conducted to investigate the above potential contamination sources. Field work conducted at the site as part of the Initial assessment in September 2008 comprised the following:

- Drilling of eight boreholes using a drilling rig and hand tools;
- Near-surface soil sampling at two locations;
- Sampling of observed potential ACM at the surface; and
- Installation of two groundwater monitoring wells (Bores 4 and 10) to assess groundwater depth and quality.

The results of initial subsurface investigation and laboratory testing indicated the following with respect to contamination:

- The presence of benzo(a)pyrene and PAH impact above the adopted landuse criteria associated with near-surface soils and dumped stockpiles within the vacant south-western portion of the site (generally 0.55 m thick – based on Bore 6);
- The presence of asbestos fines materials (small fragments and fibre bundles) in near-surface filling within Bore 1, 4, 5 and 6, likely to be associated with demolition of former structures at the site (generally 0.2 m to 0.8 m thick); and
- The presence of hydrocarbon impact in soil and groundwater in the northern portion of the site associated with the underground fuel storage tank(s) and associated pipework, bowsers, etc. (impact observed in Bore 10 from 0.7 m depth to the depth of investigation).

Based on the results of the initial investigation, fill materials were generally observed to depths of up to about 2 m within the site, with an average of 1.3 m depth. Fill materials more likely to contain potential contamination (i.e. those observed to contain anthropogenic materials such as building rubble) were generally up to 0.8 m thick across the site, with an average thickness of 0.5 m. It is also noted that the raised floor area within the building contained fill with anthropogenic inclusions to a depth of 1.45 m (the raised floor level was about 1.1 m above the surrounding ground levels).

It was noted that there was potential for contamination to be present within fill materials across the site due to the following:

- Absence of detailed information on the original source or quality of fill materials used at the site;
- Historical information indicating demolition of former structures at the site; and
- The results of the subsurface investigation, indicating the presence of imported fill materials at some locations, and potential for impact from former site activities.

Test locations from the initial investigation (test locations 1 to 10, Ref 1) are shown on Drawing 1, Appendix D.

Following initial subsurface investigation (Ref 1), additional subsurface investigation was conducted to further assess potential contamination and possible migration of hydrocarbon impacts from the underground fuel storage tank in the north-western portion of the site (Ref 2). The additional work comprised the following:

- Drilling of eight boreholes (Bores 101 to 108) and installation of groundwater monitoring wells in each of the boreholes;
- Soil and groundwater sampling from each location;
- Laboratory analysis of selected sample for target contaminants; and
- Preparation of a report presenting the results of the assessment.

The additional boreholes were drilled in the vicinity of the underground fuel storage tank, and within the downgradient road pavement and footpath within Dangar Street, immediately north and north-east of the site. Test locations (Bores 101 to 108) are shown on Drawing 1, Appendix D.

The results of the additional investigation indicated the following with respect to contamination and possible off-site migration of hydrocarbon contamination associated with the UST(s) located within the north-western corner of the site:

- Presence of hydrocarbon-impacted soil and groundwater in the immediate vicinity of the UST(s) – Bore 10 (north-western portion of the site);
- Presence of minor off-site hydrocarbon impact in soil and groundwater (Bore 102 - approximately 5 m north-east (generally downgradient of the UST(s));
- Presence of minor PAH impact in groundwater to the north-east of the site (i.e. Bore 108);
- The presence of heavy metal impact in groundwater within the site and in off-site bores; and
- Groundwater flow is generally in an east-north-easterly direction (i.e. towards Throsby Basin).

The results suggested that hydrocarbon impact in soil and groundwater associated with the UST(s) had migrated beyond the site boundary, however, the extent of off-site migration appeared to be limited (i.e. only minor impact within Bore 102 located 5 m from the site boundary and approximately downgradient of the UST). Elevated petroleum hydrocarbons were not detected in the remaining bores.

The possible source of PAH impact on groundwater in Bore 108 was not certain. Such impact may be due to diffused sources other than the UST (i.e. regional presence of general fill materials). The potential for PAH impact to be a result of migration from the UST(s), however, cannot be discounted.

Based on the results of the previous investigations, on-site hydrocarbon contamination and minor off-site impact (associated with the UST(s)) was assessed to have occurred. Site remediation was recommended for future residential or commercial development, to address the following identified contamination:

- Hydrocarbon contamination associated with the UST(s) within the north-western corner of the site (Bores 10 and 102, Ref 2);
- PAH contamination present in near-surface fill materials within the south-western corner of the site (Bore 6 – generally 0.55 m thick – Ref 1); and
- Asbestos contamination in near-surface soils at Bores 1, 4, 5 and 6 (0.2 m to 0.8 m thick – Ref 1).

It is noted that fill materials containing deleterious materials were generally 0.2 m to 0.8 m thick across the site (average of 0.5 m). There is a risk that such materials may also contain contaminants such as asbestos.

An updated preliminary site investigation (Ref 3) was prepared by DP for the site in October 2018, which generally comprised collation of previous assessment and supplementary site history searches to assess the current site condition and potential for contamination. The report concluded that the site could be made suitable for the proposed development, subject to the remediation of previously identified impacts. The potential contamination sources were generally similar to those identified in previous DP assessment.

Reference should be made to the PSI (Ref 3) for an assessment of the current site condition.

5. Field Work

5.1 Sampling Rationale

A number of potential sources of site contamination were identified in the brief history review and the site inspection in the updated PSI (Ref 3). A judgemental and systematic sampling procedure was conducted initially as part of the previous assessments and subsequently for this DSI to assess the principal potential sources of contamination described above.

A total of five boreholes (Bores 201 to 205) were drilled at accessible locations for the current assessment, in addition to the previously drilled boreholes (Refs 1 and 2). The test locations were located to assess the main potential contaminant sources as summarised in Table 2 below.

Table 2: Sample Locations and Associated Potential Contamination Sources

Potential Contamination Source	Sample ID
Fill placement	All bores
Demolition of former structures	All bores
Underground fuel storage tank(s)	Bores 10, 102, 103, 104, 105, 106, 107, 108, 201, 202
Industrial site use	Bores 203, 204 and 205

In addition, three groundwater wells were installed across the site as part of the current assessment within the upper unconfined sand / fill aquifer. The wells were installed in Bores 202, 203 and 204 to assist in determining possible impacts from identified potential contamination sources, assess groundwater flow direction and to assess on-site / off-site migration of contamination.

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

Groundwater samples were collected and analysed from each of the three installed monitoring wells for the targeted site investigation. Water levels and observations were noted in the accessible wells from the previous investigation.

Groundwater gauging and observation was also conducted on six existing groundwater monitoring wells (Bores 10, 101, 103, 105, 106 and 107) located in or adjacent to Dangar Street, to assess the potential for migration of hydrocarbon impacts on to the subject site from off-site former underground fuel storage.

5.2 Methods

The field work was undertaken between 9 October 2018 and 24 October 2018 and comprised the following:

- Site inspection by a senior environmental engineer from DP;
- Checking for underground services at proposed bore locations by a professional service locator;
- Ground penetrating radar (GPR) search in the vicinity of suspected USTs and underground assets in the vicinity of proposed borehole locations;
- Concrete coring of concrete pavements to facilitate drilling where required;
- Drilling of five boreholes to depths of up to 8 m below the ground surface using a track-mounted dual tube push tube rig (Geoprobe);
- Logging of the subsurface profile, including visual and olfactory assessment of potential contaminants in filling;
- Collection of soil samples for contamination testing purposes from the test locations;
- Installation, development, purging, gauging and sampling of three groundwater wells for contamination testing purposes (Bores 202, 203 and 204);
- Gauging and sampling of six previously installed groundwater wells along Dangar Street (Bores 10, 101, 103, 105, 106, 107); and
- Levelling of groundwater wells.

An engineer from DP logged the subsurface profile and collected samples for identification and testing purposes. The approximate test locations were recorded using site features and are shown on Drawing 1, Appendix D.

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

5.3 Well Design and Installation

A groundwater well constructed of 50 mm diameter flush threaded Class 18 PVC was installed in Bores 202, 203 and 204 with reference to current industry standards, using dual tube push tubes from the track-mounted drilling rig.

A 3 m machine-slotted PVC screen with an end cap was installed from 0.5 m/1.7 m to 3.5 m/4.7 m below ground level (approximately 0.5 m to 1.0 m above the groundwater level observed at the time of installation). A filter pack was installed in the bore annulus consisting of 2 mm graded and washed gravel to generally 0.1 m to 0.7 m above the slotted PVC screen. A bentonite seal was placed above the filter pack within the annulus.

The wells were competed at the surface with a flush mounted well cover set in concrete. Details of well design and construction are shown on Borehole logs, Appendix A.

Drilling and well installation was undertaken under Quality Assurance / Quality Control (QA/QC) protocols to minimise the risk of cross contamination.

The groundwater well locations were surveyed for elevation by DP using differential GPS.

5.4 Well Development/Purging and Sampling

Following installation, the wells were developed by removing groundwater using new dedicated single check valve disposable bailers in order to provide an efficient hydraulic connection between the well and the formation. Regular measurements of pH and Electricity Conductivity (EC) readings were undertaken on groundwater during development using a calibrated portable meter until steady readings were achieved. A minimum of five bore volumes of groundwater were removed.

Prior to sampling, the wells were purged using micropurge low-flow sampler or single check valve disposable bailers until steady pH, EC, Oxidation Reduction Potential (ORP), Dissolved Oxygen (DO), temperature, turbidity readings were achieved.

Groundwater samples from the wells were collected using micropurge low-flow sampler (Bores 203 and 204) or single check valve disposable bailers (Bore 202, due to obvious hydrocarbon impact) and preserved in laboratory prepared containers for analysis. The samples were delivered to the laboratory within the recommended holding times for analysis. The groundwater level was allowed to recover from the effects of purging prior to sampling. Samples were collected under strict QA/QC protocols.

The headspace of the well and groundwater collected from the well was also screened for the presence of volatile organic compounds (VOC's) using a calibrated Photoionisation Detector (PID) following purging. Following development and prior to purging, an oil-water interface meter was used to confirm the depth to groundwater in each well for groundwater contouring purposes and to assess the possible presence of floating product within each well.

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

5.5 Results

GPR Survey

The GPR survey and associated electronic scan was conducted on 9 October 2018 within accessible areas in the vicinity of suspected fuel infrastructure (i.e. bowser, fuel lines, UST locations) in the north-western corner of the site.

The GPR was unable to clearly detect the presence of any USTs or associated pipe work. The GPR did, however, detect changes in subsurface density and/or discontinuous subsurface materials within the presumed area of underground fuel storage. The possible number of location of USTs has therefore not been confirmed. It is noted that GPR can be affected by interference from concrete slabs, building materials, utilities, groundwater etc.

Subsurface Conditions

The subsurface conditions are presented in detail in the borehole logs, Appendix A. The subsurface conditions provide a summary from boreholes drilled as part of the previous and current assessments. These should be read in conjunction with the general notes preceding them, which explain definitions of the classification methods and descriptive terms.

FILLING encountered in all bores underlying concrete or asphalt to depths up to 0.7 m / 1.65 m, generally comprising sand filling, silty sand filling, sandy clay filling and gravelly sand filling. Various inclusions such as coal reject, ash fragments, slag fragments, concrete fragments and brick fragments were encountered in Bores 201 to 205;

SILTY SAND encountered in Bore 105 from 0.7 to 1.2 m, Bores 106 and 107 from 0.3 m to 0.7 m, and Bore 204 from 1.5 m to 1.7 m, generally comprising dark grey-brown silty sand (possibly fill);

CLAY encountered in Bore 201 from 1.2 m to 1.3 m comprising dark grey clay with some sand

SAND encountered in all bores from 0.3 m to 1.7 m to termination, generally comprising grey, grey brown, brown and light fine to medium grained sand with trace silt, trace to some clay in parts and occasional trace gravel and shells.

Further details are provided in the borehole logs from the previous and current investigation in Appendix A.

5.6 Groundwater Conditions

Groundwater was encountered during drilling from depths of 1.4 m to 2.7 m in Bores 201 to 205 (current investigation) and 1.25 m to 1.5 m in Bores 101 to 108 and Bore 10 (previous investigation) . It should be noted that groundwater levels are affected by factors such as climatic conditions, tidal influence and soil permeability and will therefore vary with time.

The results of gauging of groundwater wells conducted on 29 October 2018 are presented in Table 3 below.

Table 3: Groundwater Gauging Observations on 29 October 2018

Sample ID	Approx. RL TOC (AHD)	Depth to Groundwater below TOC	Approx. Groundwater RL (AHD)	Observations
10*	1.64	1.465	0.175	Hydrocarbon odour observed
101*	1.53	1.375	0.155	No hydrocarbon odour observed
103*	1.51	1.309	0.201	No hydrocarbon odour observed
105*	1.50	1.224	0.276	No hydrocarbon odour observed
106*	1.60	1.385	0.215	No hydrocarbon odour observed
107*	1.67	1.455	0.215	No hydrocarbon odour observed
202	1.62	1.445	0.175	Hydrocarbon odour observed
203	2.84	2.632	0.208	No hydrocarbon odour observed
204	2.82	2.701	0.119	No hydrocarbon odour observed

Notes to Table 3:
TOC – Top of casing
*Denotes wells installed for previous investigation (Refs 1, 2)

Based on the above, the groundwater gradient across the site is relatively flat. The levels would, however, suggest the regional groundwater flow direction is to the north-east towards Throsby Basin.

Groundwater parameters measured during purging are provided in Table 4 below.

Table 4: Groundwater Field Parameters Measured During Sampling on 31 January 2018 and 24 October 2018

Location ID	Date	PID (sample headspace) (ppm)	Thickness of Product (mm)	pH	EC (µS/cm)	ORP (mV)	DO (ppm)	Turbidity (NTU)	Temp (°C)	Comments
107*	31.1.18	<1	ND	6.6	293	113	5.12	20.9	24.3	Clear
108*	31.1.18	<1	ND	6.6	213	136	0.05	28.7	25.1	Clear
202	29.10.18	348	ND	7.0	345	-35	-	>1000	20.1	Very turbid. Hydrocarbon odour
203	29.10.18	<1	ND	6.0	1144	111	-	300	22.3	Moderately turbid
204	29.10.18	<1	ND	6.6	678	157	-	100	22.2	Slightly turbid, light grey

Notes to Table 4:

EC – Electrical Conductivity

ORP – Oxidation Reduction Potential

DO – Dissolved Oxygen

ND – Not detected (i.e. < 1.2 mm)

*Denotes wells installed for previous investigation (Ref 2), and sampled as part of adjacent assessment in January 2018

The results of groundwater field testing indicated the following:

- Groundwater was slightly acidic to neutral (i.e. pH 6.0 to pH 7.0);
- Groundwater was generally fresh to slightly brackish (i.e. EC 213 µS/cm to 1144 µS/cm);
- Generally aerobic conditions were encountered with the exception of Bore 202 (i.e. ORP of -35 mV);
- PID readings were generally low (i.e. <1 ppm), with the exception of Bore 202 (348 ppm); and
- Hydrocarbon odour was observed in Bore 202, however, free product was not detected in any of the gauged wells (i.e. <1.2 mm).

5.7 Contaminant Observations

Observations of potential contamination during field work from the current and previous assessments are summarised in Table 5 below:

Table 5: Contamination Observations during Field Work – Soil

Potential Contamination Observation	Locations and Depths (m)
Hydrocarbon odour/staining/sheen	10/0.7->2.3; 102/0.4-1.5; 103/0.4-0.7, 202/1.0-3.0
Building Rubble (concrete, steel, brick fragments)[1]	1/0.1-0.35; 6/0.0-0.55; 9/0.16-1.45; 10/0.15-0.7; 204/0.0-1.4
Coal/coal reject	101/0.3-0.7; 105/0.35-0.7; 202/0.22-1.3; 203/1.4-1.65; 204/1.4-1.5; 205/0.3-1.4
Ash	201/0.16-1.2; 202/0.22-1.3; 203/0.17-1.65; 204/1.4-1.5; 205/0.3-1.4
Slag	4/0.05-0.45, 7 (surface); 202/0.22-1.3
Fibro fragments	Eastern portion of the site (surface – previous assessment)

Notes to Table 5

1 - May contain asbestos due to possible association with building wastes.

The results of PID screening on soil samples are shown on the borehole logs in Appendix A. PID screening generally suggested the absence of gross volatile hydrocarbon impact in samples collected within the majority of the site (i.e. < 1 ppm). Samples collected from north-western portion of the site (i.e. in the vicinity of former bowser and UST locations) from Bore 10 (Ref 1), Bore 102 (Ref 2) and Bore 202 (current investigation) generally indicated the presence of hydrocarbon impact at depths in the vicinity of the groundwater table. Approximate depth ranges for the observed hydrocarbon impact based on visual and olfactory observations are presented in Table 5 above.

There were no obvious groundwater hydrocarbon impacts in gauged off-site wells (i.e. Bores 103, 105, 106, 107). Bore 102 previously indicated some hydrocarbon impact, but was not accessible during the current assessment.

6. Data Quality Objectives

6.1 Data Quality Objectives

Table 6 summarises the data quality objectives (DQO) and the procedures designed to enable achievement of the DQOs.

Table 6: Data Quality Objectives

DQO	Achievement Evaluation Procedure
Step 1 – State the problem	Level of contamination and possible remediation / management options and waste classification/reuse options.
Step 2 – Identify the decision	Assess whether the identified contaminated filling can be classified for off-site disposal as part of the proposed basement construction and residential land use from a contamination perspective. Also to what extent is remediation of hydrocarbon impact required. Refer Appendix C for adopted site assessment criteria.
Step 3 – Identify the inputs to the decision	Findings of the previous investigations at the site. Selection of appropriate contaminants of concern based on previous investigation findings and CSM (Section 4). Selection of the appropriate laboratory testing methods. Field and laboratory QA/QC data to assess the suitability of the environmental data for the assessment.
Step 4 – Define the Boundary of the Assessment	As defined in Section 2 and shown on Drawing 1.
Step 5 – Develop of decision rule	Selected soil samples were analysed for the contaminants of concern as outlined in Section 4. The field and laboratory data was assessed as reliable by reference to the Data Quality Indicators (DQI) as outlined in Step 7.
Step 6 – Specify the acceptance criteria	The site assessment criteria were developed through reference to NEPC 2013 and NSW EPA Waste Classification Guidelines. The acceptance limits for laboratory QA/QC parameters were based on the laboratory reported acceptance limits and those stated in NEPC 2013.
Step 7 – Optimise the design for obtaining data	Design was optimised by the development of a plan for sample collection, handling and analysis, including undertaking quality assurance and quality control measures to allow assessment of the suitability of the data collected. Measurement to assess the project DQOs using data quality indicators (DQIs) as follows: Completeness – completion of field and laboratory chain of custody documentation, use of experienced field staff, compliance with holding times and correct documentation; Comparability – consistent sampling procedures, use of NATA certified laboratory and experienced field staff; Representativeness – appropriate media sampled; Precision - Analysis of field and laboratory replicates and achievement of acceptable RPDs, acceptable levels for laboratory QC criteria; Accuracy – Analysis of field duplicates, matrix spikes and surrogate spikes.

6.2 Sampling and Analysis

6.2.1 Soil Sample Collection, Decontamination and Preservation

Soil and groundwater samples for contamination testing for the current assessment were collected with reference to environmental sampling protocols and chain of custody (COC) documentation.

Soil samples were generally collected from the near surface and at regular depth intervals or changes in strata within each borehole. Soil samples were collected directly from the extruded sample (push tube) using disposable gloves. Care was taken to remove any extraneous material deposited on the sample.

All sampling data was recorded on DP COC. The general sampling procedure comprised:

- Decontamination of sampling equipment using a 3% solution of phosphate free detergent (Decon 90) and tap water prior to collecting each sample;
- Use of new disposable sample tubes for every metre of sample collected from dual tube push tube boreholes;
- The use of new disposable gloves for each sampling event;
- Transfer of samples into laboratory-prepared jars and capping immediately;
- Collection of replicate soil samples in zip-lock plastic bags at each depth for screening by PID;
- Collection of additional samples, excluded from air for the purposes of acid sulfate soil testing;
- Collection of replicate samples for QA / QC purposes;
- Labelling of sample containers with individual and unique identification, including project number, sample location and sample depth; and
- Placement of the sample containers and replicate sample bags into a cooled, insulated and sealed container for transport to the laboratory.

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

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

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

6.2.2 Laboratory QA / QC

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

- Reagent blanks;
- Spike recovery analysis;

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

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

7. Laboratory Testing

7.1 Analytical Program

Laboratory testing for the DSI was undertaken by Envirolab Services Pty Ltd, a NATA registered laboratory. Analytical methods used are shown in the laboratory sheets in Appendix B.

Soil

A total of 15 soil samples (including two QA/QC soil samples) were selected as part of the current assessment of soil / fill conditions. The samples were selected to target the identified potential sources of contamination (see Section 4) and were analysed for a range of the following potential contaminants:

- Metals: Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb); Mercury (Hg), Nickel (Ni), Zinc (Zn), Manganese (Mn) and Iron (Fe);
- Total Recoverable Hydrocarbons (TRH);
- Benzene, Toluene, Ethyl Benzene, Xylene (BTEX);
- Polycyclic Aromatic Hydrocarbons (PAH).

Selected upper fill samples were also analysed for the following analytes:

- Polychlorinated Biphenyls (PCBs);
- Organochlorine (OC) and Organophosphate (OP) Pesticides;
- Asbestos Identification.

QA / QC comprised analysis of two replicate soil sample. The results of QA / QC testing are presented in Appendix C.

In addition, four filling samples were analysed for asbestos identification.

Following the receipt of total contaminant test results, additional leachability testing was conducted as follows:

- Acid leachability testing (TCLP) for waste classification purposes on four selected soil samples;
- Water leachability testing (ASLP) on two soil samples to assess leachability characteristics of soils with elevated benzo(a)pyrene and lead concentrations.

Laboratory testing for ASS comprised a total of 36 ASS screening tests and analysis of four samples for detailed ASS testing (chromium suite).

Groundwater

A total of four groundwater samples (Bores 202, 203 and 204, plus one QA/QC sample) were collected and analysed to provide an assessment of groundwater conditions.

The groundwater samples were analysed for a range of potential contaminants as follows:

- Metals: Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb); Mercury (Hg), Nickel (Ni), Zinc (Zn), Manganese (Mn) and Iron (Fe);
- Total Recoverable Hydrocarbons (TRH);
- Benzene, Toluene, Ethyl Benzene, Xylene (BTEX);
- Polycyclic Aromatic Hydrocarbons (PAH);
- pH;
- Electrical Conductivity.

QA / QC comprised analysis of one replicate groundwater sample. The results of QA / QC testing are presented in Appendix C.

7.2 Analytical Results

The results of chemical analysis undertaken on soil samples, including acid leach testing for waste classification and water leach testing for assessment of on-site retention, are summarised in Tables 7 to 10.

The results of chemical analysis undertaken on groundwater samples are summarised in Table 11.

The results of ASS testing are summarised in Table 12.

Soil and groundwater analysis results from previous assessments at the site are also presented in the following tables.

Table 7: Laboratory Results in Soil - Metals

Sample ID	Depth (m)	PID (ppm)	As [3]	Cd	Cr [7]	Cu	Pb [4]	Pb TCLP	Pb ASLP	Hg [5,6]	Hg TCLP	Ni	Zn	Fe	Mn
1	0.2	<1	5	10	19	130	**310**	NT	NT	0.11	NT	10	810	NT	NT
2	0.5	<1	3	<0.3	2.3	12	**130**	NT	NT	0.08	NT	2.1	88	NT	NT
2	1-1.45	<1	<3	<0.3	1.2	<0.5	<1	NT	NT	<0.05	NT	<0.5	0.9	NT	NT
3	0.5	<1	<3	<0.3	2.3	5.4	20	NT	NT	0.14	NT	1.2	37	NT	NT
4	0.05	<1	17	0.8	100	42	82	NT	NT	0.07	NT	9.2	170	NT	NT
4	0.5	<1	<3	<0.3	1.5	3	13	NT	NT	<0.05	NT	0.6	24	NT	NT
D5	0.5	<1	<3	<0.3	2	6	84	NT	NT	0.05	NT	1.1	55	NT	NT
5	0.05	<1	12	0.95	9.7	58	**340**	NT	NT	0.35	NT	9.6	430	NT	NT
5	0.5	<1	4	2	9.1	40	**260**	NT	NT	1.6	NT	4	360	NT	NT
6	0.05	<1	4	0.7	39	56	**260**	NT	NT	0.95	NT	6.9	280	NT	NT
6	0.5	<1	11	0.9	12	48	**490**	NT	NT	0.22	NT	12	450	NT	NT
7	0.05	<1	9	1.1	10	78	**710**	NT	NT	1	NT	20	740	NT	NT
D7	0.05	<1	10	0.93	9.5	69	**580**	NT	NT	0.77	NT	21	530	NT	NT
9	0.3	<1	<3	0.7	3	20	20	NT	NT	0.05	NT	1.7	380	NT	NT
9	1.7	<1	<3	<0.3	1.9	38	52	NT	NT	0.14	NT	1.6	110	NT	NT
101	0.8-1.0	<1	3	<0.3	4	160	**130**	NT	NT	0.11	NT	8	52	NT	NT
102	0.5-0.6	143	<3	<0.3	0.8	4.5	18	NT	NT	<0.05	NT	0.7	3.1	NT	NT
102	0.9-1.0	72	<3	<0.3	0.99	1	4	NT	NT	<0.05	NT	<0.5	1.7	NT	NT
103	0.4-0.5	<1	<3	<0.3	0.7	2	3	NT	NT	<0.05	NT	<0.5	3.3	NT	NT
104	1.2-1.4	<1	<3	<0.3	1	<0.5	<1	NT	NT	<0.05	NT	0.6	9	NT	NT
BD102	1.2-1.4	<1	<3	<0.3	0.8	<0.5	<1	NT	NT	<0.05	NT	<0.5	4.7	NT	NT
105	0.8-1.0	<1	6	<0.3	4.7	78	**120**	NT	NT	0.12	NT	9	70	NT	NT
106	1.3-1.4	<1	<3	<0.3	1.7	3.3	3	NT	NT	<0.05	NT	0.7	2.2	NT	NT
108	1.3-1.4	<1	<3	<0.3	1.2	<0.5	<1	NT	NT	<0.05	NT	0.7	1.6	NT	NT
10	1.7	224	<3	<0.3	2.6	4.3	30	NT	NT	0.48	NT	3.2	55	NT	NT
10	2.2	40	<3	<0.3	3.9	2.9	4	NT	NT	<0.05	NT	4.6	43	NT	NT
201	0.4-0.5	<1	<4	0.5	3	27	39	NT	NT	0.3	NT	3	18	3800	61
D1	-	<1	<4	<0.4	<1	6	3	NT	NT	<0.1	NT	<1	2	730	26
201	2.2-2.3	<1	<4	<0.4	4	2	1	NT	NT	<0.1	NT	3	6	3300	24
202	0.6-0.7	3	5	1	16	430	460	0.05	NT	0.9	NT	28	970	14000	270
202	1.7-2.0	361	<4	<0.4	<1	<1	<1	NT	NT	<0.1	NT	<1	4	390	3
202	2.7-2.9	10	<4	<0.4	5	2	1	NT	NT	<0.1	NT	4	9	4200	25
202	3.2-3.4	1	<4	<0.4	2	<1	<1	NT	NT	<0.1	NT	<1	3	850	6
203	0.8-0.9	<1	7	<0.4	16	39	90	NT	NT	0.2	NT	12	170	15000	280
203	2.7-2.9	<1	<4	<0.4	<1	<1	1	NT	NT	<0.1	NT	<1	6	630	2
204	0.7-0.9	<1	6	<0.4	13	17	27	NT	NT	0.2	NT	6	130	11000	230
204	2.3-2.4	<1	<4	<0.4	5	<1	5	NT	NT	<0.1	NT	1	11	1700	10
205	0.2-0.3	<1	5	0.4	11	35	310	0.5	NT	0.3	NT	9	250	8600	290
205^	0.2-0.3	<1	7	1	15	65	**560**	NT	NT	0.5	NT	12	550	11000	530
205 - [TRIPLICATE]	0.2-0.3	<1	7	0.9	12	79	**590**	NT	NT	0.4	NT	11	480	10000	280
205	0.5-0.6	<1	16	15	21	78	700	0.1	0.015	4.4	<0.0005	12	23000	19000	350
205^	0.5-0.6	<1	14	15	19	89	**720**	NT	NT	**7.7**	NT	12	23000	23000	270
205 - [TRIPLICATE]	0.5-0.6	<1	14	20	15	79	**660**	NT	NT	3.7	NT	9	26000	17000	230
D3	-	<1	4	0.7	8	31	**590**	NT	NT	1	NT	8	820	7700	99
D3^	-	<1	6	0.6	9	31	**480**	NT	NT	1.2	NT	8	930	15000	94
205	1.8-2.0	<1	<4	<0.4	6	3	1	NT	NT	0.4	NT	4	9	5100	29
Laboratory PQL			4	0.4	1	1	1	0.03	0.001	0.1	0.0005	1	1	1	1
NEPM HIL B [1] (Ref 5)			500	150	500	30000	1200	NC	NC	120	NC	1200	60000	NC	14000
NEPM HIL D (Ref 5)			3000	900	3600	240000	1500	NC	NC	730	NC	6000	400000	NC	60000
NSW EPA - General Solid Waste Guidelines (Ref 6)			100	20	100	NC	100/1500*	5	NC	4/50*	0.2	40	NC	NC	NC
NSW EPA - Restricted Solid Waste Guidelines - (Ref 6)			400	80	400	NC	400/6000*	20	NC	16/200*	0.8	160	NC	NC	NC
ANZECC 2018 95% Level of Species Protection (Ref 7)			NC	NC	NC	NC	NC	NC	0.0034	NC	NC	NC	NC	NC	NC

Notes to Table 7:
All total concentration results in mg/kg on a dry weight basis
TCLP results in mg/L
NC - No Criteria
NT - Not Tested
PID - Photoionisation Detector
PQL - Practical Quantitation Limits
1 - Health Based Criteria for High Density Residential Land Use
2- HIL generally applies to the top 3m of soil
3- HIL assumes 70% oral bioavailability. Site-specific bioavailability may be important and should be considered where appropriate (refer Schedule B7)
4- HIL is based on blood lead models (adult lead model where 50% bioavailability has been considered. Site-specific bioavailability may be important and should be considered where appropriate (refer Schedule B7)
5- Assessment of methyl mercury should only be considered if there is evidence of its potential source.
6- HIL does not address elemental mercury
7 - Chromium (VI) (Conservative)
exceeds NEPM Health-Based Criteria for High Density Residential Landuse
Bold results exceed NSW EPA Waste Classification Guidelines for General Solid Waste, including TCLP results
* Waste classification criteria when used in conjunction with TCLP results
exceeds ANZECC 2018 95% level of species protection
^ laboratory duplicate result
D5 - replicate of 4/0.5
D7 - replicate of 7/0.05
BD102 - replicate of 104/1.2-1.4
D1 - replicate of 201/0.4-0.5
D3 - replicate of 205/0.5-0.6
Boreholes 1 to 10 from DP Project 39961 September 2008
Boreholes 101 to 108 from DP Project 39961.01 November 2008
Boreholes 201 to 205 from DP Project 39961.02 November 2018 (current project)

Table 8: Laboratory Results in Soil – TRH, BTEX

Sample ID	Depth (m)	PID (ppm)	TRH				TRH (NEPM)						BTEX				
			C_6 - C_9	C_{10} - C_{14}	C_{15} - C_{28}	C_{29} - C_{36}	F1 (C_6-C_{10}-BTEX)	F2 (>C_{10}-C_{16} - Naphthalene)	C_6-C_{10}	>C_{10}-C_{16}	F3 (>C_{16}-C_{34})	F4 (>C_{34}-C_{40})	Benzene	Toluene	Ethyl Benzene	Xylenes	Naphthalene
1	0.2	<1	<20	<20	150	94	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
2	0.5	<1	<20	<20	<50	<50	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
2	1-1.45	<1	<20	<20	<50	<50	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
3	0.5	<1	<20	<20	<50	<50	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
4	0.05	<1	<20	<20	<50	<50	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
4	0.5	<1	<20	<20	<50	<50	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
D5	0.5	<1	<20	<20	<50	<50	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
5	0.05	<1	<20	<20	110	<50	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
5	0.5	<1	<20	<20	<50	<50	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
6	0.05	<1	<20	<20	190	96	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
6	0.5	<1	<20	<20	160	59	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
7	0.05	<1	<20	<20	590	410	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
D7	0.05	<1	<20	<20	500	350	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
9	0.3	<1	<20	<20	<50	<50	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
9	1.7	<1	<20	<20	<50	<50	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
101	0.8-1.0	<1	<20	<20	<50	<50	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
102	0.5-0.6	143	46	780	680	<50	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
102	0.9-1.0	72	<20	170	180	<50	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
103	0.4-0.5	<1	<20	<20	<50	<50	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
104	1.2-1.4	<1	<20	<20	<50	<50	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
BD102	1.2-1.4	<1	<20	<20	<50	<50	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
105	0.8-1.0	<1	<20	<20	84	72	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
106	1.3-1.4	<1	<20	<20	<50	<50	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
108	1.3-1.4	<1	<20	<20	<50	<50	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
10	1.7	224	780	3900	4800	<50	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
10	2.2	40	<20	<20	<50	<50	NT	NT	NT	NT	NT	NT	<0.5	<0.5	<0.5	<1.5	NT
201	0.4-0.5	<1	<25	<50	<100	<100	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
D1	-	<1	<25	<50	<100	<100	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
201	2.2-2.3	<1	<25	<50	<100	<100	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
202	0.6-0.7	3	<25	94	420	130	<25	160	<25	160	440	<100	<0.2	<0.5	1	<3	<1
202	1.7-2.0	361	<25	<50	<100	<100	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
202	2.7-2.9	10	<25	<50	<100	<100	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
202	3.2-3.4	1	<25	<50	<100	<100	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
203	0.8-0.9	<1	<25	<50	<100	100	<25	<50	<25	<50	140	<100	<0.2	<0.5	<1	<3	<1
203	2.7-2.9	<1	<25	<50	<100	<100	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
204	0.7-0.9	<1	<25	<50	<100	<100	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
204	2.3-2.4	<1	<25	<50	<100	<100	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
205	0.2-0.3	<1	<25	<50	<100	<100	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
205^	0.2-0.3	<1	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
205 - [TRIPLICATE]	0.2-0.3	<1	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
205	0.5-0.6	<1	<25	<50	430	380	<25	<50	<25	<50	740	190	<0.2	<0.5	<1	<3	<1
205^	0.5-0.6	<1	<25	82	650	240	<25	200	<25	200	720	180	<0.2	<0.5	<1	<3	<1
205 - [TRIPLICATE]	0.5-0.6	<1	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
D3	-	<1	<25	<50	4000	3200	<25	130	<25	130	6700	1400	<0.2	<0.5	<1	<3	<1
D3^	-	<1	NT	**130**	**8900**	**7300**	NT	NT	NT	320	16000	3500	NT	NT	NT	NT	NT
205	1.8-2.0	<1	<25	<50	<100	<100	<25	<50	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<1
Laboratory PQL			25	50	100	100	25	50	25	50	100	100	0.2	0.5	1	3	1
NEPM HSL B [3] (Ref 5) SAND			NC	NC			45/70/110/200 [1]	110/240/440/NL [1]	NC	NC	NC	NC	0.5/0.5/0.5/0.5 [1]	160/220/310/540 [1]	55/NL/NL/NL [1]	40/60/95/170 [1]	3/NL/NL/NL [1]
NEPM HSL D [3] (Ref 5) SAND			NC	NC			260/370/630/NL [1]	NL/NL/NL/NL [1]	NC	NC	NC	NC	3/3/3/3 [1]	NL/NL/NL/NL [1]	NL/NL/NL/NL [1]	230/NL/NL/NL [1]	NL/NL/NL/NL [1]
Management limits for TPH fractions in coarse soils - Residential A, B, C [2]			NC	NC			NC	NC	700	1000	2500	10000	NC	NC	NC	NC	NC
NSW EPA - General Solid Waste Guidelines (Ref 6)			650	10000 total			NC	NC	NC	NC	NC	NC	10	288	600	1000	NC
NSW EPA - Restricted Solid Waste Guidelines (Ref 6)			2600	40000 total			NC	NC	NC	NC	NC	NC	40	1152	2400	4000	NC

Notes to Table 8:

All results in mg/kg on a dry weight basis

NC - No Criteria

NT - Not Tested

PID - Photoionisation Detector

PQL - Practical Quantitation Limits

1- Soil HSLs for vapour intrusion (mg/kg) for SAND samples recovered from 0 m to <1 m / 1 m to <2 m / 2 m to <4 m / >=4 m

2- Management limits are applied after consideration of relevant ESLs and HSLs

3- Multiplication factor may be applied (for depths >2m) subject to favourable biodegradation conditions - refer to 2.4.10

[ ] exceeds NEPM HSL Health-Based Criteria for High Desnity Residential Landuse

Underlined results exceed NEPM management limits for TPH fractions in coarse soils - Residential Landuse

Bold results exceed NSW EPA Waste Classification Guidelines for General Solid Waste without leachability testing

^ laboratory duplicate result

D5 - replicate of 4/0.5

D7 - replicate of 7/0.05

BD102 - replicate of 104/1.2-1.4

D1 - replicate of 201/0.4-0.5

D3 - replicate of 205/0.5-0.6

Boreholes 1 to 10 from DP Project 39961 September 2008

Boreholes 101 to 108 from DP Project 39961.01 November 2008

Boreholes 201 to 205 from DP Project 39961.02 November 2018 (current project)

Table 9: Laboratory Results in Soil – PAH, PCB, OCP, OPP

Sample ID	Depth (m)	PID (ppm)	Total PAH	Benzo(a) Pyrene	Benzo(a) Pyrene TCLP	Benzo(a) Pyrene ASLP	Benzo(a) Pyrene TEQ	PCB [2]	Total OPP	Chlorpyrifos	Total OCP	Aldrin + Dieldrin	Chlordane	DDT+DDE +DDD	Endosulphan [3]	Endrin	Heptachlor	HCB	Methoxychlor
1	0.2	<1	<48.24	**3.9**	NT	NT	NT	<0.90	<0.1	NT	all <0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2	0.5	<1	<1.78	0.08	NT	NT	NT	<0.90	<0.1	NT	all <0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2	1-1.45	<1	<1.55	<0.05	NT	NT	NT	<0.90	<0.1	NT	all <0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
3	0.5	<1	<1.81	0.11	NT	NT	NT	<0.90	<0.1	NT	all <0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4	0.05	<1	<8.68	0.78	NT	NT	NT	<0.90	<0.1	NT	all <0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4	0.5	<1	<1.55	<0.05	NT	NT	NT	<0.90	<0.1	NT	all <0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
D5	0.5	<1	<1.81	0.11	NT	NT	NT	<0.90	<0.1	NT	all <0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
5	0.05	<1	<27.48	**2.2**	NT	NT	NT	<0.90	<0.1	NT	all <0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
5	0.5	<1	<2.49	0.19	NT	NT	NT	<0.90	<0.1	NT	all <0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
6	0.05	<1	85	**6.4**	NT	NT	NT	<0.90	<0.1	NT	all <0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
6	0.5	<1	<73.49	**5.4**	NT	NT	NT	<0.90	<0.1	NT	all <0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
7	0.05	<1	210	**22**	NT	NT	NT	<0.90	<0.1	NT	all <0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
D7	0.05	<1	150	**17**	NT	NT	NT	<0.90	<0.1	NT	all <0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
9	0.3	<1	<2.40	0.2	NT	NT	NT	<0.90	<0.1	NT	all <0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
9	1.7	<1	<1.82	0.12	NT	NT	NT	<0.90	<0.1	NT	all <0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
101	0.8-1.0	<1	4.4	0.67	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
102	0.5-0.6	143	31	**1.5**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
102	0.9-1.0	72	27	**1.7**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
103	0.4-0.5	<1	<1.55	<0.05	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
104	1.2-1.4	<1	<1.55	<0.05	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
BD102	1.2-1.4	<1	<1.55	<0.05	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
105	0.8-1.0	<1	35	**5.4**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
106	1.3-1.4	<1	<1.55	<0.05	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
108	1.3-1.4	<1	<1.55	0.12	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
10	1.7	224	<56	0.13	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
10	2.2	40	<1.55	<0.05	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
201	0.4-0.5	<1	<0.05	<0.05	NT	NT	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
D1	-	<1	<0.05	<0.05	NT	NT	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
201	2.2-2.3	<1	<0.05	<0.05	NT	NT	<0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
202	0.6-0.7	3	14	0.66	NT	NT	1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
202	1.7-2.0	361	0.1	<0.05	NT	NT	<0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
202	2.7-2.9	10	<0.05	<0.05	NT	NT	<0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
202	3.2-3.4	1	<0.05	<0.05	NT	NT	<0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
203	0.8-0.9	<1	27	2.7	<0.001	NT	3.8	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
203	2.7-2.9	<1	<0.05	<0.05	NT	NT	<0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
204	0.7-0.9	<1	3.8	0.4	NT	NT	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
204	2.3-2.4	<1	0.2	<0.05	NT	NT	<0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
205	0.2-0.3	<1	8.1	1	<0.001	NT	1.4	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
205^	0.2-0.3	<1	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
205 - [TRIPLICATE]	0.2-0.3	<1	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
205	0.5-0.6	<1	150	**18**	<0.001	0.0002	27	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
205^	0.5-0.6	<1	220	**28**	NT	NT	39	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
205 - [TRIPLICATE]	0.5-0.6	<1	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
D3	-	<1	**1200**	**160**	<0.001	0.0003	230	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
D3^	-	<1	**4600**	**570**	NT	NT	850	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
205	1.8-2.0	<1	<0.05	<0.05	NT	NT	<0.5	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Laboratory PQL			0.05	0.05	0.001	0.0001	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NEPM HIL B [1] (Ref 5)			400	NC	NC	NC	4	1	NC	340	NC	10	90	600	400	20	10	15	500
NEPM HIL D [1] (Ref 5)			4000	NC	NC	NC	40	7	NC	2000	NC	45	530	3600	2000	100	50	80	2500
NSW EPA - General Solid Waste Guidelines (Ref 6)			200 SCC1	0.8/10*	0.04	NC	NC	50 SCC1	NC	4	NC	NC	NC	NC	60	NC	NC	NC	NC
NSW EPA - Restricted Solid Waste Guidelines (Ref 6)			800 SCC2	3.2/23*	0.16	NC	NC	50 SCC2	NC	16	NC	NC	NC	NC	240	NC	NC	NC	NC
ANZECC 2018 95% Level of Species Protection (Ref 7)			NC	NC	NC	0.0001	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

Notes to Table 9:
All results in mg/kg on a dry weight basis
CT - Concentration Threshold
NA - Not Applicable
NC - No Criteria
NT - Not Tested
PID - Photoionisation Detector
PQL - Practical Quantitation Limits
SCC - Specific Contaminant Concentration
TEQ - Toxicity Equivalent Quotient
Total PAH - Sum of positive and PQL values
1 - Health Based Criteria for Commercial Land Use
2- PCB HILs relates to non-dioxin-like PCB only
3- Endosulphan is total of Endosulphan I, Endosulphan II and Endosulphan Sulphate
Benzo(a)pyrene ANZECC 2018 criteria is of unknown reliability
exceeds NSW EPA Health-Based Criteria for High Density Residential Landuse
Bold results exceed NSW EPA Waste Classification Guidelines for General Solid Waste including leachability testing
* Waste classification criteria when used in conjunction with TCLP results
^ laboratory duplicate result
D5 - replicate of 4/0.5
D7 - replicate of 7/0.05
BD102 - replicate of 104/1.2-1.4
D1 - replicate of 201/0.4-0.5
D3 - replicate of 205/0.5-0.6
Boreholes 1 to 10 from DP Project 39961 September 2008
Boreholes 101 to 108 from DP Project 39961.01 November 2008
Boreholes 201 to 205 from DP Project 39961.02 November 2018 (current project)

Table 10: Results of Asbestos Analysis of Soil and Materials

Location	Depth	Sample Type	Asbestos Identification	Trace Analysis
1*	0.2	Soil	Chrysotile asbestos detected	-
2*	0.5	Soil	No asbestos detected	-
3*	0.5	Soil	No asbestos detected	-
4*	0.05	Soil	Amosite asbestos detected	-
4*	0.5	Soil	No asbestos detected	-
5*	0.05	Soil	Chrysotile asbestos detected	-
5*	0.5	Soil	Chrysotile asbestos detected	-
6*	0.05	Soil	Chrysotile asbestos detected	-
6*	0.5	Soil	No asbestos detected	-
7*	0.05	Soil	No asbestos detected	-
8*	Surface	Cement sheet fragment (80 mm x 20 mm x 5 mm)	No asbestos detected	-
9*	0.3	Soil	No asbestos detected	-
203	0.8-0.9	Soil	No asbestos detected at reporting limit of 0.1 g/kg	No asbestos detected
204	0.7-0.9	Soil	No asbestos detected at reporting limit of 0.1 g/kg	No asbestos detected
205	0.2-0.3	Soil	No asbestos detected at reporting limit of 0.1 g/kg	No asbestos detected
205	0.5-0.6	Soil	No asbestos detected at reporting limit of 0.1 g/kg	No asbestos detected

Notes to Table 10

* Testing from previous investigation

It is noted that the asbestos detected in soil samples as part of the previous investigation (Ref 1) generally comprised either small fibro sheet fragments, or fibre bundles in soil.

Table 11: Results of Groundwater Testing

Sample Identification	Bore 10*	Bore 101*	Bore 102*	Bore 103*	Bore 104*	Bore 105*	Bore 106*	BD101	Bore 107 November 2008*	Bore 107 Apr 18*	Bore 108 November 2008*	Bore 108 Apr 18*	202	203	204	D1/JPS	Laboratory PQL	ANZECC (2018, Ref 7) Slightly to Moderately Disturbed Systems		NEPM 2013
																		Fresh	Marine	HSL [8]
PID (ppm)	19	<1	15	<1	<1	<1	<1	<1	<1	<1	<1	<1	348	<1	<1	<1				
pH	NT	NT	NT	NT	NT	NT	NT	NT	NT	6.6	NT	6.6	6.9	6	6.6	6.7	0.01	6.5-8.0 [1]	7.0-8.5 [2]	NC
Electrical Conductivity (µS/cm)	NT	NT	NT	NT	NT	NT	NT	NT	NT	300	NT	220	340	1100	670	660	1	125-2200 [1]	NC	NC
Metal																				
As	0.0019	0.0038	<0.001	0.014	<0.001	0.0027	0.0037	0.0041	0.0015	0.002	0.03	0.001	0.002	0.002	<0.001	<0.001	0.001	0.013 [4]	0.0023 [L] [7]	NC
Cd	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	0.0002	0.0001	0.0002	0.0007	NC
Cr	<0.001	<0.001	0.0019	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.0011	<0.001	<0.001	0.001	<0.001	<0.001	0.001	0.0004 [3]	0.0044 [3]	NC
Cu	0.0035	0.0013	<0.001	<0.001	0.0088	<0.001	<0.001	0.0027	0.0036	<0.001	0.0014	0.003	<0.001	0.001	0.004	0.004	0.001	0.0014	0.0013	NC
Pb	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.001	0.0034	0.0044	NC
Hg	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00005	<0.0001	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00005	0.00006 [5]	0.0001 [5]	NC
Ni	<0.001	0.0017	<0.001	0.0016	<0.001	0.0017	<0.001	<0.001	0.0012	0.01	<0.001	0.008	0.002	0.025	0.008	0.009	0.001	0.011	0.007	NC
Zn	0.014	0.041	0.0067	0.02	0.027	0.012	0.0069	0.035	0.066	0.013	0.0081	0.023	0.008	0.11	0.55	0.56	0.001	0.008	0.015	NC
Mn	NT	NT	NT	NT	NT	NT	NT	NT	NT	0.084	NT	0.017	0.19	0.15	0.039	0.04	0.005	1.9	0.08 [L]	NC
Fe	NT	NT	NT	NT	NT	NT	NT	NT	NT	0.76	NT	0.051	1.7	1.2	0.064	0.064	0.01	NC	NC	NC
TRH																				
C_6 - C_9	0.28	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.01	0.093	<0.01	<0.01	<0.01	0.01	NC	NC	NC
C_{10} - C_{14}	0.89	<0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.05	<0.04	<0.05	1	<0.05	<0.05	<0.05	0.05	NC	NC	NC
C_{15} - C_{28}	0.99	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.1	<0.1	<0.1	<0.1	0.1	NC	NC	NC
C_{29} - C_{36}	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	NC	NC	NC
C_6 - C_{10}	NT	NT	NT	NT	NT	NT	NT	NT	NT	<0.01	NT	<0.01	0.24	<0.01	<0.01	<0.01	0.01	NC	NC	NC
C_6 - C_{10} - BTEX (F1)	NT	NT	NT	NT	NT	NT	NT	NT	NT	<0.01	NT	<0.01	0.24	<0.01	<0.01	<0.01	0.01	NC	NC	1
>C_{10} - C_{16}	NT	NT	NT	NT	NT	NT	NT	NT	NT	<0.05	NT	<0.05	1.5	<0.05	<0.05	<0.05	0.05	NC	NC	NC
>C_{10} - C_{16} - naphthalene (F2)	NT	NT	NT	NT	NT	NT	NT	NT	NT	<0.05	NT	<0.05	**1.5**	<0.05	<0.05	<0.05	0.05	NC	NC	1
>C_{16} - C_{34}	NT	NT	NT	NT	NT	NT	NT	NT	NT	<0.1	NT	<0.1	0.53	<0.1	<0.1	<0.1	0.1	NC	NC	NC
>C_{34} - C_{40}	NT	NT	NT	NT	NT	NT	NT	NT	NT	<0.1	NT	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	NC	NC	NC
BTEX																				
Benzene	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.95	0.5	0.8
Toluene	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.18 [L]	0.18 [L]	NL
Ethyl Benzene	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.08 [L]	0.005 [L]	NL
Xylene	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	0.075 [6] [L]	0.075 [6] [L]	NL
PAHs																				
Total PAHs	0.0232	<0.0016	0.0068	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	NIL (+)VE	0.015	NIL (+)VE	0.031	NIL (+)VE	NIL (+)VE	NIL (+)VE	0.0001 eac	NC	NC	NC
Naphthalene	0.018	<0.0001	0.0047	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0013	<0.0002	0.026	<0.0002	<0.0002	<0.0002	0.0002	0.016	0.05	NL
Acenaphthylene	<0.3 [7]	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	0.0001	NC	NC	NC
Acenaphthene	0.0011	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0009	<0.0001	0.0011	<0.0001	<0.0001	<0.0001	0.0001	NC	NC	NC
Fluorene	0.0021	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0013	<0.0001	0.002	<0.0001	<0.0001	<0.0001	0.0001	NC	NC	NC
Phenanthrene	0.0013	<0.0001	0.0008	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0038	<0.0001	0.0016	<0.0001	<0.0001	<0.0001	0.0001	0.0006 [L]	0.0006 [L]	NC
Anthracene	0.0003	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0008	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	0.0001	0.0001 [L]	0.0001 [L]	NC
Fluoranthene	0.0002	<0.0001	0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.002	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	0.0001	0.001 [L]	0.001 [L]	NC
Pyrene	0.0002	<0.0001	0.0004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0016	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	0.0001	NC	NC	NC
Benzo[*a*]anthracene	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0006	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	NC	NC	NC
Chrysene	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	NC	NC	NC
Benzo[*b,k*]fluoranthene	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002	NC	NC	NC
Benzo[*a*]pyrene	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0006	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0001 [L]	0.0001 [L]	NC
Indeno[*123-cd*]pyrene	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0004	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	NC	NC	NC
Dibenzo[*ah*]anthracene	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	NC	NC	NC
Benzo[*ghi*]perylene	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	NC	NC	NC

Notes to Table 11:
Results expressed in mg/L unless otherwise stated
PQL - Practical Quantitation Limits
(1) - Trigger Values for physical and chemical stressors for south-east Australia for Slightly Disturbed Ecosystems (Table 3.3.2)-Lowland Rivers
(2) - Trigger Values for physical and chemical stressors for south-east Australia for Slightly Disturbed Ecosystems (Table 3.3.2)-Estuaries
(3) - Chromium (VI)
(4) - Arsenic (V) (conservative)
(5) - Mercury (Inorganic)
(6) - m-xylene low reliability trigger value
(7) - Environmental Concern Level (ECL) - indicative interim working level only
(8) - HSL for sand soils for groundwater depth of 2 m to <4 m. Note: The majority of groundwater depths at the date and time of measurement are at depths <2 m from the ground surface
(L) - Low /Unlnown Reliability Trigger Values
NC - No Criteria
Underlined results exceed ANZECC 2018 Trigger Values for Slightly to Moderately Disturbed Systems - Fresh Waters
Shaded results exceed ANZECC 2018 Trigger Values for Slightly to Moderately Disturbed Systems - Marine Waters
Bold Results exceed NEPM HSL
*Denotes wells installed for previous investigations (Refs 5, 6)
BD101 - Replicate sample of 106
D1/JPS - Replicate sample of 204

Table 12: Results of Acid Sulfate Soil Testing

Sample ID	Sample Depth [a] (m)	Sample RL (AHD)	Sample Description	Screening Test Results				Laboratory Results							
				pH			Strength of Reaction [b]	pH_{KCL}	Scr %S	s-TAA %S	S_{NAS} %S	s-ANC_{BT} %S	s-C_{IN} %S	Net Acidity[c] %S	Exisiting and Potential Acidity %S
				pH_F	pH_{FOX}	pH_F - pH_{FOX}									
201	1.0-1.2	0.41-0.61	Dark brown silty sand filling	6.6	**3.0**	**3.6**	1								0.00
	1.5-1.6	0.11-0.01	Grey and brown sand	6.6	**1.9**	**4.7**	4 F, H	3.7	0.50	0.06	0.03	<0.05		0.59	0.59
	2.2-2.3	-0.59--0.69	Grey and brown sand	7.4	**2.1**	**5.3**	1								0.00
	2.5-2.7	-0.89--1.09	Grey and brown sand	7.4	**2.2**	**5.2**	4 F, H								0.00
	3.1-3.3	-1.49--1.69	Grey and brown sand	7.0	**2.9**	**4.1**	2 F, H								0.00
	3.3-3.5	-1.69--1.89	Grey and brown sand	7.1	**2.9**	**4.2**	4 F, H								0.00
	3.8-4.0	-2.19--2.39	Grey and brown sand	5.9	**2.3**	**3.6**	1								0.00
	4.3-4.5	-2.69--2.89	Grey and brown sand	6.8	**2.7**	**4.1**	1								0.00
	4.8-5.0	-3.19--3.39	Grey and brown sand	7.6	**2.9**	**4.7**	1								0.00
	5.3-5.5	-3.7--3.9	Grey and brown sand	7.1	**3.0**	**4.1**	1								0.00
	5.8-6.0	-4.2--4.4	Grey and brown sand	7.0	**3.2**	**3.8**	1								0.00
	6.3-6.5	-4.69--4.89	Grey and brown sand	7.0	**3.0**	**4.0**	1								0.00
	6.5-7.0	-4.89--5.39	Grey and brown sand	6.6	**3.0**	**3.6**	1								0.00
	7.3-7.5	-5.7--5.9	Grey and brown sand	6.6	**3.1**	**3.5**	1								0.00
	7.7-7.9	-6.09--6.29	Grey and brown sand	6.5	**2.7**	**3.8**	1	4.7	0.06	<0.01	<0.005	<0.05		0.059	0.059
203	0.7	2.2	Dark grey clay filling some sand and gravel	7.3	**3.1**	**4.2**	1								0.00
	1	1.9	Dark grey clay filling some sand and gravel	8.0	7.3	0.7	2								0.00
	2	0.9	Dark grey to grey brown sand	8.2	6.5	**1.7**	4 F, H								0.00
	2.5	0.4	Dark grey to grey brown sand	8.0	6.2	**1.8**	2								0.00
	3	-0.1	Dark grey to grey brown sand	7.8	4.2	**3.6**	1								0.00
	3.5	-0.6	Dark grey to grey brown sand	7.7	**2.2**	**5.5**	1	4.0	0.17	0.06	<0.005	<0.05		0.23	0.23
	4.1	-1.2	Dark grey to grey brown sand	7.5	**3.4**	**4.1**	1								0.00
	4.8	-1.9	Dark grey to grey brown sand	6.1	**3.4**	**2.7**	1								0.00
	5.4-5.5	-2.5--2.6	Dark grey to grey brown sand	6.2	**3.0**	**3.2**	1								0.00
	6.1	-3.2	Dark grey to grey brown sand	7.0	3.9	**3.1**	2								0.00
	6.8	-3.9	Dark grey to grey brown sand	6.8	3.9	**2.9**	1								0.00
205	1.7	-0.06	Grey brown sand	6.7	**2.0**	**4.7**	2								0.00
	2.1	-0.46	Grey brown sand	7.0	**2.2**	**4.8**	1	4.3	0.18	0.04	<0.005	<0.05		0.23	0.23
	2.7	-1.06	Grey brown sand	7.1	**3.0**	**4.1**	1								0.00
	3.1	-1.46	Grey brown sand	7.2	**3.0**	**4.2**	1								0.00
	3.8	-2.16	Grey brown sand	7.1	**2.9**	**4.2**	1								0.00
	4.1	-2.46	Grey brown sand	6.2	**2.1**	**4.1**	2 F, H								0.00
	5	-3.36	Grey brown sand	6.4	**2.9**	**3.5**	1								0.00
	5.3	-3.66	Grey brown sand	6.4	**2.8**	**3.6**	1								0.00
	5.7	-4.06	Grey brown sand	6.7	**2.8**	**3.9**	1								0.00
	6.1	4.46	Grey brown sand	6.4	**2.7**	**3.7**	1								0.00
Guideline			Coarse sands, poorly buffered	<4[d]	<3.5[e]	≥1[e]	-	-	-	-	-	-	-	-	0.01

Notes to Table 12:

a Depth below ground surface

b Strength of Reaction

- 1 denotes no or slight reaction
- 2 denotes moderate reaction
- 3 denotes high reaction
- 4 denotes very vigorous reaction
- F denotes bubbling/frothy reaction indicative of organics
- H denotes heat generated

c Calculated by the laboratory based on the ABA equation in ASS Laboratory Methods Guidelines (Ref 9)

d For actual acid sulphate soils (ASS)

e Indicative value only for Potential Acid Sulphate Soils (PASS)

Bold results indicative of ASS

Shaded results indicate an exceedence of QASSIT action criteria (Ref 10)

pH_F - Soil pH Test (1:5 soil:distilled water)

pH_{FOX} - Soil Peroxide pH Test (1:4 soil:distilled water following oxidation of soil with 30% hydrogen peroxide (H_2O_2))

*Laboratory methods used to quantify ANC are likely to overestimate environmental effectiveness

The Acid Sulfate Soil Management Advisory Committee (ASSMAC) guidelines (Ref 8) suggest that a soil pH<4 in water is an indicator of actual ASS. The results of screening tests therefore suggest the absence of actual ASS at the locations and depths tested.

The ASSMAC guidelines also suggest that indicators of potential acid sulphate soils (PASS) include the following:

- Soil pH <3.5 following oxidation with H_2O_2 (i.e. pH_{FOX});
- Drop of 1 pH unit or more between pH_F and pH_{FOX}.

The results of screening tests indicated that the majority (35 of 36 samples) of soil samples tested exhibited a pH drop equal to or greater than one unit. In addition, 30 of the 36 samples tested also exhibited a soil pH following oxidation below 3.5.

It is noted that ASS screening tests are a qualitative method only and give an indication of the intensity of total acidification (pH). The guidelines indicate that peroxide may also oxidise organic matter (in addition to pyrite) to produce acids which are unlikely to form under natural conditions, thus giving falsely high indication of acid sulphate potential.

Detailed laboratory testing, comprising the Full Chromium Suite, on four selected samples from depths between 1.5 m and 7.9 m (RL2.2 to RL6.29) on the site indicated all samples exceeded the QASSIT action criteria (Ref 10) for disturbance of less than and greater than 1000 tonnes of material for sand (i.e. Net Acidity values between 0.059%S and 0.59%S). It is noted that screening tests conducted in the sand filling encountered in the current investigation suggested similar results to the underlying natural sand soils in some samples. In the absence of further ASS testing in the filling, it is recommended that the sand filling is assumed to be ASS unless additional testing suggests otherwise.

Based on the above, sandy materials (fill and natural) present on the site (i.e. below upper dark grey sandy filling) are considered to be potential ASS, and if disturbed during development, will require management in accordance with a site specific ASS management plan (i.e. basement excavation, services installation footings etc.) with reference to the ASSMAC guidelines (Ref 8).

8. Assessment of Contamination

The results of chemical analysis indicated the following:

Soil

Several samples exceeded the adopted health-based investigation levels for high density residential landuse as follows:

- Lead and nickel exceedances in Bore 204/0.2-0.5 and replicate sample D3;
- Benzo(a)pyrene TEQ and total benzo(a)pyrene exceedances in Bore 205/0.5-0.6 and replicate sample D3;
- Total benzo(a)pyrene exceedances in replicate sample D3 (replicate of Bore 205/0.5-0.6).

Two samples exceeded the adopted health-based screening levels for hydrocarbon analytes, for the adopted high density residential landuse as follows:

- F2 exceedance in Bore 202/0.6-0.7 and
- F2 exceedance Bore 205/0.5-0.6 (laboratory duplicate sample).

Exceedance of the adopted management limits for hydrocarbon analytes were observed as follows:

- F3 management limit exceedances in replicate sample D3 (replicate of Bore 205/0.5-0.6).

Although the previous testing from 2008 (Refs 1, 2) does not include analytes used in NEPC 2013 (Ref 5), it is likely that elevated hydrocarbon concentrations in Bore 10/1.7 would exceed the adopted HSL and management limits for the proposed landuse.

Asbestos was not detected in soil in samples collected as part of the current assessment. It is noted that asbestos was detected in previous assessment by DP within the site, and included asbestos in soil as small plaster fragment and as fibre bundles in filling beneath the current site structure and the current paved vehicle display area in the eastern portion of the site. It is further noted that previously observed possible asbestos-containing materials may have been removed from the structure as part of renovation works for the current site use.

Based on the above laboratory results, upper filling, generally comprising intermixed sand, gravel, ash and slag gravel, generally contained asbestos and elevated PAH concentrations. Leachability testing in water (ASLP) of upper fill samples indicated PAH concentrations marginally above the laboratory practical quantitation limits, suggesting the material has generally a low propensity to leach PAH in water. It is noted that the source of PAHs within the sample is likely to be ash, slag or coal within the sample. Ash, slag and coal typically have a low propensity to leach as the contaminants are generally encapsulated within the ash or slag in the process of formation or strongly bound within the coal's carbonaceous matrix.

ASLP testing for lead in one soil sample indicated lead concentrations in the leach sample one order of magnitude above the adopted ANZECC assessment criteria, suggesting a low to moderate propensity to leach metals. It is noted that the ASLP test includes tumbling the contaminated soil sample in water for 18 hours, followed by analysis of the leachant. This testing methodology is considered to provide a conservative assessment of the propensity to leach contamination in water. It is also noted that analysis of groundwater within the site suggested minimal lead impact in groundwater.

OCP, OPP and PCB, were not detected within the soil samples tested.

It is noted that the soil samples tested were generally within the NSW EPA (Ref 6) criteria for classification as 'General Solid Waste', with the exception of some samples which comprised elevated total concentrations of heavy metals (namely lead and mercury), C10-C36 petroleum hydrocarbons and Benzo(a)pyrene. Further leachability testing (TCLP) confirmed acid leachable concentrations were low for the majority of samples indicating that most of the samples tested would be suitable for classification as 'General Solid Waste', with the following exceptions:

- Bore 205/0.5-0.6 lab replicate which contained mercury concentrations above 'General Solid Waste' (total concentrations);
- Lab replicate of D3 (replicate of Bore 205/0.5-0.6) contained C10-C36 concentrations above 'General Solid Waste' criteria;
- D3 (replicate of Bore 205/0.5-0.6) plus lab replicate contained benzo(a)pyrene and Total PAH concentrations above 'General Solid Waste' criteria and 'Restricted Solid Waste' criteria.

Samples from previous investigations exceeded 'General Solid Waste' criteria for several analytes, however, were not analysed for TCLP.

It should be noted that soils containing asbestos materials will be classified as 'Special Waste (asbestos)'.

Groundwater

The majority of groundwater analytical results testing within the site boundary (i.e. Bores 10, 202, 203 and 204) were within the adopted guidelines with the exception of the following:

- pH in Bore 203 marginally outside the ANZECC 2018 criteria range for fresh waters and marine waters, and Bores 202, 203 and 204 outside of the marine water range;
- Copper in samples 10 and 204 above the ANZECC 2018 trigger value for fresh and marine waters;
- Nickel in samples 203 and 204 marginally above the ANZECC 2000 trigger value for fresh waters, with samples 202, 203 and 204 above marine water trigger value;
- Manganese in samples 202 and 203 above the low reliability trigger levels for marine water;
- Zinc in samples 203 and 204 above fresh water and marine water trigger levels, with zinc in sample 10 above fresh water trigger levels;
- F2 (C10-C16 minus naphthalene) in sample 202 above the adopted NEPM 2013 health-based screening level for sand soils, with groundwater 2 m to <4 m depth;
- Naphthalene in sample 202 above ANZECC 2018 fresh water trigger values;
- Phenanthrene, anthracene and fluoranthene in sample 202 above ANZECC 2018 low-reliability fresh and marine water trigger values;
- Phenanthrene and anthracene in sample 10 above ANZECC 2018 low-reliability fresh and marine water trigger values;

It is noted that TRH concentrations were detected in the groundwater samples from Bore 10 (and trace concentrations in Bore 102) during previous investigation, however, were not analysed for the current assessable hydrocarbon fractions.

9. Comments

The results of previous investigation indicated the site has been used for light industrial land use for the last 50 years following its use for residential purposes.

A number of potential on-site sources of site contamination were identified due to former and current site activities.

Subsurface investigation was undertaken as part of previous and current assessments to provide a targeted assessment of the principle potential contamination sources.

The results of the subsurface investigation and soil laboratory testing indicated the following:

- General absence of pesticide and PCB impacts;
- Presence of presumed former fuel bowser and in-situ UST location in the north-western portion of the site. The exact number or location of the USTs has not been confirmed. Drilling in the vicinity of the fuel infrastructure indicated the presence of volatile and medium chained hydrocarbon contamination in soil and groundwater. Additional bores were previously drilled to further assess the possible extent of hydrocarbon impact within the adjacent Dangar Street to the north and north-east. Based on the results of previous and current laboratory testing and observations made during the works, the extent of hydrocarbon impact is likely to be localised in the vicinity of the fuel infrastructure. The extent of hydrocarbon impacted soils can be further assessed following demolition of the existing site structures and removal of underground fuel infrastructure;
- Presence of elevated total PAH and metals concentrations above the SAC in several soil samples which may be associated with the presence of ash/coal/slag in the fill samples tested. Leachability testing in water (ASLP), however, generally indicated the material had a low propensity to leach PAH in water and a moderate propensity to leach metals in water. It is noted that ash and coal has been identified within filling across the site and the presence of additional areas of PAH impact cannot be discounted;
- Presence of asbestos fines (as fine plaster fragments and fibre bundles) identified in filling during previous DP investigations beneath current structures and pavements (Bores 1, 4, 5 and 6, 0.2 m to 0.8 m thick – Ref 1). Given the history of demolition / renovations on the site, the presence of building wastes within filling across the site, it is considered likely that additional asbestos impact is present on site;
- The majority of the soil matrix tested is classified as ‘General Solid Waste’ based on total and leachable (TCLP) concentrations, however, some upper fill samples indicated total and/or leachable concentrations above ‘General Solid Waste’ criteria. The exceedances may be due to particulate slag/ash/metal in samples and were not found consistently in filling across the site. Asbestos fines/materials have been identified in upper filling. Due to the variable nature of filling and presence of anthropogenic materials, the presence of additional asbestos in filling across the site cannot be precluded. Fill materials containing asbestos would be classified ‘Special Waste (asbestos)’ in addition to the chemical classification of the soil matrix.

The results of the groundwater monitoring and testing indicated the following:

- The presence of hydrocarbon impact in groundwater in the immediate vicinity of underground fuel infrastructure, located in the north-western portion of the site;
- Presence of elevated heavy metals in the majority of groundwater water samples (previous and current assessments) above the adopted criteria. It is noted that previous groundwater testing on adjacent sites and in the Wickham area has identified heavy metal impact (i.e. results are considered to be typical of regional groundwater quality).

The results of groundwater testing suggest the general absence of gross groundwater impact from the upper PAH and metal-impacted filling within the site. Groundwater hydrocarbon impact is present in the vicinity of the underground fuel infrastructure. Localised off-site migration of hydrocarbon impact has occurred.

Based on the results of the investigation, remediation will be required to render the site suitable for the proposed development with respect to site contamination. Remediation would need to be undertaken with reference to a site specific remediation action plan (RAP) for the development with reference to NSW EPA guidelines.

Based on our current understanding of site conditions, the recommended remediation option for the site would include the following:

- Decommissioning, excavation and removal of remnant underground fuel infrastructure including excavation, soil remediation and on-site reuse of remediated soils, or off-site disposal of identified localised hydrocarbon-impacted soil;
- Off-site disposal of PAH/metals/asbestos-impacted soils to an appropriately licensed landfill, subject to appropriate classification.

It is noted that the current development plan indicates the construction of a two level basement across the majority of the site area, which would possibly limit the potential for on-site management of impacted soils. The potential capacity for on-site management of soils should be confirmed during subsequent design finalisation. This is likely to require additional targeted investigations to better assess the extent of contaminated materials and inform management options.

On-site management of contaminated soils would attract a notice on the Section 149 planning certificate for the site. A long term environmental management plan (EMP) would also be required to manage the contamination including potential future disturbance of the capping layer post construction.

Active groundwater remediation is generally not considered to be necessary within the site based on the results of testing. The heavy metal concentrations observed in groundwater are considered to be typical of regional groundwater quality. Hydrocarbon impacts in groundwater are proposed to be addressed via the removal of the source of possible impacts (i.e. removal and remediation of underground fuel infrastructure and hydrocarbon-impacted soils). Further groundwater testing during and following soil remediation in accordance with a site-specific RAP is recommended to confirm groundwater conditions and requirements (if any) for further remediation or management. Due consideration should be given to the possible risk of vapour intrusion associated with basement design and construction if hydrocarbon impacts remain adjacent to the site boundary following remediation.

Disturbance of ASS (where required for future development), generally comprising sand filling and underlying natural sands will need to be conducted with reference to an ASSMP for the site.

The site is considered to be suitable for the proposed high density residential development subject to appropriate remediation and validation.

10. References

1. Douglas Partners Pty Ltd, "Report on Preliminary Contamination and Geotechnical Assessment, Proposed Multi-Storey Commercial Development, 10 Dangar Street, Wickham, prepared for Valad Property Management, Project 39961, September 2008.
2. Douglas Partners Pty Ltd, 'Report on Additional Contamination Assessment, Proposed Multi-storey Commercial Development, 10 Dangar Street Wickham', prepared for Valad Property Management, Project 39961.01, November 2008.
3. Douglas Partners Pty Ltd, 'Report on Preliminary Site Investigation, Desktop Geotechnical and Acid Sulfate Soil Assessment, Proposed Apartment Development, 10 Dangar Street Wickham', prepared for Dangar Street Wickham Pty Ltd, Project 39961.02 dated 18 October 2018.
4. NSW EPA Contaminated Sites (2011), 'Guidelines for Consultants Reporting on Contaminated Sites', August 2011.
5. National Environment Protection Council (2013), 'National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013', 11 April 2013.
6. NSW EPA, "Waste Classification Guidelines: Part 1 – Classifying Waste", November 2014;
7. ANZECC (2000) "Australian and New Zealand Guidelines for Fresh and Marine Water Quality", October 2000.
8. ASSMAC, "ASSMAC Acid Sulphate Soil Manual", New South Wales Acid Sulphate Soil Management Advisory Committee, August 1998.
9. Ahern CR, Sullivan LA, McElnea AE 'Acid Sulphate Soils, Laboratory Methods Guidelines Version 2.1 - June 2004', Department of Natural Resources, Mines and Energy, June 2004.
10. Queensland Acid Sulfate Soil Technical Manual - Soil Management Guidelines v4.0, Department of Science, Information Technology, Innovation and the Arts, 2014.

11. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for this project at 10 Dangar Street Wickham with reference to DP's proposal dated 5 July 2018 and acceptance received from Matt Zappia of Dangar Street Wickham Pty Ltd dated 20 September 2018. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Dangar Street Wickham Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

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

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

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

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

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

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

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

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Appendix A

About This Report
Sampling Methods
Soil Descriptions
Symbols and Abbreviations
Borehole Logs:
Bores 1 to 6, 9 and 10
Bores 101 to 108
Bores 201 to 205

About this Report

Douglas Partners

Introduction

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

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

Copyright

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

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

About this Report

Site Anomalies

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

Information for Contractual Purposes

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

Site Inspection

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

Sampling Methods

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Sampling

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

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

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

Test Pits

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

Large Diameter Augers

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

Continuous Spiral Flight Augers

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

Non-core Rotary Drilling

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

Continuous Core Drilling

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

Standard Penetration Tests

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

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

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

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

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

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

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

Soil Descriptions

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Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS 1726-1993, Geotechnical Site Investigations Code. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

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

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

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

Type	Particle size (mm)
Coarse gravel	20 - 63
Medium gravel	6 - 20
Fine gravel	2.36 - 6
Coarse sand	0.6 - 2.36
Medium sand	0.2 - 0.6
Fine sand	0.075 - 0.2

The proportions of secondary constituents of soils are described as:

Term	Proportion	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	20 - 35%	Sandy Clay
Slightly	12 - 20%	Slightly Sandy Clay
With some	5 - 12%	Clay with some sand
With a trace of	0 - 5%	Clay with a trace of sand

Definitions of grading terms used are:

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

Cohesive Soils

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

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	vs	<12
Soft	s	12 - 25
Firm	f	25 - 50
Stiff	st	50 - 100
Very stiff	vst	100 - 200
Hard	h	>200

Cohesionless Soils

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

Relative Density	Abbreviation	SPT N value	CPT qc value (MPa)
Very loose	vl	<4	<2
Loose	l	4 - 10	2 -5
Medium dense	md	10 - 30	5 - 15
Dense	d	30 - 50	15 - 25
Very dense	vd	>50	>25

Soil Descriptions

Soil Origin

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

- Residual soil - derived from in-situ weathering of the underlying rock;
- Transported soils - formed somewhere else and transported by nature to the site; or
- Filling - moved by man.

Transported soils may be further subdivided into:

- Alluvium - river deposits
- Lacustrine - lake deposits
- Aeolian - wind deposits
- Littoral - beach deposits
- Estuarine - tidal river deposits
- Talus - scree or coarse colluvium
- Slopewash or Colluvium - transported downslope by gravity assisted by water. Often includes angular rock fragments and boulders.

Symbols & Abbreviations

Douglas Partners

Introduction

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

Drilling or Excavation Methods

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

Water

▷	Water seep
▽	Water level

Sampling and Testing

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

Description of Defects in Rock

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

Defect Type

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

Orientation

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

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

Coating or Infilling Term

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

Coating Descriptor

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

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

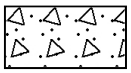
Symbols & Abbreviations

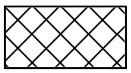
Graphic Symbols for Soil and Rock

General

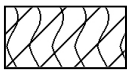
Asphalt

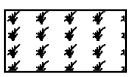
Road base

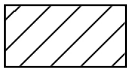

Concrete

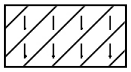

Filling

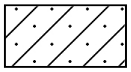
Soils


Topsoil

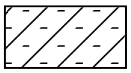

Peat

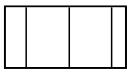

Clay

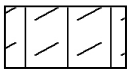

Silty clay

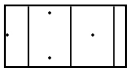

Sandy clay

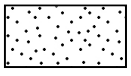
Gravelly clay

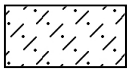

Shaly clay

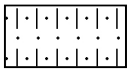

Silt


Clayey silt


Sandy silt

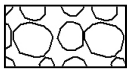

Sand

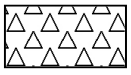

Clayey sand


Silty sand

Gravel

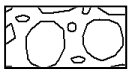
Sandy gravel


Cobbles, boulders

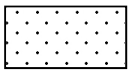

Talus

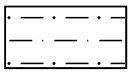
Sedimentary Rocks

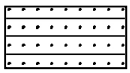
Boulder conglomerate

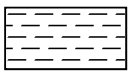

Conglomerate

Conglomeratic sandstone

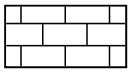

Sandstone


Siltstone

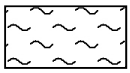

Laminite

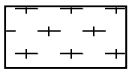

Mudstone, claystone, shale

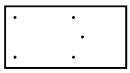
Coal


Limestone

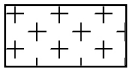
Metamorphic Rocks

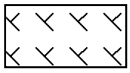

Slate, phyllite, schist

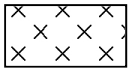

Gneiss

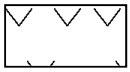

Quartzite

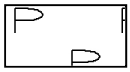
Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

BOREHOLE LOG

CLIENT: Valad Property Management
PROJECT: Preliminary Contam and Geotech Assessment
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 1
PROJECT No: 39961
DATE: 05 Aug 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.1	ASPHALT							
		FILLING - Generally comprising (loose) brown silty fine to medium grained sand filling, with trace fine to medium gravel, moist		D,PID	0.2		<1 ppm		
	0.35	At 0.15m, half brick							
		At 0.3m, black plastic sheeting		D,PID	0.5		<1 ppm		
		FILLING - Generally comprising (loose) light brown sand filling, moist							
	0.75	FILLING - Generally comprising (loose) brown fine to medium grained sand filling, with trace silt, moist		D,PID	0.8		<1 ppm		
		From 0.9m moist to wet							
1					1.0			▼	1
	1.1	FILLING? (possible natural) - Generally comprising light grey fine to medium grained sand filling, trace fine to medium gravel, saturated		S,PID			1,2,3 N = 5		
					1.45				
	1.7	SAND - Loose to medium dense brown fine to coarse grained sand, saturated							
2				A,PID	2.0		<1 ppm		2
		From 2.3m, grey, some fine to medium gravel							
					2.5				
		From 2.6m to 2.8m, trace clay		S,PID			1,2,8 N = 10 <1 ppm Note - rock wedged in end of SPT sampler		
3		At 2.95m, tree root			2.95				3
		From 3.3m, fine to coarse grained							
		From about 3.4m, sulfur odour		A,PID	3.5		<1 ppm		
4		From about 4.0m, very loose			4.0				4
		From 4.2m to 4.25m, clayey sand lens		S,PID			1,0,2 N = 2 <1 ppm		
	4.45	Bore discontinued at 4.45m, limit of investigation			4.45				

RIG: Truck Mounted **DRILLER:** BR & M Atkins Drilling **LOGGED:** Wilson **CASING:** None

TYPE OF BORING: 100mm diameter Solid Flight Augers

WATER OBSERVATIONS: Free groundwater observed at approximately 1.1m during drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date:

Douglas Partners
Geotechnics · Environment · Groundwater

BOREHOLE LOG

CLIENT: Valad Property Management
PROJECT: Preliminary Contam and Geotech Assessment
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 2
PROJECT No: 39961
DATE: 05 Aug 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		CONCRETE							
	0.2								
	0.3	FILLING - Generally comprising (loose) light brown fine to coarse grained sand filling, trace fine sized gravel, moist		D,PID	0.25		<1 ppm		
		FILLING - Generally comprising (loose) brown silty fine to medium grained sand filling, moist		A,PID	0.5		<1 ppm		
		From 0.65m, some fine to medium gravel							
	0.8	FILLING? (possible natural) - Generally comprising loose grey fine to medium grained sand, moist to wet							
1					1.0				1
		From 1.15m, saturated		S,PID			2,3,5 N = 8	▼	
					1.45				
		From 1.7m, light grey							
				A,PID	1.9		<1 ppm		
2					2.0				2
				S,PID			1,2,3 N = 5 <1 ppm		
	2.3	SAND - Very loose to loose brown fine to medium grained sand with trace silt, trace rootlets to 2.4m, saturated							
					2.45				
3		From 3.0m, sulfur odour		A,PID	3.0		<1 ppm		3
		From about 3.5m, very loose							
	3.8	SAND - Very loose brown fine to medium grained sand with trace clay, saturated							
4					4.0				4
				S,PID			1,1,1 N = 2 <1 ppm		
	4.45	Bore discontinued at 4.45m, limit of investigation			4.45				

RIG: Truck Mounted **DRILLER:** BR & M Atkins Drilling **LOGGED:** Wilson **CASING:** None

TYPE OF BORING: 100mm diameter Solid Flight Augers

WATER OBSERVATIONS: Free groundwater observed at approximately 1.15m during drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date:

Douglas Partners
Geotechnics · Environment · Groundwater

BOREHOLE LOG

CLIENT: Valad Property Management
PROJECT: Preliminary Contam and Geotech Assessment
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 3
PROJECT No: 39961
DATE: 05 Aug 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		CONCRETE							
	0.19	FILLING - Generally comprising (loose) brown silt with trace fine to medium gravel and clay, damp		D,PID	0.25		<1 ppm		
				A,PID	0.5		<1 ppm		
	0.8	FILLING - Generally comprising loose light grey fine to medium grained sand filling, moist to wet							
1					1.0				1
		From 1.25m, saturated		S,PID			2,3,3 N = 6 <1 ppm	▼	
					1.45				
	1.9	FILLING - Generally comprising loose grey silty fine grained sand, with trace fine to medium gravel, saturated		A,PID	2.0		<1 ppm		
2	2.2	SAND - Medium dense light grey fine to coarse grained sand, trace fine to medium gravel, saturated							2
					2.5				
				S,PID			2,4,7 N = 11 <1 ppm		
3					2.95				3
4		From about 4.0m, loose			4.0				4
		From 4.25m, some clay		S,PID			1,4,4 N = 8 <1 ppm		
	4.45	Bore discontinued at 4.45m, limit of investigation			4.45				

RIG: Truck Mounted **DRILLER:** BR & M Atkins Drilling **LOGGED:** Wilson **CASING:** None

TYPE OF BORING: 100mm diameter Solid Flight Augers

WATER OBSERVATIONS: Free groundwater observed at apprximately 1.25m during drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date:

Douglas Partners
Geotechnics · Environment · Groundwater

BOREHOLE LOG

CLIENT: Valad Property Management
PROJECT: Preliminary Contam and Geotech Assessment
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 4
PROJECT No: 39961
DATE: 05 Aug 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILLING - Generally comprising brown fine to medium gravelly silt filling, trace fine to medium grained sand (slag), abundant rootlets, damp		D,PID	0.05		<1 ppm		Gatic and concrete
									From 0.1m to 0.4m, bentonite seal
	0.45	FILLING - Generally comprising (loose) dark brown-black silt filling, trace fine to medium gravel and fine to coarse grained sand, damp		A,PID	0.5		<1 ppm		
	0.7	FILLING - Generally comprising (loose) light brown fine to medium grained sand filling, moist to wet							
	1				1.0				1
				S,PID			2,3,4 N = 7 <1 ppm		
		From 1.4m, saturated			1.45			▼	From 0.4m to 2.5m, 2-5mm gravel
	1.8	SAND - Loose, light grey fine to medium grained sand, saturated							From 0.5m to 2.5m, 50mm diameter, class 18 machine slotted PVC screen
	2			A,PID	2.0		<1 ppm		2
		From about 2.5m, very loose			2.5				End cap
		From 2.7m, trace clay, abundant shells and shell fragments		S,PID			1,1,2 N = 3 <1 ppm		
	3				2.95				3
		From 3.1m, trace shell fragments							
				A,PID	3.5		<1 ppm		
	4				4.0				4
		From about 4.0m, loose		S,PID			2,5,2 N = 7 <1 ppm		
	4.45	Bore discontinued at 4.45m, limit of investigation			4.45				

RIG: Truck Mounted **DRILLER:** BR & M Atkins Drilling **LOGGED:** Wilson **CASING:**

TYPE OF BORING: 100mm diameter Solid Flight Augers

WATER OBSERVATIONS: Free groundwater observed at approximately 1.4m during drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date:

Douglas Partners
Geotechnics · Environment · Groundwater

BOREHOLE LOG

CLIENT: Valad Property Management
PROJECT: Preliminary Contam and Geotech Assessment
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 5
PROJECT No: 39961
DATE: 05 Aug 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILLING - Generally comprising (loose) dark brown sandy silt, with trace medium size gravel, abundant rootlets to 0.1m, moist		D, PID	0.05		<1ppm		
	0.45	FILLING - Generally comprising (loose) brown silty fine grained sand filling, moist		A, PID	0.5		<1ppm		
	0.8	SAND - Loose brown mottled orange fine to medium grained sand, moist to wet							
	1				1.0				1
		From 1.15m, saturated		S, PID			2,3,3 N = 6 <1ppm	▼	
					1.45				
		From 1.75m, trace coarse grained sand, trace clay to 2.2m							
	2			A, PID	2.0		<1ppm		2
		From 2.35, grey							
		From about 2.5m, loose to medium dense			2.5				
				S, PID			2,4,6 N = 10 <1ppm		
	3				2.95				3
				A, PID	3.5		<1ppm		
	4				4.0				4
		From about 4.0m, medium dense							
		From 4.2m to 4.28m, grey mottled orange sandy clay/clayey sand lens		S, PID pp	4.25		2,4,7 N = 11 <1ppm 180 - 200 kPa		
	4.45	Bore discontinued at 4.45m, limit of investigation			4.45				

RIG: Truck Mounted **DRILLER:** BR & M Atkins Drilling **LOGGED:** Wilson **CASING:** None

TYPE OF BORING: 100mm diameter Solid Flight Augers

WATER OBSERVATIONS: Free groundwater observed at approximately 1.15m during drilling

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED	
Initials:	
Date:	

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BOREHOLE LOG

CLIENT: Valad Property Management
PROJECT: Preliminary Contam and Geotech Assessment
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 6
PROJECT No: 39961
DATE: 05 Aug 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILLING - Generally comprising (loose) dark brown fine to medium gravelly silt filling, some fine to medium grained sand, trace brick fragments, abundant rootlets, moist		D, PID	0.05		<1ppm		
	0.3	FILLING - Generally comprising (loose) grey and light grey fine to medium grained sandy silt filling, with some fine to medium gravel and brick fragments, moist		A, PID	0.5		<1ppm		
	0.55	FILLING - Generally comprising (medium dense) light brown fine to medium grained sandy fine to medium gravel filling, moist From 0.8m, moist to wet							
	1			A, PID	1.0		<1ppm		1
		From 1.15m, saturated						▼	
	1.4	FILLING? (possible natural) - Generally comprising soft to firm dark grey/black clayey silt/silty clay filling, M>Wp		A, PID, pp	1.5		<1ppm 50 - 60 kPa		
	1.6	FILLING? (possible natural) - Generally comprising very soft to soft brown clayey silt filling, with some fine to coarse grained sand, trace fine to medium gravel, M>Wp							
	2			A, PID, pp	2.0		<1ppm 20 - 30 kPa		2
	2.25	SAND - Loose brown fine to medium grained sand, trace silt, saturated			2.5				
				S, PID			3,4,5 N = 9 <1ppm		
	3				2.95				3
				A, PID	3.5		<1ppm		
	4				4.0				4
		From about 4.1m, trace fine to medium gravel		S, PID			2,3,3 N = 6 <1ppm		
	4.45	Bore discontinued at 4.45m, limit of investigation			4.45				

RIG: Truck Mounted **DRILLER:** BR & M Atkins Drilling **LOGGED:** Wilson **CASING:** None

TYPE OF BORING: 100mm diameter Solid Flight Augers

WATER OBSERVATIONS: Free groundwater observed at approximately 1.15m during drillng

REMARKS: Slow progress drilling from 0.55m to 1.4m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date:

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BOREHOLE LOG

CLIENT: Valad Property Management
PROJECT: Preliminary Contam and Geotech Assessment
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 9
PROJECT No: 39961
DATE: 07 Aug 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		CONCRETE							
	0.16	FILLING - Generally comprising intermixed grey and light brown fine to medium grained sand filling with bricks and brick fragments, trace silt and coal fragments, moist		A, PID	0.3		<1ppm		
		At 0.25m, metal pipe							
		From 0.55m, light brown, trace clay, brick fragments and charcoal fragments, moist		A, PID	0.65		<1ppm		
	1.2	FILLING - Generally comprising light brown fine to medium grained sand filling, trace brick fragments, moist		A, PID	1.25		<1ppm		
		From 1.35m, orange/brown, trace fine to medium gravel							
	1.45	FILLING? (possible natural) - Generally comprising dark brown slightly silty fine to medium grained sand filling, moist		A, PID	1.5		<1ppm		
				A, PID	1.7		<1ppm		
	1.75	Bore discontinued at 1.75m, limit of investigation							

RIG: Hand tools **DRILLER:** Bozinovski **LOGGED:** Wilson **CASING:** None

TYPE OF BORING: 90mm diameter hand auger

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Bore located in raised concrete floor within warehouse (approximately 1.1 m above surrounding floor levels)

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ⧗ Water level

CHECKED
Initials:
Date:

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BOREHOLE LOG

CLIENT: Valad Property Management
PROJECT: Preliminary Contam and Geotech Assessment
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 10
PROJECT No: 39961
DATE: 23 Aug 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.02	ASPHALT							Gatic and concrete
	0.15	CONCRETE							
		FILLING - Light grey brown and dark grey fine to medium grained sand filling, some brick and ceramic pipe fragments, moist							From 0.1m to 0.3m, bentonite seal
	0.7	FILLING - Dark grey brown sandy clay/clayey sand filling, moderate to strong hydrocarbon odour, M>wp		A, PID	0.75		3 ppm		
1				A, PID	1.0		11 ppm		1
	1.1	FILLING - Grey and light grey fine to medium grained sand filling, moderate to strong hydrocarbon odour, moist to wet		A, PID	1.2		110 ppm		From 0.3m to 2.2m, 2-5mm gravel
		from 1.5m possibly grading to natural sand, some organics, moderate to strong hydrocarbon odour, some hydrocarbon sheen on sample.		A, PID	1.7		224 ppm	▼	From 0.4m to 2.2m, 50mm diameter, class 18 machine slotted PVC screen
2				A, PID	2.2		40 ppm		2 End cap
	2.3	Bore discontinued at 2.3m, collapse							
3									3
4									4

RIG: Hand tools **DRILLER:** Bozinovski **LOGGED:** Heads **CASING:** None

TYPE OF BORING: 90mm diameter hand auger

WATER OBSERVATIONS: Free groundwater observed at approximately 1.5m during drillng

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date:

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BOREHOLE LOG

CLIENT: VALAD Property Management
PROJECT: Additional Contamination Assessment
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 101
PROJECT No: 39961.01
DATE: 03 Sep 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details (Gatic)
	0.03	ASPHALT							From surface to 0.15m, concrete
	0.12	CONCRETE		A, PID	0.1		<1ppm		
					0.2				
	0.3	FILLING - Generally comprising light brown coarse gravelly sand, humid			0.3				From 0.15m to 0.45m, bentonite
		FILLING - Generally comprising black, with fine to coarse grained sand and some fine to coarse gravel, predominantly coal reject/fines, humid		A, PID			1ppm		
					0.5				
	0.7	SAND - Dark grey fine to medium grained sand, trace silt and clay, fine to coarse gravel, moist			0.8				
				A, PID			<1ppm		
1					1.0				1
		From 1.2m, clay and silt content increasing with depth, organic odour, moist to wet			1.3			▼	
				A, PID			<1ppm		
		From 1.4m, saturated			1.4				
	1.6	SAND - Grey fine to medium grained sand, some clay and silt, strong organic (sulphur) odour, wet, clay content decreasing with depth			1.8				
				A, PID			1ppm		
2					2.0				2 From 0.45m to 3.5m, 2/5mm gravel
		From 2.3m, no organic odour observed			2.3				From 0.55m to 3.5m, 50mm diameter, class 18 machine slotted PVC screen
				A, PID					
					2.5				
					2.8				
				A, PID					
3					3.0				3
									End cap
4					4.0				4
				S, PID			2,2,1 N = 3 <1ppm		
	4.45	Bore discontinued at 4.45m, limit of investigation			4.45				

RIG: Truck mounted drill rig **DRILLER:** Atkins **LOGGED:** Karpiel **CASING:**

TYPE OF BORING: Hollow flight auger 150mm

WATER OBSERVATIONS: Free groundwater observed at 1.35m during drilling and at RL 0.53m on 15 September 2008

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED	
Initials:	
Date:	

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BOREHOLE LOG

CLIENT: VALAD Property Management
PROJECT: Additional Contamination Assessment
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 102
PROJECT No: 39961.01
DATE: 03 Sep 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details (Gatic)
	0.06	ASPHALT							From surface to 0.16m, concrete
		FILLING - Generally comprising dark brown medium grained sand, trace coarse gravel, moderate hydrocarbon odour, humid		A, PID	0.2 0.3		34ppm		From 0.16m to 0.4m, bentonite
	0.4	SAND - Dark grey, medium grained sand, trace silt, trace medium gravel, strong hydrocarbon odour and grey staining, humid (possibly filling)		A, PID	0.5 0.6		143ppm		
	0.8	SAND - Light brown fine to medium grained sand, trace silt, strong hydrocarbon odour, damp		A, PID	0.9 1.0		72ppm		
1		From 1.3m, saturated		A, PID	1.3 1.4		8ppm	▼	1
		From 1.5m, brown, some silt, trace clay, clay content increasing with depth		A, PID	1.8 2.0		<1ppm		From 0.4m to 3.52m, 2/5mm gravel From 0.52m to 3.52m, 50mm dimaeter, class 18 machine slotted PVC screen
2									2
				A, PID	2.8 3.0		2ppm		
3									3
									End cap
4				S, PID	4.0		1,1,2 N = 3 <1ppm		4
	4.45	Bore discontinued at 4.45m, limit of investigation			4.45				

RIG: Truck mounted drill rig **DRILLER:** Atkins **LOGGED:** Karpiel **CASING:**

TYPE OF BORING: Hand auger to 1.5m, hollow flight auger 150mm to 4.45m

WATER OBSERVATIONS: Free groundwater observed at 1.25m during drilling and at RL 0.49m on 15 September 2008

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED	
Initials:	
Date:	

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BOREHOLE LOG

CLIENT: VALAD Property Management
PROJECT: Additional Contamination Assessment
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 103
PROJECT No: 39961.01
DATE: 08 Sep 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details (Gatic)
	0.14	CONCRETE							From surface to 0.15m, concrete
		FILLING - Generally comprising dark brown medium grained sand, trace coarse gravel and silt, humid		A, PID	0.2 0.3		<1ppm		From 0.15m to 0.45m, bentonite
	0.4	SAND - Dark grey fine to medium grained sand, trace silt, trace hydrocarbon odour, damp (possibly filling)		A, PID	0.4 0.5		<1ppm		
	0.7	SAND - Grey/brown fine to medium grained sand trace silt, damp		A, PID	0.8		<1ppm		
1					1.0			▼	1
		From 1.3m, brown, trace fine to coarse gravel, saturated		A, PID	1.4 1.5		<1ppm		
		From 1.7m, grey, trace clay, slight organic/sulphur odour		A, PID	1.8		<1ppm		
2					2.0				2 From 0.45m to 3.5m, 2/5mm gravel From 0.55m to 3.5m, 50mm diameter, class 18 machine slotted PVC screen
				A, PID	2.3 2.5		<1ppm		
				A, PID	2.8		<1ppm		
3					3.0				3
		From 3.3m, trace shells		A, PID	3.3 3.5		<1ppm		End cap
4					4.0				4
				S			1,1,6 N = 7		
	4.45	Bore discontinued at 4.45m, limit of investigation			4.45				

RIG: Truck mounted drill rig **DRILLER:** Atkins **LOGGED:** Karpiel **CASING:**

TYPE OF BORING: Hollow flight auger 150mm

WATER OBSERVATIONS: Free groundwater observed at 1.3m during drilling and at RL 0.49m on 15 September

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED	
Initials:	
Date:	

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BOREHOLE LOG

CLIENT: VALAD Property Management
PROJECT: Additional Contamination Assessment
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 104
PROJECT No: 39961.01
DATE: 03 Sep 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details (Gatic)
	0.01	ASPHALT							From surface to 0.15m, concrete
		FILLING - Generally comprising grey medium grained sand, trace fine to coarse gravel, humid		A, PID	0.1 0.2		<1ppm		
	0.29	SAND - Light brown fine to medium grained sand, trace silt, humid		A, PID	0.4 0.5		<1ppm		From 0.15m to 0.45m, bentonite
		From 0.7m to 1.0m, coffee brown From 0.8m, trace fine to coarse gravel							
1		From 1.2m to 1.4m, trace shell fragments		A, PID	1.2		<1ppm		
		From 1.45m, saturated			1.4			▼	
		From 1.6m, grading to coffee brown, trace to some silt							
				A, PID	1.8		<1ppm		
2					2.0				From 0.45m to 3.5m, 2/5mm gravel From 0.55m to 3.5m, 50mm diameter, class 18 machine slotted PVC screen
	2.8	SAND - Grey fine to medium grained sand, some clay and silt, trace fine gravel, saturated		A, PID	2.8		<1ppm		
3		From 3.1m, clay content decreasing with depth			3.0				End cap
4				S, PID	4.0		4,3,2 N = 5 <1ppm		
	4.45	Bore discontinued at 4.45m, limit of investigation			4.45				

RIG: Truck mounted drill rig **DRILLER:** Atkins **LOGGED:** Karpiel **CASING:**

TYPE OF BORING: Hand auger to 1.45m, Hollow flight auger 150mm to 4.45m

WATER OBSERVATIONS: Free groundwater observed at 1.45m during drilling and at RL 0.47m on 15 September 2008

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date:

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BOREHOLE LOG

CLIENT: VALAD Property Management
PROJECT: Additional Contamination Assessment
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 105
PROJECT No: 39961.01
DATE: 03 Sep 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details (Gatic)
	0.1	CONCRETE							From surface to 0.15m, concrete
		FILLING - Generally comprising grey fine to medium grained sand, trace silt and fine gravel, humid		A, PID	0.2		<1ppm		
					0.3				From 0.15m to 0.43m, bentonite
	0.35	FILLING - Generally comprising black fine to coarse grained sand, trace gravel, predominantly coal reject, humid		A, PID	0.4		<1ppm		
					0.5				
	0.7	SILTY SAND - Dark grey/brown silty fine to medium grained sand, trace clay and fine gravel, damp (possibly fill)			0.8				
				A, PID			<1ppm		
1					1.0				1
	1.2	SAND - Grey fine to medium grained sand, some clay, trace to some silt, moist							
		From 1.4m, saturated		A, PID	1.4		<1ppm	▼	
					1.5				
		From 1.6m, trace fine to coarse gravel			1.8				
				A, PID			<1ppm		
2					2.0				2
									From 0.43m to 3.48m, 2/5mm gravel
									From 0.53m to 3.48m, 50mm diameter, class 18 machine slotted PVC screen
					2.8				
				A, PID			<1ppm		
3					3.0				3
									End cap
		From 3.5m, grey brown							
4					4.0				4
				S, PID			1,1,1 N = 2 <1ppm		
	4.45	Bore discontinued at 4.45m, limit of investigation			4.45				

RIG: Truck mounted drill rig **DRILLER:** Atkins **LOGGED:** Karpiel **CASING:**

TYPE OF BORING: Hollow flight auger 150mm

WATER OBSERVATIONS: Free groundwater observed at 1.4m during drilling and at RL 0.52m on 15 September 2008

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED	
Initials:	
Date:	

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BOREHOLE LOG

CLIENT: VALAD Property Management
PROJECT: Additional Contamination Assessment
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 106
PROJECT No: 39961.01
DATE: 08 Sep 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details (Gatic)
	0.13	CONCRETE							From surface to 0.13m, concrete
	0.3	FILLING - Generally comprising dark grey fine to medium grained sand, trace silt, humid		A, PID	0.2 0.3		<1ppm		From 0.13m to 0.43m, bentonite
		SILTY SAND - Dark grey/brown silty fine to medium grained sand, humid (possibly filling)		A, PID	0.4 0.5		<1ppm		
	0.7	SAND - Grey brown fine to medium grained sand, trace silt, humid to damp		A, PID	0.8		<1ppm		
1		From 1.1m, brown			1.0				1
		From 1.3m, saturated		A, PID	1.3 1.4			▼	
				A, PID	1.8		<1ppm		
2					2.0				2 From 0.43m to 3.45m, 2/5mm gravel From 0.53m to 3.45m, 50mm diameter, class 18 machine slotted PVC screen
		From 2.4m, trace to some clay and silt, trace fine to coarse gravel		A, PID	2.8		<1ppm		
3					3.0				3
									End cap
4				S, PID	4.0		2,1,2 N = 3 <1ppm		4
	4.45	Bore discontinued at 4.45m, limit of investigation			4.45				

RIG: Truck mounted drill rig **DRILLER:** Atkins **LOGGED:** Karpiel **CASING:**

TYPE OF BORING: Hollow flight auger 150mm

WATER OBSERVATIONS: Free groundwater observed at 1.32m during drilling and at RL 0.48m on 15 September 2008

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date:

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BOREHOLE LOG

CLIENT: VALAD Property Management
PROJECT: Additional Contamination Assessment
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 107
PROJECT No: 39961.01
DATE: 03 Sep 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details (Gatic)
	0.01	CONCRETE							From surface to 0.1m, concrete
		FILLING - Generally comprising dark grey fine to medium grained sand, some clay and silt, trace coarse gravel, humid		A, PID	0.1 0.2		<1ppm		From 0.1m to 0.4m, bentonite
	0.3	SILTY SAND - Dark brown/grey, fine to medium silty sand, humid (possibly filling)		A, PID	0.3 0.5		<1ppm		
	0.7	SAND - Light grey fine to medium grained sand, trace silt, damp		A, PID	0.8		<1ppm		
	1	From 0.9m, grading to coffee brown			1.0				1
		From 1.2m, grading to light grey brown, wet						▼	
		From 1.4m, saturated		A, PID	1.4 1.5		<1ppm		
		From 1.8m, trace fine to coarse gravel, gravel content increasing with depth		A, PID	1.8				
	2				2.0				2
		From 2.4, grey							From 0.4m to 3.45m, 2/5mm gravel From 0.5m to 3.45m, 50mm diameter, class 18 machine slotted PVC screen
				A, PID	2.8		<1ppm		
	3				3.0				3
		From 3.4m, light grey trace gravel, trace shell fragments							End cap
	4				4.0				4
				S			9,7,6 N = 13		
	4.45	Bore discontinued at 4.45m, limit of investigation			4.45				

RIG: Truck mounted drill rig **DRILLER:** Atkins **LOGGED:** Karpiel **CASING:**

TYPE OF BORING: Hollow flight auger 150mm

WATER OBSERVATIONS: Free groundwater observed at 1.35m during drilling and at RL 0.46m on 15 September 2008

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date:

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BOREHOLE LOG

CLIENT: VALAD Property Management
PROJECT: Additional Contamination Assessment
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: 108
PROJECT No: 39961.01
DATE: 08 Sep 08
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details (Gatic)
	0.08	ASPHALT							From surface to 0.18m, concrete
	0.3	FILLING - Generally comprising brown fine to coarse gravelly fine to coarse grained sand, humid							From 0.18m to 0.45m, bentonite
		SAND - Brown fine to medium grained sand, trace silt, trace gravel, humid (possibly filling)		A, PID	0.4 0.5		<1ppm		
	0.6	SAND - Light brown fine to medium grained sand, trace silt, humid From 0.7m, grading to brown		A, PID	0.8		<1ppm		
1					1.0				1
		From 1.2m, grading to light brown From 1.3m, wet to saturated		A, PID	1.3 1.4		<1ppm	▼	
		From 1.7m, trace to some silt and clay, saturated		A, PID	1.8 2.0				
2									2
	2.3	SAND - Light grey fine to medium grained sand, trace silt, trace fine to coarse gravel, saturated							From 0.45m to 3.51m, 2/5mm gravel From 0.56m to 3.51m, 50mm diameter, class 18 machine slotted PVC screen
				A, PID	2.8		<1ppm		
3					3.0				3
									End cap
4					4.0				4
				S			4,6,5 N = 11		
	4.45	Bore discontinued at 4.45m, limit of investigation			4.45				

RIG: Truck mounted drill rig **DRILLER:** Atkins **LOGGED:** Karpiel **CASING:**

TYPE OF BORING: Hollow flight auger 150mm

WATER OBSERVATIONS: Free groundwater observed at 1.32m during drilling and at RL 0.46m on 15 September 2008

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	PID	Photo ionisation detector
B	Bulk sample	S	Standard penetration test
U_x	Tube sample (x mm dia.)	PL	Point load strength Is(50) MPa
W	Water sample	V	Shear Vane (kPa)
C	Core drilling	▷	Water seep ▼ Water level

CHECKED
Initials:
Date:

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BOREHOLE LOG

CLIENT: Danger Street, Wickham Pty Ltd
PROJECT: Proposed Apartment Development
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: 1.61 AHD
EASTING: 384022
NORTHING: 6356508
DIP/AZIMUTH: 90°/--

BORE No: 201
PROJECT No: 39961.02
DATE: 9/10/2018
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.08	ASPHALT - AC7							
	0.16	CONCRETE - Grey							
		FILLING - Generally comprising dark brown silty sand filling, with fine to medium grained sand, with trace ash, fragments up to 10mm in size, sandy clay and rootlets in parts, moist		E	0.4 0.5		PID<1		
				U	1.0				
	1.2	CLAY - Firm, dark grey clay, with some fine to medium grained sand, M>Wp (wet)			1.2				
	1.3	SAND - Grey and brown, fine to medium grained sand, with trace to some subrounded gravel up to 40mm in size and trace silt, moist		E, U	1.5 1.6		PID<1		
		From 1.3m to 3m, slight to moderate sulfur odour, trace organics and rootlets							
		From 2m, no gravel						▼	
		From 2.05m, saturated		U	2.2 2.3		PID<1		
				U	2.5 2.7				
				U	3.1 3.3				
				U	3.5				
		From 3.7m to 4.5m, with indurated / slightly cemented sand bands up to 50mm thick		U	3.8 4.0				
				U	4.3 4.5				
				U	5.0				

RIG: Geoprobe 7822 DT **DRILLER:** Terratest **LOGGED:** West **CASING:** Nil
TYPE OF BORING: 90mm dual tube
WATER OBSERVATIONS: Free groundwater at 2.05m, whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: Danger Street, Wickham Pty Ltd
PROJECT: Proposed Apartment Development
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: 1.61 AHD
EASTING: 384022
NORTHING: 6356508
DIP/AZIMUTH: 90°/--

BORE No: 201
PROJECT No: 39961.02
DATE: 9/10/2018
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-4	6	SAND - Grey and brown, fine to medium grained sand, with trace to some subrounded gravel up to 40mm in size and trace silt, moist *(continued)*							
				U	5.3				
					5.5				
				U	5.8				
					6.0				
				U	6.3				
-5					6.5				
				U					
	7				7.0				
		From 7.3m, increased drilling resistance / slow progress		U	7.3				
-6					7.5				
				U	7.7				
					7.9				
	8 8.0	Bore discontinued at 8.0m, limit of investigation							
-7	9								
-8									

RIG: Geoprobe 7822 DT **DRILLER:** Terratest **LOGGED:** West **CASING:** Nil
TYPE OF BORING: 90mm dual tube
WATER OBSERVATIONS: Free groundwater at 2.05m, whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: Danger Street, Wickham Pty Ltd
PROJECT: Proposed Apartment Development
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: 1.71 AHD
EASTING: 384028
NORTHING: 6356506
DIP/AZIMUTH: 90°/--

BORE No: 202
PROJECT No: 39961.02
DATE: 9/10/2018
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.08	ASPHALT - AC7							Gatic Cover at Suface
	0.22	CONCRETE							From 0.0m to 0.5m, bentonite From 0.0m to 0.6m, blank 50mm diameter class 18 PVC From 0.6m, machine slotted class 18 PVC
		FILLING - Generally comprising dark grey brown silty sand filling, with fine to medium grained sand and some coal chitter, ash and possible slag fragments up to 20mm in size, some clay in parts, moist		D	0.5				
				U	0.6		PID=3.0		
					0.7				
					0.9				
	1	From 1m, strong hydrocarbon odour		U			PID=2.0		1
					1.1				
					1.2				
	1.3	SAND - Grey, fine to medium grained sand, with trace subrounded to subangular gravel and silt saturated (strong carbon odour)		U			PID=220		
					1.4			▼	
				D	1.6		PID=1	09-10-18	
		From 1.7m to 3m, moderate hydrocarbon odour			1.7				
				U			PID=361		
	2				2.0				2
									From 0.5m to 3.6m, gravel
				U	2.3		PID=33		
					2.4				
		From 2.5m to 3m, with trace organics and some subrounded to subangular gravel up to 40mm in size		D	2.5				
					2.7				
				U			PID=10		
	3	From 3.0m, brown with trace to some subrounded gravel up to 10mm in size			2.9				3
		From 3.0m to 4.2m, slight sulfide odour, no hydrocarbon odour			3.2				
				U			PID=1		
					3.4				
				U	3.5				End cap
					3.7				
				E			PID<1		
	4				3.9				4
				U	4.0				
	4.2	SANDY CLAY - Grey mottled orange-brown sandy clay, with fine to medium grained sand and trace organics, M>Wp slight sulfur odour			4.2				
				E			PID<1		
					4.4				
				U	4.45				
	4.5	SAND - Brown, fine to medium grained sand with trace silt, saturated			4.5				
				E			PID=1.2		
		From 4.5m to 4.7m, with some clay			4.7				
				U	4.9				

RIG: Geoprobe 7822 DT **DRILLER:** Terratest **LOGGED:** West **CASING:** Nil
TYPE OF BORING: 90mm dual tube
WATER OBSERVATIONS: Free groundwater at 1.4m, whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: Danger Street, Wickham Pty Ltd
PROJECT: Proposed Apartment Development
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: 1.71 AHD
EASTING: 384028
NORTHING: 6356506
DIP/AZIMUTH: 90°/--

BORE No: 202
PROJECT No: 39961.02
DATE: 9/10/2018
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SAND - Brown, fine to medium grained sand with trace silt, saturated *(continued)*			5.1				
				E			PID=2		
					5.3				
					5.4				
				U	5.5				
-4				E			PID<1		
	6				6.0				6
-5									
	7	7.0 Bore discontinued at 7.0m, blocked inner tube							7
-6									
	8								8
-7									
	9								9
-8									

RIG: Geoprobe 7822 DT **DRILLER:** Terratest **LOGGED:** West **CASING:** Nil
TYPE OF BORING: 90mm dual tube
WATER OBSERVATIONS: Free groundwater at 1.4m, whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: Danger Street, Wickham Pty Ltd
PROJECT: Proposed Apartment Development
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: 2.9 AHD
EASTING: 384051
NORTHING: 6356450
DIP/AZIMUTH: 90°/--

BORE No: 203
PROJECT No: 39961.02
DATE: 9/10/2018
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.17	CONCRETE							Gatic Cover at Suface
		FILLING - Generally comprising dark grey clay filling, with some fine to medium grained sand, gravel and fine to medium grained sand, with possible ash fragments up to 20mm in size, M>Wp		U	0.3 0.4		PID<1		From 0.0m to 1.0m, bentonite
				D	0.7				
				U	0.8 0.9		PID<1		From 0.0m to 1.7m, blank class 18 50mm diameter PVC
2	1			D	1.0				1
				U	1.1 1.3		PID<1		
	1.4	FILLING - Generally comprising dark grey silty sand filling, with fine to medium grained sand, coal chitter and ash fragments up to 20mm in size, moist		U	1.4		PID<1		
	1.65	SAND - Dark grey, fine to medium grained sand with trace to some silt, moist			1.65 1.7				
				U			PID<1		
1	2			D	1.9 2.0				2
		From 2.2m to 2.9m, with trace organics		U	2.2		PID<1		
				D	2.4 2.5				
		From 2.7m, pale grey brown		U	2.7		PID<1	▼	From 1m to 4.7m, gravel
0	3			D	2.9 3.0				3
				U	3.2		PID<1		From 1.7m to 4.7m, blank class 18 50mm diameter machine slotted PVC
				D	3.4 3.5				
-1	4			U	3.8		PID<1		4
				D	4.0 4.1				
				D, U	4.4		PID<1		
					4.6				End cap
-2		From 4.8m to 5.0m, slightly indurated orange brown band		D	4.8				

RIG: Geoprobe 7822 DT **DRILLER:** Terratest **LOGGED:** West **CASING:** Nil
TYPE OF BORING: 90mm dual tube
WATER OBSERVATIONS: Free groundwater at 2.7m, whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

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

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BOREHOLE LOG

CLIENT: Danger Street, Wickham Pty Ltd
PROJECT: Proposed Apartment Development
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: 2.9 AHD
EASTING: 384051
NORTHING: 6356450
DIP/AZIMUTH: 90°/--

BORE No: 203
PROJECT No: 39961.02
DATE: 9/10/2018
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-3	6	SAND - Dark grey, fine to medium grained sand with trace to some silt, moist *(continued)*							6
		From 5.2m to 5.6m, sandy clay / clayey sand band			5.2				
				U			PID<1		
				D	5.4				
					5.5				
		From 5.6m to 6.0m, with trace to some clay							
					5.8				
				U			PID<1		
					6.0				
				D	6.1				
				U	6.5		PID<1		
-4				D	6.8				
	7 7.0	Bore discontinued at 7.0m, limit of investigation							7
-5	8								8
-6	9								9
-7									

RIG: Geoprobe 7822 DT **DRILLER:** Terratest **LOGGED:** West **CASING:** Nil
TYPE OF BORING: 90mm dual tube
WATER OBSERVATIONS: Free groundwater at 2.7m, whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

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

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Danger Street, Wickham Pty Ltd
PROJECT: Proposed Apartment Development
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: 2.9 AHD
EASTING: 384056
NORTHING: 6356475
DIP/AZIMUTH: 90°/--

BORE No: 204
PROJECT No: 39961.02
DATE: 10/10/2018
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		FILLING - Generally comprising brown and grey sandy gravel and sandy clay filling, with fine to medium grained sand and subrounded to subangular gravel up to 20mm in size, with trace concrete and steel fragments up to 80mm in size, wet		E	0.2		PID<1		Gatic Cover at Suface
				U	0.4				
	0.6	FILLING - Generally comprising grey sandy clay filling, with fine to medium grained sand and some subangular gravel and concrete fragments up to 20mm in size, M>Wp		E	0.7		PID<1		From 0.0m to 1.1m, bentonite
2				U	0.9				From 0.0m to 1.7m, blank class 18, 50mm diameter PVC
1					1.0				
	1.4			E	1.45				
	1.5	FILLING - Generally comprising dark grey silty sand filling, with some coal chitter ash and gravel fragments up to 20mm in size, moist		E	1.5		PID<1		
	1.7	SILTY SAND - Dark grey silty, fine to medium grained sand, moist		U	1.7				
1		SAND - Brown, fine to medium grained sand with trace silt, moist (possible filling?)		E	1.8		PID<1		
	2				1.9				
					2.0				
					2.2				
		From 2.4m, pale grey		E			PID<1		
								10-10-18	
	2.8	From 2.7m to 2.75m, dark grey with coal and gravel fragments up to 10mm in size, moist			2.75				
0		SAND - Brown fine to coarse grained sand, saturated		U	2.9				From 1.1m to 4.7m, gravel pack
	3								
	3.15	SAND - Grey brown, fine to coarse grained sand with trace to some silt							From 1.7m to 4.7m, machine slotted class 18, 50mm diameter slotted PVC
		From 3.15m to 3.7m, with some clay and shells and trace subrounded to subangular gravel up to 20mm in size		E	3.3		PID<1		
					3.5				
				U	3.6				
					3.8				
-1				E	3.9		PID<1		
	4			U	4.0				
		From 4.3m to 4.5m, with subangular gravel up to 40mm in size		E	4.4		PID<1		
		From 4.5m pale grey brown		E	4.6				End cap
		From 4.8m to 5.0m, slight sulfur odour							
-2				U	5.0				

RIG: Geoprobe 7822 DT **DRILLER:** Terratest **LOGGED:** West **CASING:** Nil
TYPE OF BORING: 90mm dual tube
WATER OBSERVATIONS: Free groundwater at 2.6m, whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Danger Street, Wickham Pty Ltd
PROJECT: Proposed Apartment Development
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: 2.9 AHD
EASTING: 384056
NORTHING: 6356475
DIP/AZIMUTH: 90°/--

BORE No: 204
PROJECT No: 39961.02
DATE: 10/10/2018
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-3	6	SAND - Grey brown, fine to coarse grained sand with trace to some silt *(continued)*		E	5.5		PID<1		6
				U	5.8				
	6.0	Bore discontinued at 6.0m, hole collapse							
-4	7								7
-5	8								8
-6	9								9
-7									

RIG: Geoprobe 7822 DT **DRILLER:** Terratest **LOGGED:** West **CASING:** Nil
TYPE OF BORING: 90mm dual tube
WATER OBSERVATIONS: Free groundwater at 2.6m, whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Danger Street, Wickham Pty Ltd
PROJECT: Proposed Apartment Development
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: 1.64 AHD
EASTING: 384018
NORTHING: 6356469
DIP/AZIMUTH: 90°/--

BORE No: 205
PROJECT No: 39961.02
DATE: 10/10/2018
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.13	CONCRETE							
	0.3	FILLING - Generally comprising brown sandy gravel filling, with subangular gravel and possible crushed brick fragments up to 20mm in size, moist		U	0.2 0.3		PID<1		
		FILLING - Generally comprising dark grey to black sandy ash and coal chitter filling, with ash and coal chitter fragments up to 40mm in size, with some silt and clay in parts, moist		E	0.5 0.6		PID<1		
		From 0.8m to 0.9m, with some shell and gravel							
	1			E	1.0		PID<1		1
					1.2				
	1.4	SAND - Grey brown fine to medium grained sand, with trace to some silt, moist to wet		E	1.4		PID<1		
		From 1.4m to 2.1m, with some organics, trace clay and subrounded gravel up to 10mm in size			1.6				
				U	1.7		PID<1		
					1.8				
				E			PID<1		
	2	From 2m to 3m, slight sulfar odour			2.0			10-10-18	2
				U	2.1				
					2.4				
				E			PID<1		
					2.6				
				U	2.7				
	3								3
				U	3.1				
					3.4				
				E			PID<1		
					3.6				
				U	3.8				
	4	From 4.0m to 5.6m, with some clay							4
				U	4.1				
					4.4				
				E			PID<1		
					4.6				
				U	5.0				

RIG: Geoprobe 7822 DT **DRILLER:** Terratest **LOGGED:** West **CASING:** Nil
TYPE OF BORING: 90mm dual tube
WATER OBSERVATIONS: Free groundwater at 2.0m, whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Danger Street, Wickham Pty Ltd
PROJECT: Proposed Apartment Development
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: 1.64 AHD
EASTING: 384018
NORTHING: 6356469
DIP/AZIMUTH: 90°/--

BORE No: 205
PROJECT No: 39961.02
DATE: 10/10/2018
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
-4	6	SAND - Grey brown fine to medium grained sand, with trace to some silt, moist to wet *(continued)*		U	5.3				6
					5.4				
				E			PID<1		
					5.6				
				U	5.7				
				U	6.1				
					6.3				
				E			PID<1		
	6.5				6.5				
-5		Bore discontinued at 6.5m, hole collapse							
	7								7
-6									
	8								8
-7									
	9								9
-8									

RIG: Geoprobe 7822 DT **DRILLER:** Terratest **LOGGED:** West **CASING:** Nil
TYPE OF BORING: 90mm dual tube
WATER OBSERVATIONS: Free groundwater at 2.0m, whilst drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

Appendix B

Laboratory Testing

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 202898

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**39961.02, Wickham**
Number of Samples	15 SOIL
Date samples received	12/10/2018
Date completed instructions received	12/10/2018

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	19/10/2018
Date of Issue	19/10/2018

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Asbestos Approved By
Analysed by Asbestos Approved Identifier: Panika Wongchanda
Authorised by Asbestos Approved Signatory: Matt Tang

Results Approved By
Jeremy Faircloth, Organics Supervisor
Long Pham, Team Leader, Metals
Matthew Tang, Asbsestos Analyst

Authorised By

Jacinta Hurst, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		202898-1	202898-2	202898-3	202898-4	202898-5
Your Reference	UNITS	201	201	202	202	202
Depth		0.4-0.5	2.2-2.3	0.6-0.7	1.7-2.0	2.7-2.9
Date Sampled		09/10/2018	09/10/2018	09/10/2018	09/10/2018	09/10/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	15/10/2018	15/10/2018	15/10/2018	15/10/2018	15/10/2018
Date analysed	-	16/10/2018	16/10/2018	16/10/2018	16/10/2018	16/10/2018
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	85	87	80	84	87

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		202898-6	202898-7	202898-8	202898-9	202898-10
Your Reference	UNITS	202	203	203	204	204
Depth		3.2-3.4	0.8-0.9	2.7-2.9	0.7-0.9	2.3-2.4
Date Sampled		09/10/2018	09/10/2018	09/10/2018	10/10/2018	10/10/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	15/10/2018	15/10/2018	15/10/2018	15/10/2018	15/10/2018
Date analysed	-	16/10/2018	16/10/2018	16/10/2018	16/10/2018	16/10/2018
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	85	89	83	82	85

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		202898-11	202898-12	202898-13	202898-14	202898-15
Your Reference	UNITS	205	205	205	D1	D3
Depth		0.2-0.3	0.5-0.6	1.8-2.0	-	-
Date Sampled		10/10/2018	10/10/2018	10/10/2018	09/10/2018	10/10/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	15/10/2018	15/10/2018	15/10/2018	15/10/2018	15/10/2018
Date analysed	-	16/10/2018	16/10/2018	16/10/2018	16/10/2018	16/10/2018
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	83	82	78	88	83

svTRH (C10-C40) in Soil						
Our Reference		202898-1	202898-2	202898-3	202898-4	202898-5
Your Reference	UNITS	201	201	202	202	202
Depth		0.4-0.5	2.2-2.3	0.6-0.7	1.7-2.0	2.7-2.9
Date Sampled		09/10/2018	09/10/2018	09/10/2018	09/10/2018	09/10/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	15/10/2018	15/10/2018	15/10/2018	15/10/2018	15/10/2018
Date analysed	-	16/10/2018	16/10/2018	16/10/2018	16/10/2018	16/10/2018
TRH C_{10} - C_{14}	mg/kg	<50	<50	94	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	420	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	130	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	160	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	160	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	440	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	600	<50	<50
Surrogate o-Terphenyl	%	78	76	#	77	76

svTRH (C10-C40) in Soil						
Our Reference		202898-6	202898-7	202898-8	202898-9	202898-10
Your Reference	UNITS	202	203	203	204	204
Depth		3.2-3.4	0.8-0.9	2.7-2.9	0.7-0.9	2.3-2.4
Date Sampled		09/10/2018	09/10/2018	09/10/2018	10/10/2018	10/10/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	15/10/2018	15/10/2018	15/10/2018	15/10/2018	15/10/2018
Date analysed	-	16/10/2018	16/10/2018	16/10/2018	16/10/2018	16/10/2018
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	140	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	140	<50	<50	<50
Surrogate o-Terphenyl	%	75	77	75	84	79

svTRH (C10-C40) in Soil						
Our Reference		202898-11	202898-12	202898-13	202898-14	202898-15
Your Reference	UNITS	205	205	205	D1	D3
Depth		0.2-0.3	0.5-0.6	1.8-2.0	-	-
Date Sampled		10/10/2018	10/10/2018	10/10/2018	09/10/2018	10/10/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	15/10/2018	15/10/2018	15/10/2018	15/10/2018	15/10/2018
Date analysed	-	16/10/2018	16/10/2018	16/10/2018	16/10/2018	16/10/2018
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	430	<100	<100	4,000
TRH C_{29} - C_{36}	mg/kg	<100	380	<100	<100	3,200
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	130
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	130
TRH >C_{16} -C_{34}	mg/kg	<100	740	<100	<100	6,700
TRH >C_{34} -C_{40}	mg/kg	<100	190	<100	<100	1,400
Total +ve TRH (>C10-C40)	mg/kg	<50	930	<50	<50	8,300
Surrogate o-Terphenyl	%	80	84	86	74	#

PAHs in Soil						
Our Reference		202898-1	202898-2	202898-3	202898-4	202898-5
Your Reference	UNITS	201	201	202	202	202
Depth		0.4-0.5	2.2-2.3	0.6-0.7	1.7-2.0	2.7-2.9
Date Sampled		09/10/2018	09/10/2018	09/10/2018	09/10/2018	09/10/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	15/10/2018	15/10/2018	15/10/2018	15/10/2018	15/10/2018
Date analysed	-	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018
Naphthalene	mg/kg	<0.1	<0.1	5.9	0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	0.4	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	1.9	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	1.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	0.8	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.5	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	0.5	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	1	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.66	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	0.4	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	0.5	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	14	0.1	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	0.9	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	0.9	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	1	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	89	92	89	93	91

PAHs in Soil						
Our Reference		202898-6	202898-7	202898-8	202898-9	202898-10
Your Reference	UNITS	202	203	203	204	204
Depth		3.2-3.4	0.8-0.9	2.7-2.9	0.7-0.9	2.3-2.4
Date Sampled		09/10/2018	09/10/2018	09/10/2018	10/10/2018	10/10/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	15/10/2018	15/10/2018	15/10/2018	15/10/2018	15/10/2018
Date analysed	-	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018
Naphthalene	mg/kg	<0.1	0.2	<0.1	0.1	<0.1
Acenaphthylene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	1.6	<0.1	0.2	<0.1
Anthracene	mg/kg	<0.1	0.3	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	5.2	<0.1	0.7	0.1
Pyrene	mg/kg	<0.1	4.8	<0.1	0.6	0.1
Benzo(a)anthracene	mg/kg	<0.1	2.1	<0.1	0.3	<0.1
Chrysene	mg/kg	<0.1	2.0	<0.1	0.3	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	4.4	<0.2	0.6	<0.2
Benzo(a)pyrene	mg/kg	<0.05	2.7	<0.05	0.4	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	1.4	<0.1	0.2	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	2.1	<0.1	0.3	<0.1
Total +ve PAH's	mg/kg	<0.05	27	<0.05	3.8	0.2
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	3.8	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	3.8	<0.5	0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	3.8	<0.5	0.6	<0.5
Surrogate p-Terphenyl-d14	%	94	96	89	91	89

PAHs in Soil						
Our Reference		202898-11	202898-12	202898-13	202898-14	202898-15
Your Reference	UNITS	205	205	205	D1	D3
Depth		0.2-0.3	0.5-0.6	1.8-2.0	-	-
Date Sampled		10/10/2018	10/10/2018	10/10/2018	09/10/2018	10/10/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	15/10/2018	15/10/2018	15/10/2018	15/10/2018	15/10/2018
Date analysed	-	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018
Naphthalene	mg/kg	<0.1	0.9	<0.1	<0.1	21
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	7.9
Acenaphthene	mg/kg	<0.1	0.8	<0.1	<0.1	24
Fluorene	mg/kg	<0.1	0.7	<0.1	<0.1	15
Phenanthrene	mg/kg	0.4	11	<0.1	<0.1	72
Anthracene	mg/kg	<0.1	3.3	<0.1	<0.1	57
Fluoranthene	mg/kg	1.1	19	<0.1	<0.1	87
Pyrene	mg/kg	1.1	17	<0.1	<0.1	96
Benzo(a)anthracene	mg/kg	0.6	13	<0.1	<0.1	210
Chrysene	mg/kg	0.6	10	<0.1	<0.1	160
Benzo(b,j+k)fluoranthene	mg/kg	1	24	<0.2	<0.2	130
Benzo(a)pyrene	mg/kg	1.0	18	<0.05	<0.05	160
Indeno(1,2,3-c,d)pyrene	mg/kg	0.7	11	<0.1	<0.1	44
Dibenzo(a,h)anthracene	mg/kg	0.1	4.1	<0.1	<0.1	33
Benzo(g,h,i)perylene	mg/kg	0.9	12	<0.1	<0.1	53
Total +ve PAH's	mg/kg	8.1	150	<0.05	<0.05	1,200
Benzo(a)pyrene TEQ calc (zero)	mg/kg	1.4	27	<0.5	<0.5	230
Benzo(a)pyrene TEQ calc(half)	mg/kg	1.4	27	<0.5	<0.5	230
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	1.4	27	<0.5	<0.5	230
Surrogate p-Terphenyl-d14	%	94	99	99	92	98

Organochlorine Pesticides in soil						
Our Reference		202898-1	202898-3	202898-7	202898-9	202898-12
Your Reference	UNITS	201	202	203	204	205
Depth		0.4-0.5	0.6-0.7	0.8-0.9	0.7-0.9	0.5-0.6
Date Sampled		09/10/2018	09/10/2018	09/10/2018	10/10/2018	10/10/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	15/10/2018	15/10/2018	15/10/2018	15/10/2018	15/10/2018
Date analysed	-	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018
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
gamma-BHC	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
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	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
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	89	74	73	95	83

Organochlorine Pesticides in soil			
Our Reference		202898-14	202898-15
Your Reference	UNITS	D1	D3
Depth		-	-
Date Sampled		09/10/2018	10/10/2018
Type of sample		SOIL	SOIL
Date extracted	-	15/10/2018	15/10/2018
Date analysed	-	17/10/2018	17/10/2018
HCB	mg/kg	<0.1	<1
alpha-BHC	mg/kg	<0.1	<1
gamma-BHC	mg/kg	<0.1	<1
beta-BHC	mg/kg	<0.1	<1
Heptachlor	mg/kg	<0.1	<1
delta-BHC	mg/kg	<0.1	<1
Aldrin	mg/kg	<0.1	<1
Heptachlor Epoxide	mg/kg	<0.1	<1
gamma-Chlordane	mg/kg	<0.1	<1
alpha-chlordane	mg/kg	<0.1	<1
Endosulfan I	mg/kg	<0.1	<1
pp-DDE	mg/kg	<0.1	<1
Dieldrin	mg/kg	<0.1	<1
Endrin	mg/kg	<0.1	<1
pp-DDD	mg/kg	<0.1	<1
Endosulfan II	mg/kg	<0.1	<1
pp-DDT	mg/kg	<0.1	<1
Endrin Aldehyde	mg/kg	<0.1	<1
Endosulfan Sulphate	mg/kg	<0.1	<1
Methoxychlor	mg/kg	<0.1	<1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1
Surrogate TCMX	%	79	86

Organophosphorus Pesticides						
Our Reference		202898-1	202898-3	202898-7	202898-9	202898-12
Your Reference	UNITS	201	202	203	204	205
Depth		0.4-0.5	0.6-0.7	0.8-0.9	0.7-0.9	0.5-0.6
Date Sampled		09/10/2018	09/10/2018	09/10/2018	10/10/2018	10/10/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	15/10/2018	15/10/2018	15/10/2018	15/10/2018	15/10/2018
Date analysed	-	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.5
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	89	74	73	95	83

Organophosphorus Pesticides			
Our Reference		202898-14	202898-15
Your Reference	UNITS	D1	D3
Depth		-	-
Date Sampled		09/10/2018	10/10/2018
Type of sample		SOIL	SOIL
Date extracted	-	15/10/2018	15/10/2018
Date analysed	-	17/10/2018	17/10/2018
Azinphos-methyl (Guthion)	mg/kg	<0.1	<1
Bromophos-ethyl	mg/kg	<0.1	<1
Chlorpyriphos	mg/kg	<0.1	<1
Chlorpyriphos-methyl	mg/kg	<0.1	<1
Diazinon	mg/kg	<0.1	<1
Dichlorvos	mg/kg	<0.1	<1
Dimethoate	mg/kg	<0.1	<1
Ethion	mg/kg	<0.1	<1
Fenitrothion	mg/kg	<0.1	<1
Malathion	mg/kg	<0.1	<1
Parathion	mg/kg	<0.1	<1
Ronnel	mg/kg	<0.1	<1
Surrogate TCMX	%	79	86

PCBs in Soil						
Our Reference		202898-1	202898-3	202898-7	202898-9	202898-12
Your Reference	UNITS	201	202	203	204	205
Depth		0.4-0.5	0.6-0.7	0.8-0.9	0.7-0.9	0.5-0.6
Date Sampled		09/10/2018	09/10/2018	09/10/2018	10/10/2018	10/10/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	15/10/2018	15/10/2018	15/10/2018	15/10/2018	15/10/2018
Date analysed	-	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018
Aroclor 1016	mg/kg	<0.1	<0.1	<0.2	<0.1	<0.5
Aroclor 1221	mg/kg	<0.1	<0.1	<0.2	<0.1	<0.5
Aroclor 1232	mg/kg	<0.1	<0.1	<0.2	<0.1	<0.5
Aroclor 1242	mg/kg	<0.1	<0.1	<0.2	<0.1	<0.5
Aroclor 1248	mg/kg	<0.1	<0.1	<0.2	<0.1	<0.5
Aroclor 1254	mg/kg	<0.1	<0.1	<0.2	<0.1	<0.5
Aroclor 1260	mg/kg	<0.1	<0.1	<0.2	<0.1	<0.5
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.2	<0.1	<0.5
Surrogate TCLMX	%	89	74	73	95	83

PCBs in Soil			
Our Reference		202898-14	202898-15
Your Reference	UNITS	D1	D3
Depth		-	-
Date Sampled		09/10/2018	10/10/2018
Type of sample		SOIL	SOIL
Date extracted	-	15/10/2018	15/10/2018
Date analysed	-	17/10/2018	17/10/2018
Aroclor 1016	mg/kg	<0.1	<1
Aroclor 1221	mg/kg	<0.1	<1
Aroclor 1232	mg/kg	<0.1	<1
Aroclor 1242	mg/kg	<0.1	<1
Aroclor 1248	mg/kg	<0.1	<1
Aroclor 1254	mg/kg	<0.1	<1
Aroclor 1260	mg/kg	<0.1	<1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<1
Surrogate TCLMX	%	79	86

Acid Extractable metals in soil						
Our Reference		202898-1	202898-2	202898-3	202898-4	202898-5
Your Reference	UNITS	201	201	202	202	202
Depth		0.4-0.5	2.2-2.3	0.6-0.7	1.7-2.0	2.7-2.9
Date Sampled		09/10/2018	09/10/2018	09/10/2018	09/10/2018	09/10/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	15/10/2018	15/10/2018	15/10/2018	15/10/2018	15/10/2018
Date analysed	-	15/10/2018	15/10/2018	15/10/2018	15/10/2018	15/10/2018
Arsenic	mg/kg	<4	<4	5	<4	<4
Cadmium	mg/kg	0.5	<0.4	1	<0.4	<0.4
Chromium	mg/kg	3	4	16	<1	5
Copper	mg/kg	27	2	430	<1	2
Lead	mg/kg	39	1	460	<1	1
Mercury	mg/kg	0.3	<0.1	0.9	<0.1	<0.1
Nickel	mg/kg	3	3	28	<1	4
Zinc	mg/kg	18	6	970	4	9
Iron	mg/kg	3,800	3,300	14,000	390	4,200
Manganese	mg/kg	61	24	270	3	25

Acid Extractable metals in soil						
Our Reference		202898-6	202898-7	202898-8	202898-9	202898-10
Your Reference	UNITS	202	203	203	204	204
Depth		3.2-3.4	0.8-0.9	2.7-2.9	0.7-0.9	2.3-2.4
Date Sampled		09/10/2018	09/10/2018	09/10/2018	10/10/2018	10/10/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	15/10/2018	15/10/2018	15/10/2018	15/10/2018	15/10/2018
Date analysed	-	15/10/2018	15/10/2018	15/10/2018	15/10/2018	15/10/2018
Arsenic	mg/kg	<4	7	<4	6	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	2	16	<1	13	5
Copper	mg/kg	<1	39	<1	17	<1
Lead	mg/kg	<1	90	1	27	5
Mercury	mg/kg	<0.1	0.2	<0.1	0.2	<0.1
Nickel	mg/kg	<1	12	<1	6	1
Zinc	mg/kg	3	170	6	130	11
Iron	mg/kg	850	15,000	630	11,000	1,700
Manganese	mg/kg	6	280	2	230	10

Acid Extractable metals in soil						
Our Reference		202898-11	202898-12	202898-13	202898-14	202898-15
Your Reference	UNITS	205	205	205	D1	D3
Depth		0.2-0.3	0.5-0.6	1.8-2.0	-	-
Date Sampled		10/10/2018	10/10/2018	10/10/2018	09/10/2018	10/10/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	15/10/2018	15/10/2018	15/10/2018	15/10/2018	15/10/2018
Date analysed	-	15/10/2018	15/10/2018	15/10/2018	15/10/2018	15/10/2018
Arsenic	mg/kg	5	16	<4	<4	4
Cadmium	mg/kg	0.4	15	<0.4	<0.4	0.7
Chromium	mg/kg	11	21	6	<1	8
Copper	mg/kg	35	78	3	6	31
Lead	mg/kg	310	700	1	3	590
Mercury	mg/kg	0.3	4.4	0.4	<0.1	1
Nickel	mg/kg	9	12	4	<1	8
Zinc	mg/kg	250	23,000	9	2	820
Iron	mg/kg	8,600	19,000	5,100	730	7,700
Manganese	mg/kg	290	350	29	26	99

Acid Extractable metals in soil				
Our Reference		202898-16	202898-17	202898-18
Your Reference	UNITS	205 - [TRIPLICATE]	205 - [TRIPLICATE]	D3 - [TRIPLICATE]
Depth		0.5-0.6	0.2-0.3	-
Date Sampled		10/10/2018	10/10/2018	10/10/2018
Type of sample		SOIL	SOIL	SOIL
Date prepared	-	15/10/2018	15/10/2018	15/10/2018
Date analysed	-	15/10/2018	15/10/2018	15/10/2018
Arsenic	mg/kg	14	7	5
Cadmium	mg/kg	20	0.9	0.7
Chromium	mg/kg	15	12	10
Copper	mg/kg	79	79	31
Lead	mg/kg	660	590	550
Mercury	mg/kg	3.7	0.4	1.2
Nickel	mg/kg	9	11	8
Zinc	mg/kg	26,000	480	980
Iron	mg/kg	17,000	10,000	11,000
Manganese	mg/kg	230	280	100

Moisture						
Our Reference		202898-1	202898-2	202898-3	202898-4	202898-5
Your Reference	UNITS	201	201	202	202	202
Depth		0.4-0.5	2.2-2.3	0.6-0.7	1.7-2.0	2.7-2.9
Date Sampled		09/10/2018	09/10/2018	09/10/2018	09/10/2018	09/10/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	15/10/2018	15/10/2018	15/10/2018	15/10/2018	15/10/2018
Date analysed	-	16/10/2018	16/10/2018	16/10/2018	16/10/2018	16/10/2018
Moisture	%	9.2	22	19	20	13

Moisture						
Our Reference		202898-6	202898-7	202898-8	202898-9	202898-10
Your Reference	UNITS	202	203	203	204	204
Depth		3.2-3.4	0.8-0.9	2.7-2.9	0.7-0.9	2.3-2.4
Date Sampled		09/10/2018	09/10/2018	09/10/2018	10/10/2018	10/10/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	15/10/2018	15/10/2018	15/10/2018	15/10/2018	15/10/2018
Date analysed	-	16/10/2018	16/10/2018	16/10/2018	16/10/2018	16/10/2018
Moisture	%	16	17	13	11	7.5

Moisture						
Our Reference		202898-11	202898-12	202898-13	202898-14	202898-15
Your Reference	UNITS	205	205	205	D1	D3
Depth		0.2-0.3	0.5-0.6	1.8-2.0	-	-
Date Sampled		10/10/2018	10/10/2018	10/10/2018	09/10/2018	10/10/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	15/10/2018	15/10/2018	15/10/2018	15/10/2018	15/10/2018
Date analysed	-	16/10/2018	16/10/2018	16/10/2018	16/10/2018	16/10/2018
Moisture	%	19	21	26	8.8	17

Asbestos ID - soils					
Our Reference		202898-7	202898-9	202898-11	202898-12
Your Reference	UNITS	203	204	205	205
Depth		0.8-0.9	0.7-0.9	0.2-0.3	0.5-0.6
Date Sampled		09/10/2018	10/10/2018	10/10/2018	10/10/2018
Type of sample		SOIL	SOIL	SOIL	SOIL
Date analysed	-	16/10/2018	16/10/2018	16/10/2018	16/10/2018
Sample mass tested	g	Approx. 40g	Approx. 45g	Approx. 35g	Approx. 30g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.

Method ID	Methodology Summary
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	202898-3
Date extracted	-			15/10/2018	1	15/10/2018	15/10/2018		15/10/2018	15/10/2018
Date analysed	-			16/10/2018	1	16/10/2018	16/10/2018		16/10/2018	16/10/2018
TRH C_6 - C_9	mg/kg	25	Org-016	<25	1	<25	<25	0	92	82
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	1	<25	<25	0	92	82
Benzene	mg/kg	0.2	Org-016	<0.2	1	<0.2	<0.2	0	94	84
Toluene	mg/kg	0.5	Org-016	<0.5	1	<0.5	<0.5	0	91	81
Ethylbenzene	mg/kg	1	Org-016	<1	1	<1	<1	0	92	83
m+p-xylene	mg/kg	2	Org-016	<2	1	<2	<2	0	92	81
o-Xylene	mg/kg	1	Org-016	<1	1	<1	<1	0	91	80
naphthalene	mg/kg	1	Org-014	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	93	1	85	86	1	92	81

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	12	15/10/2018	15/10/2018		[NT]	[NT]
Date analysed	-			[NT]	12	16/10/2018	16/10/2018		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-016	[NT]	12	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-016	[NT]	12	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-016	[NT]	12	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-016	[NT]	12	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-016	[NT]	12	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-016	[NT]	12	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-016	[NT]	12	<1	<1	0	[NT]	[NT]
naphthalene	mg/kg	1	Org-014	[NT]	12	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-016	[NT]	12	82	84	2	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	202898-3
Date extracted	-			15/10/2018	1	15/10/2018	15/10/2018		15/10/2018	15/10/2018
Date analysed	-			16/10/2018	1	16/10/2018	16/10/2018		16/10/2018	16/10/2018
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	1	<50	<50	0	77	104
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	1	<100	<100	0	76	119
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	1	<100	<100	0	76	86
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	<50	1	<50	<50	0	77	104
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	<100	1	<100	<100	0	76	119
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	<100	1	<100	<100	0	76	86
Surrogate o-Terphenyl	%		Org-003	76	1	78	79	1	84	135

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	12	15/10/2018	18/10/2018		[NT]	[NT]
Date analysed	-			[NT]	12	16/10/2018	19/10/2018		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-003	[NT]	12	<50	82	48	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-003	[NT]	12	430	650	41	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-003	[NT]	12	380	240	45	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	[NT]	12	<50	200	120	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	[NT]	12	740	720	3	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	[NT]	12	190	180	5	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-003	[NT]	12	84	#		[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	15	15/10/2018	18/10/2018		[NT]	[NT]
Date analysed	-			[NT]	15	16/10/2018	19/10/2018		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-003	[NT]	15	<50	130	89	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-003	[NT]	15	4000	8900	76	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-003	[NT]	15	3200	7300	78	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-003	[NT]	15	130	320	84	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-003	[NT]	15	6700	16000	82	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-003	[NT]	15	1400	3500	86	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-003	[NT]	15	#	#		[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	202898-3
Date extracted	-			15/10/2018	1	15/10/2018	15/10/2018		15/10/2018	15/10/2018
Date analysed	-			17/10/2018	1	17/10/2018	17/10/2018		17/10/2018	17/10/2018
Naphthalene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	101	74
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	101	80
Phenanthrene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	106	90
Anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	98	86
Pyrene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	89	80
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	96	84
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	1	<0.05	0.06	18	105	83
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	98	1	89	89	0	85	84

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	12	15/10/2018	18/10/2018		[NT]	[NT]
Date analysed	-			[NT]	12	17/10/2018	19/10/2018		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-012	[NT]	12	0.9	1.6	56	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	[NT]	12	<0.1	0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	[NT]	12	0.8	1.4	55	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	[NT]	12	0.7	1.2	53	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-012	[NT]	12	11	16	37	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-012	[NT]	12	3.3	5.2	45	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	[NT]	12	19	28	38	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-012	[NT]	12	17	25	38	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	[NT]	12	13	20	42	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	[NT]	12	10	15	40	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	[NT]	12	24	38	45	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	[NT]	12	18	28	43	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	[NT]	12	11	16	37	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	[NT]	12	4.1	3.4	19	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	[NT]	12	12	18	40	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	[NT]	12	99	95	4	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	15	15/10/2018	18/10/2018		[NT]	[NT]
Date analysed	-			[NT]	15	17/10/2018	19/10/2018		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-012	[NT]	15	21	37	55	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-012	[NT]	15	7.9	<1	155	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-012	[NT]	15	24	40	50	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-012	[NT]	15	15	25	50	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-012	[NT]	15	72	360	133	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-012	[NT]	15	57	120	71	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-012	[NT]	15	87	620	151	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-012	[NT]	15	96	590	144	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-012	[NT]	15	210	400	62	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-012	[NT]	15	160	340	72	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-012	[NT]	15	130	760	142	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-012	[NT]	15	160	570	112	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	[NT]	15	44	310	150	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	[NT]	15	33	130	119	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	[NT]	15	53	320	143	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	[NT]	15	98	110	12	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	202898-3
Date extracted	-			15/10/2018	1	15/10/2018	15/10/2018		15/10/2018	15/10/2018
Date analysed	-			17/10/2018	1	17/10/2018	17/10/2018		17/10/2018	17/10/2018
HCB	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	95	82
gamma-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	92	70
Heptachlor	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	85	65
delta-BHC	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	88	62
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	91	70
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	96	74
Dieldrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	93	72
Endrin	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	92	75
pp-DDD	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	100	78
Endosulfan II	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	89	75
Methoxychlor	mg/kg	0.1	Org-005	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	91	1	89	112	23	102	89

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	12	15/10/2018	15/10/2018		[NT]	[NT]
Date analysed	-			[NT]	12	17/10/2018	17/10/2018		[NT]	[NT]
HCB	mg/kg	0.1	Org-005	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-005	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-005	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-005	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-005	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-005	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-005	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-005	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-005	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-005	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-005	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-005	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-005	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-005	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-005	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-005	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-005	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-005	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-005	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-005	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-005	[NT]	12	83	88	6	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	202898-3
Date extracted	-			15/10/2018	1	15/10/2018	15/10/2018		15/10/2018	15/10/2018
Date analysed	-			17/10/2018	1	17/10/2018	17/10/2018		17/10/2018	17/10/2018
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	119	92
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	110	96
Dimethoate	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	128	114
Fenitrothion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	128	107
Malathion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	82	70
Parathion	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	118	98
Ronnel	mg/kg	0.1	Org-008	<0.1	1	<0.1	<0.1	0	128	100
Surrogate TCMX	%		Org-008	91	1	89	112	23	102	100

QUALITY CONTROL: Organophosphorus Pesticides						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	12	15/10/2018	15/10/2018		[NT]	[NT]
Date analysed	-			[NT]	12	17/10/2018	17/10/2018		[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	[NT]	12	<0.5	<0.5	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-008	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-008	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-008	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-008	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-008	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-008	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-008	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-008	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-008	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-008	[NT]	12	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-008	[NT]	12	83	88	6	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	202898-3
Date extracted	-			15/10/2018	1	15/10/2018	15/10/2018		15/10/2018	15/10/2018
Date analysed	-			17/10/2018	1	17/10/2018	17/10/2018		17/10/2018	17/10/2018
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	97	99
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCLMX	%		Org-006	91	1	89	112	23	102	100

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	12	15/10/2018	15/10/2018		[NT]	[NT]
Date analysed	-			[NT]	12	17/10/2018	17/10/2018		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-006	[NT]	12	<0.5	<0.5	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-006	[NT]	12	<0.5	<0.5	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-006	[NT]	12	<0.5	<0.5	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-006	[NT]	12	<0.5	<0.5	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-006	[NT]	12	<0.5	<0.5	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-006	[NT]	12	<0.5	<0.5	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-006	[NT]	12	<0.5	<0.5	0	[NT]	[NT]
Surrogate TCLMX	%		Org-006	[NT]	12	83	88	6	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	202898-3
Date prepared	-			15/10/2018	1	15/10/2018	15/10/2018		15/10/2018	15/10/2018
Date analysed	-			15/10/2018	1	15/10/2018	15/10/2018		15/10/2018	15/10/2018
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	106	92
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	0.5	0.9	57	102	95
Chromium	mg/kg	1	Metals-020	<1	1	3	3	0	105	90
Copper	mg/kg	1	Metals-020	<1	1	27	33	20	105	#
Lead	mg/kg	1	Metals-020	<1	1	39	34	14	103	#
Mercury	mg/kg	0.1	Metals-021	<0.1	1	0.3	0.2	40	118	97
Nickel	mg/kg	1	Metals-020	<1	1	3	3	0	98	85
Zinc	mg/kg	1	Metals-020	<1	1	18	21	15	101	#
Iron	mg/kg	1	Metals-020	<1	1	3800	4300	12	104	#
Manganese	mg/kg	1	Metals-020	<1	1	61	68	11	106	#

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	15/10/2018	15/10/2018		[NT]	[NT]
Date analysed	-			[NT]	11	15/10/2018	15/10/2018		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	11	5	7	33	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	11	0.4	1	86	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	11	11	15	31	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	11	35	65	60	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	11	310	560	57	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	11	0.3	0.5	50	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	11	9	12	29	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	11	250	550	75	[NT]	[NT]
Iron	mg/kg	1	Metals-020	[NT]	11	8600	11000	24	[NT]	[NT]
Manganese	mg/kg	1	Metals-020	[NT]	11	290	530	59	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	12	15/10/2018	15/10/2018		[NT]	[NT]
Date analysed	-			[NT]	12	15/10/2018	15/10/2018		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	12	16	14	13	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	12	15	15	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	12	21	19	10	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	12	78	89	13	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	12	700	720	3	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	12	4.4	7.7	55	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	12	12	12	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	12	23000	23000	0	[NT]	[NT]
Iron	mg/kg	1	Metals-020	[NT]	12	19000	23000	19	[NT]	[NT]
Manganese	mg/kg	1	Metals-020	[NT]	12	350	270	26	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	15	15/10/2018	15/10/2018		[NT]	[NT]
Date analysed	-			[NT]	15	15/10/2018	15/10/2018		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	15	4	6	40	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	15	0.7	0.6	15	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	15	8	9	12	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	15	31	31	0	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	15	590	480	21	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	15	1	1.2	18	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	15	8	8	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	15	820	930	13	[NT]	[NT]
Iron	mg/kg	1	Metals-020	[NT]	15	7700	15000	64	[NT]	[NT]
Manganese	mg/kg	1	Metals-020	[NT]	15	99	94	5	[NT]	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Report Comments

TRH Soil C10-C40 NEPM - # Percent recovery for the surrogate is not possible to report as the high concentration of analytes in the samples 3, 12 and 15 have caused interference.
TRH Soil C10-C40 NEPM - The RPD for duplicate results is accepted due to the non homogenous nature of the sample/s.

Asbestos: A portion of the supplied samples were sub-sampled for asbestos analysis according to Envirolab procedures.
We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying
40-50g of sample in its own container.
Note: Samples requested for asbestos testing were sub-sampled from jars provided by the client.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria
has been exceeded for 202898-11 for Mn, Cu, Pb and Zn. Therefore a triplicate result has
been issued as laboratory sample number 202898-17.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria
has been exceeded for 202898-12 for Hg. Therefore a triplicate result has
been issued as laboratory sample number 202898-16.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria
has been exceeded for 202898-15 for Fe. Therefore a triplicate result has
been issued as laboratory sample number 202898-18.

Acid Extractable Metals in Soil:
Percent recovery is not possible to report due to the high concentration
of the element/s in the sample/s. However an acceptable recovery was
obtained for the LCS.

OC/OP/PCBs in Soil - PQL has been raised due to interference from analytes(other than those being tested) in the sample/s.

PAHs in Soil - The RPD for duplicate results is accepted due to the non homogenous nature of the sample/s.
PAHs in Soil - PQL has been raised due to the high concentration of analytes in the sample/s, resulting in the sample/s requiring dilution.

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CERTIFICATE OF ANALYSIS 202898-A

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**39961.02, Wickham**
Number of Samples	15 SOIL
Date samples received	12/10/2018
Date completed instructions received	25/10/2018

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	01/11/2018
Date of Issue	01/11/2018

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Results Approved By
Jaimie Loa-Kum-Cheung, Senior Chemist
Jeremy Faircloth, Organics Supervisor
Long Pham, Team Leader, Metals

Authorised By

Jacinta Hurst, Laboratory Manager

Metals in TCLP USEPA1311						
Our Reference		202898-A-3	202898-A-7	202898-A-11	202898-A-12	202898-A-15
Your Reference	UNITS	202	203	205	205	D3
Depth		0.6-0.7	0.8-0.9	0.2-0.3	0.5-0.6	-
Date Sampled		09/10/2018	09/10/2018	10/10/2018	10/10/2018	10/10/2018
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	29/10/2018	29/10/2018	29/10/2018	29/10/2018	29/10/2018
Date analysed	-	29/10/2018	29/10/2018	29/10/2018	29/10/2018	29/10/2018
pH of soil for fluid# determ.	pH units	7.2	7.3	9.2	8.3	8.0
pH of soil TCLP (after HCl)	pH units	1.6	1.6	2.1	2.5	1.6
Extraction fluid used	-	1	1	1	1	1
pH of final Leachate	pH units	5.0	5.1	5.7	6.0	5.0
Lead in TCLP	mg/L	0.05	[NA]	0.2	0.1	[NA]
Mercury in TCLP	mg/L	[NA]	[NA]	[NA]	<0.0005	[NA]

PAHs in TCLP (USEPA 1311)					
Our Reference		202898-A-7	202898-A-11	202898-A-12	202898-A-15
Your Reference	UNITS	203	205	205	D3
Depth		0.8-0.9	0.2-0.3	0.5-0.6	-
Date Sampled		09/10/2018	10/10/2018	10/10/2018	10/10/2018
Type of sample		SOIL	SOIL	SOIL	SOIL
Date extracted	-	30/10/2018	30/10/2018	30/10/2018	30/10/2018
Date analysed	-	31/10/2018	31/10/2018	31/10/2018	31/10/2018
Naphthalene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Acenaphthene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Phenanthrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Fluoranthene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.002	<0.002	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001
Total +ve PAH's	mg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	93	99	94	100

Metals-ASLP Neutral (ICP-MS)		
Our Reference		202898-A-12
Your Reference	UNITS	205
Depth		0.5-0.6
Date Sampled		10/10/2018
Type of sample		SOIL
Date extracted	-	29/10/2018
Date analysed	-	29/10/2018
pH of final Leachate	pH units	7.7
Lead in ASLP	µg/L	15

PAHs in Water Leach Low Level			
Our Reference		202898-A-12	202898-A-15
Your Reference	UNITS	205	D3
Depth		0.5-0.6	-
Date Sampled		10/10/2018	10/10/2018
Type of sample		SOIL	SOIL
Date extracted	-	30/10/2018	30/10/2018
Date analysed	-	31/10/2018	31/10/2018
pH of final Leachate	pH units	7.7	7.8
Naphthalene	µg/L	<0.1	<0.1
Acenaphthylene	µg/L	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1
Phenanthrene	µg/L	0.2	0.3
Anthracene	µg/L	<0.1	<0.1
Fluoranthene	µg/L	0.2	0.4
Pyrene	µg/L	0.2	0.4
Benzo(a)anthracene	µg/L	<0.1	0.2
Chrysene	µg/L	0.2	0.3
Benzo(b,j+k)fluoranthene	µg/L	<0.2	0.4
Benzo(a)pyrene	µg/L	0.2	0.3
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	0.2
Surrogate p-Terphenyl-d14	%	74	82

Method ID	Methodology Summary
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using in house method INORG-004. Please note that the mass used may be scaled down from the default based on sample mass available.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS following leaching using neutralised deionised water by AS 4439.3 - 1997.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-012	Leachates are extracted with Dichloromethane and analysed by GC-MS.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.

QUALITY CONTROL: Metals in TCLP USEPA1311						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			29/10/2018	7	29/10/2018	29/10/2018		29/10/2018	[NT]
Date analysed	-			29/10/2018	7	29/10/2018	29/10/2018		29/10/2018	[NT]
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	[NT]	[NT]	[NT]	[NT]	102	[NT]
Mercury in TCLP	mg/L	0.0005	Metals-021 CV-AAS	<0.0005	[NT]	[NT]	[NT]	[NT]	107	[NT]

QUALITY CONTROL: PAHs in TCLP (USEPA 1311)						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	202898-A-11
Date extracted	-			30/10/2018	7	30/10/2018	30/10/2018		30/10/2018	30/10/2018
Date analysed	-			31/10/2018	7	31/10/2018	31/10/2018		31/10/2018	31/10/2018
Naphthalene in TCLP	mg/L	0.001	Org-012	<0.001	7	<0.001	<0.001	0	85	92
Acenaphthylene in TCLP	mg/L	0.001	Org-012	<0.001	7	<0.001	<0.001	0	[NT]	[NT]
Acenaphthene in TCLP	mg/L	0.001	Org-012	<0.001	7	<0.001	<0.001	0	[NT]	[NT]
Fluorene in TCLP	mg/L	0.001	Org-012	<0.001	7	<0.001	<0.001	0	92	101
Phenanthrene in TCLP	mg/L	0.001	Org-012	<0.001	7	<0.001	<0.001	0	97	102
Anthracene in TCLP	mg/L	0.001	Org-012	<0.001	7	<0.001	<0.001	0	[NT]	[NT]
Fluoranthene in TCLP	mg/L	0.001	Org-012	<0.001	7	<0.001	<0.001	0	92	97
Pyrene in TCLP	mg/L	0.001	Org-012	<0.001	7	<0.001	<0.001	0	82	85
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-012	<0.001	7	<0.001	<0.001	0	[NT]	[NT]
Chrysene in TCLP	mg/L	0.001	Org-012	<0.001	7	<0.001	<0.001	0	92	97
Benzo(bjk)fluoranthene in TCLP	mg/L	0.002	Org-012	<0.002	7	<0.002	<0.002	0	[NT]	[NT]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-012	<0.001	7	<0.001	<0.001	0	95	102
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-012	<0.001	7	<0.001	<0.001	0	[NT]	[NT]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-012	<0.001	7	<0.001	<0.001	0	[NT]	[NT]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-012	<0.001	7	<0.001	<0.001	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	84	7	93	79	16	85	102

QUALITY CONTROL: Metals-ASLP Neutral (ICP-MS)					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			29/10/2018	[NT]	[NT]	[NT]	[NT]	29/10/2018	[NT]
Date analysed	-			29/10/2018	[NT]	[NT]	[NT]	[NT]	29/10/2018	[NT]
Lead in ASLP	µg/L	1	Metals-022	<1	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: PAHs in Water Leach Low Level					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			30/10/2018	[NT]	[NT]	[NT]	[NT]	30/10/2018	[NT]
Date analysed	-			31/10/2018	[NT]	[NT]	[NT]	[NT]	31/10/2018	[NT]
Naphthalene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	85	[NT]
Acenaphthylene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Phenanthrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Anthracene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Pyrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	82	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	84	[NT]	[NT]	[NT]	[NT]	85	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
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NEPM	National Environmental Protection Measure
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Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

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Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

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CERTIFICATE OF ANALYSIS 203991

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**39961.02, Wickham**
Number of Samples	4 water
Date samples received	25/10/2018
Date completed instructions received	25/10/2018

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	01/11/2018
Date of Issue	01/11/2018

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Results Approved By
Jeremy Faircloth, Organics Supervisor
Long Pham, Team Leader, Metals
Priya Samarawickrama, Senior Chemist
Steven Luong, Senior Chemist

Authorised By

Jacinta Hurst, Laboratory Manager

vTRH(C6-C10)/BTEXN in Water					
Our Reference		203991-1	203991-2	203991-3	203991-4
Your Reference	UNITS	202	203	204	D1/JPS
Date Sampled		24/10/2018	24/10/2018	24/10/2018	24/10/2018
Type of sample		water	water	water	water
Date extracted	-	26/10/2018	26/10/2018	26/10/2018	26/10/2018
Date analysed	-	29/10/2018	29/10/2018	29/10/2018	29/10/2018
TRH C_6 - C_9	µg/L	93	<10	<10	<10
TRH C_6 - C_{10}	µg/L	240	<10	<10	<10
TRH C_6 - C_{10} less BTEX (F1)	µg/L	240	<10	<10	<10
Benzene	µg/L	<1	<1	<1	<1
Toluene	µg/L	<1	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2	<2
o-xylene	µg/L	<1	<1	<1	<1
Naphthalene	µg/L	39	<1	<1	<1
Surrogate Dibromofluoromethane	%	100	98	101	99
Surrogate toluene-d8	%	96	96	95	96
Surrogate 4-BFB	%	100	103	116	118

svTRH (C10-C40) in Water					
Our Reference		203991-1	203991-2	203991-3	203991-4
Your Reference	UNITS	202	203	204	D1/JPS
Date Sampled		24/10/2018	24/10/2018	24/10/2018	24/10/2018
Type of sample		water	water	water	water
Date extracted	-	30/10/2018	30/10/2018	30/10/2018	30/10/2018
Date analysed	-	30/10/2018	30/10/2018	31/10/2018	31/10/2018
TRH C_{10} - C_{14}	µg/L	1,000	<50	<50	<50
TRH C_{15} - C_{28}	µg/L	1,100	<100	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100	<100	<100
TRH >C_{10} - C_{16}	µg/L	1,500	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	µg/L	1,500	<50	<50	<50
TRH >C_{16} - C_{34}	µg/L	530	<100	<100	<100
TRH >C_{34} - C_{40}	µg/L	<100	<100	<100	<100
Surrogate o-Terphenyl	%	104	74	85	94

PAHs in Water - Low Level					
Our Reference	UNITS	203991-1	203991-2	203991-3	203991-4
Your Reference		202	203	204	D1/JPS
Date Sampled		24/10/2018	24/10/2018	24/10/2018	24/10/2018
Type of sample		water	water	water	water
Date extracted	-	30/10/2018	30/10/2018	30/10/2018	30/10/2018
Date analysed	-	31/10/2018	31/10/2018	31/10/2018	31/10/2018
Naphthalene	µg/L	26	<0.2	<0.2	<0.2
Acenaphthylene	µg/L	0.2	<0.1	<0.1	<0.1
Acenaphthene	µg/L	1.1	<0.1	<0.1	<0.1
Fluorene	µg/L	2.0	<0.1	<0.1	<0.1
Phenanthrene	µg/L	1.6	<0.1	<0.1	<0.1
Anthracene	µg/L	0.2	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.2	<0.1	<0.1	<0.1
Pyrene	µg/L	0.2	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	31	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	75	81	71	71

HM in water - dissolved					
Our Reference		203991-1	203991-2	203991-3	203991-4
Your Reference	UNITS	202	203	204	D1/JPS
Date Sampled		24/10/2018	24/10/2018	24/10/2018	24/10/2018
Type of sample		water	water	water	water
Date prepared	-	26/10/2018	26/10/2018	26/10/2018	26/10/2018
Date analysed	-	26/10/2018	26/10/2018	26/10/2018	26/10/2018
Arsenic-Dissolved	µg/L	2	2	<1	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1	0.2	0.2
Chromium-Dissolved	µg/L	<1	1	<1	<1
Copper-Dissolved	µg/L	<1	1	4	4
Lead-Dissolved	µg/L	2	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	2	25	8	9
Zinc-Dissolved	µg/L	8	110	550	560
Iron-Dissolved	µg/L	1,700	1,200	64	64
Manganese-Dissolved	µg/L	190	150	39	40

Miscellaneous Inorganics					
Our Reference		203991-1	203991-2	203991-3	203991-4
Your Reference	UNITS	202	203	204	D1/JPS
Date Sampled		24/10/2018	24/10/2018	24/10/2018	24/10/2018
Type of sample		water	water	water	water
Date prepared	-	25/10/2018	25/10/2018	25/10/2018	25/10/2018
Date analysed	-	25/10/2018	25/10/2018	25/10/2018	25/10/2018
pH	pH Units	6.9	6.0	6.6	6.7
Electrical Conductivity	µS/cm	340	1,100	670	660

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date extracted	-			29/10/2018	[NT]	[NT]	[NT]	[NT]	29/10/2018	[NT]
Date analysed	-			30/10/2018	[NT]	[NT]	[NT]	[NT]	30/10/2018	[NT]
TRH C_6 - C_9	µg/L	10	Org-016	<10	[NT]	[NT]	[NT]	[NT]	119	[NT]
TRH C_6 - C_{10}	µg/L	10	Org-016	<10	[NT]	[NT]	[NT]	[NT]	119	[NT]
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	117	[NT]
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	118	[NT]
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	120	[NT]
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	[NT]	[NT]	121	[NT]
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	[NT]	[NT]	120	[NT]
Naphthalene	µg/L	1	Org-013	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-016	98	[NT]	[NT]	[NT]	[NT]	100	[NT]
Surrogate toluene-d8	%		Org-016	94	[NT]	[NT]	[NT]	[NT]	103	[NT]
Surrogate 4-BFB	%		Org-016	118	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Water						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			30/10/2018	[NT]	[NT]	[NT]	[NT]	30/10/2018	[NT]
Date analysed	-			31/10/2018	[NT]	[NT]	[NT]	[NT]	31/10/2018	[NT]
TRH C_{10} - C_{14}	µg/L	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	104	[NT]
TRH C_{15} - C_{28}	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	102	[NT]
TRH C_{29} - C_{36}	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	130	[NT]
TRH >C_{10} - C_{16}	µg/L	50	Org-003	<50	[NT]	[NT]	[NT]	[NT]	104	[NT]
TRH >C_{16} - C_{34}	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	102	[NT]
TRH >C_{34} - C_{40}	µg/L	100	Org-003	<100	[NT]	[NT]	[NT]	[NT]	130	[NT]
Surrogate o-Terphenyl	%		Org-003	97	[NT]	[NT]	[NT]	[NT]	102	[NT]

QUALITY CONTROL: PAHs in Water - Low Level					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			30/10/2018	[NT]	[NT]	[NT]	[NT]	30/10/2018	[NT]
Date analysed	-			31/10/2018	[NT]	[NT]	[NT]	[NT]	31/10/2018	[NT]
Naphthalene	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	[NT]	[NT]	85	[NT]
Acenaphthylene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluorene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Phenanthrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Anthracene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Pyrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	82	[NT]
Benzo(a)anthracene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Benzo(b,j+k)fluoranthene	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-012	84	[NT]	[NT]	[NT]	[NT]	85	[NT]

QUALITY CONTROL: HM in water - dissolved						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date prepared	-			26/10/2018	1	26/10/2018	26/10/2018		26/10/2018	[NT]
Date analysed	-			26/10/2018	1	26/10/2018	26/10/2018		26/10/2018	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	1	2	[NT]		107	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	1	<0.1	[NT]		105	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	1	<1	[NT]		107	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	1	<1	[NT]		103	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	1	2	[NT]		102	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	1	<0.05	<0.05	0	94	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	1	2	[NT]		106	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	1	8	[NT]		110	[NT]
Iron-Dissolved	µg/L	10	Metals-022	<10	1	1700	[NT]		106	[NT]
Manganese-Dissolved	µg/L	5	Metals-022	<5	1	190	[NT]		104	[NT]

QUALITY CONTROL: Miscellaneous Inorganics						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W3	[NT]
Date prepared	-			25/10/2018	1	25/10/2018	25/10/2018		25/10/2018	[NT]
Date analysed	-			25/10/2018	1	25/10/2018	25/10/2018		25/10/2018	[NT]
pH	pH Units		Inorg-001	[NT]	1	6.9	6.9	0	102	[NT]
Electrical Conductivity	µS/cm	1	Inorg-002	<1	1	340	330	3	107	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

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Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
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LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
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Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

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For VOCs in water samples, three vials are required for duplicate or spike analysis.

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Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

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CERTIFICATE OF ANALYSIS 204047

Client Details

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Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**39961.02**
Number of Samples	4 Soil
Date samples received	26/10/2018
Date completed instructions received	26/10/2018

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	02/11/2018
Date of Issue	01/11/2018

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Results Approved By
Priya Samarawickrama, Senior Chemist

Authorised By

Jacinta Hurst, Laboratory Manager

Chromium Suite					
Our Reference		204047-1	204047-2	204047-3	204047-4
Your Reference	UNITS	201	201	203	205
Depth		1.5-1.6	7.7-7.9	3.5	2.1
Date Sampled		09/10/2018	09/10/2018	09/10/2018	10/10/2018
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	29/10/2018	29/10/2018	29/10/2018	29/10/2018
Date analysed	-	29/10/2018	29/10/2018	29/10/2018	29/10/2018
pH $_{kcl}$	pH units	3.7	4.7	4.0	4.3
s-TAA pH 6.5	%w/w S	0.06	<0.01	0.06	0.04
TAA pH 6.5	moles H^+ /t	36	<5	36	26
Chromium Reducible Sulfur	%w/w	0.50	0.06	0.17	0.18
a-Chromium Reducible Sulfur	moles H^+ /t	310	35	110	110
S_{HCl}	%w/w S	0.17	<0.005	0.094	0.077
S_{KCl}	%w/w S	0.14	0.039	0.096	0.085
S_{NAS}	%w/w S	0.029	<0.005	<0.005	<0.005
ANC_{BT}	% $CaCO_3$	<0.05	<0.05	<0.05	<0.05
s-ANC_{BT}	%w/w S	<0.05	<0.05	<0.05	<0.05
s-Net Acidity	%w/w S	0.59	0.059	0.23	0.23
a-Net Acidity	moles H^+ /t	370	37	140	140
Liming rate	kg $CaCO_3$ /t	28	2.8	11	11
a-Net Acidity without ANCE	moles H^+ /t	370	37	140	140
Liming rate without ANCE	kg $CaCO_3$ /t	28	2.8	11	11
s-Net Acidity without ANCE	%w/w S	0.59	0.059	0.23	0.23

Method ID	Methodology Summary
Inorg-068	Chromium Reducible Sulfur - Hydrogen Sulfide is quantified by iodometric titration after distillation to determine potential acidity. Based on Acid Sulfate Soils Laboratory Methods Guidelines, Version 2.1 - June 2004.

QUALITY CONTROL: Chromium Suite						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			29/10/2018	1	29/10/2018	29/10/2018		29/10/2018	[NT]
Date analysed	-			29/10/2018	1	29/10/2018	29/10/2018		29/10/2018	[NT]
pH $_{kcl}$	pH units		Inorg-068	[NT]	1	3.7	3.7	0	94	[NT]
s-TAA pH 6.5	%w/w S	0.01	Inorg-068	<0.01	1	0.06	0.07	15	[NT]	[NT]
TAA pH 6.5	moles H^+ /t	5	Inorg-068	<5	1	36	42	15	115	[NT]
Chromium Reducible Sulfur	%w/w	0.005	Inorg-068	<0.005	1	0.50	0.50	0	[NT]	[NT]
a-Chromium Reducible Sulfur	moles H^+ /t	3	Inorg-068	<3	1	310	310	0	92	[NT]
S_{HCl}	%w/w S	0.005	Inorg-068	<0.005	1	0.17	0.17	0	[NT]	[NT]
S_{KCl}	%w/w S	0.005	Inorg-068	<0.005	1	0.14	0.13	7	[NT]	[NT]
S_{NAS}	%w/w S	0.005	Inorg-068	<0.005	1	0.029	0.038	27	[NT]	[NT]
ANC_{BT}	% $CaCO_3$	0.05	Inorg-068	<0.05	1	<0.05	<0.05	0	[NT]	[NT]
s-ANC_{BT}	%w/w S	0.05	Inorg-068	<0.05	1	<0.05	<0.05	0	[NT]	[NT]
s-Net Acidity	%w/w S	0.005	Inorg-068	<0.005	1	0.59	0.61	3	[NT]	[NT]
a-Net Acidity	moles H^+ /t	5	Inorg-068	<5	1	370	380	3	[NT]	[NT]
Liming rate	kg $CaCO_3$ /t	0.75	Inorg-068	<0.75	1	28	28	0	[NT]	[NT]
a-Net Acidity without ANCE	moles H^+ /t	5	Inorg-068	<5	1	370	380	3	[NT]	[NT]
Liming rate without ANCE	kg $CaCO_3$ /t	0.75	Inorg-068	<0.75	1	28	28	0	[NT]	[NT]
s-Net Acidity without ANCE	%w/w S	0.005	Inorg-068	<0.005	1	0.59	0.61	3	[NT]	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Appendix C

Data Quality Report
Chain of Custody (Field and Despatch)
Sample Receipt
Site Assessment Criteria

Data Quality Assessment Report
Report on Detailed Site Investigation (Contamination)
Proposed Apartments
10 Dangar Street, Wickham

1. Data Quality Objectives

The Detailed Site Investigation (DSI) was prepared with reference to the seven step data quality objective (DQO) process which is provided in Appendix B, Schedule B2 of the *National Environment Protection (Assessment of Site Contamination) Measure* 1999 as amended 2013 (NEPC, 2013). The DQO process is outlined as follows:

- Stating the Problem;
- Identifying the Decision;
- Identifying Inputs to the Decision;
- Defining the Boundary of the Assessment;
- Developing a Decision Rule;
- Specifying Acceptable Limits on Decision Errors; and
- Optimising the Design for Obtaining Data.

The DQOs have been addressed within Table 6 of the report.

2. Field and Laboratory Quality Control

2.1 Introduction

The field and laboratory quality control (QC) procedures and results are summarised in Tables 1 and 2. Reference should be made to the field work and analysis procedures in Section 6.2 and the laboratory results certificates in Appendix B for further details.

Table 1: Field QC

Item	Frequency	Acceptance Criteria	Achievement
Intra-laboratory replicates	5% primary samples	RPD <30% inorganics), <50% (organics)	Yes[1]

Notes to Table 2:

1 qualitative assessment of RPD results overall; refer Section 2.1

Table 2: Laboratory QC

Item	Frequency	Acceptance Criteria	Achievement
Analytical laboratories used		NATA accreditation	Yes
Holding times		In accordance with NEPC (2013) which references various Australian and international standards	Yes
Laboratory / Reagent Blanks	1 per lab batch	<PQL	Yes
Laboratory duplicates	10% primary samples	Laboratory specific [1]	Yes
Matrix Spikes	1 per lab batch	70-130% recovery (inorganics); 60-140% (organics); 10-140% (SVOC, speciated phenols)	Yes[2]
Surrogate Spikes	organics by GC	70-130% recovery (inorganics); 60-140% (organics); 10-140% (SVOC, speciated phenols)	Yes[2]
Control Samples	1 per lab batch	70-130% recovery (inorganics); 60-140% (organics); 10-140% (SVOC, speciated phenols)	Yes

Notes to Table 2:

1 ELS: <5xPQL – any RPD; >5xPQL – 0-50%RPD

2 Qualitative assessment of RPD results overall; refer below for details

The laboratory provided the following summary of quality assessment results, including some exceedances of laboratory QAQC criteria:

- TRH Soil C10-C40 NEPM - # Percent recovery for the surrogate is not possible to report as the high concentration of analytes in the samples 3, 12 and 15 have caused interference;
- TRH Soil C10-C40 NEPM - The RPD for duplicate results is accepted due to the non-homogenous nature of the sample/s;
- Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 202898-11 for Mn, Cu, Pb and Zn. Therefore a triplicate result has been issued as laboratory sample number 202898-17;
- Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 202898-12 for Hg. Therefore a triplicate result has been issued as laboratory sample number 202898-16;
- Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 202898-15 for Fe. Therefore a triplicate result has been issued as laboratory sample number 202898-18;

- Acid Extractable Metals in Soil: # Percent recovery is not possible to report due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS;
- OC/OP/PCBs in Soil - PQL has been raised due to interference from analytes (other than those being tested) in the sample/s;
- PAHs in Soil - The RPD for duplicate results is accepted due to the non-homogenous nature of the sample/s;
- PAHs in Soil - PQL has been raised due to the high concentration of analytes in the sample/s, resulting in the sample/s requiring dilution.

The above QC criteria exceedances are generally due to sample heterogeneity within upper impacted filling.

In summary, the QC data is considered to be of sufficient quality to be acceptable for the assessment.

2.2 Intra-Laboratory Replicates

Intra-laboratory replicates were analysed as an internal check of the reproducibility within the primary laboratory and as a measure of consistency of sampling techniques. The comparative results of analysis between original and intra-laboratory replicate samples are summarised in Table 4.

Table 3: Relative Percentage Difference Results – Intra-laboratory Replicates

Analyte		201/0.4-0.5	D1	RPD (%)	205/0.5-0.6	D3	RPD (%)
Metals	As	<4	<4	N/A	16	4	**120**
	Cd	0.5	<0.4	**N/A**	15	0.7	**182**
	Cr	3	<1	N/A	21	8	**90**
	Cu	27	6	**127**	78	31	**86**
	Pb	39	3	**171**	700	590	**17**
	Hg	0.3	<0.1	N/A	4.4	1	**126**
	Ni	3	<1	N/A	12	8	**40**
	Zn	18	2	**160**	23000	820	**186**
	Mn	61	26	**80**	19000	7700	**85**
	Fe	3800	730	**136**	350	99	**112**
TRH	C_6 - C_9	<25	<25	N/A	<25	<25	N/A
	C_{29} - C_{36}	<100	<100	N/A	380	3200	**158**
	C_6 - C_{10}	<25	<25	N/A	<25	<25	N/A
	$>C_{10}$ - C_{16}	<50	<50	N/A	<50	130	N/A
	$>C_{16}$ - C_{34}	<100	<100	N/A	740	6700	**160**
	$>C_{34}$ - C_{40}	<100	<100	N/A	190	1400	**152**
BTEX	Benzene	<0.2	<0.2	N/A	<0.2	<0.2	N/A
	Toluene	<0.5	<0.5	N/A	<0.5	<0.5	N/A
	Ethyl Benzene	<1	<1	N/A	<1	<1	N/A
	Xylene	<3	<3	N/A	<3	<3	N/A
	Naphthalene	<1	<1	N/A	<1	<1	N/A
PAH	Total	<0.05	<0.05	N/A	150	1200	**156**
	Benzo(a)pyrene	<0.05	<0.05	N/A	18	160	**160**
OCPs	Total	<0.1	<0.1	N/A	<0.1	<0.1	N/A
	Aldrin + Dieldrin	<0.1	<0.1	N/A	<0.1	<0.1	N/A
	Chlordane	<0.1	<0.1	N/A	<0.1	<0.1	N/A
	DDT	<0.1	<0.1	N/A	<0.1	<0.1	N/A
	Heptachlor	<0.1	<0.1	N/A	<0.1	<0.1	N/A
OPPs		<0.1	<0.1	N/A	<0.1	<0.1	N/A
PCBs		<0.1	<0.1	N/A	<0.1	<0.1	N/A

The calculated RPD values were within the acceptable range of ± 30 for inorganic analytes and ± 50% for organics with the with the exception of those in bold. The exceedances are likely due to the following:

- The replicate pairs being collected from fill soils which were heterogeneous in nature;
- Soil replicates, rather than homogenised soil duplicates, were used to minimise the risk of possible volatile loss, hence greater variability can be expected.

All other QA/QC parameters generally met the DQIs.

Overall, while the sampling techniques were generally consistent and repeatable, intra-laboratory replicate comparisons indicate that results were not repeatable, generally due to non-homogenous soils.

3. Data Quality Indicators

The reliability of field procedures and analytical results was assessed against the following data quality indicators (DQIs):

- Completeness – a measure of the amount of usable data from a data collection activity;
- Comparability – the confidence (qualitative) that data may be considered to be equivalent for each sampling and analytical event;
- Representativeness – the confidence (qualitative) of data representativeness of media present on site;
- Precision – a measure of variability or reproducibility of data; and
- Accuracy – a measure of closeness of the data to the 'true' value.

The DQIs were assessed as outlined in the following Table 4.

Table 4: Data Quality Indicators

Data Quality Indicator	Method(s) of Achievement
Completeness	Planned systematic and selected target locations sampled; Preparation of field logs, sample location plan and chain of custody (COC) records; Preparation of field groundwater sampling sheets; Laboratory sample receipt information received confirming receipt of samples intact and appropriateness of the chain of custody; Samples analysed for contaminants of potential concern (COPC) identified in the Conceptual Site Model (CSM); Completion of COC documentation; NATA endorsed laboratory certificates provided by the laboratory; Satisfactory frequency and results for field and laboratory QC samples as discussed in Section 2.
Comparability	Using appropriate techniques for sample recovery, storage and transportation, which were the same for the duration of the project; Works undertaken by appropriately experienced and trained DP environmental engineer; Use of NATA registered laboratories, with test methods the same or similar between laboratories; Satisfactory results for field and laboratory QC samples.
Representativeness	Target media sampled; Spatial and temporal distribution of sample locations; Sample numbers recovered and analysed are considered to be representative of the target media and complying with DQOs; Samples were extracted and analysed within holding times; Samples were analysed in accordance with the analysis request.
Precision	Generally acceptable RPD between original samples and replicates; Satisfactory results for all other field and laboratory QC samples.
Accuracy	Satisfactory results for all field and laboratory QC samples.

Based on the above, it is considered that the DQIs have been complied with. As such, it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.

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CHAIN OF CUSTODY FIELD SHEET

Project No: 39961.02	**Client Project Name:** WICKHAM PROPOSED APARTMENT DEVELOPMENT
Client: DANGAR ST WICKHAM PTY LTD	**Location:** 10 DANGAR STREET WICKHAM
Project Manager: PH	**DP Lab Received** By: DSW Date: 9/10

Do samples contain 'potential' HBM? Yes ☐ No ☑ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S-soil W water	Container Type G-glass P-plastic	ASS Samples	Sampling By	Sampling Date	Sampling Time	Storage Locn*	Envirolab Services			
201	0.4-0.5	D1	S	G,P		DSW	9/10/18	10:06	Fridge	11.10.18			
	1.0-1.2	—	S	P	✓			10:08					
	1.5-1.6	R	S	G,P	✓			10:12					
	2.2-2.3	R	S	G,P	✓			10:14		11.10.18			
	2.5-2.7	—	S	P	✓			10:17					
	3.1-3.3	—	S	P	✓			10:21					
	3.8-4.0	—	S	P	✓			10:24					
	4.1-4.5	—	S	P	✓			10:26					
	4.8-5	—	S	P	✓			10:30					
	5.3-5.5	—	S	P	✓			10:33					
	5.8-6.0	—	S	P	✓			10:35					
	6.3-6.5	—	S	P	✓			10:38					
	6.5-7	—	S	P	✓			10:41					
	7.3-7.5	—	S	P	✓			10:44					
	7.7-7.9	—	S	P	✓			10:45					
202	0.5	—	S	P	✓			11:10					
	0.6-0.7	R	S	G,P	✓			11:15		11.10.18			
	0.9-1.1	R	S	G,P	✓			11.18					

*Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

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CHAIN OF CUSTODY FIELD SHEET

Project No: 39961.02	**Client Project Name:** WICKHAM PROPOSED APARTMENT DEVELOPMENT
Client: DANGAR ST WICKHAM PTY LTD	**Location:** 10 DANGAR STREET WICKHAM
Project Manager: PH	**DP Lab Received** By: DSW Date: 9/10/18

Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S-soil W water	Container Type G-glass P-plastic	ASS Samples	Sampling By	Sampling Date	Sampling Time	Storage Locn*	Enviro Lab Services			
	0.5	—	S	P	✓	DSW	9/10	11:20	Fridge				
202	1.2-1.4	R	S	G,P		DSW	9/10	11:21					
	1.6	—	S	P	✓			11:24					
	1.7-2.0	R	S	G,P				11:27		11.10.18			
	2.3-2.4	R	S	G,P				11:31					
	2.5	—	S	P	✓			11:33					
	2.7-2.9	R	S	G,P	✓			11:36		11.10.18			
	3.2-3.4	R	S	G,P	✓			11:40		11.10.18			
	3.5	—	S	P	✓			11:43					
	3.7-3.9	R	S	G,P				11:46					
	4.0	—	S	P	✓			11:49					
	4.2-4.4	R	S	G,P				11:51					
	4.45	—	S	P	✓			11:54					
	4.5-4.7	R	S	G,P				11:56					
	4.9	—	S	P	✓			11.59					
	5.1-5.3	R	S	G,P				12:03					
	5.5	—	S	P	✓			12:06					
↓	5.9-6.0	R	S	G,P		↓	↓	12:09	↓				

*Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

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CHAIN OF CUSTODY FIELD SHEET

Project No: 39961.02	**Client Project Name:** WICKHAM PROPOSED APARTMENT DEVELOPMENT
Client: DANGAR ST WICKHAM PTY LTD	**Location:** 10 DANGAR STREET WICKHAM
Project Manager: JH	**DP Lab Received** By: DSW Date: 9/10/18

Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S-soil W water	Container Type G-glass P-plastic	ASS Samples	Sampling By	Sampling Date	Sampling Time	Storage Locn*	Envirolab Services			
203	0.3-0.4	R	S	G,P		DSW	9/10/18	1:15	Fridge				
	0.7	—	S	P	✓			1:17					
	0.8-0.9	R	S	G,P				1:20		11.10.18			
	1.0	—	S	P	✓			1:22					
	1.1-1.3	R	S	G,P				1:25					
	1.4-1.5	R	S	G,P				1:29					
	1.7-1.9	R	S	G,P				1:31					
	2.0	—	S	P	✓			1:34					
	2.2-2.4	R	S	G,P				1:37					
	2.5	—	S	P	✓			1:39					
	2.7-2.9	R	S	G,P				1:42		11.10.18			
	3.0	—	S	P	✓			1:45					
	3.2-3.4	R	S	G,P	✓			1:48					
	3.5	—	S	P	✓			1:51					
	3.8-4.0	R	S	G,P				1:54					
	4.1	—	S	P	✓			1:57					
	4.4-4.6	R	S	G,P				1:59					
	4.8	—	S	P	✓			2:01					

*Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

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CHAIN OF CUSTODY FIELD SHEET

Project No: 39961.02	**Client Project Name:** WICKHAM PROPOSED APARTMENT DEVELOPMENT
Client: DANGAR ST WICKHAM PTY LTD	**Location:** 10 DANGAR STREET WICKHAM
Project Manager: PH	**DP Lab Received** By: Date:

Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S-soil W water	Container Type G-glass P-plastic	ASS Samples	Sampling By	Sampling Date	Sampling Time	Storage Locn*	Geotechnics services			
203	5.2-5.4	R	S	G,P		BSW	9/10/18	2:04	Fridge				
	5.4-5.8	—	S	P	✓			2:07					
	5.8-6.0	R	S	G,P				2:10					
	6.1	—	S	P	✓			2:13					
	6.5	R	S	G,P				2:16					
	6.8	—	S	P	✓			2:19					

*Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

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CHAIN OF CUSTODY FIELD SHEET

Project No: 39961.02	**Client Project Name:** WICKHAM PROPOSED APARTMENT DEVELOPMENT
Client: DANGAR ST WICKHAM PTY LTD	**Location:** 10 DANGAR STREET WICKHAM
Project Manager: PH	**DP Lab Received** By: DSW Date: 10/10/18

Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S-soil W water	Container Type G-glass P-plastic	ASS Samples	Sampling By	Sampling Date	Sampling Time	Storage Locn*	(Envirolab services)			
204	0.2-0.4	R	S	G,P	✓	DSW	10/10/18	10:35	Fridge				
	0.7-0.9	D2	S	G,P				10:38		11.10.18			
	1.0	—	S	P	✓			10:41					
	1.45	—	S	G				10:44					
	1.5-1.7	R	S	G,P				10:47					
	1.8	—	S	P	✓			10:51					
	1.9-2	R	S	G,P				10:54					
	2.0	—	S	P	✓			10:57					
	2.3-2.4	R	S	G,P				11:01		11.10.18			
	2.1-2.15	R	S	G,P				11:04					
	2.9	—	S	P	✓			11:07					
	3.3-3.5	R	S	G,P	✓			11:10					
	3.6	—	S	P	✓			11:13					
	3.8-3.9	R	S	G,P				11:17					
	4.0	—	S	P	✓			11:20					
	4.4	R	S	G,P				11:23					
	4.6	—	S	P	✓			11:26					
	5.5	R	S	G,P	✓			11:29					

*Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY FIELD SHEET

Project No: 39961.02	**Client Project Name:** WICKHAM PROPOSED APARTMENT DEVELOPMENT
Client: DANGAR ST WICKHAM PTY LTD	**Location:** 10 DANGAR STREET WICKHAM
Project Manager: PH	**DP Lab Received** By: DSW Date: 10/10/18

Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S-soil W water	Container Type G-glass P-plastic	ASS Samples	Sampling By	Sampling Date	Sampling Time	Storage Locn*	Enviolab Services			
204	5.0	—	S	P	✓	DSW	10/10/18	11:34	Fridge				
↓	5.8	—	S	P	✓	↓	↓	11:37	↓				
205	0.2-0.3	R	S	G, P				1:11		11.10.18			
	0.5-0.6	D3	S	G, P				1:14		11.10.18			
	1.0-1.2	R	S	G, P				1:17					
	1.4-1.6	R	S	G, P				1:21					
	1.7	—	S	P	✓			1:25					
	1.8-2.0	R	S	G, P				1:28		11.10.18			
	2.1	—	S	P	✓			1:32					
	2.4-2.6	R	S	G, P				1:35					
	2.7	—	S	P	✓			1:38					
	3.1	—	S	P	✓			1:42					
	3.4-3.6	R	S	G, P				1:45					
	3.8	—	S	P	✓			1:48					
	4.1	—	S	P	✓			1:51					
	4.4-4.6	R	S	G, P				1:54					
	5.0	—	S	P	✓			1:57					
↓	5.3	—	S	P	✓	↓	↓	2:02	↓				

*Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

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CHAIN OF CUSTODY FIELD SHEET

Project No: 39961.02	**Client Project Name:** WICKHAM PROPOSED APARTMENT DEVELOPMENT
Client: DANGAR ST WICKHAM PTY LTD	**Location:** 10 DANGAR STREET WICKHAM
Project Manager: PH	**DP Lab Received** By: DJW Date: 10/10/18

Do samples contain 'potential' HBM? Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S-soil W water	Container Type G-glass P-plastic	ASS Samples	Sampling By	Sampling Date	Sampling Time	Storage Locn*	Envirolab Services			
205	5.4-5.6	R	S	G,P		DJW	10/10/18	2:05					
	5.7	—	S	P	—			2:10					
	6.1	—	S	P	—			2:14					
	6.3-6.5	R	S	G,P				2:18					

*Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

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CHAIN OF CUSTODY FIELD SHEET

Project No: 399 61.02	**Client Project Name:**
Client:	**Location:**
Project Manager: PH	**DP Lab Received** By: NA Date:
Do samples contain 'potential' HBM? Yes ☐ No ☑ (If YES, then handle, transport and store in accordance with FPM HAZID)	

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S-soil W water	Container Type G-glass P-plastic	ASS Samples	Sampling By	Sampling Date	Sampling Time	Storage Locn*	24/10/18 Brisbane			
204		D1/SP3	W	G,P	–	JP3	24/10/18	12	Fridge	✓ D1/SP3			
203		↓	↓	↓	–	↓	↓	↓	"	✓			
202		↓	↓	↓	–	↓	↓	3	"	✓			
													?

*Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

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CHAIN OF CUSTODY DESPATCH SHEET (1)

Project No: 39961.02	**Suburb/Town: WICKHAM**	**To: ENVIROLAB SERVICES - CHATSWOOD**	
DP Order No: 141457	**DP Contact Person: PATRICK HEADS**		
Prior Storage: Esky ☐ Fridge ☑ Shelved ☐		**Ph: 02 9910 6200**	**Attn: SIMON / AILEEN**

Do samples contain 'potential' HBM? Yes ☑ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Sample				Analytes							TCLP	Notes
DP ID	Date Sampled	Type S-soil W-water	Lab ID	Metals *	BTEX/ TRH	OCs/ OPs	PAHs	PCBs	Asbestos ID			
201/0.4-0.5	9-10-18	S	1	✓	✓	✓	✓	✓				Combo 6
201/2.2-2.3			2	✓	✓		✓					Combo 3
202/0.6-0.7			3	✓	✓	✓	✓	✓				Combo 6
202/1.7-2.0			4	✓	✓		✓					Combo 3
202/2.7-2.9			5	✓	✓		✓					Combo 3
202/3.2-3.4			6	✓	✓		✓					Combo 3
203/0.8-0.9			7						✓			Combo 6a
203/2.7-2.9			8	✓	✓		✓					Combo 3
204/0.7-0.9	10-10-18		9						✓			Combo 6a
204/2.3-2.4			10	✓	✓		✓					Combo 3
205/0.2-0.3			11	✓	✓		✓		✓			Combo 3a
205/0.5-0.6			12	✓	✓	✓	✓	✓	✓			Combo 6a
PQL (S) mg/kg												
PQL (W) mg/L	ANZECC PQLs req'd for all water analytes ☐											

ENVIROLAB
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 202898
Date Received: 12/10/18
Time Received: 10:20
Received By: KH
Temp: Cool/Ambient
Cooling: Ice/Ice pack
Security: Intact/Broken/None

POL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

*Metals to Analyse (Please circle): As, Cd, Cr, Cu, Pb, Zn, Hg, Ni, Mn, Fe

Total number of samples in container: 15

Date relinquished: 11/10/18 By: JPS

Results required by: 19/10/18

☐ Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☑ Standard

SAMPLES RECEIVED BY LAB
Please sign and date to acknowledge receipt of samples and return by email

Signature: .....
Date: 12/10/18
Lab Ref: 202898

Send results to:
Douglas Partners Pty Ltd
Address:
.....
.....
.....
.....

Douglas Partners
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2 of 2

CHAIN OF CUSTODY DESPATCH SHEET (1)

Project No: 39961.02	**Suburb/Town: WICKHAM**	**To: ENVIROLAB SERVICES - CHATSWOOD**	
DP Order No: 141457	**DP Contact Person: PATRICK HEADS**		
Prior Storage: Esky ☐ Fridge ☑ Shelved ☐		**Ph: 02 9910 6200**	**Attn: SIMON / AILEEN**
Do samples contain 'potential' HBM? Yes ☑ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)			

Sample				Analytes									TCLP	Notes
DP ID	Date Sampled	Type S-soil W-water	Lab ID	Metals *	BTEX/ TRH	OCs/ OPs	PAHs	PCBs	Asbestos ID					
205/1.8-2.0	10-10-18	S	13	✓	✓		✓							Combo 3
D1	9-10-18	〃	14	✓	✓	✓	✓	✓						Combo 6
D3	10-10-18	〃	15	✓	✓	✓	✓	✓						Combo 6
PQL (S) mg/kg														
PQL (W) mg/L	ANZECC PQLs req'd for all water analytes ☐													

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

*Metals to Analyse (Please circle) As, Cd, Cr, Cu, Pb, Zn, Hg, Ni, Mn, Fe

Total number of samples in container: 15

Date relinquished: 11/10/18 By: .....

Results required by: 19/10/18

[ ] Same day [ ] 24 hours [ ] 48 hours [ ] 72 hours ☑ Standard

SAMPLES RECEIVED BY LAB
Please sign and date to acknowledge receipt of samples and return by email

Signature: .....

Date: 12/10/18

Lab Ref: 202898

Send results to:
Douglas Partners Pty Ltd
Address: .....
.....
.....
.....
Email: patrick.heads@douglaspartners.com.au

ELS: 202898-A
TAT: 5 days
Due: 1/11/18

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CHAIN OF CUSTODY DESPATCH SHEET (2)

Project No: 39961.02	**Suburb/Town:** WICKHAM	**To:** ENVIROLAB SERVICES CHATSWOOD	
DP Order No:	**DP Contact Person:** PATRICK HEADS		
Prior Storage: Esky ☐ Fridge ☑ Shelved ☐ AT LAB		**Ph:** 0299106200	**Attn:** SIMON/KEEN

Do samples contain 'potential' HBM? Yes ☑ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Sample				Analytes										Notes
DP ID	Date Sampled	Type S-soil W-water	Lab ID	TCLP BaP	TCLP Pb	TCLP Hg	ASLP BaP Low level	ASLP Pb						
202/0.6-0.7	9/10/18	S	3		✓									
203/0.8-0.9	↓	↓	7	✓										
205/0.2-0.3	10/10/18	↓	11	✓	✓									
205/0.5-0.6	↓	↓	12	✓	✓	✓	✓	✓						Low level BaP (ANZECC ASLP)
D3	↓	↓	15	✓			✓							
PQL (S) mg/kg														
PQL (W) mg/L	ANZECC PQLs req'd for all water analytes ☐													

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

*Metals to Analyse (Please circle) As, Cd, Cr, Cu, Pb, Zn, Hg, Ni, Mn, Fe

Total number of samples in container: AT LAB

Date relinquished: 11/10/18 By: PH

Results required by: 2/11/18

☐ Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☑ Standard

SAMPLES RECEIVED BY LAB
Please sign and date to acknowledge receipt of samples and return by email

Signature: .....

Date: .....

Lab Ref: .....

Send results to:
Douglas Partners Pty Ltd
Address: .....
.....
.....
.....
Email: .....

Douglas Partners
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CHAIN OF CUSTODY DESPATCH SHEET (1)

Project No: 39961.02	**Suburb/Town:** WYCKHAM	**To:** ENVIROLAB SERVICES CHATSWOOD	
DP Order No: 141468	**DP Contact Person:** PATRICK HEATH		
Prior Storage: Esky ☑ Fridge ☑ Shelved ☐		**Ph:** 02 99106200	**Attn:** SIMON SONG

Do samples contain 'potential' HBM? Yes ☐ No ☑ (If YES, then handle, transport and store in accordance with FPM HAZID)

Sample				Analytes									TCLP	Notes
DP ID	Date Sampled	Type S-soil W-water	Lab ID	Metals *	Total Phenol	BTEX/ TRH	OCs/ OPs	PAHs low level ANZECC	PCBs	pH	EC			
202	24/10/18	W		✓		✓		✓		✓	✓			combo 3 + pH + EC
203	↓	↓		✓		✓		✓		✓	✓			↓
204	↓	↓		✓		✓		✓		✓	✓			↓
DUP5	↓	↓		✓		✓		✓		✓	✓			↓
PQL (S) mg/kg														
PQL (W) mg/L	ANZECC PQLs req'd for all water analytes ☐													

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 203991
Date Received: 25/10/18
Time Received:
Received by: [illegible]
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

*Metals to Analyse (Please circle): As, Cd, Cr, Cu, Pb, Zn, Hg, Ni, Mn, Fe

Total number of samples in container: 4

Date relinquished: 24/10/18 By: DUPS

Results required by: 2/11/18

☐ Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☑ Standard

SAMPLES RECEIVED BY LAB
Please sign and date to acknowledge receipt of samples and return by email

Signature: [signature]

Date: 25/10/18

Lab Ref:

Send results to:
Douglas Partners Pty Ltd
Address:

Email:

Douglas Partners
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CHAIN OF CUSTODY DESPATCH SHEET (2)

Project No: 39961.02	**Suburb/Town:** WILLIAM	**To:** Envirolab Services Chatswood	
DP Order No: 141470	**DP Contact Person:** PATRICK HOARE		
Prior Storage: Esky ☐ Fridge ☑ Shelved ☐ FREEZER		**Ph:** 0299106200	**Attn:** SIMON SONG

Do samples contain 'potential' HBM? Yes ☐ No ☑ (If YES, then handle, transport and store in accordance with FPM HAZID)

Sample DP ID	Sample Date Sampled	Sample Type S-soil W-water	Sample Lab ID	Analytes: AGS Chromium Suite	Notes
201/1.5-1.6	9/10/18	S	1	✓	
201/7.7-7.9	↓	↓	2	✓	
203/3.5	↓	↓	3	✓	
205/2.1	10/10/18	↓	4	✓	
PQL (S) mg/kg					
PQL (W) mg/L	ANZECC PQLs req'd for all water analytes ☐				

ENVIROLAB GROUP
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 204047
Date Received: 26/10/18
Time Received: 10:45
Received By: LN
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

*Metals to Analyse (Please circle) As, Cd, Cr, Cu, Pb, Zn, Hg, Ni, Mn, Fe

Total number of samples in container: 4

Date relinquished: 25/10/18 By: PH

Results required by: 2/11/18

☐ Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☑ Standard

SAMPLES RECEIVED BY LAB
Please sign and date to acknowledge receipt of samples and return by email

Signature: Hg Nott

Date: 26/10/18 10:45

Lab Ref: 204047

Send results to:
Douglas Partners Pty Ltd
Address: .....
.....
.....
.....
Email: .....

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads

Sample Login Details

Your reference	39961.02, Wickham
Envirolab Reference	202898
Date Sample Received	12/10/2018
Date Instructions Received	12/10/2018
Date Results Expected to be Reported	19/10/2018

Sample Condition

Samples received in appropriate condition for analysis	YES
No. of Samples Provided	15 SOIL
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	13.6
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticidesin soil	Organophosphorus Pesticides	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils
201-0.4-0.5	✓	✓	✓	✓	✓	✓	✓	
201-2.2-2.3	✓	✓	✓				✓	
202-0.6-0.7	✓	✓	✓	✓	✓	✓	✓	
202-1.7-2.0	✓	✓	✓				✓	
202-2.7-2.9	✓	✓	✓				✓	
202-3.2-3.4	✓	✓	✓				✓	
203-0.8-0.9	✓	✓	✓	✓	✓	✓	✓	✓
203-2.7-2.9	✓	✓	✓				✓	
204-0.7-0.9	✓	✓	✓	✓	✓	✓	✓	✓
204-2.3-2.4	✓	✓	✓				✓	
205-0.2-0.3	✓	✓	✓				✓	✓
205-0.5-0.6	✓	✓	✓	✓	✓	✓	✓	✓
205-1.8-2.0	✓	✓	✓				✓	
D1	✓	✓	✓	✓	✓	✓	✓	
D3	✓	✓	✓	✓	✓	✓	✓	

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads

Sample Login Details

Your reference	39961.02, Wickham
Envirolab Reference	202898-A
Date Sample Received	12/10/2018
Date Instructions Received	25/10/2018
Date Results Expected to be Reported	01/11/2018

Sample Condition

Samples received in appropriate condition for analysis	YES
No. of Samples Provided	15 SOIL
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	13.6
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	pH of soil for fluid#determ.	pH of soil TCLP (after HCl)	Extraction fluid used	pH of final Leachate	Lead in TCLP	Mercury in TCLP	Naphthalene in TCLP	Acenaphthylene in TCLP	Acenaphthene in TCLP	Fluorene in TCLP	Phenanthrene in TCLP	Anthracene in TCLP	Fluoranthene in TCLP	Pyrene in TCLP	Benzo(a)anthracene in TCLP	Chrysene in TCLP	Benzo(bjk)fluoranthene in TCLP	Benzo(a)pyrene in TCLP	Indeno(1,2,3-c,d)pyrene - TCLP	Dibenzo(a,h)anthracene in TCLP	Benzo(g,h,i)perylene in TCLP	Total +vePAH's	Surrogate p-Terphenyl-d14	Metals-ASLP Neutral (ICP-MS)	PAHs in Water LeachLow Level	On Hold
201-0.4-0.5																										✓
201-2.2-2.3																										✓
202-0.6-0.7	✓	✓	✓	✓	✓																					
202-1.7-2.0																										✓
202-2.7-2.9																										✓
202-3.2-3.4																										✓
203-0.8-0.9	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
203-2.7-2.9																										✓
204-0.7-0.9																										✓
204-2.3-2.4																										✓
205-0.2-0.3	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
205-0.5-0.6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
205-1.8-2.0																										✓
D1																										✓
D3	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	
205 - [TRIPLICATE]-0.5-0.6																										✓
205 - [TRIPLICATE]-0.2-0.3																										✓
D3 - [TRIPLICATE]																										✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads

Sample Login Details

Your reference	39961.02, Wickham
Envirolab Reference	203991
Date Sample Received	25/10/2018
Date Instructions Received	25/10/2018
Date Results Expected to be Reported	01/11/2018

Sample Condition

Samples received in appropriate condition for analysis	YES
No. of Samples Provided	4 water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	12.2
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Water	svTRH (C10-C40) in Water	PAHs in Water - Low Level	HM in water - dissolved	pH	Electrical Conductivity
202	✓	✓	✓	✓	✓	✓
203	✓	✓	✓	✓	✓	✓
204	✓	✓	✓	✓	✓	✓
D1/JPS	✓	✓	✓	✓	✓	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads

Sample Login Details

Your reference	39961.02
Envirolab Reference	204047
Date Sample Received	26/10/2018
Date Instructions Received	26/10/2018
Date Results Expected to be Reported	02/11/2018

Sample Condition

Samples received in appropriate condition for analysis	YES
No. of Samples Provided	4 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	12.3
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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12 Ashley St Chatswood NSW 2067
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Sample ID	Chromium Suite
201-1.5-1.6	✓
201-7.7-7.9	✓
203-3.5	✓
205-2.1	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.

APPENDIX C – DATA QUALITY REPORT

1. Site Assessment Criteria

1.1 Introduction

It is understood that the proposed development at 10 Dangar Street, Wickham, will comprise a 14-level retail, commercial and residential development with two basement levels. The majority of the development footprint will be excavated as part of basement construction, with the majority of ground floor footprint comprising concrete slabs, pavements or imported landscape materials.

The Site Assessment Criteria (SAC) applied in the current investigation are informed by the CSM which identified human and ecological receptors to potential contamination on the site (refer to Section 4 of the report). Analytical results were assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1, National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended 2013 (NEPC, 2013). NEPC (2013) is endorsed by the NSW EPA under the CLM Act 1997.

The investigation and screening levels applied in the current investigation comprise levels adopted for a generic residential with minimal access to soil and commercial / industrial land use scenario.

1.2 Soils

1.2.1 Health Investigation and Screening Levels

The generic HIL and HSL are considered to be appropriate for the assessment of contamination at the site. The adopted soil HIL and HSL for high density residential (HIL/HSL B) and commercial (HIL/HSL D) for the potential contaminants of concern are presented in Table C1.

Table C1: HIL and HSL in mg/kg Unless Otherwise Indicated

Contaminants		HIL- B	HIL- D	HSL- B [4]	HSL- D [4]
Metals	Arsenic	500	3000	NC	NC
	Cadmium	150	900	NC	NC
	Chromium (VI)	500	3600	NC	NC
	Copper	30000	240000	NC	NC
	Lead	1200	1500	NC	NC
	Manganese	14000	60000	NC	NC
	Mercury (inorganic)	120	730	NC	NC
	Nickel	1200	6000	NC	NC
	Zinc	60000	400000	NC	NC
PAH	Benzo(a)pyrene TEQ[1]	4	40	NC	NC
	Naphthalene	NC	NC	3/NL/NL	NL/NL/NL
	Total PAH	400	4000	NC	NC
TRH	C6 – C10 (less BTEX) [F1]	NC	NC	45/70/110	260/370/630
	>C10-C16 (less Naphthalene) [F2]	NC	NC	110/240/440	NL/NL/NL
	>C16-C34 [F3]	NC	NC	NC	NC
	>C34-C40 [F4]	NC	NC	NC	NC
BTEX	Benzene	NC	NC	0.5/0.5/0.5	3/3/3
	Toluene	NC	NC	160/220/310	NL/NL/NL
	Ethylbenzene	NC	NC	55/NL/NL	NLNL/NL
	Xylenes	NC	NC	40/60/95	230/NL/NL
OCP	Aldrin + Dieldrin	10	45	NC	NC
	Chlordane	90	530	NC	NC
	DDT+DDE+DDD	600	3600	NC	NC
	Endosulfan	400	2000	NC	NC
	Endrin	20	100	NC	NC
	Heptachlor	10	50	NC	NC
	HCB	15	80	NC	NC
	Methoxychlor	500	2500	NC	NC
OPP	Chlorpyrifos	340	2000	NC	NC
PCB [2]		1	7	NC	NC

Notes to Table C1:

1 Sum of carcinogenic PAH

2 Non dioxin-like PCBs only.

3 The soil saturation concentration (Csat) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds Csat, a soil vapour source concentration for a petroleum mixture could not exceed a level that would results in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'.

4 The HSL have been calculated for a potential vapour intrusion pathway, a sand soil based on subsurface conditions being the predominant soil type (Section 5) and an assumed depth to contamination of 0 m to <1 m / 1 m to < 2 m / 2 m to <4 m.

As shown in Table C1 the adopted HSLs are predicated on a potential vapour intrusion pathway, as identified in the CSM. Although the CSM also identifies a direct contact pathway, and construction worker receptors, the corresponding HSLs are significantly higher than those for the vapour intrusion pathway and are therefore not drivers for further assessment and/or remediation. As such the direct contact and intrusive maintenance worker HSLs have not been listed.

1.2.2 Ecological Investigation Levels

Ecological Investigation Levels (EIL) are not considered to be relevant for the proposed residential with minimal access to soil / commercial development due to the following:

- The fill materials present across the site are likely to be typical of the fill conditions across the broader Wickham area;
- The majority of soils currently at the site will be excavated as part of basement construction;
- The site will be capped with concrete slabs and pavements. Localised landscape areas are likely to comprise raised garden beds with 'clean' imported soils;
- The site is not considered to comprise an area of ecological significance due to the former landuse and extensive filling conducted;
- The site is extensively covered by pavements and as such would have limited environmental value related to terrestrial ecosystems.

1.2.3 Ecological Screening Levels

Ecological Screening Levels (ESL) are not considered to be relevant for the proposed residential with minimal access to soil / commercial development as discussed above.

1.2.4 Management Limits

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

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

The adopted management limits from Schedule B1 of NEPC (2013) are shown in the following Table C2.

Table C2: Management Limits in mg/kg

Analyte		Management Limit Residential	Management Limit Commercial	
TRH	$C_6 – C_{10}$ (F1) #	700	700	The management limits have been calculated for a coarse soil based on sands being the predominant soil type (Section 5) and residential, parkland and public open space / commercial and industrial landuse
	$>C_{10}-C_{16}$ (F2) #	1000	1000	
	$>C_{16}-C_{34}$ (F3)	2500	3500	
	$>C_{34}-C_{40}$ (F4)	10000	10000	

Notes to Table C2

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

1.2.4 Asbestos in Soil

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

A detailed asbestos assessment was not undertaken as part of these works. Therefore the presence or absence of asbestos at a limit of reporting of 0.1 g/kg has been adopted for this assessment as an initial screen.

1.3 Groundwater

The potential receptors of impacted groundwater from the site include:

- Site occupants including residents and employees (vapour impacts from contaminated groundwater);
- Workers conducting excavations, construction or maintenance works within the site or nearby the site (impacted groundwater);
- Down-gradient groundwater users (if any);
- Throsby Basin located approximately 100 m east-north-east of the site and is considered the nearest sensitive receptor.

1.3.1 Groundwater Investigation Levels (GIL)

The GIL adopted in NEPC (2013) are based on:

- *Australian Drinking Water Guidelines* 2011 (ADWG);
- *Guidelines for Managing Risk in Recreational Waters* 2008 (GMRRW);
- *National water quality management strategy. Australian and New Zealand guidelines for fresh and marine water quality* 2018 (ANZECC & ARMCANZ).

The adopted GIL for the analytes included in the assessment (where applicable), and the corresponding source documents, are shown in Table C3.

Table C3: GIL (in µg/L unless otherwise stated)

Analyte		NEPC (2013) Fresh Waters [2]	NEPC (2013) Marine Waters [2]
Metals	Arsenic (V)	13	2.3
	Cadmium	0.2	0.7
	Chromium (VI)	1	4.4
	Copper	1.4	1.3
	Lead	3.4	4.4
	Manganese	1900	80
	Mercury (total)	0.06	0.1
	Nickel	11	7
	Zinc	8	15
PAH	Naphthalene	16	50
	Benzo(a)pyrene	0.1	0.1
BTEX	Benzene	950	500
	Toluene	180	180
	Ethylbenzene	80	5
	Xylene (o)	350	NC
	Xylenes (Total)	NC	NC

Notes to Table C3:

1 In cases where no high reliability trigger values are provided, the low reliability trigger values provided in ANZECC & ARMCANZ (2000) have been used as screening levels

2 Investigation levels apply to typically slightly-moderately disturbed systems

1.3.2 Health Screening Levels (HSL)

The generic HSL are considered to be appropriate for the assessment of contamination at the site. Given the proposed land use the adopted HSL is:

- **HSL- B** – residential B.

The HSL for commercial/industrial land use (HSL D) were also included for comparison purposes.

The adopted groundwater HSL for vapour intrusion, from Table 1A(4), Schedule B1 of NEPC (2013) are shown in the following Table C4.

Table C4: HSL (mg/L)

Analyte		HSL-B	HSL-D	
TRH	$C_6 – C_{10}$ (less BTEX) [F1]	1	6	The HSL have been calculated for a sand soil based on sands being the predominant soil type (Section 5) and an assumed depth to contamination of 2 m to <4 m.
	$>C_{10}-C_{16}$ (less Naphthalene) [F2]	1	NL	
BTEX	Benzene	0.8	5	
	Toluene	NL	NL	
	Ethylbenzene	NL	NL	
	Xylene	NL	NL	
PAH	Naphthalene	NL	NL	

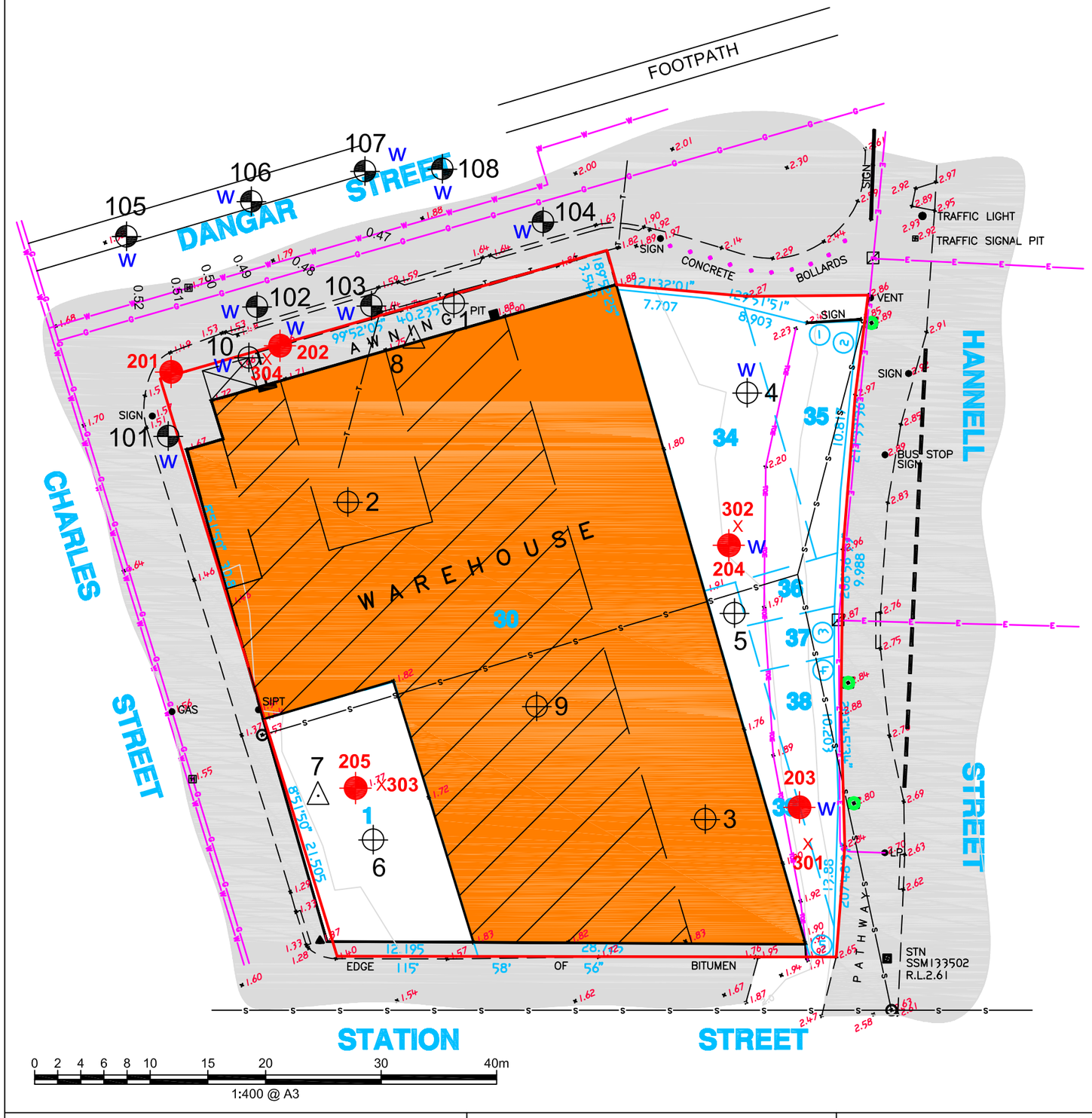
Note to Table C4:

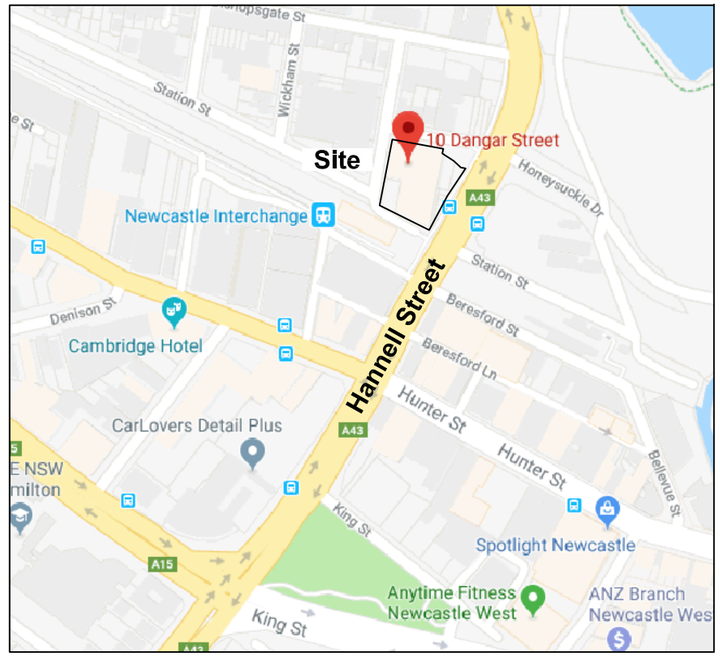
NL -The solubility limit is defined as the groundwater concentration at which the water cannot dissolve any more of an individual chemical based on a petroleum mixture. The soil vapour which is in equilibrium with the groundwater will be at its maximum. If the derived groundwater HSL exceeds the water solubility limit, a soil-vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for a given scenario. For these scenarios no HSL is presented for these chemicals. These are denoted as not limiting 'NL'.

It is noted that the generic HSL are not appropriate when the depth to groundwater impact is less than 2m. Under these circumstances a site specific risk assessment may be needed. The adopted HSLs have therefore been used for preliminary assessment purposes only.

Appendix D

Drawing 1 – Test Location Plan
Basement and Ground Floor Plan by PBD Architects, Drawing No. DA102, Issue A





Locality Plan

NOTES

1. Drawing adapted from survey plan by Parker Scanlon Pty Ltd, Ref B122 dated 25.1.08.

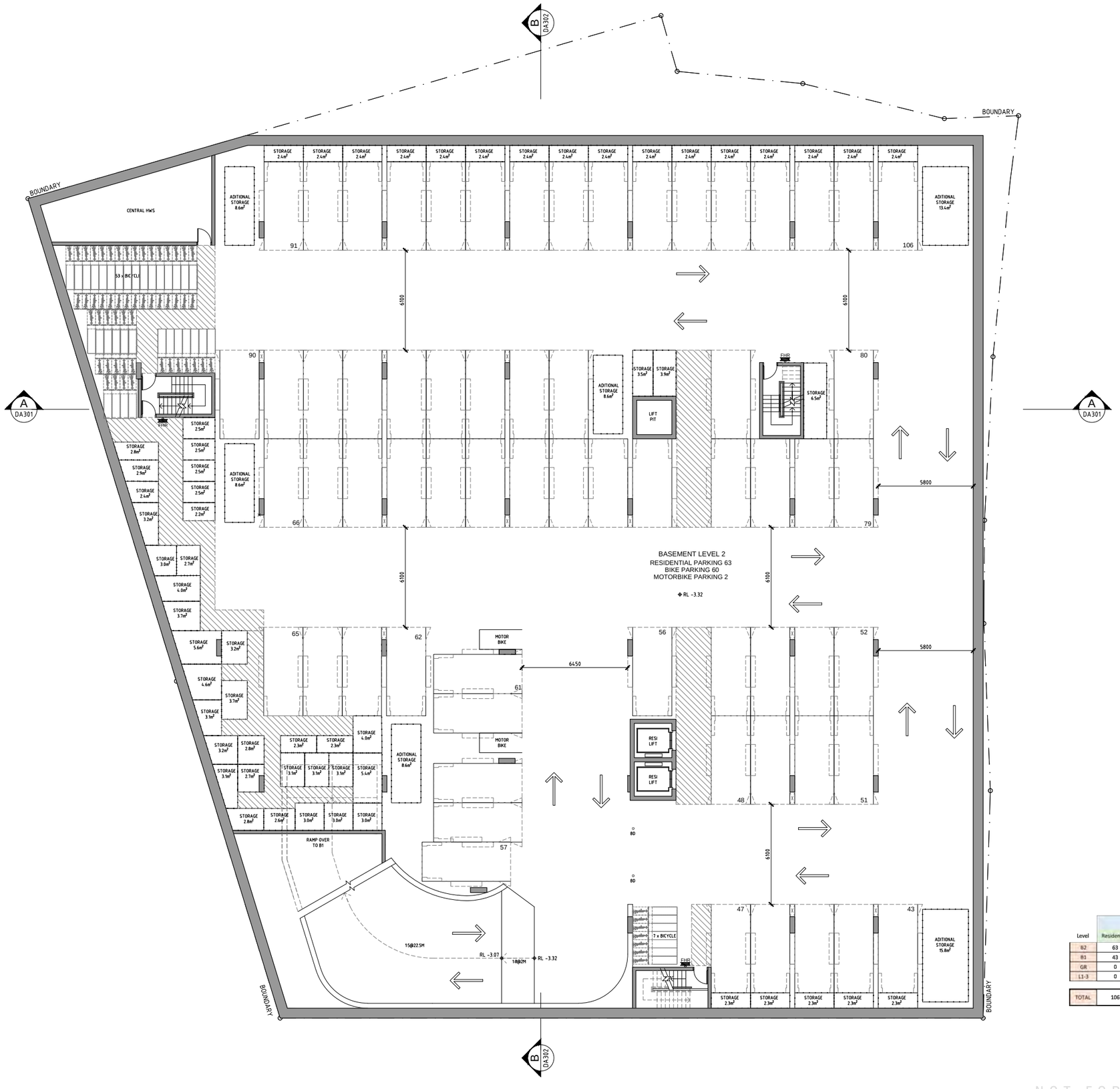
LEGEND

- Approximate Borehole Location (current investigation)
- Approximate CPT Location (current investigation)
- Approximate Borehole Location (previous investigation 39961.01, Nov 2008)
- Approximate Borehole Location (previous investigation 39961, Sept 2008)
- Approximate Location of Raised Concrete Floor
- Approximate Surface / Near Surface Sampling Location (previous investigation 39961, Sept 2008)
- Approximate Location of Possible Former Bowser(s)
- Approximate of Possible Underground Storage Tank(s)
- W Groundwater Monitoring Well
- Site Boundary

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: Dangar Street Wickham Pty Ltd		TITLE: **Test Location Plan** **Proposed Apartment Development** **10 Dangar Street, Wickham**
OFFICE: Newcastle	DRAWN BY: PLH	
SCALE: 1:400@A3 Sheet	DATE: 23.11.2018	

PROJECT No:	39961.02
DRAWING No:	1
REVISION:	0



GENERAL NOTES:

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- CONTRACTOR TO VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK. SHOULD A DISCREPANCY BE IDENTIFIED PLEASE CONFIRM WITH ARCHITECT PRIOR TO PROCEEDING (DO NOT SCALE FROM DRAWINGS)
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- COPYRIGHT OF DESIGN SHOWN HEREON IS RETAINED BY PBD ARCHITECTS AND AUTHORITY IS REQUIRED FOR ANY REPRODUCTION

LEGEND:

AW	AWNING
HW	HIGHLIGHT WINDOW
CU	A/C CONDENSER UNITS
FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
FS	FIRE STAIRS
MV	MECHANICAL RISER TO FUTURE DETAIL
GC	GARBAGE CHUTE
MB	MAILBOX TO FUTURE DETAIL
R	240L RECYCLING BIN
SK	SKYLIGHT
ST	STORAGE
WT	HOT WATER UNITS

MATERIALS LEGEND:

AFG	ALUMINIUM FRAMED GLAZING
AFL	ALUMINIUM ELLIPTICAL FIXED LOUVERS
AW	AWNING TO FUTURE DETAILS
BS	BATTEN SCREEN (TO FUTURE DETAIL)
FB	FACE BRICK
GB	FRAMELESS TOUGHENED GLASS BALUSTRADE (TO BCA/AUSTRALIAN STANDARDS)
MC	METAL CLADDING
MF	METAL FENCING (TO FUTURE SELECTION)
PS	PRIVACY SCREEN (TO FUTURE SELECTION)
PTx	PAINT FINISH TYPEx
RD	ROLLER DOOR
RP	RIVER PEBBLES
RW	RENDERED WALL/SELECTED PAINT FINISH
TC	TIMBER CLADDING

Level	Parking Requirement				
	Residential	Retail	Comercial	Bikes	Motorbikes
B2	63	0	0	60	2
B1	43	10	6	47	2
GR	0	8	0	0	0
L1-3	0	0	67	27	6
TOTAL	106	18	73	134	10

DA
NOT FOR CONSTRUCTION

ISSUE	DATE	DESCRIPTION
A	19-10-18	DA SUBMISSION

CLIENT:
MultiPart Property Group

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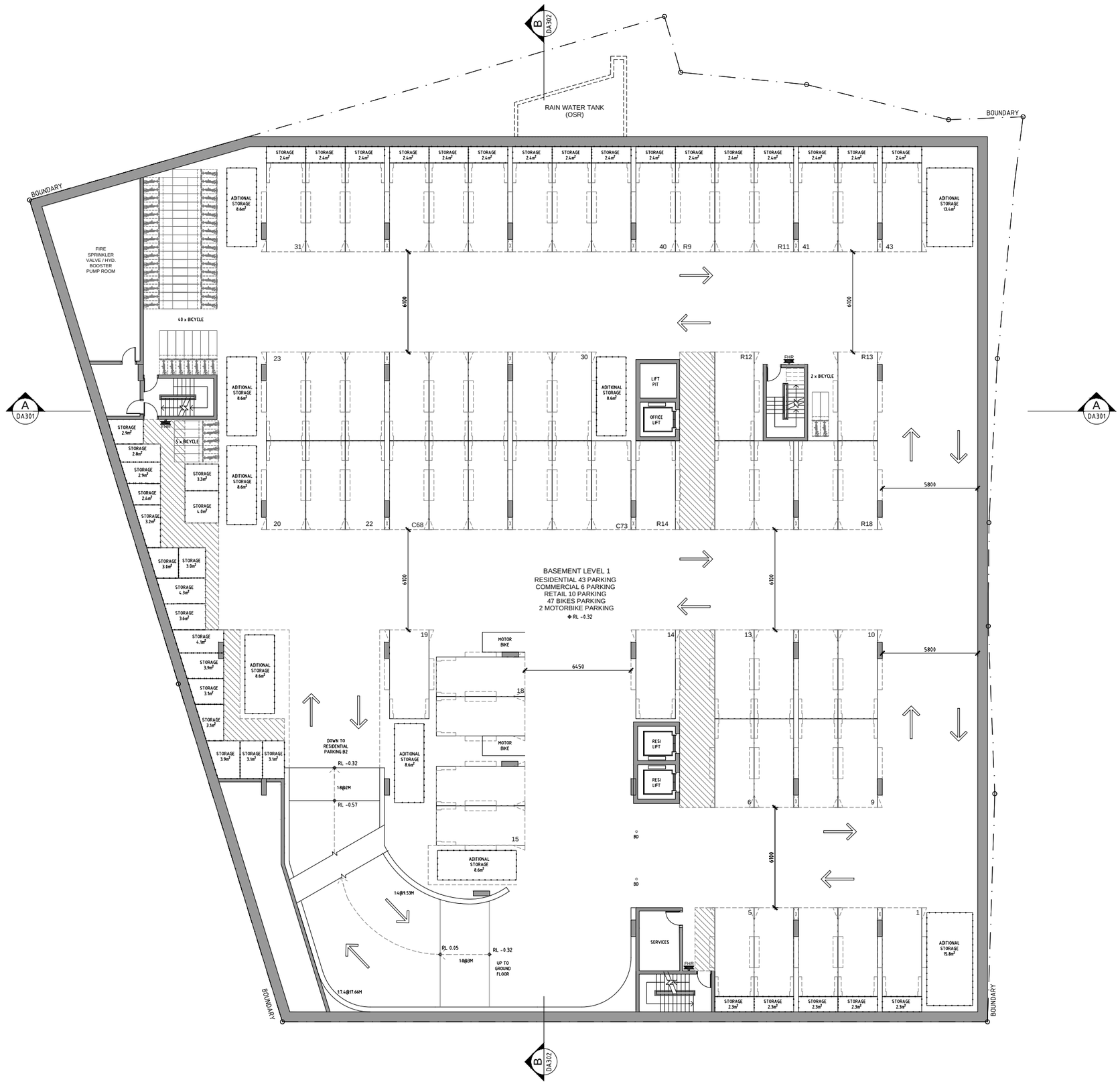
PROJECT:
PROPOSED RESIDENTIAL DEVELOPMENT
10 DANGAR ST, WICKHAM

SEPT 2018

DRAWING TITLE:
BASEMENT 2 PLAN

SCALE:	DRAWING NO:	ISSUE:
1:100@B1 / 1:250@A3	DA100	A
PROJECT NO: 1825		



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FHR	FIRE HOSE REEL
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A	19-10-18	DA SUBMISSION

CLIENT:

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PROJECT:

PROPOSED RESIDENTIAL DEVELOPMENT
10 DANGAR ST, WICKHAM

SEPT 2018

DRAWING TITLE:

BASEMENT 1 PLAN

SCALE:	DRAWING NO:	ISSUE:
1:100@B1 / 1:250@A3	DA101	A
PROJECT NO: 1825		

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LEGEND:

AW	AWNING
HW	HIGHLIGHT WINDOW
OU	A/C CONDENSER UNITS
FH	FIRE HYDRANT
FHR	FIRE HOSE REEL
FS	FIRE STAIRS
MV	MECHANICAL RISER TO FUTURE DETAIL
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PROJECT:

PROPOSED RESIDENTIAL DEVELOPMENT
10 DANGAR ST, WICKHAM

SEPT 2018

DRAWING TITLE:

GROUND FLOOR PLAN

SCALE:	DRAWING NO:	ISSUE:
1:100@B1 / 1:250@A3	DA102	A
PROJECT NO: 1825		

PRELIMINARY
WORK IN PROGRESS

Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Remediation Action Plan

Proposed Apartment Development
10 Dangar Street, Wickham

Prepared for
Dangar Street Wickham Pty Ltd

Project 39961.02
January 2021

Douglas Partners
Geotechnics / Environment / Groundwater

Document History

Document details

Project No.	39961.02	Document No.	R.004.Rev3
Document title	Remediation Action Plan Proposed Apartment Development		
Site address	10 Dangar Street, Wickham		
Report prepared for	Dangar Street Wickham Pty Ltd		
File name	39961.02.R.004.Rev3		

Document status and review

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Revision 1	Patrick Heads	Chris Bozinovski	18 September 2020
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Revision 1	1	0	David Goldman, Dangar Street Wickham Pty Ltd
Revision 2	1	0	David Goldman, Dangar Street Wickham Pty Ltd
Revision 3	1	0	David Goldman, Dangar Street Wickham Pty Ltd

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

	Signature	Date
Author	Patrick Heads	29 January 2021
Reviewer	C. Bozinovski	29 January 2021

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FS 604853

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Appendix A: About This Report
Drawing 1 – Test Location Plan
Architectural Plans (Team 2 Architects Ref 918, Rev 4 dated 17.9.2020)

Remediation Action Plan
Proposed Apartment Development
10 Dangar Street, Wickham

1. Introduction

This remediation action plan (RAP) was prepared for a proposed apartment development at 10 Dangar Street, Wickham. The work was commissioned in a signed services order dated 20 September 2018 by David Goldman of Dangar Street Wickham Pty Ltd and was undertaken with reference to Douglas Partners Pty Ltd (DP) proposal NCL180390 dated 5 July 2018.

The RAP has been developed based on available standards and guidelines prepared by the relevant authorities, the results of the previous investigations (Refs 1, 2) and recent preliminary site investigation (Ref 3) and detailed site investigation (Ref 4) conducted by DP for the proposed development.

The previous investigations conducted by DP (Refs 1 to 4) identified the following contamination issues:

- The presence of hydrocarbon impacts in soil and groundwater associated with underground storage tank(s) (UST) and associated infrastructure (i.e. presumed former petrol bowser and fuel lines) in the north-western portion of the site;
- The presence of elevated total PAH concentrations in several fill samples;
- The presence of asbestos containing materials (ACM) within filling across the site.

This RAP has been prepared to describe procedures for the remediation/management of the following:

- Former UST area:
  - Decommissioning and removal of remnant fuel infrastructure (if any);
  - Excavation, remediation and/or off-site disposal of identified localised hydrocarbon-impacted soils;
  - Treatment of remnant groundwater contamination (if required).
- General site filling containing PAH and asbestos:
  - Off-site disposal of impacted filling to an appropriately licensed landfill.

It is noted that the above remediation methodology has been conducted successfully on nearby similar developments.

The RAP includes an unexpected finds protocol and contingency measures to manage other issues which may arise during the course of remediation and redevelopment works.

The results of previous soil and groundwater analysis conducted by DP with comparison to NEPM 2013 criteria are provided in Reference 4.

This RAP details the aims, methods and procedures by which the remediation and site validation will be achieved. It will enable the site to be declared suitable for the proposed high-density residential development.

This RAP has been prepared with reference to the NSW EPA Guidelines for Consultants Reporting on Contamination Sites (Ref 5).

2. Methods and Objectives of the RAP

The following remediation methods are proposed:

- Decommission and remove USTs and associated infrastructure, remediate localised hydrocarbon impacted soils (and groundwater, if required) with subsequent validation to confirm appropriate removal;
- Excavation and off-site disposal of soils impacted by PAHs and ACM as part of basement construction at the site. It is noted that the Architectural Plans (Team 2 Architects Ref 918, Rev 4 dated 17.9.2020, as provided in Appendix A) indicate that the majority of the site will be excavated for basement construction, which will result in the removal of impacted soils. For those localised areas not excavated for basement construction, it is recommended that upper impacted filling be excavated and removed from site and be replaced with verified imported materials.

The objective of the RAP is to ensure that the site is remediated in an acceptable manner, with minimal environmental impact, to a condition suitable for proposed high density residential development. The objectives of this RAP are therefore to provide a strategy for site remediation which:

- Minimises impacts from the site on the environment and on public health and safety during site remediation;
- Maximises the protection of workers involved with site remediation;
- Renders the site safe for the proposed landuse and substantially reduces potential exposure pathways to contaminants;
- Minimises impacts on the local environment during and following site remediation.

The RAP also provides an outline working plan for the excavation, stockpiling, management and disposal of excess spoil and sediment controls and a contingency plan.

The extent of “chase-out” excavation of contaminated soil would necessarily be limited by the proximity of the impact to site boundaries and consideration of adjacent underground services.

Based on the above considerations the remediation excavations will be extended to the extent practicable. If residual contamination is present at the practical limit of excavation then either; (a) risk assessment would be conducted to assess the actual risk associated with the residual contamination and/or (b) a mitigation and management strategy will be devised to appropriately manage the residual contamination. It is noted that the previous investigation by DP (Refs 2, 4) has assessed the approximate extent of hydrocarbon impact associated with the former UST area. Based on previous results and the proximity of USTs to the northern site boundary, it is anticipated that some localised contamination may be present beyond the northern site boundary.

3. Review of Site Information

3.1 Site Description

The site is identified as Lot 1, DP1197377 and is known as 10 Dangar Street Wickham. The site is an irregular-shaped area of approximately 2930 m^2.

The site is bounded to the east by Hannell Street, to the north by Dangar Street, and residential development, to the west by Charles Street, Station Street and commercial development, and to the south by the Newcastle Transport Interchange (i.e. former rail corridor).

The subject lot is shown in Figure 1 below.

Figure 1: Subject site, in yellow

The site is currently occupied by a vehicle retailer. It is understood that that the site is zoned B3 Commercial Core, which permits a range of landuses with consent, from childcare centres to commercial premises.

Reference to NSW LiDAR topographic imaging for the site indicates that surface levels are in the order of RL1.5 to RL2.0 (AHD), with the site being generally flat.

The site was previously identified as the following lots, as presented in Ref 1:

- Lot 30, DP 635397;
- Lot 1, DP 735415; and
- Lots 34-39, DP 1086794.

3.2 Background

DP has conducted geotechnical and contamination assessment on the site as follows:

- DP, 'Report on Preliminary Contamination and Geotechnical Assessment, Proposed Multi-storey Commercial Development, 10 Dangar Street Wickham', Project 39961, September 2008 (Ref 1);
- DP, 'Report on Additional Contamination Assessment, Proposed Multi-storey Commercial Development, 10 Dangar Street Wickham', Project 39961.01, November 2008 (Ref 2);
- DP, 'Report on Preliminary Site Investigation, Desktop Geotechnical and Acid Sulfate Soil Assessment, Proposed Apartment Development, 10 Dangar Street Wickham', prepared for Dangar Street Wickham Pty Ltd, Project 39961.02 dated 18 October 2018 (Ref 3);
- DP, 'Report on Detailed Site Investigation, Proposed Apartment Development, 10 Dangar Street Wickham', prepared for Dangar Street Wickham Pty Ltd, Project 39961.02 dated 23 November 2018 (Ref 4).

The assessments comprised the following:

- Desktop assessment of published information;
- Site history assessment, comprising review of historical aerial photos, discussions with previous site occupiers, Council records search and NSW EPA search;
- Drilling of boreholes across the site to target potential contamination sources and provided an overall assessment of site condition;
- Groundwater well installation and sampling to assess potential groundwater impacts and possible migration of hydrocarbon impact in groundwater; and
- Preparation of reports presenting the results of the assessments.

The results of site history indicated the following:

- Possible former site uses included a transport terminal, distribution centre, motor workshop, motor vehicle storage, motor vehicle auction warehouse, removalists, courier/freight terminal and residential dwellings (i.e. prior to commercial site use);
- Underground fuel storage is located in the north-western corner of the site (i.e. underground tank and possible bowsers in an alcove in the north-western corner of the structure); and

- Demolition of previous structures (e.g. residential dwellings) had occurred prior to construction of the warehouse structure.

A site walkover was conducted in 2008 as part of the previous works (i.e. prior to refurbishment of the site structure and pavements to the current configuration). Relevant features included the following:

- Presence of fibro fragments (possible asbestos containing materials – ACM) at the surface in the eastern portion of the site;
- Fibro sheeting (possible ACM) used as exterior cladding on the site structure;
- Raised floor levels within the warehouse building (i.e. possible filling beneath the structure); and
- Observations of filling in unpaved areas at the surface including ash, slag, rail ballast and building rubble.

On the basis of the above, a conceptual site model (CSM) was prepared with reference to the National Environment Protection (Assessment of Site Contamination) Measure 1999 (Amendment Measure 2013) Schedule B2 (Ref 6). The CSM from Reference 3 is reproduced in Table 1 below.

Table 1: Conceptual Site Model

Known and Potential Primary Sources	Primary Release Mechanism	Secondary Release Mechanism	Potential Impacted Media	Contaminants of Concern	Exposure Pathway	Potential Receptors	
						Current	Future
Filling imported across the site (subject to source)	Placement of filling on-site	Long-term leaching of contaminants via runoff, rain water infiltration / percolation or exposure / disturbance during proposed development	Soil, groundwater, surface water	TRH, BTEX, PAH, Metals, Pesticides, PCB, asbestos	Dermal contact, inhalation (dust/vapours), ingestion	Site workers, maintenance workers, consultants, trespassers, surface water bodies, groundwater, neighbouring properties in the case of groundwater or surface water migration	Site workers, residents, maintenance workers, consultants, trespassers, surface water bodies, groundwater, neighbouring properties in the case of groundwater or surface water migration
USTs & associated Infrastructure on site and off site	Potential leaks and spills from USTs, bowsers and associated pipework	Long-term leaching of contaminants via runoff, rain water infiltration / percolation, through soil or cracks/joints in concrete, groundwater migration or exposure/disturbance during proposed development	Soil, groundwater, surface water	TRH, BTEX, PAH, Metals, VOC	Dermal contact, inhalation (dust/vapours), ingestion		
Demolition of former structures or renovations to existing / former buildings	Demolition of buildings / structures	Long-term leaching of contaminants via runoff, rain water infiltration / percolation or exposure / disturbance during proposed development	Soil, groundwater, surface water	Metals, PCB, asbestos	Dermal contact, inhalation (dust/vapours), ingestion		
Car Parking on unpaved areas	Spills and leaks	Long-term leaching of contaminants via runoff, rain water infiltration / percolation, through soil or cracks / joints in concrete or exposure/disturbance during proposed development	Soil, groundwater, surface water	TRH, BTEX, PAH, Metals, VOC, acids	Dermal contact, inhalation (dust/vapours), ingestion		

Table 1: Conceptual Site Model (continued)

Known and Potential Primary Sources	Primary Release Mechanism	Secondary Release Mechanism	Potential Impacted Media	Contaminants of Concern	Exposure Pathway	Potential Receptors	
						Current	Future
Repairs/servicing/ storage of vehicles and storage of vehicles / parts	Spills and leaks, hydrocarbon sources and solvents	Long-term leaching of contaminants via runoff, rain water infiltration / percolation, through soil or cracks / joints in concrete or exposure/disturbance during proposed development	Soil, groundwater, surface water	TRH, BTEX, PAH, Metals, VOC	Dermal contact, inhalation (dust/vapours), ingestion		
Refurbishment of existing structure	Partial demolition of buildings / structures, removal of hazardous materials	Long-term leaching of contaminants via runoff, rain water infiltration / percolation or exposure / disturbance during proposed development	Soil, groundwater, surface water	Metals, PCB, Asbestos	Dermal contact, inhalation (dust/vapours), ingestion		

Preliminary subsurface assessment was conducted to investigate the above potential contamination sources. Field work conducted at the site as part of the Initial assessment in September 2008 comprised the following:

- Drilling of eight boreholes using a drilling rig and hand tools;
- Near-surface soil sampling at two locations;
- Sampling of observed potential ACM at the surface; and
- Installation of two groundwater monitoring wells (Bores 4 and 10) to assess groundwater depth and quality.

The results of initial subsurface investigation and laboratory testing indicated the following with respect to contamination:

- The presence of benzo(a)pyrene and PAH impact above the adopted landuse criteria associated with near-surface soils and dumped stockpiles within the vacant south-western portion of the site (generally 0.55 m thick – based on Bore 6);
- The presence of asbestos fines materials (small fragments and fibre bundles) in near-surface filling within Bore 1, 4, 5 and 6, likely to be associated with demolition of former structures at the site (generally 0.2 m to 0.8 m thick); and
- The presence of hydrocarbon impact in soil and groundwater in the northern portion of the site associated with the underground fuel storage tank(s) and associated pipework, bowsers, etc. (impact observed in Bore 10 from 0.7 m depth to the depth of investigation).

Based on the results of the initial investigation, fill materials were generally observed to depths of up to about 2 m within the site, with an average of 1.3 m depth. Fill materials more likely to contain potential contamination (i.e. those observed to contain anthropogenic materials such as building rubble) were generally up to 0.8 m thick across the site, with an average thickness of 0.5 m. It is also noted that the raised floor area within the building contained fill with anthropogenic inclusions to a depth of 1.45 m (the raised floor level was about 1.1 m above the surrounding ground levels).

It was noted that there was potential for contamination to be present within fill materials across the site due to the following:

- Absence of detailed information on the original source or quality of fill materials used at the site;
- Historical information indicating demolition of former structures at the site; and
- The results of the subsurface investigation, indicating the presence of imported fill materials at some locations, and potential for impact from former site activities.

Test locations from the initial investigation (test locations 1 to 10, Ref 1) are shown on Drawing 1, Appendix A.

Following initial subsurface investigation (Ref 1), additional subsurface investigation was conducted to further assess potential contamination and possible migration of hydrocarbon impacts from the underground fuel storage tank in the north-western portion of the site (Ref 2). The additional work comprised the following:

- Drilling of eight boreholes (Bores 101 to 108) and installation of groundwater monitoring wells in each of the boreholes;

- Soil and groundwater sampling from each location;
- Laboratory analysis of selected sample for target contaminants; and
- Preparation of a report presenting the results of the assessment.

The additional boreholes were drilled in the vicinity of the underground fuel storage tank, and within the downgradient road pavement and footpath within Dangar Street, immediately north and north-east of the site. Test locations (Bores 101 to 108) are shown on Drawing 1, Appendix A.

The results of the additional investigation indicated the following with respect to contamination and possible off-site migration of hydrocarbon contamination associated with the UST(s) located within the north-western corner of the site:

- Presence of hydrocarbon-impacted soil and groundwater in the immediate vicinity of the UST(s) – Bore 10 (north-western portion of the site);
- Presence of minor off-site hydrocarbon impact in soil and groundwater (Bore 102 - approximately 5 m north-east (generally downgradient of the UST(s));
- Presence of minor PAH impact in groundwater to the north-east of the site (i.e. Bore 108);
- The presence of heavy metal impact in groundwater within the site and in off-site bores; and
- Groundwater flow is generally in an east-north-easterly direction (i.e. towards Throsby Basin).

The results suggested that hydrocarbon impact in soil and groundwater associated with the UST(s) had migrated beyond the site boundary, however, the extent of off-site migration appeared to be limited (i.e. only minor impact within Bore 102 located 5 m from the site boundary and approximately downgradient of the UST). Elevated petroleum hydrocarbons were not detected in the remaining bores.

The possible source of PAH impact on groundwater in Bore 108 was not certain. Such impact may be due to diffused sources other than the UST (i.e. regional presence of general fill materials). The potential for PAH impact to be a result of migration from the UST(s), however, cannot be discounted.

Based on the results of the previous investigations, on-site hydrocarbon contamination and minor off-site impact (associated with the UST(s)) was assessed to have occurred. Site remediation was recommended for future residential or commercial development, to address the following identified contamination:

- Hydrocarbon contamination associated with the UST(s) within the north-western corner of the site (Bores 10 and 102, Ref 2);
- PAH contamination present in near-surface fill materials within the south-western corner of the site (Bore 6 – generally 0.55 m thick – Ref 1); and
- Asbestos contamination in near-surface soils at Bores 1, 4, 5 and 6 (0.2 m to 0.8 m thick – Ref 1).

It is noted that fill materials containing deleterious materials were generally 0.2 m to 0.8 m thick across the site (average of 0.5 m). There is a risk that such materials may also contain contaminants such as asbestos.

An updated preliminary site investigation (Ref 3) was prepared by DP for the site in October 2018, which generally comprised collation of previous assessment and supplementary site history searches to assess the current site condition and potential for contamination. The report concluded that the site could be made suitable for the proposed development, subject to the remediation of previously identified impacts. The potential contamination sources were generally similar to those identified in previous DP assessment.

Reference should be made to the PSI (Ref 3) for an assessment of the current site condition.

A detailed site investigation (DSI) was conducted by DP in November 2018 (Ref 4), which included additional subsurface investigation at five locations, groundwater well installation, soil and groundwater sampling and analysis and preparation of a report presenting the results of the investigation.

The results of the DSI reinforced the results of previous investigation, indicating the presence of hydrocarbon impact in soil and groundwater in the vicinity of identified underground fuel storage tanks, plus PAH and metal impacted upper filling. The DSI also indicated the presence of potential acid sulfate soils (PASS) within the site, inclusive of sand filling and underlying natural sands.

Active groundwater remediation was generally not considered to be necessary within the site based on the results of testing. Hydrocarbon impacts in groundwater are proposed to be addressed via the removal of the source of possible impacts (i.e. removal and remediation of underground fuel infrastructure and hydrocarbon-impacted soils). Further groundwater testing during and following soil was recommended to confirm groundwater conditions and requirements (if any) for further remediation or management. It was noted that due consideration should be given to the possible risk of vapour intrusion associated with basement design and construction if hydrocarbon impacts remain adjacent to the site boundary following remediation.

3.3 Proposed Development

It is understood that the development of the site will include construction of a 14-level retail, commercial and residential development with three basement levels. Development drawings indicate that the ground floor use comprises retail and car parking, with levels one to three comprising office/commercial space. Residential development is proposed for levels four to 13. The three basement levels are proposed for vehicle parking. The Architectural Plans (Team 2 Architects Ref 918, Rev 4 dated 17.9.2020)are provided in Appendix A.

3.4 Geology and Hydrogeology

Reference to the Newcastle Coalfield Regional Geology 1:100 000 Geological Series Sheet published by the Department of Mineral Resources indicates that the site is underlain by Quaternary aged alluvium which typically comprises gravel, sand, silt and clay.

Reference to the Newcastle Acid Sulfate Soil Risk Map prepared by the Department of Land & Water Conservation indicates that the site has a high probability of occurrence of ASS between 1 m and 3 m below the ground surface.

The regional groundwater flow regime is believed to be to the east-north-east of the site, towards Throsby Creek, which is approximately 180 m east-north-east of the site, and is considered to be the nearest sensitive receptor. Based on the site topography and previous assessment in the area, the depth to the water table is believed to be within 3 m of the ground surface. It should be noted that groundwater levels are affected by climatic conditions, soil permeability and tidal influences and will therefore vary with time.

4. Assessment of Remediation Options

A number of remediation options were reviewed with reference to the principles and criteria defined in relevant documents, including, the following:

- NEPC, "National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013", 11 April 2013 (Ref 6);
- NSW EPA, Contaminated Site, "Guidelines for the NSW Site Auditor Scheme 2nd Edition", April 2006 (Ref 7).

NEPM 2013 guidelines state that the preferred hierarchy of options for site clean-up and/or management are as follows:

- On-site treatment of the contamination so that it is destroyed or the associated risk is reduced to an acceptable level; and
- Off-site treatment of excavated soil, so that the contamination is destroyed or the associated risk is reduced to an acceptable level, after which soil is returned to the site; or

If the above are not practicable:

- Consolidation and isolation of the soil on site by containment with a properly designed barrier; and
- Removal of contaminated material to an approved site or facility, followed, where necessary, by replacement with appropriate material;

or

- Where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.

Based on the distribution and depth of contaminated soils, subsurface conditions, the type of contamination (i.e. PAHs, metals, ACM, and hydrocarbons from USTs and infrastructure), the following remediation options were considered as follows:

1. No Action.
2. Off-site disposal of contaminated soils to a licensed landfill.
3. On-site treatment and re-use (volatile hydrocarbon impacted soils only).
4. On-site management (i.e. containment) of the contaminated soils (i.e. asbestos and PAH impacts only).
5. A combination of Options 2 to 4.

No Action

The "No Action" option involves no remediation response to the contamination identified or likely to be present on the subject site. This option was considered not appropriate as it does not provide any means to appropriately address, remediate, alleviate, and/or manage the long and short-term human health and environmental risk of the contamination already identified on-site.

Off-site Disposal of Contaminated Soils

Off-site disposal of the contaminated soils is the most likely remediation option for both localised hydrocarbon-impacted soils and PAH/metals/ACM impacted soils, since the proposed development requires excavation of the majority of impacted soils for basement construction. On-site treatment of hydrocarbon impacts may be required to enable a 'General Solid Waste' classification and disposal.

On-Site Management of Contaminated Soils

On-site management of contaminated soils involves placement/retention of the contaminated soils within the site area such that the proposed development is constructed over the contaminated soils, minimising the potential for access to the contaminated soils. The management of contaminated soils at the site requires the preparation and implementation of a long-term Site Management Plan (SMP) at the site which outlines the procedures used to render the site suitable for the proposed development. The SMP also provides the procedures for managing contaminated soils should access to the soils be required following construction. On-site management of contaminated materials also requires that a notice be on the Section 10.7 Planning Certificate. On-site management is generally considered for non-volatile contaminants which have a low propensity to leach.

On-site management of PAH and asbestos impacted soils is considered to be a suitable remediation strategy for PAH/metals/ACM-impacted soils development given the distribution (i.e. localised and potentially sporadic within fill materials) and characteristics (i.e. low propensity to leach and located above the observed groundwater table) of the impact on site, however, this approach is not considered practical as the majority of impacted soils require removal as part of basement construction.

On-site management is not considered suitable for the identified localised volatile hydrocarbon impact associated with the UST and fuel infrastructure.

On-site Treatment and Re-use of Contaminated Material

In general on-site treatment is most applicable to hydrocarbon contaminants and requires sufficient time and space to allow impacted materials to be remediated via bioremediation. Depending on the contaminant compounds and their concentrations, the time taken to remediate the soils to levels suitable for re-use may vary from weeks to several months. Whilst this option is suitable for short-medium chain length TRH impacted materials on site, it may not be suitable for the longer chain TRH contamination.

Based on the above the adopted remediation approach for the development is as follows:

- Decommissioning and removal of any remnant fuel infrastructure, with off-site disposal of localised hydrocarbon impacted soils;
- Off-site disposal of PAH, metal and asbestos impacted soils;

- Validation of excavations.

If hydrocarbon concentrations in excavated soils exceed the criteria for direct disposal to landfill, localised bioremediation will be conducted reduce hydrocarbon concentrations to allow direct disposal to landfill.

Off-site disposal of contaminated soils would generally comprise the following:

- Excavation of contaminated soils to the full depth of impact;
- Direct disposal of contaminated soils to an appropriately licensed waste disposal facility;
- Validation of the stripped surface/remaining soils to confirm appropriate removal of contaminated soils;
- Re-instatement of site soils (where required) to achieve design levels with 'clean' soil (ENM/VENM).

5. Remediation Goals and Acceptance Criteria

5.1 Remediation Goals

5.1.1 Removal of USTs and Associated Infrastructure

The main objective of this remediation approach will be to appropriately decommission and remove remaining USTs and associated infrastructure and excavate and 'chase out' any localised residual soil contamination for off-site disposal to an appropriate licensed landfill.

The remediation process will minimise potential risks to human health and the environment.

5.1.2 Off-site Disposal of PAH/Metal/ACM-Impacted Soils

The main objective of this remediation approach will be to excavate contaminated PAH, metal and asbestos impacted soils for removal from site, followed by validation of the remaining soils to confirm removal of the identified impacts.

Any materials requiring off-site disposal should be classified with reference to NSW EPA waste classification guidelines (Ref 9), and disposed to a facility which is licensed to receive such materials. It is noted that previous investigation has indicated the majority of fill materials tested are classified as 'General Solid Waste'. It is noted asbestos impacted soils would be classified as 'Special Waste'.

This process of remediation will remove the potential for human contact with materials that are contaminated so that the development site can be made suitable for the proposed medium/high density residential development.

5.2 Remediation Acceptance Criteria

The RAC used to assess/validate the removal of the USTs, associated infrastructure, any residual impacted soils and the PAH/metals/ACM-impacted upper filling have been developed in line with the proposed use of the site for high density residential landuse with minimal access to soils.

The contaminants of concern associated with the USTs are hydrocarbons (TRH, BTEX, VOCs and PAHs) and heavy metals. The contaminants of concern associated with the impacted upper filling are PAH, heavy metals and asbestos.

It is considered that the validation analysis should focus on the identified contaminants of concern in the area of concern. In order to provide for contingency situations, however, RAC are also established for other contaminants (e.g. OCP/OPP, PCB etc.). This should, however, only be used as and when required (i.e. if signs of such contaminants are observed, suspected or found).

The adopted criteria are as follows:

- NEPM 2013 (Ref 6) - Health Investigation Levels (HIL) and Health Screening Levels (HSL) for high density residential landuse with minimal access to soils (HIL B/HSL B);
- NEPM 2013 (Ref 6) - Management Limits for Residential, Parkland and Public Open Space Landuse – Coarse Soil Texture for TRH impact;
- CRC Care 2011 (Ref 10) – Petroleum based HSL for direct contact for high density residential landuse with minimal access to soils (HSL B).

For the purposes of providing a single RAC for each analyte the lowest of the above criteria (i.e. most conservative) has been adopted as the RAC as shown in Table 2 below. It is noted that the use of medium density landuse is consistent with the zoning and proposed landuse at the site.

Table 2: Site RAC for Soil (mg/kg)

Contaminant	NEPM HIL B[b] / HSL B[c]	CRC Care Direct Contact - HSL B[a]	NEPM Management Limits – Residential Landuse / Coarse Soil [d]	Adopted RAC (mg/kg)
Asbestos [e]	0.001% for FA and AF; 0.04% w/w for ACM over the impacted volume; and No visible asbestos for surface soils	NC	NC	Nil (imported fill and excavation validation) OR 0.04% w/w for ACM and No visible asbestos for surface soils for existing filling
Arsenic	500	NC	NC	500
Cadmium	150	NC	NC	150
Chromium	500	NC	NC	500 (Cr VI)
Copper	30,000	NC	NC	30,000
Lead	1200	NC	NC	1200
Mercury	120	NC	NC	120
Nickel	1200	NC	NC	1200
Zinc	60,000	NC	NC	60,000
TRH (C_6-C_{10})-BTEX (F1)	45	5600	700	45
TRH (>C_{10}-C_{16})-Naphthalene (F2)	110	4200	1000	110
TRH (>C_{16}-C_{34})	NC	5800	2500	2500
TRH (>C_{34}-C_{40})	NC	8100	10,000	8100
Benzene	0.5	140	NC	0.5
Toluene	160	21,000	NC	160
Ethylbenzene	55	5900	NC	55
Xylene	40	17,000	NC	40
Total PAH	400	NC	NC	400
Benzo(a)pyrene	NC	NC	NC	NC
Benzo(a)pyrene TEQ	4	NC	NC	4
Naphthalene	3	2200	NC	3
PCBs	1	NC	NC	1

Notes for Table 2:

a CRC Care (2011) – Petroleum based HSL for direct contact – Table B4 (Ref 6)

b NEPC (2013) Health-based investigation levels (HIL) – Table 1A(1) Ref 6

c NEPC (2013) Health-based screening levels for vapour intrusion - medium density residential landuse (Sand 0 to <1 m) – Table 1A(3) Ref 6

d NEPC (2013) Management Limits for TPH – Table 1 B(7) Ref 6

e WA DOH (2009) – Trigger levels for residential landuse with minimal access to soils (Ref 11)

f Adoption of a lower RAC should be considered when the material will be below the water table or potentially in contact with surface water due to the leachable characteristics of Naphthalene.

NC No Criteria

NL Non Limiting

The results of previous groundwater assessment at the site indicated the general absence of gross groundwater contamination across the site. Some localised hydrocarbon impact (i.e. TRH (>C_{10}-C_{16})-Naphthalene (F2)) was encountered in groundwater in the vicinity of the USTs (i.e. Bore 10 and Bore 202). The results of groundwater testing suggest the general absence of gross groundwater impact from the upper PAH and metal-impacted filling within the site. Groundwater hydrocarbon impact is present in the vicinity of the underground fuel infrastructure (i.e. TRH (>C_{10}-C_{16})-Naphthalene (F2)) in Bore 10 and Bore 202). Localised off-site migration of hydrocarbon impact has occurred.

Active groundwater remediation is generally not considered to be necessary within the site based on the results of testing, however, further groundwater testing during and following soil remediation is recommended to assess any residual impacts (if any).

In the event, however that localised groundwater impact remains following UST removal and remediation, groundwater RAC should be adopted for validation purposes. The adopted criteria are as follows:

- Australian Drinking Water Guidelines 2016 (ADWG);
- ANZAST (2018), 'Australian and New Zealand Guidelines for Fresh and Marine Water Quality', August 2018, (Ref 12);
- NEPM 2013 (Ref 6) – Health Screening Levels for Vapour Intrusion in groundwater for medium density residential landuse (HSL-B) for volatile hydrocarbon impact.

For the purposes of providing a single RAC for each analyte the lowest of the above criteria (i.e. most conservative) has been adopted as the RAC as shown in Table 3 below. It is noted that the use of medium density landuse is consistent with the zoning and proposed landuse at the site.

Table 3: Site RAC for Groundwater (µg/L)

Analyte		NEPC (2013) Fresh Waters [2]	NEPC (2013) Marine Waters [2]	NEPC (2013) Drinking Water	NEPC (2013) HSL B Vapour Intrusion	Adopted RAC (µg/L)
Metals	Arsenic (V)	13	2.3	10	NC	Given regional groundwater quality exceeds the adopted criteria, no RAC is provided for heavy metals. If heavy metal testing is conducted concentrations should be compared to previous groundwater testing (Ref 4)
	Barium	NC	NC	2000	NC	
	Cadmium	0.2	0.7	2	NC	
	Chromium (VI)	1	4.4	NC	NC	
	Cobalt	NC	1	NC	NC	
	Copper	1.4	1.3	2000	NC	
	Lead	3.4	4.4	10	NC	
	Manganese	1900	80	500	NC	
	Mercury (total)	0.06	0.1	1	NC	
	Nickel	11	7	20	NC	
	Selenium	5	3	10	NC	
	Zinc	8	15	NC	NC	
PAH	Naphthalene	16	50	NC	NL	16
	Benzo(a)pyrene	0.1	0.1	0.01	NC	0.01
TRH	C6 – C10 (less BTEX) [F1]	NC	NC	NC	1000	1000
	>C10-C16 (less Naphthalene) [F2]	NC	NC	NC	1000	1000
BTEX	Benzene	950	500	1	800	1
	Toluene	180	180	800	NL	180
	Ethylbenzene	80	5	300	NL	5
	Xylene (o)	350	NC	NC	NC	350
	Xylenes (Total)	NC	NC	600	NL	600
VOC[3]	Chloroform	370	NC	NC	NC	370
	Trichloroethene	30	NC	NC	NC	30
	Isopropylbenzene	30	NC	NC	NC	30

Notes to Table 3:

1 In cases where no high reliability trigger values are provided, the low reliability trigger values provided in ANZECC & ARMCANZ (2000) have been used as screening levels

2 Investigation levels apply to typically slightly-moderately disturbed systems

3 Given the exhaustive list of VOC contaminants, only a few have been included in this table.

NL -The solubility limit is defined as the groundwater concentration at which the water cannot dissolve any more of an individual chemical based on a petroleum mixture. The soil vapour which is in equilibrium with the groundwater will be at its maximum. If the derived groundwater HSL exceeds the water solubility limit, a soil-vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for a given scenario. For these scenarios no HSL is presented for these chemicals. These are denoted as not limiting 'NL'.

It is noted that the generic HSL are not appropriate when the depth to groundwater impact is less than 2m. Under these circumstances a site specific risk assessment may be needed. The adopted HSLs have therefore been used for preliminary assessment purposes only.

NC No Criteria

6. Responsibilities

In order to achieve the goals of the remediation/earthworks programme, the following roles and responsibilities have been identified for the contractor and consultants:

Contractor

The contractor is responsible for on-site operations including:

- Decommissioning and removal of USTs, and associated infrastructure (i.e. fuel lines etc.);
- Handling of fill materials (contaminated or otherwise) including excavations, stockpiles, segregation, placement, compaction, and disposal of unsuitable or excess materials;
- Treatment of contaminated materials (i.e. bioremediation of hydrocarbon contaminated materials) if required;
- Disposal of contaminated soil material (hydrocarbon-contaminated material and PAH/metals/asbestos contaminated materials) to a licensed landfill (after classification);
- Safety of all personnel on site;
- Measures to minimise environmental effects;
- Preparation of a site specific construction environmental management plan (CEMP) and WHS plan. The CEMP should reference this RAP and will require review and comment by DP to confirm consistency with the objectives of the RAP prior to commencement of remediation;
- Ensure required licenses and approvals from regulatory authorities are obtained prior to remediation works commencing. It is noted that an appropriately licenced contractor will be required to conduct earthworks within the site due to the presence of asbestos in filling.

Occupational Hygienist (OH)

- Advice on management of asbestos contamination (if required);
- Set-up and maintenance, analysis and reporting of air monitoring for air borne asbestos fibres during construction works resulting in the disturbance of fill materials (i.e. any excavations, stockpiling, placement or transport of fill materials).

General Site Validation (Suitably Qualified Environmental Consultant)

- Full time inspection associated with excavation and validation of hydrocarbon contaminated soils in the areas of USTs and associated infrastructure (i.e. fuel lines etc.);
- Validation/classification of bioremediated soils (if required) prior to off-site disposal;
- Advice on excavation and segregation of contaminated soils;
- Validation of excavations;
- Inspection of remediation and validation works;
- Sampling and classification of imported fill materials (where required);
- Provision of a remediation and validation report;
- Correspondence/liaison with the regulatory authority throughout the remediation works.

Client

- Overall project management;
- Engaging suitably qualified remediation contractor, and Environmental Consultant to conduct the remediation works;
- Ensure necessary approvals and notifications have been obtained prior to remedial works commencing;
- Liaison with the regulator (Newcastle City Council - NCC), environmental consultant, remediation contractor during remediation process;
- Submission of validation reports to NCC.

Prior to the commencement of remediation works, a site meeting between the client, contractor and environmental consultant is recommended to confirm responsibilities and procedures in accordance with the agreed management plan.

7. Regulatory Approvals and Licences

State Environmental Planning Policy No. 55 - Remediation of Land (Ref 12, SEPP 55) aims to provide a state-wide planning approach to the remediation of contaminated land. Under clause 7(1) of SEPP 55 the approval authority is required to consider whether the land is contaminated, and:

a) If the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out; and

b) If the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.

This RAP presents the proposed remediation methodologies to address PAH, metals and asbestos contamination on site, and remediation of remnant fuel infrastructure and residual soil contamination. Implementation of the RAP will render the site suitable for the proposed development.

In accordance with Clause 9 of SEPP 55 the definition of Category 1 remediation works which require development consent are as follows:

a) Designated development, or

b) Carried out or to be carried out on land declared to be a critical habitat, or

c) Possibly have a significant effect on a critical habitat or a threatened species, population or ecological community, or

d) Development for which another State environmental planning policy or a regional environmental plan requires development consent, or

e) Carried out or to be carried out in an area or zone to which any classifications to the following effect apply under an environmental planning instrument:

   i) coastal protection,

ii) conservation or heritage conservation,

iii) habitat area, habitat protection area, habitat or wildlife corridor,

iv) environment protection,

v) escarpment, escarpment protection or escarpment preservation,

vi) floodway,

vii) littoral rainforest,

viii) nature reserve,

ix) scenic area or scenic protection,

x) wetland, or

f) Carried out or to be carried out on any land in a manner that does not comply with a policy made under the contaminated land planning guidelines by the council for any local government area in which the land is situated (or if the land is within the unincorporated area, the Western Lands commissioner).

It is understood that site remediation works are considered to be Category 1 under SEPP55 due to the site being within a coastal protection zone and being within flood prone land.

It is noted that the proposed residential development, which is integral to the remediation of the site (i.e. proposed basement excavation to remove impacted soils) will require development consent from Council.

Based on review of Appendix VI of the Guidelines for the NSW Site Auditor Scheme (Ref 7), the following consent, notification or licence requirements are anticipated:

- Any conditions outlined in the DA;
- SafeWork NSW asbestos removal work licence under the Work Health and Safety Regulation 2011 (WHS Regulation) and appropriate notification prior to commencement;
- As remediation works may involve groundwater extraction, a groundwater interference permit through the NSW Office of Water may need to be obtained prior to remediation commencing as per the requirements of the NSW Aquifer Interference Policy September 2012. It is noted that the permit may also be required to facilitate installation of services for the proposed development.

It is noted that previous asbestos testing at the site indicated the presence of asbestos 'fines' in fill materials, which should be considered in the work licence application to SafeWork NSW.

It is recommended that the proposed development is staged and conditional upon the submission of a validation report for the site;

8. Remediation Strategy

8.1 Sequence of Remediation

The following staged remediation methodology is recommended to achieve the remediation goals:

Stage 1: Initial Preparation and Site Meeting

- Client/Contractor to obtain all necessary approvals and notifications to allow commencement of the works, including Council approvals and SafeWork NSW permit for friable/non-friable asbestos related works (i.e. excavation, handling and disposal of soils containing asbestos). The contractor should hold the relevant licenses/approvals for asbestos related works;
- Site inception meeting between environmental consultant, the remediation contractor, demolition contractor and the site owner to discuss remediation methodologies and responsibilities, prior to demolition activities.

Stage 2: Demolition

- Contractor to set up environmental controls and secure the site. OH to setup air monitoring stations as required;
- Contractor to demolish and remove existing buildings across the site. It is recommended that concrete slabs/pavements in the vicinity of the remnant fuel infrastructure area are left in place until infrastructure has been decommissioned;
- Following demolition / removal of concrete surface, interim environmental management procedures should be implemented where ACM impacts are identified at the surface. Occupational Hygienist to provide advice on recommended procedures.

Stage 3: Decommissioning of Remnant Fuel Infrastructure

- USTs, fuel lines etc. to be decommissioned and removed by a licensed contractor (full time inspection by environmental consultant) in accordance with regulatory requirements.

Stage 4: Remediation / Validation – Petroleum Hydrocarbon Materials

- Preparation of a soil remediation/stockpiling area for on-site bioremediation of hydrocarbon contaminated soil (if required) and to allow waste classification for off-site disposal (contractor). Ideally, sufficient concrete slabs would be left in place to facilitate this;
- Excavation and 'chasing out' of petroleum hydrocarbon affected soils by the contractor (commencing at identified locations) based on visual and olfactory observations and screening with a photoionisation detector (PID) by environmental consultant (full-time inspection);
- Validation of excavated areas (environmental consultant);
- Collection and analysis of groundwater grab samples from water within the excavation during and following soil excavation and validation to assess groundwater conditions;
- Remediation of petroleum hydrocarbon affected soils using bioremediation techniques (on-site treatment) – if required, and/or disposal of hydrocarbon-impacted soil to a licensed landfill i.e. off-site disposal by the contractor, following waste classification sampling and testing by environmental consultant.

Stage 5: Remediation and Validation of PAH, metals and Asbestos Contaminated Soils

- Preparation of a soil stockpiling area for waste classification of contaminated soils for off-site disposal (contractor) where required;
- Excavation and 'chasing out' of impacted soils by the contractor based on visual observations and material types by DP;
- Validation of excavated areas (DP);
- Disposal of affected soils to a licensed landfill i.e. off-site disposal by the contractor, following waste classification sampling and testing by DP.

Stage 6: Validation – Imported Fill Materials (if required)

- Inspection and analysis by environmental consultant of imported fill materials required to re-instate or raise site levels to confirm levels are within RAC as required (i.e. where certificate from supplier not available).

In addition to the above, lower sand filling and underlying natural sand soils will require treatment as acid sulfate soils with reference to an acid sulfate soil management plan.

8.2 Remediation of Petroleum Hydrocarbon-Affected Soils

8.2.1 Methodology

Remnant fuel infrastructure, including a possible former fuel bowser, possible fuel line and presumed USTs, have been identified within the site. The proposed remediation strategy is to remove any remnant fuel infrastructure and to excavate identified hydrocarbon-impacted soils.

The following general procedures are recommended for the remediation and validation of hydrocarbon affected soils:

- Decommissioning and removal of remnant fuel infrastructure by licensed contractor (with full time inspection by the environmental consultant);
- Inspection of areas potentially containing hydrocarbon-impacted soils;
- Contractor to progressively excavate affected soils from former identified impacted areas under full-time inspection by the environmental consultant;
- Contaminated material will be excavated/chased from the walls and base of the tank pits/excavations until visual and olfactory evidence, and the results of PID screening, indicates the absence of such materials;
- The environmental consultant to validate excavated areas as discussed in Section 8.2.3.

Procedures for stockpiling of excavated soil/fill materials are discussed below.

Soil/fill material containing visual or olfactory evidence of potential contamination is considered to be contaminated material until classification has found otherwise.

8.2.2 Stockpiling of Hydrocarbon Contaminated Soils

The following outlines the basic procedure for stockpiling of hydrocarbon-impacted soils.

Hydrocarbon contaminated soil should be placed on-site in a specified area, prepared as follows:

- Nominate stockpile area on-site, away from the possible excavation of contaminated soil, and as far as practicable from adjacent residences. If possible, the stockpile area should be located over a concrete area;
- Provision should be made to allow for expansion of the stockpile area should this be required during the course of the works;
- Cover any drainage pits (if present) within the stockpile area to minimise leachate from contaminated soils entering the stormwater system;
- Cover the base of the stockpile area with plastic sheeting, and surround with straw bales and/or absorbent boom;
- Placement of plastic sheeting around the outside of perimeter bales to minimise the potential for leachate to migrate beneath the bales or absorbent boom during storage;
- Stockpile hydrocarbon contaminated material over plastic sheeting;
- Cover hydrocarbon impacted soils with plastic sheeting to manage possible odours/vapours during waste classification, prior to direct disposal to landfill as appropriate;
- Barricade the perimeter of the stockpiled material.

A photoionisation detector and visual/olfactory observation by the environmental consultant will be used as a guide to excavate/chase out hydrocarbon contaminated soil from the impacted area.

Stockpiled materials will be sampled and tested for waste classification at a minimum frequency of one sample per 50 m3 prior to disposal to a licenced landfill.

8.2.3 Validation of Excavations/Stripped Surfaces

The following procedure is recommended for validation of identified areas of hydrocarbon-contaminated soils following stripping/removal:

- The stripped surface should be inspected by DP to confirm, visually, the absence of potentially contaminated soils;
- As a minimum, validation samples will be collected at the following frequency:
    - Base of Excavation – a minimum of one sample from the base of excavation (per tank), or one sample per 10 m^2 area for larger excavated areas;
    - Side of Excavations – one location per side wall (per tank) or one per 5 m length of wall. Additional samples may be required due to the observed soil profile (e.g. upon signs of contamination and at the depth of groundwater seepage);
    - Fuel Lines/Pipe Lines – a minimum of one sample per 5 m linear metres or at least one sample from beneath each fuel line (if present);

- Chemical analysis will be conducted by a NATA registered laboratory on samples collected to validate the removal of materials containing hydrocarbon contamination.

The above analysis will be utilised to determine contaminant levels with respect to the RAC in the validated areas.

If validation results exceed the RAC, further removal (additional scraping/excavation) will be required, followed by additional validation sampling and analysis, until the RAC is met. Note that at least seven working days are required for laboratory analysis.

Excess rain water entering tank pit excavations or groundwater will be sampled and analysed to assess the potential for contamination.

8.2.4 Monitoring Procedures

The following monitoring procedures are recommended during remediation activities:

- The contractor/site manager inform nearby occupants of the proposed remediation activities, and provide contact details of the site manager (including after-hours contacts) to report a loss of amenity due to the remediation of hydrocarbon-impacted soils (e.g. hydrocarbon odours);
- Monitoring of volatile hydrocarbon levels using a calibrated photo ionisation detector (PID) as well as olfactory observations should be undertaken as follows:
  - During excavation of hydrocarbon-impacted soils (i.e. adjacent to the excavation);
  - During placement of contaminated soils in the proposed stockpiling area;
  - Periodic monitoring during site inspections at site boundaries.

The above monitoring should be undertaken by a suitable qualified contaminated land or WHS consultant. The remediation contractor will be responsible for appropriate WHS and environmental monitoring and management during site remediation.

Detectable levels of volatile hydrocarbons (PID readings above ambient levels at site boundaries) or olfactory evidence of loss of amenity will trigger additional contingency management, as indicated below.

8.2.5 Loading and Transport of Contaminated Materials

Transport of contaminated material off the site shall be via a clearly demarcated haul route and this route exclusively shall be used for entry and egress of vehicles used to haul identified contaminated materials within and away from the site.

Removal of waste materials from the site shall only be carried out by a licensed contractor holding appropriate licences, consents and approvals from NSW EPA and/or other Authorities to transport and dispose the waste materials according to the classification guidelines.

Details of all contaminated materials removed from the site shall be documented by the contractor with copies of weighbridge slips, trip tickets and consignment disposal confirmation (where appropriate). Such information should be provided to DP for reporting purposes. A site log/tracking sheets shall be maintained by the remediation contractor for stockpiles (numbered locations), to enable the tracking of disposed loads against on-site origin and location of the materials and corresponding (validation) sample numbers.

Measures shall be implemented to minimise the potential for contaminated material to be spilled onto public roadways or tracked off-site on vehicle wheels. Such measures could include the deployment of a vehicle washing / cleaning facility, which should be placed at a location before the egress point of the site. The facility shall be able to handle all vehicles and plant operating on site (if required). Residue from the cleaning facility will be deemed contaminated unless shown by validation to be below RAC criteria.

The proposed waste transport route should be notified to the local Council and truck dispatch shall be logged and recorded by the contractor for each load leaving the site. The waste tracking procedure should be confirmed by the environmental consultant.

8.2.6 Limits of Excavation

In the event that significant contamination has occurred, consideration must be given to site boundaries, building infrastructure and infrastructure of the surrounding properties. The stability of the structures and adjacent features must be maintained at all times. If a field assessment or validation data indicate that contamination in the soil extends beyond a point where stability may be threatened, advice should be sought from a qualified geotechnical or structural engineer before any further excavation is undertaken in this direction. Temporary retaining structures may be recommended, however, in any event, excavation will not progress beyond the site boundary or within a reasonable proximity to existing structural elements. Validation samples will be taken at the limit of excavation notwithstanding that there may be residual contamination present.

8.2.7 Contingency Procedures

8.2.7.1 Hydrocarbon Impacts in Soil

Contingency action will be required if elevated PID levels are encountered, olfactory evidence of loss of amenity is observed, or the outcomes of the RAP are not being achieved. Contingency procedures shall comprise the following (in no particular order):

- Postponement of remediation and validation works (including fuel infrastructure decommissioning/removal, excavation, etc.) until such time that the loss of amenity is ameliorated and prevailing conditions are suitable to recommence;
- Covering of excavated soils within the stockpiling area until loss of amenity is ameliorated and prevailing conditions are suitable;
- Application of a suppressant, such as BioSolve, to reduce volatiles and odours from hydrocarbon-impacted soils within the excavation or the stockpile area.

8.2.7.2 Seepage/Groundwater

Active groundwater remediation is not proposed based on the results of previous investigations (Refs 2 and 4). As part of the validation process, grab samples of groundwater or seepage water encountered in the remediation excavations will be collected.

Groundwater (or surface water) grab samples will be analysed for TRH, BTEX, PAH, and heavy metals. The results of the groundwater analysis will be incorporated with the validation report and assessed against the criteria in Section 5.2.

If hydrocarbon free product or slick is observed over seepage/groundwater within the excavation, appropriate absorbent materials should be utilised to skim/absorb such materials. Further grab sampling and analysis of remaining waters within the excavation will be conducted to confirm the groundwater conditions and requirements for further remediation and/or management (if any).

8.2.7.3 Waste Classification – Hydrocarbon-impacted Soils

Active soil remediation for hydrocarbon-impacted soils is not proposed at this site. Direct excavation and disposal to an appropriately licensed landfill is proposed for hydrocarbon impacts.

Additional remediation may be required where contaminant concentrations exceed waste classification criteria for direct disposal to licensed landfill. Contingency options for localised remediation of hydrocarbon-impacted soils for disposal include, but may not be limited to, the following:

- Excavation and removal of the impacted soils to an appropriately licensed facility for additional treatment and subsequent disposal;
- On-site bioremediation of hydrocarbon impacts in accordance with Reference 8 (i.e. biological process to attenuate or breakdown the contaminating substances) under controlled conditions to minimise uncontrolled emissions of volatile gases, leachates and odours.

8.3 Remediation of PAH, Heavy Metal and Asbestos-Impacted Soils

8.3.1 Methodology

Based on the results of laboratory testing from previous investigations (Refs 1, 2), there was several location containing elevated concentrations of PAH, heavy metals and asbestos in filling. Based on the results of subsurface investigation, the affected filling is likely to be across the whole site. The proposed remediation strategy is to remove the localised affected filling as part of basement construction works.

The following general procedures are recommended for the remediation and validation of PAH/metal/asbestos-impacted soils:

- Contractor to progressively excavate affected soils from across the site areas under full-time inspection by DP;
- Contaminated material will be excavated/chased from the site until visual evidence indicates the absence of such materials;

- DP to validate excavated areas as discussed in Section 8.3.3;
- Contractor to dispose of the excavated soils to an appropriately licensed landfill, following waste classification of the soils.

Procedures for stockpiling of excavated soil/fill materials are discussed in Section 8.3.2 below.

8.3.2 Stockpiling of PAH / Metal / Asbestos Contaminated Soils

PAH/metal/asbestos contaminated soil should be placed on site in a specified area, prepared by the contractor as follows:

- DP to nominate designated stockpile area in consultation with the contractor. The stockpile should be away from the possible excavation of contaminated soil, and as far as practicable from adjacent residences or other sensitive landuses;
- The proposed stockpile area should be inspected to confirm the absence of deleterious or potentially contaminated materials at the surface prior to the placement of materials;
- Provision should be made to allow for expansion of the stockpile area should this be required during the course of the works;
- An impermeable membrane such as plastic sheeting should be provided at the surface by the remediation contractor prior to stockpiling;
- Stockpile areas should be demarcated by the remediation contractor (i.e. fence/pickets and hazard tape) to prevent access, and clearly delineate the stockpiles;
- Stockpiles that are observed to contain or potentially contain asbestos materials should be lightly conditioned by sprinkler and covered by plastic or similar to prevent dust blow (undertaken by the remediation contractor - refer to Section 11.5);
- Measures should be taken by the remediation contractor to prevent the migration of stockpile materials (i.e. perimeter bunds, hay bales, silt fences, etc.);
- A record of stockpile locations, dimensions, descriptions, environmental controls, etc. should be maintained by the contractor.

Excavation, handling, transport etc. of asbestos-impacted materials should be undertaken by the licensed contractor with reference to the appropriate statutory and regulatory guidelines.

8.3.3 Validation of Excavations/Stripped Surfaces

The following procedure is recommended for validation following stripping / removal of upper fill materials identified to contain PAH/metal/asbestos impacts:

- The stripped surface should be inspected by DP to confirm the visual absence of potentially contaminated filling/soils (it is noted that the upper impacted filling is visually different to the underlying soils proposed for beneficial reuse following validation);
- Validation samples for chemical testing will be collected by DP over the stripped surface (ie following complete removal of the upper fill layer) as follows:
    - Systematic Locations:
        - At a sampling density of at least a 10 m x 10 m grid over the stripped area;

- Targeted locations:
  - At the approximate location of previously identified contamination;
  - Within 5 m of previously identified contamination to assess potential lateral impacts associated with identified contamination;
  - Within areas where previously soil testing was precluded due to access restrictions (e.g. within suspended slab area in the eastern portion of the existing building – Bores 502 and 504);
- Chemical analysis will be conducted by a NATA registered laboratory on samples collected to validate the removal of impacted materials.

The proposed validation sample locations are shown on Drawing 1, Appendix A.

The above analysis will be utilised to determine contaminant levels with respect to the RAC in the validated areas.

If validation results exceed the RAC, further removal (additional scraping/excavation) will be required, followed by additional validation sampling and analysis, until the RAC is met. Note that at least seven working days are required for laboratory analysis. Excavation of contaminated material will be limited to the extent of site boundaries.

It is further noted that the remediation methodology assumes that all fill will be removed from site, and that validation testing will be conducted on the remaining clean soils across the entire lot footprint.

8.3.4 Fill Stockpile Classification and Disposal/Reuse Options

Segregated fill stockpiles containing potentially contaminated materials are classified in accordance with the NSW EPA Waste Classification Guidelines (Ref 9) for disposal purposes.

For soils to be disposed off-site, representative samples should be collected by DP from the segregated fill stockpiles (i.e. where waste classification testing has not already been conducted as part of previous investigation), and analysed for the potential chemical contaminants as discussed in Section 9.4. The frequency of samples will depend on the size and composition/characteristics of the stockpile. A minimum frequency of one sample per 25 m^3 should be initially considered.

The results of analysis will be utilised to confirm options for off-site disposal, or re-use at the site, as follows:

- Satisfies RAC:
  - Re-use on site, subject to geotechnical suitability as engineered fill;
  - Dispose off-site to a licensed landfill.
- Satisfies RAC and off-site re-use criteria:
  - Re-use on site, subject to geotechnical suitability as engineered fill;
  - Dispose off-site to a licensed landfill;
  - Re-use off-site, subject to geotechnical suitability and classification as VENM or ENM.

- Exceeds RAC but satisfies landfill disposal guidelines (Ref 9):
  - Dispose off-site to a licensed landfill.
- Exceeds RAC and exceeds landfill disposal guidelines:
  - Develop on-site remediation strategy and continue until guidelines are satisfied;
  - Carry out appropriate immobilisation for off-site disposal to licensed landfill (subject to regulatory approvals).

8.3.5 Loading and Transport of Contaminated Materials

The procedures for the loading and transport of contaminated material are detailed in Section 8.2.5.

8.4 Imported Fill

Imported fill used to reinstate site excavations (where required), raise site levels or utilised for the proposed development (i.e. landscape areas, pavement materials etc.) should be classified as Virgin Excavated Natural Material (VENM, Excavated Natural material (ENM) or material classified under an appropriate resource recovery order and should be accompanied by an appropriate certificate from the supplier, otherwise detailed assessment (including analysis of representative samples) will be required prior to use on-site. Imported soils should also meet the adopted RAC. Soil proposed for importation should be confirmed to be VENM / ENM or an approved resource recovery material prior to delivery to the site.

8.5 Geotechnical Considerations

The site stripping, excavation and the placement and compaction of fill materials should be carried out with due consideration of geotechnical requirements for development. Deleterious inclusions such as organics, timber, metal, concrete (>200 mm) should be segregated from filling that may be used as engineered fill (i.e. for support of buildings or pavements).

Fill materials that will support structural loads, pavement, services or form structural backfill, should be placed and compacted to a suitable geotechnical specification that takes account of the intended purpose of the fill. Stability of excavations should also be considered.

The geotechnical specification for earthworks should be prepared as part of the final design.

8.6 Acid Sulfate Soil Management

Based on the results of previous investigations, sand filling and natural sand soils are acid sulfate soils. Disturbance of these materials (i.e. excavation or dewatering) will need to be conducted in accordance with a site specific Acid Sulfate Soil Management Plan (ASSMP) to be prepared by DP.

It is noted that disturbance of potential ASS during remediation works is likely as part of basement excavation.

8.7 Unexpected Finds Protocol

8.7.1 Potentially Contaminated Soils

The results of previous assessments at the site indicate the presence of PAH, heavy metal and asbestos contamination within upper filling at the site, and identified hydrocarbon impacts from USTs and associated infrastructure. Due to the historical use of the site, history of demolition and the presence of uncontrolled filling at the site, there is potential for additional contamination within site soils. Contingency procedures are required should additional potentially contaminated soils be identified during site development.

The following general procedures are suggested for the assessment and management of potentially impacted filling/soils during remediation/earthworks. Based on the results of previous assessment, soils/filling may be potentially impacted by petroleum hydrocarbons, heavy metals, PAH and asbestos:

- Excavation, handling loading and transport of contaminated materials should be undertaken by a licensed contractor in accordance with the appropriate regulatory approvals and legislative requirements;
- The progress of site excavations during construction should be inspected by the contractor during earthworks, and periodically by the contaminated lands consultant (i.e. DP). Potential soil contamination may include stained soils, odorous soils, soils containing fibro fragments, soils containing building rubble (i.e. bricks, tiles, concrete, timber etc.) and slag/ash products;
- If additional/unknown potentially contaminated soils are encountered (i.e. visual or olfactory indication of contamination), excavation of filling should cease, and the extent of the affected filling should be assessed by DP;
- The affected soils may need to be segregated based on visual/olfactory observations, and stockpiled for further assessment;
- If the assessment of impacted materials indicates that the materials are not suitable to remain on-site, the materials should be classified for disposal to an appropriately licensed landfill with reference to the NSW EPA waste classification guidelines (Ref 9);
- The affected area should be stripped and validated by DP;
- Excavation in the affected area cannot recommence until the validation testing indicates the absence of gross impact and no visual or olfactory indicators of contamination;
- Licensed contractor to load classified materials directly into appropriate trucks for transport and disposal to a licensed facility (Note: waste classification is required prior to off-site disposal).

The occupational hygienist should provide work health and safety advice to the contractor during site works.

8.7.2 Migration along Preferential Pathways

In the event that contamination is found to be migrating along preferential pathways (such as service trenches and conduits) in the vicinity of the identified hydrocarbon contamination, the following contingency procedure will be adopted:

- Remediation excavations will be continued in the direction of migration to the practical extent possible (without causing damage to infrastructure) as directed by the structural engineer (it is anticipated that the extent to which impacted materials can be chased-out along service conduits would be limited due to structural elements and services) and site boundaries;
- If impacted materials are present at the practical limits of the remedial excavation, validation samples will be collected and analysed per the requirements of Section 9.3 to determine the degree of residual contamination present;
- If concentrations of residual contaminants at the practical extent of the remedial excavation exceed the adopted RAC then the following additional contingencies may be adopted:
    - Site specific risk assessment will be undertaken to determine the actual level of risk to human health;
    - Additional groundwater monitoring wells/soil bores will be considered (if feasible) hydraulically down gradient of the observed impacted material/preferential pathway to attempt to define extent and degree of preferential migration;
    - Consideration of vapour intrusion risks to the proposed development; and
    - Based on the results of the above, additional management controls and/or groundwater remediation measures may be required.

9. Sample Collection and Analysis

9.1 Sample Collection and Handling

9.1.1 Soil

Soil sampling will be directly from the exposed surface of excavation, or, in the case of remediation stockpiles, from various depths between the surface and the base. Sampling data shall be recorded to comply with routine Chain of Custody (COC) requirements.

The general sampling, handling, transport and tracking procedures comprises:

- The use of stainless steel sampling equipment;
- The use of disposable gloves for each sampling event;
- Washing of all sampling equipment in contact with the sample, in a 3% solution of phosphate free detergent (Decon 90) then rinsing with distilled water prior to each sample being collected;
- Transfer of the sample immediately into new glass jars;
- Collection of 10% replicate samples for QA/QC purposes;
- Collection of replicate soil samples in zip-lock plastic bags for PID screening;

- Labelling of the sample containers with individual and unique identification including Project Number and Sample Number;
- Placement of the containers into a chilled, enclosed and secure container for transport to the laboratory; and
- Use of chain of custody documentation so that sample tracking and custody can be cross-checked at any point in the transfer of samples from the field to hand-over to the laboratory.

9.1.2 Seepage / Groundwater

The general sampling, handling, transport and tracking procedures for the collection and analysis of a seepage/groundwater sample from water within the excavation comprises:

- Collection of seepage/groundwater 'grab' sample using a long-handled 'swing-sampler' fitted with new laboratory prepared containers for analysis;
- The use of disposable gloves for each sampling event;
- Collection of 10% replicate samples for QA/QC purposes;
- Collection of replicate water samples in a laboratory prepared jar for field screening of the groundwater with a PID;
- Labelling of the sample containers with individual and unique identification including Project Number and Sample Number;
- Placement of the containers into a chilled, enclosed and secure container for transport to the laboratory; and
- Use of COC documentation so that sample tracking and custody can be cross-checked at any point in the transfer of samples from the field to hand-over to the laboratory.

9.2 Sample Holding Times

The maximum sample holding times are as follows:

Soil

- Metals – 6 months (if required);
- TRH/BTEX – 14 days;
- PAH – 14 days, and 40 days following extraction (if required);
- OCP/OPP – 14 days, and 40 days following extraction (if required);
- Asbestos – no holding time.

Groundwater

- Metals – 6 months (if required);
- TRH/BTEX – 14 days;
- PAH – 14 days, and 40 days following extraction (if required).

All samples must be collected in appropriate containers and stored at 4°C or below.

9.3 Analysis – Hydrocarbon Impacted Soils

Analysis for the classification of excavated hydrocarbon impacted soils should comprise the following:

- Total Recoverable hydrocarbons (TRH);
- Benzene, Toluene, Ethylbenzene and Xylene (BTEX);
- Polycyclic Aromatic Hydrocarbons (PAHs).

Stockpiled materials should also be analysed for asbestos to classify the material prior to off-site disposal.

The analytical programme will be reviewed following excavation, segregation and sampling to confirm analysis for testing. Leachability (TCLP) analysis may be required for stockpile samples if total contaminant levels are found to exceed 'General Solid Waste' Criteria.

9.4 Analysis – PAH/Metals/Asbestos-Impacted Soils

Analysis for the validation of excavated PAH/metals/asbestos impacted soils should comprise the following:

- Total Recoverable hydrocarbons (TRH);
- Polycyclic Aromatic Hydrocarbons (PAHs);
- Heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn);
- Asbestos identification.

Stockpiled materials should also be analysed for asbestos to classify the material prior to off-site disposal.

The analytical programme will be reviewed following excavation, segregation and sampling to confirm analysis for testing. Leachability (TCLP) analysis may be required for stockpile samples if total contaminant levels are found to exceed 'General Solid Waste' Criteria.

9.5 Imported Fill

Any materials which are imported onto the site (e.g. to backfill excavations) should be classified as Virgin Excavated Natural Materials (VENM), Excavated Natural Material (ENM) or under an appropriate resource recovery order and an appropriate report must be made available to the environmental consultant prior to the importation of the material.

If the source or suitability of use for imported fill has not been confirmed, the material should be assessed with reference to appropriate resource recovery Exemptions/Orders and analysed for the following at a minimum:

- Total Recoverable hydrocarbons (TRH);
- Benzene, Toluene, Ethylbenzene and Xylene (BTEX);
- Polycyclic Aromatic Hydrocarbons (PAHs);
- Heavy Metals (Arsenic, Cadmium, Chromium, Copper, Lead, Nickel, Mercury, and Zinc);
- pH, Electrical Conductivity;
- Percentage Foreign Material (NSW RTA Test Method T276).

10. Quality Assurance Plan

10.1 Field Quality Assurance

Sampling accuracy and precision should be maintained through the analysis of:

- Minimum 10% field duplicate/replicate samples;
- Field/trip spikes/blanks to be analysed at a rate of one per day of validation sampling;
- Rinsate samples are collected and analysed at a rate of one per day of validation sampling;
- Trip spike/blank samples during storage/transport of samples to the laboratory.

Appropriate sampling procedures should be undertaken to minimise potential for cross contamination, for example:

- Standard operating procedures are followed;
- Site safety plans are developed prior to commencement of works;
- Duplicate or replicate field samples are collected and analysed;
- Equipment rinsate samples are analysed as part of the QA/QC programme;
- Samples are stored under secure, temperature controlled conditions;
- Chain of custody documentation is employed for the handling, transport and delivery of samples to the selected laboratory.

10.2 Laboratory Quality Assurance and Quality Control

DP's preferred laboratory routinely undertakes in-house QA/QC procedures involving the routine testing of:

- Reagent blanks;
- Spike recovery analysis;
- Laboratory duplicate analysis;

- Analysis of control standards;
- Calibration standards and blanks;
- Statistical analysis of QC data.

10.3 Data Quality Indicators

Based on the analysis of quality control samples i.e. duplicates/replicates and in-house laboratory QA/QC procedures, the following data quality indicators have been assigned for the validation testing:

- Conformance with specified holding times;
- Accuracy of spiked samples within the laboratory's acceptable range (typically 70% to 130% for inorganic contaminants and greater for some organic contaminants);
- Field and laboratory duplicates and replicates samples will have a precision average of +/- 50% relative per cent difference (RPD). Elevated RPDs may be present due to heterogeneity of materials;
- Rinsate samples will show that the sampling equipment is free of introduced contaminants (i.e. the analytes within the normal range for deionised water);
- Field duplicates/replicates will be collected at a frequency of 10% of all samples, and rinsate samples of field equipment will be collected at one per day of sampling.

An assessment of the overall data quality will be presented in the final validation report.

10.4 Validation Reporting

A validation report will be prepared by the environmental consultant with reference to the NSW EPA Contaminated Sites Guidelines for Consultants Reporting on Contaminated Sites (Ref 5) and other appropriate guidance documentation.

The report shall be submitted to Council at the completion of the remediation works program. The validation report shall confirm that the site has been remediated to a suitable standard for the proposed high density residential development.

With respect to the remediation and validation of excavations (if required), backfilling and subsequent construction should only commence following validation of the excavations.

The validation report shall include (where required) details of the total volume of contaminated materials excavated, present detailed analytical results, confirm that excavation areas and remediated soils re-used on site are validated and indicate the final disposal destination of the materials removed from site.

11. Environmental Management Plan (during construction)

11.1 Introduction

The contractor should undertake the work with due regard to the minimisation of environmental effects and to meet all statutory and regulatory requirements.

The contractor shall have in place a Construction Environmental Management Plan (CEMP) so that work on the site complies with, but not limited to, the requirements of the following legislation:

- Protection of the Environment Operations Act;
- Contaminated Land Management Act;
- Dangerous Goods Act;
- Construction Safety Act;
- Work Health and Safety Act (SafeWork NSW);
- Council Development Approval Conditions.

The contractor shall also be responsible that the site works comply with the following conditions:

- Wastes generated at the site are disposed in an appropriate manner;
- Fugitive dust leaving the confines of the site is minimised;
- No water containing any suspended matter or contaminants leaves the site in a manner which could pollute the environment;
- Vehicles shall be cleaned and secured so that no mud, soil or water are deposited on any public roadways or adjacent areas;
- Noise and vibration levels at the site boundaries comply with the legislative requirements.

Asbestos materials have been associated with various human respiratory diseases. The risk of contracting these diseases from contact with asbestos depends entirely on the fibres becoming airborne. It is important during disturbance of asbestos impacted soils that the potential for generating airborne asbestos fibres should be minimised. Moreover, levels of airborne asbestos fibres immediately outside the works area should be maintained to within the acceptable background level (i.e. <0.01 fibre/mL). Appropriate air monitoring should be conducted by the OH during remediation of upper asbestos-impacted filling.

In order to achieve a minimisation of environmental effects, the following measures are recommended, and should be adopted by the appointed contractor.

The contractor's CEMP is to include:

- Contingency plans to respond to site incidents;
- Site management plan for the operation phase of remediation works;
- A remediation schedule and hours of operation (which will be subject to development consent conditions);
- Details of relevant contacts;

- Requirements outlined in Newcastle City Council Technical Manual: Contaminated Land Management (June 2012);
- Procedure(s) for dealing with deleterious materials that may affect use as fill;
- Incident management/emergency response procedures;
- Any community consultation requirements.

At the commencement of site works and following demolition and removal of concrete slabs, interim measures should be adopted to manage possible human-health and environmental impacts from ACM observed at the surface (i.e. prior to full scale construction). Such measures could include use of spray / sprinklers to prevent dust blow or temporary covers. Requirements for interim control measures should be confirmed following demolition with the OH.

11.2 Traffic Management

All vehicular traffic shall use only routes approved by Council, to and from the selected landfill where off-site disposal is undertaken. All loads shall be tarpaulin covered and lightly wetted to minimise the potential for materials or dust are dropped or deposited outside or within the site. The proposed landfill should be consulted for any additional requirements.

Each vehicle that has trafficked potentially impacted site soils within the site shall be inspected for cleanliness before being logged out as clean (wheels and chassis), or hosed down into a wheel wash or wash down bay until designated as clean when exiting the site (if required).

Wheel wash silt residues should be collected periodically and either returned to the excavation area or included in the remediation stockpile. Such material will be treated as contaminated unless analysis proves otherwise.

Removal of waste materials from the site shall only be carried out by a licensed contractor holding appropriate licence, consent or approvals to dispose the waste materials according to the waste classification.

Waste tracking should be conducted by the licensed contractor in accordance with regulatory requirements. Details of all materials removed from the site shall be documented by a contractor with copies of weighbridge slips, trip tickets and consignment disposal confirmation (where appropriate) provided to the environmental consultant responsible for site validation. A site log shall be maintained by the contractor to track disposed loads against on-site origin and location of the materials.

Truck dispatch shall be logged and recorded by the contractor for each load leaving the site. A record of the truck dispatch should be provided to the environmental consultant responsible for site validation by the contractor.

Similarly tracking and documentation of all on-site movements of material should be maintained by the contractor.

11.3 Excavations

Records of all excavations and stockpile locations should be maintained. A site diary should also be maintained by the contractor to record daily progress, abnormal occurrences, incidents, and truck movements.

Contaminated material should be stockpiled at suitable locations within the site. All temporary stockpiles of contaminated material shall be secured and demarcated to clearly delineate their boundaries.

All excavations shall be made with due regard to the stability of adjacent footings and structures. It will be the contractor's responsibility to provide adequate battering, shoring and/or underpinning to protect adjacent structures (if required).

No person shall be permitted to enter an unsupported excavation where it is more than 1.5 m deep or where it is considered to be unstable, irrespective of depth.

Records of all imported filling and placement should also be maintained by the contractor.

11.4 Stormwater Management and Control

Appropriate measures shall be taken to minimise the potential for potentially contaminated water or sediments to leave the site. Such measures could include:

- Construction of diversion bunds to divert stormwater from contaminated areas and contaminated soil stockpiles;
- Provision of sediment traps including geotextiles or hay bales. This would be required for contaminated soil stockpiles to prevent losses by surface erosion; and
- Construction of sediment control basins (if required).

Discharge of any waters should meet the consent conditions from the appropriate authority. This should be verified by sampling and analyses undertaken by the contractor. For example, if excavations fill with water during validation works (i.e. due to rainfall), the water will require analysis to determine appropriate options for discharge (i.e. disposal to stormwater, sewer or collection by a licensed contractor).

11.5 Control of Dust and Odour

Control of dust and odour during the course of the remediation works shall be maintained by the contractor and may include, but not necessarily be limited to, the following:

- The use of a water cart, as and when appropriate, to eliminate wind-blown dust;
- Use of sprays/sprinklers to prevent dust blow from stockpiles;
- Covering of stockpiles with plastic sheeting or geotextile membranes;
- Restriction of stockpile heights to 2 m above surrounding site level;

- Ceasing works during periods of inclement weather such as high winds or heavy rain;
- Regular checking of the fugitive dust and odour issues. Undertake immediate remediation measures to rectify any cases of excessive dust or odour;
- Provision of temporary capping over site soils.

11.6 Noise Control

Noise and vibration will be restricted to reasonable levels. All plant and machinery used on site should not breach statutory noise levels. Working hours will be restricted to those specified by Council.

12. Work Health and Safety

All site work must be undertaken in a controlled and safe manner with due regard to potential hazards, training and safe work practices. The practices outlined should generally comply with the WHS policies specified by the relevant Authorities.

All personnel on site should be required to wear the following protection as a minimum:

- Steel-capped boots;
- Safety glasses or safety goggles with side shields meeting AS1337 requirements (as necessary);
- Hard hat meeting AS1801 requirements;
- Hearing protection meeting AS1270 requirements when working around machinery or plant equipment if noise levels exceed exposure standards.

In the event that personnel are required to work in areas of potential contact with asbestos containing materials, the following protection will be required in accordance with the Worksafe Australia: Asbestos – Code of Practice and Guidelines Notes:

- Disposable coveralls to prevent contact with asbestos materials if large volumes of asbestos material are present;
- Breathing apparatus fitted with a Class P2 filter;
- Steel-capped boots;
- nitrile work gloves meeting AS 2161 requirements or heavy duty gauntlet gloves;
- Safety glasses or safety goggles with side shields meeting AS 1337 requirements (as necessary);
- Hard hat meeting AS 1801 requirements;
- Hearing protection meeting AS 1270 requirements when working around machinery or plant equipment if noise levels exceed exposure standards.

Excavation, handling, stockpiling, transport etc. of materials containing asbestos should be undertaken by a licenced contractor in accordance with regulatory requirements including the Work Safe Australia: Asbestos – Code of Practice and Guidelines Notes, and the relevant statutory requirements such as Section 29 of the Protection of the Environment Operations (Waste) Regulation 2014. Based on the results of the previous investigations, the presence of asbestos materials comprises mainly asbestos fines (i.e. small fibro fragments and fibre bundles). Asbestos in the form of larger fibro fragments may also be present given the history of demolition and fill importation at the site.

The contractor shall prepare a project-specific environmental management and WHS plans to supplement measures presented in this RAP.

13. Conclusion

This RAP provides the clean-up objectives, remediation acceptance criteria (RAC), principles, methods and procedures by which the remediation and validation of the site will be achieved.

Prior to commencement of remediation and construction works, it is recommended that a site inception meeting is held between the developer, remediation contractor and consultant to discuss the remediation and validation process and to identify the tasks and responsibilities for the remediation of the site to a condition suitable for the proposed high density residential development.

14. References

1. Douglas Partners Pty Ltd, “Report on Preliminary Contamination and Geotechnical Assessment, Proposed Multi-Storey Commercial Development, 10 Dangar Street, Wickham, prepared for Valad Property Management, Project 39961, September 2008.
2. Douglas Partners Pty Ltd, ‘Report on Additional Contamination Assessment, Proposed Multi-storey Commercial Development, 10 Dangar Street Wickham’, prepared for Valad Property Management, Project 39961.01, November 2008.
3. Douglas Partners Pty Ltd, ‘Report on Preliminary Site Investigation, Desktop Geotechnical and Acid Sulfate Soil Assessment, Proposed Apartment Development, 10 Dangar Street Wickham’, prepared for Dangar Street Wickham Pty Ltd, Project 39961.02 dated 18 October 2018.
4. Douglas Partners Pty Ltd, ‘Report on Detailed Site Investigation, Proposed Apartment Development, 10 Dangar Street Wickham’, prepared for Dangar Street Wickham Pty Ltd, Project 39961.02 dated 23 November 2018.
5. NSW EPA Contaminated Sites (2011), ‘Guidelines for Consultants Reporting on Contaminated Sites’, August 2011.
6. National Environment Protection Council (2013), ‘National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013’, 11 April 2013.
7. NSW EPA, Contaminated Site, “Guidelines for the NSW Site Auditor Scheme 2nd Edition”, April 2006.
8. NSW EPA, “Best Practice Note: Landfarming”, April 2014.

9. NSW EPA, “Waste Classification Guidelines: Part 1 – Classifying Waste”, November 2014.

10. Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) Technical Report no.10 (2011), ‘Health screening levels for petroleum hydrocarbons in soil and groundwater’ September 2011.ANZECC (2000) “Australian and New Zealand Guidelines for Fresh and Marine Water Quality”, October 2000.

11. Western Australia Department of Health (2009), ‘Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia’, May 2009.

12. ANZAST (2018), 'Australian and New Zealand Guidelines for Fresh and Marine Water Quality', August 2018.

13. NSW EPA, “Managing Land Contamination, Planning Guidelines, SEPP55 – Remediation of Land”, 1998.

15. Limitations

Douglas Partners (DP) has prepared this report for this project at 10 Dangar Street with reference to DP’s proposal dated 5 July 2018 and acceptance received from David Goldman of Dangar Street Wickham Pty Ltd dated 20 September 2018. The work was carried out under DP’s Conditions of Engagement. This report is provided for the exclusive use of Dangar Street Wickham Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

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

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

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

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

Asbestos was previously detected by laboratory analysis in filling materials at the test locations sampled and analysed. Building demolition materials, such as concrete, brick and tile were also located in previous below-ground filling and these are considered as indicative of the possible presence of hazardous building materials (HBM), including asbestos.

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

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

Douglas Partners Pty Ltd

Appendix A

About This Report
Drawing 1- Test Location Plan
Architectural Plans (Team 2 Architects Ref 918, Rev 4 dated 17.9.2020)

About this Report

Douglas Partners

Introduction

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

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

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

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

About this Report

Site Anomalies

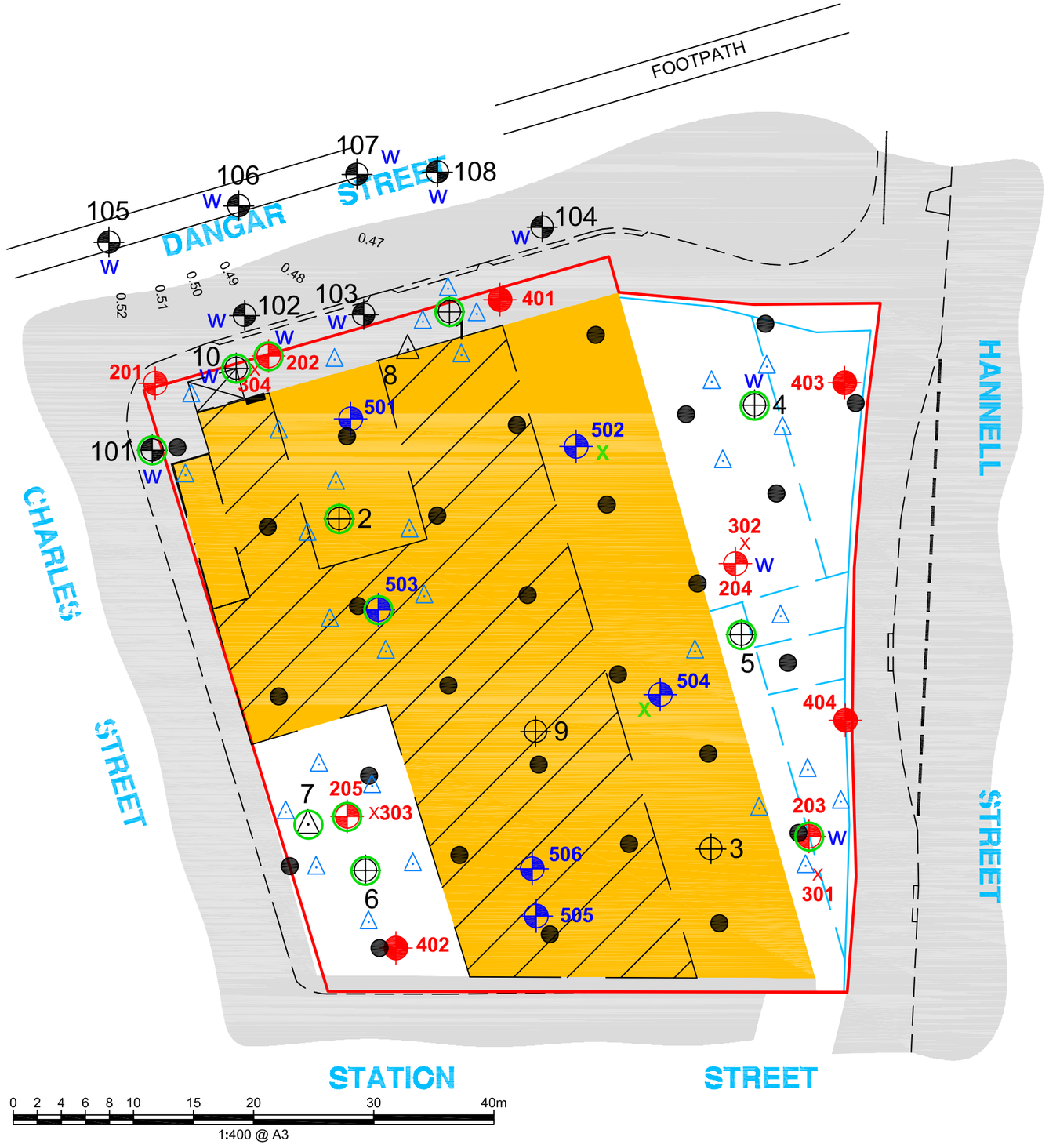
In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later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

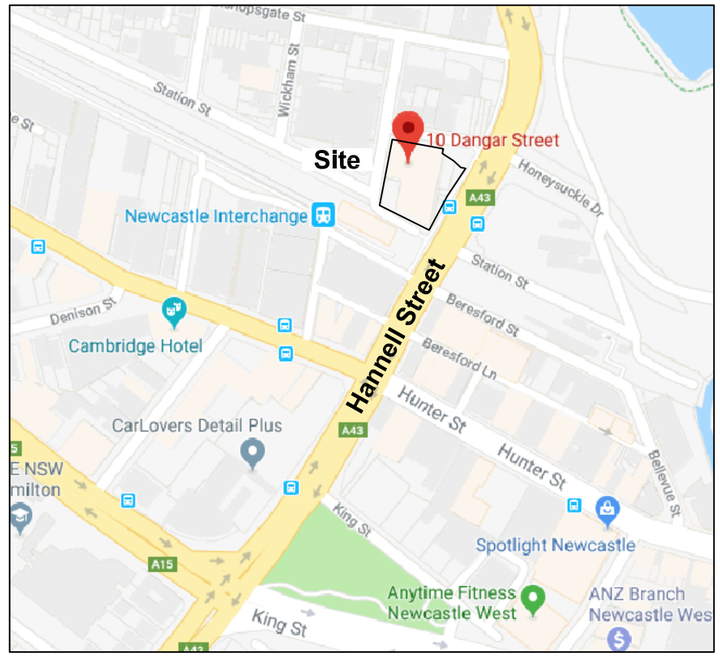
Information for Contractual Purposes

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

Site Inspection

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





Locality Plan

NOTES

1. Drawing adapted from survey plan by Parker Scanlon Pty Ltd, Ref B122 dated 25.1.08.

LEGEND

- Approximate Location of Systematic Validation Locations
- Approximate Location of Targeted Validation Locations
- X Approximate Location of Additional Validation Locations (previous inaccessible areas)
- Approximate Location of Targeted Validation Locations for Delineation
- Approximate Borehole Location (current investigation, 39961.08)
- Approximate Borehole Location (previous investigation, 39961.03, March 2019)
- Approximate Borehole Location (previous investigation, 39961.02, Nov 2018)
- X Approximate CPT Location (previous investigation, 39961.02, Nov 2018)
- Approximate Borehole Location (previous investigation 39961.01, Nov 2008)
- Approximate Borehole Location (previous investigation 39961, Sept 2008)
- Approximate Location of Raised Concrete Floor
- Approximate Surface / Near Surface Sampling Location (previous investigation 39961, Sept 2008)
- Approximate Location of Possible Former Bowser(s)
- Approximate of Possible Underground Storage Tank(s)
- W Groundwater Monitoring Well
- Site Boundary

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: Dangar Street Wickham Pty Ltd		TITLE: **Test Location Plan, Additional Contamination Testing**	PROJECT No: 39961.02
OFFICE: Newcastle	DRAWN BY: PLH	**Proposed Apartment Development**	DRAWING No: R.004
SCALE: 1:400@A3 Sheet	DATE: 28.01.2021	**10 Dangar Street, Wickham**	REVISION: 3

Sheet List_S4.55			
Sheet Number	Sheet Name	Current Revision	Current Revision Date
S4.55			
1000-General Arrangement Plans			
DA-1000	Basement 3 GA	5	17.09.20
DA-1001	Basement 2 GA	5	17.09.20
DA-1002	Basement 1 GA	5	17.09.20
DA-1003	Ground Floor GA	5	17.09.20
DA-1004	Level 1-3 Typical GA	4	17.09.20
2000-Building Elevations			
DA-2000	North Elevation	4	17.09.20
DA-2001	West Elevation	4	17.09.20
DA-2002	South Elevation	4	17.09.20
DA-2003	East Elevation	4	17.09.20
3000-Building Sections			
DA-3000	Building Section AA	4	17.09.20
DA-3001	Building Section BB	4	17.09.20
DA-Supporting Documents			
DA-4000	Materials Schedule	4	17.09.20
DA-4001	Visual Impact Analysis 01	4	17.09.20
DA-4002	Visual Impact Analysis 02	4	17.09.20
DA-5000	GFA Diagram 01	4	17.09.20

DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	Draft S4.55 Issue	18.08.20
2	Draft S4.55 Issue	28.08.20
3	Draft S4.55 Issue	11.09.20
4	S4.55 Submission	17.09.20

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DRAWING LEGEND:

1. Architectural drawings shall be read in conjunction with other consultant drawings and specifications. Any discrepancies shall be referred to team 2 architects before proceeding with work.
2. All dimensions and levels are in millimeters unless noted otherwise. No dimension shall be obtained by scaling the drawing.
3. All dimensions to be checked on site with any discrepancies referred to team 2 architects before proceeding with work.
4. All work to be carried out in accordance with the requirements of the principal certifying authority, current ncc & australian standards.

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Project:
BOWLINE

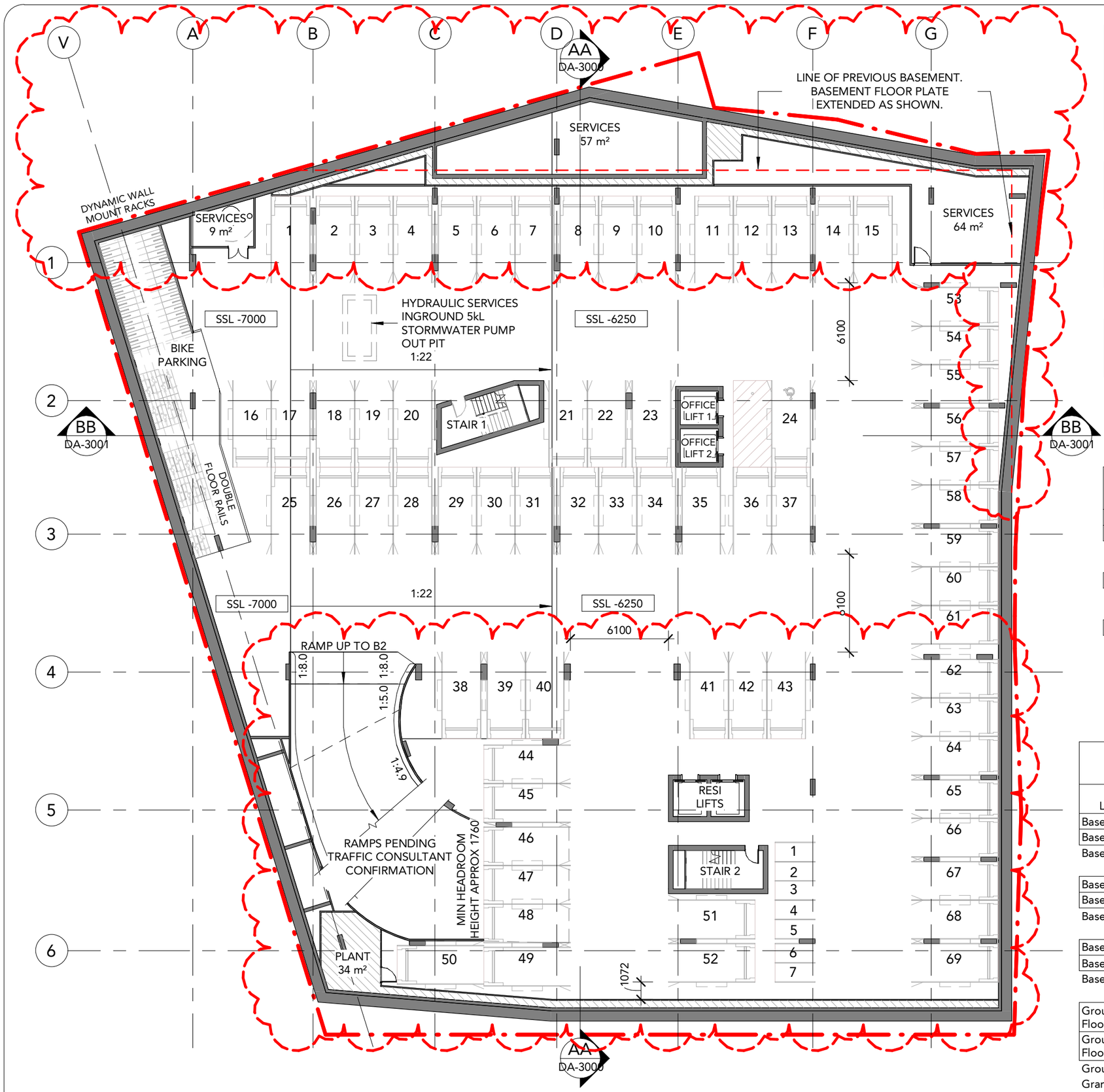
10 Dangar Street
Wickham NSW 2293

Title:
Cover Sheet

Project #:	Scale:	Drw:	Ckd:
918		LR	ML

Drawing #: DA-0001

Rev: 4



Overall Vehicle Parking Schedule

Level	Type	Count
Basement 3	Tandem	2
Basement 3	Standard	66
Basement 3	Accessible	1
Basement 3		69
Basement 2	Tandem	2
Basement 2	Standard	57
Basement 2	Accessible- SDA	4
Basement 2		63
Basement 1	Tandem	2
Basement 1	Standard	60
Basement 1	Accessible	2
Basement 1		64
Ground Floor Upper	Standard	7
Ground Floor Upper	Loading Bay	2
Ground Floor Upper		9
Grand total		205

Overall Motorcycle Parking Schedule

Level	Description	Count
Basement 3	Motorbike Bay	7
Basement 3		7
Basement 2	Motorbike Bay	5
Basement 2		5
Basement 1	Motorbike Bay	7
Basement 1		7
Grand total		19

Overall Bicycle Parking Schedule

Level	Type	Count	No. of Spaces
Basement 3	Floor Rail Double	9	18
Basement 3	Wall Mount Single DYN	34	34
Basement 3		43	52
Basement 2	Floor Rail Double	14	28
Basement 2	Wall Mount Single DYN	10	10
Basement 2		24	38
Basement 1	Floor Rail Double	5	10
Basement 1	Wall Mount Single DYN	58	58
Basement 1		63	68
Ground Floor Upper	Floor Rail Double	3	6
Ground Floor Upper	Wall Mount Single DYN	15	15
Ground Floor Upper		18	21
Grand total		148	179

DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	Draft S4.55 Issue	14.08.20
2	Draft S4.55 Issue	28.08.20
3	Issue for Information	08.09.20
4	Draft S4.55 Issue	11.09.20
5	S4.55 Submission	17.09.20

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ABN: 72 104 833 507
Reg Vic: 19340

Project:
BOWLINE

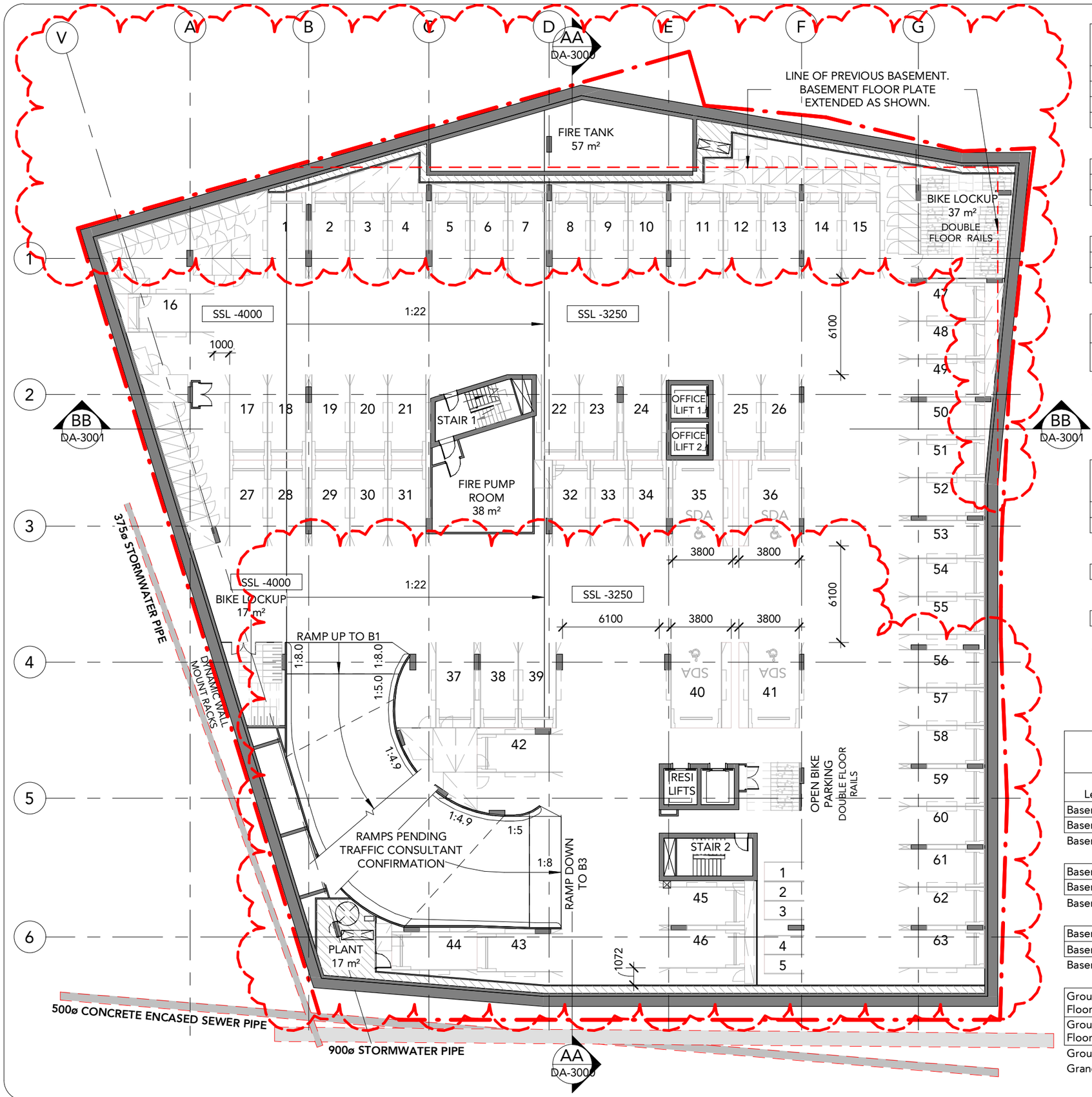
10 Dangar Street
Wickham NSW 2293

Title:
Basement 3 GA

Project #:	Scale:	Drw:	Ckd:
918	1 : 250 @A3	LR	ML

Drawing #: DA-1000

Rev: 5



Overall Vehicle Parking Schedule

Level	Type	Count
Basement 3	Tandem	2
Basement 3	Standard	66
Basement 3	Accessible	1
Basement 3		69
Basement 2	Tandem	2
Basement 2	Standard	57
Basement 2	Accessible- SDA	4
Basement 2		63
Basement 1	Tandem	2
Basement 1	Standard	60
Basement 1	Accessible	2
Basement 1		64
Ground Floor Upper	Standard	7
Ground Floor Upper	Loading Bay	2
Ground Floor Upper		9
Grand total		205

Overall Motorcycle Parking Schedule

Level	Description	Count
Basement 3	Motorbike Bay	7
Basement 3		7
Basement 2	Motorbike Bay	5
Basement 2		5
Basement 1	Motorbike Bay	7
Basement 1		7
Grand total		19

Overall Bicycle Parking Schedule

Level	Type	Count	No. of Spaces
Basement 3	Floor Rail Double	9	18
Basement 3	Wall Mount Single DYN	34	34
Basement 3		43	52
Basement 2	Floor Rail Double	14	28
Basement 2	Wall Mount Single DYN	10	10
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Basement 1	Wall Mount Single DYN	58	58
Basement 1		63	68
Ground Floor Upper	Floor Rail Double	3	6
Ground Floor Upper	Wall Mount Single DYN	15	15
Ground Floor Upper		18	21
Grand total		148	179

DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
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Reg Vic: 19340

Project:
BOWLINE

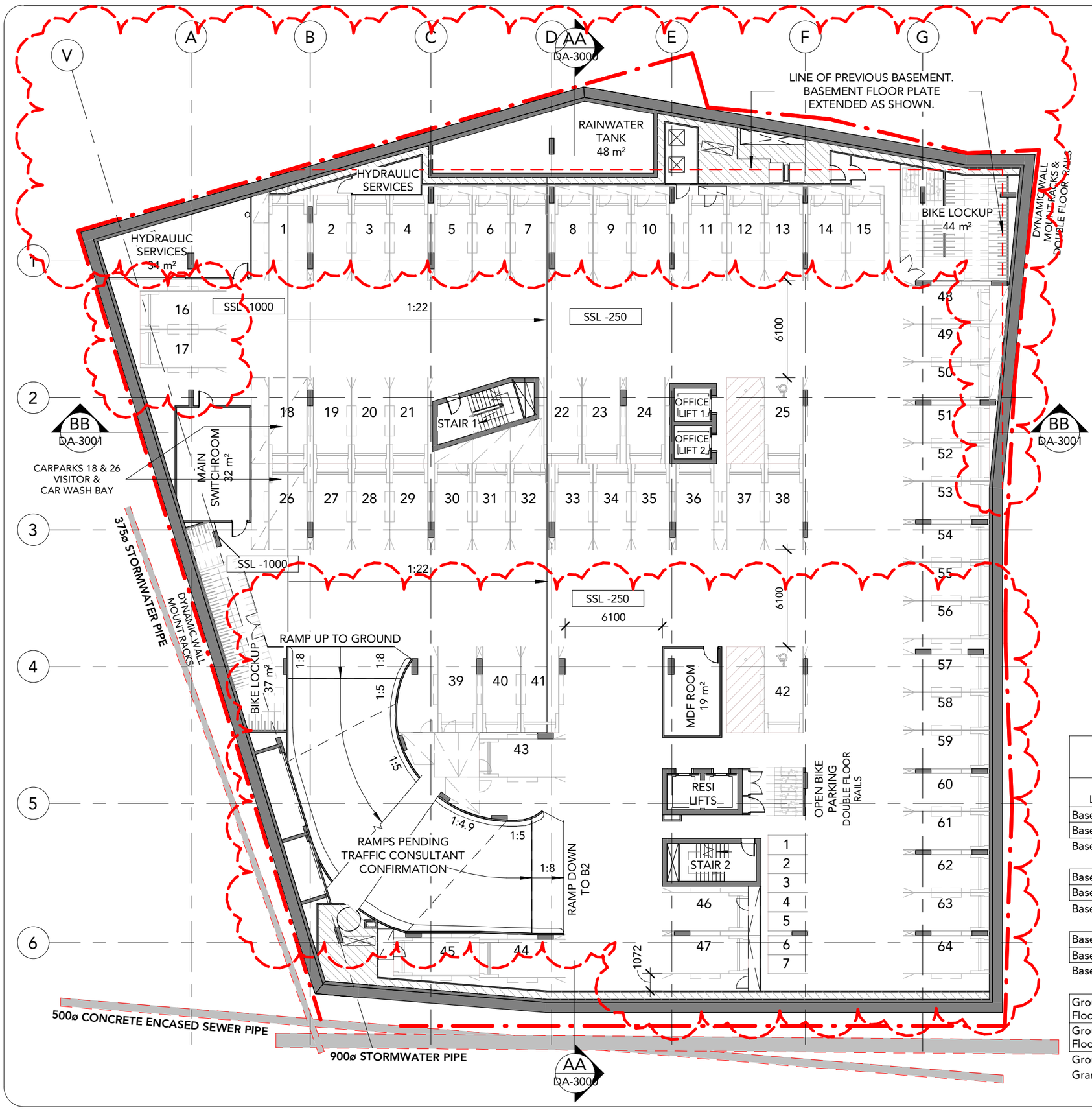
10 Dangar Street
Wickham NSW 2293

Title:
Basement 2 GA

Project #:	Scale:	Drw:	Ckd:
918	1 : 250 @A3	LR	ML

Drawing #: DA-1001

Rev: 5



Overall Vehicle Parking Schedule

Level	Type	Count
Basement 3	Tandem	2
Basement 3	Standard	66
Basement 3	Accessible	1
Basement 3		69
Basement 2	Tandem	2
Basement 2	Standard	57
Basement 2	Accessible- SDA	4
Basement 2		63
Basement 1	Tandem	2
Basement 1	Standard	60
Basement 1	Accessible	2
Basement 1		64
Ground Floor Upper	Standard	7
Ground Floor Upper	Loading Bay	2
Ground Floor Upper		9
Grand total		205

Overall Motorcycle Parking Schedule

Level	Description	Count
Basement 3	Motorbike Bay	7
Basement 3		7
Basement 2	Motorbike Bay	5
Basement 2		5
Basement 1	Motorbike Bay	7
Basement 1		7
Grand total		19

Overall Bicycle Parking Schedule

Level	Type	Count	No. of Spaces
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Basement 3	Wall Mount Single DYN	34	34
Basement 3		43	52
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Basement 2	Wall Mount Single DYN	10	10
Basement 2		24	38
Basement 1	Floor Rail Double	5	10
Basement 1	Wall Mount Single DYN	58	58
Basement 1		63	68
Ground Floor Upper	Floor Rail Double	3	6
Ground Floor Upper	Wall Mount Single DYN	15	15
Ground Floor Upper		18	21
Grand total		148	179

DRAWING STATUS:

S4.55 APPLICATION

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Project:
BOWLINE

10 Dangar Street
Wickham NSW 2293

Title:
Basement 1 GA

Project #:	Scale:	Drw:	Ckd:
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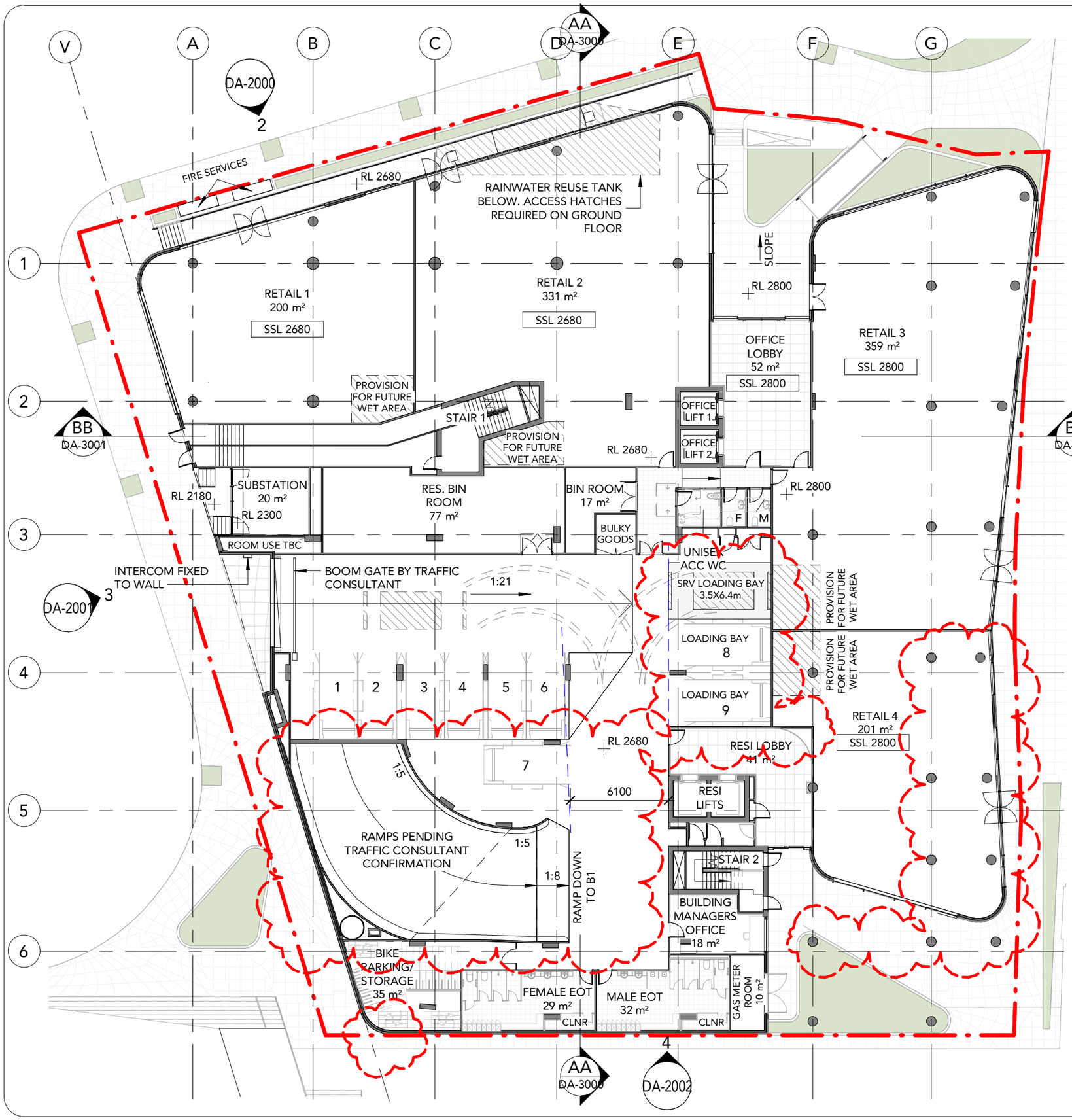
Drawing #: DA-1002
Rev: 5



Overall Vehicle Parking Schedule

Level	Type	Count
Basement 3	Tandem	2
Basement 3	Standard	66
Basement 3	Accessible	1
Basement 3		69
Basement 2	Tandem	2
Basement 2	Standard	57
Basement 2	Accessible- SDA	4
Basement 2		63
Basement 1	Tandem	2
Basement 1	Standard	60
Basement 1	Accessible	2
Basement 1		64
Ground Floor Upper	Standard	7
Ground Floor Upper	Loading Bay	2
Ground Floor Upper		9
Grand total		205

Overall Motorcycle Parking Schedule

Level	Description	Count
Basement 3	Motorbike Bay	7
Basement 3		7
Basement 2	Motorbike Bay	5
Basement 2		5
Basement 1	Motorbike Bay	7
Basement 1		7
Grand total		19

Overall Bicycle Parking Schedule

Level	Type	Count	No. of Spaces
Basement 3	Floor Rail Double	9	18
Basement 3	Wall Mount Single DYN	34	34
Basement 3		43	52
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Basement 2	Wall Mount Single DYN	10	10
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Basement 1	Wall Mount Single DYN	58	58
Basement 1		63	68
Ground Floor Upper	Floor Rail Double	3	6
Ground Floor Upper	Wall Mount Single DYN	15	15
Ground Floor Upper		18	21
Grand total		148	179

DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	Draft S4.55 Issue	14.08.20
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5	S4.55 Submission	17.09.20

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Project:
BOWLINE

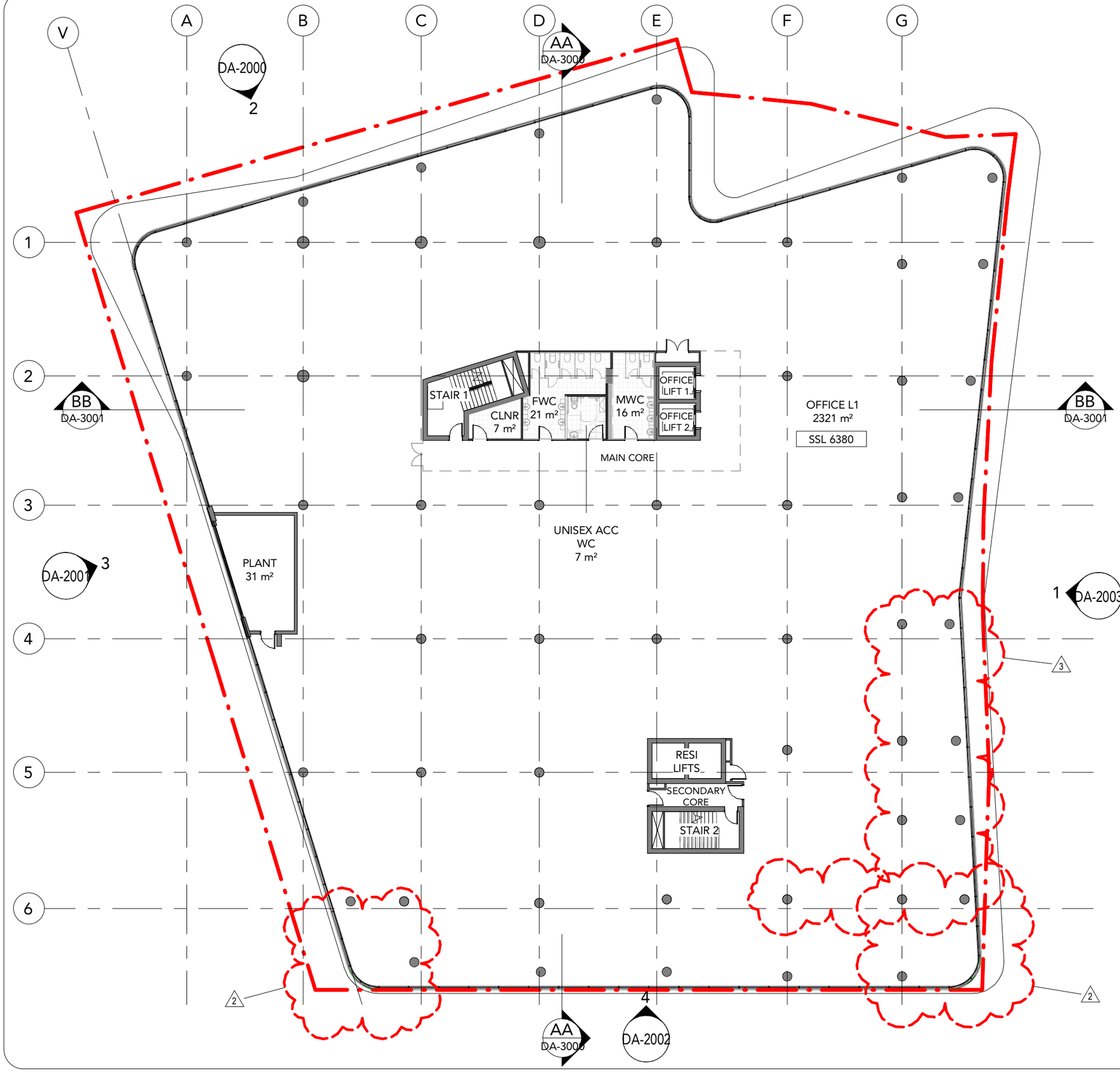
10 Dangar Street
Wickham NSW 2293

Title:
Ground Floor GA

Project #:	Scale:	Drw:	Ckd:
918	1 : 250 @A3	LR	ML

Drawing #: DA-1003

Rev: 5



DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	Draft S4.55 Issue	14.08.20
2	Draft S4.55 Issue	28.08.20
3	Draft S4.55 Issue	11.09.20
4	S4.55 Submission	17.09.20

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Reg Vic: 19340

Project:
BOWLINE

10 Dangar Street
Wickham NSW 2293

Title:
Level 1-3 Typical GA

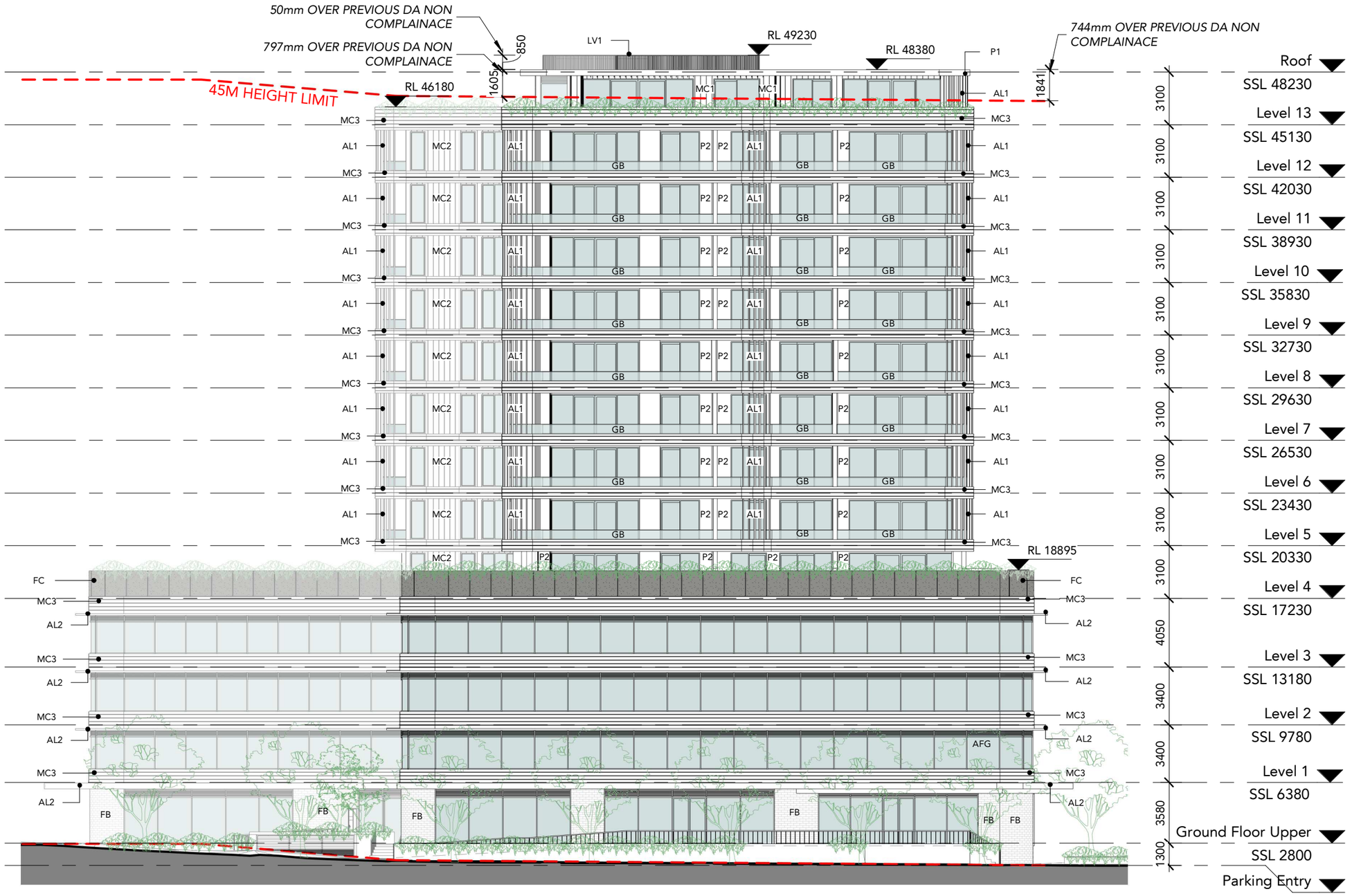
Project #:	Scale:	Drw:	Ckd:
918	1 : 250 @A3	LR	ML

Drawing #: DA-1004

Rev: 4

FINISHES KEY

AFG	ALUMINIUM FRAMED GLAZING
AL1	ALUMINIUM LOUVRE
AL2	HORIZONTAL ALUMINIUM SUNSHADE
FB	AUSTRAL FACE BRICK
FC	EQUITONE NATURA/LINES FIBRE CEMENT CLADDING
GB	FRAMELESS GLASS BALUSTRADE
LV1	VERTICAL SERVICES LOUVRE
MC1	METAL CLADDING
MC2	METAL CLADDING
MC3	METAL CLADDING
P1	PAINT DULUX ZEUS BLACK MATT
P2	PAINT MILTON MOON 94



DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	Draft S4.55 Issue	14.08.20
2	Draft S4.55 Issue	28.08.20
3	Draft S4.55 Issue	11.09.20
4	S4.55 Submission	17.09.20

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Reg Vic: 19340

Project:
BOWLINE

10 Dangar Street
Wickham NSW 2293

Title:
North Elevation

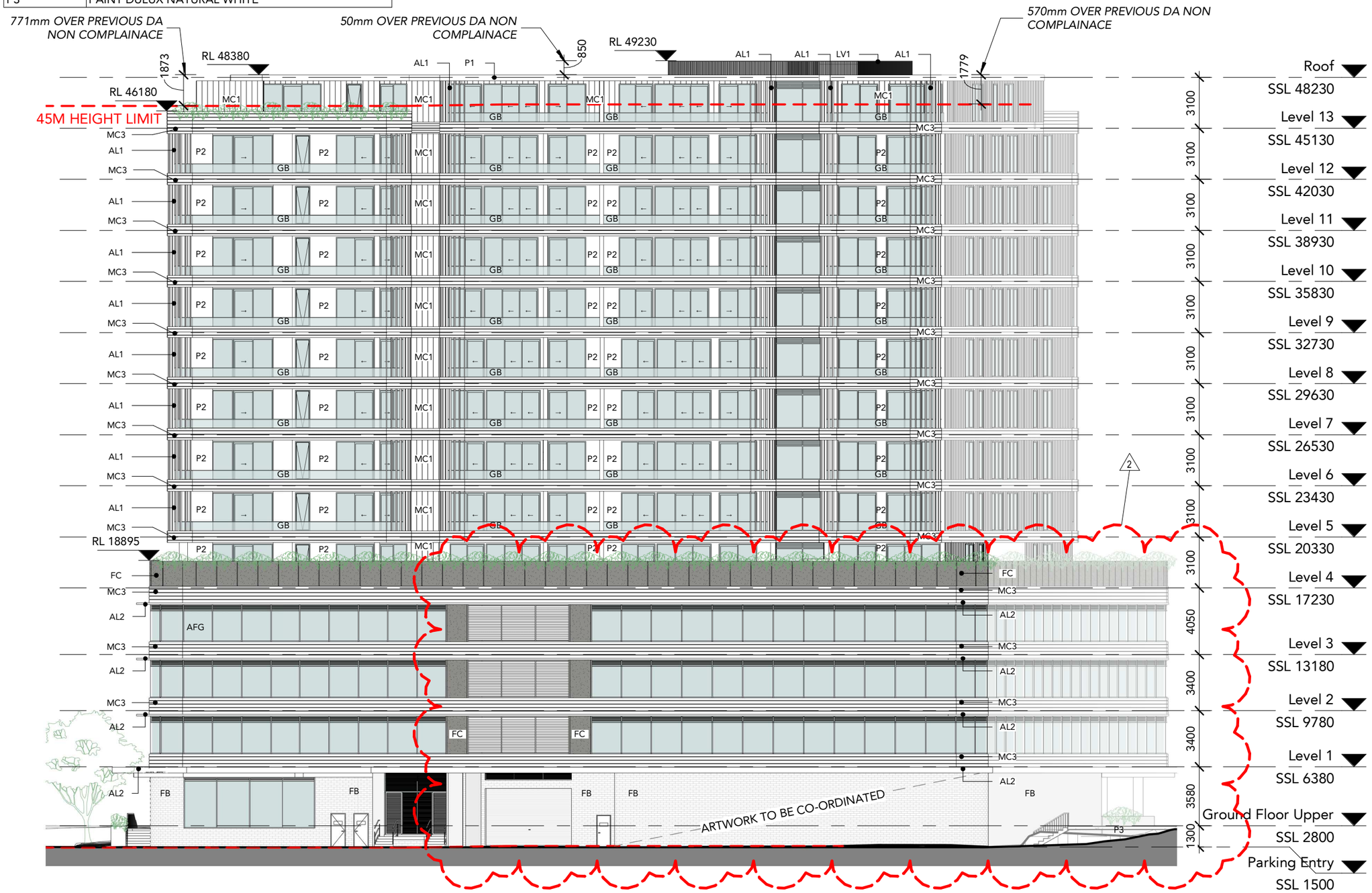
Project #:	Scale:	Drw:	Ckd:
918	1 : 250 @A3	LR	ML

Drawing #: DA-2000

Rev: 4

FINISHES KEY

AFG	ALUMINIUM FRAMED GLAZING
AL1	ALUMINIUM LOUVRE
AL2	HORIZONTAL ALUMINIUM SUNSHADE
FB	AUSTRAL FACE BRICK
FC	EQUITONE NATURA/LINES FIBRE CEMENT CLADDING
GB	FRAMELESS GLASS BALUSTRADE
LV1	VERTICAL SERVICES LOUVRE
MC1	METAL CLADDING
MC3	METAL CLADDING
P1	PAINT DULUX ZEUS BLACK MATT
P2	PAINT MILTON MOON 94
P3	PAINT DULUX NATURAL WHITE



DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	Draft S4.55 Issue	14.08.20
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3	Draft S4.55 Issue	11.09.20
4	S4.55 Submission	17.09.20

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Hawthorn East VIC 3123
ABN: 72 104 833 507
Reg Vic: 19340

Project:
BOWLINE

10 Dangar Street
Wickham NSW 2293

Title:
West Elevation

Project #:	Scale:	Drw:	Ckd:
918	1 : 250 @A3	LR	ML

Drawing #: DA-2001

Rev: 4

FINISHES KEY

AFG	ALUMINIUM FRAMED GLAZING
AL1	ALUMINIUM LOUVRE
AL2	HORIZONTAL ALUMINIUM SUNSHADE
FB	AUSTRAL FACE BRICK
FC	EQUITONE NATURA/LINES FIBRE CEMENT CLADDING
GB	FRAMELESS GLASS BALUSTRADE
LV1	VERTICAL SERVICES LOUVRE
MC1	METAL CLADDING
MC3	METAL CLADDING
P1	PAINT DULUX ZEUS BLACK MATT

DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	Draft S4.55 Issue	14.08.20
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ABN: 72 104 833 507
Reg Vic: 19340

Project:
BOWLINE
10 Dangar Street
Wickham NSW 2293

Title:
South Elevation

Project #:	Scale:	Drw:	Ckd:
918	1 : 250 @A3	LR	ML

Drawing #: DA-2002
Rev: 4

FINISHES KEY

AFG	ALUMINIUM FRAMED GLAZING
AL1	ALUMINIUM LOUVRE
AL2	HORIZONTAL ALUMINIUM SUNSHADE
FB	AUSTRAL FACE BRICK
FC	EQUITONE NATURA/LINES FIBRE CEMENT CLADDING
GB	FRAMELESS GLASS BALUSTRADE
LV1	VERTICAL SERVICES LOUVRE
MC1	METAL CLADDING
MC2	METAL CLADDING
MC3	METAL CLADDING
P1	PAINT DULUX ZEUS BLACK MATT
P2	PAINT MILTON MOON 94

DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	Draft S4.55 Issue	14.08.20
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Project:
BOWLINE

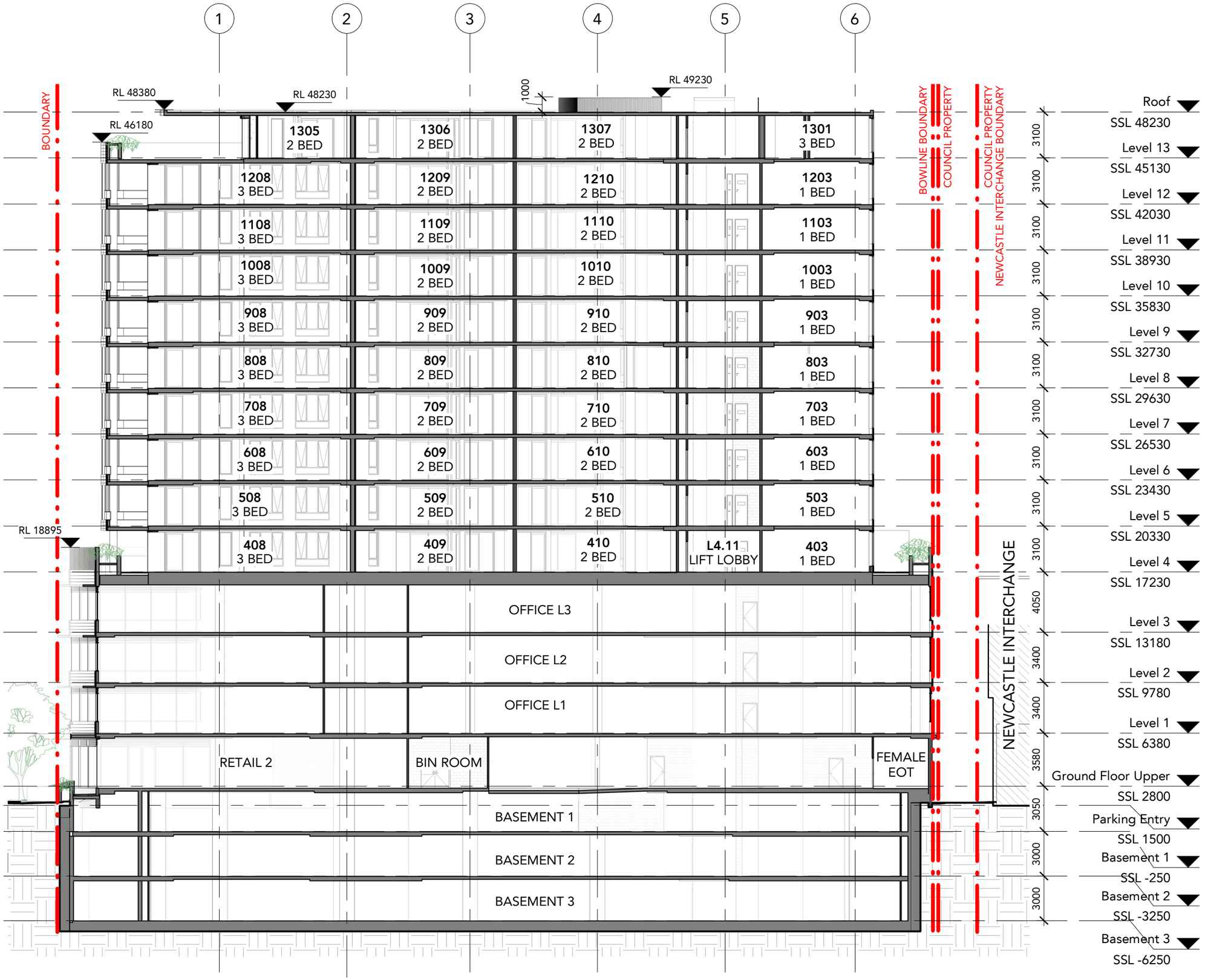
10 Dangar Street
Wickham NSW 2293

Title:
East Elevation

Project #:	Scale:	Drw:	Ckd:
918	1 : 250 @A3	LR	ML

Drawing #: DA-2003

Rev: 4



DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	Draft S4.55 Issue	14.08.20
2	Draft S4.55 Issue	28.08.20
3	Draft S4.55 Issue	11.09.20
4	S4.55 Submission	17.09.20

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Project:
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10 Dangar Street
Wickham NSW 2293

Title:
Building Section AA

Project #:	Scale:	Drw:	Ckd:
918	1 : 250 @A3	LR	ML

Drawing #: DA-3000
Rev: 4

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Project:
BOWLINE

10 Dangar Street
Wickham NSW 2293

Title:
Building Section BB

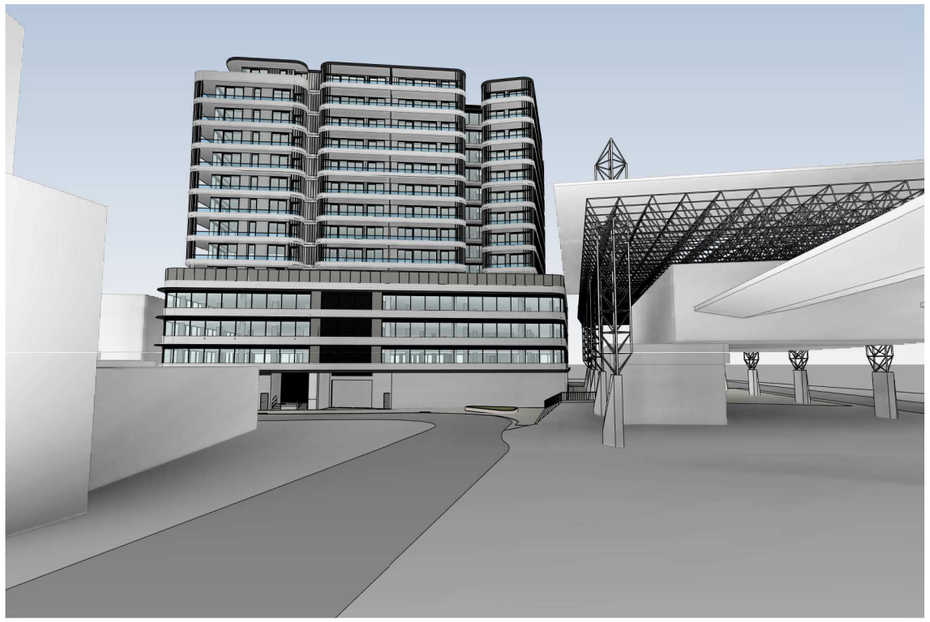
Project #:	Scale:	Drw:	Ckd:
918	1 : 250 @A3	LR	ML

Drawing #: DA-3001

Rev: 4

1 North View (Charles Street)
Scale:

2 East View (Hannell Street)
Scale:



3 West View (Station Street)
Scale:

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S4.55 APPLICATION

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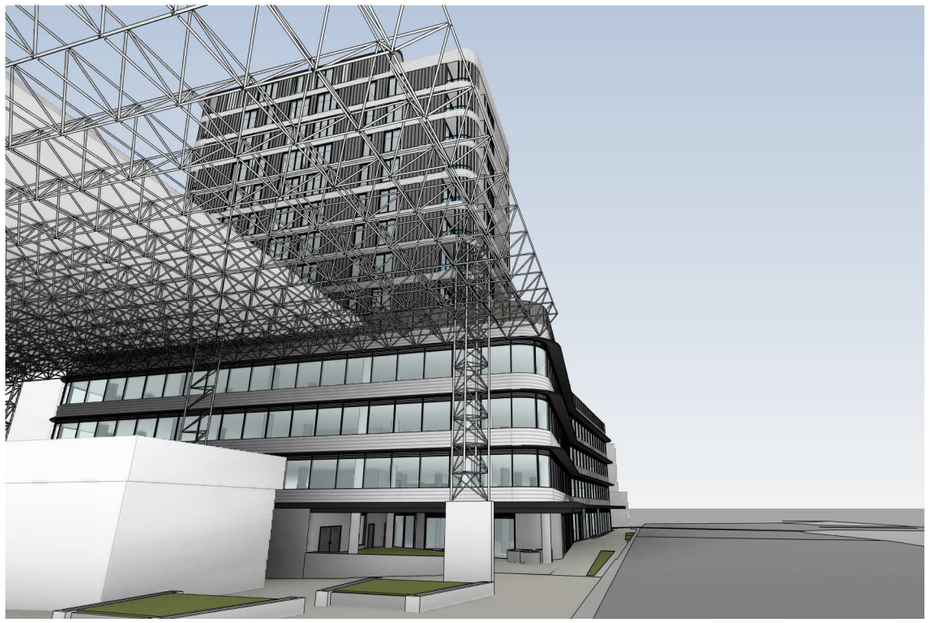
Project:
BOWLINE

10 Dangar Street
Wickham NSW 2293

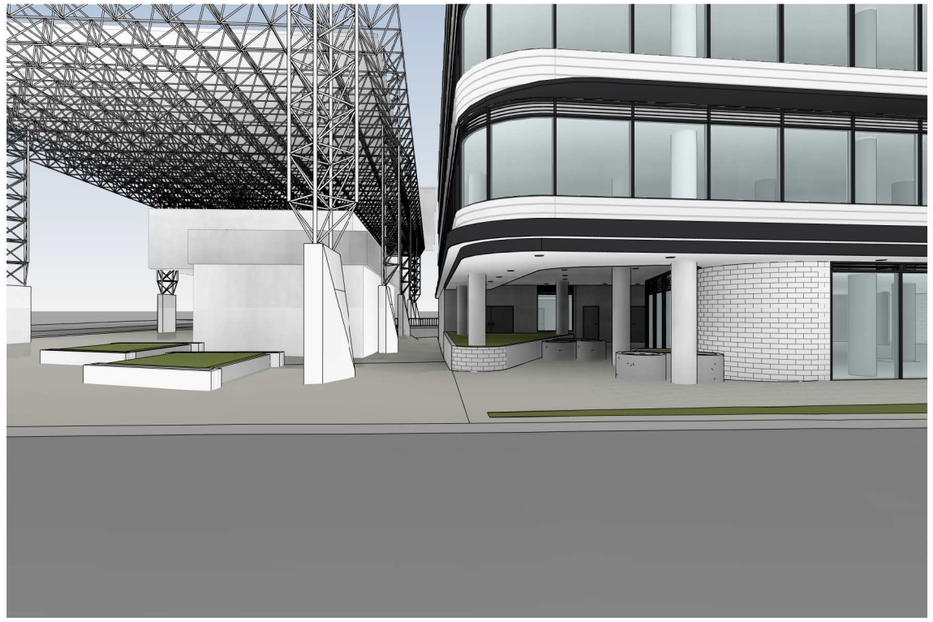
Title:
Visual Impact Analysis 01

Project #:	Scale:	Drw:	Ckd:
918	NTS	LR	ML

Drawing #: DA-4001
Rev: 4



4 South View (Hannell Street)
Scale:



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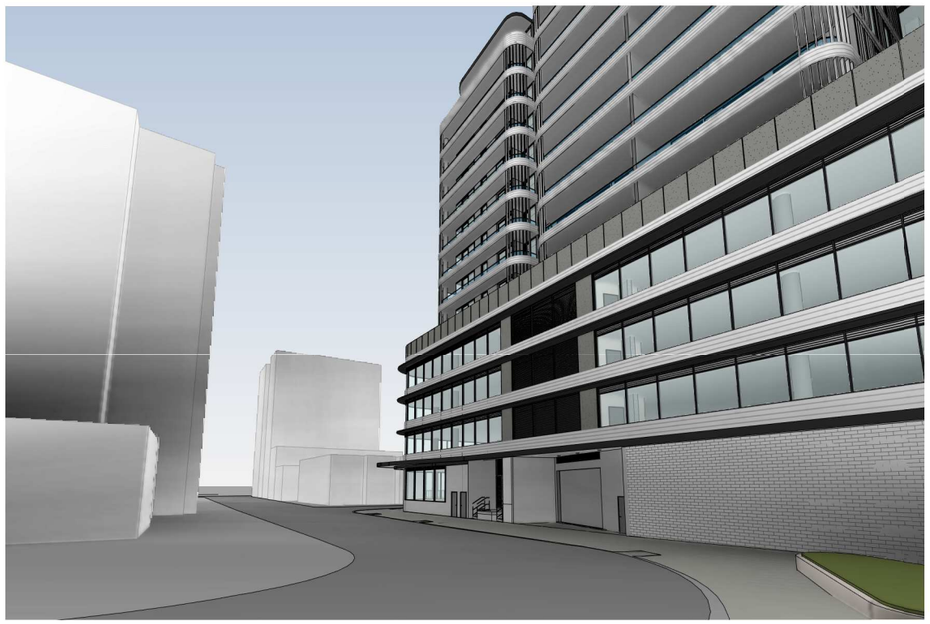
Scale:



6 South View (Charles Street)
Scale:

DRAWING STATUS:

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Project:
BOWLINE

10 Dangar Street
Wickham NSW 2293

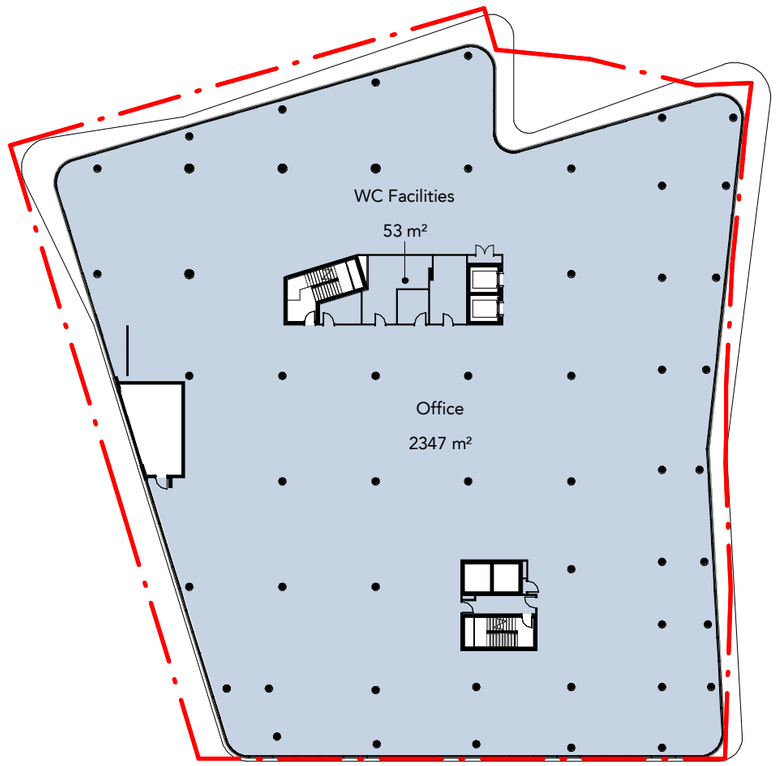
Title:
Visual Impact Analysis 02

Project #:	Scale:	Drw:	Ckd:
918	NTS	LR	ML

Drawing #: DA-4002
Rev: 4

1 Ground Floor GFA
Scale: 1 : 500

ROOM	AREA
RETAIL 1	202m²
RETAIL 2	333m²
RETAIL 3	366m²
RETAIL 4	206m²
OFFICE LOBBY	53m²
RESI LOBBY	43m²
WC'S+LOBBY	33m²
EOT+LOBBY	114m²
BM OFFICE	20m²
TOTAL	1370m²



2 Levels 1-3 TYPICAL GFA
Scale: 1 : 500

ROOM	AREA
OFFICE	2347m²
WC FACILITIES	53m²
TOTAL	2400m²

Podium Levels GFA	
Level	Area
Ground Floor Upper	1368.79 m²
Level 1	2400.62 m²
Level 2	2400.62 m²
Level 3	2400.62 m²
Total Podium Gross Floor Area	8570.65 m²

Newcastle Local Environmental Plan 2012

Gross floor area means the sum of the floor area of each floor of a building measured from the internal face of external walls, or from the internal face of walls separating the building from any other building, measured at a height of 1.4 metres above the floor, and includes:

(a) the area of a mezzanine, and
(b) habitable rooms in a basement or an attic, and
(c) any shop, auditorium, cinema, and the like, in a basement or attic,

but excludes:

(d) any area for common vertical circulation, such as lifts and stairs, and
(e) any basement:
(i) storage, and
(ii) vehicular access, loading areas, garbage and services, and
(f) plant rooms, lift towers and other areas used exclusively for mechanical services or ducting, and
(g) car parking to meet any requirements of the consent authority (including access to that car parking), and
(h) any space used for the loading or unloading of goods (including access to it), and
(i) terraces and balconies with outer walls less than 1.4 metres high, and
(j) voids above a floor at the level of a storey or storey above.

DRAWING STATUS:

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Title:
GFA Diagram 01

Project #:	Scale:	Drw:	Ckd:
918	1 : 500 @A3	LR	ML

Drawing #: DA-5000
Rev: 4

Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Validation of Remediation

Proposed Apartment Development
10 Dangar Street, Wickham

Prepared for
Eastern Pacific

Project 39961.11
April 2022

Douglas Partners
Geotechnics / Environment / Groundwater

Document History

Document details

Project No.	39961.11	Document No.	R.002.Rev0
Document title	Report on Validation of Remediation Proposed Apartment Development		
Site address	10 Dangar Street, Wickham		
Report prepared for	Eastern Pacific		
File name	39961.00.R.002.Rev0		

Document status and review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Patrick Heads	Matthew Blackert	29 April 2022

Distribution of copies

Status	Electronic	Paper	Issued to
Revision 0			Lachlan Richards, Eastern Pacific

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

	Signature	Date
Author	Patrick Heads	29 April 2022
Reviewer	MBlackert	29 April 2022

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Executive Summary

This report presents the results of validation of remediation of identified PAH/metal/asbestos-impacted fill and hydrocarbon-impacted soils at 10 Dangar Street Wickham.

The proposed development comprises a 14 storey commercial and residential development with a three level basement.

The validation woks were conducted to render the site suitable for the proposed land use, and also to allow for reuse of underlying soils which are not contaminated but are classified as acid sulfate soils (ASS) with reference to a NSW EPA site-specific resource recovery order and exemption.

Remediation works included the excavation and disposal of the affected soils to an appropriately licensed landfill.

Validation works comprised inspections and collection of validation samples across the stripped surface following removal of upper fill, and inspections and collection of validation samples from the former underground fuel storage tank location following removal of hydrocarbon-impacted soils.

The results of validation inspections, sampling and analysis indicated the absence of gross contamination at the test locations, with contaminant concentrations within the adopted remediation action criteria based on the proposed residential land use with minimal soil access, and the resource recovery order limits for reuse of the soils.

Based on the remediation and validation works conducted the site is considered to be suitable for the proposed multi-storey residential and commercial development from a contamination perspective.

The underlying soils are considered to be suitable for potential re-use on another site as per the site-specific resource recovery order and exemption, subject to the treatment and validation of acid sulfate soils at the site as per the resource recovery order.

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Drawing 3 – Test Location Plan – Validation of Stockpile Removal
Proposed Development Plans (Team 2 Architects Ref 918, Rev 4 dated 17.9.2020)

Report on Validation of Remediation
Proposed Apartment Development
10 Dangar Street, Wickham

1. Introduction

This report presents the results of validation of remediation undertaken for removal of upper impacted fill for the proposed apartment development at 10 Dangar Street, Wickham. The investigation was commissioned in an email dated 16 February 2022 by Lachlan Richards of Eastern Pacific and was undertaken in accordance with Douglas Partners Pty Ltd (DP) proposal 39961.11.P.003.Rev0 dated 14 October 2021.

It is understood that the proposed development of the site includes the following:

- Demolition of existing structures and removal of upper fill;
- Installation of boundary sheet piles and basement piles;
- Installation of deep piles for support of the proposed structure;
- Excavation of soils to facilitate basement construction;
- Construction of a three-level basement across the majority of the site footprint;
- Construction of a 14 level retail and residential tower.

The aim of the validation was to:

- Assess site remediation with respect to the council and NSW EPA-approved remediation action plan (RAP) for the site (DP 2021), comprising inspections and validation testing associated with the removal of impacted soils, prior to commencement of the construction of the proposed apartment development;
- Confirm the absence of contamination in the remaining samples to facilitate reuse of underlying soils with reference to the NSW EPA specific resource recovery order/exemption for the site (NSW EPA 2022).

The validation works included inspection of the stripped site surface and former underground storage tank area during and following impacted soils/fill removal, sampling and analysis of remaining soils and preparation of this report.

The validation works were conducted with reference to the methodologies and procedures outlined in the Remediation Action Plan (DP, 2021) for the site. The works were also carried out with reference to the requirements of the Resource Recovery Order (RRO) for the site (NSW EPA, 2022), for the validation of upper fill removal prior to treatment and reuse of the underlying acid sulfate soils.

2. Proposed Development

It is understood that the development of the site will include construction of a 14-level retail, commercial and residential development with three basement levels. Development drawings indicate that the ground floor use will comprise retail and car parking, with levels one to three comprising office/commercial space. Residential development is proposed for levels four to 13. The three basement levels are proposed for vehicle parking. The Architectural Plans (Team 2 Architects Ref 918, Rev 4 dated 17.9.2020) are provided in Appendix D.

3. Site Description

The site is identified as Lot 1, DP1197377 and is known as 10 Dangar Street Wickham. The site is an irregular-shaped area of approximately 2930 m^2.

The site is bounded to the east by Hannell Street, to the north by Dangar Street, and residential development, to the west by Charles Street, Station Street and commercial development, and to the south by the Newcastle Transport Interchange (i.e. former rail corridor).

The subject lot is shown in Figure 1 below.

Figure 1: Subject site, in yellow (Image from Six Maps)

4. Published Data

4.1 Geology

Reference to the Newcastle Coalfield Regional Geology 1:100 000 Geological Series Sheet published by the Department of Mineral Resources indicates that the site is underlain by Quaternary aged alluvium which typically comprises gravel, sand, silt and clay.

4.2 Hydrogeology

The regional groundwater flow regime, based on site observations and monitoring, is believed to be to the north-east of the site, towards Throsby Creek, which is approximately 180 m east-north-east of the site, and is considered to be the nearest sensitive receptor. The groundwater gradient is considered to be relatively flat. Based on groundwater measurement and monitoring as part of investigations by DP at the site, groundwater levels within the site have varied between RL 0.53 (AHD) and RL -0.78, with an average level of approximately RL 0.2. It should be noted that groundwater levels are affected by climatic conditions, soil permeability and tidal influences and will therefore vary with time.

4.3 Acid Sulfate Soils

Reference to the Newcastle Acid Sulfate Soil Risk Map prepared by the Department of Land & Water Conservation indicates that the site has a high probability of occurrence of acid sulfate soils (ASS) between 1 m and 3 m below the ground surface. Refer to Section 5 below for further details.

5. Background

DP has conducted several investigations across the site, including preliminary site investigation for contamination, detailed site investigation for contamination, acid sulfate soil assessment and groundwater assessment. The assessments included desktop and site history assessment, subsurface investigation, soil and groundwater sampling and testing, groundwater measurement and monitoring and preparation of reports for the site-specific resource recovery order and exemption. The findings of the assessments are summarised below:

- The site was previously used for a combination of residential and commercial land use;
- Demolition of structures had occurred at the site;
- Previous site use has included a transport/courier distribution centre, which included underground fuel storage tank use;
- The site had been filled with imported materials, likely to include industrial waste materials (e.g. slag and ash);
- Subsurface conditions generally comprised upper silty sand fill with slag and ash inclusions, underlain by possible sand fill/windblown sand and natural sands;
- Groundwater was encountered at depths of approximately 2 m from the previous ground surface;

- Contamination assessment indicated the presence of elevated PAH and heavy metal contamination in upper fill, as well as the presence of building rubble and asbestos containing materials;
- Elevated contaminant concentrations were generally absent in underlying sand fill and natural sands with the exception of localised hydrocarbons impacts in the vicinity of the former underground fuel storage area;
- The conceptual site model for the site, based on the results of previous investigations, is presented in Table 1 below;
- Natural sands at the site are potential acid sulfate soils;
- A site-specific resource recovery order (RRO) has been obtained for the site for the treatment and reuse of the acid sulfate soils generated from proposed basement excavation at the site. The requirements of the RRO generally include the following;
    - Remediation and validation of the site as per the RAP (DP, 2021), including removal of upper fill and hydrocarbon impacted soils, and validation of the remaining soils prior to commencement of excavation;
    - Lime treatment of excavated acid sulfate soils, with detailed ASS testing of the treated soils to confirm appropriate treatment of the ASS for the proposed reuse on another site.

Table 1: Conceptual Site Model

Known and Potential Primary Sources	Primary Release Mechanism	Secondary Release Mechanism	Potential Impacted Media	Contaminants of Concern	Exposure Pathway	Potential Receptors	
						Current	Future
Filling imported across the site (subject to source)	Placement of filling on-site	Long-term leaching of contaminants via runoff, rain water infiltration / percolation or exposure / disturbance during proposed development	Soil, groundwater, surface water	TRH, BTEX, PAH, Metals, Pesticides, PCB, asbestos	Dermal contact, inhalation (dust/vapours), ingestion	Site workers, maintenance workers, consultants, trespassers, surface water bodies, groundwater, neighbouring properties in the case of groundwater or surface water migration	Site workers, residents, maintenance workers, consultants, trespassers, surface water bodies, groundwater, neighbouring properties in the case of groundwater or surface water migration
USTs & associated Infrastructure on site and off site	Potential leaks and spills from USTs, bowsers and associated pipework	Long-term leaching of contaminants via runoff, rain water infiltration / percolation, through soil or cracks/joints in concrete, groundwater migration or exposure/disturbance during proposed development	Soil, groundwater, surface water	TRH, BTEX, PAH, Metals, VOC	Dermal contact, inhalation (dust/vapours), ingestion		
Demolition of former structures or renovations to existing / former buildings	Demolition of buildings / structures	Long-term leaching of contaminants via runoff, rain water infiltration / percolation or exposure / disturbance during proposed development	Soil, groundwater, surface water	Metals, PCB, asbestos	Dermal contact, inhalation (dust/vapours), ingestion		
Car Parking on unpaved areas	Spills and leaks	Long-term leaching of contaminants via runoff, rain water infiltration / percolation, through soil or cracks / joints in concrete or exposure/disturbance during proposed development	Soil, groundwater, surface water	TRH, BTEX, PAH, Metals, VOC, acids	Dermal contact, inhalation (dust/vapours), ingestion		
Repairs/servicing/ storage of vehicles and storage of vehicles / parts	Spills and leaks, hydrocarbon sources and solvents	Long-term leaching of contaminants via runoff, rain water infiltration / percolation, through soil or cracks / joints in concrete or exposure/disturbance during proposed development	Soil, groundwater, surface water	TRH, BTEX, PAH, Metals, VOC	Dermal contact, inhalation (dust/vapours), ingestion		
Refurbishment of existing structure	Partial demolition of buildings / structures, removal of hazardous materials	Long-term leaching of contaminants via runoff, rain water infiltration / percolation or exposure / disturbance during proposed development	Soil, groundwater, surface water	Metals, PCB, Asbestos	Dermal contact, inhalation (dust/vapours), ingestion		

6. Remediation Methodology and Objectives

Following consideration of several remediation methodologies, (DP, 2021) including off-site disposal, on-site management and on-site treatment and reuse, off-site disposal of the contaminated soils was considered to be the most appropriate remediation option for upper PAH/metals/ACM impacted soils/fill and hydrocarbon-impacted soils, since the proposed development requires excavation of the majority of impacted soils for basement construction.

The main objective of this remediation approach was to excavate contaminated PAH, metal, asbestos and hydrocarbon-impacted soils for removal and disposal from site to an appropriately licensed facility, followed by validation of the remaining soils to confirm removal of the identified impacts and so that the development site can be made suitable for the proposed medium/high density residential development.

Following demolition of above-ground structures, the general remediation methodology comprised the following:

- Preparation of a clearance certificate for asbestos from the demolition contractor's consultant (ADE, 2022) following building removal and partial removal of the upper fill;
- Removal of below-ground structures (footings, underground fuel storage tanks (UST)/infrastructure, underground slabs) and associated soils;
- Completion of impacted soil removal to the extent practical.

7. Remediation Acceptance Criteria

The remediation acceptance criteria (RAC) used to assess/validate the removal of the PAH/metals/ACM-impacted upper filling as presented in DP (2021) were developed in line with the proposed use of the site for high density residential land use with minimal access to soils. The contaminants of concern associated with the impacted upper filling are PAH, heavy metals and asbestos. The contaminants of concern for the hydrocarbon-impacted soils from the former UST are total recoverable hydrocarbons (TRH).

Subsequent to the formation of the RAC based on the proposed land use, the acceptance criteria to validate the removal of the upper impacted fill was based on the acceptance criteria provided in the RRO for the site (NSW EPA, 2022), which was generally more stringent than the previously adopted RAC. The RRO specified the maximum average and absolute maximum allowable contaminant concentrations in the remaining soils following removal of upper impacted fill to facilitate re-use of remaining soils at another site under the site-specific RRO/RRE.

An extract from the RRO (NSW EPA, 2022) showing the criteria is reproduced in Figure 2.

The above RRO acceptance limits were utilised to demonstrate that the underlying soils were acceptable for the proposed land use, and also acceptable for reuse on another site from a contamination perspective, subject to appropriate acid sulfate soil treatment.

Column 1	Column 2	Column 3
Chemicals and other attributes	Maximum average concentration for characterisation (mg/kg 'dry weight' unless otherwise specified)	Absolute maximum concentration (mg/kg 'dry weight' unless otherwise specified)
1. Mercury	0.5	1.0
2. Cadmium	0.5	1.0
3. Lead	50	100
4. Arsenic	20	40
5. Chromium (total)	75	150
6. Copper	100	200
7. Nickel	30	60
8. Zinc	150	300
9. Total Polycyclic Aromatic Hydrocarbons (PAHs)	20	40
10. Benzo(a)pyrene	0.5	1
11. Benzene	NA	0.5
12. Toluene	NA	65
13. Ethyl-benzene	NA	25
14. Xylene	NA	15
15. Total Recoverable Hydrocarbons C_{10} – C_{40}	250	500
16. Rubber, plastic, bitumen, paper, cloth, paint and wood	0.05%	0.10%
17. PCBs	NA	<LOR
18. OCPs	NA	<LOR
19. AF/FA	NA	<LOR

*Note:

1. NA: Not applicable
2. <LOR means less than the laboratory limit of reporting

Figure 2: RAC for chemical contamination, based on the requirements of the RRO

8. Data Quality Objectives

Table 2 summarises the data quality objectives (DQO) and the procedures designed to enable achievement of the DQOs.

Table 2: Data Quality Objectives

DQO	Achievement Evaluation Procedure
Step 1 – State the problem	Removal and validation of the removal of impacted soils and confirmation of the absence of contamination of underlying natural soils to facilitate the proposed development and off-site reuse of excess soils.
Step 2 – Identify the decision	Further assess the level of contamination in natural soils following removal of identified contamination. Assessment of natural soils for development based on the remediation action criteria and the requirements of the site-specific resource recovery order for the purposes of reuse of soils.
Step 3 – Identify the inputs to the decision	Findings of the previous investigations at the site. Selection of appropriate contaminants of concern based on previous investigation findings and CSM (Section 5). Selection of the appropriate laboratory testing methods. Field and laboratory QA/QC data to assess the suitability of the environmental data for the assessment.
Step 4 – Define the Boundary of the Assessment	As defined in Section 3 and shown on Drawing 1.
Step 5 – Develop of decision rule	Systematic and targeted soil samples will be collected and analysed for the suite as defined in the RRO to confirm suitability for reuse of the soils from a contamination perspective. The field and laboratory data will be assessed as reliable by reference to the Data Quality Indicators (DQI) as outlined in Step 7.
Step 6 – Specify the acceptance criteria	The site assessment criteria will be developed through reference to NEPC 2013, and the contamination limits as prescribed in the site-specific RRO (NSW EPA 2022). The acceptance limits for laboratory QA/QC parameters were based on the laboratory reported acceptance limits and those stated in NEPC 2013.
Step 7 – Optimise the design for obtaining data	Design will be optimised by the implementation of a plan for sample collection, handling and analysis, including undertaking quality assurance and quality control measures to allow assessment of the suitability of the data collected. Measurement to assess the project DQOs using data quality indicators (DQIs) as follows: Completeness – completion of field and laboratory chain of custody documentation, use of experienced field staff, compliance with holding times and correct documentation; Comparability – consistent sampling procedures, use of NATA certified laboratory and experienced field staff; Representativeness – appropriate media sampled; Precision - Analysis of field and laboratory replicates and achievement of acceptable RPDs, acceptable levels for laboratory QC criteria; Accuracy – Analysis of field duplicates, matrix spikes and surrogate spikes.

9. Responsibilities

In order to achieve the goals of the interim remediation (i.e. .removal of the upper PAH/metals/asbestos impacted fill), the following roles and responsibilities were implemented:

Contractor

The demolition contractor, Drumderg, was responsible for on-site operations including:

- Demolition of structures;
- Decommissioning and removal of USTs, and associated infrastructure (i.e. fuel lines etc.);
- Handling of fill materials (contaminated or otherwise) associated with demolition works, including excavations, stockpiles, segregation, and disposal of unsuitable or excess materials;
- Disposal of contaminated soil material (PAH/metals/asbestos contaminated materials) to a licensed landfill;
- Safety of all personnel on site;
- Measures to minimise environmental effects;
- Ensure required licenses and approvals from regulatory authorities are obtained prior to demolition and excavation works commencing. It is noted that an appropriately licenced contractor was required to conduct earthworks within the site due to the presence of bonded asbestos in fill.

Asbestos Consultant

- ADE Consulting was engaged by the demolition contractor to conduct asbestos work during demolition;
- Advice on management of asbestos contamination;
- Set-up and maintenance, analysis and reporting of air monitoring for air borne asbestos fibres during demolition and early earthworks resulting in the disturbance of fill materials (i.e. any excavations, stockpiling, placement or transport of potentially asbestos-impacted fill materials).

General Site Validation (Douglas Partners)

- Advice on excavation and segregation of contaminated soils;
- Validation of excavations;
- Inspection of remediation and validation works;
- Validation sampling and analysis of the stripped surface samples;
- Validation sampling and analysis of the former UST area;
- Provision of this validation report.

Client

- The builder, Eastern Pacific, was awarded the project by the property developer to perform overall project management services;
- Engaging suitably qualified remediation contractor, and Environmental Consultant to conduct the remediation works;

- Ensure necessary approvals and notifications have been obtained prior to remedial works commencing;
- Liaison with the environmental consultant and remediation contractor during remediation process.

Prior to the commencement of remediation works, a site meeting between the client, contractor and environmental consultant was conducted to confirm responsibilities and procedures in accordance with the agreed RAP.

10. Remediation Strategy and Methodology

10.1 General

The following staged remediation methodology was conducted to achieve the interim remediation goal of removal of upper PAH/metals/asbestos impacted fill:

Stage 1: Initial Preparation and Site Meeting

- The property developer engaged an asbestos consultant to conduct a hazardous materials assessment on the building prior to demolition;
- The licensed demolition Contractor (Drumderg) obtained all necessary approvals and notifications to allow commencement of the demolition works, including SafeWork NSW permit for asbestos related works (i.e. excavation, handling and disposal of soils containing asbestos);
- Site inception meeting between environmental consultant (DP), Drumderg and the site owner to discuss methodologies and responsibilities, prior to demolition activities.

Stage 2: Demolition

- Drumderg set up environmental controls and secured the site. ADE set up air monitoring stations as required;
- Drumderg demolished and removed existing buildings across the site;
- Following demolition / removal of concrete surface, interim environmental management procedures were implemented where ACM impacts were identified at the surface (i.e. minimise disturbance, wetting of soils);
- Drumderg decommissioned and removed the identified underground fuel storage tanks and any remnant infrastructure.

Stage 3: Remediation and Validation of PAH, metals and Asbestos Contaminated Soils

- Drumderg excavated and chased out subsurface structures such as concrete and brick footings, lower slabs and associated impacted soils based on visual observations and identification of material types by DP;
- Contaminated material was excavated/chased from the site until visual evidence indicated the absence of such materials;

- Direct loading of demolition materials and associated impacted soils into trucks for disposal as 'General Solid Waste' with asbestos to an appropriately licensed landfill. The material was classified as 'General Solid Waste' with asbestos as part of previous assessment by DP;
- Validation of excavated areas by DP (see section 8.2).

At this stage, due to the proximity of impacted soils to the site boundary, a batter of impacted soils remained at the site boundary until sheet piles could be installed along the site boundary

Stage 4: Additional Remediation and Validation of PAH, metals and Asbestos Contaminated Soils

- Eastern Pacific installed sheet pile walls along the northern, eastern and western site boundaries to facilitate removal of remaining impacted fill;
- Enviropacific Services were engaged to complete removal of impacted fill, comprising excavation of the PAH, metal and asbestos-impacted soils to the sheet pile wall on the site boundary;
- Contaminated material was excavated/chased from the site until visual evidence indicated the absence of such materials;
- Stockpiling of the impacted materials, followed by loading of the impacted fill materials into trucks for disposal as 'General Solid Waste' with asbestos to an appropriately licensed landfill. The material was classified as 'General Solid Waste with asbestos', as part of previous assessment by DP;
- Validation of excavated areas by DP (see section 8.2);
- Validation of stockpile areas.

Stage 5: Remediation and Validation of TRH-impacted soils

- Enviropacific Services were engaged to complete removal of hydrocarbon-impacted soils in the north-western portion of the site. The impacted soils were present due to the former underground fuel storage and dispensing;
- Contaminated material was excavated/chased from the area of impact until visual evidence and the results of in-situ screening using a photoionisation detector (PID) indicated the absence of such materials;
- Stockpiling of the impacted materials, followed by waste classification testing and loading of the impacted fill materials into trucks for disposal as 'General Solid Waste' to an appropriately licensed landfill. The material was classified as 'General Solid Waste' following excavation and stockpiling. The waste classification report is provided in Appendix C;
- Validation of excavated areas by DP (see section 8.2).

10.2 Validation

10.2.1 Validation of the Removal of Upper PAH, Metal and asbestos-impacted soils

The following procedure was conducted for validation following stripping / removal of upper fill materials identified to contain PAH/metal/asbestos impacts:

- The stripped surface was inspected by DP to confirm the visual absence of potentially contaminated fill. It is noted that the upper impacted fill was visually different to the underlying soils, being dark grey silty sand with ash, slag and some building rubble, overlying light brown and grey sand;
- Validation samples for chemical testing were collected by DP over the stripped surface (i.e. following removal of the upper fill layer, as follows, and as shown on Drawing 1, Appendix D:
    - Systematic Locations:
        - At a sampling density of approximately 10 m x 10 m grid over the stripped area;
    - Targeted locations:
        - At the approximate location of previously identified contamination;
        - Collection of six validation samples at and around the previous area of lead impact identified at previous test location Bore 503;
        - Within areas where previously soil testing was precluded due to access restrictions (e.g. within suspended slab area in the eastern portion of the existing building – Bores 502 and 504);
- Chemical analysis was conducted by a NATA registered laboratory on samples collected to provide interim validation of the removal of impacted materials;
- Validation samples were tested for some, or all of the analytes as indicated in Figure 2 above from the RRO, namely TRH, BTEX, PAH, metals, asbestos, foreign materials, organochlorine pesticides and polychlorinated biphenyls.

The validation sample locations are shown on Drawing 1, Appendix D.

The analysis was utilised to determine contaminant concentrations with respect to the RAC and RRO (NSW EPA, 2022) in the validated areas.

10.2.2 Validation of Hydrocarbon-impacted Soils

The following procedure was adopted for validation of the identified area of hydrocarbon-contaminated soils following stripping/removal:

- The stripped surface was inspected by DP during and following excavation to confirm, visually, the absence of potentially contaminated soils;
- Validation samples were collected at the following frequency:
    - Base of Excavation – two samples were collected from the base of the excavation (i.e. one sample per tank);
    - Side of Excavations – one location per short side wall (i.e. western and eastern sides of the excavation) and two samples per long side wall (i.e. northern and southern sides of the excavation);
    - Chemical analysis for TRH, BTEX and PAH was conducted on the validation samples by a NATA registered laboratory to validate the removal of materials containing hydrocarbon contamination.

The above analysis was utilised to determine contaminant concentrations with respect to the RAC and RRO in the validated areas.

In addition to comparison of results to RRO and RAC, validation included the removal of soils with visual and/or olfactory evidence of hydrocarbon contamination.

11. Validation Observations

11.1 Demolition and Bulk Soil Removal

Demolition of structures and removal of surface slabs, underground structures and associated impacted soils was conducted in November and December 2021.

Figure 3: North-eastern corner of the site following demolition of structures and removal of upper slabs (18 November 2021)

An area of clay fill, located above a second concrete slab, was located in the eastern portion of the site as shown in Figure 4 below. Additional waste classification works were conducted for the clay fill. The waste classification report is presented in Appendix C

Figure 4: Localised clay fill and underlying concrete slab (in red ellipse) in the eastern portion of the site.

Following structure, slab, footings and associated impacted soil removal, soils at the site surface generally comprised light brown to grey brown sand as shown in Figures 5, 6 and 7.

Figure 5: Site surface following structure, underground slabs/footings and associated impacted soils, looking south-east from the north-western corner of the site (28 January 2022)

Figure 6: Site surface following demolition and partial fill removal, looking east from the northern site boundary (28 January 2022)

Figure 7: Stripped surface, looking north-west from the south-eastern corner of the site. Note the presence of impacted fill on the eastern site boundary (28 January 2022)

11.2 Soil Removal from Site Boundaries

Following sheet pile wall installation, additional excavation and stripping of upper impacted soils was conducted around the site boundaries between 17 March 2022 and 24 March 2022.

Figure 8: Excavation of upper fill adjacent to the northern site boundary, 17 March 2022

Figure 9: Stripped surface following excavation in the north-eastern corner of the site, 17 March 2022

11.3 Excavation of Hydrocarbon-impacted Soils

Following completion of removal and validation of upper fill in the north-western portion of the site, additional deeper excavation was conducted in the vicinity of the removed underground fuel storage tanks (as per Section 9.2.2)

Excavation was conducted until visual and olfactory observations indicated the absence of hydrocarbon impact.

Figure 10: Excavation of hydrocarbon impacted soils in the north-western portion of the site, looking west (17 March 2022)

12. Sampling and Analysis

12.1 General

Soil samples for the interim validation were collected directly from the exposed stripped surface or excavation. Sampling data including sample location, replicate samples, personnel and time of sampling was recorded to comply with routine Chain of Custody (COC) requirements.

The general sampling, handling, transport and tracking procedures comprised:

- The use of disposable gloves for each sampling event;
- Transfer of the sample immediately into new glass jars;
- Collection of 10% replicate samples for QA/QC purposes;
- Collection of replicate soil samples in zip-lock plastic bags for PID screening;

- Labelling of the sample containers with individual and unique identification including Project Number and Sample Number;
- Placement of the containers into a chilled, enclosed and secure container for transport to the laboratory; and
- Use of chain of custody documentation so that sample tracking and custody can be cross-checked at any point in the transfer of samples from the field to hand-over to the laboratory.

12.2 Validation of the Removal of Upper Fill

Analysis for the validation of excavated PAH/metals/asbestos impacted soils comprised the following:

- Total Recoverable hydrocarbons (TRH);
- Benzene, Toluene, Ethylbenzene and Xylene (BTEX);
- Polycyclic Aromatic Hydrocarbons (PAHs);
- Heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn);
- Asbestos identification (500 mL bulk sample for AF/FA).

In addition to the above analytes, additional samples around the previous test location Bore 503 were analysed for lead and foreign material content (i.e. as per NSW EPA (2022)) due to a previous contaminant exceedance during prior investigation at the site (DP (2019)). Additional samples for asbestos identification were also analysed in the vicinity of former test locations where asbestos containing materials were previously encountered.

Validation test locations are shown on Drawing 1, Appendix D.

Validation test locations following removal of the stockpiled upper impacted soils are shown on Drawing 3, Appendix D. Validation samples for the stripped surface (Samples V6 to V9, V11) were also utilised to validate the removal of the upper fill stockpile following disposal.

12.3 Validation of Former UST area

Analysis for the validation of excavated hydrocarbon-impacted soils from the former UST area comprised the following:

- Total Recoverable hydrocarbons (TRH);
- Benzene, Toluene, Ethylbenzene and Xylene (BTEX);
- Polycyclic Aromatic Hydrocarbons (PAHs);

Validation test locations are shown on Drawing 2, Appendix D.

12.4 Waste Classification of Impacted Soils

Waste classification for the upper PAH/metals/asbestos-impacted fill was completed as part of previous investigation at the site (DP, 2018).

Analysis for the waste classification of excavated hydrocarbon-impacted soils comprised the following:

- Total Recoverable hydrocarbons (TRH);
- Benzene, Toluene, Ethylbenzene and Xylene (BTEX);
- Polycyclic Aromatic Hydrocarbons (PAHs);
- Heavy metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn);
- Asbestos identification (500 mL bulk sample for AF/FA).

The waste classification reports for the above are provided in Appendix C. Some potential contaminants in fill such as OCP, OPP and PCB were not analysed as part of the waste classification, as previous works at the site indicated the absence of those contaminants in the fill.

In addition to the above, waste classification assessment was conducted on localised geotechnically unsuitable clay soils encountered in the western and south-western portions of the site. These clay soils were excavated and stockpiled following analysis for the above analytes. Confirmatory acid sulfate soil testing (chromium suite) was also conducted on these soils following lime treatment to counteract potential acid generation from the acid sulfate soils.

13. Quality Assurance

13.1 Field Quality Assurance

Sampling accuracy and precision was maintained for the validation through the analysis of 10% field replicate samples;

Appropriate sampling procedures were conducted to minimise potential for cross contamination including:

- Standard operating procedures were followed;
- Site safety plans were developed prior to commencement of works;
- Replicate field samples were collected and analysed (Samples DR1, DR2, DV3, DV4, DV5 and DV6 for the validation of upper fill removal, VTD1 for the validation of hydrocarbon-impacted soils in the former UST area);
- Samples were stored under secure, temperature controlled conditions;
- Chain of custody documentation was completed for the handling, transport and delivery of samples to the selected laboratory.

13.2 Laboratory Quality Assurance

DP's preferred laboratory routinely undertakes in-house QA/QC procedures involving the routine testing of:

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

13.3 Data Quality Indicators

Based on the analysis of quality control samples i.e. replicates and in-house laboratory QA/QC procedures, the following data quality indicators have been assigned for the validation testing as referenced in the RAP (DP, 2021):

- Conformance with specified holding times;
- Accuracy of spiked samples within the laboratory's acceptable range (typically 70% to 130% for inorganic contaminants and greater for some organic contaminants);
- Field and laboratory duplicates and replicates samples are to have a precision average of +/- 50% relative per cent difference (RPD). Elevated RPDs may be present due to heterogeneity of materials;
- Field duplicates/replicates have been collected at a frequency of 10% of all samples.

The data quality indicators above have been used to provide measured assessments of completeness, comparability, representativeness, accuracy and precision and presented in Step 7 of the DQO process in Section 8.

14. Validation Results

14.1 Validation of Stripped Surface – Removal of Upper Fill

Validation samples were collected for validation of the stripped soil surface following removal of upper fill as per the methodology provided in Section 10.2. Soil descriptions of the validation samples are provided in Table 3 below.

Table 3: Summary of validation samples, stripped surface validation

Sample Location	Sample Description	Validation Sample Type
V1	Light grey brown sand	Targeted location for delineation
V2	Light grey brown sand	Systematic validation sample location
V3	Light grey brown sand	Targeted location for delineation
V4	Light grey brown sand	Targeted location for delineation
V5	Dark brown silty sand	Systematic validation sample location
V6	Light grey brown sand	Targeted location for delineation
V7	Light grey brown sand	Systematic validation sample location
V8	Light grey brown sand	Targeted location for delineation
V9	Light grey brown sand	Targeted location for delineation
V10	Light grey brown sand	Targeted location for delineation
V11	Light grey brown sand	Systematic validation sample location
V12	Dark grey brown silty clay	Targeted location for delineation
V13	Dark grey brown silty clay	Systematic validation sample location
V13A	Dark grey brown silty clay	Targeted location for delineation
V13B	Dark grey brown silty clay	Targeted location for delineation
V14	Light grey brown sand	Systematic validation sample location
V15	Light grey brown sand	Targeted location for delineation
V16	Light grey brown sand	Systematic validation sample location
V17	Light grey brown sand	Systematic validation sample location
V18	Light grey brown sand	Targeted location for delineation
V19	Light grey brown sand	Targeted location for delineation
V20	Light grey brown sand	Targeted location for delineation
V21	Light grey brown sand	Systematic validation sample location
V22	Light grey brown sand	Systematic validation sample location
V23	Dark brown silty sand	Systematic validation sample location
V24	Light grey brown sand	Systematic validation sample location
V25	Light grey brown sand	Systematic validation sample location
V26	Light grey brown sand	Systematic validation sample location
V27	Light grey brown sand	Systematic validation sample location
V28	Light grey brown sand	Systematic validation sample location
V29	Light grey brown sand	Systematic validation sample location
V30	Light grey brown sand	Systematic validation sample location
V31	Light grey brown sand	Systematic validation sample location
V32	Light grey brown sand	Systematic validation sample location
V33	Light grey brown sand	Systematic validation sample location
V34	Light grey brown sand	Systematic validation sample location
V35	Light grey brown sand	Systematic validation sample location
V36	Light grey brown sand	Systematic validation sample location
V37	Light grey brown sand	Systematic validation sample location
V38	Light grey brown sand	Systematic validation sample location
V39	Light grey brown sand	Systematic validation sample location
V40	Light grey brown sand	Systematic validation sample location
V41	Light grey brown sand	Previous inaccessible area (Bore 502)
V42	Light grey brown sand	Previous inaccessible area (Bore 504)

V43	Light grey brown sand	Targeted location for delineation
V44	Light grey brown sand	Targeted location for delineation
V45	Light grey brown sand	Targeted location for delineation
V46	Light grey brown sand	Targeted location for delineation
V47	Light grey brown sand	Targeted location for delineation
V48	Light grey brown sand	Targeted location for delineation
V49	Light grey brown sand	Targeted location for delineation
V50	Light grey brown sand	Targeted location for delineation
V51	Light grey brown sand	Targeted location for delineation
V52	Light grey brown sand	Targeted location for delineation
V53	Light grey brown sand	Targeted location for delineation
V54	Light grey brown sand	Targeted location for delineation
V55	Light grey brown sand	Targeted location for delineation
V56	Light grey brown sand	Targeted location for delineation
V57	Light grey brown sand	Targeted location for delineation
V58	Dark grey brown silty clay	Targeted location for delineation
V59	Dark grey brown silty clay	Targeted location for delineation
V59A	Dark grey brown silty clay	Targeted location for delineation
V59B	Dark grey brown silty clay	Targeted location for delineation
V60	Dark grey brown silty clay	Targeted location for delineation
V60A	Dark grey brown silty clay	Targeted location for delineation
V61	Dark grey brown silty clay	Targeted location for delineation
SV1	Light grey brown sand	Footprint following removal of upper fill stockpile
SV2	Light grey brown sand	Footprint following removal of upper fill stockpile

Approximate validation sample locations are shown on Drawing 1, 2 and 3 in Appendix D. The results of validation testing are presented in Tables B1 to B5 in Appendix B.

Inspection of the soils suggested the absence of contamination at the above locations and on the stripped surface generally. The results of in-situ screening with a PID suggested the absence of volatile hydrocarbon contamination (i.e. all results less than 1 ppm).

Following receipt of initial laboratory testing results, validation sample locations were all within the RRO acceptance limits with the exception of a few samples which exhibited slightly elevated contaminant concentrations (i.e. elevated lead and/or benzo(a)pyrene at sample locations V13, V59 and V60). Following additional soil scraping and removal, the locations were re-sampled ('A' samples in Table 3 above) along with additional delineation samples in the vicinity of the failed sample ('B' samples in Table 3 above) to confirm that contaminant concentrations were all within the adopted RRO criteria for the stripped surface associated with upper impacted fill removal across the site.

14.2 Validation of Excavation – Hydrocarbon-impacted Soils

Validation samples were collected for validation of the former UST area following removal of hydrocarbon-impacted soils as per the methodology provided in Section 10.2. Soil descriptions of the validation samples are provided in Table 4 below.

Table 4: **Summary of validation samples, former UST excavation – hydrocarbon-impacted soils**

Sample Location	Sample Description	PID reading (ppm)	Validation Sample Type
VT1	Light grey brown sand	2	Eastern wall of excavation, 1.8 m depth below footpath level of Dangar Street
VT2	Light grey brown sand	4	South-eastern wall of excavation, 1.8 m depth
VT3	Light grey brown sand	2	South-western wall of excavation, 1.8 m depth
VT4	Light grey brown sand	6	Western wall of excavation, 1.8 m depth
VT5	Light grey brown sand	4	Western base of excavation, 2.3 m depth
VT6	Light grey brown sand	1	Eastern base of excavation, 2.3 m depth
VT7	Light grey brown sand	150	North-western wall of excavation, 1.8 m depth
VT7A	Light grey brown sand	1	North-western wall of excavation, 1.8 m depth, following removal of additional impacted soils
VT8	Light grey brown sand	1	North-eastern wall of excavation, 1.8 m depth

Inspection of the soils suggested the absence of gross contamination at the above locations and on the base and sides of the excavation, with the exception of the north-western portion of the excavation (i.e. sample VT7), where a hydrocarbon odour was present. The results of in-situ screening with a PID suggested the absence of volatile hydrocarbon contamination with the exception of VT7.

Following receipt of initial laboratory testing results, validation samples were all within the above the RRO acceptance limits with the exception of location VT7 which exhibited slightly elevated contaminant concentrations. Following additional localised soil scraping and removal, the location was re-sampled ('VT7A' sample in Table 4 above) to confirm that contaminant concentrations were all within the adopted RRO criteria for the UST excavation associated with the hydrocarbon impacted soils.

15. Assessment of Remediation

Remediation and validation activities comprised the following:

- Demolition of structures, underground footings, slabs and removal of associated impacted soils;
- Asbestos air monitoring and surface clearance by the asbestos consultant. Asbestos air monitoring was found to be within the adopted limits;
- Inspection of the site surface to confirm removal of the upper impacted soils and associated in-ground infrastructure;

- Validation of the underlying soils across the site following removal of upper impacted soils to confirm contaminant levels were within the adopted RAC, based on the proposed residential land use with minimal soil access and contaminant concentrations provided in the RRO (NSW EPA (2022));
- Validation of the former UST area in the north-western portion of the site following removal of hydrocarbon-impacted soils to confirm contaminant levels were within the adopted RAC, based on the proposed residential land use with minimal soil access and contaminant concentrations provided in the RRO (NSW EPA (2022));
- Disposal of the impacted soils to an appropriately licensed landfill as follows:
    - Disposal of upper PAH/metals/asbestos impacted soils as 'General Solid Waste (non-putrescible) with asbestos, based on previous waste classification as provided in DP (2018);
    - Disposal of Hydrocarbon-impacted soils as 'General Solid Waste (non-putrescible).

On the basis of the above, the identified PAH/metals/asbestos upper fill and hydrocarbon-impacted soil has been appropriately remediated (i.e. removed from site), with validation works confirming the remediation works have been successful (i.e. inspections indicate the impacted soils have been removed from site and all remaining validation samples are within the adopted RAC and RRO (NSW EPA 2022)). The site is therefore considered to be suitable for the following from a contamination perspective:

- Ongoing construction activities, such as services realignment;
- Construction of crane pad platform;
- Disposal and treatment of remaining sand soils, either as 'General Solid Waste' or under the Wickham ASSM RRO (NSW EPA, 2022) for the site (subject to ASS treatment and subsequent validation);
- Construction of the proposed residential development.

16. Disposal of Waste Materials

In-situ waste classification testing was conducted on the fill materials excavated during the above-mentioned remediation works as part of DP (2018) and DP (2021) and was conducted with reference to NSW EPA(2014). The in-situ waste classification was as follows:

- The impacted dark grey silty sand (including slag and ash) and gravel with building rubble 'General Solid Waste (non-putrescible) with asbestos', based on previous waste classification as provided in DP (2018);
- Silty sandy clay fill observed between the two slabs in the eastern portion of the site as reported in DP (2021) and presented in Appendix C was classified as 'General Solid Waste (non-putrescible)';
- Hydrocarbon-impacted sand, excavated from the former UST area, was reported in DP (2021) and presented in Appendix C and was classified as 'General Solid Waste (non-putrescible)'

A total of 6670.94 tonnes of upper impacted fill (General Solid Waste with asbestos) was disposed at Summerhill Waste Management Centre between 6 December 2021 and 15 December 2021.

A further 783.88 tonnes of upper impacted fill (General Solid Waste with Asbetsos) and 108.62 tonnes of hydrocarbon impacted soils (General Solid Waste) was disposed at Summerhill Waste Management Centre between 21 March 2022 and 29 March 2022.

A summary of the tracking and tip dockets for disposed soils are presented in Appendix C.

17. References

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

NSW EPA. (2014). *Waste Classification Guidelines, Part 1: Classifying Waste.* NSW Environment Protection Authority.

NSW EPA. (2020). *Guidelines for Consultants Reporting on Contaminated Land.* Contaminated Land Guidelines: NSW Environment Protection Authority.

DP (2021), *Remediation Action Plan, Proposed Apartment Development, 10 Dangar Street Newcastle*, prepared for Dangar Street Wickham Pty Ltd, project 39961.11, reference 39961.02.R.004.Rev3, Douglas Partners Pty Ltd

NSW EPA (2022), *Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 The Wickham acid sulfate soil material ('ASSM') order January 2022*, NSW Environment Protection Authority

18. Limitations

Douglas Partners (DP) has prepared this report for this project at 10 Dangar Street with reference to DP's proposal 39961.11.P.003.Rev0 dated 14 October 2021 and acceptance received from Eastern Pacific. The work was carried out under DP Conditions of Engagement. This report is provided for the exclusive use of Eastern Pacific for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

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

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

The assessment of atypical safety hazards arising from this advice is restricted to the environmental components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

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

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

Asbestos has previously been detected by observation and by laboratory analysis, on the surface of the site, and in fill materials at the test locations sampled and analysed. Building demolition materials, such as concrete, brick, tile, ceramic and cement sheeting, were, also, located in previous below-ground fill and these are considered as indicative of the possible presence of hazardous building materials (HBM), including asbestos.

Although the sampling plan adopted for this investigation is considered appropriate to achieve the stated project objectives, there are necessarily parts of the site that have not been sampled and analysed. This is due to undetected variations in ground conditions. It is therefore considered possible that HBM, including asbestos, may be present in unobserved or untested parts of the site, between and beyond sampling locations, and hence no warranty can be given that additional asbestos is not present.

Douglas Partners Pty Ltd

Appendix A

About This Report

About this Report

Douglas Partners

Introduction

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

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

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

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

About this Report

Site Anomalies

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

Information for Contractual Purposes

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

Site Inspection

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

Appendix B

Summary of Laboratory Results
Laboratory Reports

Appendix B
Summary of Laboratory Testing
10 Dangar Street Wickham

B1.0 Introduction

A summary of laboratory testing results for the interim validation is provided in the tables below as follows:

- Table B1: Summary of Laboratory Results for Validation for Removal of Upper Soils – Metals;
- Table B2: Summary of Laboratory Results for Validation for Removal of Upper Soils – TRH, BTEX
- Table B3: Summary of Laboratory Results for Validation for Removal of Upper Soils - PAH;
- Table B4: Summary of Laboratory Results for Validation for Removal of Upper Soils – PCB, OCP
- Table B5: Summary of Laboratory Results for Validation for Removal of Upper Soils – Asbestos
- Table B6: Summary of Laboratory Results for Validation for Removal of Upper Soils – Foreign Materials
- Table B7: Summary of Laboratory Results, Validation of Former Underground Fuel Storage Tank Area – TRH, BTEX, PAH.

Table B1: Summary of Laboratory Results for Validation Following Removal of Upper Soils – Metals

			Metals							
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc
		PQL	4	0.4	1	1	1	0.1	1	1
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
V1	0 m		<4	<0.4	**2**	**3**	**7**	**0.3**	<1	**16**
V2	0 m		<4	<0.4	**2**	**2**	**8**	<0.1	<1	**38**
V3	0 m		<4	<0.4	<1	<1	<1	<0.1	<1	<1
V4	0 m		<4	<0.4	<1	<1	<1	<0.1	<1	<1
V5	0 m		<4	<0.4	**8**	**35**	**10**	<0.1	**3**	**7**
V6	0 m	22/03/2022	<4	<0.4	**2**	**2**	**10**	<0.1	<1	**26**
V7	0 m	22/03/2022	<4	<0.4	**2**	<1	<1	<0.1	<1	**13**
V8	0 m	22/03/2022	<4	<0.4	**2**	**2**	**5**	<0.1	**1**	**53**
V9	0 m	22/03/2022	<4	<0.4	**1**	<1	<1	<0.1	<1	**5**
V10	0 m	22/03/2022	<4	<0.4	**3**	<1	**2**	<0.1	<1	**44**
V11	0 m	22/03/2022	<4	<0.4	<1	<1	<1	<0.1	<1	**2**
V12	0 m	17/03/2022	<4	<0.4	**3**	**7**	**43**	**0.1**	**2**	**62**
V12 - [TRIPLICATE]	0 m	17/03/2022	<4	<0.4	**3**	**11**	**50**	**0.2**	**2**	**86**
V13	0 m	17/03/2022	<4	<0.4	**8**	**33**	**140**	**0.4**	**6**	**210**
V13A	0 m	24/03/2022	NT	NT	NT	NT	**9**	NT	NT	NT
V13B	0 m	24/03/2022	NT	NT	NT	NT	**9**	NT	NT	NT
V13C	0 m	24/03/2022	NT	NT	NT	NT	**5**	NT	NT	NT
V14	0 m		<4	<0.4	**1**	<1	**2**	<0.1	<1	**7**
V15	0 m		<4	<0.4	<1	<1	<1	<0.1	<1	**31**
V16	0 m		<4	<0.4	**1**	<1	**3**	<0.1	<1	**63**
V17	0 m		<4	<0.4	<1	<1	<1	<0.1	<1	**9**
V18	0 m		NT	NT	NT	NT	<1	NT	NT	NT
DR1	0 m		<4	<0.4	<1	<1	<1	<0.1	<1	**2**
V19	0 m		-	-	-	-	<1	-	-	-
V20	0 m		NT	NT	NT	NT	**2**	NT	NT	NT
DR2	0 m		<4	<0.4	<1	**1**	<1	<0.1	<1	**46**
V21	0 m	22/02/2022	<4	<0.4	**2**	**7**	**17**	**0.1**	**1**	**48**
V22	0 m	22/02/2022	<4	<0.4	**3**	**10**	**44**	<0.1	**2**	**83**
V23	0 m	22/02/2022	<4	<0.4	<1	<1	<1	<0.1	<1	**5**
V24	0 m	16/03/2022	<4	<0.4	<1	<1	**1**	<0.1	<1	**4**
V25	0 m	22/02/2022	<4	<0.4	<1	<1	<1	<0.1	<1	<1
DV3	0 m	.	<4	<0.4	<1	<1	<1	<0.1	<1	<1
V26	0 m	22/02/2022	<4	<0.4	**1**	**3**	**4**	<0.1	<1	**37**
V27	0 m	22/02/2022	**6**	<0.4	**3**	**6**	**4**	<0.1	<1	**38**
V28	0 m	22/02/2022	<4	<0.4	**3**	<1	<1	<0.1	**1**	**18**
V29	0 m	22/02/2022	<4	<0.4	**2**	<1	**2**	<0.1	<1	**120**
V30	0 m	22/02/2022	<4	<0.4	**2**	<1	<1	<0.1	<1	**20**
V31	0 m	22/02/2022	<4	<0.4	**2**	<1	<1	<0.1	<1	**6**
V32	0 m	22/02/2022	<4	<0.4	**3**	<1	**1**	<0.1	**1**	**9**
V33	0 m	22/02/2022	<4	<0.4	**3**	<1	**2**	<0.1	<1	**2**
V34	0 m	16/03/2022	<4	<0.4	<1	**2**	**12**	<0.1	<1	**37**
DV6	0 m	16/03/2022	<4	<0.4	<1	<1	**6**	<0.1	<1	**17**
V35	0 m	16/03/2022	<4	**0.4**	**3**	**5**	**35**	**0.2**	**2**	**36**
V36	0 m	16/03/2022	<4	<0.4	**2**	<1	**2**	<0.1	<1	**7**
V36	0 m	.	<4	<0.4	**2**	**3**	**10**	<0.1	<1	**36**
V37	0 m	22/02/2022	<4	<0.4	**2**	<1	**1**	<0.1	<1	**2**
DV4	0 m	.	<4	<0.4	**2**	<1	**1**	<0.1	<1	**2**
V38	0 m	22/02/2022	<4	<0.4	**2**	<1	**1**	<0.1	<1	**10**
V39	0 m	16/03/2022	<4	<0.4	**1**	**1**	**5**	<0.1	<1	**240**
V40	0 m	16/03/2022	<4	<0.4	**1**	**2**	**1**	<0.1	<1	**4**
V41	0 m	22/02/2022	<4	<0.4	**3**	**2**	**1**	<0.1	**1**	**24**
V42	0 m	.	<4	<0.4	**2**	**1**	**1**	<0.1	<1	**7**
V49	0 m	16/03/2022	NT	NT	NT	NT	NT	NT	NT	NT
DV5	0 m	16/03/2022	<4	<0.4	<1	<1	<1	<0.1	<1	<1
V59	0 m	17/03/2022	**4**	<0.4	**7**	**26**	**100**	**0.3**	**5**	**130**
V59A	0 m	24/03/2022	NT	NT	NT	NT	**38**	NT	NT	NT
V59B	0 m	24/03/2022	NT	NT	NT	NT	**23**	NT	NT	NT
V60	0 m	17/03/2022	**5**	**0.4**	**6**	**23**	**74**	**0.3**	**8**	**220**
V60A	0 m	24/03/2022	NT	NT	NT	NT	NT	NT	NT	NT
V61	0 m	17/03/2022	<4	<0.4	**11**	**6**	**3**	<0.1	**9**	**17**
Summary Statistics										
Min			4	0.4	1	1	1	0.1	1	1
Max			6	0.4	11	35	140	0.4	9	240
Mean			4	0.4	2	4	12	0.1	2	38
Wickham ASSM Order Maximum Average			20	0.5	75	100	50	0.5	30	150
Wickham ASSM Order Absolute Maximum			40	1	150	200	100	1	60	300
Waste Classification Criteria [f]										
CT1			100	20	100	NC	100	4	40	NC
SCC1			500	100	1900	NC	1500	50	1050	NC
TCLP1			N/A	N/A	N/A	NC	N/A	N/A	N/A	NC
CT2			400	80	400	NC	400	16	160	NC
SCC2			2000	400	7600	NC	6000	200	4200	NC
TCLP2			N/A	N/A	N/A	NC	N/A	N/A	N/A	NC

Wickham ASSM Order Exceedance

CT1 exceedance TCLP1 and/or SCC1 exceedance CT2 exceedance TCLP2 and/or SCC2 exceedance Asbestos detection

NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable

Notes:

a	QA/QC replicate of sample listed directly below the primary sample
b	Total chromium used as initial screen for chromium(VI).
c	Total recoverable hydrocarbons (TRH) used as an initial screen for total petroleum hydrocarbons (TPH)
d	Criteria for scheduled chemicals used as an initial screen
e	Criteria for Chlorpyrifos used as initial screen
f	All criteria are in the same units as the reported results
PQL	Practical quantitation limit
CT1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: General solid waste
SCC1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste
TCLP1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste
CT2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: Restricted solid waste
SCC2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste
TCLP2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste
V13A, V59A, V60A - V13B, V13C, V59B	retests following exeedance and subsequent removal of additional soils additional delineation following exeedance and subsequent removal of additional soils

Table B2: Summary of Laboratory Results for Validation Following Removal of Upper Soils – TRH, BTEX

			TRH					BTEX					
			TRH C6 - C9	TRH C10 - C14	TRH C15 - C28	TRH C29 - C36	C10-C36 recoverable hydrocarbons	Benzene	Toluene	Ethylbenzene	m+p-Xylene	o- Xylene	Xylenes (total)
		PQL	25	50	100	100	50	0.2	0.5	1	2	1	1
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
V1	0 m	21/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V2	0 m	21/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V3	0 m	21/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V4	0 m	21/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V5	0 m	21/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V6	0 m	22/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
V7	0 m	22/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
V8	0 m	22/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
V9	0 m	22/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
V10	0 m	22/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
V11	0 m	22/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
V12	0 m	17/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
V13	0 m	17/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
V13A	0 m	24/03/2022	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
V13B	0 m	24/03/2022	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
V13C	0 m	24/03/2022	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
V14	0 m	21/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V15	0 m	21/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V16	0 m	21/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V17	0 m	21/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V18	0 m	21/02/2022	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
DR1	0 m	21/02/2022	<25	<50	<100	<100	NT	<0.2	<0.5	<1	<2	<1	<1
V20	0 m	22/02/2022	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
DR2	0 m	22/02/2022	<25	<50	<100	<100	NT	<0.2	<0.5	<1	<2	<1	<1
V21	0 m	22/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V22	0 m	22/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V23	0 m	22/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V24	0 m	16/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
V25	0 m	22/02/2022	<25	<50	<100	<100	NT	<0.2	<0.5	<1	<2	<1	<1
DV3	0 m	22/02/2022	<25	<50	<100	<100	NT	<0.2	<0.5	<1	<2	<1	<1
V26	0 m	22/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V27	0 m	22/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V28	0 m	22/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V29	0 m	22/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V30	0 m	22/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V31	0 m	22/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V32	0 m	22/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V33	0 m	22/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V34	0 m	16/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
DV6	0 m	16/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
V35	0 m	16/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
V36	0 m	16/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
V36	0 m	.	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V37	0 m	22/02/2022	<25	<50	<100	<100	NT	<0.2	<0.5	<1	<2	<1	<1
DV4	0 m	22/02/2022	<25	<50	<100	<100	NT	<0.2	<0.5	<1	<2	<1	<1
V38	0 m	22/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V39	0 m	16/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
V40	0 m	16/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
V41	0 m	22/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V42	0 m	22/02/2022	<25	<50	<100	<100	-	<0.2	<0.5	<1	<2	<1	<1
V49	0 m	16/03/2022	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
DV5	0 m	16/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
V56	0 m	16/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
V57	0 m	16/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
V58	0 m	16/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
V59	0 m	17/03/2022	<25	<50	**220**	**200**	**420**	<0.2	<0.5	<1	<2	<1	<1
V59A	0 m	24/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
V59B	0 m	24/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
V60	0 m	17/03/2022	<25	**130**	**690**	**630**	**1400**	<0.2	<0.5	<1	<2	<1	<1
V60A	0 m	24/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
V61	0 m	17/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1
Summary Statistics													
Min			25	50	100	100	50	0.2	0.5	1	2	1	1
Max			25	130	690	630	1400	0.2	0.5	1	2	1	1
Mean			25	52	114	112	128	0.2	0.5	1	2	1	1
Wickham ASSM Order Maximum Average			NC	NC	NC	NC	250*	NA	NA	NA	NC	NC	NA
Wickham ASSM Order Absolute Maximum			NC	NC	NC	NC	500*	0.5	65	25	NC	NC	15
Waste Classification Criteria [f]													
CT1			650	NC	NC	NC	10000	10	288	600	NC	NC	1000
SCC1			650	NC	NC	NC	10000	18	518	1080	NC	NC	1800
TCLP1			N/A	NC	NC	NC	N/A	N/A	N/A	N/A	NC	NC	N/A
CT2			2600	NC	NC	NC	40000	40	1152	2400	NC	NC	4000
SCC2			2600	NC	NC	NC	40000	72	2073	4320	NC	NC	7200
TCLP2			N/A	NC	NC	NC	N/A	N/A	N/A	N/A	NC	NC	N/A

Wickham ASSM Order Exceedance

CT1 exceedance | TCLP1 and/or SCC1 exceedance | CT2 exceedance | TCLP2 and/or SCC2 exceedance | Asbestos detection

NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable

Notes:

a	QA/QC replicate of sample listed directly below the primary sample
b	Total chromium used as initial screen for chromium(VI).
c	Total recoverable hydrocarbons (TRH) used as an initial screen for total petroleum hydrocarbons (TPH)
d	Criteria for scheduled chemicals used as an initial screen
e	Criteria for Chlorpyrifos used as initial screen
f	All criteria are in the same units as the reported results
PQL	Practical quantitation limit
CT1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: General solid waste
SCC1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste
TCLP1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste
CT2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: Restricted solid waste
SCC2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste
TCLP2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste
V13A, V59A, V60A -	retests following exeedance and subsequent removal of additional soils
V13B, V13C, V59B	additional delineation following exeedance and subsequent removal of additional soils

Table B3: Summary of Laboratory Results for Validation Following Removal of Upper Soils – PAH

			PAH															
			Benzo(a)pyrene (BaP)	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(b,j+k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAHs
		PQL	0.05	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05
Sample ID	Depth	Sample Date	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
V1	0 m	21/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V2	0 m	21/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V3	0 m	21/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V4	0 m	21/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V5	0 m	21/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V6	0 m	22/03/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V7	0 m	22/03/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V8	0 m	22/03/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V9	0 m	22/03/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V10	0 m	22/03/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V11	0 m	22/03/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V12	0 m	17/03/2022	**0.2**	<0.1	<0.1	<0.1	**0.2**	**0.3**	**0.2**	**0.2**	<0.1	**0.3**	<0.1	**0.1**	<0.1	**0.1**	**0.3**	**1.9**
V13	0 m	17/03/2022	**1.2**	<0.1	<0.1	**0.2**	**0.9**	**1**	**0.8**	**0.8**	**0.1**	**2.1**	<0.1	**0.7**	<0.1	**0.8**	**2**	**11**
V13A	0 m	24/03/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V13B	0 m	24/03/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V13C	0 m	24/03/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V14	0 m	21/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V15	0 m	21/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V16	0 m	21/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V17	0 m	21/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V18	0 m	21/02/2022	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
DR1	0 m	21/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V20	0 m	22/02/2022	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
DR2	0 m	22/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V21	0 m	22/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V22	0 m	22/02/2022	**0.3**	<0.1	<0.1	<0.1	**0.3**	**0.4**	**0.2**	**0.3**	<0.1	**0.7**	<0.1	**0.2**	<0.1	**0.4**	**0.6**	**3.2**
V23	0 m	22/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V24	0 m	16/03/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V25	0 m	22/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
DV3	0 m	22/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V26	0 m	22/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V27	0 m	22/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V28	0 m	22/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V29	0 m	22/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V30	0 m	22/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V31	0 m	22/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V32	0 m	22/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V33	0 m	22/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V34	0 m	16/03/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
DV6	0 m	16/03/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V35	0 m	16/03/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V36	0 m	16/03/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	**0.2**	<0.1	<0.1	<0.1	**0.2**	**0.2**	**0.53**
V36	0 m	.	**0.07**	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	**0.1**	<0.1	<0.1	<0.1	<0.1	**0.1**	**0.3**
V37	0 m	22/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	**0.2**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.2**
DV4	0 m	22/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	**0.1**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.1**
V38	0 m	22/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V39	0 m	16/03/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V40	0 m	16/03/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V41	0 m	22/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V42	0 m	22/02/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V49	0 m	16/03/2022	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
DV5	0 m	16/03/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V59	0 m	17/03/2022	**0.82**	<0.1	<0.1	**0.1**	**0.6**	**0.9**	**0.4**	**0.4**	<0.1	**0.8**	<0.1	**0.4**	<0.1	**0.4**	**0.8**	**5.6**
V59A	0 m	24/03/2022	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
V59B	0 m	24/03/2022	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
V60	0 m	17/03/2022	**17**	**1**	**0.3**	**4.5**	**16**	**23**	**7**	**10**	**1.9**	**19**	**0.8**	**7.7**	**1.3**	**12**	**16**	**140**
V60A	0 m	24/03/2022	**0.4**	<0.1	<0.1	<0.1	**0.3**	**0.5**	**0.2**	**0.2**	<0.1	**0.2**	<0.1	**0.2**	<0.1	**0.1**	**0.2**	**2.3**
V61	0 m	17/03/2022	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
Summary Statistics																		
Min			0.05	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05
Max			17	1	0.3	4.5	16	23	7	10	1.9	19	0.8	7.7	1.3	12	16	140
Mean			0.44	0.1	0.1	0.2	0.5	0.7	0.3	0.3	0.1	0.6	0.1	0.3	0.1	0.4	0.5	3.36
Wickham ASSM Order Maximum Average			0.5	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	20
Wickham ASSM Order Absolute Maximum			1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	40
Waste Classification Criteria [f]																		
CT1			0.8	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	200
SCC1			10	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	200
TCLP1			N/A	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	N/A
CT2			3.2	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	800
SCC2			23	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	800
TCLP2			N/A	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	N/A

Wickham ASSM Order Exceedance

CT1 exceedance TCLP1 and/or SCC1 exceedance CT2 exceedance TCLP2 and/or SCC2 exceedance Asbestos detection

NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable

Notes:

a	QA/QC replicate of sample listed directly below the primary sample
b	Total chromium used as initial screen for chromium(VI).
c	Total recoverable hydrocarbons (TRH) used as an initial screen for total petroleum hydrocarbons (TPH)
d	Criteria for scheduled chemicals used as an initial screen
e	Criteria for Chlorpyrifos used as initial screen
f	All criteria are in the same units as the reported results
PQL	Practical quantitation limit
CT1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: General solid waste
SCC1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste
TCLP1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste
CT2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: Restricted solid waste
SCC2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste
TCLP2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste
V13A, V59A, V60A - V13B, V13C, V59B	retests following exeedance and subsequent removal of additional soils
	additional delineation following exeedance and subsequent removal of additional soils

Table B4: Summary of Laboratory Results for Validation Following Removal of Upper Soils – OCP, PCB

			OCP		PCB							
			Total Endosulfan	Total Analysed OCP	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Aroclor 1260	Total PCB
		PQL	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
V1	0 m	21/02/2022	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
V5	0 m	21/02/2022	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
V14	0 m	21/02/2022	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
V20	0 m	22/02/2022	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
V22	0 m	22/02/2022	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
V23	0 m	22/02/2022	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
V25	0 m	22/02/2022	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
V27	0 m	22/02/2022	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
V30	0 m	22/02/2022	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
V38	0 m	22/02/2022	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Summary Statistics												
Min			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Max			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Mean			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Wickham ASSM Order Maximum Average			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Wickham ASSM Order Absolute Maximum			<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL	<PQL
Waste Classification Criteria [f]												
CT1			60	<50	NC	NC	NC	NC	NC	NC	NC	<50
SCC1			108	<50	NC	NC	NC	NC	NC	NC	NC	<50
TCLP1			N/A	N/A	NC	NC	NC	NC	NC	NC	NC	N/A
CT2			240	<50	NC	NC	NC	NC	NC	NC	NC	<50
SCC2			432	<50	NC	NC	NC	NC	NC	NC	NC	<50
TCLP2			N/A	N/A	NC	NC	NC	NC	NC	NC	NC	N/A

Wickham ASSM Order Exceedance

CT1 exceedance | TCLP1 and/or SCC1 exceedance | CT2 exceedance | TCLP2 and/or SCC2 exceedance | Asbestos detection

NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable

Notes:

a	QA/QC replicate of sample listed directly below the primary sample
b	Total chromium used as initial screen for chromium(VI).
c	Total recoverable hydrocarbons (TRH) used as an initial screen for total petroleum hydrocarbons (TPH)
d	Criteria for scheduled chemicals used as an initial screen
e	Criteria for Chlorpyrifos used as initial screen
f	All criteria are in the same units as the reported results
PQL	Practical quantitation limit
CT1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: General solid waste
SCC1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste
TCLP1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste
CT2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: Restricted solid waste
SCC2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste
TCLP2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste

Table B5 : Summary of Laboratory Results for Validation Following Removal of Upper Soils – Asbestos

			Asbestos							
			Asbestos ID in soil >0.1g/kg	Asbestos ID in soil <0.1g/kg	Trace Analysis	ACM >7mm Estimation	FA and AF Estimation	FA and AF Estimation	Total Asbestos#1	Total Asbestos
		PQL						<0.001	<0.1	0.001
Sample ID	Depth	Sample Date	-	-	-	g	g	%(w/w)	g/kg	-
V1	0 m	21/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V2	0 m	21/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V3	0 m	21/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V4	0 m	21/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V5	0 m	21/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V6	0 m	22/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V7	0 m	22/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V8	0 m	22/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V9	0 m	22/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V10	0 m	22/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V11	0 m	22/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V12	0 m	17/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V13	0 m	17/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V14	0 m	21/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V15	0 m	21/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V16	0 m	21/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V17	0 m	21/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V21	0 m	22/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V22	0 m	22/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V23	0 m	22/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V24	0 m	16/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V25	0 m	22/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V26	0 m	22/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V27	0 m	22/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V28	0 m	22/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V29	0 m	22/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V30	0 m	22/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V31	0 m	22/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V32	0 m	22/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V33	0 m	22/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V34	0 m	16/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V35	0 m	16/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V36	0 m	16/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V36	0 m		**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V37	0 m	22/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V38	0 m	22/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V39	0 m	16/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V40	0 m	16/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V41	0 m	22/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V42	0 m	22/02/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V43	0 m	16/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V44	0 m	16/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V45	0 m	16/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V46	0 m	16/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V47	0 m	16/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V48	0 m	16/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V49	0 m	16/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V50	0 m	16/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V51	0 m	16/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V52	0 m	16/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V53	0 m	16/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V54	0 m	16/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V55	0 m	16/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V59	0 m	17/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V60	0 m	17/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
V61	0 m	17/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
SV1	0 m	17/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
SV2	0 m	17/03/2022	**NAD**	**NAD**	**NAD**	NT	NT	-	-	**NAD**
Summary Statistics										
Min			-	-	-	-	-	-	-	-
Max			-	-	-	-	-	-	-	-
Mean			-	-	-	-	-	-	-	-
Wickham ASSM Order Maximum Average			NA	NA	NA	NA	NA	NA	NA	NA
Wickham ASSM Order Absolute Maximum			NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD
Waste Classification Criteria [f]										
CT1			NC	NC	NC	NC	NC	NC	NC	NC
SCC1			NC	NC	NC	NC	NC	NC	NC	NC
TCLP1			NC	NC	NC	NC	NC	NC	NC	NC
CT2			NC	NC	NC	NC	NC	NC	NC	NC
SCC2			NC	NC	NC	NC	NC	NC	NC	NC
TCLP2			NC	NC	NC	NC	NC	NC	NC	NC

Wickham ASSM Order Exceedance

CT1 exceedance TCLP1 and/or SCC1 exceedance CT2 exceedance TCLP2 and/or SCC2 exceedance Asbestos detection

NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable

Notes:

a	QA/QC replicate of sample listed directly below the primary sample
b	Total chromium used as initial screen for chromium(VI).
c	Total recoverable hydrocarbons (TRH) used as an initial screen for total petroleum hydrocarbons (TPH)
d	Criteria for scheduled chemicals used as an initial screen
e	Criteria for Chlorpyrifos used as initial screen
f	All criteria are in the same units as the reported results
PQL	Practical quantitation limit
CT1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: General solid waste
SCC1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste
TCLP1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste
CT2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: Restricted solid waste
SCC2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste
TCLP2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste

Table B6 : Summary of Laboratory Results for Validation Following Removal of Upper Soils – Foreign Materials

			Foreign Materials		
			Rubber, Plastic, Bitumen, Paper, Cloth, Paint, Wood (% w/w)	All other foreign materials	Total Foreign Materials
		PQL			
Sample ID	Depth	Sample Date	-	-	-
V1	0 m	21/02/2022	**0**	**0**	**0**
V2	0 m	21/02/2022	**0**	**0**	**0**
V3	0 m	21/02/2022	**0**	**0**	**0**
V4	0 m	21/02/2022	**0**	**0**	**0**
V5	0 m	21/02/2022	**0**	**0**	**0**
V15	0 m	21/02/2022	**0**	**0**	**0**
V17	0 m	21/02/2022	**0**	**0**	**0**
V18	0 m	22/02/2022	**0**	**0**	**0**
V19	0 m	22/02/2022	**0**	**0**	**0**
V20	0 m	22/02/2022	**0**	**0**	**0**
V21	0 m	16/03/2022	**0**	**0**	**0**
Wickham ASSM Order Maximum Average			0.05	NC	NC
Wickham ASSM Order Absolute Maximum			0.1	NC	NC

Table B7 : Summary of Laboratory Results, Validation of Former Underground Fuel Stroage Tank Area– TRH, BTEX, PAH

			TRH					BTEX						PAH															
			TRH C6 - C9	TRH C10 - C14	TRH C15 - C28	TRH C29 - C36	C10-C36 recoverable hydrocarbons	Benzene	Toluene	Ethylbenzene	m+p-Xylene	o-Xylene	Xylenes (total)	Benzo(a)pyrene (BaP)	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(b,j+k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAHs
		PQL	25	50	100	100	50	0.2	0.5	1	2	1	1	0.05	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05
Sample ID	Depth	Sample Date	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	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VT1	0 m	17/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**2**	<0.1	<0.1	**2**
VT2	0 m	17/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.5**	**0.1**	<0.1	**0.6**
VT3	0 m	17/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
VT4	0 m	17/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
VT5	0 m	17/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
VT6	0 m	17/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
VTD1	0 m	17/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
VT7	0 m	17/03/2022	<25	**96**	**300**	<100	**400**	<0.2	<0.5	<1	<2	<1	<1	**0.2**	<0.1	<0.1	**0.3**	**0.1**	**0.3**	**0.2**	<0.1	<0.1	**0.2**	**0.2**	**0.1**	**1**	**0.9**	**0.2**	**3.7**
VT7A	2.3 m	22/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
VT8	0 m	17/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	**0.3**	<0.1	<0.1	**0.3**
Summary Statistics																													
Min			25	50	100	100	50	0.2	0.5	1	2	1	1	0.05	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05
Max			25	96	300	100	400	0.2	0.5	1	2	1	1	0.2	0.1	0.1	0.3	0.1	0.3	0.2	0.1	0.1	0.2	0.2	0.1	2	0.9	0.2	3.7
Mean			25	55	122	100	89	0.2	0.5	1	2	1	1	0.07	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.2	0.1	0.76
Wickham ASSM Order Maximum Average			NC	NC	NC	NC	250*	NA	NA	NA	NC	NC	NA	0.5	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	20
Wickham ASSM Order Absolute Maximum			NC	NC	NC	NC	500*	0.5	65	25	NC	NC	15	1	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	40
Waste Classification Criteria [f]																													
CT1			650	NC	NC	NC	10000	10	288	600	NC	NC	1000	0.8	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	200
SCC1			650	NC	NC	NC	10000	18	518	1080	NC	NC	1800	10	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	200
TCLP1			N/A	NC	NC	NC	N/A	N/A	N/A	N/A	NC	NC	N/A	N/A	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	N/A
CT2			2600	NC	NC	NC	40000	40	1152	2400	NC	NC	4000	3.2	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	800
SCC2			2600	NC	NC	NC	40000	72	2073	4320	NC	NC	7200	23	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	800
TCLP2			N/A	NC	NC	NC	N/A	N/A	N/A	N/A	NC	NC	N/A	N/A	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	N/A

CT1 exceedance | TCLP1 and/or SCC1 exceedance | CT2 exceedance | TCLP2 and/or SCC2 exceedance | Asbestos detection

NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable

Notes:

a	QA/QC replicate of sample listed directly below the primary sample
b	Total chromium used as initial screen for chromium(VI).
c	Total recoverable hydrocarbons (TRH) used as an initial screen for total petroleum hydrocarbons (TPH)
d	Criteria for scheduled chemicals used as an initial screen
e	Criteria for Chlorpyrifos used as initial screen
f	All criteria are in the same units as the reported results
PQL	Practical quantitation limit
CT1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: General solid waste
SCC1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste
TCLP1	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste
CT2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: Restricted solid waste
SCC2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste
TCLP2	NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste
VT7A	re-test of sample VT7 following removal of additional hydrocarbon-impacted fill

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CERTIFICATE OF ANALYSIS 289404

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**39961.11, Wickham**
Number of Samples	14 Soil
Date samples received	22/02/2022
Date completed instructions received	22/02/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	22/02/2022
Date of Issue	22/02/2022

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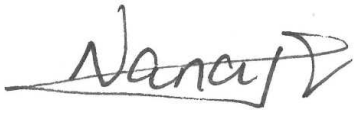
Results Approved By
Dragana Tomas, Senior Chemist
Hannah Nguyen, Metals Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		289404-1	289404-2	289404-3	289404-4	289404-5
Your Reference	UNITS	V1	V2	V3	V4	V5
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	83	92	93	85	83

vTRH(C6-C10)/BTEXN in Soil					
Our Reference		289404-6	289404-7	289404-8	289404-9
Your Reference	UNITS	V14	V15	V16	V17
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	92	79	77	79

svTRH (C10-C40) in Soil						
Our Reference		289404-1	289404-2	289404-3	289404-4	289404-5
Your Reference	UNITS	V1	V2	V3	V4	V5
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	100	104	69	70	74

svTRH (C10-C40) in Soil					
Our Reference		289404-6	289404-7	289404-8	289404-9
Your Reference	UNITS	V14	V15	V16	V17
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50
Surrogate o-Terphenyl	%	69	75	88	75

PAHs in Soil						
Our Reference		289404-1	289404-2	289404-3	289404-4	289404-5
Your Reference	UNITS	V1	V2	V3	V4	V5
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	92	89	90	76	81

PAHs in Soil					
Our Reference		289404-6	289404-7	289404-8	289404-9
Your Reference	UNITS	V14	V15	V16	V17
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Naphthalene	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+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	74	109	95	97

Acid Extractable metals in soil						
Our Reference		289404-1	289404-2	289404-3	289404-4	289404-5
Your Reference	UNITS	V1	V2	V3	V4	V5
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	2	2	<1	<1	8
Copper	mg/kg	3	2	<1	<1	35
Lead	mg/kg	7	8	<1	<1	10
Mercury	mg/kg	0.3	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	<1	<1	<1	<1	3
Zinc	mg/kg	16	38	<1	<1	7

Acid Extractable metals in soil						
Our Reference		289404-6	289404-7	289404-8	289404-9	289404-10
Your Reference	UNITS	V14	V15	V16	V17	V18
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Arsenic	mg/kg	<4	<4	<4	<4	[NA]
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	[NA]
Chromium	mg/kg	1	<1	1	<1	[NA]
Copper	mg/kg	<1	<1	<1	<1	[NA]
Lead	mg/kg	2	<1	3	<1	<1
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	[NA]
Nickel	mg/kg	<1	<1	<1	<1	[NA]
Zinc	mg/kg	7	31	63	9	[NA]

Acid Extractable metals in soil			
Our Reference		289404-11	289404-12
Your Reference	UNITS	V19	V20
Type of sample		Soil	Soil
Date prepared	-	22/02/2022	22/02/2022
Date analysed	-	22/02/2022	22/02/2022
Lead	mg/kg	<1	2

Moisture						
Our Reference		289404-1	289404-2	289404-3	289404-4	289404-5
Your Reference	UNITS	V1	V2	V3	V4	V5
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Moisture	%	18	17	16	18	36

Moisture						
Our Reference		289404-6	289404-7	289404-8	289404-9	289404-10
Your Reference	UNITS	V14	V15	V16	V17	V18
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date analysed	-	22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Moisture	%	13	13	14	22	14

Moisture			
Our Reference		289404-11	289404-12
Your Reference	UNITS	V19	V20
Type of sample		Soil	Soil
Date prepared	-	22/02/2022	22/02/2022
Date analysed	-	22/02/2022	22/02/2022
Moisture	%	13	21

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

Method ID	Methodology Summary
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-12	289404-2
Date extracted	-			22/02/2022	1	22/02/2022	22/02/2022		22/02/2022	22/02/2022
Date analysed	-			22/02/2022	1	22/02/2022	22/02/2022		22/02/2022	22/02/2022
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	97	93
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	97	93
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	94	85
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	96	85
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	94	94
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	100	101
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	98	94
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	92	1	83	86	4	95	87

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-12	289404-2
Date extracted	-			22/02/2022	1	22/02/2022	22/02/2022		22/02/2022	22/02/2022
Date analysed	-			22/02/2022	1	22/02/2022	22/02/2022		22/02/2022	22/02/2022
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	89	106
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	78	99
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	109	116
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	89	106
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	78	99
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	109	116
Surrogate o-Terphenyl	%		Org-020	86	1	100	101	1	116	104

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-12	289404-2
Date extracted	-			22/02/2022	1	22/02/2022	22/02/2022		22/02/2022	22/02/2022
Date analysed	-			22/02/2022	1	22/02/2022	22/02/2022		22/02/2022	22/02/2022
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	116
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	83	121
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	84	97
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	92	90
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	90	110
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	95	107
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	71	81
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	<0.05	<0.05	0	120	134
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	86	1	92	86	7	76	93

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	289404-2
Date prepared	-			22/02/2022	1	22/02/2022	22/02/2022		22/02/2022	22/02/2022
Date analysed	-			22/02/2022	1	22/02/2022	22/02/2022		22/02/2022	22/02/2022
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	100	99
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	99	95
Chromium	mg/kg	1	Metals-020	<1	1	2	2	0	100	95
Copper	mg/kg	1	Metals-020	<1	1	3	2	40	100	103
Lead	mg/kg	1	Metals-020	<1	1	7	5	33	99	93
Mercury	mg/kg	0.1	Metals-021	<0.1	1	0.3	<0.1	100	122	121
Nickel	mg/kg	1	Metals-020	<1	1	<1	<1	0	99	98
Zinc	mg/kg	1	Metals-020	<1	1	16	13	21	96	81

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	22/02/2022	22/02/2022		[NT]	[NT]
Date analysed	-			[NT]	11	22/02/2022	22/02/2022		[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	11	<1	2	67	[NT]	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

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CERTIFICATE OF ANALYSIS 289404-A

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**39961.11, Wickham**
Number of Samples	14 Soil
Date samples received	22/02/2022
Date completed instructions received	23/02/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	23/02/2022
Date of Issue	23/02/2022

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Asbestos Approved By
Analysed by Asbestos Approved Analyst: Nyovan Moonean, Panika Wongchanda
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Lucy Zhu, Asbestos Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

Asbestos ID - soils NEPM						
Our Reference		289404-A-1	289404-A-2	289404-A-3	289404-A-4	289404-A-5
Your Reference	UNITS	V1	V2	V3	V4	V5
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Sample mass tested	g	455.16	519.42	622.95	536.34	552.21
Sample Description	-	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM					
Our Reference		289404-A-6	289404-A-7	289404-A-8	289404-A-9
Your Reference	UNITS	V14	V15	V16	V17
Type of sample		Soil	Soil	Soil	Soil
Date analysed	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Sample mass tested	g	429.26	207.91	468.93	461.35
Sample Description	-	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–
FA and AF Estimation*	g	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Report Comments

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

Note: All samples analysed as received. However, sample 289404-A-7 is below the minimum recommended 500mL sample volume as per National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.

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CERTIFICATE OF ANALYSIS 289404-B

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**39961.11, Wickham**
Number of Samples	additional analysis
Date samples received	22/02/2022
Date completed instructions received	01/03/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	01/03/2022
Date of Issue	01/03/2022

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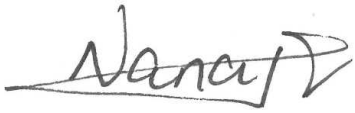
Results Approved By
Dragana Tomas, Senior Chemist
Hannah Nguyen, Metals Supervisor
Nancy Zhang, Laboratory Manager, Sydney

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil			
Our Reference		289404-B-13	289404-B-14
Your Reference	UNITS	DR1	DR2
Type of sample		Soil	Soil
Date extracted	-	01/03/2022	01/03/2022
Date analysed	-	01/03/2022	01/03/2022
TRH C_6 - C_9	mg/kg	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25
Benzene	mg/kg	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
o-Xylene	mg/kg	<1	<1
Naphthalene	mg/kg	<1	<1
Total +ve Xylenes	mg/kg	<1	<1
Surrogate aaa-Trifluorotoluene	%	85	92

svTRH (C10-C40) in Soil			
Our Reference	UNITS	289404-B-13	289404-B-14
Your Reference		DR1	DR2
Type of sample		Soil	Soil
Date extracted	-	01/03/2022	01/03/2022
Date analysed	-	01/03/2022	01/03/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50
Surrogate o-Terphenyl	%	75	68

PAHs in Soil			
Our Reference		289404-B-13	289404-B-14
Your Reference	UNITS	DR1	DR2
Type of sample		Soil	Soil
Date extracted	-	01/03/2022	01/03/2022
Date analysed	-	01/03/2022	01/03/2022
Naphthalene	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
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(b,j+k)fluoranthene	mg/kg	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	83	83

Acid Extractable metals in soil			
Our Reference		289404-B-13	289404-B-14
Your Reference	UNITS	DR1	DR2
Type of sample		Soil	Soil
Date prepared	-	01/03/2022	01/03/2022
Date analysed	-	01/03/2022	01/03/2022
Arsenic	mg/kg	<4	<4
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	<1	<1
Copper	mg/kg	<1	1
Lead	mg/kg	<1	<1
Mercury	mg/kg	<0.1	<0.1
Nickel	mg/kg	<1	<1
Zinc	mg/kg	2	46

Moisture						
Our Reference		289404-B-1	289404-B-5	289404-B-6	289404-B-12	289404-B-13
Your Reference	UNITS	V1	V5	V14	V20	DR1
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	01/03/2022	01/03/2022	01/03/2022	01/03/2022	01/03/2022
Date analysed	-	01/03/2022	01/03/2022	01/03/2022	01/03/2022	01/03/2022
Moisture	%	17	36	14	24	15

Moisture		
Our Reference		289404-B-14
Your Reference	UNITS	DR2
Type of sample		Soil
Date prepared	-	01/03/2022
Date analysed	-	01/03/2022
Moisture	%	18

Organochlorine Pesticides in soil					
Our Reference		289404-B-1	289404-B-5	289404-B-6	289404-B-12
Your Reference	UNITS	V1	V5	V14	V20
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	01/03/2022	01/03/2022	01/03/2022	01/03/2022
Date analysed	-	01/03/2022	01/03/2022	01/03/2022	01/03/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	73	78	76	79

PCBs in Soil					
Our Reference		289404-B-1	289404-B-5	289404-B-6	289404-B-12
Your Reference	UNITS	V1	V5	V14	V20
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	01/03/2022	01/03/2022	01/03/2022	01/03/2022
Date analysed	-	01/03/2022	01/03/2022	01/03/2022	01/03/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	73	78	76	79

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.

Method ID	Methodology Summary
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			01/03/2022	[NT]	[NT]	[NT]	[NT]	01/03/2022	[NT]
Date analysed	-			01/03/2022	[NT]	[NT]	[NT]	[NT]	01/03/2022	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	87	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	87	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	[NT]	[NT]	[NT]	[NT]	91	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]	[NT]	[NT]	[NT]	95	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	80	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	84	[NT]
o-Xylene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	85	[NT]
Naphthalene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	91	[NT]	[NT]	[NT]	[NT]	96	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			01/03/2022	[NT]	[NT]	[NT]	[NT]	01/03/2022	[NT]
Date analysed	-			01/03/2022	[NT]	[NT]	[NT]	[NT]	01/03/2022	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	89	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	99	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	109	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	89	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	99	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	109	[NT]
Surrogate o-Terphenyl	%		Org-020	84	[NT]	[NT]	[NT]	[NT]	85	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date extracted	-			01/03/2022	[NT]	[NT]	[NT]	[NT]	01/03/2022	[NT]
Date analysed	-			01/03/2022	[NT]	[NT]	[NT]	[NT]	01/03/2022	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	140	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	100	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	111	[NT]
Anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	111	[NT]
Pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	113	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	124	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	122	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	84	[NT]	[NT]	[NT]	[NT]	103	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date prepared	-			01/03/2022	[NT]	[NT]	[NT]	[NT]	01/03/2022	[NT]
Date analysed	-			01/03/2022	[NT]	[NT]	[NT]	[NT]	01/03/2022	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	97	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	94	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	118	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	99	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date extracted	-			01/03/2022	[NT]	[NT]	[NT]	[NT]	01/03/2022	[NT]
Date analysed	-			01/03/2022	[NT]	[NT]	[NT]	[NT]	01/03/2022	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
HCB	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	105	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	114	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	115	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	115	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	114	[NT]
Endrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	83	[NT]	[NT]	[NT]	[NT]	90	[NT]

QUALITY CONTROL: PCBs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	[NT]
Date extracted	-			01/03/2022	[NT]	[NT]	[NT]	[NT]	01/03/2022	[NT]
Date analysed	-			01/03/2022	[NT]	[NT]	[NT]	[NT]	01/03/2022	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	111	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-021	83	[NT]	[NT]	[NT]	[NT]	90	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

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www.envirolab.com.au

CERTIFICATE OF ANALYSIS 289404-C

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**39961.11, Wickham**
Number of Samples	additional analysis
Date samples received	22/02/2022
Date completed instructions received	11/03/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	14/03/2022
Date of Issue	14/03/2022

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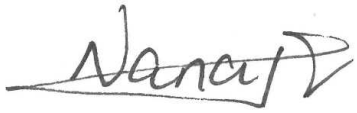
Results Approved By
Nick Sarlamis, Assistant Operation Manager

Authorised By



Nancy Zhang, Laboratory Manager

sPOCAS field test						
Our Reference		289404-C-1	289404-C-2	289404-C-3	289404-C-4	289404-C-5
Your Reference	UNITS	V1	V2	V3	V4	V5
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	11/03/2022	11/03/2022	11/03/2022	11/03/2022	11/03/2022
Date analysed	-	11/03/2022	11/03/2022	11/03/2022	11/03/2022	11/03/2022
pH_F (field pH test)*	pH Units	7.1	7.2	7.0	6.6	5.8
pH_{FOX} (field peroxide test)*	pH Units	3.7	5.0	4.9	3.9	2.6
Reaction Rate*	-	Low reaction	Low reaction	Low reaction	Low reaction	High reaction

sPOCAS field test						
Our Reference		289404-C-6	289404-C-7	289404-C-8	289404-C-9	289404-C-10
Your Reference	UNITS	V14	V15	V16	V17	V18
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	11/03/2022	11/03/2022	11/03/2022	11/03/2022	11/03/2022
Date analysed	-	11/03/2022	11/03/2022	11/03/2022	11/03/2022	11/03/2022
pH_F (field pH test)*	pH Units	6.5	6.4	6.6	6.4	6.4
pH_{FOX} (field peroxide test)*	pH Units	4.2	5.4	4.9	4.9	4.2
Reaction Rate*	-	Low reaction	Low reaction	Low reaction	Low reaction	Low reaction

sPOCAS field test			
Our Reference		289404-C-11	289404-C-12
Your Reference	UNITS	V19	V20
Type of sample		Soil	Soil
Date prepared	-	11/03/2022	11/03/2022
Date analysed	-	11/03/2022	11/03/2022
pH_F (field pH test)*	pH Units	6.6	6.5
pH_{FOX} (field peroxide test)*	pH Units	4.6	5.3
Reaction Rate*	-	Low reaction	Low reaction

Method ID	Methodology Summary
Inorg-063	pH- measured using pH meter and electrode. Soil is oxidised with Hydrogen Peroxide or extracted with water. Based on section H, Acid Sulfate Soils Laboratory Methods Guidelines, Version 2.1 - June 2004. To ensure accurate results these tests are recommended to be done in the field as pH may change with time thus these results may not be representative of true field conditions.

QUALITY CONTROL: sPOCAS field test						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			11/03/2022	1	11/03/2022	11/03/2022		11/03/2022	[NT]
Date analysed	-			11/03/2022	1	11/03/2022	11/03/2022		11/03/2022	[NT]
pH_F (field pH test)*	pH Units		Inorg-063	[NT]	1	7.1	7.1	0	102	[NT]
pH_{FOX} (field peroxide test)*	pH Units		Inorg-063	[NT]	1	3.7	3.8	3	102	[NT]

QUALITY CONTROL: sPOCAS field test						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	11/03/2022	11/03/2022		[NT]	[NT]
Date analysed	-			[NT]	11	11/03/2022	11/03/2022		[NT]	[NT]
pH_F (field pH test)*	pH Units		Inorg-063	[NT]	11	6.6	6.7	2	[NT]	[NT]
pH_{FOX} (field peroxide test)*	pH Units		Inorg-063	[NT]	11	4.6	4.5	2	[NT]	[NT]

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>	Greater than
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LCS	Laboratory Control Sample
NS	Not specified
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Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

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CERTIFICATE OF ANALYSIS 289551

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**39961.11, Wickham**
Number of Samples	19 Soil
Date samples received	23/02/2022
Date completed instructions received	23/02/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	24/02/2022
Date of Issue	24/02/2022

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Analysed by Asbestos Approved Analyst: Nyovan Moonean
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Dragana Tomas, Senior Chemist
Hannah Nguyen, Metals Supervisor
Josh Williams, LC Supervisor
Lucy Zhu, Asbestos Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		289551-1	289551-2	289551-3	289551-4	289551-5
Your Reference	UNITS	V21	V22	V23	V25	V26
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date extracted	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Date analysed	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	97	100	97	101	105

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		289551-6	289551-7	289551-8	289551-9	289551-10
Your Reference	UNITS	V27	V28	V29	V30	V31
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date extracted	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Date analysed	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	92	100	102	104	101

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		289551-11	289551-12	289551-13	289551-14	289551-15
Your Reference	UNITS	V32	V33	V37	V38	V41
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date extracted	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Date analysed	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	102	106	104	108	103

vTRH(C6-C10)/BTEXN in Soil					
Our Reference		289551-16	289551-17	289551-18	289551-19
Your Reference	UNITS	V42	DV3	DV4	V36
Type of sample		Soil	Soil	Soil	Soil
Date Sampled		.	.	.	.
Date extracted	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Date analysed	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	102	104	110	101

svTRH (C10-C40) in Soil						
Our Reference		289551-1	289551-2	289551-3	289551-4	289551-5
Your Reference	UNITS	V21	V22	V23	V25	V26
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date extracted	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Date analysed	-	24/02/2022	24/02/2022	24/02/2022	24/02/2022	24/02/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	73	72	73	83	70

svTRH (C10-C40) in Soil						
Our Reference		289551-6	289551-7	289551-8	289551-9	289551-10
Your Reference	UNITS	V27	V28	V29	V30	V31
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date extracted	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Date analysed	-	24/02/2022	24/02/2022	24/02/2022	24/02/2022	24/02/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	75	71	71	70	69

svTRH (C10-C40) in Soil						
Our Reference		289551-11	289551-12	289551-13	289551-14	289551-15
Your Reference	UNITS	V32	V33	V37	V38	V41
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date extracted	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Date analysed	-	24/02/2022	24/02/2022	24/02/2022	24/02/2022	24/02/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	130	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	130	<50	<50
Surrogate o-Terphenyl	%	71	71	82	71	72

svTRH (C10-C40) in Soil					
Our Reference		289551-16	289551-17	289551-18	289551-19
Your Reference	UNITS	V42	DV3	DV4	V36
Type of sample		Soil	Soil	Soil	Soil
Date Sampled		.	.	.	.
Date extracted	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Date analysed	-	24/02/2022	24/02/2022	24/02/2022	24/02/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50
Surrogate o-Terphenyl	%	76	75	83	74

PAHs in Soil						
Our Reference		289551-1	289551-2	289551-3	289551-4	289551-5
Your Reference	UNITS	V21	V22	V23	V25	V26
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date extracted	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Date analysed	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.4	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.7	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	0.6	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.3	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	0.3	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	0.4	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.3	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	3.2	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	100	98	97	94	98

PAHs in Soil						
Our Reference		289551-6	289551-7	289551-8	289551-9	289551-10
Your Reference	UNITS	V27	V28	V29	V30	V31
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date extracted	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Date analysed	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	95	95	91	96	103

PAHs in Soil						
Our Reference		289551-11	289551-12	289551-13	289551-14	289551-15
Your Reference	UNITS	V32	V33	V37	V38	V41
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date extracted	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Date analysed	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	0.2	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	106	106	105	104	108

PAHs in Soil					
Our Reference		289551-16	289551-17	289551-18	289551-19
Your Reference	UNITS	V42	DV3	DV4	V36
Type of sample		Soil	Soil	Soil	Soil
Date Sampled		.	.	.	.
Date extracted	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Date analysed	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Naphthalene	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+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	0.07
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	0.1	0.3
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	103	98	104	96

Acid Extractable metals in soil						
Our Reference		289551-1	289551-2	289551-3	289551-4	289551-5
Your Reference	UNITS	V21	V22	V23	V25	V26
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date prepared	-	24/02/2022	24/02/2022	24/02/2022	24/02/2022	24/02/2022
Date analysed	-	24/02/2022	24/02/2022	24/02/2022	24/02/2022	24/02/2022
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	2	3	<1	<1	1
Copper	mg/kg	7	10	<1	<1	3
Lead	mg/kg	17	44	<1	<1	4
Mercury	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	2	<1	<1	<1
Zinc	mg/kg	48	83	5	<1	37

Acid Extractable metals in soil						
Our Reference		289551-6	289551-7	289551-8	289551-9	289551-10
Your Reference	UNITS	V27	V28	V29	V30	V31
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date prepared	-	24/02/2022	24/02/2022	24/02/2022	24/02/2022	24/02/2022
Date analysed	-	24/02/2022	24/02/2022	24/02/2022	24/02/2022	24/02/2022
Arsenic	mg/kg	6	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	3	3	2	2	2
Copper	mg/kg	6	<1	<1	<1	<1
Lead	mg/kg	4	<1	2	<1	<1
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	<1	1	<1	<1	<1
Zinc	mg/kg	38	18	120	20	6

Acid Extractable metals in soil						
Our Reference		289551-11	289551-12	289551-13	289551-14	289551-15
Your Reference	UNITS	V32	V33	V37	V38	V41
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date prepared	-	24/02/2022	24/02/2022	24/02/2022	24/02/2022	24/02/2022
Date analysed	-	24/02/2022	24/02/2022	24/02/2022	24/02/2022	24/02/2022
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	3	3	2	2	3
Copper	mg/kg	<1	<1	<1	<1	2
Lead	mg/kg	1	2	1	1	1
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	<1	<1	<1	1
Zinc	mg/kg	9	2	2	10	24

Acid Extractable metals in soil					
Our Reference		289551-16	289551-17	289551-18	289551-19
Your Reference	UNITS	V42	DV3	DV4	V36
Type of sample		Soil	Soil	Soil	Soil
Date Sampled		.	.	.	.
Date prepared	-	24/02/2022	24/02/2022	24/02/2022	24/02/2022
Date analysed	-	24/02/2022	24/02/2022	24/02/2022	24/02/2022
Arsenic	mg/kg	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	2	<1	2	2
Copper	mg/kg	1	<1	<1	3
Lead	mg/kg	1	<1	1	10
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	<1	<1	<1	<1
Zinc	mg/kg	7	<1	2	36

Moisture						
Our Reference		289551-1	289551-2	289551-3	289551-4	289551-5
Your Reference	UNITS	V21	V22	V23	V25	V26
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date prepared	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Date analysed	-	24/02/2022	24/02/2022	24/02/2022	24/02/2022	24/02/2022
Moisture	%	15	15	19	12	10

Moisture						
Our Reference		289551-6	289551-7	289551-8	289551-9	289551-10
Your Reference	UNITS	V27	V28	V29	V30	V31
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date prepared	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Date analysed	-	24/02/2022	24/02/2022	24/02/2022	24/02/2022	24/02/2022
Moisture	%	16	14	11	10	12

Moisture						
Our Reference		289551-11	289551-12	289551-13	289551-14	289551-15
Your Reference	UNITS	V32	V33	V37	V38	V41
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date prepared	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Date analysed	-	24/02/2022	24/02/2022	24/02/2022	24/02/2022	24/02/2022
Moisture	%	17	10	5.2	7.9	9.7

Moisture					
Our Reference		289551-16	289551-17	289551-18	289551-19
Your Reference	UNITS	V42	DV3	DV4	V36
Type of sample		Soil	Soil	Soil	Soil
Date Sampled		.	.	.	.
Date prepared	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Date analysed	-	24/02/2022	24/02/2022	24/02/2022	24/02/2022
Moisture	%	10	9.9	5.4	11

Asbestos ID - soils NEPM						
Our Reference		289551-1	289551-2	289551-3	289551-4	289551-5
Your Reference	UNITS	V21	V22	V23	V25	V26
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date analysed	-	24/02/2022	24/02/2022	24/02/2022	24/02/2022	24/02/2022
Sample mass tested	g	347.24	367.34	507.99	435.1	337.56
Sample Description	-	Grey sandy soil	Grey sandy soil	Beige sandy soil	Grey sandy soil	Beige sandy soil
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM						
Our Reference		289551-6	289551-7	289551-8	289551-9	289551-10
Your Reference	UNITS	V27	V28	V29	V30	V31
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date analysed	-	24/02/2022	24/02/2022	24/02/2022	24/02/2022	24/02/2022
Sample mass tested	g	377.29	508.26	446.12	502.51	458.99
Sample Description	-	Beige sandy soil	Beige sandy soil	Grey sandy soil	Grey sandy soil	Beige sandy soil
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM						
Our Reference		289551-11	289551-12	289551-13	289551-14	289551-15
Your Reference	UNITS	V32	V33	V37	V38	V41
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date analysed	-	24/02/2022	24/02/2022	24/02/2022	24/02/2022	24/02/2022
Sample mass tested	g	578.6	487.46	497.11	397.53	505
Sample Description	-	Beige sandy soil	Grey sandy soil	Beige sandy soil	Beige sandy soil	Brown sandy soil
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM			
Our Reference		289551-16	289551-19
Your Reference	UNITS	V42	V36
Type of sample		Soil	Soil
Date Sampled		.	.
Date analysed	-	24/02/2022	24/02/2022
Sample mass tested	g	511.7	542.47
Sample Description	-	Beige sandy soil	Grey sandy soil
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected
Total Asbestos#1	g/kg	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–
FA and AF Estimation*	g	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).

Method ID	Methodology Summary
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	289551-2
Date extracted	-			23/02/2022	1	23/02/2022	23/02/2022		23/02/2022	23/02/2022
Date analysed	-			23/02/2022	1	23/02/2022	23/02/2022		23/02/2022	23/02/2022
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	104	94
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	104	94
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	112	101
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	111	99
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	96	88
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	101	91
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	113	102
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	97	1	97	99	2	113	102

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	23/02/2022	23/02/2022		[NT]	[NT]
Date analysed	-			[NT]	11	23/02/2022	23/02/2022		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	11	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	11	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	11	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	11	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	11	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
Naphthalene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	11	102	97	5	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	289551-2
Date extracted	-			23/02/2022	1	23/02/2022	23/02/2022		23/02/2022	23/02/2022
Date analysed	-			24/02/2022	1	24/02/2022	24/02/2022		24/02/2022	24/02/2022
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	82	76
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	79	75
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	91	102
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	82	76
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	79	75
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	91	102
Surrogate o-Terphenyl	%		Org-020	76	1	73	75	3	89	86

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	23/02/2022	23/02/2022		[NT]	[NT]
Date analysed	-			[NT]	11	24/02/2022	24/02/2022		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	11	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	11	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	11	71	77	8	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	289551-2
Date extracted	-			23/02/2022	1	23/02/2022	23/02/2022		23/02/2022	23/02/2022
Date analysed	-			23/02/2022	1	23/02/2022	23/02/2022		23/02/2022	23/02/2022
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	113	105
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	115	105
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	116	105
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	126	99
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	118	87
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	121	93
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	81	65
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	<0.05	<0.05	0	118	114
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	105	1	100	97	3	97	88

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	23/02/2022	23/02/2022		[NT]	[NT]
Date analysed	-			[NT]	11	23/02/2022	23/02/2022		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	11	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	11	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	11	106	105	1	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	289551-2
Date prepared	-			24/02/2022	1	24/02/2022	24/02/2022		24/02/2022	24/02/2022
Date analysed	-			24/02/2022	1	24/02/2022	24/02/2022		24/02/2022	24/02/2022
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	99	104
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	95	97
Chromium	mg/kg	1	Metals-020	<1	1	2	2	0	96	99
Copper	mg/kg	1	Metals-020	<1	1	7	7	0	97	110
Lead	mg/kg	1	Metals-020	<1	1	17	14	19	99	126
Mercury	mg/kg	0.1	Metals-021	<0.1	1	0.1	0.2	67	110	121
Nickel	mg/kg	1	Metals-020	<1	1	1	<1	0	103	105
Zinc	mg/kg	1	Metals-020	<1	1	48	51	6	104	#

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	11	24/02/2022	24/02/2022		[NT]	[NT]
Date analysed	-			[NT]	11	24/02/2022	24/02/2022		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	11	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	11	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	11	3	3	0	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	11	<1	<1	0	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	11	1	1	0	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	11	1	1	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	11	9	11	20	[NT]	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

Note: All samples analysed as received. However, samples 289551-1, 2, 5, 6, 14 are below the minimum recommended 500mL sample volume as per National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013.

8 metals in soil - # Percent recovery is not possible to report due to the inhomogeneous nature of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

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CERTIFICATE OF ANALYSIS 289551-A

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**39961.11, Wickham**
Number of Samples	additional analysis
Date samples received	23/02/2022
Date completed instructions received	02/03/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	03/03/2022
Date of Issue	03/03/2022

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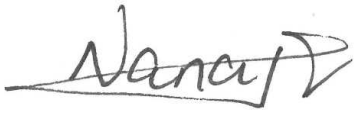
Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Dragana Tomas, Senior Chemist

Authorised By



Nancy Zhang, Laboratory Manager

Organochlorine Pesticides in soil						
Our Reference		289551-A-2	289551-A-3	289551-A-4	289551-A-6	289551-A-9
Your Reference	UNITS	V22	V23	V25	V27	V30
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date extracted	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Date analysed	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	87	88	86	88	87

Organochlorine Pesticides in soil		
Our Reference		289551-A-14
Your Reference	UNITS	V38
Type of sample		Soil
Date Sampled		22/02/2022
Date extracted	-	23/02/2022
Date analysed	-	23/02/2022
alpha-BHC	mg/kg	<0.1
HCB	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1
Surrogate TCMX	%	96

PCBs in Soil						
Our Reference		289551-A-2	289551-A-3	289551-A-4	289551-A-6	289551-A-9
Your Reference	UNITS	V22	V23	V25	V27	V30
Type of sample		Soil	Soil	Soil	Soil	Soil
Date Sampled		22/02/2022	22/02/2022	22/02/2022	22/02/2022	22/02/2022
Date extracted	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Date analysed	-	23/02/2022	23/02/2022	23/02/2022	23/02/2022	23/02/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	87	88	86	88	87

PCBs in Soil		
Our Reference		289551-A-14
Your Reference	UNITS	V38
Type of sample		Soil
Date Sampled		22/02/2022
Date extracted	-	23/02/2022
Date analysed	-	23/02/2022
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1
Surrogate TCMX	%	96

Method ID	Methodology Summary
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	[NT]
Date extracted	-			23/02/2022	[NT]	[NT]	[NT]	[NT]	23/02/2022	[NT]
Date analysed	-			23/02/2022	[NT]	[NT]	[NT]	[NT]	23/02/2022	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
HCB	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	113	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	124	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	118	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	117	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	130	[NT]
Endrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	119	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	112	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	118	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	94	[NT]	[NT]	[NT]	[NT]	89	[NT]

QUALITY CONTROL: PCBs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-11	[NT]
Date extracted	-			23/02/2022	[NT]	[NT]	[NT]	[NT]	23/02/2022	[NT]
Date analysed	-			23/02/2022	[NT]	[NT]	[NT]	[NT]	23/02/2022	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	115	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-021	94	[NT]	[NT]	[NT]	[NT]	89	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

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CERTIFICATE OF ANALYSIS 291489

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**39961.11, Wickham**
Number of Samples	7 Soil
Date samples received	22/03/2022
Date completed instructions received	22/03/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	23/03/2022
Date of Issue	23/03/2022

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Asbestos Approved By
Analysed by Asbestos Approved Analyst: Nyovan Moonean
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Dragana Tomas, Senior Chemist
Hannah Nguyen, Metals Supervisor
Kyle Gavrily, Chemist
Liam Timmins, Chemist
Lucy Zhu, Asbestos Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		291489-1	291489-2	291489-3	291489-4	291489-5
Your Reference	UNITS	V12	V13	V59	V60	V61
Date Sampled		17/03/2022	17/03/2022	17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	111	111	109	100	103

svTRH (C10-C40) in Soil						
Our Reference		291489-1	291489-2	291489-3	291489-4	291489-5
Your Reference	UNITS	V12	V13	V59	V60	V61
Date Sampled		17/03/2022	17/03/2022	17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Date analysed	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	130	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	220	690	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	200	630	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	420	1,400	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	77	140	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	77	140	<50
TRH >C_{16} -C_{34}	mg/kg	<100	110	330	1,100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	140	390	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	110	540	1,700	<50
Surrogate o-Terphenyl	%	115	118	126	#	117

PAHs in Soil						
Our Reference		291489-1	291489-2	291489-3	291489-4	291489-5
Your Reference	UNITS	V12	V13	V59	V60	V61
Date Sampled		17/03/2022	17/03/2022	17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Date analysed	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	1.3	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	0.3	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	0.8	<0.1
Phenanthrene	mg/kg	0.1	0.8	0.4	12	<0.1
Anthracene	mg/kg	<0.1	0.2	0.1	4.5	<0.1
Fluoranthene	mg/kg	0.3	2.1	0.8	19	<0.1
Pyrene	mg/kg	0.3	2.0	0.8	16	<0.1
Benzo(a)anthracene	mg/kg	0.2	0.9	0.6	16	<0.1
Chrysene	mg/kg	0.2	0.8	0.4	10	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.3	1	0.9	23	<0.2
Benzo(a)pyrene	mg/kg	0.2	1.2	0.82	17	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	0.7	0.4	7.7	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	0.1	<0.1	1.9	<0.1
Benzo(g,h,i)perylene	mg/kg	0.2	0.8	0.4	7.0	<0.1
Total +ve PAH's	mg/kg	1.9	11	5.6	140	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	1.7	1.0	24	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	1.7	1.1	24	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	1.7	1.1	24	<0.5
Surrogate p-Terphenyl-d14	%	122	127	126	133	124

Acid Extractable metals in soil						
Our Reference		291489-1	291489-2	291489-3	291489-4	291489-5
Your Reference	UNITS	V12	V13	V59	V60	V61
Date Sampled		17/03/2022	17/03/2022	17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Arsenic	mg/kg	<4	<4	4	5	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	0.4	<0.4
Chromium	mg/kg	3	8	7	6	11
Copper	mg/kg	7	33	26	23	6
Lead	mg/kg	43	140	100	74	3
Mercury	mg/kg	0.1	0.4	0.3	0.3	<0.1
Nickel	mg/kg	2	6	5	8	9
Zinc	mg/kg	62	210	130	220	17

Acid Extractable metals in soil		
Our Reference		291489-8
Your Reference	UNITS	V12 - [TRIPLICATE]
Date Sampled		17/03/2022
Type of sample		Soil
Date prepared	-	23/03/2022
Date analysed	-	23/03/2022
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	3
Copper	mg/kg	11
Lead	mg/kg	50
Mercury	mg/kg	0.2
Nickel	mg/kg	2
Zinc	mg/kg	86

Moisture						
Our Reference		291489-1	291489-2	291489-3	291489-4	291489-5
Your Reference	UNITS	V12	V13	V59	V60	V61
Date Sampled		17/03/2022	17/03/2022	17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Moisture	%	19	26	29	33	34

Asbestos ID - soils NEPM						
Our Reference		291489-1	291489-2	291489-3	291489-4	291489-5
Your Reference	UNITS	V12	V13	V59	V60	V61
Date Sampled		17/03/2022	17/03/2022	17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Sample mass tested	g	543.46	843.92	379.22	416.53	569.11
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM			
Our Reference		291489-6	291489-7
Your Reference	UNITS	SV1	SV2
Date Sampled		17/03/2022	17/03/2022
Type of sample		Soil	Soil
Date analysed	-	23/03/2022	23/03/2022
Sample mass tested	g	937.95	520.01
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–
FA and AF Estimation*	g	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).

Method ID	Methodology Summary
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-24	291489-2
Date extracted	-			22/03/2022	1	22/03/2022	22/03/2022		22/03/2022	22/03/2022
Date analysed	-			23/03/2022	1	23/03/2022	23/03/2022		23/03/2022	23/03/2022
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	122	115
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	122	115
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	130	125
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	130	125
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	113	106
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	116	109
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	120	114
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	124	1	111	110	1	126	114

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-24	291489-2
Date extracted	-			22/03/2022	1	22/03/2022	22/03/2022		22/03/2022	22/03/2022
Date analysed	-			22/03/2022	1	22/03/2022	22/03/2022		22/03/2022	22/03/2022
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	122	122
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	113	123
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	130	#
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	122	122
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	113	123
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	130	#
Surrogate o-Terphenyl	%		Org-020	105	1	115	114	1	99	117

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-24	291489-2
Date extracted	-			22/03/2022	1	22/03/2022	22/03/2022		22/03/2022	22/03/2022
Date analysed	-			22/03/2022	1	22/03/2022	22/03/2022		22/03/2022	22/03/2022
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	118	122
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	109	111
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	113	115
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	0.1	0.1	0	130	#
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	0.3	0.2	40	127	#
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	0.3	0.2	40	131	#
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	0.1	67	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	0.2	0	115	131
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	0.3	0.2	40	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	0.2	0.2	0	116	#
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	0.1	67	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	98	1	122	123	1	117	117

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-24	291489-2
Date prepared	-			23/03/2022	1	23/03/2022	23/03/2022		23/03/2022	23/03/2022
Date analysed	-			23/03/2022	1	23/03/2022	23/03/2022		23/03/2022	23/03/2022
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	99	90
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	98	86
Chromium	mg/kg	1	Metals-020	<1	1	3	4	29	94	87
Copper	mg/kg	1	Metals-020	<1	1	7	11	44	95	90
Lead	mg/kg	1	Metals-020	<1	1	43	72	50	94	#
Mercury	mg/kg	0.1	Metals-021	<0.1	1	0.1	0.1	0	122	#
Nickel	mg/kg	1	Metals-020	<1	1	2	2	0	94	85
Zinc	mg/kg	1	Metals-020	<1	1	62	130	71	100	##

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.
PAHs in Soil - # Percent recovery for the matrix spike is not possible to report as the high concentration of analytes in sample 291489-2ms have caused interference.

TRH Soil C10-C40 NEPM - # Percent recovery for the surrogate/matrix spike is not possible to report as the high concentration of analytes in samples 291489-2ms,4 have caused interference.

Acid Extractable Metals in Soil:
-The laboratory RPD acceptance criteria has been exceeded for 291489-1 for Pb and Zn. Therefore a triplicate result has been issued as laboratory sample number 291489-8.
-# Percent recovery is not possible to report due to the inhomogeneous nature of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.
-## Percent recovery is not applicable due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

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CERTIFICATE OF ANALYSIS 291491

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**39961.11, Wickham**
Number of Samples	24 Soil
Date samples received	18/03/2022
Date completed instructions received	22/03/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	23/03/2022
Date of Issue	23/03/2022

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Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Asbestos Approved By
Analysed by Asbestos Approved Analyst: Nyovan Moonean, Panika Wongchanda
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Dragana Tomas, Senior Chemist
Hannah Nguyen, Metals Supervisor
Lucy Zhu, Asbestos Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		291491-1	291491-2	291491-3	291491-4	291491-5
Your Reference	UNITS	V24	V25	V26	V27	V28
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	113	104	104	123	104

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		291491-6	291491-20	291491-21	291491-22	291491-23
Your Reference	UNITS	V29	V43	V44	V45	DV6
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	118	114	113	105	104

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		291491-24
Your Reference	UNITS	DV5
Date Sampled		16/03/2022
Type of sample		Soil
Date extracted	-	22/03/2022
Date analysed	-	23/03/2022
TRH C_6 - C_9	mg/kg	<25
TRH C_6 - C_{10}	mg/kg	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	106

svTRH (C10-C40) in Soil						
Our Reference		291491-1	291491-2	291491-3	291491-4	291491-5
Your Reference	UNITS	V24	V25	V26	V27	V28
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Date analysed	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	109	113	112	110	112

svTRH (C10-C40) in Soil						
Our Reference		291491-6	291491-20	291491-21	291491-22	291491-23
Your Reference	UNITS	V29	V43	V44	V45	DV6
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Date analysed	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	111	109	105	106	109

svTRH (C10-C40) in Soil		
Our Reference		291491-24
Your Reference	UNITS	DV5
Date Sampled		16/03/2022
Type of sample		Soil
Date extracted	-	22/03/2022
Date analysed	-	22/03/2022
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	<100
Total +ve TRH (C10-C36)	mg/kg	<50
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	<100
TRH >C_{34} -C_{40}	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	105

PAHs in Soil						
Our Reference		291491-1	291491-2	291491-3	291491-4	291491-5
Your Reference	UNITS	V24	V25	V26	V27	V28
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Date analysed	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	0.53	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	121	122	121	117	126

PAHs in Soil				
Our Reference		291491-6	291491-23	291491-24
Your Reference	UNITS	V29	DV6	DV5
Date Sampled		16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	22/03/2022	22/03/2022	22/03/2022
Date analysed	-	22/03/2022	22/03/2022	22/03/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	118	123	122

Acid Extractable metals in soil						
Our Reference		291491-1	291491-2	291491-3	291491-4	291491-5
Your Reference	UNITS	V24	V25	V26	V27	V28
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	0.4	<0.4	<0.4
Chromium	mg/kg	<1	<1	3	2	1
Copper	mg/kg	<1	2	5	<1	1
Lead	mg/kg	1	12	35	2	5
Mercury	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Nickel	mg/kg	<1	<1	2	<1	<1
Zinc	mg/kg	4	37	36	7	240

Acid Extractable metals in soil				
Our Reference		291491-6	291491-23	291491-24
Your Reference	UNITS	V29	DV6	DV5
Date Sampled		16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil
Date prepared	-	23/03/2022	23/03/2022	23/03/2022
Date analysed	-	23/03/2022	23/03/2022	23/03/2022
Arsenic	mg/kg	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4
Chromium	mg/kg	1	<1	<1
Copper	mg/kg	2	<1	<1
Lead	mg/kg	1	6	<1
Mercury	mg/kg	<0.1	<0.1	<0.1
Nickel	mg/kg	<1	<1	<1
Zinc	mg/kg	4	17	<1

Moisture						
Our Reference		291491-1	291491-2	291491-3	291491-4	291491-5
Your Reference	UNITS	V24	V25	V26	V27	V28
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Moisture	%	10	24	23	8.2	24

Moisture						
Our Reference		291491-6	291491-20	291491-21	291491-22	291491-23
Your Reference	UNITS	V29	V43	V44	V45	DV6
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Moisture	%	7.1	8.3	12	13	23

Moisture		
Our Reference		291491-24
Your Reference	UNITS	DV5
Date Sampled		16/03/2022
Type of sample		Soil
Date prepared	-	22/03/2022
Date analysed	-	23/03/2022
Moisture	%	22

Asbestos ID - soils NEPM						
Our Reference	UNITS	291491-1	291491-2	291491-3	291491-4	291491-5
Your Reference		V24	V25	V26	V27	V28
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Sample mass tested	g	877.61	719.5	923.74	826.75	850.97
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM						
Our Reference		291491-6	291491-7	291491-8	291491-9	291491-10
Your Reference	UNITS	V29	V30	V31	V32	V33
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Sample mass tested	g	851.31	943.59	1,067.24	936.4	1,029.53
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM						
Our Reference		291491-11	291491-12	291491-13	291491-14	291491-15
Your Reference	UNITS	V34	V35	V36	V37	V38
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Sample mass tested	g	920.74	1,005.74	922.01	791.85	866.82
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM					
Our Reference		291491-16	291491-17	291491-18	291491-19
Your Reference	UNITS	V39	V40	V41	V42
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Sample mass tested	g	883.65	903.53	998.13	848.66
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–
FA and AF Estimation*	g	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).

Method ID	Methodology Summary
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-24	291491-2
Date extracted	-			22/03/2022	1	22/03/2022	22/03/2022		22/03/2022	22/03/2022
Date analysed	-			23/03/2022	1	23/03/2022	23/03/2022		23/03/2022	23/03/2022
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	122	107
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	122	107
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	132	116
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	134	118
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	113	99
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	116	102
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	120	106
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	124	1	113	111	2	126	106

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	23	22/03/2022	22/03/2022		[NT]	[NT]
Date analysed	-			[NT]	23	23/03/2022	23/03/2022		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	23	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	23	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	23	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	23	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	23	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	23	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	23	<1	<1	0	[NT]	[NT]
Naphthalene	mg/kg	1	Org-023	[NT]	23	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	23	104	102	2	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-24	291491-2
Date extracted	-			22/03/2022	1	22/03/2022	22/03/2022		22/03/2022	22/03/2022
Date analysed	-			22/03/2022	1	22/03/2022	22/03/2022		22/03/2022	22/03/2022
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	122	113
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	113	109
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	122	128
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	122	113
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	113	109
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	122	128
Surrogate o-Terphenyl	%		Org-020	101	1	109	109	0	99	117

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	23	22/03/2022	22/03/2022		[NT]	[NT]
Date analysed	-			[NT]	23	22/03/2022	22/03/2022		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	23	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	23	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	23	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	23	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	23	<100	<100	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	23	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	23	109	107	2	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-24	291491-2
Date extracted	-			22/03/2022	1	22/03/2022	22/03/2022		22/03/2022	22/03/2022
Date analysed	-			22/03/2022	1	22/03/2022	22/03/2022		22/03/2022	22/03/2022
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	118	126
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	109	119
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	113	120
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	130	124
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	127	121
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	131	127
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	115	121
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	<0.05	<0.05	0	116	116
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	98	1	121	121	0	117	114

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	23	22/03/2022	22/03/2022		[NT]	[NT]
Date analysed	-			[NT]	23	22/03/2022	22/03/2022		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	23	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	23	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	23	123	120	2	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-24	291491-2
Date prepared	-			23/03/2022	1	23/03/2022	23/03/2022		23/03/2022	23/03/2022
Date analysed	-			23/03/2022	1	23/03/2022	23/03/2022		23/03/2022	23/03/2022
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	99	93
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	98	92
Chromium	mg/kg	1	Metals-020	<1	1	<1	<1	0	94	90
Copper	mg/kg	1	Metals-020	<1	1	<1	<1	0	95	90
Lead	mg/kg	1	Metals-020	<1	1	1	1	0	94	89
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	122	119
Nickel	mg/kg	1	Metals-020	<1	1	<1	<1	0	94	90
Zinc	mg/kg	1	Metals-020	<1	1	4	4	0	100	87

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	23	23/03/2022	23/03/2022		[NT]	[NT]
Date analysed	-			[NT]	23	23/03/2022	23/03/2022		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	23	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	23	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	23	<1	<1	0	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	23	<1	1	0	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	23	6	8	29	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	23	<1	<1	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	23	17	24	34	[NT]	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

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CERTIFICATE OF ANALYSIS 291491

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**39961.11, Wickham**
Number of Samples	24 Soil
Date samples received	18/03/2022
Date completed instructions received	22/03/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	23/03/2022
Date of Issue	24/03/2022
Reissue Details	This report replaces R00 created on 23/03/2022 due to: sample ID error

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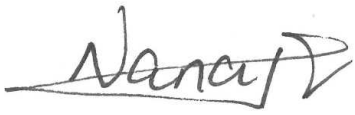
Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Asbestos Approved By
Analysed by Asbestos Approved Analyst: Nyovan Moonean, Panika Wongchanda
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Dragana Tomas, Senior Chemist
Hannah Nguyen, Metals Supervisor
Lucy Zhu, Asbestos Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		291491-1	291491-2	291491-3	291491-4	291491-5
Your Reference	UNITS	V24	V34	V35	V36	V39
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	113	104	104	123	104

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		291491-6	291491-20	291491-21	291491-22	291491-23
Your Reference	UNITS	V40	V56	V57	V58	DV6
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	118	114	113	105	104

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		291491-24
Your Reference	UNITS	DV5
Date Sampled		16/03/2022
Type of sample		Soil
Date extracted	-	22/03/2022
Date analysed	-	23/03/2022
TRH C_6 - C_9	mg/kg	<25
TRH C_6 - C_{10}	mg/kg	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	106

svTRH (C10-C40) in Soil						
Our Reference		291491-1	291491-2	291491-3	291491-4	291491-5
Your Reference	UNITS	V24	V34	V35	V36	V39
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Date analysed	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	109	113	112	110	112

svTRH (C10-C40) in Soil						
Our Reference		291491-6	291491-20	291491-21	291491-22	291491-23
Your Reference	UNITS	V40	V56	V57	V58	DV6
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Date analysed	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	111	109	105	106	109

svTRH (C10-C40) in Soil		
Our Reference		291491-24
Your Reference	UNITS	DV5
Date Sampled		16/03/2022
Type of sample		Soil
Date extracted	-	22/03/2022
Date analysed	-	22/03/2022
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	<100
Total +ve TRH (C10-C36)	mg/kg	<50
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	<100
TRH >C_{34} -C_{40}	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	105

PAHs in Soil						
Our Reference		291491-1	291491-2	291491-3	291491-4	291491-5
Your Reference	UNITS	V24	V34	V35	V36	V39
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Date analysed	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	0.53	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	121	122	121	117	126

PAHs in Soil				
Our Reference		291491-6	291491-23	291491-24
Your Reference	UNITS	V40	DV6	DV5
Date Sampled		16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	22/03/2022	22/03/2022	22/03/2022
Date analysed	-	22/03/2022	22/03/2022	22/03/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	118	123	122

Acid Extractable metals in soil						
Our Reference		291491-1	291491-2	291491-3	291491-4	291491-5
Your Reference	UNITS	V24	V34	V35	V36	V39
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	0.4	<0.4	<0.4
Chromium	mg/kg	<1	<1	3	2	1
Copper	mg/kg	<1	2	5	<1	1
Lead	mg/kg	1	12	35	2	5
Mercury	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Nickel	mg/kg	<1	<1	2	<1	<1
Zinc	mg/kg	4	37	36	7	240

Acid Extractable metals in soil				
Our Reference		291491-6	291491-23	291491-24
Your Reference	UNITS	V40	DV6	DV5
Date Sampled		16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil
Date prepared	-	23/03/2022	23/03/2022	23/03/2022
Date analysed	-	23/03/2022	23/03/2022	23/03/2022
Arsenic	mg/kg	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4
Chromium	mg/kg	1	<1	<1
Copper	mg/kg	2	<1	<1
Lead	mg/kg	1	6	<1
Mercury	mg/kg	<0.1	<0.1	<0.1
Nickel	mg/kg	<1	<1	<1
Zinc	mg/kg	4	17	<1

Moisture						
Our Reference		291491-1	291491-2	291491-3	291491-4	291491-5
Your Reference	UNITS	V24	V34	V35	V36	V39
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Moisture	%	10	24	23	8.2	24

Moisture						
Our Reference		291491-6	291491-20	291491-21	291491-22	291491-23
Your Reference	UNITS	V40	V56	V57	V58	DV6
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Moisture	%	7.1	8.3	12	13	23

Moisture		
Our Reference		291491-24
Your Reference	UNITS	DV5
Date Sampled		16/03/2022
Type of sample		Soil
Date prepared	-	22/03/2022
Date analysed	-	23/03/2022
Moisture	%	22

Asbestos ID - soils NEPM						
Our Reference	UNITS	291491-1	291491-2	291491-3	291491-4	291491-5
Your Reference		V24	V34	V35	V36	V39
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Sample mass tested	g	877.61	719.5	923.74	826.75	850.97
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM						
Our Reference		291491-6	291491-7	291491-8	291491-9	291491-10
Your Reference	UNITS	V40	V43	V44	V45	V46
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Sample mass tested	g	851.31	943.59	1,067.24	936.4	1,029.53
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM						
Our Reference		291491-11	291491-12	291491-13	291491-14	291491-15
Your Reference	UNITS	V47	V48	V49	V50	V51
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Sample mass tested	g	920.74	1,005.74	922.01	791.85	866.82
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM					
Our Reference		291491-16	291491-17	291491-18	291491-19
Your Reference	UNITS	V52	V53	V54	V55
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Sample mass tested	g	883.65	903.53	998.13	848.66
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–
FA and AF Estimation*	g	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).

Method ID	Methodology Summary
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-24	291491-2
Date extracted	-			22/03/2022	1	22/03/2022	22/03/2022		22/03/2022	22/03/2022
Date analysed	-			23/03/2022	1	23/03/2022	23/03/2022		23/03/2022	23/03/2022
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	122	107
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	122	107
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	132	116
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	134	118
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	113	99
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	116	102
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	120	106
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	124	1	113	111	2	126	106

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	23	22/03/2022	22/03/2022		[NT]	[NT]
Date analysed	-			[NT]	23	23/03/2022	23/03/2022		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	23	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	23	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	23	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	23	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	23	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	23	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	23	<1	<1	0	[NT]	[NT]
Naphthalene	mg/kg	1	Org-023	[NT]	23	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	23	104	102	2	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-24	291491-2
Date extracted	-			22/03/2022	1	22/03/2022	22/03/2022		22/03/2022	22/03/2022
Date analysed	-			22/03/2022	1	22/03/2022	22/03/2022		22/03/2022	22/03/2022
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	122	113
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	113	109
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	122	128
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	122	113
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	113	109
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	122	128
Surrogate o-Terphenyl	%		Org-020	101	1	109	109	0	99	117

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	23	22/03/2022	22/03/2022		[NT]	[NT]
Date analysed	-			[NT]	23	22/03/2022	22/03/2022		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	23	<50	<50	0	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	23	<100	<100	0	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	23	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	23	<50	<50	0	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	23	<100	<100	0	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	23	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	23	109	107	2	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-24	291491-2
Date extracted	-			22/03/2022	1	22/03/2022	22/03/2022		22/03/2022	22/03/2022
Date analysed	-			22/03/2022	1	22/03/2022	22/03/2022		22/03/2022	22/03/2022
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	118	126
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	109	119
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	113	120
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	130	124
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	127	121
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	131	127
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	115	121
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	<0.05	<0.05	0	116	116
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	98	1	121	121	0	117	114

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	23	22/03/2022	22/03/2022		[NT]	[NT]
Date analysed	-			[NT]	23	22/03/2022	22/03/2022		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	23	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	23	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	23	123	120	2	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-24	291491-2
Date prepared	-			23/03/2022	1	23/03/2022	23/03/2022		23/03/2022	23/03/2022
Date analysed	-			23/03/2022	1	23/03/2022	23/03/2022		23/03/2022	23/03/2022
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	99	93
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	98	92
Chromium	mg/kg	1	Metals-020	<1	1	<1	<1	0	94	90
Copper	mg/kg	1	Metals-020	<1	1	<1	<1	0	95	90
Lead	mg/kg	1	Metals-020	<1	1	1	1	0	94	89
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	122	119
Nickel	mg/kg	1	Metals-020	<1	1	<1	<1	0	94	90
Zinc	mg/kg	1	Metals-020	<1	1	4	4	0	100	87

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	23	23/03/2022	23/03/2022		[NT]	[NT]
Date analysed	-			[NT]	23	23/03/2022	23/03/2022		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	23	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	23	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	23	<1	<1	0	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	23	<1	1	0	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	23	6	8	29	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	23	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	23	<1	<1	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	23	17	24	34	[NT]	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

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CERTIFICATE OF ANALYSIS 291607

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**39961.11, Wickham**
Number of Samples	7 Soil
Date samples received	23/03/2022
Date completed instructions received	23/03/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	23/03/2022
Date of Issue	23/03/2022

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Asbestos Approved By
Analysed by Asbestos Approved Analyst: Nyovan Moonean
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Dragana Tomas, Senior Chemist
Hannah Nguyen, Metals Supervisor
Josh Williams, Organics and LC Supervisor
Lucy Zhu, Asbestos Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		291607-1	291607-2	291607-3	291607-4	291607-5
Your Reference	UNITS	V6	V7	V8	V9	V10
Date Sampled		22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	94	91	78	98	86

vTRH(C6-C10)/BTEXN in Soil			
Our Reference		291607-6	291607-7
Your Reference	UNITS	V11	VT7A
Date Sampled		22/03/2022	22/03/2022
Type of sample		Soil	Soil
Date extracted	-	23/03/2022	23/03/2022
Date analysed	-	23/03/2022	23/03/2022
TRH C_6 - C_9	mg/kg	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25
Benzene	mg/kg	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
o-Xylene	mg/kg	<1	<1
Naphthalene	mg/kg	<1	<1
Total +ve Xylenes	mg/kg	<1	<1
Surrogate aaa-Trifluorotoluene	%	92	89

svTRH (C10-C40) in Soil						
Our Reference		291607-1	291607-2	291607-3	291607-4	291607-5
Your Reference	UNITS	V6	V7	V8	V9	V10
Date Sampled		22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	90	90	102	80	108

svTRH (C10-C40) in Soil			
Our Reference		291607-6	291607-7
Your Reference	UNITS	V11	VT7A
Date Sampled		22/03/2022	22/03/2022
Type of sample		Soil	Soil
Date extracted	-	23/03/2022	23/03/2022
Date analysed	-	23/03/2022	23/03/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50
Surrogate o-Terphenyl	%	106	103

PAHs in Soil						
Our Reference		291607-1	291607-2	291607-3	291607-4	291607-5
Your Reference	UNITS	V6	V7	V8	V9	V10
Date Sampled		22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	93	85	88	92	84

PAHs in Soil			
Our Reference		291607-6	291607-7
Your Reference	UNITS	V11	VT7A
Date Sampled		22/03/2022	22/03/2022
Type of sample		Soil	Soil
Date extracted	-	23/03/2022	23/03/2022
Date analysed	-	23/03/2022	23/03/2022
Naphthalene	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
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(b,j+k)fluoranthene	mg/kg	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	90	87

Acid Extractable metals in soil						
Our Reference		291607-1	291607-2	291607-3	291607-4	291607-5
Your Reference	UNITS	V6	V7	V8	V9	V10
Date Sampled		22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	2	2	2	1	3
Copper	mg/kg	2	<1	2	<1	<1
Lead	mg/kg	10	<1	5	<1	2
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	<1	<1	1	<1	<1
Zinc	mg/kg	26	13	53	5	44

Acid Extractable metals in soil		
Our Reference		291607-6
Your Reference	UNITS	V11
Date Sampled		22/03/2022
Type of sample		Soil
Date prepared	-	23/03/2022
Date analysed	-	23/03/2022
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	<1
Copper	mg/kg	<1
Lead	mg/kg	<1
Mercury	mg/kg	<0.1
Nickel	mg/kg	<1
Zinc	mg/kg	2

Moisture						
Our Reference		291607-1	291607-2	291607-3	291607-4	291607-5
Your Reference	UNITS	V6	V7	V8	V9	V10
Date Sampled		22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Moisture	%	21	12	24	27	27

Moisture			
Our Reference		291607-6	291607-7
Your Reference	UNITS	V11	VT7A
Date Sampled		22/03/2022	22/03/2022
Type of sample		Soil	Soil
Date prepared	-	23/03/2022	23/03/2022
Date analysed	-	23/03/2022	23/03/2022
Moisture	%	19	4.3

Asbestos ID - soils NEPM						
Our Reference	UNITS	291607-1	291607-2	291607-3	291607-4	291607-5
Your Reference		V6	V7	V8	V9	V10
Date Sampled		22/03/2022	22/03/2022	22/03/2022	22/03/2022	22/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	23/03/2022	23/03/2022	23/03/2022	23/03/2022	23/03/2022
Sample mass tested	g	348.51	296.35	402.66	293.55	501.54
Sample Description	-	Brown sandy soil	Brown sandy soil	Brown sandy soil	Brown sandy soil	Brown sandy soil
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM		
Our Reference		291607-6
Your Reference	UNITS	V11
Date Sampled		22/03/2022
Type of sample		Soil
Date analysed	-	23/03/2022
Sample mass tested	g	559.35
Sample Description	-	Brown sandy soil
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected
ACM >7mm Estimation*	g	–
FA and AF Estimation*	g	–
FA and AF Estimation*#2	%(w/w)	<0.001

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).

Method ID	Methodology Summary
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-20	[NT]
Date extracted	-			23/03/2022	[NT]	[NT]	[NT]	[NT]	23/03/2022	[NT]
Date analysed	-			23/03/2022	[NT]	[NT]	[NT]	[NT]	23/03/2022	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	94	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	94	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	[NT]	[NT]	[NT]	[NT]	90	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]	[NT]	[NT]	[NT]	87	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	82	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	106	[NT]
o-Xylene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	78	[NT]
Naphthalene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	101	[NT]	[NT]	[NT]	[NT]	96	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-20	[NT]
Date extracted	-			23/03/2022	[NT]	[NT]	[NT]	[NT]	23/03/2022	[NT]
Date analysed	-			23/03/2022	[NT]	[NT]	[NT]	[NT]	23/03/2022	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	86	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	82	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	121	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	86	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	82	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	121	[NT]
Surrogate o-Terphenyl	%		Org-020	91	[NT]	[NT]	[NT]	[NT]	127	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			23/03/2022	[NT]	[NT]	[NT]	[NT]	23/03/2022	[NT]
Date analysed	-			23/03/2022	[NT]	[NT]	[NT]	[NT]	23/03/2022	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
Pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	100	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	98	[NT]	[NT]	[NT]	[NT]	94	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-20	[NT]
Date extracted	-			[NT]	[NT]	[NT]	[NT]	[NT]	23/03/2022	[NT]
Date analysed	-			[NT]	[NT]	[NT]	[NT]	[NT]	23/03/2022	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	95	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	85	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	95	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	90	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	92	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	95	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	75	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	118	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	[NT]	[NT]	[NT]	[NT]	93	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			23/03/2022	[NT]	[NT]	[NT]	[NT]	23/03/2022	[NT]
Date analysed	-			23/03/2022	[NT]	[NT]	[NT]	[NT]	23/03/2022	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	94	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	92	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	94	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

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CERTIFICATE OF ANALYSIS 291861

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**39961.11, Wickham**
Number of Samples	6 Soil
Date samples received	25/03/2022
Date completed instructions received	25/03/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	25/03/2022
Date of Issue	25/03/2022

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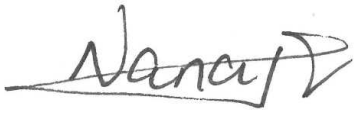
Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Dragana Tomas, Senior Chemist
Giovanni Agosti, Group Technical Manager
Thomas Beenie, Lab Technician

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil				
Our Reference		291861-4	291861-5	291861-6
Your Reference	UNITS	V59A	V59B	V60A
Date Sampled		24/03/2022	24/03/2022	24/03/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	25/03/2022	25/03/2022	25/03/2022
Date analysed	-	25/03/2022	25/03/2022	25/03/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	116	111	119

svTRH (C10-C40) in Soil				
Our Reference		291861-4	291861-5	291861-6
Your Reference	UNITS	V59A	V59B	V60A
Date Sampled		24/03/2022	24/03/2022	24/03/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	25/03/2022	25/03/2022	25/03/2022
Date analysed	-	25/03/2022	25/03/2022	25/03/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50
Surrogate o-Terphenyl	%	76	90	91

PAHs in Soil					
Our Reference		291861-1	291861-2	291861-3	291861-6
Your Reference	UNITS	V13A	V13B	V13C	V60A
Date Sampled		24/03/2022	24/03/2022	24/03/2022	24/03/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	25/03/2022	25/03/2022	25/03/2022	25/03/2022
Date analysed	-	25/03/2022	25/03/2022	25/03/2022	25/03/2022
Naphthalene	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	0.2
Pyrene	mg/kg	<0.1	<0.1	<0.1	0.2
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	0.3
Chrysene	mg/kg	<0.1	<0.1	<0.1	0.2
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	0.5
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	0.4
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	0.2
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	0.2
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	2.3
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	0.6
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	0.6
Surrogate p-Terphenyl-d14	%	107	121	106	106

Acid Extractable metals in soil						
Our Reference		291861-1	291861-2	291861-3	291861-4	291861-5
Your Reference	UNITS	V13A	V13B	V13C	V59A	V59B
Date Sampled		24/03/2022	24/03/2022	24/03/2022	24/03/2022	24/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	25/03/2022	25/03/2022	25/03/2022	25/03/2022	25/03/2022
Date analysed	-	25/03/2022	25/03/2022	25/03/2022	25/03/2022	25/03/2022
Lead	mg/kg	9	9	5	38	23

Moisture						
Our Reference		291861-1	291861-2	291861-3	291861-4	291861-5
Your Reference	UNITS	V13A	V13B	V13C	V59A	V59B
Date Sampled		24/03/2022	24/03/2022	24/03/2022	24/03/2022	24/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	25/03/2022	25/03/2022	25/03/2022	25/03/2022	25/03/2022
Date analysed	-	25/03/2022	25/03/2022	25/03/2022	25/03/2022	25/03/2022
Moisture	%	50	[NT]	43	21	15

Moisture		
Our Reference		291861-6
Your Reference	UNITS	V60A
Date Sampled		24/03/2022
Type of sample		Soil
Date prepared	-	25/03/2022
Date analysed	-	25/03/2022
Moisture	%	17

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			25/03/2022	[NT]	[NT]	[NT]	[NT]	25/03/2022	[NT]
Date analysed	-			25/03/2022	[NT]	[NT]	[NT]	[NT]	25/03/2022	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	93	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	93	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	[NT]	[NT]	[NT]	[NT]	93	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]	[NT]	[NT]	[NT]	99	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	87	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	93	[NT]
o-Xylene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Naphthalene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	100	[NT]	[NT]	[NT]	[NT]	109	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			25/03/2022	[NT]	[NT]	[NT]	[NT]	25/03/2022	[NT]
Date analysed	-			25/03/2022	[NT]	[NT]	[NT]	[NT]	25/03/2022	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	101	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	103	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	121	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	101	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	103	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	121	[NT]
Surrogate o-Terphenyl	%		Org-020	93	[NT]	[NT]	[NT]	[NT]	107	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			25/03/2022	[NT]	[NT]	[NT]	[NT]	25/03/2022	[NT]
Date analysed	-			25/03/2022	[NT]	[NT]	[NT]	[NT]	25/03/2022	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	99	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	93	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	97	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	106	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	109	[NT]	[NT]	[NT]	[NT]	111	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			25/03/2022	[NT]	[NT]	[NT]	[NT]	25/03/2022	[NT]
Date analysed	-			25/03/2022	[NT]	[NT]	[NT]	[NT]	25/03/2022	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Moisture - Sample 2 has been reported on an "as received" basis, i.e. moisture content not included in the calculation.

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CERTIFICATE OF ANALYSIS 291268

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**39961.11, Wickham**
Number of Samples	12 Soil
Date samples received	18/03/2022
Date completed instructions received	18/03/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	18/03/2022
Date of Issue	18/03/2022

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Asbestos Approved By
Analysed by Asbestos Approved Analyst: Nyovan Moonean
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Dragana Tomas, Senior Chemist
Hannah Nguyen, Metals Supervisor
Josh Williams, LC Supervisor
Lucy Zhu, Asbestos Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		291268-1	291268-2	291268-3	291268-4	291268-5
Your Reference	UNITS	VT1	VT2	VT3	VT4	VT5
Date Sampled		17/03/2022	17/03/2022	17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	91	102	104	91	88

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		291268-6	291268-7	291268-8	291268-9	291268-10
Your Reference	UNITS	VT6	VT7	VT8	TS1	TS2
Date Sampled		17/03/2022	17/03/2022	17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	73	85	80	68	65

vTRH(C6-C10)/BTEXN in Soil			
Our Reference		291268-11	291268-12
Your Reference	UNITS	TS3	VTD1
Date Sampled		17/03/2022	17/03/2022
Type of sample		Soil	Soil
Date extracted	-	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022
TRH C_6 - C_9	mg/kg	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25
Benzene	mg/kg	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
o-Xylene	mg/kg	<1	<1
Naphthalene	mg/kg	<1	<1
Total +ve Xylenes	mg/kg	<1	<1
Surrogate aaa-Trifluorotoluene	%	80	71

svTRH (C10-C40) in Soil						
Our Reference		291268-1	291268-2	291268-3	291268-4	291268-5
Your Reference	UNITS	VT1	VT2	VT3	VT4	VT5
Date Sampled		17/03/2022	17/03/2022	17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	81	97	99	97	98

svTRH (C10-C40) in Soil						
Our Reference		291268-6	291268-7	291268-8	291268-9	291268-10
Your Reference	UNITS	VT6	VT7	VT8	TS1	TS2
Date Sampled		17/03/2022	17/03/2022	17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
TRH C_{10} - C_{14}	mg/kg	<50	96	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	300	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	400	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	190	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	190	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	200	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	390	<50	<50	<50
Surrogate o-Terphenyl	%	86	#	86	88	90

svTRH (C10-C40) in Soil			
Our Reference		291268-11	291268-12
Your Reference	UNITS	TS3	VTD1
Date Sampled		17/03/2022	17/03/2022
Type of sample		Soil	Soil
Date extracted	-	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022
TRH C_{10} - C_{14}	mg/kg	330	<50
TRH C_{15} - C_{28}	mg/kg	520	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100
Total +ve TRH (C10-C36)	mg/kg	840	<50
TRH >C_{10} -C_{16}	mg/kg	520	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	520	<50
TRH >C_{16} -C_{34}	mg/kg	280	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	790	<50
Surrogate o-Terphenyl	%	#	93

PAHs in Soil						
Our Reference		291268-1	291268-2	291268-3	291268-4	291268-5
Your Reference	UNITS	VT1	VT2	VT3	VT4	VT5
Date Sampled		17/03/2022	17/03/2022	17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Naphthalene	mg/kg	2.0	0.5	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	2.0	0.60	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	115	113	116	115	113

PAHs in Soil						
Our Reference		291268-6	291268-7	291268-8	291268-9	291268-10
Your Reference	UNITS	VT6	VT7	VT8	TS1	TS2
Date Sampled		17/03/2022	17/03/2022	17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Naphthalene	mg/kg	<0.1	1	0.3	<0.1	0.4
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.9	<0.1	<0.1	0.1
Anthracene	mg/kg	<0.1	0.3	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	0.3	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.2	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	3.7	0.3	<0.05	0.5
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	114	117	111	112	107

PAHs in Soil			
Our Reference		291268-11	291268-12
Your Reference	UNITS	TS3	VTD1
Date Sampled		17/03/2022	17/03/2022
Type of sample		Soil	Soil
Date extracted	-	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022
Naphthalene	mg/kg	2.5	<0.1
Acenaphthylene	mg/kg	0.1	<0.1
Acenaphthene	mg/kg	0.2	<0.1
Fluorene	mg/kg	0.7	<0.1
Phenanthrene	mg/kg	1.3	<0.1
Anthracene	mg/kg	0.5	<0.1
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(b,j+k)fluoranthene	mg/kg	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1
Total +ve PAH's	mg/kg	5.5	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	108	116

Acid Extractable metals in soil				
Our Reference	UNITS	291268-9	291268-10	291268-11
Your Reference		TS1	TS2	TS3
Date Sampled		17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil
Date prepared	-	18/03/2022	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022	18/03/2022
Arsenic	mg/kg	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4
Chromium	mg/kg	2	<1	<1
Copper	mg/kg	2	<1	1
Lead	mg/kg	6	11	14
Mercury	mg/kg	<0.1	<0.1	<0.1
Nickel	mg/kg	1	<1	<1
Zinc	mg/kg	18	1	12

Moisture						
Our Reference		291268-1	291268-2	291268-3	291268-4	291268-5
Your Reference	UNITS	VT1	VT2	VT3	VT4	VT5
Date Sampled		17/03/2022	17/03/2022	17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Moisture	%	19	9.1	19	20	21

Moisture						
Our Reference		291268-6	291268-7	291268-8	291268-9	291268-10
Your Reference	UNITS	VT6	VT7	VT8	TS1	TS2
Date Sampled		17/03/2022	17/03/2022	17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Moisture	%	23	19	18	26	16

Moisture			
Our Reference		291268-11	291268-12
Your Reference	UNITS	TS3	VTD1
Date Sampled		17/03/2022	17/03/2022
Type of sample		Soil	Soil
Date prepared	-	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022
Moisture	%	15	26

Asbestos ID - soils				
Our Reference	UNITS	291268-9	291268-10	291268-11
Your Reference		TS1	TS2	TS3
Date Sampled		17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil
Date analysed	-	18/03/2022	18/03/2022	18/03/2022
Sample mass tested	g	Approx. 40g	Approx. 45g	Approx. 45g
Sample Description	-	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected Synthetic mineral fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

Method ID	Methodology Summary
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	291268-2
Date extracted	-			18/03/2022	1	18/03/2022	18/03/2022		18/03/2022	18/03/2022
Date analysed	-			18/03/2022	1	18/03/2022	18/03/2022		18/03/2022	18/03/2022
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	89	86
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	89	86
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	96	91
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	89	85
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	89	86
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	86	84
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	96	93
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	92	1	91	96	5	105	95

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	18/03/2022	18/03/2022		[NT]	[NT]
Date analysed	-			[NT]	11	18/03/2022	18/03/2022		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	11	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	11	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	11	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	11	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	11	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
Naphthalene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	11	80	69	15	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	291268-2
Date extracted	-			18/03/2022	1	18/03/2022	18/03/2022		18/03/2022	18/03/2022
Date analysed	-			18/03/2022	1	18/03/2022	18/03/2022		18/03/2022	18/03/2022
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	90	99
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	95	108
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	89	102
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	90	99
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	95	108
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	89	102
Surrogate o-Terphenyl	%		Org-020	87	1	81	97	18	101	97

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	18/03/2022	18/03/2022		[NT]	[NT]
Date analysed	-			[NT]	11	18/03/2022	18/03/2022		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	11	330	200	49	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	11	520	360	36	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	11	520	320	48	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	11	280	210	29	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	11	#	#		[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	291268-2
Date extracted	-			18/03/2022	1	18/03/2022	18/03/2022		18/03/2022	18/03/2022
Date analysed	-			18/03/2022	1	18/03/2022	18/03/2022		18/03/2022	18/03/2022
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	2.0	2.4	18	113	86
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	107	103
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	109	107
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	118	117
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	110	106
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	123	117
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	103	103
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	<0.05	<0.05	0	134	124
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	116	1	115	117	2	108	104

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	18/03/2022	18/03/2022		[NT]	[NT]
Date analysed	-			[NT]	11	18/03/2022	18/03/2022		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	11	2.5	1.6	44	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	11	0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	11	0.2	0.2	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	11	0.7	1	35	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	11	1.3	1.2	8	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	11	0.5	0.4	22	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	11	0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	11	0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	11	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	11	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	11	108	113	5	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	291268-10
Date prepared	-			18/03/2022	9	18/03/2022	18/03/2022		18/03/2022	18/03/2022
Date analysed	-			18/03/2022	9	18/03/2022	18/03/2022		18/03/2022	18/03/2022
Arsenic	mg/kg	4	Metals-020	<4	9	<4	<4	0	98	101
Cadmium	mg/kg	0.4	Metals-020	<0.4	9	<0.4	<0.4	0	97	97
Chromium	mg/kg	1	Metals-020	<1	9	2	2	0	98	98
Copper	mg/kg	1	Metals-020	<1	9	2	1	67	97	100
Lead	mg/kg	1	Metals-020	<1	9	6	5	18	100	96
Mercury	mg/kg	0.1	Metals-021	<0.1	9	<0.1	<0.1	0	99	100
Nickel	mg/kg	1	Metals-020	<1	9	1	1	0	99	101
Zinc	mg/kg	1	Metals-020	<1	9	18	16	12	100	101

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures.
We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.
Note: Samples 291268-9 to 11 were sub-sampled from jars provided by the client.

TRH Soil C10-C40 NEPM - # Percent recovery for the surrogate/matrix spike is not possible to report as the high concentration of analytes in sample 291268-7 and 11 have caused interference.

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CERTIFICATE OF ANALYSIS 291491-A

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**39961.11, Wickham**
Number of Samples	additional analysis
Date samples received	18/03/2022
Date completed instructions received	13/04/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	21/04/2022
Date of Issue	20/04/2022

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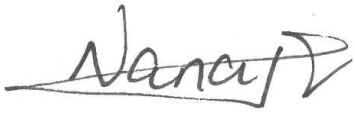
Results Approved By
Steven Luong, Senior Chemist

Authorised By



Nancy Zhang, Laboratory Manager

Organochlorine Pesticides in soil						
Our Reference		291491-A-2	291491-A-4	291491-A-5	291491-A-20	291491-A-22
Your Reference	UNITS	V34	V36	V39	V56	V58
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	19/04/2022	19/04/2022	19/04/2022	19/04/2022	19/04/2022
Date analysed	-	19/04/2022	19/04/2022	19/04/2022	19/04/2022	19/04/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	128	131	110	116	110

PCBs in Soil						
Our Reference		291491-A-2	291491-A-4	291491-A-5	291491-A-20	291491-A-22
Your Reference	UNITS	V34	V36	V39	V56	V58
Date Sampled		16/03/2022	16/03/2022	16/03/2022	16/03/2022	16/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	19/04/2022	19/04/2022	19/04/2022	19/04/2022	19/04/2022
Date analysed	-	19/04/2022	19/04/2022	19/04/2022	19/04/2022	19/04/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	128	131	110	116	110

Method ID	Methodology Summary
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			19/04/2022	[NT]	[NT]	[NT]	[NT]	19/04/2022	[NT]
Date analysed	-			19/04/2022	[NT]	[NT]	[NT]	[NT]	19/04/2022	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	82	[NT]
HCB	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	103	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	93	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	85	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Endrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	82	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	74	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	121	[NT]	[NT]	[NT]	[NT]	90	[NT]

QUALITY CONTROL: PCBs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			19/04/2022	[NT]	[NT]	[NT]	[NT]	19/04/2022	[NT]
Date analysed	-			19/04/2022	[NT]	[NT]	[NT]	[NT]	19/04/2022	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	113	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-021	121	[NT]	[NT]	[NT]	[NT]	90	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Samples were out of the recommended holding time for this analysis.Samples received in good order: Holding time exceedance

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CERTIFICATE OF ANALYSIS 291607-A

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**39961.11, Wickham**
Number of Samples	additional analysis
Date samples received	23/03/2022
Date completed instructions received	13/04/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date results requested by	21/04/2022
Date of Issue	19/04/2022

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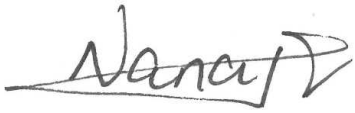
Results Approved By
Josh Williams, Organics and LC Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

Organochlorine Pesticides in soil		
Our Reference		291607-A-1
Your Reference	UNITS	V6
Date Sampled		22/03/2022
Type of sample		Soil
Date extracted	-	23/03/2022
Date analysed	-	23/03/2022
alpha-BHC	mg/kg	<0.1
HCB	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1
Surrogate TCMX	%	88

PCBs in Soil		
Our Reference		291607-A-1
Your Reference	UNITS	V6
Date Sampled		22/03/2022
Type of sample		Soil
Date extracted	-	23/03/2022
Date analysed	-	23/03/2022
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1
Surrogate TCMX	%	88

Method ID	Methodology Summary
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-20	[NT]
Date extracted	-			23/03/2022	[NT]	[NT]	[NT]	[NT]	23/03/2022	[NT]
Date analysed	-			23/03/2022	[NT]	[NT]	[NT]	[NT]	23/03/2022	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
HCB	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	75	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	75	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	82	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	94	[NT]
Endrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	76	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	80	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	85	[NT]	[NT]	[NT]	[NT]	88	[NT]

QUALITY CONTROL: PCBs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-20	[NT]
Date extracted	-			23/03/2022	[NT]	[NT]	[NT]	[NT]	23/03/2022	[NT]
Date analysed	-			23/03/2022	[NT]	[NT]	[NT]	[NT]	23/03/2022	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	72	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-021	85	[NT]	[NT]	[NT]	[NT]	88	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

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www.envirolab.com.au

CERTIFICATE OF ANALYSIS 291861-A

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**39961.11, Wickham**
Number of Samples	additional analysis
Date samples received	25/03/2022
Date completed instructions received	13/04/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	21/04/2022
Date of Issue	20/04/2022

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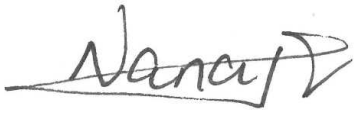
Results Approved By
Steven Luong, Senior Chemist

Authorised By



Nancy Zhang, Laboratory Manager

Organochlorine Pesticides in soil		
Our Reference		291861-A-1
Your Reference	UNITS	V13A
Date Sampled		24/03/2022
Type of sample		Soil
Date extracted	-	19/04/2022
Date analysed	-	19/04/2022
alpha-BHC	mg/kg	<0.1
HCB	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1
Surrogate TCMX	%	121

PCBs in Soil		
Our Reference		291861-A-1
Your Reference	UNITS	V13A
Date Sampled		24/03/2022
Type of sample		Soil
Date extracted	-	19/04/2022
Date analysed	-	19/04/2022
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1
Surrogate TCMX	%	121

Method ID	Methodology Summary
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			19/04/2022	[NT]	[NT]	[NT]	[NT]	19/04/2022	[NT]
Date analysed	-			19/04/2022	[NT]	[NT]	[NT]	[NT]	19/04/2022	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	82	[NT]
HCB	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	103	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	93	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	85	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	96	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	98	[NT]
Endrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	82	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	74	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	121	[NT]	[NT]	[NT]	[NT]	90	[NT]

QUALITY CONTROL: PCBs in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-3	[NT]
Date extracted	-			19/04/2022	[NT]	[NT]	[NT]	[NT]	19/04/2022	[NT]
Date analysed	-			19/04/2022	[NT]	[NT]	[NT]	[NT]	19/04/2022	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	113	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-021	121	[NT]	[NT]	[NT]	[NT]	90	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Samples were out of the recommended holding time for this analysis.Samples received in good order: Holding time exceedance

Appendix C

Data Quality Report
Chain of Custody (Field and Despatch)
Sample Receipt
Tip Dockets and Tracking
Waste Classification Report - Clay Fill between Slabs, November 2021
Waste Classification Report – Hydrocarbon-impacted Soils, March 2022

Appendix C
Data Quality Report, Interim Validation of Remediation
10 Dangar Street, Wickham

C1.0 Field and Laboratory Data Quality Assurance and Quality Control

The field and laboratory data quality assurance and quality control (QA/QC) procedures and results are summarised in the following Table 1. Reference should be made to the field work methodology and the laboratory results / certificates of analysis for further details. The relative percentage difference (RPD) results, along with the other field QC samples are included at the end of this appendix.

Table 1: Field and Laboratory Quality Control

Item	Evaluation / Acceptance Criteria	Compliance
Analytical laboratories used	NATA accreditation	C
Holding times	Various based on type of analysis	PC
Intra-laboratory replicates	10% of primary samples; <30% RPD	PC
Laboratory / Reagent Blanks	1 per batch; <PQL	C
Laboratory Duplicate	1 per lab batch; As laboratory certificate	C
Matrix Spikes	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Surrogate Spikes	All organics analysis; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Control Samples	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Standard Operating Procedures (SOP)	Adopting SOP for all aspects of the sampling field work	C

Notes:
C = compliance; PC = partial compliance; NC = non-compliance

Partial compliance was achieved for holdings times due to n exceedance of holding time for six samples for OCP and PCB assessment of stripped surface validation samples. The samples were refrigerated and capped immediately upon sampling. In addition, any OCP/PCB contamination in the samples would be from aged sources. The results are therefore considered to be acceptable and useable for this assessment.

The RPD results were all within the acceptable range, with the exception of those indicated in bold in Table QA1. The exceedances are not, however, considered to be of concern given that:

- The typically low actual differences in the concentrations of the replicate pairs where some RPD exceedances occurred;
- Replicates, rather than homogenised duplicates, were used to minimise risk of volatile loss, hence greater variability can be expected;
- Most of the recorded concentrations being relatively close to the PQL;
- The majority of RPDs within a replicate pair being within the acceptable limits; and
- All other QA/QC parameters met the DQIs.

In summary, the QC data is determined to be of sufficient quality to be considered acceptable for the assessment.

C2.0 Data Quality Indicators

The reliability of field procedures and analytical results was assessed against the following data quality indicators (DQIs) as outlined in NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013):

- Completeness: a measure of the amount of usable data from a data collection activity;
- Comparability: the confidence (qualitative) that data may be considered to be equivalent for each sampling and analytical event;
- Representativeness: the confidence (qualitative) of data representativeness of media present on-site;
- Precision: a measure of variability or reproducibility of data; and
- Accuracy: a measure of closeness of the data to the 'true' value.

Table 2: Data Quality Indicators

Data Quality Indicator	Method(s) of Achievement
Completeness	Systematic and selected target locations sampled.
	Preparation sample descriptions, sample location plan and chain of custody records.
	Laboratory sample receipt information received confirming receipt of samples intact and appropriateness of the chain of custody.
	Samples analysed for contaminants of potential concern (COPC) identified in the Conceptual Site Model (CSM).
	Completion of chain of custody (COC) documentation.
	NATA accredited laboratory results certificates provided by the laboratory.
	Satisfactory frequency and results for field and laboratory quality control (QC) samples as discussed in Section 1.
Comparability	Using appropriate techniques for sample recovery, storage and transportation, which were the same for the duration of the project.
	Experienced sampler(s) used.
	Use of NATA registered laboratories, with test methods the same or similar between laboratories.
	Satisfactory results for field and laboratory QC samples.
Representativeness	Target media sampled.
	Sample numbers recovered and analysed are considered to be representative of the target media and complying with DQOs.
	Samples were extracted and analysed within holding times.
	Samples were analysed in accordance with the COC.
Precision	Field staff followed standard operating procedures.
	Acceptable RPD between original samples and replicates.
	Satisfactory results for all other field and laboratory QC samples.
Accuracy	Field staff followed standard operating procedures.
	Satisfactory results for all field and laboratory QC samples.

Based on the above, it is considered that the DQIs have been generally complied with.

C3.0 Conclusion

Based on the results of the field QA and field and laboratory QC, and evaluation against the DQIs it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.

C4.0 References

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

Table QA1: Relative Percentage Difference Results – Intra-laboratory Replicates

			Metals								TRH					BTEX						PAH													
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C9	TRH C10 - C14	TRH C15 - C28	TRH C29 - C36	C10-C36 recoverable hydrocarbons	Benzene	Toluene	Ethylbenzene	m+p-Xylene	o-Xylene	Xylenes (total)	Benzo(a)pyrene (BaP)	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(b+k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAHs
Sample ID	Depth	Sample Date	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	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
DR1	0 m		<4	<0.4	<1	<1	<1	<0.1	<1	2	<25	<50	<100	<100	NT	<0.2	<0.5	<1	<2	<1	<1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V18	0 m		NT	NT	NT	NT	<1	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
		Difference	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		RPD	-	-	-	-	0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DR2	0 m		<4	<0.4	<1	1	<1	<0.1	<1	46	<25	<50	<100	<100	NT	<0.2	<0.5	<1	<2	<1	<1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V20	0 m		NT	NT	NT	NT	2	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
		Difference	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		RPD	-	-	-	-	**67%**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DV3	0 m	.	<4	<0.4	<1	<1	<1	<0.1	<1	<1	<25	<50	<100	<100	NT	<0.2	<0.5	<1	<2	<1	<1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V25	0 m	22/02/2022	<4	<0.4	<1	<1	<1	<0.1	<1	<1	<25	<50	<100	<100	NT	<0.2	<0.5	<1	<2	<1	<1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
		Difference	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		RPD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
DV4	0 m	.	<4	<0.4	2	<1	1	<0.1	<1	2	<25	<50	<100	<100	NT	<0.2	<0.5	<1	<2	<1	<1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
V37	0 m	22/02/2022	<4	<0.4	2	<1	1	<0.1	<1	2	<25	<50	<100	<100	NT	<0.2	<0.5	<1	<2	<1	<1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2
		Difference	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0.1
		RPD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**67%**	0%	0%	0%	0%	0%	0%	0%	0%	**67%**
DV6	0 m	16/03/2022	<4	<0.4	<1	<1	6	<0.1	<1	17	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
V34	0 m	16/03/2022	<4	<0.4	<1	2	12	<0.1	<1	37	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
		Difference	0	0	0	1	6	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		RPD	0%	0%	0%	**67%**	**67%**	0%	0%	**74%**	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

			TRH					BTEX						PAH																					
			TRH C6 - C9	TRH C10 - C14	TRH C15 - C28	TRH C29 - C36	C10-C36 recoverable hydrocarbons	Benzene	Toluene	Ethylbenzene	m+p-Xylene	o-Xylene	Xylenes (total)	Benzo(a)pyrene (BaP)	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(b+k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAHs
Sample ID	Depth	Sample Date	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	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
VTD1	0 m	17/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
VT6	0 m	17/03/2022	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
		Difference	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		RPD	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

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CHAIN OF CUSTODY FIELD SHEET

Project No:	39961.11	**Client Project Name:**	PROPOSED APARTMENT DEVELOPMENT
Client:	EASTERN PACIFIC	**Location:**	10 DANGAR ST WICKHAM
Project Manager:	PATRICK HEADS	**DP Lab Received** By:	PH Date: ~~21~~ 21/2/22

Do samples contain 'potential' HBM? Yes ☐ No ☑ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S - soil W - water	Container Type G - glass P - plastic	ASS Samples	Sampling By	Sampling Date	Sampling Time	Storage Locn *	Lab 1 A Date	Lab 2 B Date	Lab 3 C Date	
V1	Surface		S	G/P		PH	21/2/22	10.30		✓			
V2										✓			
V3										✓			
V4										✓			
V5										✓			
V14										✓			
V15										✓			
V16										✓			
V17										✓			
V18		DV1								✓ +AV1			
V19										✓			
V20		DV2						2pm		✓ +AV2			
AW1										✓			4 days
AW2										✓			
AW3										✓			
AW4										✓			
AW5										✓			

* **Default storage:** glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

A Provide name of Lab 1 ENVIRO LAB B Provide name of Lab 2 C Provide name of Lab 3

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Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY FIELD SHEET

Project No:	39961.11	**Client Project Name:**	PROPOSED APARTMENT DEVELOPMENT
Client:	~~EASTERN~~ PACIFIC	**Location:**	10 DANGAR ST WICKHAM
Project Manager:	PH	**DP Lab Received** By:	PH Date: 21-22/2/22

Do samples contain 'potential' HBM? Yes ☐ No ☑ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	ASS Samples	Sampling By	Sampling Date	Sampling Time	Storage Locn *	Lab 1 [A] Date	Lab 2 [B] Date	Lab 3 [C] Date	
AW6			S	P		PH	22/2/22	1140		✓ 21-22/2/22			
AW7			↓	↓						✓			
AW8										✓			
AW9										✓			
AW10										✓			
AW11										✓			
AW12										✓			
AW13				↓						✓			
~~AW~~ V21				G/P						✓			
V22				↓						✓			
V23										✓			
~~V24~~										✓			
V25		DW3								+ DW3 ✓			
V26										✓			
V27										✓			
V28										✓			
V29			↓	↓						✓			

* **Default storage:** glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

A Provide name of Lab 1 ENVIROLAB

B Provide name of Lab 2

C Provide name of Lab 3

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CHAIN OF CUSTODY FIELD SHEET

Project No:	39961.11	**Client Project Name:**	PROPOSED APARTMENT DEVELOPMENT
Client:	EASTERN PACIFIC	**Location:**	10 DANGAR ST WICKHAM
Project Manager:	PATRICK HEARS	**DP Lab Received By:**	PH Date: 22/2/22

Do samples contain 'potential' HBM? Yes ☐ No ☑ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S - soil W - water	Container Type G - glass P - plastic	ASS Samples	Sampling By	Sampling Date	Sampling Time	Storage Locn *	Lab 1 [A] Date	Lab 2 [B] Date	Lab 3 [C] Date	
V30						PH	22/2/22	1pm		22/2/22 ✓			
V31										✓			
V32										✓			
V33										✓			
V34										✓			
~~V35~~													
~~V36~~										~~✓~~			
V37		DV4								✓ x DV4			
V38										✓			
~~V39~~										~~✓~~			
~~V40~~										~~✓~~			
V41										✓			
V42										✓			

* **Default storage:** glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

A Provide name of Lab 1 ENVIROLABS

B Provide name of Lab 2

C Provide name of Lab 3

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CHAIN OF CUSTODY FIELD SHEET

Project No:	39961.11	**Client Project Name:**	Proposed Apartment Development
Client:	Eastern Pacific	**Location:**	10 Langer Street Wickham
Project Manager:	Patrick Heads	**DP Lab Received**	By: Date:

Do samples contain 'potential' HBM? Yes ☐ **No X** (If YES, then handle, transport and store in accordance with FPM HAZID)

Field										DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S - soil W - water	Container Type G - glass P - plastic	ASS Samples	Sampling By	Sampling Date	Sampling Time		Storage Locn *	Lab 1 [A] Date	Lab 2 [B] Date	Lab 3 [C] Date	
V39			S	G, P		JL	15/3/22	1200		114	16/3/22 ✓			
V40											✓			
V43											✓			
V44											✓			
V45											✓			
V46											✓			
V53											✓			
V54											✓			
V55								1400			✓			
V24			S	G, P		JL	16/3/22	930		114	✓			
V34		DUG									✓ +DNG ~~+BJ~~			
V35											✓			
V36											✓			
V47											✓			
V48											✓			
V49		DU5									✓ [redacted]			
V50								1130			✓			

* **Default storage:** **glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge**

A Envirolab Services

B Provide name of Lab 2

C Provide name of Lab 3

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CHAIN OF CUSTODY FIELD SHEET

Project No:	39961.11	**Client Project Name:**	Proposed Apartment Development
Client:	Eastern Pacific	**Location:**	10 Denger St Wickham
Project Manager:	Patrick Heads	**DP Lab Received**	By: Date:

Do samples contain 'potential' HBM? Yes ☐ **No X** (If YES, then handle, transport and store in accordance with FPM HAZID)

Field										DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S - soil W - water	Container Type G - glass P - plastic	ASS Samples	Sampling By	Sampling Date	Sampling Time		Storage Locn *	Lab 1 [A] Date	Lab 2 [B] Date	Lab 3 [C] Date	
VS1			S W	G, P		JCL	16/3/22	1130		114	✓ 18/3/22			VALIDATE INITIAL
VS2						↓	↓	↓			✓			ASBESTOS SP.
SV1						JCL	16/3/22	1600			✓			
SV2						↓	↓	↓			✓			
VT1	1-8					JCL	17/3/22	1050 am			✓ 18/3/22			
VT2	1-8										✓			
VT3	1-8										✓			
VTK	1-8										✓			
VT5	2-3										✓			
VT6	2-3	VT01									✓ =VT01			
VT7	1-8										✓			
VT8	1-8										✓			
TS1											✓			
TS2											✓			
TS3											✓			
VS6											✓			
VS7						↓	↓	1200		↓	✓			

* **Default storage:** **glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge**

A Envirolab Services

B Provide name of Lab 2

C Provide name of Lab 3

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CHAIN OF CUSTODY FIELD SHEET

Project No: 39961.11	**Client Project Name:** Proposed Apartment Development
Client: Eastern Suburbs	**Location:** 10 Langar St Wickham
Project Manager: Patrick Heads	**DP Lab Received** By: Date:

Do samples contain 'potential' HBM? Yes ☑ **No X** (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S - soil W - water	Container Type G - glass P - plastic	ASS Samples	Sampling By	Sampling Date	Sampling Time	Storage Locn *	Lab 1 [A] Date	Lab 2 [B] Date	Lab 3 [C] Date	
V58			S W	G, P		JH	17/3/22	1200	114	24/3/22			
V59			↓	↓		↓	↓	↓	↓	✓			
V60			↓	↓		↓	↓	↓	↓	✓			
V61			↓	↓		↓	↓	↓	↓	✓			
V12			↓	↓		↓	↓	↓	↓	✓			
V13			↓	↓		↓	↓	1500	↓	✓			
V6			↓	↓		PH	22/3/22	2pm	esky	✓ 22/3/22			
V7			↓	↓		↓	↓	↓	↓	✓			
V8			↓	↓		↓	↓	↓	↓	✓			
V9			↓	↓		↓	↓	↓	↓	✓			
V10			↓	↓		↓	↓	↓	↓	✓			
V11			↓	↓		↓	↓	↓	↓	✓			
VT7A			↓	↓		↓	↓	↓	↓	✓ ↓			

* **Default storage:** **glass containers in fridge,** **plastic containers shelved,** **ASS in freezer,** **water samples in fridge**

A Envirolab Services

B Provide name of Lab 2

C Provide name of Lab 3

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CHAIN OF CUSTODY FIELD SHEET

Project No: 39961.11	**Client Project Name:** Proposed Apartment Development
Client: Eastern Pacific	**Location:** 10 Danger Street Wickham
Project Manager: PH	**DP Lab Received** By: Date:

Do samples contain 'potential' HBM? Yes ☐ No ☑ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S-soil W water	Container Type G-glass P-plastic	ASS Samples	Sampling By	Sampling Date	Sampling Time	Storage Locn*	Envirolab 24/3/22			
V13A	2		S	G/P		PH	24/3/22	8am		✓			
V13B	–		↓	↓		↓	↓	↓		✓			
V13C	–									✓			
V59A	–									✓			
V59B	–									✓			
V60A	–		↓	↓		↓	↓	↓		✓			

*Default storage: glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge

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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	39961.11	**Suburb:** Wickham	**To:** Envirolab
Project Name:	Wickham	**Order Number** NC230353	
Project Manager:	Patrick Heads	**Sampler:**	**Attn:** Simon
Emails:			**Phone:** 02 99106200
Date Required:	Same day ☒ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐		**Email:**
Prior Storage:	☒ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM? Yes ☐	No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Heavy Metals	OCP/OPP PCB	TRH and BTEX	PAH	Total Phenols	Asbestos 500 ml	Lead			Notes/preservation
V1	1				✓		✓	✓		✓				combo 3 plus Asb 500 ml
V2	2				✓		✓	✓		✓				combo 3 plus Asb 500 ml
V3	3				✓		✓	✓		✓				combo 3 plus Asb 500 ml
V4	4				✓		✓	✓		✓				combo 3 plus Asb 500 ml
V5	5				✓		✓	✓		✓				combo 3 plus Asb 500 ml
V14	6				✓		✓	✓		✓				combo 3 plus Asb 500 ml
V15	7				✓		✓	✓		✓				combo 3 plus Asb 500 ml
V16	8				✓		✓	✓		✓				combo 3 plus Asb 500 ml
V17	9				✓		✓	✓		✓				combo 3 plus Asb 500 ml
V18	10										✓			
V19	11										✓			
V20	12										✓			
PQL (S) mg/kg														**ANZECC PQLs req'd for all water analytes** ☐

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 289404-A

Total number of samples in container:	**Relinquished by:** PH	**Transported to laboratory by:**	Fexex
Send Results to: Douglas Partners Pty Ltd	**Address:**	**Phone:**	**Fax:**
Signed:	**Received by:**	**Date & Time:**	23/02/2022 @10:45

Douglas Partners
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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	39961.11	**Suburb:** Wickham	**To:** Envirolab
Project Name:	Wickham	**Order Number**	
Project Manager:	Patrick Heads	**Sampler:**	**Attn:** Simon
Emails:			**Phone:** 02 99106200
Date Required:	Same day ☒ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐		**Email:**
Prior Storage:	☒ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM? Yes ☐	No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes									Notes/preservation
						OCP	PCB	Combo 3						
V1	1					✓	✓							Envirolab job # 289404
V2	2													
V3	3													
V4	4													
V5	5					✓	✓							
V14	6					✓	✓							
V15	7													
V16	8													
V17	9													
V18	10													
V19	11													
V20	12					✓	✓							
DV1	13							✓						
DV2	14							✓						
PQL (S) mg/kg													ANZECC PQLs req'd for all water analytes ☐	

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 289404-B

Total number of samples in container: at lab | **Relinquished by:** PH | **Transported to laboratory by:** Fedex

Send Results to: Douglas Partners Pty Ltd | **Address:** | **Phone:** | **Fax:**

Signed: | **Received by:** Ming Yan 20 | **Date & Time:** 01/03/2022 08:31

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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	39961.11	**Suburb:**	Wickham	**To:**	Envirolab
Project Name:	Wickham	**Order Number**	NC230353		
Project Manager:	Patrick Heads	**Sampler:**		**Attn:**	Simon
Emails:				**Phone:**	02 99106200
Date Required:	Same day 24 hours ☐ 48 hours ☒ 72 hours ☐ Standard ☐			**Email:**	
Prior Storage:	☒ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☒	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: pHF / pHFOX									Notes/preservation
V1	1				✓									
V2	2				✓									
V3	3				✓									
V4	4				✓									
V5	5				✓									
V14	6				✓									
V15	7				✓									
V16	8				✓									
V17	9				✓									
V18	10				✓									
V19	11				✓									
V20	12				✓									
PQL (S) mg/kg														**ANZECC PQLs req'd for all water analytes** ☐

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 289404-C

Total number of samples in container: at lab **Relinquished by:** PH **Transported to laboratory by:** Fedex

Send Results to: Douglas Partners Pty Ltd **Address:** **Phone:** **Fax:**

Signed: **Received by:** Ming Yan Zo- **Date & Time:** 11/03/2022 15:35

Douglas Partners
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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	39961.11	**Suburb:**	Wickham	**To:**	Envirolab
Project Name:	Wickham	**Order Number**	NC230353		
Project Manager:	Patrick Heads	**Sampler:**		**Attn:**	Simon
Emails:				**Phone:**	02 99106200
Date Required:	Same day ☒ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐			**Email:**	
Prior Storage:	☒ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)		

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil W - water)	Container Type (G - glass P - plastic)	Analytes: Heavy Metals	OCP/OPP PCB	TRH and BTEX	PAH	Total Phenols	Asbestos 500 ml	Lead			Notes/preservation
V1	1				✓		✓	✓		✓				combo 3 plus Asb 500 ml
V2	2				✓		✓	✓		✓				combo 3 plus Asb 500 ml
V3	3				✓		✓	✓		✓				combo 3 plus Asb 500 ml
V4	4				✓		✓	✓		✓				combo 3 plus Asb 500 ml
V5	5				✓		✓	✓		✓				combo 3 plus Asb 500 ml
V14	6				✓		✓	✓		✓				combo 3 plus Asb 500 ml
V15	7				✓		✓	✓		✓				combo 3 plus Asb 500 ml
V16	8				✓		✓	✓		✓				combo 3 plus Asb 500 ml
V17	9				✓		✓	✓		✓				combo 3 plus Asb 500 ml
V18	10										✓			
V19	11										✓			
V20	12										✓			
Dr1	13	Efra.												
Dr2	14													
PQL (S) mg/kg														ANZECC PQLs req'd for all water analytes ☐

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 289404
Date Received: 22/2/2022
Time Received: 1045
Received by: TS
Temp: Cool/Ambient 14°C
Cooling: Ice/Icepack
Security: Intact/Broken/None

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container: **Relinquished by:** PH **Transported to laboratory by:** Fexex

Send Results to: Douglas Partners Pty Ltd **Address:** **Phone:** **Fax:**

Signed: **Received by:** Phay **Date & Time:** 22/2/2022 1045

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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	39961.11	**Suburb:**	Wickham	**To:**	Envirolab
Project Name:	Wickham	**Order Number**	NC230384		
Project Manager:	Patrick Heads	**Sampler:**	PH	**Attn:**	Simon
Emails:				**Phone:**	02 99106200
Date Required:	Same day 24 hours ☒ 48 hours ☐ 72 hours ☐ Standard ☐			**Email:**	
Prior Storage:	☒ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐	No ☒	(If YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil W - water)	Container Type (G - glass P - plastic)	Analytes: Heavy Metals	OCP	PCB	PAH	Total Phenols	Asbestos 500 ml	Lead			Notes/preservation
V21	1	22/02/22	S	G/P										
V22	2	22/02/22	S	G/P		✓	✓							
V23	3	22/02/22	S	G/P		✓	✓							
V25	4	22/02/22	S	G/P		✓	✓							
V26	5	22/02/22	S	G/P										
V27	6	22/02/22	S	G/P		✓	✓							
V28	7	22/02/22	S	G/P										
V29	8	22/02/22	S	G/P										
V30	9	22/02/22	S	G/P		✓	✓							
V31	10	22/02/22	S	G/P										
V32	11	22/02/22	S	G/P										
V33	12	22/02/22	S	G/P										
V37	13	22/02/22	S	G/P										
V38	14	22/02/22	S	G/P		✓	✓							
V41	15	22/02/22	S	G/P										
PQL (S) mg/kg														**ANZECC PQLs req'd for all water analytes ☐**

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 289551-A

Total number of samples in container:	**Relinquished by:** PH	**Transported to laboratory by:**	Fedex
Send Results to: Douglas Partners Pty Ltd	**Address:**	**Phone:**	**Fax:**
Signed:	**Received by:** Ming Yan To.	**Date & Time:**	02/03/2022 12:14.

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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	39961.11	**Suburb:**	Wickham	**To:**	Envirolab
Project Name:	Wickham	**Order Number**	230365		
Project Manager:	Patrick Heads	**Sampler:**	PH	**Attn:**	Simon
Emails:				**Phone:**	02 99106200
Date Required:	Same day 24 hours ☐ 48 hours ☒ 72 hours ☐ Standard ☐			**Email:**	
Prior Storage:	☒ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)		

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes									Notes/preservation
					pHF / pHFOX									
V21	1	22/02/22	S	G/P	✓									
V22	2	22/02/22	S	G/P	✓									
V23	3	22/02/22	S	G/P	✓									
V25	4	22/02/22	S	G/P	✓									
V26	5	22/02/22	S	G/P	✓									
V27	6	22/02/22	S	G/P	✓									
V28	7	22/02/22	S	G/P	✓									
V29	8	22/02/22	S	G/P	✓									
V30	9	22/02/22	S	G/P	✓									
V31	10	22/02/22	S	G/P	✓									
V32	11	22/02/22	S	G/P	✓									
V33	12	22/02/22	S	G/P	✓									
V37	13	22/02/22	S	G/P	✓									
V38	14	22/02/22	S	G/P	✓									
V41	15	22/02/22	S	G/P	✓									
PQL (S) mg/kg													**ANZECC PQLs req'd for all water analytes** ☐	

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 289551-B.

Total number of samples in container: at lab **Relinquished by:** PH **Transported to laboratory by:** Fedex

Send Results to: Douglas Partners Pty Ltd **Address:** **Phone:** **Fax:**

Signed: **Received by:** Ming Yan Tz. **Date & Time:** 10/03/2022 15:35

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No: 39961.11	**Suburb:** Wickham	**To:** Envirolab	
Project Name: Wickham	**Order Number** 230365		
Project Manager: Patrick Heads	**Sampler:** PH	**Attn:** Simon	
Emails:		**Phone:** 02 99106200	
Date Required: Same day 24 hours ☐ 48 hours ☒ 72 hours ☐ Standard ☐		**Email:**	
Prior Storage: ☒ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM? Yes ☐	No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes									Notes/preservation
					pHF / pHFOX									
V42	16		S	G/P	✓									
			S	G/P										
			S	G/P										
PQL (S) mg/kg														ANZECC PQLs req'd for all water analytes ☐

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 289551-B.

Total number of samples in container: 18 **Relinquished by:** PH **Transported to laboratory by:** Fedex

Send Results to: Douglas Partners Pty Ltd **Address:** **Phone:** **Fax:**

Signed: **Received by:** Ming Yan To. **Date & Time:** 10/03/2022 15:35.

COC rec'd 1400

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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	39961.11	**Suburb:**	Wickham	**To:**	Envirolab
Project Name:	Wickham	**Order Number**	230365		
Project Manager:	Patrick Heads	**Sampler:**	PH	**Attn:**	Simon
Emails:				**Phone:**	02 99106200
Date Required:	Same day ☒ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐			**Email:**	
Prior Storage:	☒ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☒	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Lab ID	Date Sampled	Sample Type: S - soil W - water	Container Type: G - glass P - plastic	Analytes: Heavy Metals	OCP/OPP PCB	TRH and BTEX	PAH	Total Phenols	Asbestos 500 ml	Lead			Notes/preservation
V21	1	22/02/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V22	2	22/02/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V23	3	22/02/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V25	4	22/02/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V26	5	22/02/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V27	6	22/02/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V28	7	22/02/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V29	8	22/02/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V30	9	22/02/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V31	10	22/02/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V32	11	22/02/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V33	12	22/02/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V37	13	22/02/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V38	14	22/02/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V41	15	22/02/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
PQL (S) mg/kg														**ANZECC PQLs req'd for all water analytes** ☐

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 289551

Total number of samples in container:	18	**Relinquished by:** PH	**Transported to laboratory by:** Fedex
Send Results to:	Douglas Partners Pty Ltd	**Address**	**Phone:** **Fax:**
Signed:		**Received by:** ELS Sydney CBD	**Date & Time:** 23/02/22 1045

rec'd 15°C on ice

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	39961.11	**Suburb:**	Wickham	**To:**	Envirolab
Project Name:	Wickham	**Order Number**	230365		
Project Manager:	Patrick Heads	**Sampler:**	PH	**Attn:**	Simon
Emails:				**Phone:**	02 99106200
Date Required:	Same day ☒ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐			**Email:**	
Prior Storage:	☒ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐	No ☒	(If YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil W - water)	Container Type (G - glass P - plastic)	Analytes: Heavy Metals	OCP/OPP PCB	TRH and BTEX	PAH	Total Phenols	Asbestos 500 ml	Lead			Notes/preservation
V42	16		S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
DV3	17		S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
DV4	18		S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
extra														
V36	19													
PQL (S) mg/kg														**ANZECC PQLs req'd for all water analytes** ☐

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 289551

Total number of samples in container: 18 **Relinquished by:** PH **Transported to laboratory by:** Fedex

Send Results to: Douglas Partners Pty Ltd **Address:** **Phone:** **Fax:**

Signed: **Received by:** ELS Sydney CBD **Date & Time:** 23/02/2022 1045

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	39961.11	**Suburb:** Wickham	**To:** Envirolab
Project Name:	Wickham	**Order Number** 230450	
Project Manager:	Patrick Heads	**Sampler:** JCL	**Attn:** Simon
Emails:			**Phone:** 02 99106200
Date Required:	Same day ☒ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐		**Email:**
Prior Storage:	☒ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM? Yes ☐	No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Lab ID	Date Sampled	Sample Type: S - soil W - water	Container Type: G - glass P - plastic	Analytes: Heavy Metals	OCP/OPP PCB	TRH and BTEX	PAH	Total Phenols	Asbestos 500 ml				Notes/preservation
V12	1	17/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V13	2	17/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V59	3	17/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V60	4	17/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V61	5	17/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
SV1	6	17/03/22	S	G/P						✓				combo 3 plus Asb 500 ml
SV2	7	17/03/22	S	G/P						✓				combo 3 plus Asb 500 ml
PQL (S) mg/kg													ANZECC PQLs req'd for all water analytes	

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 291489
Date Received: 22/3
Time Received: 10:30
Received By:
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 291489

Total number of samples in container: 7 **Relinquished by:** PH **Transported to laboratory by:** Fedex

Send Results to: Douglas Partners Pty Ltd **Address** **Phone:** **Fax:**

Signed: **Received by:** **Date & Time:**

Douglas Partners
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CHAIN OF CUSTODY DESPATCH SHEET

Envirolab Services
[illegible] Chatswood NSW 2067
Ph: (02) 9910 6200

Project No:	39961.11	**Suburb:**	Wickham	**To:**	Envirolab
Project Name:	Wickham	**Order Number**			
Project Manager:	Patrick Heads	**Sampler:**	JCL	**Attn:**	Simon
Emails:				**Phone:**	02 99106200
Date Required:	Same day ☒ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐			**Email:**	
Prior Storage:	☒ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)		

Job No: 291491
Date Received: 17/3, 18/3
Time Received: 11.00 a.
Received By: JH
Temp: Cool/Ambient
Cooling: Ice/Pack
Security: Intact/Broken/None

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Heavy Metals	OCP/OPP PCB	TRH and BTEX	PAH	Total Phenols	Asbestos 500 ml	Lead			Notes/preservation
~~V6~~		16/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
~~V7~~		16/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
~~V8~~		16/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
~~V9~~		16/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
~~V10~~		16/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
~~V11~~		16/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
~~V12~~		16/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
~~V13~~		16/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V24	1	16/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V34	2	16/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V35	3	16/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V36	4	16/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V39	5	16/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V40	6	16/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
PQL (S) mg/kg													**ANZECC PQLs req'd for all water analytes** ☐	

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 291491

Total number of samples in container:	34	**Relinquished by:** PH	**Transported to laboratory by:** Fedex
Send Results to:	Douglas Partners Pty Ltd	**Address**	**Phone:** **Fax:**
Signed:		**Received by:**	**Date & Time:** 17/3 / 18/3

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	39961.11	**Suburb:**	Wickham	**To:**	Envirolab
Project Name:	Wickham	**Order Number**			
Project Manager:	Patrick Heads	**Sampler:**	JCL	**Attn:**	Simon
Emails:				**Phone:**	02 99106200
Date Required:	Same day ☒ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐			**Email:**	
Prior Storage:	☒ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)		

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil W - water)	Container Type (G - glass P - plastic)	Analytes: Heavy Metals	OCP/OPP PCB	TRH and BTEX	PAH	Total Phenols	Asbestos 500 ml	Lead			Notes/preservation
V43	17	16/03/22	S	G/P						✓				
V44	8	16/03/22	S	G/P						✓				
V45	9	16/03/22	S	G/P						✓				
V46	10	16/03/22	S	G/P						✓				
V47	11	16/03/22	S	G/P						✓				
V48	12	16/03/22	S	G/P						✓				
V49	13	16/03/22	S	G/P						✓				
V50	14	16/03/22	S	G/P						✓				
V51	15	16/03/22	S	G/P						✓				
V52	16	16/03/22	S	G/P						✓				
V53	17	16/03/22	S	G/P						✓				
V54	18	16/03/22	S	G/P						✓				
V55	19	16/03/22	S	G/P						✓				
V56	20	16/03/22	S	G/P			✓							
V57	21	16/03/22	S	G/P			✓							
PQL (S) mg/kg														ANZECC PQLs req'd for all water analytes

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 291491

Total number of samples in container:	34	**Relinquished by:**	PH	**Transported to laboratory by:**	Fedex
Send Results to:	Douglas Partners Pty Ltd	**Address**		**Phone:**	**Fax:**
Signed:		**Received by:**		**Date & Time:**	17/3 18/3

Douglas Partners
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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	39961.11	**Suburb:**	Wickham	**To:**	Envirolab
Project Name:	Wickham	**Order Number**			
Project Manager:	Patrick Heads	**Sampler:**	JCL	**Attn:**	Simon
Emails:				**Phone:**	02 99106200
Date Required:	Same day ☒ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐			**Email:**	
Prior Storage:	☒ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)		

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Heavy Metals	OCP/OPP PCB	TRH and BTEX	PAH	Total Phenols	Asbestos 500 ml	Lead			Notes/preservation
V58	22	16/03/22	S	G/P			✓							
~~V59~~		16/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
~~V60~~		16/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
~~V61~~		16/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
DV6	23	16/03/22	S	G/P	✓		✓	✓		X - no bag.				combo 3 plus Asb 500 ml
DV5	24.	16/3.			✓		✓	✓						
PQL (S) mg/kg														**ANZECC PQLs req'd for all water analytes** ☐

eta.

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 291491

Total number of samples in container:	34	**Relinquished by:**	PH	**Transported to laboratory by:**	Fedex
Send Results to:	Douglas Partners Pty Ltd	**Address.**		**Phone:**	**Fax:**
Signed:		**Received by:**		**Date & Time:**	17/3 / 18/3.

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CHAIN OF CUSTODY DESPATCH SHEET

Project No: 39961.11	**Suburb:** Wickham	**To:** Envirolab	
Project Name: Wickham	**Order Number** 230454		
Project Manager: Patrick Heads	**Sampler:** PH	**Attn:** Simon	
Emails:		**Phone:** 02 99106200	
Date Required: Same day ☒ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐		**Email:**	
Prior Storage: ☒ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM? Yes ☐	No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Lab ID	Date Sampled	Sample Type: S - soil W - water	Container Type: G - glass P - plastic	Analytes: Heavy Metals	OCP/OPP PCB	TRH and BTEX	PAH	Total Phenols	Asbestos 500 ml				Notes/preservation
V6	1	22/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V7	2	22/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V8	3	22/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V9	4	22/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V10	5	22/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
V11	6	22/03/22	S	G/P	✓		✓	✓		✓				combo 3 plus Asb 500 ml
VT7A	7	22/03/22	S	G/P			✓	✓						
PQL (S) mg/kg														ANZECC PQLs req'd for all water analytes

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 291607
Date Received: 23/03/2022
Time Received: 10:30
Received By:
Temp: Cool/Ambient
Cooling: Ice/Gelpack
Security: Intact/Broken

7°C

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container: 7 **Relinquished by:** PH **Transported to laboratory by:** Fedex

Send Results to: Douglas Partners Pty Ltd **Address:** **Phone:** **Fax:**

Signed: **Received by:** Nancy Zhang **Date & Time:** 23/03/2022 10:30

Douglas Partners
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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	39961.11	**Suburb:**	Wickham	**To:**	Envirolab
Project Name:	Wickham	**Order Number**	230464		
Project Manager:	Patrick Heads	**Sampler:**	PH	**Attn:**	Simon
Emails:				**Phone:**	02 99106200
Date Required:	Same day ☒ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐			**Email:**	
Prior Storage:	☒ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☒	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Heavy Metals	OCP/OPP PCB	TRH and BTEX	PAH	Total Phenols	Lead (Pb)				Notes/preservation
V13A	1	24/03/22	S	G				✓		✓				
V13B	2	24/03/22	S	G				✓		✓				
V13C	3	24/03/22	S	G				✓		✓				
V59A	4	24/03/22	S	G			✓			✓				
V59B	5	24/03/22	S	G			✓			✓				
V60A	6	24/03/22	S	G			✓	✓						
PQL (S) mg/kg													**ANZECC PQLs req'd for all water analytes** ☐	

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

ID: 291861
Date Received: 25/3
Time Received: 10.45
By:
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container: 6 **Relinquished by:** PH **Transported to laboratory by:** Fedex

Send Results to: Douglas Partners Pty Ltd **Address** **Phone:** **Fax:**

Signed: **Received by:** JHWSH. **Date & Time:** 25/3 10.45

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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	39961.11	**Suburb:**	Wickham	**To:**	Envirolab
Project Name:	Wickham	**Order Number**	230435		
Project Manager:	Patrick Heads	**Sampler:**	JCL	**Attn:**	Simon
Emails:				**Phone:**	02 99106200
Date Required:	Same day ☒ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐			**Email:**	
Prior Storage:	☒ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)		

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil W - water)	Container Type (G - glass P - plastic)	Analytes: Heavy Metals	OCP/OPP PCB	TRH and BTEX	PAH	Total Phenols	Asbestos ID 40 g	Lead			Notes/preservation
VT1	1	17/03/22	S	G			✓	✓						Envirolab Services 12 Ashley St Chatswood NSW 2067 Ph: (02) 9910 6200
VT2	2	17/03/22	S	G			✓	✓						Job No: 291268
VT3	3	17/03/22	S	G			✓	✓						Date Received: 18/3/22
VT4	4	17/03/22	S	G			✓	✓						Time Received: 10:30
VT5	5	17/03/22	S	G			✓	✓						Received By:
VT6	6	17/03/22	S	G			✓	✓						Temp: Cool/Ambient
VT7	7	17/03/22	S	G			✓	✓						Cooling: Ice/icepack
VT8	8	17/03/22	S	G			✓	✓						Security: Intact/Broken/None
TS1	9	17/03/22	S	G	✓		✓	✓		✓				
TS2	10	17/03/22	S	G	✓		✓	✓		✓				
TS3	11	17/03/22	S	G	✓		✓	✓		✓				
VTD1	12	17/03/22	S	G			✓	✓						
PQL (S) mg/kg														ANZECC PQLs req'd for all water analytes

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container:	15	**Relinquished by:**	PH	**Transported to laboratory by:**	Fedex
Send Results to:	Douglas Partners Pty Ltd	**Address**		**Phone:**	**Fax:**
Signed:		**Received by:**		**Date & Time:**	18/3/22 10:30

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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	39961.11	**Suburb:** Wickham	**To:** Envirolab
Project Name:	Wickham	**Order Number**	
Project Manager:	Patrick Heads	**Sampler:** PH	**Attn:** Simon
Emails:			**Phone:** 02 99106200
Date Required:	24 hours	48 hours ☐ 72 hours ☒ Standard ☐	**Email:**
Prior Storage:	☒ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM? Yes ☐ No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil W - water)	Container Type (G - glass P - plastic)	Analytes: Heavy Metals	OCP	PCB	PAH	Total Phenols	Asbestos 500 ml	Lead			Notes/preservation
V6		22/03/22	S	G/P		✓	✓							envirolab #291607
V13A		24/03/22	S	G/P		✓	✓							envirolab #291861
V36	(4)	16/03/22	S	G/P		✓	✓							envirolab #291491
V39	(5)	16/03/22	S	G/P		✓	✓							envirolab #291491
V56	(20)	16/03/22	S	G/P		✓	✓							envirolab #291491
V58	(22)	16/03/22	S	G/P		✓	✓							envirolab #291491
V34	(2)	16/03/22	S	G/P		✓	✓							envirolab #291491
PQL (S) mg/kg														ANZECC PQLs req'd for all water analytes ☐

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 291491-A

Total number of samples in container: at lab **Relinquished by:** PH **Transported to laboratory by:** Fedex

Send Results to: Douglas Partners Pty Ltd **Address:** **Phone:** **Fax:**

Signed: **Received by:** Ming Yan To · **Date & Time:** 13/04/2022 19:17.

Additional analysis

Douglas Partners
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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	39961.11	**Suburb:**	Wickham	**To:**	Envirolab
Project Name:	Wickham	**Order Number**			
Project Manager:	Patrick Heads	**Sampler:**	PH	**Attn:**	Simon
Emails:				**Phone:**	02 99106200
Date Required:	24 hours	48 hours ☐	72 hours ☒ Standard ☐	**Email:**	
Prior Storage:	☒ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)		

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Heavy Metals	OCP	PCB	PAH	Total Phenols	Asbestos 500 ml	Lead			Notes/preservation
V6	(1)	22/03/22	S	G/P		✓	✓							envirolab #291607
V13A		24/03/22	S	G/P		✓	✓							envirolab #291861
V36		16/03/22	S	G/P		✓	✓							envirolab #291491
V39		16/03/22	S	G/P		✓	✓							envirolab #291491
V56		16/03/22	S	G/P		✓	✓							envirolab #291491
V58		16/03/22	S	G/P		✓	✓							envirolab #291491
V34		16/03/22	S	G/P		✓	✓							envirolab #291491
PQL (S) mg/kg													ANZECC PQLs req'd for all water analytes ☐	

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 291607-A

Total number of samples in container: at lab **Relinquished by:** PH **Transported to laboratory by:** Fedex

Send Results to: Douglas Partners Pty Ltd **Address:** **Phone:** **Fax:**

Signed: **Received by:** Ming Yan To **Date & Time:** 13/04/2022 19:17

Additional testing

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	39961.11	**Suburb:**	Wickham	**To:**	Envirolab
Project Name:	Wickham	**Order Number**			
Project Manager:	Patrick Heads	**Sampler:**	PH	**Attn:**	Simon
Emails:				**Phone:**	02 99106200
Date Required:	24 hours	48 hours ☐	72 hours ☒ Standard ☐	**Email:**	
Prior Storage:	☒ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)		

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Heavy Metals	OCP	PCB	PAH	Total Phenols	Asbestos 500 ml	Lead			Notes/preservation
V6		22/03/22	S	G/P		✓	✓							envirolab #291607
V13A	(1)	24/03/22	S	G/P		✓	✓							envirolab #291861
V36		16/03/22	S	G/P		✓	✓							envirolab #291491
V39		16/03/22	S	G/P		✓	✓							envirolab #291491
V56		16/03/22	S	G/P		✓	✓							envirolab #291491
V58		16/03/22	S	G/P		✓	✓							envirolab #291491
V34		16/03/22	S	G/P		✓	✓							envirolab #291491
PQL (S) mg/kg														ANZECC PQLs req'd for all water analytes ☐

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No: 291861-A

Total number of samples in container: at lab **Relinquished by:** PH **Transported to laboratory by:** Fedex

Send Results to: Douglas Partners Pty Ltd **Address:** **Phone:** **Fax:**

Signed: **Received by:** Ming Yan To. **Date & Time:** 13/04/2022 (9:17

Additional Analysis

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads

Sample Login Details

Your reference	39961.11, Wickham
Envirolab Reference	289404-B
Date Sample Received	22/02/2022
Date Instructions Received	01/03/2022
Date Results Expected to be Reported	01/03/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	additional analysis
Turnaround Time Requested	Same day
Temperature on Receipt (°C)	14
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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ABN 37 112 535 645
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www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Acid Extractable metalsin soil	Organochlorine Pesticides in soil	PCBs in Soil	On Hold
V1					✓	✓	
V2							✓
V3							✓
V4							✓
V5					✓	✓	
V14					✓	✓	
V15							✓
V16							✓
V17							✓
V18							✓
V19							✓
V20					✓	✓	
DR1	✓	✓	✓	✓			
DR2	✓	✓	✓	✓			

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

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customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads

Sample Login Details

Your reference	39961.11, Wickham
Envirolab Reference	289404
Date Sample Received	22/02/2022
Date Instructions Received	22/02/2022
Date Results Expected to be Reported	22/02/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	14 Soil
Turnaround Time Requested	Same day
Temperature on Receipt (°C)	14
Cooling Method	Ice
Sampling Date Provided	YES

Comments

#13-14 samples received floating in water.

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Acid Extractable metalsin soil	On Hold
V1	✓	✓	✓	✓	
V2	✓	✓	✓	✓	
V3	✓	✓	✓	✓	
V4	✓	✓	✓	✓	
V5	✓	✓	✓	✓	
V14	✓	✓	✓	✓	
V15	✓	✓	✓	✓	
V16	✓	✓	✓	✓	
V17	✓	✓	✓	✓	
V18				✓	
V19				✓	
V20				✓	
DR1					✓
DR2					✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

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SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads

Sample Login Details

Your reference	39961.11, Wickham
Envirolab Reference	289551-A
Date Sample Received	23/02/2022
Date Instructions Received	02/03/2022
Date Results Expected to be Reported	03/03/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	additional analysis
Turnaround Time Requested	1 day
Temperature on Receipt (°C)	15
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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www.envirolab.com.au

Sample ID	Organochlorine Pesticides in soil	PCBs in Soil	On Hold
V21			✓
V22	✓	✓	
V23	✓	✓	
V25	✓	✓	
V26			✓
V27	✓	✓	
V28			✓
V29			✓
V30	✓	✓	
V31			✓
V32			✓
V33			✓
V37			✓
V38	✓	✓	
V41			✓
V42			✓
DV3			✓
DV4			✓
V36			✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

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SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads

Sample Login Details

Your reference	39961.11, Wickham
Envirolab Reference	289551-B
Date Sample Received	23/02/2022
Date Instructions Received	10/03/2022
Date Results Expected to be Reported	14/03/2022

Sample Condition

Samples received in appropriate condition for analysis	Holding time exceedance
No. of Samples Provided	additional analysis
Turnaround Time Requested	2 days
Temperature on Receipt (°C)	15
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Please contact the laboratory within 24 hours if you wish to cancel the aformentioned testing. Otherwise testing will proceed as per the COC and hence invoice accordingly.

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

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www.envirolab.com.au

Sample ID	sPOCAS field test	On Hold
V21	✓	
V22	✓	
V23	✓	
V25	✓	
V26	✓	
V27	✓	
V28	✓	
V29	✓	
V30	✓	
V31	✓	
V32	✓	
V33	✓	
V37	✓	
V38	✓	
V41	✓	
V42	✓	
DV3		✓
DV4		✓
V36		✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

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SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads

Sample Login Details

Your reference	39961.11, Wickham
Envirolab Reference	289551
Date Sample Received	23/02/2022
Date Instructions Received	23/02/2022
Date Results Expected to be Reported	24/02/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	19 Soil
Turnaround Time Requested	1 day
Temperature on Receipt (°C)	15
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM
V21	✓	✓	✓	✓	✓
V22	✓	✓	✓	✓	✓
V23	✓	✓	✓	✓	✓
V25	✓	✓	✓	✓	✓
V26	✓	✓	✓	✓	✓
V27	✓	✓	✓	✓	✓
V28	✓	✓	✓	✓	✓
V29	✓	✓	✓	✓	✓
V30	✓	✓	✓	✓	✓
V31	✓	✓	✓	✓	✓
V32	✓	✓	✓	✓	✓
V33	✓	✓	✓	✓	✓
V37	✓	✓	✓	✓	✓
V38	✓	✓	✓	✓	✓
V41	✓	✓	✓	✓	✓
V42	✓	✓	✓	✓	✓
DV3	✓	✓	✓	✓	
DV4	✓	✓	✓	✓	
V36	✓	✓	✓	✓	✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

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www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads

Sample Login Details

Your reference	39961.11, Wickham
Envirolab Reference	291489
Date Sample Received	22/03/2022
Date Instructions Received	22/03/2022
Date Results Expected to be Reported	23/03/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	7 Soil
Turnaround Time Requested	1 day
Temperature on Receipt (°C)	4
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM
V12	✓	✓	✓	✓	✓
V13	✓	✓	✓	✓	✓
V59	✓	✓	✓	✓	✓
V60	✓	✓	✓	✓	✓
V61	✓	✓	✓	✓	✓
SV1					✓
SV2					✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

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SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads

Sample Login Details

Your reference	39961.11, Wickham
Envirolab Reference	291491
Date Sample Received	18/03/2022
Date Instructions Received	22/03/2022
Date Results Expected to be Reported	23/03/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	24 Soil
Turnaround Time Requested	1 day
Temperature on Receipt (°C)	8
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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customerservice@envirolab.com.au
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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM
V24	✓	✓	✓	✓	✓
V34	✓	✓	✓	✓	✓
V35	✓	✓	✓	✓	✓
V36	✓	✓	✓	✓	✓
V39	✓	✓	✓	✓	✓
V40	✓	✓	✓	✓	✓
V43					✓
V44					✓
V45					✓
V46					✓
V47					✓
V48					✓
V49					✓
V50					✓
V51					✓
V52					✓
V53					✓
V54					✓
V55					✓
V56	✓	✓			
V57	✓	✓			
V58	✓	✓			
DV6	✓	✓	✓	✓	
DV5	✓	✓	✓	✓	

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

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SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads

Sample Login Details

Your reference	39961.11, Wickham
Envirolab Reference	291607
Date Sample Received	23/03/2022
Date Instructions Received	23/03/2022
Date Results Expected to be Reported	23/03/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	7 Soil
Turnaround Time Requested	Same day
Temperature on Receipt (°C)	7
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM
V6	✓	✓	✓	✓	✓
V7	✓	✓	✓	✓	✓
V8	✓	✓	✓	✓	✓
V9	✓	✓	✓	✓	✓
V10	✓	✓	✓	✓	✓
V11	✓	✓	✓	✓	✓
VT7A	✓	✓	✓		

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

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www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads

Sample Login Details

Your reference	39961.11, Wickham
Envirolab Reference	291861
Date Sample Received	25/03/2022
Date Instructions Received	25/03/2022
Date Results Expected to be Reported	25/03/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	6 Soil
Turnaround Time Requested	Same day
Temperature on Receipt (°C)	9
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
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customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Acid Extractable metalsin soil
V13A			✓	✓
V13B			✓	✓
V13C			✓	✓
V59A	✓	✓		✓
V59B	✓	✓		✓
V60A	✓	✓	✓	

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads

Sample Login Details

Your reference	39961.11, Wickham
Envirolab Reference	291268
Date Sample Received	18/03/2022
Date Instructions Received	18/03/2022
Date Results Expected to be Reported	18/03/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	12 Soil
Turnaround Time Requested	Same day
Temperature on Receipt (°C)	6
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Acid Extractable metalsin soil	Asbestos ID - soils
VT1	✓	✓	✓		
VT2	✓	✓	✓		
VT3	✓	✓	✓		
VT4	✓	✓	✓		
VT5	✓	✓	✓		
VT6	✓	✓	✓		
VT7	✓	✓	✓		
VT8	✓	✓	✓		
TS1	✓	✓	✓	✓	✓
TS2	✓	✓	✓	✓	✓
TS3	✓	✓	✓	✓	✓
VTD1	✓	✓	✓		

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

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SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads

Sample Login Details

Your reference	39961.11, Wickham
Envirolab Reference	291491-A
Date Sample Received	18/03/2022
Date Instructions Received	13/04/2022
Date Results Expected to be Reported	21/04/2022

Sample Condition

Samples received in appropriate condition for analysis	Holding time exceedance
No. of Samples Provided	additional analysis
Turnaround Time Requested	3 days
Temperature on Receipt (°C)	8
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Please contact the laboratory within 24 hours if you wish to cancel the aformentioned testing. Otherwise testing will proceed as per the COC and hence invoiced accordingly.

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

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www.envirolab.com.au

Sample ID	Organochlorine Pesticides in soil	PCBs in Soil	On Hold
V24			✓
V34	✓	✓	
V35			✓
V36	✓	✓	
V39	✓	✓	
V40			✓
V43			✓
V44			✓
V45			✓
V46			✓
V47			✓
V48			✓
V49			✓
V50			✓
V51			✓
V52			✓
V53			✓
V54			✓
V55			✓
V56	✓	✓	
V57			✓
V58	✓	✓	
DV6			✓
DV5			✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

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customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads

Sample Login Details

Your reference	39961.11, Wickham
Envirolab Reference	291607-A
Date Sample Received	23/03/2022
Date Instructions Received	13/04/2022
Date Results Expected to be Reported	21/04/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	additional analysis
Turnaround Time Requested	3 days
Temperature on Receipt (°C)	7
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	Organochlorine Pesticides in soil	PCBs in Soil	On Hold
V6	✓	✓	
V7			✓
V8			✓
V9			✓
V10			✓
V11			✓
VT7A			✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

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www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads

Sample Login Details

Your reference	39961.11, Wickham
Envirolab Reference	291861-A
Date Sample Received	25/03/2022
Date Instructions Received	13/04/2022
Date Results Expected to be Reported	21/04/2022

Sample Condition

Samples received in appropriate condition for analysis	Holding time exceedance
No. of Samples Provided	additional analysis
Turnaround Time Requested	3 days
Temperature on Receipt (°C)	9
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Please contact the laboratory within 24 hours if you wish to cancel the aformentioned testing. Otherwise testing will proceed as per the COC and hence invoiced accordingly.

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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Sample ID	Organochlorine Pesticides in soil	PCBs in Soil	On Hold
V13A	✓	✓	
V13B			✓
V13C			✓
V59A			✓
V59B			✓
V60A			✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

PROGRESS CLAIM SUMMARY

Contract Name:	Bowline - Asbsoils	**Date of application:**	8/12/2021
Site Location:	10 Dangar Street Wickham NSW	**Application Number:**	1
Contact:	David Goldman	**Dates Works Valued:**	6/12/21 - 7/12/2021
Contract No:		**Date of Payment:**	
Drumderg Services Job No:	145	**Prepared By:**	Daniel Restrepo

SUMMARY

ITEM	DESCRIPTION	WHEN COMPLETE	PROGRESS	CLAIMED TO DATE	CURRENT CLAIM (EXC. GST)	COMMENTS
			ASBSOILS			
1.1	ASBSOILS 6/12 - 7/12	$ 601,417.60	100%	$ -	$ 601,417.60	
				$ -	$ 601,417.60	

TOTAL CLAIMED (EXC. GST)	$ 601,417.60

DETAILED BREAKDOWN

ITEM No	DATE	DOCKET No	DESCRIPTION	QTY	UNIT	RATE	TOTAL	COMMENT
			ASBSOILS					
1.1.001	6/12/2021	30383941-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	20.32	Tonnes	$ 280.00	$ 5,689.60	
1.1.002	6/12/2021	30384010-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	16.36	Tonnes	$ 280.00	$ 4,580.80	
1.1.003	6/12/2021	30384090-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	24.50	Tonnes	$ 280.00	$ 6,860.00	
1.1.004	6/12/2021	30384178-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	26.24	Tonnes	$ 280.00	$ 7,347.20	
1.1.005	6/12/2021	30384266-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	24.56	Tonnes	$ 280.00	$ 6,876.80	
1.1.006	6/12/2021	30384349-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	26.14	Tonnes	$ 280.00	$ 7,319.20	
1.1.007	6/12/2021	30383954-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	21.20	Tonnes	$ 280.00	$ 5,936.00	
1.1.008	6/12/2021	30384036-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	27.26	Tonnes	$ 280.00	$ 7,632.80	
1.1.009	6/12/2021	30384125-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	27.98	Tonnes	$ 280.00	$ 7,834.40	
1.1.010	6/12/2021	30384223-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.38	Tonnes	$ 280.00	$ 7,946.40	
1.1.011	6/12/2021	30384315-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.70	Tonnes	$ 280.00	$ 8,036.00	
1.1.012	6/12/2021	30384376-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	27.70	Tonnes	$ 280.00	$ 7,756.00	
1.1.013	6/12/2021	30383934-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	20.54	Tonnes	$ 280.00	$ 5,751.20	
1.1.014	6/12/2021	30384026-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.54	Tonnes	$ 280.00	$ 7,991.20	
1.1.015	6/12/2021	30384109-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	32.20	Tonnes	$ 280.00	$ 9,016.00	
1.1.016	6/12/2021	30384200-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	33.92	Tonnes	$ 280.00	$ 9,497.60	
1.1.017	6/12/2021	30384300-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.28	Tonnes	$ 280.00	$ 8,478.40	
1.1.018	6/12/2021	30384374-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	31.18	Tonnes	$ 280.00	$ 8,730.40	
1.1.019	6/12/2021	30383953-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	27.26	Tonnes	$ 280.00	$ 7,632.80	
1.1.020	6/12/2021	30384032-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	32.80	Tonnes	$ 280.00	$ 9,184.00	
1.1.021	6/12/2021	30384120-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	31.36	Tonnes	$ 280.00	$ 8,780.80	
1.1.022	6/12/2021	30384215-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	32.26	Tonnes	$ 280.00	$ 9,032.80	
1.1.023	6/12/2021	30384307-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	34.30	Tonnes	$ 280.00	$ 9,604.00	
1.1.024	6/12/2021	30384383-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	32.20	Tonnes	$ 280.00	$ 9,016.00	
1.1.025	6/12/2021	30383956-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	20.04	Tonnes	$ 280.00	$ 5,611.20	

1.1.026	6/12/2021	30384045-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	25.08	Tonnes	$ 280.00	$ 7,022.40	
1.1.027	6/12/2021	30384131-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	26.06	Tonnes	$ 280.00	$ 7,296.80	
1.1.028	6/12/2021	30384234-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.18	Tonnes	$ 280.00	$ 7,890.40	
1.1.029	6/12/2021	30384336-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	27.88	Tonnes	$ 280.00	$ 7,806.40	
1.1.030	6/12/2021	30383967-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	25.90	Tonnes	$ 280.00	$ 7,252.00	
1.1.031	6/12/2021	30384057-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.08	Tonnes	$ 280.00	$ 8,422.40	
1.1.032	6/12/2021	30384138-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	27.22	Tonnes	$ 280.00	$ 7,621.60	
1.1.033	6/12/2021	30384242-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	31.06	Tonnes	$ 280.00	$ 8,696.80	
1.1.034	6/12/2021	30384330-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	31.48	Tonnes	$ 280.00	$ 8,814.40	
1.1.035	6/12/2021	30384390-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	32.66	Tonnes	$ 280.00	$ 9,144.80	
1.1.036	7/12/2021	30384436-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	24.72	Tonnes	$ 280.00	$ 6,921.60	
1.1.037	7/12/2021	30384529-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	27.38	Tonnes	$ 280.00	$ 7,666.40	
1.1.038	7/12/2021	30384612-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	25.42	Tonnes	$ 280.00	$ 7,117.60	
1.1.039	7/12/2021	30384696-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.58	Tonnes	$ 280.00	$ 8,282.40	
1.1.040	7/12/2021	30384782-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.18	Tonnes	$ 280.00	$ 8,170.40	
1.1.041	7/12/2021	30384874-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.58	Tonnes	$ 280.00	$ 8,562.40	
1.1.042	7/12/2021	30384423-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.72	Tonnes	$ 280.00	$ 8,321.60	
1.1.043	7/12/2021	30384505-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.88	Tonnes	$ 280.00	$ 8,646.40	
1.1.044	7/12/2021	30384597-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.98	Tonnes	$ 280.00	$ 8,114.40	
1.1.045	7/12/2021	30384675-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	31.40	Tonnes	$ 280.00	$ 8,792.00	
1.1.046	7/12/2021	30384777-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	32.88	Tonnes	$ 280.00	$ 9,206.40	
1.1.047	7/12/2021	30384866-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	31.52	Tonnes	$ 280.00	$ 8,825.60	
1.1.048	7/12/2021	30384433-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.54	Tonnes	$ 280.00	$ 8,271.20	
1.1.049	7/12/2021	30384528-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.88	Tonnes	$ 280.00	$ 8,366.40	
1.1.050	7/12/2021	30384610-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.56	Tonnes	$ 280.00	$ 8,276.80	
1.1.051	7/12/2021	30384693-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	33.86	Tonnes	$ 280.00	$ 9,480.80	
1.1.052	7/12/2021	30384781-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.14	Tonnes	$ 280.00	$ 8,439.20	
1.1.053	7/12/2021	30384870-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.58	Tonnes	$ 280.00	$ 8,562.40	
1.1.054	7/12/2021	30384477-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	25.74	Tonnes	$ 280.00	$ 7,207.20	
1.1.055	7/12/2021	30384583-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.72	Tonnes	$ 280.00	$ 8,041.60	
1.1.056	7/12/2021	30384662-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	23.66	Tonnes	$ 280.00	$ 6,624.80	
1.1.057	7/12/2021	30384766-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	31.04	Tonnes	$ 280.00	$ 8,691.20	
1.1.058	7/12/2021	30384844-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.06	Tonnes	$ 280.00	$ 8,136.80	
1.1.059	7/12/2021	30384455-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.50	Tonnes	$ 280.00	$ 8,260.00	
1.1.060	7/12/2021	30384544-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.82	Tonnes	$ 280.00	$ 8,069.60	
1.1.061	7/12/2021	30384630-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.98	Tonnes	$ 280.00	$ 8,394.40	
1.1.062	7/12/2021	30384723-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.60	Tonnes	$ 280.00	$ 8,568.00	
1.1.063	7/12/2021	30384811-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.64	Tonnes	$ 280.00	$ 8,579.20	
1.1.064	7/12/2021	30384885-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.36	Tonnes	$ 280.00	$ 8,500.80	
1.1.065	7/12/2021	30384453-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.06	Tonnes	$ 280.00	$ 7,856.80	
1.1.066	7/12/2021	30384551-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.26	Tonnes	$ 280.00	$ 8,192.80	
1.1.067	7/12/2021	30384632-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	26.78	Tonnes	$ 280.00	$ 7,498.40	
1.1.068	7/12/2021	30384732-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	31.94	Tonnes	$ 280.00	$ 8,943.20	
1.1.069	7/12/2021	30384819-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.42	Tonnes	$ 280.00	$ 8,517.60	
1.1.070	7/12/2021	30384890-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.68	Tonnes	$ 280.00	$ 8,310.40	
1.1.071	7/12/2021	30384465-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	27.82	Tonnes	$ 280.00	$ 7,789.60	
1.1.072	7/12/2021	30384442-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	27.62	Tonnes	$ 280.00	$ 7,733.60	
1.1.073	7/12/2021	30384539-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.48	Tonnes	$ 280.00	$ 7,974.40	
1.1.074	7/12/2021	30384622-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	33.98	Tonnes	$ 280.00	$ 9,514.40	

1.1.075	7/12/2021	30384799-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.14	Tonnes	$ 280.00	$ 7,879.20	
TOTALS				2147.92			$ 601,417.60	

PROGRESS CLAIM SUMMARY

Contract Name:	Bowline - Asbsoils	**Date of application:**	15/12/21
Site Location:	10 Dangar Street Wickham NSW	**Application Number:**	2
Contact:	David Goldman	**Dates Works Valued:**	8/12/21 - 15/12/2021
Contract No:		**Date of Payment:**	
Drumderg Services Job No:	145	**Prepared By:**	Daniel Restrepo

SUMMARY

ITEM	DESCRIPTION	WHEN COMPLETE	PROGRESS	CLAIMED TO DATE	CURRENT CLAIM (EXC. GST)	COMMENTS
	ASBSOILS					
1.1	ASBSOILS **6/12 - 7/12**	$ 601,417.60	100%	$ 601,417.60	**$ -**	
1.2	ASBSOILS 8**/12 - 15/12**	$ 1,266,445.60	100%	$ -	**$ 1,266,445.60**	
2.1	CONCRETE PROCESSING, CART & DISPOSE	$ 47,549.00	100%	$ -	**$ 47,549.00**	

TOTAL CLAIMED (EXC. GST)	**$ 1,313,994.60**

DETAILED BREAKDOWN

ITEM No	DATE	DOCKET No	DESCRIPTION	QTY	UNIT	RATE	TOTAL	COMMENT
			ASBSOILS					
1.2.001	8/12/21	30384933-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	24.86	Tonnes	$ 280.00	$ 6,960.80	
1.2.002	8/12/21	30385002-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	27.12	Tonnes	$ 280.00	$ 7,593.60	
1.2.003	8/12/21	30385110-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	31.34	Tonnes	$ 280.00	$ 8,775.20	
1.2.004	8/12/21	30385191-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.26	Tonnes	$ 280.00	$ 7,912.80	
1.2.005	8/12/21	30385272-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	26.84	Tonnes	$ 280.00	$ 7,515.20	
1.2.006	8/12/21	30385374-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	27.78	Tonnes	$ 280.00	$ 7,778.40	
1.2.007	8/12/21	30384982-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.36	Tonnes	$ 280.00	$ 7,940.80	
1.2.008	8/12/21	30385060-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.36	Tonnes	$ 280.00	$ 8,220.80	
1.2.009	8/12/21	30385133-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	33.40	Tonnes	$ 280.00	$ 9,352.00	
1.2.010	8/12/21	30385253-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	32.08	Tonnes	$ 280.00	$ 8,982.40	
1.2.011	8/12/21	30385354-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.08	Tonnes	$ 280.00	$ 7,862.40	
1.2.012	8/12/21	30384940-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.42	Tonnes	$ 280.00	$ 7,957.60	
1.2.013	8/12/21	30385012-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.80	Tonnes	$ 280.00	$ 8,624.00	
1.2.014	8/12/21	30385099-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.02	Tonnes	$ 280.00	$ 7,845.60	
1.2.015	8/12/21	30385180-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	34.56	Tonnes	$ 280.00	$ 9,676.80	
1.2.016	8/12/21	30385280-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.58	Tonnes	$ 280.00	$ 8,282.40	
1.2.017	8/12/21	30385365-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.08	Tonnes	$ 280.00	$ 8,422.40	
1.2.018	8/12/21	30384929-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.76	Tonnes	$ 280.00	$ 8,612.80	
1.2.019	8/12/21	30384999-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	32.16	Tonnes	$ 280.00	$ 9,004.80	
1.2.020	8/12/21	30385102-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	34.70	Tonnes	$ 280.00	$ 9,716.00	
1.2.021	8/12/21	30385189-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.56	Tonnes	$ 280.00	$ 8,556.80	
1.2.022	8/12/21	30385271-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	34.50	Tonnes	$ 280.00	$ 9,660.00	
1.2.023	8/12/21	30385373-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.48	Tonnes	$ 280.00	$ 8,254.40	
1.2.024	8/12/21	30384978-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.68	Tonnes	$ 280.00	$ 8,030.40	
1.2.025	8/12/21	30385136-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.34	Tonnes	$ 280.00	$ 8,215.20	
1.2.026	8/12/21	30385263-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.30	Tonnes	$ 280.00	$ 7,924.00	
1.2.027	8/12/21	30385361-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.46	Tonnes	$ 280.00	$ 8,248.80	
1.2.028	8/12/21	30384966-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	25.30	Tonnes	$ 280.00	$ 7,084.00	
1.2.029	8/12/21	30385052-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.32	Tonnes	$ 280.00	$ 8,489.60	

1.2.030	8/12/21	30385141-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.76	Tonnes	$ 280.00	$ 8,052.80	
1.2.031	8/12/21	30385224-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.14	Tonnes	$ 280.00	$ 8,439.20	
1.2.032	8/12/21	30385337-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.92	Tonnes	$ 280.00	$ 8,377.60	
1.2.033	8/12/21	30384943-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.40	Tonnes	$ 280.00	$ 7,952.00	
1.2.034	8/12/21	30385020-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	31.00	Tonnes	$ 280.00	$ 8,680.00	
1.2.035	8/12/21	30385114-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.96	Tonnes	$ 280.00	$ 8,388.80	
1.2.036	8/12/21	30385204-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.96	Tonnes	$ 280.00	$ 8,668.80	
1.2.037	8/12/21	30385285-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	32.28	Tonnes	$ 280.00	$ 9,038.40	
1.2.038	8/12/21	30385379-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.56	Tonnes	$ 280.00	$ 8,556.80	
1.2.039	8/12/21	30384969-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	26.42	Tonnes	$ 280.00	$ 7,397.60	
1.2.040	8/12/21	30385057-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.12	Tonnes	$ 280.00	$ 8,153.60	
1.2.041	8/12/21	30385145-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	31.78	Tonnes	$ 280.00	$ 8,898.40	
1.2.042	8/12/21	30385227-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.32	Tonnes	$ 280.00	$ 8,489.60	
1.2.043	8/12/21	30385295-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	27.86	Tonnes	$ 280.00	$ 7,800.80	
1.2.044	8/12/21	30385383-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	31.00	Tonnes	$ 280.00	$ 8,680.00	
1.2.045	8/12/21	30384944-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	27.34	Tonnes	$ 280.00	$ 7,655.20	
1.2.046	8/12/21	30385024-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	33.04	Tonnes	$ 280.00	$ 9,251.20	
1.2.047	8/12/21	30385115-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.44	Tonnes	$ 280.00	$ 8,243.20	
1.2.048	8/12/21	30385205-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.74	Tonnes	$ 280.00	$ 8,607.20	
1.2.049	8/12/21	30385286-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	27.28	Tonnes	$ 280.00	$ 7,638.40	
1.2.050	8/12/21	30385381-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	32.56	Tonnes	$ 280.00	$ 9,116.80	
1.2.051	8/12/21	30385033-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.46	Tonnes	$ 280.00	$ 8,248.80	
1.2.052	8/12/21	30385124-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.58	Tonnes	$ 280.00	$ 8,562.40	
1.2.053	8/12/21	30385245-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	26.94	Tonnes	$ 280.00	$ 7,543.20	
1.2.054	8/12/21	30385345-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.90	Tonnes	$ 280.00	$ 8,372.00	
1.2.055	8/12/21	30384957-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	27.12	Tonnes	$ 280.00	$ 7,593.60	
1.2.056	8/12/21	30385038-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.92	Tonnes	$ 280.00	$ 8,377.60	
1.2.057	8/12/21	30385125-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.88	Tonnes	$ 280.00	$ 8,646.40	
1.2.058	8/12/21	30385237-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	32.08	Tonnes	$ 280.00	$ 8,982.40	
1.2.059	8/12/21	30385329-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	36.30	Tonnes	$ 280.00	$ 10,164.00	
1.2.060	8/12/21	30384974-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	27.32	Tonnes	$ 280.00	$ 7,649.60	
1.2.061	8/12/21	30385062-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.88	Tonnes	$ 280.00	$ 8,366.40	
1.2.062	8/12/21	30385147-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	32.28	Tonnes	$ 280.00	$ 9,038.40	
1.2.063	8/12/21	30385255-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	31.56	Tonnes	$ 280.00	$ 8,836.80	
1.2.064	8/12/21	30385356-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	39.12	Tonnes	$ 280.00	$ 10,953.60	
1.2.065	8/12/21	30384967-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.18	Tonnes	$ 280.00	$ 8,170.40	
1.2.066	8/12/21	30385053-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	27.04	Tonnes	$ 280.00	$ 7,571.20	
1.2.067	8/12/21	30385142-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	23.60	Tonnes	$ 280.00	$ 6,608.00	
1.2.068	8/12/21	30385225-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	24.24	Tonnes	$ 280.00	$ 6,787.20	
1.2.069	8/12/21	30385339-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	33.60	Tonnes	$ 280.00	$ 9,408.00	
1.2.070	9/12/21	30385479-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	32.30	Tonnes	$ 280.00	$ 9,044.00	
1.2.071	9/12/21	30385469-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.46	Tonnes	$ 280.00	$ 8,248.80	
1.2.072	9/12/21	30385473-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	37.14	Tonnes	$ 280.00	$ 10,399.20	
1.2.073	9/12/21	30385449-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	34.74	Tonnes	$ 280.00	$ 9,727.20	
1.2.074	9/12/21	30385483-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	24.68	Tonnes	$ 280.00	$ 6,910.40	
1.2.075	9/12/21	30385436-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	31.84	Tonnes	$ 280.00	$ 8,915.20	
1.2.076	9/12/21	30385489-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.00	Tonnes	$ 280.00	$ 8,120.00	
1.2.077	13/12/21	30387268-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.00	Tonnes	$ 280.00	$ 8,400.00	
1.2.078	13/12/21	30387369-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	37.94	Tonnes	$ 280.00	$ 10,623.20	
1.2.079	13/12/21	30387459-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	39.24	Tonnes	$ 280.00	$ 10,987.20	
1.2.080	13/12/21	30387563-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	26.04	Tonnes	$ 280.00	$ 7,291.20	
1.2.081	13/12/21	30387662-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	31.96	Tonnes	$ 280.00	$ 8,948.80	
1.2.082	13/12/21	30387248-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	35.76	Tonnes	$ 280.00	$ 10,012.80	
1.2.083	13/12/21	30387323-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	33.52	Tonnes	$ 280.00	$ 9,385.60	
1.2.084	13/12/21	30387414-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	34.74	Tonnes	$ 280.00	$ 9,727.20	
1.2.085	13/12/21	30387493-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.10	Tonnes	$ 280.00	$ 7,868.00	

1.2.086	13/12/21	30387616-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	35.80	Tonnes	$ 280.00	$ 10,024.00	
1.2.087	13/12/21	30387708-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	31.90	Tonnes	$ 280.00	$ 8,932.00	
1.2.088	13/12/21	30387280-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	27.56	Tonnes	$ 280.00	$ 7,716.80	
1.2.089	13/12/21	30387376-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.20	Tonnes	$ 280.00	$ 8,456.00	
1.2.090	13/12/21	30387476-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	33.56	Tonnes	$ 280.00	$ 9,396.80	
1.2.091	13/12/21	30387589-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.64	Tonnes	$ 280.00	$ 8,299.20	
1.2.092	13/12/21	30387682-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.88	Tonnes	$ 280.00	$ 8,086.40	
1.2.093	13/12/21	30387264-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	31.72	Tonnes	$ 280.00	$ 8,881.60	
1.2.094	13/12/21	30387360-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	31.56	Tonnes	$ 280.00	$ 8,836.80	
1.2.095	13/12/21	30387463-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	35.50	Tonnes	$ 280.00	$ 9,940.00	
1.2.096	13/12/21	30387572-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.00	Tonnes	$ 280.00	$ 7,840.00	
1.2.097	13/12/21	30387676-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.20	Tonnes	$ 280.00	$ 8,456.00	
1.2.098	13/12/21	30387255-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	25.92	Tonnes	$ 280.00	$ 7,257.60	
1.2.099	13/12/21	30387332-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	31.02	Tonnes	$ 280.00	$ 8,685.60	
1.2.100	13/12/21	30387424-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.26	Tonnes	$ 280.00	$ 7,912.80	
1.2.101	13/12/21	30387510-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	25.64	Tonnes	$ 280.00	$ 7,179.20	
1.2.102	13/12/21	30387609-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.50	Tonnes	$ 280.00	$ 7,980.00	
1.2.103	13/12/21	30387688-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	31.78	Tonnes	$ 280.00	$ 8,898.40	
1.2.104	13/12/21	30387250-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.66	Tonnes	$ 280.00	$ 8,584.80	
1.2.105	13/12/21	30387326-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.66	Tonnes	$ 280.00	$ 8,304.80	
1.2.106	13/12/21	30387419-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	33.04	Tonnes	$ 280.00	$ 9,251.20	
1.2.107	13/12/21	30387505-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.62	Tonnes	$ 280.00	$ 8,013.60	
1.2.108	13/12/21	30387621-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	32.16	Tonnes	$ 280.00	$ 9,004.80	
1.2.109	13/12/21	30387704-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	31.80	Tonnes	$ 280.00	$ 8,904.00	
1.2.110	14/12/21	30387773-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	32.40	Tonnes	$ 280.00	$ 9,072.00	
1.2.111	14/12/21	30387866-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	32.34	Tonnes	$ 280.00	$ 9,055.20	
1.2.112	14/12/21	30387939-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	26.12	Tonnes	$ 280.00	$ 7,313.60	
1.2.113	14/12/21	30388029-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	26.98	Tonnes	$ 280.00	$ 7,554.40	
1.2.114	14/12/21	30388137-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	33.36	Tonnes	$ 280.00	$ 9,340.80	
1.2.115	14/12/21	30388201-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.98	Tonnes	$ 280.00	$ 8,394.40	
1.2.116	14/12/21	30387778-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	33.56	Tonnes	$ 280.00	$ 9,396.80	
1.2.117	14/12/21	30387854-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	33.04	Tonnes	$ 280.00	$ 9,251.20	
1.2.118	14/12/21	30387930-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.60	Tonnes	$ 280.00	$ 8,568.00	
1.2.119	14/12/21	30388006-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	34.32	Tonnes	$ 280.00	$ 9,609.60	
1.2.120	14/12/21	30388098-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.46	Tonnes	$ 280.00	$ 7,968.80	
1.2.121	14/12/21	30388181-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	34.60	Tonnes	$ 280.00	$ 9,688.00	
1.2.122	14/12/21	30387871-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	27.84	Tonnes	$ 280.00	$ 7,795.20	
1.2.123	14/12/21	30387958-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.56	Tonnes	$ 280.00	$ 7,996.80	
1.2.124	14/12/21	30388047-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	23.92	Tonnes	$ 280.00	$ 6,697.60	
1.2.125	14/12/21	30388115-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.08	Tonnes	$ 280.00	$ 7,862.40	
1.2.126	14/12/21	30387807-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	27.62	Tonnes	$ 280.00	$ 7,733.60	
1.2.127	14/12/21	30387915-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.24	Tonnes	$ 280.00	$ 8,467.20	
1.2.128	14/12/21	30387984-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.38	Tonnes	$ 280.00	$ 8,226.40	
1.2.129	14/12/21	30388102-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.18	Tonnes	$ 280.00	$ 8,170.40	
1.2.130	14/12/21	30388190-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.48	Tonnes	$ 280.00	$ 7,974.40	
1.2.131	14/12/21	30387770-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	27.80	Tonnes	$ 280.00	$ 7,784.00	
1.2.132	14/12/21	30387839-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	29.68	Tonnes	$ 280.00	$ 8,310.40	
1.2.133	14/12/21	30387917-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.24	Tonnes	$ 280.00	$ 8,467.20	
1.2.134	14/12/21	30387989-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	25.24	Tonnes	$ 280.00	$ 7,067.20	
1.2.135	14/12/21	30388075-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	28.10	Tonnes	$ 280.00	$ 7,868.00	
1.2.136	14/12/21	30388157-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	26.86	Tonnes	$ 280.00	$ 7,520.80	
1.2.137	15/12/21	30388262-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	21.82	Tonnes	$ 280.00	$ 6,109.60	
1.2.138	15/12/21	30388333-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	27.48	Tonnes	$ 280.00	$ 7,694.40	
1.2.139	15/12/21	30388401-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.88	Tonnes	$ 280.00	$ 8,646.40	
1.2.140	15/12/21	30388480-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	26.02	Tonnes	$ 280.00	$ 7,285.60	
1.2.141	15/12/21	30388571-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	34.44	Tonnes	$ 280.00	$ 9,643.20	

1.2.142	15/12/21	30388342-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	20.90	Tonnes	$ 280.00	$ 5,852.00	
1.2.143	15/12/21	30388434-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	30.88	Tonnes	$ 280.00	$ 8,646.40	
1.2.144	15/12/21	30388501-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	26.38	Tonnes	$ 280.00	$ 7,386.40	
1.2.145	15/12/21	30388589-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	16.68	Tonnes	$ 280.00	$ 4,670.40	
1.2.146	15/12/21	30388255-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	18.16	Tonnes	$ 280.00	$ 5,084.80	
1.2.147	15/12/21	30388328-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	20.90	Tonnes	$ 280.00	$ 5,852.00	
1.2.148	15/12/21	30388393-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	22.44	Tonnes	$ 280.00	$ 6,283.20	
1.2.149	15/12/21	30388268-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	21.16	Tonnes	$ 280.00	$ 5,924.80	
1.2.150	15/12/21	30388353-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	19.56	Tonnes	$ 280.00	$ 5,476.80	
1.2.151	15/12/21	30388417-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	25.54	Tonnes	$ 280.00	$ 7,151.20	
1.2.152	15/12/21	30388495-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	25.74	Tonnes	$ 280.00	$ 7,207.20	
1.2.153	15/12/21	30388585-SH	EXCAVATE, HYGIENIST, LOAD, HAUL & DISPOSE	26.64	Tonnes	$ 280.00	$ 7,459.20	
TOTALS				**4523.02**			**$ 1,266,445.60**	

CONCRETE PROCESSING, CART & DISPOSE								
2.1.001	9/12/21	M143129	CONCRETE - CART & DISPOSE	26.40	Tonnes	$ 55.00	$ 1,452.00	
2.1.002	9/12/21	M143151	CONCRETE - CART & DISPOSE	29.30	Tonnes	$ 55.00	$ 1,611.50	
2.1.003	9/12/21	M143113	CONCRETE - CART & DISPOSE	25.18	Tonnes	$ 55.00	$ 1,384.90	
2.1.004	9/12/21	M143140	CONCRETE - CART & DISPOSE	27.24	Tonnes	$ 55.00	$ 1,498.20	
2.1.005	9/12/21	M143137	CONCRETE - CART & DISPOSE	37.74	Tonnes	$ 55.00	$ 2,075.70	
2.1.006	9/12/21	M143131	CONCRETE - CART & DISPOSE	33.02	Tonnes	$ 55.00	$ 1,816.10	
2.1.007	9/12/21	M143122	CONCRETE - CART & DISPOSE	30.56	Tonnes	$ 55.00	$ 1,680.80	
2.1.008	9/12/21	M143121	CONCRETE - CART & DISPOSE	29.74	Tonnes	$ 55.00	$ 1,635.70	
2.1.009	9/12/21	M143132	CONCRETE - CART & DISPOSE	26.54	Tonnes	$ 55.00	$ 1,459.70	
2.1.010	9/12/21	M143124	CONCRETE - CART & DISPOSE	25.38	Tonnes	$ 55.00	$ 1,395.90	
2.1.011	10/12/21	M143240	CONCRETE - CART & DISPOSE	20.16	Tonnes	$ 55.00	$ 1,108.80	
2.1.012	10/12/21	M143170	CONCRETE - CART & DISPOSE	29.82	Tonnes	$ 55.00	$ 1,640.10	
2.1.013	10/12/21	M143180	CONCRETE - CART & DISPOSE	31.78	Tonnes	$ 55.00	$ 1,747.90	
2.1.014	10/12/21	M143187	CONCRETE - CART & DISPOSE	29.10	Tonnes	$ 55.00	$ 1,600.50	
2.1.015	10/12/21	M143199	CONCRETE - CART & DISPOSE	30.00	Tonnes	$ 55.00	$ 1,650.00	
2.1.016	10/12/21	M143211	CONCRETE - CART & DISPOSE	28.96	Tonnes	$ 55.00	$ 1,592.80	
2.1.017	10/12/21	M143210	CONCRETE - CART & DISPOSE	27.72	Tonnes	$ 55.00	$ 1,524.60	
2.1.018	10/12/21	M143220	CONCRETE - CART & DISPOSE	31.38	Tonnes	$ 55.00	$ 1,725.90	
2.1.019	10/12/21	M143225	CONCRETE - CART & DISPOSE	21.24	Tonnes	$ 55.00	$ 1,168.20	
2.1.020	10/12/21	M143246	CONCRETE - CART & DISPOSE	27.20	Tonnes	$ 55.00	$ 1,496.00	
2.1.021	13/12/21	M143381	CONCRETE - CART & DISPOSE	24.48	Tonnes	$ 55.00	$ 1,346.40	
2.1.022	14/12/21	M143422	CONCRETE - CART & DISPOSE	21.86	Tonnes	$ 55.00	$ 1,202.30	
2.1.023	9/12/21	15406	50 TONNE EXCAVATOR	11.00	Hrs	$ 200.00	$ 2,200.00	
2.1.024			50T - HAMMER ATTACHMENT	11.00	Hrs	$ 135.00	$ 1,485.00	
2.1.025			50T - PULVERISER ATTACHMENT	11.00	Hrs	$ 70.00	$ 770.00	
2.1.026	9/12/21	15408	23 TONNE EXCAVATOR	11.00	Hrs	$ 145.00	$ 1,595.00	
2.1.027			23T - HAMMER ATTACHMENT	11.00	Hrs	$ 80.00	$ 880.00	
2.1.028			23T - PULVERISER ATTACHMENT	11.00	Hrs	$ 40.00	$ 440.00	
2.1.029	10/12/21	15407	50 TONNE EXCAVATOR	9.50	Hrs	$ 200.00	$ 1,900.00	
2.1.030			50T - HAMMER ATTACHMENT	9.50	Hrs	$ 135.00	$ 1,282.50	
2.1.031			50T - PULVERISER ATTACHMENT	9.50	Hrs	$ 70.00	$ 665.00	
2.1.032	10/12/21	15409	23 TONNE EXCAVATOR	9.50	Hrs	$ 145.00	$ 1,377.50	
2.1.033			23T - HAMMER ATTACHMENT	9.50	Hrs	$ 80.00	$ 760.00	
2.1.034			23T - PULVERISER ATTACHMENT	9.50	Hrs	$ 40.00	$ 380.00	
TOTALS							**$ 47,549.00**	

Customer Transactions Paged - Full details by category

Client Name: Enviropacific Services Pty Ltd

Client Account Number: 200198

Date/Time In	Date/Time Out	Docket	Rego/Fleet	Product	Order Number	Gross	Tare	Net
21/03/2022 7:39 AM	21/03/2022 7:54 AM	30427814-SH.2	FCT600	Asbsoil	10 DANGAR ST WICKHAM	23.38	11.08	12.30
21/03/2022 7:49 AM	21/03/2022 8:01 AM	30427826-SH.2	DIMECH	Asbsoil	10 DANGAR ST WICKHAM	22.84	11.68	11.16
21/03/2022 7:38 AM	21/03/2022 7:53 AM	30427812-SH.2	XN68MJ	Asbsoil	10 DANGAR ST WICKHAM	23.06	10.28	12.78
21/03/2022 7:55 AM	21/03/2022 8:12 AM	30427830-SH.2	XO21AF	Asbsoil	10 DANGAR ST WICKHAM	21.24	9.94	11.30
21/03/2022 9:24 AM	21/03/2022 9:38 AM	30427910-SH.2	XO21AF	Asbsoil	10 DANGAR ST WICKHAM	21.76	9.92	11.84
21/03/2022 10:41 AM	21/03/2022 10:55 AM	30427977-SH.2	XO21AF	Asbsoil	10 DANGAR ST WICKHAM	22.74	9.9	12.84
21/03/2022 12:03 PM	21/03/2022 12:17 PM	30428064-SH.2	XO21AF	Asbsoil	10 DANGAR ST WICKHAM	22.94	9.88	13.06
21/03/2022 1:21 PM	21/03/2022 1:35 PM	30428153-SH.2	XO21AF	Asbsoil	10 DANGAR ST WICKHAM	22.44	9.88	12.56
21/03/2022 2:36 PM	21/03/2022 2:53 PM	30428240-SH.2	XO21AF	Asbsoil	10 DANGAR ST WICKHAM	23.00	9.86	13.14
21/03/2022 8:05 AM	21/03/2022 8:18 AM	30427839-SH	XO82BP	Asbsoil	10 DANGAR ST WICKHAM	18.62	9.48	9.14
21/03/2022 9:01 AM	21/03/2022 9:17 AM	30427882-SH	FCT600	Asbsoil	10 DANGAR ST WICKHAM	23.96	11.08	12.88
21/03/2022 9:15 AM	21/03/2022 9:31 AM	30427898-SH	XN68MJ	Asbsoil	10 DANGAR ST WICKHAM	24.54	10.26	14.28
21/03/2022 9:18 AM	21/03/2022 9:34 AM	30427902-SH	DIMECH	Asbsoil	10 DANGAR ST WICKHAM	23.56	11.64	11.92
21/03/2022 9:27 AM	21/03/2022 9:46 AM	30427914-SH	XO82BP	Asbsoil	10 DANGAR ST WICKHAM	21.44	9.44	12.00
21/03/2022 10:15 AM	21/03/2022 10:27 AM	30427958-SH	FCT600	Asbsoil	10 DANGAR ST WICKHAM	24.16	11.04	13.12
21/03/2022 10:30 AM	21/03/2022 10:46 AM	30427968-SH	XN68MJ	Asbsoil	10 DANGAR ST WICKHAM	23.68	10.24	13.44
21/03/2022 10:35 AM	21/03/2022 10:50 AM	30427972-SH	DIMECH	Asbsoil	10 DANGAR ST WICKHAM	24.18	11.62	12.56
21/03/2022 10:50 AM	21/03/2022 11:01 AM	30427985-SH	XO82BP	Asbsoil	10 DANGAR ST WICKHAM	21.02	9.44	11.58
21/03/2022 11:23 AM	21/03/2022 11:37 AM	30428021-SH	FCT600	Asbsoil	10 DANGAR ST WICKHAM	25.32	11.08	14.24

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Generated 22/03/22 8:34:23 AM

[ClientID] IN ('Enviropacific Services Pty Ltd')

Report generated by

21/03/2022 11:50 AM	21/03/2022 12:03 PM	30428048-SH	DIMECH	Asbsoil	10 DANGAR ST WICKHAM	23.50	11.62	11.88
21/03/2022 12:13 PM	21/03/2022 12:25 PM	30428073-SH	XO82BP	Asbsoil	10 DANGAR ST WICKHAM	21.40	9.42	11.98
21/03/2022 12:33 PM	21/03/2022 12:48 PM	30428096-SH	XN79ZS	Asbsoil	10 DANGAR ST WICKHAM	35.42	12.72	22.70
21/03/2022 12:37 PM	21/03/2022 12:50 PM	30428102-SH	FCT600	Asbsoil	10 DANGAR ST WICKHAM	25.86	11.02	14.84
21/03/2022 1:02 PM	21/03/2022 1:14 PM	30428135-SH	DIMECH	Asbsoil	10 DANGAR ST WICKHAM	26.88	11.58	15.30
21/03/2022 1:24 PM	21/03/2022 1:43 PM	30428157-SH	XO82BP	Asbsoil	10 DANGAR ST WICKHAM	22.02	9.4	12.62
21/03/2022 1:51 PM	21/03/2022 2:05 PM	30428189-SH	FCT600	Asbsoil	10 DANGAR ST WICKHAM	27.34	11.14	16.20
21/03/2022 1:58 PM	21/03/2022 2:21 PM	30428198-SH	XN79ZS	Asbsoil	10 DANGAR ST WICKHAM	37.20	12.72	24.48
21/03/2022 2:16 PM	21/03/2022 2:29 PM	30428217-SH	DIMECH	Asbsoil	10 DANGAR ST WICKHAM	24.34	11.58	12.76
21/03/2022 2:57 PM	21/03/2022 3:09 PM	30428262-SH	XO82BP	Asbsoil	10 DANGAR ST WICKHAM	22.48	9.64	12.84
21/03/2022 3:05 PM	21/03/2022 3:25 PM	30428270-SH	FCT600	Asbsoil	10 DANGAR ST WICKHAM	26.66	11.04	15.62
21/03/2022 3:27 PM	21/03/2022 3:42 PM	30428286-SH	XN79ZS	Asbsoil	10 DANGAR ST WICKHAM	38.18	12.7	25.48
21/03/2022 3:29 PM	21/03/2022 3:44 PM	30428289-SH	DIMECH	Asbsoil	10 DANGAR ST WICKHAM	25.30	11.58	13.72
Client Account Number: 200198	21/03/2022 7:54 AM	32			10 DANGAR ST WICKHAM	790.46	343.9	446.56
Client Name: Enviropacific Services Ptv Ltd	21/03/2022 7:54 AM	32			10 DANGAR ST WICKHAM	790.46	343.9	446.56
	21/03/2022 7:54 AM	32			10 DANGAR ST WICKHAM	790.46	343.9	446.56

Customer Transactions Paged - Full details by category

Mandalay

Client Name: Enviropacific Services Pty Ltd

Client Account Number: 200198

Date/Time In	Date/Time Out	Docket	Rego/Fleet	Product	Order Number	Gross	Tare	Net
22/03/2022 7:35 AM	22/03/2022 7:52 AM	30428331-SH	FCT600	Asbsoil	10 DANGAR ST WICKHAM	27.24	11	16.24
22/03/2022 7:41 AM	22/03/2022 7:57 AM	30428338-SH	XN79ZS	Asbsoil	10 DANGAR ST WICKHAM	35.98	12.66	23.32
22/03/2022 7:55 AM	22/03/2022 8:09 AM	30428355-SH	DIMECH	Asbsoil	10 DANGAR ST WICKHAM	24.96	11.96	13.00
22/03/2022 8:57 AM	22/03/2022 9:14 AM	30428398-SH	FCT600	Asbsoil	10 DANGAR ST WICKHAM	26.48	11.02	15.46
22/03/2022 9:08 AM	22/03/2022 9:26 AM	30428409-SH	XN79ZS	Asbsoil	10 DANGAR ST WICKHAM	35.52	12.64	22.88
22/03/2022 10:20 AM	22/03/2022 10:38 AM	30428469-SH	FCT600	Asbsoil	10 DANGAR ST WICKHAM	26.94	10.98	15.96
22/03/2022 10:40 AM	22/03/2022 10:58 AM	30428489-SH	XN79ZS	Asbsoil	10 DANGAR ST WICKHAM	36.38	12.6	23.78
22/03/2022 11:34 AM	22/03/2022 11:47 AM	30428535-SH	DIMECH	Asbsoil	10 DANGAR ST WICKHAM	26.40	11.92	14.48
22/03/2022 11:41 AM	22/03/2022 11:57 AM	30428544-SH	FCT600	Asbsoil	10 DANGAR ST WICKHAM	26.12	10.98	15.14
22/03/2022 12:09 PM	22/03/2022 12:27 PM	30428576-SH	XN79ZS	Asbsoil	10 DANGAR ST WICKHAM	35.68	12.58	23.10
22/03/2022 12:51 PM	22/03/2022 1:05 PM	30428617-SH	DIMECH	SP WASTE Classified Soil	10 DANGAR ST WICKHAM	25.40	11.92	13.48
22/03/2022 1:09 PM	22/03/2022 1:24 PM	30428638-SH	FCT600	SP WASTE Classified Soil	10 DANGAR ST WICKHAM	26.04	11.12	14.92
22/03/2022 1:30 PM	22/03/2022 1:46 PM	30428660-SH	XN79ZS	SP WASTE Classified Soil	10 DANGAR ST WICKHAM	38.68	12.58	26.10
22/03/2022 2:09 PM	22/03/2022 2:23 PM	30428695-SH	DIMECH	SP WASTE Classified Soil	10 DANGAR ST WICKHAM	24.94	11.92	13.02
22/03/2022 2:36 PM	22/03/2022 2:52 PM	30428714-SH	FCT600	SP WASTE Classified Soil	10 DANGAR ST WICKHAM	24.78	11.12	13.66
22/03/2022 3:06 PM	22/03/2022 3:26 PM	30428739-SH	XN79ZS	SP WASTE Classified Soil	10 DANGAR ST WICKHAM	39.96	12.52	27.44
Client Account Number: 200198	22/03/2022 7:52 AM	16			10 DANGAR ST WICKHAM	481.50	189.52	291.98
Client Name: Enviropacific Services Pty Ltd	22/03/2022 7:52 AM	16			10 DANGAR ST WICKHAM	481.50	189.52	291.98
	22/03/2022 7:52 AM	16			10 DANGAR ST WICKHAM	481.50	189.52	291.98

[DateOut] (YESTERDAY)

[ClientID] IN ('Enviropacific Services Pty Ltd')

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Report generated by

Customer Transactions Paged - Full details by category

Client Name: Enviropacific Services Pty Ltd

Client Account Number: 200198

Date/Time In	Date/Time Out	Docket	Rego/Fleet	Product	Order Number	Gross	Tare	Net
22/03/2022 7:35 AM	22/03/2022 7:52 AM	30428331-SH	FCT600	Asbsoil	10 DANGAR ST WICKHAM	27.24	11	16.24
22/03/2022 7:41 AM	22/03/2022 7:57 AM	30428338-SH	XN79ZS	Asbsoil	10 DANGAR ST WICKHAM	35.98	12.66	23.32
22/03/2022 7:55 AM	22/03/2022 8:09 AM	30428355-SH	DIMECH	Asbsoil	10 DANGAR ST WICKHAM	24.96	11.96	13.00
22/03/2022 8:57 AM	22/03/2022 9:14 AM	30428398-SH	FCT600	Asbsoil	10 DANGAR ST WICKHAM	26.48	11.02	15.46
22/03/2022 9:08 AM	22/03/2022 9:26 AM	30428409-SH	XN79ZS	Asbsoil	10 DANGAR ST WICKHAM	35.52	12.64	22.88
22/03/2022 10:20 AM	22/03/2022 10:38 AM	30428469-SH	FCT600	Asbsoil	10 DANGAR ST WICKHAM	26.94	10.98	15.96
22/03/2022 10:40 AM	22/03/2022 10:58 AM	30428489-SH	XN79ZS	Asbsoil	10 DANGAR ST WICKHAM	36.38	12.6	23.78
22/03/2022 11:34 AM	22/03/2022 11:47 AM	30428535-SH	DIMECH	Asbsoil	10 DANGAR ST WICKHAM	26.40	11.92	14.48
22/03/2022 11:41 AM	22/03/2022 11:57 AM	30428544-SH	FCT600	Asbsoil	10 DANGAR ST WICKHAM	26.12	10.98	15.14
22/03/2022 12:51 PM	22/03/2022 1:05 PM	30428617-SH	DIMECH	SP WASTE Classified Soil	10 DANGAR ST WICKHAM	25.40	11.92	13.48
22/03/2022 1:09 PM	22/03/2022 1:24 PM	30428638-SH	FCT600	SP WASTE Classified Soil	10 DANGAR ST WICKHAM	26.04	11.12	14.92
22/03/2022 1:30 PM	22/03/2022 1:46 PM	30428660-SH	XN79ZS	SP WASTE Classified Soil	10 DANGAR ST WICKHAM	38.68	12.58	26.10
22/03/2022 2:09 PM	22/03/2022 2:23 PM	30428695-SH	DIMECH	SP WASTE Classified Soil	10 DANGAR ST WICKHAM	24.94	11.92	13.02
22/03/2022 2:36 PM	22/03/2022 2:52 PM	30428714-SH	FCT600	SP WASTE Classified Soil	10 DANGAR ST WICKHAM	24.78	11.12	13.66
22/03/2022 3:06 PM	22/03/2022 3:26 PM	30428739-SH	XN79ZS	SP WASTE Classified Soil	10 DANGAR ST WICKHAM	39.96	12.52	27.44
Client Account Number: 200198	22/03/2022 7:52 AM	16			10 DANGAR ST WICKHAM	481.50	189.52	291.98

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[ClientID] IN ('Enviropacific Services Pty Ltd')

Generated 23/03/22 7:13:02 AM

Report generated by

Client Name: Enviropacific Services Pty Ltd	22/03/2022 7:52 AM	16		10 DANGAR ST WICKHAM	481.50	189.52	291.98
	22/03/2022 7:52 AM	16		10 DANGAR ST WICKHAM	481.50	189.52	291.98

Customer Transactions Paged - Full details by

Date/Time In	Date/Time Out	Docket	Rego/Fleet	Product	Order Number	Gross	Tare	Net
Client Name: Enviropacific Services Pty Ltd								
Client Account Number: 200198								
23/03/2022 7:40 AM	23/03/2022 8:02 AM	30428810-SH	CP59QG	Asbestos	120KG - 349	2.28	2.14	0.14
23/03/2022 7:41 AM	23/03/2022 7:59 AM	30428812-SH	XN68MJ	Asbsoil	10 DANGAR ST WICKHAM	21.64	10.26	11.38
23/03/2022 9:37 AM	23/03/2022 9:51 AM	30428906-SH	XN68MJ	Asbsoil	10 DANGAR ST WICKHAM	24.46	10.54	13.92
Client Account Number: 200198	23/03/2022 8:02 AM	3			120KG - 349	48.38	22.94	25.44
Client Name: Enviropacific Services Ptv Ltd	23/03/2022 8:02 AM	3			120KG - 349	48.38	22.94	25.44
	23/03/2022 8:02 AM	3			120KG - 349	48.38	22.94	25.44

[DateOut] (YESTERDAY)

[ClientID] IN ('Enviropacific Services Pty Ltd')

Generated 24/03/22 7:10:08 AM

Report generated by

Customer Transactions Paged - Full details by category

Mandalay

Date/Time In	Date/Time Out	Docket	Rego/Fleet	Product	Order Number	Gross	Tare	Net
Client Name: Enviropacific Services Pty Ltd								
Client Account Number: 200198								
29/03/2022 7:43 AM	29/03/2022 8:11 AM	30431163-SH	FCT600	Asbsoil	10 DANGAR ST WICKHAM	21.52	10.98	10.54
29/03/2022 10:03 AM	29/03/2022 11:11 AM	30431261-SH	FCT600	Asbsoil	10 DANGAR ST WICKHAM	20.36	11	9.36
Client Account Number: 200198	29/03/2022 8:11 AM	2			10 DANGAR ST WICKHAM	41.88	21.98	19.90
Client Name: Enviropacific Services Pty Ltd	29/03/2022 8:11 AM	2			10 DANGAR ST WICKHAM	41.88	21.98	19.90
	29/03/2022 8:11 AM	2			10 DANGAR ST WICKHAM	41.88	21.98	19.90

[DateOut] (YESTERDAY)

[ClientID] IN ('Enviropacific Services Pty Ltd')

Generated 30/03/22 6:32:29 AM

Report generated by

OFFSITE LOADSHEET

ENVIROPACIFIC

DOC NO: Enter document number **SPONSOR:** Enter sponsor

Project Name: Bowline Wickham	Project No: 105123	**Material Type**
Date: 23/3/22	Materials Classification / Approvals obtained Yes ☑	VENM ☐ ENM ☐ Hazardous ☐
Day: WEDNESDAY		General Solid Waste ☑ Restricted Solid Waste ☐
Origen on site: BATTER MATERIAL	Disposal Location: SUMMER HILL	Asbestos ☑ Category/Type: BONDED / SOIL
		Other:

Truck Details				Load Time										Tonnage Estimate
No	Truck Rego	Est. Tonnage per load	Signed Truck Driver Induction Y/N?	1	2	3	4	5	6	7	8	9	10	
1.	XN 68 MJ	12	Y	7:05	8:35									
2.														
3.														
4.														
5.														
6.														
7.														
8.														
9.														
10.														
11.														
12.														
13.														
14.														
15.													Total	25.30 t

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OFFSITE LOADSHEET

ENVIROPACIFIC

DOC NO: Enter document number **SPONSOR:** Enter sponsor

Project Name: Bowline Wickham	Project No: 105123	**Material Type**
Date: 22/3/22	Materials Classification / Approvals obtained Yes ☑	VENM ☐ ENM ☐ Hazardous ☐
Day: TUESDAY		General Solid Waste ☑ Restricted Solid Waste ☐
Origen on site: BATTER MATERIAL	Disposal Location: SUMMER HILL	Asbestos ☑ Category/Type: BONDED/SOIL
		Other:

Truck Details				Load Time										Tonnage Estimate
No	Truck Rego	Est. Tonnage per load	Signed Truck Driver Induction Y/N?	1	2	3	4	5	6	7	8	9	10	
1.	FCT600	12	Y	7-00	8-25	9-43	11-05							
2.	XN79ZS	20	Y	7-05	8-30	10-05	11-30							
3.	DIMECH	12	Y	7-25	8-47									
4.														
5.														
6.														
7.						10 loads								
8.														
9.														
10.														
11.														
12.														
13.														
14.														
15.													Total	183.36 t

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OFFSITE LOADSHEET

ENVIROPACIFIC

DOC NO: Enter document number **SPONSOR:** Enter sponsor

Project Name: Bowline Wickham	Project No: 105123	**Material Type**
Date: 21/3/22	Materials Classification / Approvals obtained Yes ☑	VENM ☐ ENM ☐ Hazardous ☐
Day: MONDAY		General Solid Waste ☑ Restricted Solid Waste ☐
Origen on site: BATTER MATERIAL	Disposal Location: Summer Hill	Asbestos ☑ Category/Type: BONDED / SOIL
		Other:

Truck Details				Load Time										Tonnage Estimate
No	Truck Rego	Est. Tonnage per load	Signed Truck Driver Induction Y/N?	1	2	3	4	5	6	7	8	9	10	
1.	XN68MJ	12	Y	7-00	8-38	9-57								
2.	FCT600	12	Y	7-00	8-27	9-42	10-55	12-05	1-15	2-32				
3.	DIMECA	12	Y	7-18	8-43	10-05	11-17	12-30	1-40	3-00				
4.	XO21AF	12	Y	7-20	8-50	10-10	11-24	12-45	2-00					
5.	XO82BP	12	Y	7-30	8-57	10-16	11-30	12-50	2-08					
6.	XN79ZS	20	Y	12-00	1-30	2-50								
7.														
8.														
9.							32 loads							
10.														
11.														
12.														
13.														
14.														
15.													Total	446-56

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ENVIROPACIFIC

DOC NO: Enter document number **SPONSOR:** Enter sponsor

Project Name: Bowline Wickham	Project No: 105123	**Material Type**
Date: 29/3/22	Materials Classification / Approvals obtained Yes ☐	VENM ☐ ENM ☐ Hazardous ☐
Day: Tuesday		General Solid Waste ☑ Restricted Solid Waste ☐
Origin on site: Butler Material.	Disposal Location: Summer Hill	Asbestos ☑ Category/Type: Bonded/Soil
		Other:

Truck Details				Load Time										Tonnage Estimate
No	Truck Rego	Est. Tonnage per load	Signed Truck Driver Induction Y/N?	1	2	3	4	5	6	7	8	9	10	
1.	FCT 600	12	Y	7:00	8:50									
2.														
3.														
4.														
5.														
6.						2 loads								
7.														
8.														
9.														
10.														
11.														
12.														
13.														
14.														
15.													Total	19.90 t

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OFFSITE LOADSHEET

ENVIROPACIFIC

DOC NO: Enter document number **SPONSOR:** Enter sponsor

Project Name: Bowline Wickham	Project No: 105123	**Material Type**
Date: 22/3/22	Materials Classification / Approvals obtained Yes ☑	VENM ☐ ENM ☐ Hazardous ☐
Day: TUESDAY		General Solid Waste ☑ Restricted Solid Waste ☐
Origen on site: NORTH WESTERN CORNER OF SITE TANK EXCAVATION	Disposal Location: SUMMER HILL	Asbestos ☐ Category/Type:
		Other: HYDROCARBON IMPACTED SOIL

Truck Details				Load Time										Tonnage Estimate
No	Truck Rego	Est. Tonnage per load	Signed Truck Driver Induction Y/N?	1	2	3	4	5	6	7	8	9	10	
1.	DIMECH	12	Y	12-15	1-38									
2.	FCT 600	12	Y	12-35	2-00									
3.	XN7925	20	Y	12.55	2-15									
4.														
5.														
6.														
7.														
8.														
9.														
10.														
11.														
12.														
13.														
14.														
15.													Total	108.62

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Project 39961.08
23 November 2021
R.007.Rev0
PH:kd

Attention: David Goldman

Email: davidg@multipartproperty.com.au

Waste Classification
Proposed Apartment Development
10 Dangar Street, Wickham

1. Executive Summary

This report describes the methodology and results of a waste classification of soils undertaken by Douglas Partners Pty Ltd (DP) on in situ material located at 10 Dangar Street, Wickham (the site) (refer to Section 2 for further details). The results are summarised in the following Table 1.

Table 1: Summary of Waste Classification

Material Identification	Fill between former floor slab (removed) and underlying slab at approximately 1 m depth within the assessment area as shown in Drawing 1.
Approximate Volume	200m^3 approx, as shown on the attached Drawing 1. It is noted that volume approximations have been estimated to inform the sampling rationale. DP recommends that if accurate volumes and / or tonnages are required surveys and weighbridge measurements are undertaken.
Material Description	Fill: Silty sand – generally comprising brown/grey silty sand occasional concrete, tile, metal; underlain by Fill: Silty clay – generally comprising brown/dark brown/grey/dark grey silty clay, with gravel (rock/slag/ash), occasional brick, tile, timber, cobbles, plastic.
Classification	General Solid Waste (non-putrescible, SCC1) based on total and leachable concentrations.
Conditions Specific to this Classification	Refer to Section 8.

2. Introduction

This waste classification was commissioned by David Goldman of Multipart on behalf of Dangar Street Wickham Pty Ltd and was undertaken with reference to DP Proposal 39961.08.P.001.Rev0 dated 22 May 2020.

It is understood that the site at 10 Dangar Street, Wickham is proposed for bulk excavation to a level of RL-6.25 AHD to allow for the construction of a three-storey basement. All materials excavated are surplus to the development and require disposal off site. Previous site investigations included sampling and testing of accessible fill/soils prior to site demolition activities. The current assessment comprised supplementary sampling and testing of fill/soil identified between concrete slabs following the demolition of site structures (refer to Drawing 1 attached for the approximate investigation area).

3. Scope of Works

The scope of works was as follows:

- Brief review of previous reports / historical aerial photographs to assess the potential for historical sources of contamination;
- Review of geological and acid sulfate soil mapping;
- Inspection of the target area to estimate volume;
- Excavation of four test pits using an excavator to facilitate soil sampling;
- Collection of soil samples and dispatch to a NATA accredited laboratory for analysis for the identified contaminants of concern; and
- Preparation of this waste classification report.

4. Site Information

The results of a brief review of site information is presented in Table 2 below.

Table 2: Site Information

Item	Description
Site Description	At the time of conducting the field work (18 November 2021), demolition of the site was ongoing. Majority of the site was either exposed concrete slabs or exposed soils (see Figure 1 and Figure 2).
Site History	• A review of previous reports (DP 2018) indicated that the site was previously a car dealership and warehouse/distribution centre; • Upper fill soils previously identified on site comprised grey to dark grey sand fill including slag and ash materials and building rubble with some observations of fibro fragments (asbestos containing materials); • Natural underlying sand soils are also classified as acid sulfate soils; • Bonded asbestos and asbestos fines were identified in dark grey sand fill with building rubble; • Testing on dark grey sand fill outside the current investigation area indicated a waste classification of GSW (based on total and leachable contaminant concentration) containing asbestos (ie special waste – asbestos). The current assessment targeted fill/soils between the concrete slabs within the area shown on Drawing 1 attached. Previous testing has not been conducted on these materials. Previous investigation has also indicated the presence of abandoned underground fuel storage tank(s) on the northern property boundary (located approximately 20 m north-east of the current investigation area).
Geology and Soil Landscapes	Reference to the Newcastle Coalfield Regional Geology 1:100 000 Geological Series Sheet published by the Department of Mineral Resources indicates that the site is underlain by Quaternary aged alluvium which typically comprises gravel, sand, silt and clay.
Acid Sulfate Soils	Reference to the Newcastle Acid Sulfate Soil Risk Map indicates that the site has a high probability of occurrence of ASS between 1 m and 3 m below ground level.
Identified Potential Sources of Contamination	• Imported fill; • Previous buildings (potential hazardous materials such as asbestos); • Underground storage tanks (UST).

Figure 1: North-east corner of the site looking south-west across the current investigation area (18 November 2021).

Figure 2: Approximate investigation area (red), looking south (18 November 2021).

Surface conditions observed in the area of investigation generally comprised light grey fine to coarse sand (bedding sand/crusher dust) beneath former floor slab with occasional concrete fragments from recent concrete slab removal. There were no observations of gross contamination at the surface within the assessment area (i.e. no gross staining, odours or other anthropogenic inclusions).

5. Field Work Observations

The test pit logs are attached, which should be read in conjunction with the attached explanatory notes that define classification methods and terms used to describe the soils. Subsurface conditions are summarised in Table 3.

Table 3: Summary of Subsurface Conditions

Depth (m)		Stratum	Description
From	To		
Surface (0.0)	0.05 / 0.15	Fill	Generally comprising brown/grey silty sandy, occasional concrete, tile metal.
0.05/0.15	1.0[1]/1.1[1]	Fill	Generally comprising brown/dark brown/grey/dark grey, with gravel (rock/slag/ash), occasional brick, tile, timber, cobbles, plastic.

Notes to Table 3:
[1] Limit of investigation (refusal on underlying concrete slab)

Groundwater was not observed in any of the pits during the time that they remained open.

The results of PID screening indicated the general absence of gross volatile hydrocarbon impacts within the screened soil samples from the test pits (all less than 5 ppm).

Contaminant observations in the test pits were limited to the following:

- Occasional building rubble in fill (concrete, brick, tile, metal);
- Moderate hydrocarbon staining and odour (possibly aged hydrocarbon) at the base of fill in Pits 701 to 703, as described in the attached test pit logs.

6. Analytical and Sampling Rationale

Based on the site history, surface and field observations above, analysis was undertaken for the following:

- Laboratory analysis for the following contamination suite:
  - Heavy Metals: arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), mercury (Hg), nickel (Ni), zinc (Zn), lead (Pb), iron (Fe), manganese (Mn), beryllium (Be), boron (B), molybdenum (Mo) and selenium (Se);
  - Total recoverable hydrocarbons (TRH);
  - Benzene, toluene, ethyl-benzene and xylene (BTEX);
  - Polycyclic aromatic hydrocarbons (PAH);
  - Organochlorine pesticides (OCP);
  - Organophosphate pesticides (OPP);
  - Polychlorinated biphenyls (PCB);

- o PAH and metals in TCLP; and
- o Asbestos.

Table 4: Sampling Rationale

Assessment Area	Approximately 200 m^2 as shown on the attached Drawing 1.
Depth of Assessment	Approximately 1 m.
Number of Sampling Locations	Four, as shown on the attached Drawing 1.

It is noted that dimensions/volume approximations have been estimated to inform the sampling rationale. DP recommends that if accurate volumes and / or tonnages are required surveys and weighbridge measurements are undertaken.

The methodology for the soil sampling conducted is attached.

7. Waste Classification

Table 5 presents the results of the six step procedure outlined in NSW EPA (2014) for determining the type of waste and the waste classification. This process applies to the fill within the area of assessment as shown on Drawing 1 attached, and is specific to the fill between the two observed concrete slabs in the identified area.

Table 5: Six Step Classification Procedure

Step	Comments	Rationale
1. Is the waste special waste?	No	No asbestos-containing materials (ACM), clinical or related waste, or waste tyres were observed at the surface or in the test pits within the investigation area; Asbestos was not detected by the analytical laboratory in the samples tested. The fill materials observed within the investigation area were physically different to the grey/dark grey sandy fill found to contain ACM in the previous site investigations.
2. Is the waste liquid waste?	No	The fill comprised a soil matrix.
3. Is the waste "pre-classified"?	No	The fill is not pre-classified with reference to NSW EPA (2014).
4. Does the waste possess hazardous waste characteristics?	No	The fill was not observed to contain or considered at risk to contain explosives, gases, flammable solids, oxidising agents, organic peroxides, toxic substances, corrosive substances, coal tar, batteries, lead paint or dangerous goods containers.
5. Determining a wastes classification using chemical assessment	Conducted	Refer to Table A1 (attached).
6. Is the waste putrescible or non-putrescible?	Putrescible / Non-putrescible	The fill does not contain materials considered to be putrescible [a].

Note to Table 5:

a wastes that are generally not classified as putrescible include soils, timber, garden trimmings, agricultural, forest and crop materials, and natural fibrous organic and vegetative materials (NSW EPA, 2014).

The field and laboratory data quality assurance and quality control results for the samples have been reviewed and are considered to be acceptable. The laboratory certificate(s) is / are attached.

As shown in the attached Table A1, all contaminant concentrations were within the criteria for General Solid Waste (non-putrescible SCC1) as defined in NSW EPA (2014), considering both total and leachable concentrations.

Table 6: Waste Classification Summary

Item	Description
Based on the observations at the time of sampling and the reported analytical results, the fill described as:	brown and grey silty sand and silty clay fill with occasional inclusions (brick, concrete, metal, timber, tile)
Within the area and depth subject to classification as shown on Drawing 1 and defined in Table 1 above, is classified as:	General Solid Waste (non-putrescible – SCC1) based on total and leachable concentrations.

8. Conditions

If any materials are encountered that are different to those sampled and tested or exhibit signs of potential contamination (e.g: additional anthropogenic inclusions including potential asbestos containing materials, additional staining or odours) this waste classification does not apply and the advice of a qualified environmental consultant should be sought.

Both the receiving site and the site disposing of the material should satisfy the requirements of the receiving sites license before disposal of the material is undertaken. Note that appropriate prior arrangement with the receiving site/relevant authorities should be obtained prior to the disposal of any material off site. The receiving site should check to ensure that the material received matches the description provided in this report and contains no cross contamination. The handling, transport and disposal of the materials should be conducted in accordance with regulatory and statutory requirements. DP does not accept liability for the unlawful disposal of waste materials from any site. DP accepts no responsibility for the material tracking, loading, management, transport or disposal of waste from the site.

Care should be taken to minimise cross contamination between the previously identified contaminated soils (grey/dark grey sand fill with asbestos impacts) and the brown clay fill and crushed dust encountered in the current investigation area.

9. References

NSW EPA. (2014). Waste Classification Guidelines, Part 1: Classifying Waste. *NSW Environment Protection Authority.*

DP (2018), *Report on Detailed Site Investigation, Proposed Apartment Development, 10 Dangar Street Wickham*, prepared for Dangar Street Wickham Pty Ltd, Project 39961.02, Douglas Partners Pty Ltd.

10. Limitations

Douglas Partners (DP) has prepared this report for this project at 10 Dangar Street, Wickham in accordance with DP's proposal dated 22 May 2020 and acceptance received from David Goldman dated 15 June 2020. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use Dangar Street Wickham Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

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

The assessment of atypical safety hazards arising from this advice is restricted to the environmental components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

DP personnel are not licensed or accredited quantity surveyors. Any quantities quoted in this report are provided for general guidance only and should not be relied upon. The services of a licensed/accredited quantity surveyor should be engaged if reliable quantities are required.

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

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

The results provided in the report are indicative of the surface and subsurface conditions only at the specific sampling locations, and then only to the depths investigated and at the time the work was carried out. Surface and subsurface conditions can change as a result of human influences, and such changes may occur after DP's field testing has been completed. Furthermore, fill is by its nature heterogeneous and therefore some parts of the fill may not be represented by the visual and analytical results reported herein.

Asbestos has not been detected by observation or by laboratory analysis, either on the surface of the assessment area, or in fill materials at the test locations sampled and analysed. Building demolition materials, such as concrete, brick, tile and metal, were, however, located in below-ground filling, and these are considered as indicative of the possible presence of hazardous building materials (HBM), including asbestos.

Although the sampling plan adopted for this investigation is considered appropriate to achieve the stated project objectives (noting that NSW EPA (2014) does not specify a required sampling density), there are necessarily parts of the site that have not been sampled and analysed. This is either due to undetected variations in ground conditions or to budget constraints (as discussed above), or to parts of the site being inaccessible and not available for inspection/sampling. It is therefore considered possible that HBM, including asbestos, may be present in unobserved or untested parts of the site, between and beyond sampling locations, and hence no warranty can be given that asbestos is not present.

Part 5.6, Section 143 of The Protection of the Environment Operations Act 1997 states that it is an offence for waste to be transported to a place that cannot lawfully be used as a facility to accept that waste. It is the duty of the owner and transporter of the waste to ensure that the waste is disposed of appropriately. DP does not accept liability for the unlawful transport or disposal of materials from any site. DP accepts no responsibility for tracking, loading, management, transport or disposal of the materials from the site.

Please contact the undersigned if you have any questions on this matter.

Yours faithfully
Douglas Partners Pty Ltd

Reviewed by

Jason Lambert
Geotechnical Engineer

Chris Bozinovski
Principal

Attachments: Notes About This Report
Sampling Methods
Soil Descriptions
Symbols and Abbreviations
Drawing 1
Test Pit Logs 701 to 704
Sampling Methodology
Table A1 - Summary of Laboratory Results
NATA Laboratory Certificate(s) of Analysis, Chain of Custody Documentation and Sample Receipt Advice

About this Report

Douglas Partners

Introduction

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

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

Copyright

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

Borehole and Test Pit Logs

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

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

Groundwater

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

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

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

Reports

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

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

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

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

About this Report

Site Anomalies

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

Information for Contractual Purposes

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

Site Inspection

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

Sampling Methods

Douglas Partners

Sampling

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

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

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

Test Pits

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

Large Diameter Augers

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

Continuous Spiral Flight Augers

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

Non-core Rotary Drilling

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

Continuous Core Drilling

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

Standard Penetration Tests

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

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

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

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

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

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

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

Description and Classification Methods

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

Soil Types

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

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

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

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

Definitions of grading terms used are:

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

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

In fine grained soils (>35% fines)

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

In coarse grained soils (>65% coarse)
- with clays or silts

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

In coarse grained soils (>65% coarse)
- with coarser fraction

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

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

Soil Descriptions

Cohesive Soils

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

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

Cohesionless Soils

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

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

Soil Origin

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

- Residual soil - derived from in-situ weathering of the underlying rock;
- Extremely weathered material – formed from in-situ weathering of geological formations. Has soil strength but retains the structure or fabric of the parent rock;
- Alluvial soil – deposited by streams and rivers;
- Estuarine soil – deposited in coastal estuaries;
- Marine soil – deposited in a marine environment;
- Lacustrine soil – deposited in freshwater lakes;
- Aeolian soil – carried and deposited by wind;
- Colluvial soil – soil and rock debris transported down slopes by gravity;
- Topsoil – mantle of surface soil, often with high levels of organic material.
- Fill – any material which has been moved by man.

Moisture Condition – Coarse Grained Soils

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

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

Moisture Condition – Fine Grained Soils

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

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

Symbols & Abbreviations

Douglas Partners

Introduction

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

Drilling or Excavation Methods

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

Water

▷	Water seep
▽	Water level

Sampling and Testing

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

Description of Defects in Rock

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

Defect Type

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

Orientation

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

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

Coating or Infilling Term

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

Coating Descriptor

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

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

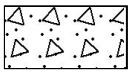
Symbols & Abbreviations

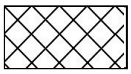
Graphic Symbols for Soil and Rock

General

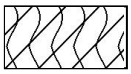
Asphalt

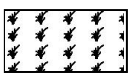
Road base

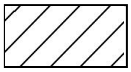

Concrete

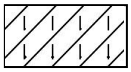

Filling

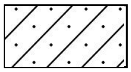
Soils


Topsoil

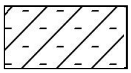

Peat

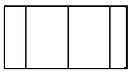

Clay

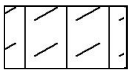

Silty clay

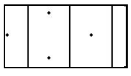

Sandy clay

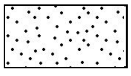
Gravelly clay

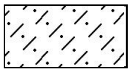

Shaly clay

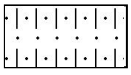

Silt


Clayey silt


Sandy silt

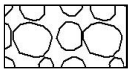

Sand

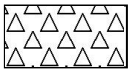

Clayey sand


Silty sand

Gravel

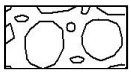
Sandy gravel


Cobbles, boulders

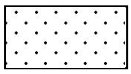

Talus

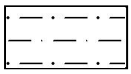
Sedimentary Rocks

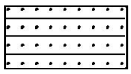
Boulder conglomerate

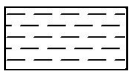

Conglomerate

Conglomeratic sandstone

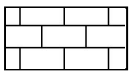

Sandstone


Siltstone

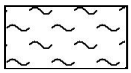

Laminite

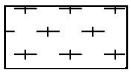

Mudstone, claystone, shale

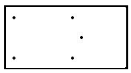
Coal


Limestone

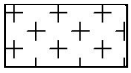
Metamorphic Rocks

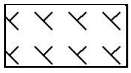

Slate, phyllite, schist

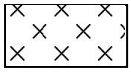

Gneiss

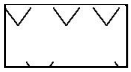

Quartzite

Igneous Rocks

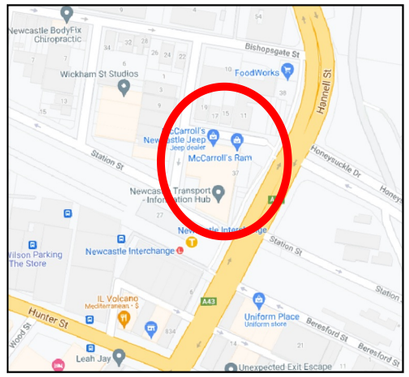

Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia

Porphyry



Site Location

Legend

- Lot
- Approximate Investigation Area
- Approximate Test Pit Location

Drawing adapted from Metromap Aerial dated 9 October 2021

0 10 20 30 m

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: Dangar Street Wickham Pty Ltd		
OFFICE: Newcastle	DRAWN BY: JCL	
SCALE: 1:500 @ A3	DATE: 19.November.2021	

TITLE: **Test Location Plan**
Waste Classification
10 Dangar Street, Wickham

PROJECT:	39961.08
DRAWING No	R.007.D.001
REVISION:	0

TEST PIT LOG

CLIENT: Dangar Street Wickham Pty Ltd
PROJECT: Proposed Apartment Development
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: --
EASTING:
NORTHING:

PIT No: 701
PROJECT No: 39961.08
DATE: 18/11/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
	0.05	FILL / SILTY SAND (SW) - Brown / grey, sand is fine to coarse grained, occasional concrete, tile, metal, moist		D	0.0	E	PID <1		
					0.05		PID <1		
		FILL / SILTY CLAY (CL) - Brown / grey / dark grey, occasional brick, timber, cobbles (rock), W=PL		D		E			
					0.5		PID <1		
		From 0.8m to 1.0m, moderate hydrocarbon staining and odour		D		E			
1	1.0	Pit discontinued at 1.0m, refusal on concrete slab			1.0				1
									2

RIG: Excavator with 300mm bucket

LOGGED: Lambert

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dangar Street Wickham Pty Ltd
PROJECT: Proposed Apartment Development
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: --
EASTING:
NORTHING:

PIT No: 702
PROJECT No: 39961.08
DATE: 18/11/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
									5 10 15 20
		FILL / SILTY SAND (SW) - Brown / grey, sand is fine to coarse grained, occasional concrete, tile, metal, moist		D	0.0	E	PID <1		
	0.1				0.1		PID <1		
		FILL / SILTY CLAY (CH) - Dark brown / dark grey with fine to medium sized subangular to subrounded gravel (rock, slag) occasional tile, brick, plastic, metal, W=PL		D		E			
					0.5		PID <1		
		From 0.75m, moderate hydrocarbon staining and odour		D		E			
	1.0	Pit discontinued at 1.0m, refusal on concrete slab			1.0				
1									1
2									2

RIG: Excavator with 300mm bucket

LOGGED: Lambert

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: Dangar Street Wickham Pty Ltd
PROJECT: Proposed Apartment Development
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: --
EASTING:
NORTHING:

PIT No: 703
PROJECT No: 39961.08
DATE: 18/11/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm) 5 10 15 20
		FILL / SILTY SAND (SW) - Brown / grey, sand is fine to coarse grained, occasional concrete, tile, metal, moist		D	0.0	E	PID <1		
	0.15	FILL / SILTY CLAY (CH) - Dark brown / dark grey with fine to medium sized subangular to subrounded gravel (rock, slag, ash), occasional cobbles (rock), brick, plastic, organics, W=PL		D	0.15	E	PID = 2.5		
				D	0.5	E	PID = 1.5		
	1	From 1m to 1.1m, moderate hydrocarbon odour and staining							1
	1.1	Pit discontinued at 1.1m, refusal on concrete slab			1.1				
	2								2

RIG: Excavator with 300mm bucket

LOGGED: Lambert

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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TEST PIT LOG

CLIENT: Dangar Street Wickham Pty Ltd
PROJECT: Proposed Apartment Development
LOCATION: 10 Dangar Street, Wickham

SURFACE LEVEL: --
EASTING:
NORTHING:

PIT No: 704
PROJECT No: 39961.08
DATE: 18/11/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
		FILL / SILTY SAND (SW) - Brown / grey, sand is fine to coarse grained, occasional concrete, tile, metal, moist		D	0.0	E	PID <1		
	0.2	FILL / SILTY CLAY (CH) - Brown / dark brown / grey, trace fine to medium sized, subangular to subrounded gravel (rock, slag, ash), occasional organics, concrete, tile, W=PL		D	0.2	E	PID = 1.5		
				D	0.5	E	PID = 1.7		
	1								1
	1.1	Pit discontinued at 1.1m, refusal on concrete slab			1.1				
	2								2

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: Excavator with 300mm bucket

LOGGED: Lambert

SURVEY DATUM: MGA94

WATER OBSERVATIONS: No free groundwater observed

REMARKS:

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

SAMPLING & IN SITU TESTING LEGEND

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

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Sampling Methodology

The inspection and environmental sampling was performed by an engineer from DP. All sampling data was recorded on DP chain of custody forms, and the general sampling procedure comprised:

- Collection of representative soil samples directly from the excavated face of test pits excavated by an excavator; using a decontaminated stainless steel sampling trowel or a new nitrile glove;
- In-situ screening of replicate samples for volatiles using a photoionisation detector;
- Transfer of samples into laboratory-prepared glass jars, capping immediately, minimising the headspace within the sample jar;
- Labelling of sample containers with individual and unique identification, including project number, sample location and sample depth;
- Placing the glass jars into a cooled, insulated and sealed container for transport to the laboratory; and
- Use of chain of custody documentation so that sample tracking and custody could be cross-checked at any point in the transfer of samples from the field to the laboratory. Copies of completed chain of custody forms are attached.

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Table A1: Summary of Laboratory Results – Metals, TRH, BTEX, PAH, OCP, OPP, PCB, Asbestos, Additional Metals

			Metals														TRHs				BTEX					PAHs																						OCP	OPP	PCB											
			Arsenic	TCLP Arsenic	Cadmium	TCLP Cadmium	Chromium (VI)	TCLP Chromium (VI)	Copper	Lead	TCLP Lead	Mercury (inorganic)	TCLP Mercury (inorganic)	Nickel	TCLP Nickel	Zinc	Manganese	TRH C6 - C9	TRH C10 - C14	TRH C15 - C28	TRH C29 - C36	TOTAL (Unspeciated) TRH C10 - C36 (Fractions)	Benzene	Toluene	Ethylbenzene	m+p-Xylene	o-Xylene	Xylenes (total)	Naphthalene (Volatile)	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene (Dibenzofulvene)	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(j)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenz(a,h)anthracene	Benzo(g,h,i)perylene	Total PAH	Perylene	Total Phenols (Phenol, 2-chlorophenol, 2-methylphenol, 3+4-methylphenol, 2,4-dimethylphenol, 2-nitrophenol, 2,4-dichlorophenol, 2,6-dichlorophenol, 4-chloro-3-methylphenol, 2,4,6-trichlorophenol, 2,4-dinitrophenol, 4-nitrophenol, Pentachlorophenol)	Total Organochlorine Pesticides	Total Organophosphorus Pesticides	Total Polychlorinated Biphenyls	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
			4	0.05	0.4	0.01	1	0.01	1	1	0.03	0.1	0.0005	1	0.02	1	1	25	50	100	100	50	0.2	0.5	1	2	1	3	0.05	0.1	0.1	0.1	0.001	0.1	0.001	0.001	0.001	0.001	0.001	0.2	0.001	0.1	0.1	0.1	0.1	0.001	0.1	0.001	0.1	0.001	0.1	0.001	0.1	0.001	0.1	0.001	0.05	0.001	0.001	0.001	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Sample ID	Depth	Sample Date	mg/kg	mg/l	mg/kg	mg/l	mg/kg	mg/l	mg/kg	mg/kg	mg/l	mg/kg	mg/l	mg/kg	mg/l	mg/kg	mg/kg	mg/kg

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CERTIFICATE OF ANALYSIS 283278

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads, Jason Lambert
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**39961.08, Wickham**
Number of Samples	10 Soil
Date samples received	19/11/2021
Date completed instructions received	19/11/2021

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	22/11/2021
Date of Issue	22/11/2021

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Asbestos Approved By
Analysed by Asbestos Approved Analyst: Ridwan Wijaya
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Dragana Tomas, Senior Chemist
Hannah Nguyen, Metals Supervisor
Lucy Zhu, Asbestos Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		283278-1	283278-2	283278-3	283278-4	283278-5
Your Reference	UNITS	701	701	701	702	702
Depth		0-0.05	0.05-0.5	0.5-1	0.1-0.5	0.5-1
Date Sampled		18/11/2021	18/11/2021	18/11/2021	18/11/2021	18/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Date analysed	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021	19/11/2021
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	93	94	88	90	95

vTRH(C6-C10)/BTEXN in Soil					
Our Reference		283278-6	283278-7	283278-8	283278-9
Your Reference	UNITS	703	703	704	D-2021.11.18
Depth		0.15-0.5	0.5-1.1	0.2-0.5	-
Date Sampled		18/11/2021	18/11/2021	18/11/2021	18/11/2021
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Date analysed	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	73	70	82	79

svTRH (C10-C40) in Soil						
Our Reference		283278-1	283278-2	283278-3	283278-4	283278-5
Your Reference	UNITS	701	701	701	702	702
Depth		0-0.05	0.05-0.5	0.5-1	0.1-0.5	0.5-1
Date Sampled		18/11/2021	18/11/2021	18/11/2021	18/11/2021	18/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Date analysed	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021	19/11/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	72	73	69	65	76

svTRH (C10-C40) in Soil					
Our Reference		283278-6	283278-7	283278-8	283278-9
Your Reference	UNITS	703	703	704	D-2021.11.18
Depth		0.15-0.5	0.5-1.1	0.2-0.5	-
Date Sampled		18/11/2021	18/11/2021	18/11/2021	18/11/2021
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Date analysed	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50
Surrogate o-Terphenyl	%	77	75	76	75

PAHs in Soil						
Our Reference		283278-1	283278-2	283278-3	283278-4	283278-5
Your Reference	UNITS	701	701	701	702	702
Depth		0-0.05	0.05-0.5	0.5-1	0.1-0.5	0.5-1
Date Sampled		18/11/2021	18/11/2021	18/11/2021	18/11/2021	18/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Date analysed	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	0.2	0.3	<0.1
Pyrene	mg/kg	<0.1	<0.1	0.1	0.2	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.06	0.1	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	<0.05	0.3	0.95	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	79	74	80	85	83

PAHs in Soil					
Our Reference		283278-6	283278-7	283278-8	283278-9
Your Reference	UNITS	703	703	704	D-2021.11.18
Depth		0.15-0.5	0.5-1.1	0.2-0.5	-
Date Sampled		18/11/2021	18/11/2021	18/11/2021	18/11/2021
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Date analysed	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Naphthalene	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	0.2	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.2	<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+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.08	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	0.54	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	85	91	94	96

Organochlorine Pesticides in soil						
Our Reference		283278-1	283278-2	283278-3	283278-4	283278-5
Your Reference	UNITS	701	701	701	702	702
Depth		0-0.05	0.05-0.5	0.5-1	0.1-0.5	0.5-1
Date Sampled		18/11/2021	18/11/2021	18/11/2021	18/11/2021	18/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Date analysed	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021	19/11/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	84	75	79	84	81

Organochlorine Pesticides in soil					
Our Reference		283278-6	283278-7	283278-8	283278-9
Your Reference	UNITS	703	703	704	D-2021.11.18
Depth		0.15-0.5	0.5-1.1	0.2-0.5	-
Date Sampled		18/11/2021	18/11/2021	18/11/2021	18/11/2021
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Date analysed	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	86	91	91	92

Organophosphorus Pesticides in Soil						
Our Reference		283278-1	283278-2	283278-3	283278-4	283278-5
Your Reference	UNITS	701	701	701	702	702
Depth		0-0.05	0.05-0.5	0.5-1	0.1-0.5	0.5-1
Date Sampled		18/11/2021	18/11/2021	18/11/2021	18/11/2021	18/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Date analysed	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	84	75	79	84	81

Organophosphorus Pesticides in Soil					
Our Reference		283278-6	283278-7	283278-8	283278-9
Your Reference	UNITS	703	703	704	D-2021.11.18
Depth		0.15-0.5	0.5-1.1	0.2-0.5	-
Date Sampled		18/11/2021	18/11/2021	18/11/2021	18/11/2021
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Date analysed	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	86	91	91	92

PCBs in Soil						
Our Reference		283278-1	283278-2	283278-3	283278-4	283278-5
Your Reference	UNITS	701	701	701	702	702
Depth		0-0.05	0.05-0.5	0.5-1	0.1-0.5	0.5-1
Date Sampled		18/11/2021	18/11/2021	18/11/2021	18/11/2021	18/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Date analysed	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	84	75	79	84	81

PCBs in Soil					
Our Reference		283278-6	283278-7	283278-8	283278-9
Your Reference	UNITS	703	703	704	D-2021.11.18
Depth		0.15-0.5	0.5-1.1	0.2-0.5	-
Date Sampled		18/11/2021	18/11/2021	18/11/2021	18/11/2021
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Date analysed	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	86	91	91	92

Acid Extractable metals in soil						
Our Reference		283278-1	283278-2	283278-3	283278-4	283278-5
Your Reference	UNITS	701	701	701	702	702
Depth		0-0.05	0.05-0.5	0.5-1	0.1-0.5	0.5-1
Date Sampled		18/11/2021	18/11/2021	18/11/2021	18/11/2021	18/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Date analysed	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Arsenic	mg/kg	14	<4	8	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	7	4	5	5	4
Copper	mg/kg	15	10	18	18	13
Lead	mg/kg	8	13	110	94	51
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	19	<1	3	4	2
Zinc	mg/kg	38	6	79	69	40
Boron	mg/kg	<3	<3	<3	<3	<3
Beryllium	mg/kg	<1	<1	<1	<1	<1
Iron	mg/kg	23,000	4,600	14,000	7,000	5,100
Manganese	mg/kg	360	2	33	76	33
Molybdenum	mg/kg	<1	<1	<1	<1	<1
Selenium	mg/kg	<2	<2	<2	<2	<2

Acid Extractable metals in soil					
Our Reference		283278-6	283278-7	283278-8	283278-9
Your Reference	UNITS	703	703	704	D-2021.11.18
Depth		0.15-0.5	0.5-1.1	0.2-0.5	-
Date Sampled		18/11/2021	18/11/2021	18/11/2021	18/11/2021
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Date analysed	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Arsenic	mg/kg	7	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	6	7	4	3
Copper	mg/kg	16	7	17	9
Lead	mg/kg	57	14	11	14
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	1	2	2
Zinc	mg/kg	47	7	9	10
Boron	mg/kg	<3	<3	<3	<3
Beryllium	mg/kg	<1	<1	<1	<1
Iron	mg/kg	12,000	18,000	4,700	5,000
Manganese	mg/kg	20	7	9	11
Molybdenum	mg/kg	<1	<1	<1	<1
Selenium	mg/kg	<2	<2	<2	<2

Moisture						
Our Reference		283278-1	283278-2	283278-3	283278-4	283278-5
Your Reference	UNITS	701	701	701	702	702
Depth		0-0.05	0.05-0.5	0.5-1	0.1-0.5	0.5-1
Date Sampled		18/11/2021	18/11/2021	18/11/2021	18/11/2021	18/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Date analysed	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Moisture	%	6.5	4.8	5.3	4.3	10

Moisture					
Our Reference		283278-6	283278-7	283278-8	283278-9
Your Reference	UNITS	703	703	704	D-2021.11.18
Depth		0.15-0.5	0.5-1.1	0.2-0.5	-
Date Sampled		18/11/2021	18/11/2021	18/11/2021	18/11/2021
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Date analysed	-	19/11/2021	19/11/2021	19/11/2021	19/11/2021
Moisture	%	4.4	5.6	4.5	5.8

Asbestos ID - soils NEPM						
Our Reference		283278-1	283278-2	283278-3	283278-4	283278-5
Your Reference	UNITS	701	701	701	702	702
Depth		0-0.05	0.05-0.5	0.5-1	0.1-0.5	0.5-1
Date Sampled		18/11/2021	18/11/2021	18/11/2021	18/11/2021	18/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	22/11/2021	22/11/2021	22/11/2021	22/11/2021	22/11/2021
Sample mass tested	g	693.59	666.25	556.99	696.32	784.53
Sample Description	-	Grey clayey soil & rocks	Grey clayey soil & rocks	Grey clayey soil & rocks	Grey clayey soil & rocks	Grey clayey soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM				
Our Reference		283278-6	283278-7	283278-8
Your Reference	UNITS	703	703	704
Depth		0.15-0.5	0.5-1.1	0.2-0.5
Date Sampled		18/11/2021	18/11/2021	18/11/2021
Type of sample		Soil	Soil	Soil
Date analysed	-	22/11/2021	22/11/2021	22/11/2021
Sample mass tested	g	721.37	680.33	722.23
Sample Description	-	Grey clayey soil & rocks	Grey clayey soil & rocks	Grey clayey soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–
FA and AF Estimation*	g	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001

Metals from Leaching Fluid pH 2.9 or 5						
Our Reference		283278-1	283278-2	283278-3	283278-4	283278-5
Your Reference	UNITS	701	701	701	702	702
Depth		0-0.05	0.05-0.5	0.5-1	0.1-0.5	0.5-1
Date Sampled		18/11/2021	18/11/2021	18/11/2021	18/11/2021	18/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/11/2021	22/11/2021	22/11/2021	22/11/2021	22/11/2021
Date analysed	-	22/11/2021	22/11/2021	22/11/2021	22/11/2021	22/11/2021
pH of soil for fluid# determ.	pH units	8.0	7.7	7.7	7.8	7.5
pH of soil TCLP (after HCl)	pH units	1.6	1.6	1.8	1.7	1.6
Extraction fluid used	-	1	1	1	1	1
pH of final Leachate	pH units	5.0	4.9	5.0	5.1	5.0
Arsenic	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
Lead	mg/L	<0.03	<0.03	0.3	0.30	0.2
Mercury	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Nickel	mg/L	0.07	<0.02	<0.02	<0.02	<0.02

Metals from Leaching Fluid pH 2.9 or 5				
Our Reference		283278-6	283278-7	283278-8
Your Reference	UNITS	703	703	704
Depth		0.15-0.5	0.5-1.1	0.2-0.5
Date Sampled		18/11/2021	18/11/2021	18/11/2021
Type of sample		Soil	Soil	Soil
Date extracted	-	22/11/2021	22/11/2021	22/11/2021
Date analysed	-	22/11/2021	22/11/2021	22/11/2021
pH of soil for fluid# determ.	pH units	7.4	7.7	7.5
pH of soil TCLP (after HCl)	pH units	1.6	1.7	1.7
Extraction fluid used	-	1	1	1
pH of final Leachate	pH units	5.0	4.9	4.9
Arsenic	mg/L	<0.05	<0.05	<0.05
Cadmium	mg/L	<0.01	<0.01	<0.01
Chromium	mg/L	<0.01	<0.01	<0.01
Lead	mg/L	0.2	0.1	<0.03
Mercury	mg/L	<0.0005	<0.0005	<0.0005
Nickel	mg/L	<0.02	<0.02	<0.02

PAHs in TCLP (USEPA 1311)						
Our Reference		283278-1	283278-2	283278-3	283278-4	283278-5
Your Reference	UNITS	701	701	701	702	702
Depth		0-0.05	0.05-0.5	0.5-1	0.1-0.5	0.5-1
Date Sampled		18/11/2021	18/11/2021	18/11/2021	18/11/2021	18/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/11/2021	22/11/2021	22/11/2021	22/11/2021	22/11/2021
Date analysed	-	22/11/2021	22/11/2021	22/11/2021	22/11/2021	22/11/2021
Naphthalene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Acenaphthene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Phenanthrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Fluoranthene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Total +ve PAH's	mg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	69	82	77	85	77

PAHs in TCLP (USEPA 1311)				
Our Reference		283278-6	283278-7	283278-8
Your Reference	UNITS	703	703	704
Depth		0.15-0.5	0.5-1.1	0.2-0.5
Date Sampled		18/11/2021	18/11/2021	18/11/2021
Type of sample		Soil	Soil	Soil
Date extracted	-	22/11/2021	22/11/2021	22/11/2021
Date analysed	-	22/11/2021	22/11/2021	22/11/2021
Naphthalene in TCLP	mg/L	<0.001	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001	<0.001
Acenaphthene in TCLP	mg/L	<0.001	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001	<0.001
Phenanthrene in TCLP	mg/L	<0.001	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001	<0.001
Fluoranthene in TCLP	mg/L	<0.001	<0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	<0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001	<0.001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.002	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001	<0.001
Total +ve PAH's	mg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	76	73	77

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
INORG-004	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311. Please note that the mass used may be scaled down from default based on sample mass available. Samples are stored at 2-6oC before and after leachate preparation.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-020	Determination of various metals by ICP-AES following buffer determination as per USEPA 1311 and hence AS 4439.3. Extraction Fluid 1 refers to the pH 5.0 buffer and Extraction Fluid 2 is the pH 2.9 buffer.
Metals-021	Determination of Mercury by Cold Vapour AAS.

Method ID	Methodology Summary
Metals-021	Determination of Mercury by Cold Vapour AAS following buffer determination as per USEPA 1311 and hence AS 4439.3. Extraction Fluid 1 refers to the pH 5.0 buffer and Extraction Fluid 2 is the pH 2.9 buffer.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-022/025	Leachates are extracted with Dichloromethane and analysed by GC-MS/GC-MSMS.

Method ID	Methodology Summary
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	[NT]
Date extracted	-			19/11/2021	[NT]	[NT]	[NT]	[NT]	19/11/2021	[NT]
Date analysed	-			19/11/2021	[NT]	[NT]	[NT]	[NT]	19/11/2021	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	103	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	[NT]	[NT]	[NT]	[NT]	103	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	[NT]	[NT]	[NT]	[NT]	91	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	[NT]	[NT]	[NT]	[NT]	94	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	112	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	[NT]	[NT]	[NT]	[NT]	109	[NT]
o-Xylene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	104	[NT]
Naphthalene	mg/kg	1	Org-023	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	92	[NT]	[NT]	[NT]	[NT]	98	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	[NT]
Date extracted	-			19/11/2021	[NT]	[NT]	[NT]	[NT]	19/11/2021	[NT]
Date analysed	-			19/11/2021	[NT]	[NT]	[NT]	[NT]	19/11/2021	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	101	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	98	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	109	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	101	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	98	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	109	[NT]
Surrogate o-Terphenyl	%		Org-020	82	[NT]	[NT]	[NT]	[NT]	86	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	[NT]
Date extracted	-			19/11/2021	[NT]	[NT]	[NT]	[NT]	19/11/2021	[NT]
Date analysed	-			19/11/2021	[NT]	[NT]	[NT]	[NT]	19/11/2021	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	76	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	73	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	72	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	85	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	73	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	[NT]	[NT]	[NT]	[NT]	76	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	77	[NT]	[NT]	[NT]	[NT]	85	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	[NT]
Date extracted	-			19/11/2021	[NT]	[NT]	[NT]	[NT]	19/11/2021	[NT]
Date analysed	-			19/11/2021	[NT]	[NT]	[NT]	[NT]	19/11/2021	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	74	[NT]
HCB	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	78	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	85	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	75	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	82	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	86	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	92	[NT]
Endrin	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	82	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	84	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	75	[NT]	[NT]	[NT]	[NT]	75	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	[NT]
Date extracted	-			19/11/2021	[NT]	[NT]	[NT]	[NT]	19/11/2021	[NT]
Date analysed	-			19/11/2021	[NT]	[NT]	[NT]	[NT]	19/11/2021	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	68	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	89	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	81	[NT]
Malathion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	91	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	90	[NT]
Parathion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	70	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	70	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	75	[NT]	[NT]	[NT]	[NT]	75	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	[NT]
Date extracted	-			19/11/2021	[NT]	[NT]	[NT]	[NT]	19/11/2021	[NT]
Date analysed	-			19/11/2021	[NT]	[NT]	[NT]	[NT]	19/11/2021	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	80	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate TCMX	%		Org-021	75	[NT]	[NT]	[NT]	[NT]	75	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-5	[NT]
Date prepared	-			19/11/2021	[NT]	[NT]	[NT]	[NT]	19/11/2021	[NT]
Date analysed	-			19/11/2021	[NT]	[NT]	[NT]	[NT]	19/11/2021	[NT]
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	[NT]	[NT]	109	[NT]
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	[NT]	[NT]	105	[NT]
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	108	[NT]
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	[NT]	[NT]	95	[NT]
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	110	[NT]
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	105	[NT]
Boron	mg/kg	3	Metals-020	<3	[NT]	[NT]	[NT]	[NT]	105	[NT]
Beryllium	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	109	[NT]
Iron	mg/kg	10	Metals-020	<10	[NT]	[NT]	[NT]	[NT]	106	[NT]
Manganese	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	107	[NT]
Molybdenum	mg/kg	1	Metals-020	<1	[NT]	[NT]	[NT]	[NT]	103	[NT]
Selenium	mg/kg	2	Metals-020	<2	[NT]	[NT]	[NT]	[NT]	104	[NT]

QUALITY CONTROL: Metals from Leaching Fluid pH 2.9 or 5						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	283278-2
Date extracted	-			22/11/2021	1	22/11/2021	22/11/2021		22/11/2021	22/11/2021
Date analysed	-			22/11/2021	1	22/11/2021	22/11/2021		22/11/2021	22/11/2021
Arsenic	mg/L	0.05	Metals-020	<0.05	1	<0.05	<0.05	0	113	101
Cadmium	mg/L	0.01	Metals-020	<0.01	1	<0.01	<0.01	0	97	86
Chromium	mg/L	0.01	Metals-020	<0.01	1	<0.01	<0.01	0	102	111
Lead	mg/L	0.03	Metals-020	<0.03	1	<0.03	<0.03	0	103	113
Mercury	mg/L	0.0005	Metals-021	<0.0005	1	<0.0005	<0.0005	0	100	99
Nickel	mg/L	0.02	Metals-020	<0.02	1	0.07	0.07	0	101	110

QUALITY CONTROL: PAHs in TCLP (USEPA 1311)						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	283278-4
Date extracted	-			22/11/2021	1	22/11/2021	22/11/2021		22/11/2021	22/11/2021
Date analysed	-			22/11/2021	1	22/11/2021	22/11/2021		22/11/2021	22/11/2021
Naphthalene in TCLP	mg/L	0.001	Org-022/025	<0.001	1	<0.001	<0.001	0	80	76
Acenaphthylene in TCLP	mg/L	0.001	Org-022/025	<0.001	1	<0.001	<0.001	0	[NT]	[NT]
Acenaphthene in TCLP	mg/L	0.001	Org-022/025	<0.001	1	<0.001	<0.001	0	70	66
Fluorene in TCLP	mg/L	0.001	Org-022/025	<0.001	1	<0.001	<0.001	0	89	83
Phenanthrene in TCLP	mg/L	0.001	Org-022/025	<0.001	1	<0.001	<0.001	0	96	108
Anthracene in TCLP	mg/L	0.001	Org-022/025	<0.001	1	<0.001	<0.001	0	[NT]	[NT]
Fluoranthene in TCLP	mg/L	0.001	Org-022/025	<0.001	1	<0.001	<0.001	0	74	81
Pyrene in TCLP	mg/L	0.001	Org-022/025	<0.001	1	<0.001	<0.001	0	73	85
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-022/025	<0.001	1	<0.001	<0.001	0	[NT]	[NT]
Chrysene in TCLP	mg/L	0.001	Org-022/025	<0.001	1	<0.001	<0.001	0	78	87
Benzo(bjk)fluoranthene in TCLP	mg/L	0.002	Org-022/025	<0.002	1	<0.002	<0.002	0	[NT]	[NT]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-022/025	<0.001	1	<0.001	<0.001	0	76	80
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-022/025	<0.001	1	<0.001	<0.001	0	[NT]	[NT]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-022/025	<0.001	1	<0.001	<0.001	0	[NT]	[NT]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-022/025	<0.001	1	<0.001	<0.001	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	92	1	69	85	21	73	85

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

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CHAIN OF CUSTODY FIELD SHEET

Project No:	39961.08	**Client Project Name:**	Proposed Apartment Development
Client:	Dangar Street Wickham Pty Ltd	**Location:**	10 Dangar Street Wickham
Project Manager:		**DP Lab Received**	By: Date:

Do samples contain 'potential' HBM? Yes ☑ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)

Field									DP Lab	For Despatch to			Notes
Sample ID	Depth (m)	Duplicate Sample	Sample Type S - soil W - water	Container Type G - glass P - plastic	ASS Samples	Sampling By	Sampling Date	Sampling Time	Storage Locn *	Lab 1 [A] Date	Lab 2 [B] Date	Lab 3 [C] Date	
701	0.0-0.5		S	G, P		JK	18-11-2021	0900	111				
	0.5-0.5		↓	↓		↓	↓	↓	↓				
	0.5-1.0												
702	0.0-0.1												
	0.1-0.5												
	0.5-1.0												
703	0.0-0.5												
	0.5-0.5												
	0.5-1.0	D-2021-11-18											
704	0.0-0.2												
	0.2-0.5							1100					
	0.5-1.1												

* **Default storage:** **glass containers in fridge, plastic containers shelved, ASS in freezer, water samples in fridge**

A Provide name of Lab 1

B Provide name of Lab 2

C Provide name of Lab 3

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	39961.08	**Suburb:**	Wickham	**To:**	*Envirolab Services*
Project Manager:	PH	**Order Number:**	NC230110	**Sampler:**	JCL
Email:	jason.lambert@douglaspartners.com.au , patrick.heads@douglaspartners.com.au			**Attn:**	*Aileen Hie*
Turnaround time:	☐ Standard ☐ 72 hour ☐ 48 hour ☐ 24 hour ☑ Same day			**Contact:**	
Prior Storage:	☑ Fridge ☐ Freezer ☐ Shelf	**Do samples contain 'potential' HBM?**	☐ No ☑ Yes (If YES, then handle, transport and store in accordance with FPM HAZID)		

Lab ID	Sample ID: Location / Other ID	Depth From	Depth To	Date Sampled	Sample Type: S - soil W - water	Container Type: G - glass P - plastic	Analytes: Combo 6A	Asbestos 500ml	TCLP Metals (As, Cd, Cr, Pb, Hg, Ni))	TCLP PAH						Notes/ Preservation/ Additional Requirements
1	701	0	0.05	18/11/21	S	G,P	✓	✓	✓	✓						Combo 6 + 500ml + TCLP
2	701	0.05	0.5	18/11/21	S	G,P	✓	✓	✓	✓						Combo 6 + 500ml + TCLP
3	701	0.5	1	18/11/21	S	G,P	✓	✓	✓	✓						Combo 6 + 500ml + TCLP
4	702	0.1	0.5	18/11/21	S	G,P	✓	✓	✓	✓						Combo 6 + 500ml + TCLP
5	702	0.5	1	18/11/21	S	G,P	✓	✓	✓	✓						Combo 6 + 500ml + TCLP
6	703	0.15	0.5	18/11/21	S	G,P	✓	✓	✓	✓						Combo 6 + 500ml + TCLP
7	703	0.5	1.1	18/11/21	S	G,P	✓	✓	✓	✓						Combo 6 + 500ml + TCLP
8	704	0.2	0.5	18/11/21	S	G,P	✓	✓	✓	✓						Combo 6 + 500ml + TCLP
9	D-2021.11.18	-	-	18/11/21	S	G	✓									Combo 6
10	702	0	0.1													

Metals to analyse:	As, Cd, Cr, Cu, Hg, Ni, Zn, Pb, Fe, Mn, Be, B, Mo, Se			**LAB RECEIPT**	283278
Number of samples in container:	9	**Transported to laboratory by:**	TNT	**Lab Ref. No:**	
Send results to:	Douglas Partners Pty Ltd			**Received by:**	CROFT
Address:	15 Calistemon Close, Warrabrok	**Phone:**	4960 9600	**Date & Time:**	18-11-21.
Relinquished by:	JCL	**Date:**	18/11/2021	**Signed:**	

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads, Jason Lambert

Sample Login Details

Your reference	39961.08, Wickham
Envirolab Reference	283278
Date Sample Received	19/11/2021
Date Instructions Received	19/11/2021
Date Results Expected to be Reported	26/11/2021

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	10 Soil
Turnaround Time Requested	Same day
Temperature on Receipt (°C)	4
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Extra sample received 702 / 0-0.1, placed on hold
TCLP ready monday 22/11/21

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM	Metals from Leaching Fluid pH 2.9 or 5	Naphthalene in TCLP	Acenaphthylene in TCLP	Acenaphthene in TCLP	Fluorene in TCLP	Phenanthrene in TCLP	Anthracene in TCLP	Fluoranthene in TCLP	Pyrene in TCLP	Benzo(a)anthracene in TCLP	Chrysene in TCLP	Benzo(bjk)fluoranthene in TCLP	Benzo(a)pyrene in TCLP	Indeno(1,2,3-c,d)pyrene - TCLP	Dibenzo(a,h)anthracene in TCLP	Benzo(g,h,i)perylene in TCLP	Total +vePAH's	Surrogate p-Terphenyl-d14	On Hold
701-0-0.05	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
701-0.05-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
701-0.5-1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
702-0.1-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
702-0.5-1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
703-0.15-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
703-0.5-1.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
704-0.2-0.5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
D-2021.11.18	✓	✓	✓	✓	✓	✓	✓																				
702-0-0.1																											✓

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.

Requests for longer term sample storage must be received in writing.

Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.

TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

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Bella Vista NSW 2153

Project 39961.11
23 March 2022
R.003.Rev0
PH:kd

Attention: Lachlan Richards

Email: lachlan.richards@easternpacific.com.au

Stockpile Waste Classification – Stockpile A
Proposed Apartment Development
10 Dangar Street, Wickham

1. Executive Summary

This report describes the methodology and results of a waste classification undertaken by Douglas Partners Pty Ltd (DP) on a stockpile of material located at 10 Dangar Street, Wickham (Refer to Section 2 for further details). The results are summarised in the following Table 1.

Table 1: Summary of Waste Classification – Stockpile A

Material Identification	Stockpile as shown on Figure 1 below, excavated from former underground storage tank pit
Approximate Volume[1]	80 m^3
Material Description	Grey brown to grey sand with slight to moderate hydrocarbon odour
Classification	General Solid Waste (non-putrescible)
Conditions Specific to this Classification	Recommended disposal to an appropriately licensed landfill. Not suitable for recycling due to visual and olfactory observations of hydrocarbon impacts (Refer to Section 7 for general conditions)

2. Introduction

This waste classification was commissioned by Lachlan Richards of Eastern Pacific and was undertaken with reference to DP Proposal 39961.11.P.003.Rev0 dated 14 October 2021.

[1] It is noted that dimensions and / or volume and / or tonnage approximations have been estimated to inform the sampling rationale. DP recommends that if accurate volumes and / or tonnages are required quantity surveys and weighbridge measurements are undertaken.

The subject of the waste classification is a stockpile of material located at Lot 1 D.P. 1197377, 10 Dangar Street, Wickham as shown on Figure 1 below. The stockpile originated from the excavation of soils from the vicinity of two former underground fuel storage tanks (USTs) located adjacent to the site boundary in the north-western portion of the site. The intention is to remove the stockpile to landfill under an assigned waste classification.

The waste classification was conducted with reference to the *Waste Classification Guidelines, Part 1: Classifying Waste* (NSW EPA, 2014).

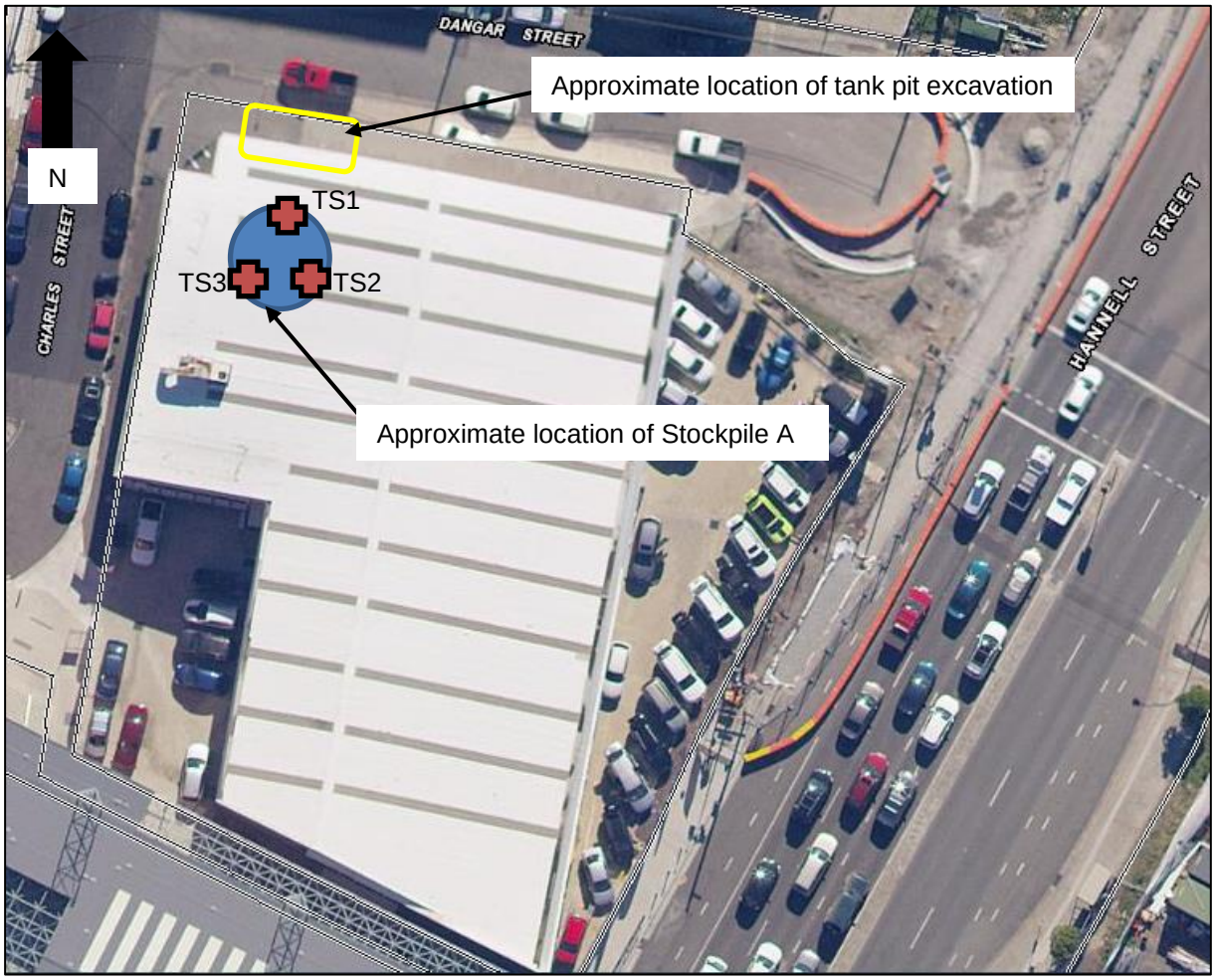

Figure 1: Approximate location of Stockpile A and tank pit excavation (i.e. the source of Stockpile A)

3. Scope of Works

The scope of works was as follows:

- Brief review of previous reports / historical aerial photographs to assess the potential for historical sources of contamination and ASS conditions;
- Inspection of the stockpile to estimate the volume and note the likely composition;

- Collection of samples and dispatch to a NATA accredited laboratory for analysis for the identified contaminants of concern; and
- Preparation of this waste classification report.

4. Analytical and Sampling Rationale

The basis for the analytical rationale is provided in Table 2.

Table 2: Site Information

Item	Description
Site Description	At the time of conducting the field work for the waste classification (17 March 2022) the site was subject to early construction works, generally comprising remediation and validation of upper impacted fill and former tank pit excavation. The tanks had previously been removed, however the impacted soil was left in situ.
Site History	A review of previous reports indicates that the site was previously a delivery/courier depot. Site uses included fuelling of vehicles. A fuel bowser and tanks were previously located in the north-western corner of the site. Previous investigation has also indicated the presence of imported fill and demolition of structures on the site, however, this impacted fill has been excavated separately and the site surface has been validated.
Geology	Reference to published mapping indicates that the site is underlain by quaternary alluvium, generally comprising gravel, sand, silt and clay.
Acid Sulfate Soils	Reference to published mapping indicates that the site has a high probability of occurrence of ASS between 1 m and 3 m below the ground surface. Previous ASS testing in the northern portion of the site indicated variable ASS conditions within the depth of the current excavation and subsequent stockpile generation. The materials within Stockpile A were excavated from a depth that was above previously identified ASS. Stockpile A materials are therefore not considered to be ASS.
Identified Potential Sources of Contamination	• Imported fill including ash and slag; • Previous buildings (potential hazardous materials such as asbestos); • Underground petroleum storage tank (UST).

On this basis the contaminant sources of concern are considered to comprise the following (analytical rationale):

- Imported fill including ash and slag;
- Previous buildings (potential hazardous materials such as asbestos);
- Underground petroleum storage tanks (UST).

The contaminants of concern in relation to the stockpile comprise the following:

- Eight priority metals arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc;

- Total recoverable hydrocarbons (TRH);
- Benzene, toluene, ethylbenzene and xylenes (BTEX);
- Polycyclic aromatic hydrocarbons (PAH);
- Asbestos.

Soil samples were collected from the stockpile (see attached sampling methodology) and analysed for the above identified potential contaminants by a NATA-accredited laboratory.

The sampling rationale is provided in Table 3.

Table 3: Sampling Rationale

Approximate Stockpile Dimensions	6 m x 6 m base, 3 m high
Approximate Stockpile Volume	80 m^3.
Number of Sampling Locations	Three systematic stockpile sampling locations as shown on Figure 1.
Number of Samples	Three samples (TS1, TS2 and TS3)

It is noted that dimensions and / or tonnage approximations have been estimated to inform the sampling rationale. DP recommends that if accurate volumes and / or tonnages are required surveys and weighbridge measurements be undertaken.

5. Field Work Observations

The follow section should be read in conjunction with the attached explanatory notes that define classification methods and terms used to describe the soils. The material observed during sampling comprised Grey brown to grey sand with some slight to moderate hydrocarbon odour.

There were indications of contamination, comprising slight to moderate hydrocarbon odour within the stockpiled soils, and in the former tank pit, observed during excavation and stockpiling.

In-situ screening for volatile compounds was conducted with a calibrated photoionisation detector. The results of screening on the stockpile samples indicated the presence of minor hydrocarbon impacts (i.e. screening results of between 20 ppm and 60 ppm).

Representative photographs are included as Figures 2 and 3 below.

Figure 2: Photograph of Stockpile and associated excavation, looking south-west

Figure 3: Photograph of Stockpile looking south

6. Waste Classification

The following Table 4 presents the results of the six step procedure outlined in NSW EPA (2014) for determining the type of waste and the waste classification.

Table 4: Six Step Classification Procedure

Step	Comments	Rationale
1. Is the waste special waste?	No	No asbestos-containing materials (ACM), clinical or related waste, or waste tyres were observed on the surface of the stockpile or in the test pits; Asbestos was not detected by the analytical laboratory.
2. Is the waste liquid waste?	No	Stockpile comprised a soil matrix.
3. Is the waste "pre-classified"?	No	The stockpile material is not pre-classified with reference to NSW EPA (2014).
4. Does the waste possess hazardous waste characteristics?	No	The fill was not observed to contain or considered at risk to contain explosives, gases, flammable solids, oxidising agents, organic peroxides, toxic substances, corrosive substances, coal tar, batteries, lead paint or dangerous goods containers.
5. Determining a wastes classification using chemical assessment	Conducted	Refer to Tables A1 and A2 (attached).
6. Is the waste putrescible or non-putrescible?	Non-putrescible	The stockpile does not contain materials considered to be putrescible [a].

Note to Table 4: a wastes that are generally not classified as putrescible include soils, timber, garden trimmings, agricultural, forest and crop materials, and natural fibrous organic and vegetative materials (NSW EPA, 2014).

The field and laboratory data quality assurance and quality control results for the samples have been reviewed and are considered to be acceptable. The laboratory certificate(s) is / are attached.

As shown in the attached Table A1, all contaminant concentrations for the analysed fill samples were within the contaminant thresholds (CT1s) for General Solid Waste (non-putrescible).

Table 5: Waste Classification Summary

Item	Description
Based on the observations at the time of sampling and the reported analytical results, the fill described as:	Grey brown to grey sand with slight to moderate hydrocarbon odour
Within the area subject to classification as shown on Figure 1, is classified as:	General Solid Waste (non-putrescible)

7. Conditions

If any materials are encountered that are different to those sampled and tested or exhibit additional signs of potential contamination (eg: anthropogenic inclusions, additional staining or odours) this waste classification does not apply and the advice of a qualified environmental consultant should be sought.

During excavation and loading of the stockpile, it is recommended that appropriate inspections are conducted and if any materials are encountered that are different to those sampled and tested or exhibit signs of potential contamination (eg: anthropogenic inclusions) these should be appropriately segregated for further assessment.

The stockpiled materials are not recommended for recycling due to the observed slight to moderate hydrocarbon odours.

Both the receiving site and the site disposing of the material should satisfy the requirements of the licence before disposal of the material is undertaken. Note that appropriate prior arrangement with the receiving site/relevant authorities should be obtained prior to the disposal of any material off site. The receiving site should check to ensure that the material received matches the description provided in this report and contains no cross contamination. The handling, transport and disposal of the materials should be conducted in accordance with regulatory and statutory requirements

8. References

NSW EPA. (2014). *Waste Classification Guidelines, Part 1: Classifying Waste.* NSW Environment Protection Authority.

DP (2018), *Report on Detailed Site Investigation, Proposed Apartment Development, 10 Dangar Street Wickham*, prepared for Dangar Street Wickham Pty Ltd, project 39961.02, Douglas Partners Pty Ltd.

9. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for this project at 10 Dangar Street, Wickham with reference to DP's proposal dated 14 October 2021 and acceptance received from Eastern Pacific dated 126 February 2022. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Eastern Pacific for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

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

The assessment of atypical safety hazards arising from this advice is restricted to the environmental components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

DP personnel are not licenced or accredited surveyors. Any quantities quoted in this report are provided for general guidance only and should not be relied upon. The services of a licenced/accredited surveyor should be engaged if reliable quantities are required.

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

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

The results provided in the report are indicative of the surface and subsurface conditions of the stockpile only at the specific sampling locations, and then only to the depths investigated and at the time the work was carried out. The stockpile conditions can change as a result of human influences, and such changes may occur after DP's field testing has been completed.

Although the sampling plan adopted for this waste classification is considered appropriate to achieve the stated project objectives (noting that EPA (2014) does not specify a required sampling density), there are necessarily parts of the stockpile that have not been sampled and analysed. This is either due to undetected variations in conditions or budget constraints. It is therefore considered possible that hazardous building materials, including asbestos, may be present in unobserved or untested parts of the stockpile, between and beyond sampling locations, and hence no warranty can be given that hazardous building materials are not present in the stockpile.

Part 5.6, Section 143 of The Protection of the Environment Operations Act 1997 states that it is an offence for waste to be transported to a place that cannot lawfully be used as a facility to accept that waste. It is the duty of the owner and transporter of the waste to ensure that the waste is disposed of appropriately. DP does not accept liability for the unlawful disposal of waste materials from any site. DP accepts no responsibility for the material tracking, loading, management, transport or disposal of waste from the site.

Please contact the undersigned if you have any questions on this matter.

Yours faithfully
Douglas Partners Pty Ltd

Reviewed by

Patrick Heads

Patrick Heads
Associate

C. Bozinovski

Chris Bozinovski
Principal

Attachments: About This Report
Sampling Methodology
Explanatory Notes
Table A1 - Summary of Laboratory Results
Laboratory Certificate(s), Chain of Custody Documentation and Sample Receipt Advice

Sampling Methodology

The inspection and environmental sampling was performed by an Engineer from DP. All sampling data was recorded on DP chain of custody sheets, and the general sampling procedure comprised:

- Inspection of the stockpile materials as it was excavated and placed in stockpile;
- Collection of representative soil samples directly from the excavated face of test pits using hand tools;
- The use of disposable gloves for each sampling event;
- Transfer of samples into laboratory-prepared glass jars, capping immediately, minimising the headspace within the sample jar;
- Collection of replicate samples into Ziplock bags and closing immediately for field screening of volatile compounds using a photoionisation detector;
- Labelling of sample containers with individual and unique identification, including project number, sample location and sample depth;
- Placing the glass jars into a cooled, insulated and sealed container for transport to the laboratory; and
- Use of chain of custody documentation so that sample tracking and custody could be cross-checked at any point in the transfer of samples from the field to the laboratory. Copies of completed chain of custody forms are attached.

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Table A1 : Summary of Laboratory Results – Metals, TRH, BTEX, PAH, Asbestos

			Metals								TRH					BTEX						PAH		Asbestos		
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C9	TRH C10 - C14	TRH C15 - C28	TRH C29 - C36	C10-C36 recoverable hydrocarbons	Benzene	Toluene	Ethylbenzene	m+p-Xylene	o-Xylene	Xylenes (total)	Benzo(a)pyrene (BaP)	Total PAHs	Asbestos ID in soil >0.1g/kg	Trace Analysis	Total Asbestos
		PQL	4	0.4	1	1	1	0.1	1	1	25	50	100	100	50	0.2	0.5	1	2	1	1	0.05	0.05			
Sample ID	Depth	Sample Date	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	-	-	-
TS1	0 m	17/03/2022	<4	<0.4	**2**	**2**	**6**	<0.1	**1**	**18**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1	<0.05	<0.05	**NAD**	**NAD**	**NAD**
TS2	0 m	17/03/2022	<4	<0.4	<1	<1	**11**	<0.1	<1	**1**	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<1	<0.05	**0.5**	**NAD**	**NAD**	**NAD**
TS3	0 m	17/03/2022	<4	<0.4	<1	**1**	**14**	<0.1	<1	**12**	<25	**330**	**520**	<100	**840**	<0.2	<0.5	<1	<2	<1	<1	<0.05	**5.5**	**NAD**	**NAD**	**NAD**
Summary Statistics																										
Min			4	0.4	1	1	6	0.1	1	1	25	50	100	100	50	0.2	0.5	1	2	1	1	0.05	0.05	-	-	-
Max			4	0.4	2	2	14	0.1	1	18	25	330	520	100	840	0.2	0.5	1	2	1	1	0.05	5.5	-	-	-
Mean			4	0.4	1	1	10	0.1	1	10	25	143	240	100	313	0.2	0.5	1	2	1	1	0.05	2.02	-	-	-
Waste Classification Criteria [f]																										
CT1			100	20	100	NC	100	4	40	NC	650	NC	NC	NC	10000	10	288	600	NC	NC	1000	0.8	200	NC	NC	NC
SCC1			500	100	1900	NC	1500	50	1050	NC	650	NC	NC	NC	10000	18	518	1080	NC	NC	1800	10	200	NC	NC	NC
TCLP1			N/A	N/A	N/A	NC	N/A	N/A	N/A	NC	N/A	NC	NC	NC	N/A	N/A	N/A	N/A	NC	NC	N/A	N/A	N/A	NC	NC	NC
CT2			400	80	400	NC	400	16	160	NC	2600	NC	NC	NC	40000	40	1152	2400	NC	NC	4000	3.2	800	NC	NC	NC
SCC2			2000	400	7600	NC	6000	200	4200	NC	2600	NC	NC	NC	40000	72	2073	4320	NC	NC	7200	23	800	NC	NC	NC
TCLP2			N/A	N/A	N/A	NC	N/A	N/A	N/A	NC	N/A	NC	NC	NC	N/A	N/A	N/A	N/A	NC	NC	N/A	N/A	N/A	NC	NC	NC

CT1 exceedance TCLP1 and/or SCC1 exceedance CT2 exceedance TCLP2 and/or SCC2 exceedance Asbestos detection

NT = Not tested NL = Non limiting NC = No criteria NA = Not applicable

Notes:

b Total chromium used as initial screen for chromium(VI).

c Total recoverable hydrocarbons (TRH) used as an initial screen for total petroleum hydrocarbons (TPH)

f All criteria are in the same units as the reported results

PQL Practical quantitation limit

CT1 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: General solid waste

SCC1 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste

TCLP1 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste

CT2 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values of specific contaminant concentration (SCC) for classification without TCLP: Restricted solid waste

SCC2 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste

TCLP2 NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste, Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste

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CERTIFICATE OF ANALYSIS 291268

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads
Address	Box 324 Hunter Region Mail Centre, Newcastle, NSW, 2310

Sample Details

Your Reference	**39961.11, Wickham**
Number of Samples	12 Soil
Date samples received	18/03/2022
Date completed instructions received	18/03/2022

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	18/03/2022
Date of Issue	18/03/2022

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Asbestos Approved By
Analysed by Asbestos Approved Analyst: Nyovan Moonean
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Dragana Tomas, Senior Chemist
Hannah Nguyen, Metals Supervisor
Josh Williams, LC Supervisor
Lucy Zhu, Asbestos Supervisor

Authorised By

Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		291268-1	291268-2	291268-3	291268-4	291268-5
Your Reference	UNITS	VT1	VT2	VT3	VT4	VT5
Date Sampled		17/03/2022	17/03/2022	17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	91	102	104	91	88

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		291268-6	291268-7	291268-8	291268-9	291268-10
Your Reference	UNITS	VT6	VT7	VT8	TS1	TS2
Date Sampled		17/03/2022	17/03/2022	17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	73	85	80	68	65

vTRH(C6-C10)/BTEXN in Soil			
Our Reference		291268-11	291268-12
Your Reference	UNITS	TS3	VTD1
Date Sampled		17/03/2022	17/03/2022
Type of sample		Soil	Soil
Date extracted	-	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022
TRH C_6 - C_9	mg/kg	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25
Benzene	mg/kg	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
o-Xylene	mg/kg	<1	<1
Naphthalene	mg/kg	<1	<1
Total +ve Xylenes	mg/kg	<1	<1
Surrogate aaa-Trifluorotoluene	%	80	71

svTRH (C10-C40) in Soil						
Our Reference		291268-1	291268-2	291268-3	291268-4	291268-5
Your Reference	UNITS	VT1	VT2	VT3	VT4	VT5
Date Sampled		17/03/2022	17/03/2022	17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	81	97	99	97	98

svTRH (C10-C40) in Soil						
Our Reference		291268-6	291268-7	291268-8	291268-9	291268-10
Your Reference	UNITS	VT6	VT7	VT8	TS1	TS2
Date Sampled		17/03/2022	17/03/2022	17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
TRH C_{10} - C_{14}	mg/kg	<50	96	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	300	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	400	<50	<50	<50
TRH >C_{10} -C_{16}	mg/kg	<50	190	<50	<50	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	190	<50	<50	<50
TRH >C_{16} -C_{34}	mg/kg	<100	200	<100	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	390	<50	<50	<50
Surrogate o-Terphenyl	%	86	#	86	88	90

svTRH (C10-C40) in Soil			
Our Reference		291268-11	291268-12
Your Reference	UNITS	TS3	VTD1
Date Sampled		17/03/2022	17/03/2022
Type of sample		Soil	Soil
Date extracted	-	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022
TRH C_{10} - C_{14}	mg/kg	330	<50
TRH C_{15} - C_{28}	mg/kg	520	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100
Total +ve TRH (C10-C36)	mg/kg	840	<50
TRH >C_{10} -C_{16}	mg/kg	520	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	520	<50
TRH >C_{16} -C_{34}	mg/kg	280	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	790	<50
Surrogate o-Terphenyl	%	#	93

PAHs in Soil						
Our Reference		291268-1	291268-2	291268-3	291268-4	291268-5
Your Reference	UNITS	VT1	VT2	VT3	VT4	VT5
Date Sampled		17/03/2022	17/03/2022	17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Naphthalene	mg/kg	2.0	0.5	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	2.0	0.60	<0.05	<0.05	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	115	113	116	115	113

PAHs in Soil						
Our Reference		291268-6	291268-7	291268-8	291268-9	291268-10
Your Reference	UNITS	VT6	VT7	VT8	TS1	TS2
Date Sampled		17/03/2022	17/03/2022	17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Naphthalene	mg/kg	<0.1	1	0.3	<0.1	0.4
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.9	<0.1	<0.1	0.1
Anthracene	mg/kg	<0.1	0.3	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	0.3	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.2	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	<0.05	3.7	0.3	<0.05	0.5
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	114	117	111	112	107

PAHs in Soil			
Our Reference		291268-11	291268-12
Your Reference	UNITS	TS3	VTD1
Date Sampled		17/03/2022	17/03/2022
Type of sample		Soil	Soil
Date extracted	-	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022
Naphthalene	mg/kg	2.5	<0.1
Acenaphthylene	mg/kg	0.1	<0.1
Acenaphthene	mg/kg	0.2	<0.1
Fluorene	mg/kg	0.7	<0.1
Phenanthrene	mg/kg	1.3	<0.1
Anthracene	mg/kg	0.5	<0.1
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(b,j+k)fluoranthene	mg/kg	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1
Total +ve PAH's	mg/kg	5.5	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	108	116

Acid Extractable metals in soil				
Our Reference	UNITS	291268-9	291268-10	291268-11
Your Reference		TS1	TS2	TS3
Date Sampled		17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil
Date prepared	-	18/03/2022	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022	18/03/2022
Arsenic	mg/kg	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4
Chromium	mg/kg	2	<1	<1
Copper	mg/kg	2	<1	1
Lead	mg/kg	6	11	14
Mercury	mg/kg	<0.1	<0.1	<0.1
Nickel	mg/kg	1	<1	<1
Zinc	mg/kg	18	1	12

Moisture						
Our Reference		291268-1	291268-2	291268-3	291268-4	291268-5
Your Reference	UNITS	VT1	VT2	VT3	VT4	VT5
Date Sampled		17/03/2022	17/03/2022	17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Moisture	%	19	9.1	19	20	21

Moisture						
Our Reference		291268-6	291268-7	291268-8	291268-9	291268-10
Your Reference	UNITS	VT6	VT7	VT8	TS1	TS2
Date Sampled		17/03/2022	17/03/2022	17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022	18/03/2022	18/03/2022	18/03/2022
Moisture	%	23	19	18	26	16

Moisture			
Our Reference		291268-11	291268-12
Your Reference	UNITS	TS3	VTD1
Date Sampled		17/03/2022	17/03/2022
Type of sample		Soil	Soil
Date prepared	-	18/03/2022	18/03/2022
Date analysed	-	18/03/2022	18/03/2022
Moisture	%	15	26

Asbestos ID - soils				
Our Reference	UNITS	291268-9	291268-10	291268-11
Your Reference		TS1	TS2	TS3
Date Sampled		17/03/2022	17/03/2022	17/03/2022
Type of sample		Soil	Soil	Soil
Date analysed	-	18/03/2022	18/03/2022	18/03/2022
Sample mass tested	g	Approx. 40g	Approx. 45g	Approx. 45g
Sample Description	-	Brown sandy soil & rocks	Brown sandy soil & rocks	Brown sandy soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected Synthetic mineral fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

Method ID	Methodology Summary
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	291268-2
Date extracted	-			18/03/2022	1	18/03/2022	18/03/2022		18/03/2022	18/03/2022
Date analysed	-			18/03/2022	1	18/03/2022	18/03/2022		18/03/2022	18/03/2022
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	89	86
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	89	86
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	96	91
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	89	85
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	89	86
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	86	84
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	96	93
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	92	1	91	96	5	105	95

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	18/03/2022	18/03/2022		[NT]	[NT]
Date analysed	-			[NT]	11	18/03/2022	18/03/2022		[NT]	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	[NT]	11	<25	<25	0	[NT]	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	[NT]	11	<25	<25	0	[NT]	[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	11	<0.2	<0.2	0	[NT]	[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	11	<0.5	<0.5	0	[NT]	[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	11	<2	<2	0	[NT]	[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
Naphthalene	mg/kg	1	Org-023	[NT]	11	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	11	80	69	15	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	291268-2
Date extracted	-			18/03/2022	1	18/03/2022	18/03/2022		18/03/2022	18/03/2022
Date analysed	-			18/03/2022	1	18/03/2022	18/03/2022		18/03/2022	18/03/2022
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	90	99
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	95	108
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	89	102
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	90	99
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	95	108
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	89	102
Surrogate o-Terphenyl	%		Org-020	87	1	81	97	18	101	97

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	18/03/2022	18/03/2022		[NT]	[NT]
Date analysed	-			[NT]	11	18/03/2022	18/03/2022		[NT]	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	[NT]	11	330	200	49	[NT]	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	[NT]	11	520	360	36	[NT]	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	[NT]	11	520	320	48	[NT]	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	[NT]	11	280	210	29	[NT]	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	[NT]	11	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	11	#	#		[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	291268-2
Date extracted	-			18/03/2022	1	18/03/2022	18/03/2022		18/03/2022	18/03/2022
Date analysed	-			18/03/2022	1	18/03/2022	18/03/2022		18/03/2022	18/03/2022
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	2.0	2.4	18	113	86
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	107	103
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	109	107
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	118	117
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	110	106
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	123	117
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	103	103
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	<0.05	<0.05	0	134	124
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	116	1	115	117	2	108	104

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	18/03/2022	18/03/2022		[NT]	[NT]
Date analysed	-			[NT]	11	18/03/2022	18/03/2022		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	11	2.5	1.6	44	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	11	0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	11	0.2	0.2	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	11	0.7	1	35	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	11	1.3	1.2	8	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	11	0.5	0.4	22	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	11	0.1	<0.1	0	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	11	0.1	<0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	11	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	11	<0.05	<0.05	0	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	11	108	113	5	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-8	291268-10
Date prepared	-			18/03/2022	9	18/03/2022	18/03/2022		18/03/2022	18/03/2022
Date analysed	-			18/03/2022	9	18/03/2022	18/03/2022		18/03/2022	18/03/2022
Arsenic	mg/kg	4	Metals-020	<4	9	<4	<4	0	98	101
Cadmium	mg/kg	0.4	Metals-020	<0.4	9	<0.4	<0.4	0	97	97
Chromium	mg/kg	1	Metals-020	<1	9	2	2	0	98	98
Copper	mg/kg	1	Metals-020	<1	9	2	1	67	97	100
Lead	mg/kg	1	Metals-020	<1	9	6	5	18	100	96
Mercury	mg/kg	0.1	Metals-021	<0.1	9	<0.1	<0.1	0	99	100
Nickel	mg/kg	1	Metals-020	<1	9	1	1	0	99	101
Zinc	mg/kg	1	Metals-020	<1	9	18	16	12	100	101

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures.
We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.
Note: Samples 291268-9 to 11 were sub-sampled from jars provided by the client.

TRH Soil C10-C40 NEPM - # Percent recovery for the surrogate/matrix spike is not possible to report as the high concentration of analytes in sample 291268-7 and 11 have caused interference.

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	39961.11	**Suburb:**	Wickham	**To:**	Envirolab
Project Name:	Wickham	**Order Number**	230435		
Project Manager:	Patrick Heads	**Sampler:**	JCL	**Attn:**	Simon
Emails:				**Phone:**	02 99106200
Date Required:	Same day ☒ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☐			**Email:**	
Prior Storage:	☒ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)		

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil W - water)	Container Type (G - glass P - plastic)	Analytes: Heavy Metals	OCP/OPP PCB	TRH and BTEX	PAH	Total Phenols	Asbestos ID 40 g	Lead			Notes/preservation
VT1	1	17/03/22	S	G			✓	✓						Envirolab Services 12 Ashley St Chatswood NSW 2067 Ph: (02) 9910 6200
VT2	2	17/03/22	S	G			✓	✓						Job No: 291268
VT3	3	17/03/22	S	G			✓	✓						Date Received: 18/3/22
VT4	4	17/03/22	S	G			✓	✓						Time Received: 10:30
VT5	5	17/03/22	S	G			✓	✓						Received By:
VT6	6	17/03/22	S	G			✓	✓						Temp: Cool/Ambient
VT7	7	17/03/22	S	G			✓	✓						Cooling: Ice/icepack
VT8	8	17/03/22	S	G			✓	✓						Security: Intact/Broken/None
TS1	9	17/03/22	S	G	✓		✓	✓		✓				
TS2	10	17/03/22	S	G	✓		✓	✓		✓				
TS3	11	17/03/22	S	G	✓		✓	✓		✓				
VTD1	12	17/03/22	S	G			✓	✓						
PQL (S) mg/kg														ANZECC PQLs req'd for all water analytes

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container:	15	**Relinquished by:**	PH	**Transported to laboratory by:**	Fedex
Send Results to:	Douglas Partners Pty Ltd	**Address**		**Phone:**	**Fax:**
Signed:		**Received by:**		**Date & Time:**	18/3/22 10:30

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Newcastle
Attention	Patrick Heads

Sample Login Details

Your reference	39961.11, Wickham
Envirolab Reference	291268
Date Sample Received	18/03/2022
Date Instructions Received	18/03/2022
Date Results Expected to be Reported	18/03/2022

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	12 Soil
Turnaround Time Requested	Same day
Temperature on Receipt (°C)	6
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Acid Extractable metalsin soil	Asbestos ID - soils
VT1	✓	✓	✓		
VT2	✓	✓	✓		
VT3	✓	✓	✓		
VT4	✓	✓	✓		
VT5	✓	✓	✓		
VT6	✓	✓	✓		
VT7	✓	✓	✓		
VT8	✓	✓	✓		
TS1	✓	✓	✓	✓	✓
TS2	✓	✓	✓	✓	✓
TS3	✓	✓	✓	✓	✓
VTD1	✓	✓	✓		

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

Asbestos Materials Clearance Inspection Report

10 Dangar Street, Wickham NSW

Prepared for: Drumderg Services Pty Ltd

21.1577 | CLR2 | Date:22 December 2021

Document information

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V1D	22/12/2021	Joshua Foy	Draft for internal review	Cameron Mitchell
V1F	22/12/2021	Joshua Foy	Final for issue	Cameron Mitchell

For and on behalf of
ADE Consulting Group Pty Ltd
ABN: 14 617 358 808

Reviewed & issued by:

Cameron Mitchell
Project Manager
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SafeWork NSW LAA001292

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Executive summary

ADE Consulting Group Pty Ltd (ADE) was commissioned by Drumderg Services Pty Ltd (Drumderg) to undertake a visual asbestos materials clearance inspection at 10 Dangar Street, Wickham NSW. The inspection was commissioned following the removal of non-friable (bonded) asbestos containing material (ACM) in the form of asbestos containing (AC) fibre cement fragments and associated soils.

The removal of the ACM was undertaken by Drumderg, a licensed asbestos removal company on the 15 December 2021. The asbestos materials clearance inspection was undertaken on 15 December 2021. The inspection was carried out by Joshua Foy, an occupational hygienist representing ADE.

The subject area of the inspection was defined as:

- 10 Dangar Street, Wickham NSW, soil surface excluding northeast corner (approximately 150m^2) and surrounding batter (approximately 1m in from site boundary), former location of AC fibre cement fragments and associated soils.

Following the removal of the ACM from within the subject area, a visual inspection certificate was issued to Drumderg. The inspection revealed no visible or accessible asbestos remaining within the subject area at the time of the inspection.

Airborne asbestos monitoring (AAM) conducted during the removal of the non-friable (bonded) ACM revealed the concentrations of airborne fibres were below the detection limit of 0.01 fibres/mL.

Based on the information presented in this report, it is the opinion of ADE that:

- the ACM had been removed to a satisfactory standard
- AAM undertaken during the removal works revealed that the airborne fibre concentrations were below the detection limit of the method
- the subject area at the time of inspection was considered safe with regard to the asbestos hazard
- ACM and associated soils may still remain within the northeast corner and within the surrounding batter at the site and are excluded from this scope of works
- please remain diligent and adhere to the limitations (refer *Appendix III – Statement of limitations*) and restrictions (*Section 2.4*) stated within this report.

1 Introduction

1.1 Background

ADE was commissioned by Drumderg to undertake a visual asbestos materials clearance inspection at 10 Dangar Street, Wickham NSW. The inspection was commissioned following the removal of non-friable (bonded) ACM in the form of AC fibre cement fragments and associated soils.

The removal of the ACM was undertaken by Drumderg, a licensed asbestos removal company on 15 December 2021. The asbestos materials clearance inspection was undertaken on 15 December 2021. The inspection was carried out by Joshua Foy, an occupational hygienist representing ADE.

Table 1. Summary of site information.

Site details	
Client name:	Drumderg Services Pty Ltd
ADE project number:	21.1577
Site address:	10 Dangar Street, Wickham NSW
Removal contractor:	Drumderg Services Pty Ltd
Date of field work:	15/12/2021
Date of inspection:	15/12/2021
Date of report:	22/12/2021
Subject areas:	The subject area of the inspection was defined as: • 10 Dangar Street, Wickham NSW, soil surface excluding northeast corner (approximately 150m^2) and surrounding batter (approximately 1m in from site boundary), former location of AC fibre cement fragments and associated soils.

1.2 Scope of work

The scope of work included the following:

- developing a site-specific safety, health, environment, and quality work method statement prior to undertaking the inspections
- conducting airborne asbestos monitoring during the removal works
- conduct laboratory analysis of all air monitoring samples by a national association of testing authorities (NATA) accredited laboratory
- visually inspect the subject area following removal works
- prepare an asbestos materials clearance inspection report outlining the site data and conclusions.

1.3 Legislative requirements

The survey works, and production of this report have been undertaken in accordance with the requirements of:

- *Work Health and Safety Regulation* (2017)
- *Work Health and Safety Act* (2011)
- *Guidance Note on Membrane Filter Method for Estimating Airborne Asbestos Fibres* 2nd Edition [NOHSC:3003 (2005)]
- SafeWork NSW *Code of Practice: How to manage and control asbestos in the workplace* (2019)
- SafeWork NSW *Code of Practice: How to safely remove asbestos* (2019).

1.4 Whole report

No one section or part of a section of this report should be taken as giving an overall idea of this report. Each section must be read in conjunction with the entire report, including its appendices and attachments.

2 Inspection details

2.1 General

Visual examination of the subject area on 15 December 2021 following the removal works, revealed the non-friable (bonded) ACM in the form of AC fibre cement fragments and associated soils had been removed to a satisfactory standard. No debris associated with the asbestos removal works were observed on the surfaces within the subject area at the time of the inspection (refer *Appendix II – Photographs*).

The removal works were undertaken in accordance with the SafeWork NSW Code of Practice: *How to safely remove asbestos* (2019) by Drumderg, a SafeWork NSW Class A licensed asbestos removal contractor. The ACM was disposed of at a licensed asbestos waste-receiving facility.

2.2 Air monitoring

Airborne fibre monitoring was completed using 25 mm cowls over the course of the removal works in accordance with the Guidance Note on Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003 (2005)]. These samples were submitted and assessed by a NATA accredited laboratory. The monitoring revealed that the airborne fibre concentration was below the detection limit of the method, being <0.01 fibres/mL of air (refer *Appendix IV – Analytical reports*).

2.3 Onsite visual asbestos clearance certificate

Following inspection of the subject area on 15 December 2021, an onsite visual asbestos clearance certificate was issued to Drumderg outlining that no visual asbestos was observed within the subject area (refer *Appendix V – Onsite visual asbestos clearance certificate*). This was to be considered an interim clearance to be issued to Drumderg while awaiting this detailed clearance inspection report.

2.4 Restrictions on survey / areas not accessed

Please note this report does not include any subsurface or adjacent areas to the subject area, including the northeast corner and surrounding batter. These areas are considered outside the scope of this report and therefore may still have ACM. Please remain diligent and contact ADE immediately should any further contamination be discovered.

3 Conclusions

Based on the information presented in this report, it is the opinion of ADE that:

- visual examination of the subject area following the removal works revealed the non-friable (bonded) ACM had been removed to a satisfactory standard
- AAM undertaken during the removal works revealed that the airborne fibre concentrations were below the detection limit of the method
- the subject area at the time of the inspection was considered safe with regard to the asbestos hazard
- ACM and associated soils may still remain within the northeast corner and within the surrounding batter at the site and are excluded from this scope of works
- please remain diligent and adhere to the limitations (refer *Appendix III – Statement of limitations*) and restrictions (*Section 2.4*) stated within this report.

Appendix I – Aerial photograph

Figure 1. Location of subject area (green outline). Site boundary (orange outline) and northeast corner excluded from this clearance (red outline) (map adapted from SIX Maps accessed on 9/12/2021).

Appendix II – Photographs

Photograph 1. Southwest corner of site following removal of ACM and associated soils (image facing south, as observed on 15/12/2021).

Photograph 2. Southwest corner of site following removal of ACM and associated soils (image facing south-west, as observed on 15/12/2021).

Photograph 3. Southeast corner of site following removal of ACM and associated soils (image facing east, as observed on 15/12/2021).

Photograph 4. Southeast corner of site following removal of ACM and associated soils (image facing south, as observed on 15/12/2021).

Photograph 5. Northeast corner of site following removal of ACM and associated soils (image facing north-east, as observed on 15/12/2021).

Photograph 6. Central portion of site following removal of ACM and associated soils (image facing south-west, as observed on 15/12/2021).

Appendix III – Statement of limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only and has been based on information provided by the client. The advice herein relates only to this project and all results, conclusions and recommendations made should be reviewed by a competent and experienced person with experience in occupational hygiene, before being used for any other purpose ADE accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced or amended in any way without prior approval by the client or ADE and should not be relied upon by any other party, who should make their own independent enquiries.

This report does not provide a complete assessment of the status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, ADE reserves the right to review the report in the context of the additional information.

ADE's professional opinions are based upon its professional judgment, experience, training, and results from analytical data. In some cases, further testing and analysis may be required, thus producing different results and / or opinions. ADE has limited investigation to the scope agreed upon with its client.

ADE has used a degree of care and skill ordinarily exercised in similar investigations by reputable members of the environmental industry within Australia. No other warranty, expressed or implied, is made or intended.

Appendix IV – Analytical reports

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EN2110793**	Page	: 1 of 2
Client	: **ADE Consulting Group Pty Ltd**	Laboratory	: Environmental Division Newcastle
Contact	: MR CAMERON MITCHELL	Contact	: Jason Dighton
Address	: 9/103 GLENWOOD DRIVE THORNTON NSW 2322	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
Telephone	: ----	Telephone	: +61 2 4014 2500
Project	: 21.1577	Date Samples Received	: 06-Dec-2021 15:56
Order number	: ----	Date Analysis Commenced	: 07-Dec-2021
C-O-C number	: ----	Issue Date	: 07-Dec-2021 17:11
Sampler	: Joshua Foy		
Site	: ----		
Quote number	: EN/097/21		
No. of samples received	: 5		
No. of samples analysed	: 5		

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Brendan Schrader	Laboratory Technician	Newcastle - Asbestos, Mayfield West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EA205: Analysis conducted in accordance with Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003 (2005)] and ALS supplementary method EA205.
- EA205: NATA accreditation does not cover the performance of air Volume measurements or results reported as Fibres/mL
- NATA accreditation is not held for results reported in µg/m³. Concentration in µg/m³ is calculated from air volume data provided by the client.

Analytical Results

Sub-Matrix: **FILTER** (Matrix: **AIR**)			Sample ID	**CW33849**	**CW330884**	**CW330850**	**CW330890**	**CW330876**
			Sampling date / time	06-Dec-2021 00:00	06-Dec-2021 00:00	06-Dec-2021 00:00	06-Dec-2021 00:00	06-Dec-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**EN2110793-001**	**EN2110793-002**	**EN2110793-003**	**EN2110793-004**	**EN2110793-005**
				Result	Result	Result	Result	Result
EA205: Asbestos Fibre Count by MFM								
ø **Fibre Concentration**	----	0.01	fibres/mL	<0.01	<0.01	<0.01	<0.01	**----**
Fibre Count	----	0.5	No.	<0.5	<0.5	<0.5	<0.5	<0.5
Fields Counted	----	20	No.	**100**	**100**	**100**	**100**	**100**
ø **Volume**	----	1	L	**698**	**698**	**698**	**698**	**----**
Total Number of Fibres	----	10.0	Fibres/100 Fields	**----**	**----**	**----**	**----**	<10.0
APPROVED COUNTER:	----	-	-	**B.SCHRADER**	**B.SCHRADER**	**B.SCHRADER**	**B.SCHRADER**	**B.SCHRADER**

ADE Consulting Group Pty Ltd	PM-F-07b1a Chain of Custody and Order (External)	Page: 1 of 1 Date: 21/12/2020

Job Number: 21.1577

From: ADE Consulting Group Pty Ltd
Unit 9 / 103 Glenwood Drive,
Thornton NSW 2322
Phone: (02) 8541 7214
Email: info@ade.group

To: ALS Global
ALS Newcastle

Attention:

QUOTE NUMBER: EN/097/20
ALS ACCOUNT ID: ADENVT

Sampler: Joshua Foy (print name) (signature) Date: 06.12.21

Delivery: Joshua Foy (print name) (signature) Date: 06.12.21

Received for Laboratory: KS (print name) (signature) Date: 6.12.21 3:56pm

DETAILS OF SAMPLE					ANALYSIS REQUIRED			
Laboratory Sample ID	Sample Date	ADE Sample ID	Sample Type	Container & Preservation	TAM Asbestos Fibre Count			
	06.12.21	CW330849	Filter	Cowl	x			
		CW330854			x			
		CW330850			x			
		CW330890			x			
		CW330876			x			

Environmental Division
Newcastle
Work Order Reference
EN2110793

Further instructions:

1. Invoices are required to be sent to accounts@ade.group instead of sending them to your contact person. ADE Consulting Group Pty Ltd will not be processing any invoices going forward unless they are emailed to this address.

2. Please analyse all samples on 24hr TAT and report results to -Cameron.Mitchell@ade.group

ADECONSULTINGGROUP

OH-AAM-F-01 Airborne Asbestos Monitoring Data Sheet

) No: 21·1577 Client Name: Drumderg Services Date: 06·12·21

) Location: Bowline - 10 Dangar St, Wilchamm NSW, Removal Contractor: Drumderg Services Field Officer/Certificate ID: JF CON-054

vice used to control the time: ✓ Mobile Phone Id number 0415 302 621 / □ Pumps Flowmeter No./CAL Due Date: FF73 / 26·07·22

Field													Lab	
Sample number	Canister number	Filter Check	Sample Type[1]	Monitor location number	Monitor locations	Pump Air flow on	Pump Air flow off	Difference of flow less than 10%? Yes/No	Time on	Time off	Pump number	Pump Calibration Due Date	Total Minutes	Fibre count
	CV330849	✓	1	1	Exclusion zone boundary, west, attached to temp fence, approx 1.8m AGL.	A 1·5 C	1·5	Y	0720	1505	296	26·07·22		
	CV330889	✓	1	2	Exclusion zone boundary, north, attached to temp fence, approx 1.8 – AGL.	A C		Y	0721	1506	297			
	CV330850	✓	1	3	Exclusion zone boundary, east, attached to temp fence, approx 1.8m AGL.	A C		Y	0722	1507	298			
	CV330890	✓	1	4	Exclusion zone boundary, south, attached to temp fence, approx 1.8m AGL.	A C		Y	0723	1508	299			
	CV330876	✓	6	–	BLANK	A C		Y						

mple types: 1 - Removal 2 - Bag Removal 3 - Enclosure Dismantling 4 - Clearance 5 - Background 6 - Blank 7 - Sheet-up 8 – Personal Monitoring A - actual C – calibrated

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ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EN2110829**	Page	: 1 of 2
Client	: **ADE Consulting Group Pty Ltd**	Laboratory	: Environmental Division Newcastle
Contact	: MR CAMERON MITCHELL	Contact	: Jason Dighton
Address	: 9/103 GLENWOOD DRIVE THORNTON NSW 2322	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
Telephone	: ----	Telephone	: +61 2 4014 2500
Project	: 21.1577	Date Samples Received	: 07-Dec-2021 16:06
Order number	: ----	Date Analysis Commenced	: 08-Dec-2021
C-O-C number	: ----	Issue Date	: 08-Dec-2021 16:22
Sampler	: Joshua Foy		
Site	: ----		
Quote number	: EN/097/21		
No. of samples received	: 5		
No. of samples analysed	: 5		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Brendan Schrader	Laboratory Technician	Newcastle - Asbestos, Mayfield West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EA205: Analysis conducted in accordance with Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003 (2005)] and ALS supplementary method EA205.
- EA205: NATA accreditation does not cover the performance of air Volume measurements or results reported as Fibres/mL
- NATA accreditation is not held for results reported in µg/m³. Concentration in µg/m³ is calculated from air volume data provided by the client.

Analytical Results

Sub-Matrix: **FILTER** (Matrix: **AIR**)			Sample ID	**CW330851**	**CW330862**	**CW330937**	**CW330840**	**CW330847**
			Sampling date / time	07-Dec-2021 00:00	07-Dec-2021 00:00	07-Dec-2021 00:00	07-Dec-2021 00:00	07-Dec-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**EN2110829-001**	**EN2110829-002**	**EN2110829-003**	**EN2110829-004**	**EN2110829-005**
				Result	Result	Result	Result	Result
EA205: Asbestos Fibre Count by MFM								
ø **Fibre Concentration**	----	0.01	fibres/mL	<0.01	<0.01	<0.01	<0.01	**----**
Fibre Count	----	0.5	No.	<0.5	<0.5	<0.5	**1.0**	<0.5
Fields Counted	----	20	No.	**100**	**100**	**100**	**100**	**100**
ø **Volume**	----	1	L	**652**	**652**	**652**	**652**	**----**
Total Number of Fibres	----	10.0	Fibres/100 Fields	**----**	**----**	**----**	**----**	<10.0
APPROVED COUNTER:	----	-	-	**B.SCHRADER**	**B.SCHRADER**	**B.SCHRADER**	**B.SCHRADER**	**B.SCHRADER**

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

BRISBANE 2 Byth Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com

MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com

MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

MUDGEE 1/29 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

NEWCASTLE 5/585 Maitland Road Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com

PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: [illegible].sydney@alsglobal.com

[illegible] 14-[illegible] Desma Court Bohle QLD 4818 Ph: 07 47[illegible] E: [illegible]vesville.environmental@alsglobal.com

WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

TAT

CLIENT: ADE Consulting Group	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)	☐ Standard TAT (List due date): 24 hr TAT (8-12-21)	FOR LABORATORY USE ONLY (Circle)
OFFICE: Thornton / Newcastle		☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes No N/A
PROJECT: Bowline - 10 Dangar, 57 Withm PROJECT NO.: 211577	ALS QUOTE NO.: EN/097/20	COC SEQUENCE NUMBER (Circle) COC: 1 2 3 4 5 6 7	Free Ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: PURCHASE ORDER NO.:	COUNTRY OF ORIGIN:	OF: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: Cameron Mitchell	CONTACT PH: 0450 603 362		Other comment:
SAMPLER: Joshua Foy	SAMPLER MOBILE: 0415 302 621	RELINQUISHED BY:	RECEIVED BY: KS
COC Emailed to ALS? (YES / (NO)	EDD FORMAT (or default):		DATE/TIME: 7-12-21 4.06pm
Email Reports to (will default to PM if no other addresses are listed): cameron.mitchell@ade-group		DATE/TIME: 07-12-21 3:57pm	RELINQUISHED BY: DATE/TIME:
Email Invoice to (will default to PM if no other addresses are listed): as above			RECEIVED BY: DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	Asbestos Air Monitoring Fibre Count								Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	CW330851	07-12-21	Filter	Cowl		x								
	CW330862					x								
	CW330937					x								
	CW330840					x								
	CW330847					x								
				TOTAL										

Environmental Division Newcastle
Work Order Reference
EN2110829

Telephone : [illegible]

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

ADECONSULTINGGROUP

OH-AAM-F-01 Airborne Asbestos Monitoring Data Sheet

Job No: 21·1577 **Client Name:** Drummderg Services **Date:** 07·12·21

Location: Bowline - 10 Danger St, Wickham NSW. **Removal Contractor:** Drummderg Services **Field Officer/Certificate ID:** JF CON-054

Device used to control the time: ✓ **Mobile Phone Id number** 0415 302 621 / □ **Pumps** **Flowmeter No./CAL Due Date:** FF73 / 26·07·22

Field													Lab	
Sample number	Canister number	Filter Check	Sample Type[1]	Monitor location number	Monitor locations	Pump Air flow		Difference of flow less than 10%? Yes/No	Time		Pump number	Pump Calibration Due Date	Total Minutes	Fibre count
						on	off		on	off				
	CW 330851	✓	1	1	Exclusion zone boundary, west, attached to temp fence, approx 1.8m AGL.	A 1.5 C	1.5	Y	0735	1450	296	26.07.22		
	CW 330862	✓	1	2	Exclusion zone boundary, north, attached to temp fence, approx 1.8m AGL.	A C		Y	0736	1451	297			
	CW 330935	✓	1	3	Exclusion zone boundary, east, attached to temp fence, approx 1.8m AGL.	A C		Y	0737	1452	298			
	CW 330940	✓	1	4	Exclusion zone boundary, south, attached to temp fence, approx 1.8m AGL.	A C		Y	0738	1453	299			
	CW 330847	✓	6	–	BLANK	A C								

Sample types: 1 - Removal 2 - Bag Removal 3 - Enclosure Dismantling 4 - Clearance 5 - Background 6 - Blank 7 - Sheet-up 8 – Personal Monitoring A - actual C – calibrated

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ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EN2110875**	Page	: 1 of 2
Client	: **ADE Consulting Group Pty Ltd**	Laboratory	: Environmental Division Newcastle
Contact	: MR CAMERON MITCHELL	Contact	: Jason Dighton
Address	: 9/103 GLENWOOD DRIVE THORNTON NSW 2322	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
Telephone	: ----	Telephone	: +61 2 4014 2500
Project	: 21.1577	Date Samples Received	: 08-Dec-2021 16:23
Order number	: ----	Date Analysis Commenced	: 10-Dec-2021
C-O-C number	: ----	Issue Date	: 10-Dec-2021 14:11
Sampler	: Joshua Foy		
Site	: ----		
Quote number	: EN/097/21		
No. of samples received	: 5		
No. of samples analysed	: 5		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

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- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Alana Smylie	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EA205: Analysis conducted in accordance with Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003 (2005)] and ALS supplementary method EA205.
- EA205: NATA accreditation does not cover the performance of air Volume measurements or results reported as Fibres/mL
- NATA accreditation is not held for results reported in µg/m³. Concentration in µg/m³ is calculated from air volume data provided by the client.

Analytical Results

Sub-Matrix: **FILTER** (Matrix: **AIR**)			Sample ID	**CW330864**	**CW330879**	**CW330845**	**CW330880**	**CW330858**
			Sampling date / time	08-Dec-2021 00:00	08-Dec-2021 00:00	08-Dec-2021 00:00	08-Dec-2021 00:00	08-Dec-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**EN2110875-001**	**EN2110875-002**	**EN2110875-003**	**EN2110875-004**	**EN2110875-005**
				Result	Result	Result	Result	Result
EA205: Asbestos Fibre Count by MFM								
ø **Fibre Concentration**	----	0.01	fibres/mL	<0.01	<0.01	<0.01	<0.01	**----**
Fibre Count	----	0.5	No.	**1.0**	<0.5	**1.0**	<0.5	<0.5
Fields Counted	----	20	No.	**100**	**100**	**100**	**100**	**100**
ø **Volume**	----	1	L	**714**	**714**	**714**	**714**	**----**
Total Number of Fibres	----	10.0	Fibres/100 Fields	**----**	**----**	**----**	**----**	<10.0
APPROVED COUNTER:	----	-	-	**J.SPOONER**	**J.SPOONER**	**J.SPOONER**	**J.SPOONER**	**J.SPOONER**

Job Number: 21-1577

From: ADE Consulting Group Pty Ltd
Unit 9 / 103 Glenwood Drive,
Thornton NSW 2322
Phone: (02) 8541 7214
Email: info@ade.group

To: ALS Global
ALS Newcastle

Attention:

ADE CONSULTING GROUP

QUOTE NUMBER: EN/097/20

ALS ACCOUNT ID: ADENVT

Sampler: Joshua Foy (print name) (Signature) Date: 08.12.21

Delivery: Joshua Foy (print name) (Signature) Date: 08-12-21

Received for Laboratory: CL (print name) 8.12.21 (signature) Date: 4:23

DETAILS OF SAMPLE					ANALYSIS REQUIRED			
Laboratory Sample ID	Sample Date	ADE Sample ID	Sample Type	Container & Preservation	Asbestos Air Monitoring Fibre Count			
	08-12-21	cw330864	Filter	Cowl	x			
		cw330879			x			
		cw330845			x			
		cw330880			x			
	↓	cw330958	↓	↓	x			

Environmental Division
Newcastle
Work Order Reference
EN2110875

Telephone - 61 2 4014 2500

Further instructions:

1. Invoices are required to be sent to accounts@ade.group instead of sending them to your contact person. ADE Consulting Group Pty Ltd will not be processing any invoices going forward unless they are emailed to this address.

2. Please analyse all samples on 24hr TAT (09.12.21) and report results to -Cameron.Mitchell@ade.group

ADECONSULTINGGROUP

OH-AAM-F-01 Airborne Asbestos Monitoring Data Sheet

› No: 21·1577 Client Name: Drumderg Services Date: 08.12.21

› Location: Bowline - 10 Dangar St, Wickham NSW Removal Contractor: Drumderg Services Field Officer/Certificate ID: JF CON-054

vice used to control the time: ✓ Mobile Phone Id number 0415 302 621 / □ Pumps Flowmeter No./CAL Due Date: FF73 / 26.07.22

Field													Lab	
Sample number	Canister number	Filter Check	Sample Type[1]	Monitor location number	Monitor locations	Pump Air flow on	Pump Air flow off	Difference of flow less than 10%? Yes/No	Time on	Time off	Pump number	Pump Calibration Due Date	Total Minutes	Fibre count
	CW 330864	✓	1	1	Exclusion zone boundary, west, attached to temp fence, approx 1.8m AGL.	A 1.5 C	1.5	Y	0730	1526	296	26.07.22		
	CW 330879	✓	1	2	Exclusion zone boundary, north, attached to temp fence, approx 1.8m AGL.	A C		Y	0731	1527	300			
	CW 330845	✓	1	3	Exclusion zone boundary, east, attached to temp fence, approx 1.8m AGL.	A C		Y	0732	1528	298			
	CW 330880	✓	1	4	Exclusion zone boundary, south, attached to temp fence, approx 1.8m AGL.	A C		Y	0733	1529	299			
	CW 330858	✓	6	–	BLANK	A C								

ımple types: 1 - Removal 2 - Bag Removal 3 - Enclosure Dismantling 4 - Clearance 5 - Background 6 - Blank 7 - Sheet-up 8 – Personal Monitoring A - actual C – calibrated

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ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EN2110925**	Page	: 1 of 2
Client	: **ADE Consulting Group Pty Ltd**	Laboratory	: Environmental Division Newcastle
Contact	: MR CAMERON MITCHELL	Contact	: Jason Dighton
Address	: 9/103 GLENWOOD DRIVE THORNTON NSW 2322	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
Telephone	: ----	Telephone	: +61 2 4014 2500
Project	: 21.1577	Date Samples Received	: 09-Dec-2021 16:15
Order number	: ----	Date Analysis Commenced	: 10-Dec-2021
C-O-C number	:	Issue Date	: 10-Dec-2021 16:52
Sampler	: Joshua Foy		
Site	: ----		
Quote number	: EN/097/21		
No. of samples received	: 5		
No. of samples analysed	: 5		

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Alana Smylie	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EA205: Analysis conducted in accordance with Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003 (2005)] and ALS supplementary method EA205.
- EA205: NATA accreditation does not cover the performance of air Volume measurements or results reported as Fibres/mL
- NATA accreditation is not held for results reported in µg/m³. Concentration in µg/m³ is calculated from air volume data provided by the client.

Analytical Results

Sub-Matrix: **FILTER** (Matrix: **AIR**)			Sample ID	**CW330831**	**CW330942**	**CW330873**	**CW330868**	**CW330935**
			Sampling date / time	09-Dec-2021 00:00	09-Dec-2021 00:00	09-Dec-2021 00:00	09-Dec-2021 00:00	09-Dec-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**EN2110925-001**	**EN2110925-002**	**EN2110925-003**	**EN2110925-004**	**EN2110925-005**
				Result	Result	Result	Result	Result
EA205: Asbestos Fibre Count by MFM								
ø **Fibre Concentration**	----	0.01	fibres/mL	<0.01	<0.01	<0.01	<0.01	**----**
Fibre Count	----	0.5	No.	<0.5	**2.0**	**2.0**	<0.5	<0.5
Fields Counted	----	20	No.	**100**	**100**	**100**	**100**	**100**
ø **Volume**	----	1	L	**690**	**690**	**690**	**690**	**----**
Total Number of Fibres	----	10.0	Fibres/100 Fields	**----**	**----**	**----**	**----**	<10.0
APPROVED COUNTER:	----	-	-	**A. SMYLIE**	**A. SMYLIE**	**A. SMYLIE**	**A. SMYLIE**	**A. SMYLIE**

ADE Consulting Group Pty Ltd	PM-F-07b1a Chain of Custody and Order (External)	Page: 1 of 1 Date: 21/12/2020

Job Number: 21.1577

From: ADE Consulting Group Pty Ltd
Unit 9 / 103 Glenwood Drive,
Thornton NSW 2322
Phone: (02) 8541 7214
Email: info@ade.group

To: ALS Global
ALS Newcastle

Attention:

ADE CONSULTING GROUP

QUOTE NUMBER: EN/097/20

ALS ACCOUNT ID: ADENVT

Sampler: Joshua Foy (print name) (Signature) Date: 09.12.21

Delivery: Joshua Foy (print name) (Signature) Date: 09.12.21

Received for Laboratory: K.S (print name) (signature) Date: 9/12/21 4:15pm

DETAILS OF SAMPLE					ANALYSIS REQUIRED			
Laboratory Sample ID	Sample Date	ADE Sample ID	Sample Type	Container & Preservation	Asbestos Air Monitoring Fibre Count			
	09-12-21	cw330831	Filter	Cowl	x			
		cw330942			x			
		cw330873			x			
		cw330868			x			
	↓	cw330935	↓	↓	x			

Environmental Division
Newcastle
Work Order Reference
EN2110925

Telephone : +61 2 4014 2500

Further instructions:

1. Invoices are required to be sent to **accounts@ade.group** instead of sending them to your contact person. ADE Consulting Group Pty Ltd will not be processing any invoices going forward unless they are emailed to this address.

2. Please analyse all samples on 24hr TAT (10.12.21) and report results to -Cameron.Mitchell@ade.group

ADECONSULTINGGROUP

OH-AAM-F-01 Airborne Asbestos Monitoring Data Sheet

No: 21·1577 Client Name: Drumderg Services Date: 09·12·21

Location: Bowline - 10 Dangar St, Wickham NSW Removal Contractor: Drumderg Services Field Officer/Certificate ID: JF CON-054

vice used to control the time: ✓ Mobile Phone Id number 0415 302 621 / □ Pumps Flowmeter No./CAL Due Date: FF73 / 26-07-22

Sample number	Canister number	Filter Check	Sample Type[1]	Monitor location number	Monitor locations	Field: Pump Air flow on	Field: Pump Air flow off	Field: Difference of flow less than 10%? Yes/No	Field: Time on	Field: Time off	Field: Pump number	Field: Pump Calibration Due Date	Lab: Total Minutes	Lab: Fibre count
	CV 330831	✓	1	1	Exclusion zone boundary, west, attached to temp fence, approx 1.8m AGL.	A 1·5 C	1·5	Y	0730	1510	296	26·07·22		
	CV 330462	✓	1	2	Exclusion zone boundary, north, attached to temp fence, approx 1.8m AGL.	A C		X	0731	1511	297			
	CV 330875	✓	1	3	Exclusion zone boundary, east, attached to temp fence, approx 1.8m AGL.	A C		Y	0732	1512	298			
	CV 330868	✓	1	4	Exclusion zone boundary, south, attached to temp fence approx 1.8m AGL.	A C		Y	0733	1513	299			
	CV 330935	✓	6	-	BLANK	A C					-			

Sample types: 1 - Removal 2 - Bag Removal 3 - Enclosure Dismantling 4 - Clearance 5 - Background 6 - Blank 7 - Sheet-up 8 – Personal Monitoring A - actual C – calibrated

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ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EN2111076**	Page	: 1 of 2
Client	: **ADE Consulting Group Pty Ltd**	Laboratory	: Environmental Division Newcastle
Contact	: MR CAMERON MITCHELL	Contact	: Jason Dighton
Address	: 9/103 GLENWOOD DRIVE THORNTON NSW 2322	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
Telephone	: ----	Telephone	: +61 2 4014 2500
Project	: 21.1577	Date Samples Received	: 13-Dec-2021 16:00
Order number	: ----	Date Analysis Commenced	: 13-Dec-2021
C-O-C number	: ----	Issue Date	: 14-Dec-2021 16:48
Sampler	: Joshua Foy		
Site	: ----		
Quote number	: EN/097/21		
No. of samples received	: 5		
No. of samples analysed	: 5		

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with ISO/IEC 17025 - Testing

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This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

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Signatories

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Signatories	*Position*	*Accreditation Category*
Alana Smylie	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW

General Comments

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^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

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- EA205: NATA accreditation does not cover the performance of air Volume measurements or results reported as Fibres/mL
- NATA accreditation is not held for results reported in µg/m³. Concentration in µg/m³ is calculated from air volume data provided by the client.

Analytical Results

Sub-Matrix: **FILTER** (Matrix: **AIR**)			Sample ID	**CW331305**	**CW330882**	**CW330870**	**CW330891**	**CW330837**
			Sampling date / time	13-Dec-2021 00:00	13-Dec-2021 00:00	13-Dec-2021 00:00	13-Dec-2021 00:00	13-Dec-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**EN2111076-001**	**EN2111076-002**	**EN2111076-003**	**EN2111076-004**	**EN2111076-005**
				Result	Result	Result	Result	Result
EA205: Asbestos Fibre Count by MFM								
ø **Fibre Concentration**	----	0.01	fibres/mL	<0.01	<0.01	<0.01	<0.01	**----**
Fibre Count	----	0.5	No.	<0.5	<0.5	**1.0**	<0.5	<0.5
Fields Counted	----	20	No.	**100**	**100**	**100**	**100**	**100**
ø **Volume**	----	1	L	**675**	**675**	**675**	**675**	**----**
Total Number of Fibres	----	10.0	Fibres/100 Fields	**----**	**----**	**----**	**----**	<10.0
APPROVED COUNTER:	----	-	-	**J. SPOONER**	**J. SPOONER**	**J. SPOONER**	**J. SPOONER**	**J. SPOONER**

ADE Consulting Group Pty Ltd	PM-F-07b1a Chain of Custody and Order (External)	Page: 1 of 1 Date: 21/12/2020

Job Number: 21.1577

From: ADE Consulting Group Pty Ltd
Unit 9 / 103 Glenwood Drive,
Thornton NSW 2322
Phone: (02) 8541 7214
Email: info@ade.group

To: ALS Global
ALS Newcastle

Attention:

TAT

ADE CONSULTING GROUP

QUOTE NUMBER: EN/097/20
ALS ACCOUNT ID: ADENVT

Sampler: Joshua Foy (print name) (signature) Date: 13.12.21

Delivery: Joshua Foy (print name) (signature) Date: 13.12.21

Received for Laboratory: T.O'BRIEN (print name) TMOBrien (signature) Date: 13/12/21 4:00pm.

DETAILS OF SAMPLE					ANALYSIS REQUIRED			
Laboratory Sample ID	Sample Date	ADE Sample ID	Sample Type	Container & Preservation	Asbestos Air Monitoring Fibre Count			
	13.12.21	CW331305	Filter	Cowl	X			
		CW330882			X			
		CW330870			X			
		CW330891			X			
		CW330837			X			

Environmental Division
Newcastle
Work Order Reference
EN2111076

Telephone : +61 2 4014 2500

Further instructions:

1. Invoices are required to be sent to **accounts@ade.group** instead of sending them to your contact person. ADE Consulting Group Pty Ltd will not be processing any invoices going forward unless they are emailed to this address.

2. Please analyse all samples on 24 hr (14.12.21) and report results to -Cameron.Mitchell@ade.group

ADECONSULTINGGROUP

OH-AAM-F-01 Airborne Asbestos Monitoring Data Sheet

) No: 21-1577 Client Name: Drumderg Services Date: 13-12-21

) Location: Bowline 10 Dangar St, Wickham NSW. Removal Contractor: Drumderg Services Field Officer/Certificate ID: JF CON-054

vice used to control the time: ✓ Mobile Phone Id number 0415 302 621 / □ Pumps Flowmeter No./CAL Due Date: FF73 / 26-07-22

Field														Lab	
Sample number	Canister number	Filter Check	Sample Type[1]	Monitor location number	Monitor locations	Pump Air flow on	Pump Air flow off	Difference of flow less than 10%? Yes/No	Time on	Time off	Pump number	Pump Calibration Due Date		Total Minutes	Fibre count
	CW 331305	✓	1	1	Exclusion zone boundary, west, attached to temp fence, approx 1.8m AGL.	A 1.5 C	1.5	Y	0730	1500	296	26-07-22			
	CW 330882	✓	1	2	Exclusion zone boundary, north, attached to temp fence, approx 1.8m AGL.	A C		Y	0731	1501	297				
	CW 330870	✓	1	3	Exclusion zone boundary, east, attached to temp fence, approx 1.8m AGL.	A C		Y	0732	1502	298				
	CW 330891	✓	1	4	Exclusion zone boundary, south, attached to temp fence, approx 1.8m AGL.	A C		Y	0733	1503	299				
	CW 330837	✓	6	-		A C									

ample types: 1 - Removal 2 - Bag Removal 3 - Enclosure Dismantling 4 - Clearance 5 - Background 6 - Blank 7 - Sheet-up 8 – Personal Monitoring A - actual C – calibrated

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ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EN2111141**	Page	: 1 of 2
Client	: **ADE Consulting Group Pty Ltd**	Laboratory	: Environmental Division Newcastle
Contact	: MR CAMERON MITCHELL	Contact	: Jason Dighton
Address	: 9/103 GLENWOOD DRIVE THORNTON NSW 2322	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
Telephone	: ----	Telephone	: +61 2 4014 2500
Project	: 21.1577	Date Samples Received	: 15-Dec-2021 16:25
Order number	: ----	Date Analysis Commenced	: 20-Dec-2021
C-O-C number	: ----	Issue Date	: 21-Dec-2021 16:04
Sampler	: Joshua Foy		
Site	: ----		
Quote number	: EN/097/21		
No. of samples received	: 5		
No. of samples analysed	: 5		

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Brendan Schrader	Laboratory Technician	Newcastle - Asbestos, Mayfield West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

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LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EA205: Analysis conducted in accordance with Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003 (2005)] and ALS supplementary method EA205.
- EA205: NATA accreditation does not cover the performance of air Volume measurements or results reported as Fibres/mL
- NATA accreditation is not held for results reported in µg/m³. Concentration in µg/m³ is calculated from air volume data provided by the client.

Analytical Results

Sub-Matrix: **FILTER** (Matrix: **AIR**)			Sample ID	**CW331075**	**CW203105**	**CW203145**	**CW203121**	**CW203115**
			Sampling date / time	15-Dec-2021 00:00	15-Dec-2021 00:00	15-Dec-2021 00:00	15-Dec-2021 00:00	15-Dec-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**EN2111141-001**	**EN2111141-002**	**EN2111141-003**	**EN2111141-004**	**EN2111141-005**
				Result	Result	Result	Result	Result
EA205: Asbestos Fibre Count by MFM								
ø **Fibre Concentration**	----	0.01	fibres/mL	<0.01	<0.01	<0.01	<0.01	**----**
Fibre Count	----	0.5	No.	**1.0**	**1.0**	<0.5	<0.5	<0.5
Fields Counted	----	20	No.	**100**	**100**	**100**	**100**	**100**
ø **Volume**	----	1	L	**700**	**700**	**700**	**700**	**----**
Total Number of Fibres	----	10.0	Fibres/100 Fields	**----**	**----**	**----**	**----**	<10.0
APPROVED COUNTER:	----	-	-	**B.SCHRADER**	**B.SCHRADER**	**B.SCHRADER**	**B.SCHRADER**	**B.SCHRADER**

Job Number: 21-1571

From: ADE Consulting Group Pty Ltd
Unit 9 / 103 Glenwood Drive,
Thornton NSW 2322
Phone: (02) 8541 7214
Email: info@ade.group

To: ALS Global
ALS Newcastle

Attention:

ADE CONSULTING GROUP

QUOTE NUMBER: EN/097/20
ALS ACCOUNT ID: ADENVT

Sampler: Joshua Foy (print name) (Signature) Date: 15-12-21

Delivery: Joshua Foy (print name) (Signature) Date: 15-12-21

Received for Laboratory: T.O'BRIEN (print name) (signature) Date: 15/12/21 4:25pm.

DETAILS OF SAMPLE					ANALYSIS REQUIRED			
Laboratory Sample ID	Sample Date	ADE Sample ID	Sample Type	Container & Preservation	Asbestos Air Monitoring Fibre Count			
	15-12-21	AW331075	Filter	Cowl	✓			
		AW203105			✓			
		AW203145			✓			
		AW203121			✓			
	↓	AW203115	↓	↓	✓			

Environmental Division
Newcastle
Work Order Reference
EN2111141

Telephone : +61 2 4014 2500

Further instructions:

1. Invoices are required to be sent to accounts@ade.group instead of sending them to your contact person. ADE Consulting Group Pty Ltd will not be processing any invoices going forward unless they are emailed to this address.

2. Please analyse all samples on _____ and report results to -Cameron.Mitchell@ade.group

e Date: 02/09/2019

ADE GROUP

OH-AAM-F-01 Airborne Asbestos Monitoring Data Sheet

› No: 21.1577 Client Name: Drumdery Services Date: 15.12.21

› Location: Bowline - 10 Dangar St, Wickham NSW. Removal Contractor: Drumdery Services Field Officer/Certificate ID: JF CON-054

vice used to control the time: ✓ Mobile Phone Id number 0415 302 621 / □ Pumps Flowmeter No./CAL Due Date: FF73 / 26.07.22

Field														Lab	
Sample number	Canister number	Filter Check	Sample Type[1]	Monitor location number	Monitor locations	Pump Air flow on	Pump Air flow off	Difference of flow less than 10%? Yes/No	Time on	Time off	Pump number	Pump Calibration Due Date		Total Minutes	Fibre count
	CW 331025	✓	1	1	Exclusion zone boundary, west, attached to temp fence, approx 1.8m AGL.	A 1.5 C	1.5	Y	0723	1510	296	26.07.22			
	CW 205105	✓	1	2	Exclusion zone boundary, north, attached to temp fence, approx 1.8m AGL.	A C		Y	0724	1511	297				
	CW 205145	✓	1	3	Exclusion zone boundary, east, attached to temp fence, approx 1.8m AGL.	A C		Y	0725	1512	298				
	CW 205121	✓	1	4	Exclusion zone boundary, south, attached to temp fence, approx 1.8m AGL.	A C		Y	0726	1513	299				
	CW 205115	✓	6	-	BLANK	A C									

ample types: 1 - Removal 2 - Bag Removal 3 - Enclosure Dismantling 4 - Clearance 5 - Background 6 - Blank 7 - Sheet-up 8 – Personal Monitoring A - actual C – calibrated

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ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EN2111222**	Page	: 1 of 2
Client	: **ADE Consulting Group Pty Ltd**	Laboratory	: Environmental Division Newcastle
Contact	: MR CAMERON MITCHELL	Contact	: Jason Dighton
Address	: 9/103 GLENWOOD DRIVE THORNTON NSW 2322	Address	: 5/585 Maitland Road Mayfield West NSW Australia 2304
Telephone	: ----	Telephone	: +61 2 4014 2500
Project	: 21.1577	Date Samples Received	: 14-Dec-2021 15:53
Order number	: ----	Date Analysis Commenced	: 20-Dec-2021
C-O-C number	: ----	Issue Date	: 21-Dec-2021 16:05
Sampler	: Joshua Foy		
Site	: ----		
Quote number	: EN/097/21		
No. of samples received	: 5		
No. of samples analysed	: 5		

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Brendan Schrader	Laboratory Technician	Newcastle - Asbestos, Mayfield West, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EA205: Analysis conducted in accordance with Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003 (2005)] and ALS supplementary method EA205.
- EA205: NATA accreditation does not cover the performance of air Volume measurements or results reported as Fibres/mL
- NATA accreditation is not held for results reported in µg/m³. Concentration in µg/m³ is calculated from air volume data provided by the client.

Analytical Results

Sub-Matrix: **FILTER** (Matrix: **AIR**)			Sample ID	**CW330830**	**CW330907**	**CW330865**	**CW330855**	**CW330955**
			Sampling date / time	14-Dec-2021 00:00	14-Dec-2021 00:00	14-Dec-2021 00:00	14-Dec-2021 00:00	14-Dec-2021 00:00
Compound	*CAS Number*	*LOR*	*Unit*	**EN2111222-001**	**EN2111222-002**	**EN2111222-003**	**EN2111222-004**	**EN2111222-005**
				Result	Result	Result	Result	Result
EA205: Asbestos Fibre Count by MFM								
ø **Fibre Concentration**	----	0.01	fibres/mL	<0.01	<0.01	<0.01	<0.01	**----**
Fibre Count	----	0.5	No.	<0.5	<0.5	<0.5	<0.5	<0.5
Fields Counted	----	20	No.	**100**	**100**	**100**	**100**	**100**
ø **Volume**	----	1	L	**660**	**660**	**660**	**658**	**----**
Total Number of Fibres	----	10.0	Fibres/100 Fields	**----**	**----**	**----**	**----**	<10.0
APPROVED COUNTER:	----	-	-	**B.SCHRADER**	**B.SCHRADER**	**B.SCHRADER**	**B.SCHRADER**	**B.SCHRADER**

Chain of Custody and Order (External)

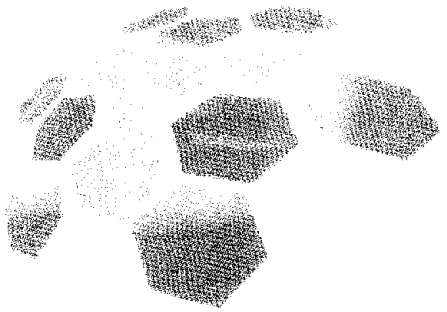
Date: 21/12/2020

Job Number: 21.1577

From: ADE Consulting Group Pty Ltd
Unit 9 / 103 Glenwood Drive,
Thornton NSW 2322
Phone: (02) 8541 7214
Email: info@ade.group

To: ALS Global
ALS Newcastle

Attention:



ADE CONSULTING GROUP

QUOTE NUMBER: EN/097/20

ALS ACCOUNT ID: ADENVT

Sampler: Joshua Foy (print name) Signature Date: 14.12.21

Delivery: Joshua Foy (print name) Signature Date: 14.12.21

Received for Laboratory: (print name) 14.12.21 (signature) Date: 3:53

DETAILS OF SAMPLE					ANALYSIS REQUIRED			
Laboratory Sample ID	Sample Date	ADE Sample ID	Sample Type	Container & Preservation	Asbestos Air Monitoring Fibre Count			
	14.12.21	CW	Filter	Cowel	x			
		CW			x			
		CW			x			
		CW			x			
		CW			x			

Environmental Division Newcastle
Work Order Reference
EN2111222

Further instructions:

1. Invoices are required to be sent to accounts@ade.group instead of sending them to your contact person. ADE Consulting Group Pty Ltd will not be processing any invoices going forward unless they are emailed to this address.

2. Please analyse all samples on _____ and report results to -Cameron.Mitchell@ade.group

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e Date: 02/09/2019

ADE GROUP

OH-AAM-F-01 Airborne Asbestos Monitoring Data Sheet

› No: 21-1577 | Client Name: Drumderg Services | Date: 14-12-21

› Location: Boatline - 10 Dangar St, Wickham NSW. | Removal Contractor: Drumderg Services | Field Officer/Certificate ID: JF CON-054

vice used to control the time: ✓ Mobile Phone Id number 0415 302 621 / □ Pumps | Flowmeter No./CAL Due Date: FF73 / 26-07-22

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	CW 330830	✓	1	1	Exclusion zone boundary, west, attached to temp fence, approx 1.8m AGL	A 1.5 C	1.5	Y	0730	1450	296	26 07 22			
	CW 330907	✓	1	2	Exclusion zone boundary, north, attached to temp fence, approx 1.8m AGL.	A C		Y	0731	1451	297				
	CW 330865	✓	1	3	Exclusion zone boundary, east, attached to temp fence, approx 1.8m AGL.	A C		Y	0731	1452	298				
	CW 330855	✓	1	4	Exclusion zone boundary, south, attached to temp fence, approx 1.8m AGL.	A C		Y	0733	1452	299				
	CW 330955	✓	6	-	BLANK	A C									

ample types: 1 - Removal 2 - Bag Removal 3 - Enclosure Dismantling 4 - Clearance 5 - Background 6 - Blank 7 - Sheet-up 8 – Personal Monitoring A - actual C – calibrated

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Appendix V – Onsite visual asbestos clearance certificate

ADE CONSULTING GROUP
SOLUTIONS THROUGH INNOVATION

Docket Number:
CLR 0013939

Onsite Visual Asbestos Clearance Certificate

Job Number: 21.1577 **Date:** 15.12.21

Client / Contractor: Drumderg Services

Client Contact: Daniel Jones **Client Contact Number:** 0478775107

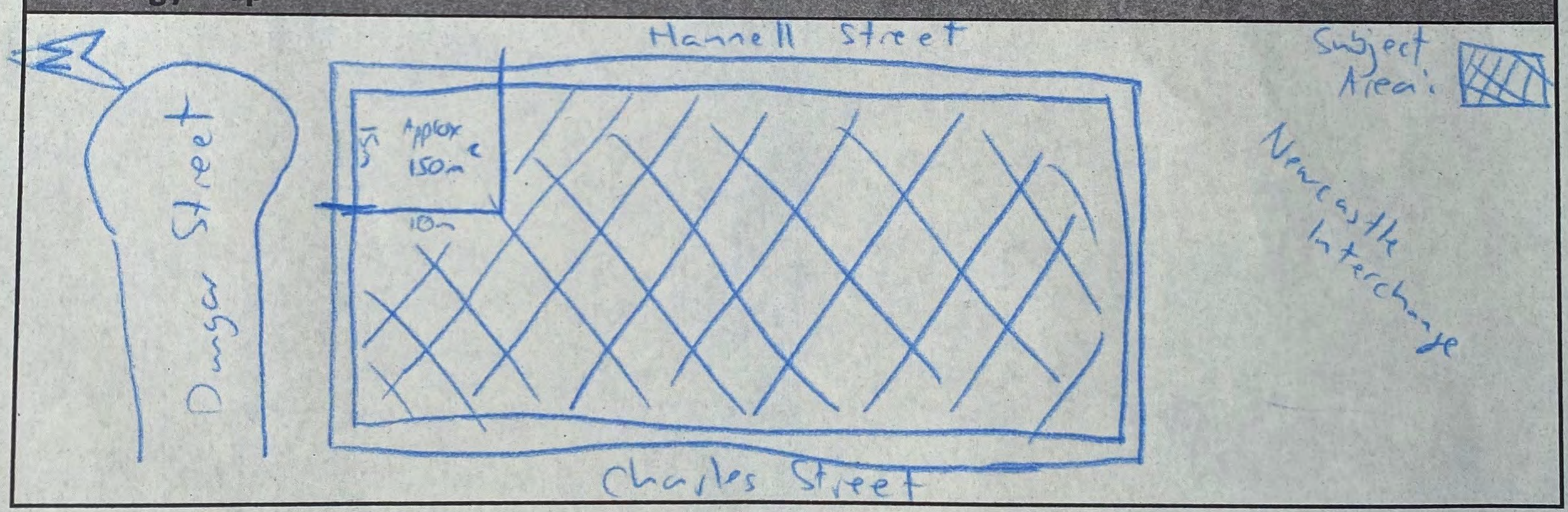
Address / Location: Bowline Project - 10 Dangar St, Wickham NSW.

Subject Area: 10 Dangar St, Wickham, soil surface, all areas excluding north-east section (15m²) and 1m in from site boundary, former location of asbestos impacted soils.

Scope of removal works: Removal of asbestos impacted soil from within the subject area.

Inspection details: Visual inspection of the subject area revealed that all asbestos impacted soils had been removed to a satisfactory standard.

Drawing / Map



Limitations on visual clearance / areas not accessible / notes: Visual clearance limited to subject area only. All adjacent areas and sub-surfaces not included.

Upon visual inspection of the subject area and surrounds, the asbestos containing materials have been (please circle) removed/encapsulated/sealed/made safe to a satisfactory standard. The subject area may be reoccupied safely, subject to the limitations and/or notes listed above.

Name: Joshua Foy

Signature:

ADE REPRESENTATIVE

Name: Daniel Jones

Signature:

CLIENT REPRESENTATIVE

ADECONSULTINGGROUP
SOLUTIONS THROUGH INNOVATION

Further details regarding ADE's Services are available via

info@ade.group www.ade.group

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Silverwater, NSW 2128 Australia

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Thornton, NSW 2322, Australia

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Brisbane
Unit 3/22 Palmer Place
Murarrie, QLD 4172, Australia

ADE Consulting Group (VIC) Pty Ltd

Melbourne
Unit 4/95 Salmon Street
Port Melbourne, VIC 3207, Australia

Appendix D

Drawing 1 – Test Location Plan – Validation of Removal of Upper Fill
Drawing 2 – Test Location Plan – Validation of Hydrocarbon-impacted Soils
Drawing 3 – Test Location Plan – Validation of Stockpile Removal
Proposed Development Plans (Team 2 Architects Ref 918, Rev 4 dated 17.9.2020)

Sheet List_S4.55			
Sheet Number	Sheet Name	Current Revision	Current Revision Date
S4.55			
1000-General Arrangement Plans			
DA-1000	Basement 3 GA	6	23.09.20
DA-1001	Basement 2 GA	6	23.09.20
DA-1002	Basement 1 GA	6	23.09.20
DA-1003	Ground Floor GA	6	23.09.20
DA-1004	Level 1-3 Typical GA	5	23.09.20
2000-Building Elevations			
DA-2000	North Elevation	5	23.09.20
DA-2001	West Elevation	5	23.09.20
DA-2002	South Elevation	5	23.09.20
DA-2003	East Elevation	5	23.09.20
3000-Building Sections			
DA-3000	Building Section AA	5	23.09.20
DA-3001	Building Section BB	5	23.09.20
DA-Supporting Documents			
DA-4000	Materials Schedule	5	23.09.20
DA-4001	Visual Impact Analysis 01	5	23.09.20
DA-4002	Visual Impact Analysis 02	5	23.09.20
DA-5000	GFA Diagram 01	5	23.09.20
DA-6000	Shadow Diagrams 01	1	23.09.20

DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	Draft S4.55 Issue	18.08.20
2	Draft S4.55 Issue	28.08.20
3	Draft S4.55 Issue	11.09.20
4	S4.55 Submission	17.09.20
5	S4.55 Submission	23.09.20

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ABN: 72 104 833 507
Reg Vic: 19340

Project:
BOWLINE

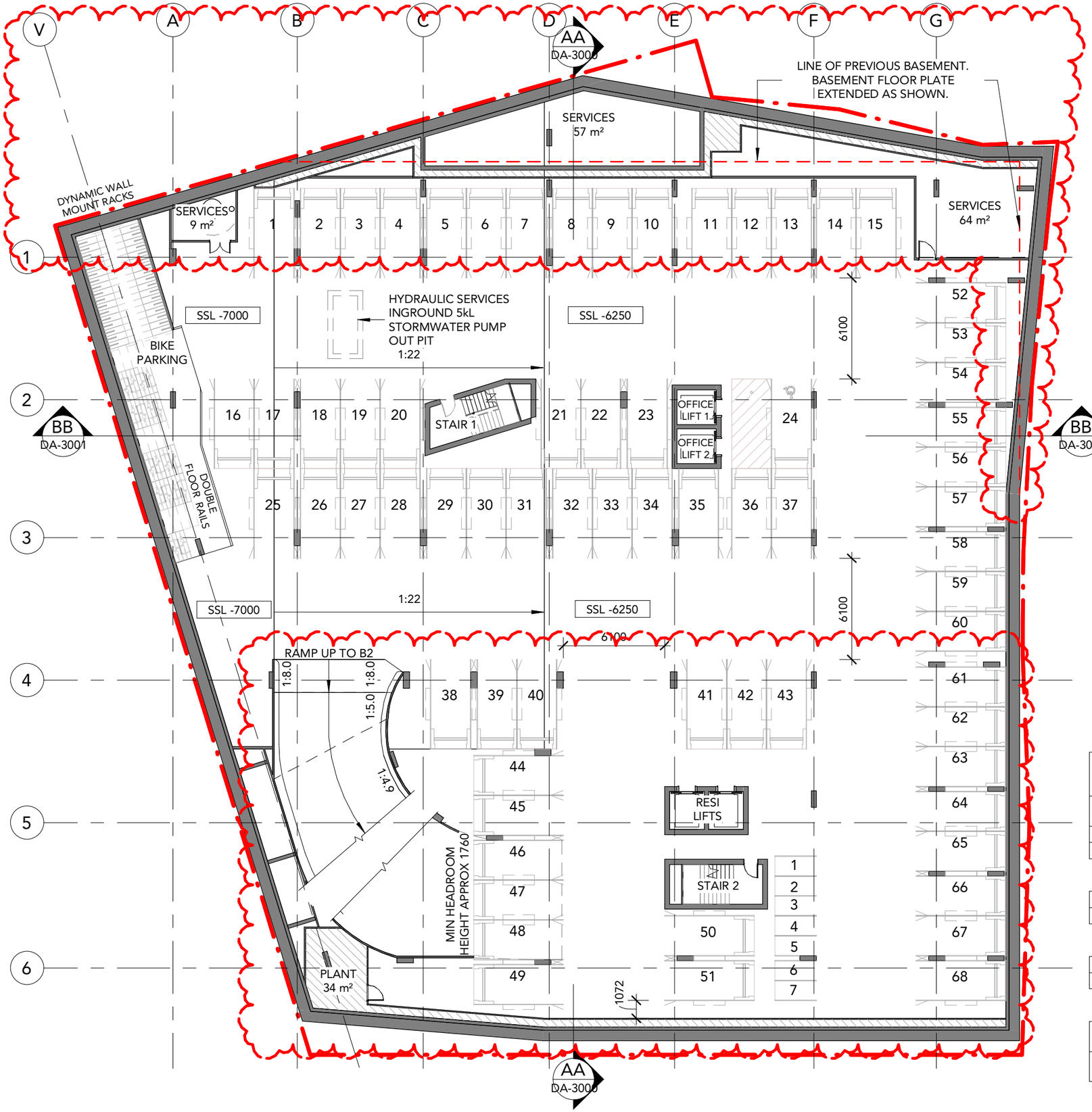
10 Dangar Street
Wickham NSW 2293

Title:
Cover Sheet

Project #:	Scale:	Drw:	Ckd:
918		LR	ML

Drawing #: DA-0001

Rev: 5



Overall Vehicle Parking Schedule

Level	Type	Count
Basement 3	Tandem	1
Basement 3	Standard	66
Basement 3	Accessible	1
Basement 3		68
Basement 2	Tandem	1
Basement 2	Standard	56
Basement 2	Accessible- SDA	4
Basement 2		61
Basement 1	Tandem	1
Basement 1	Standard	60
Basement 1	Accessible	2
Basement 1		63
Ground Floor Upper	Standard	7
Ground Floor Upper	Loading Bay	2
Ground Floor Upper		9
Grand total		201

Overall Motorcycle Parking Schedule

Level	Description	Count
Basement 3	Motorbike Bay	7
Basement 3		7
Basement 2	Motorbike Bay	5
Basement 2		5
Basement 1	Motorbike Bay	7
Basement 1		7
Grand total		19

Overall Bicycle Parking Schedule

Level	Type	Count	No. of Spaces
Basement 3	Floor Rail Double	9	18
Basement 3	Wall Mount Single DYN	34	34
Basement 3		43	52
Basement 2	Floor Rail Double	14	28
Basement 2	Wall Mount Single DYN	10	10
Basement 2		24	38
Basement 1	Floor Rail Double	5	10
Basement 1	Wall Mount Single DYN	58	58
Basement 1		63	68
Ground Floor Upper	Floor Rail Double	3	6
Ground Floor Upper	Wall Mount Single DYN	15	15
Ground Floor Upper		18	21
Grand total		148	179

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S4.55 APPLICATION

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ABN: 72 104 833 507
Reg Vic: 19340

Project:
BOWLINE

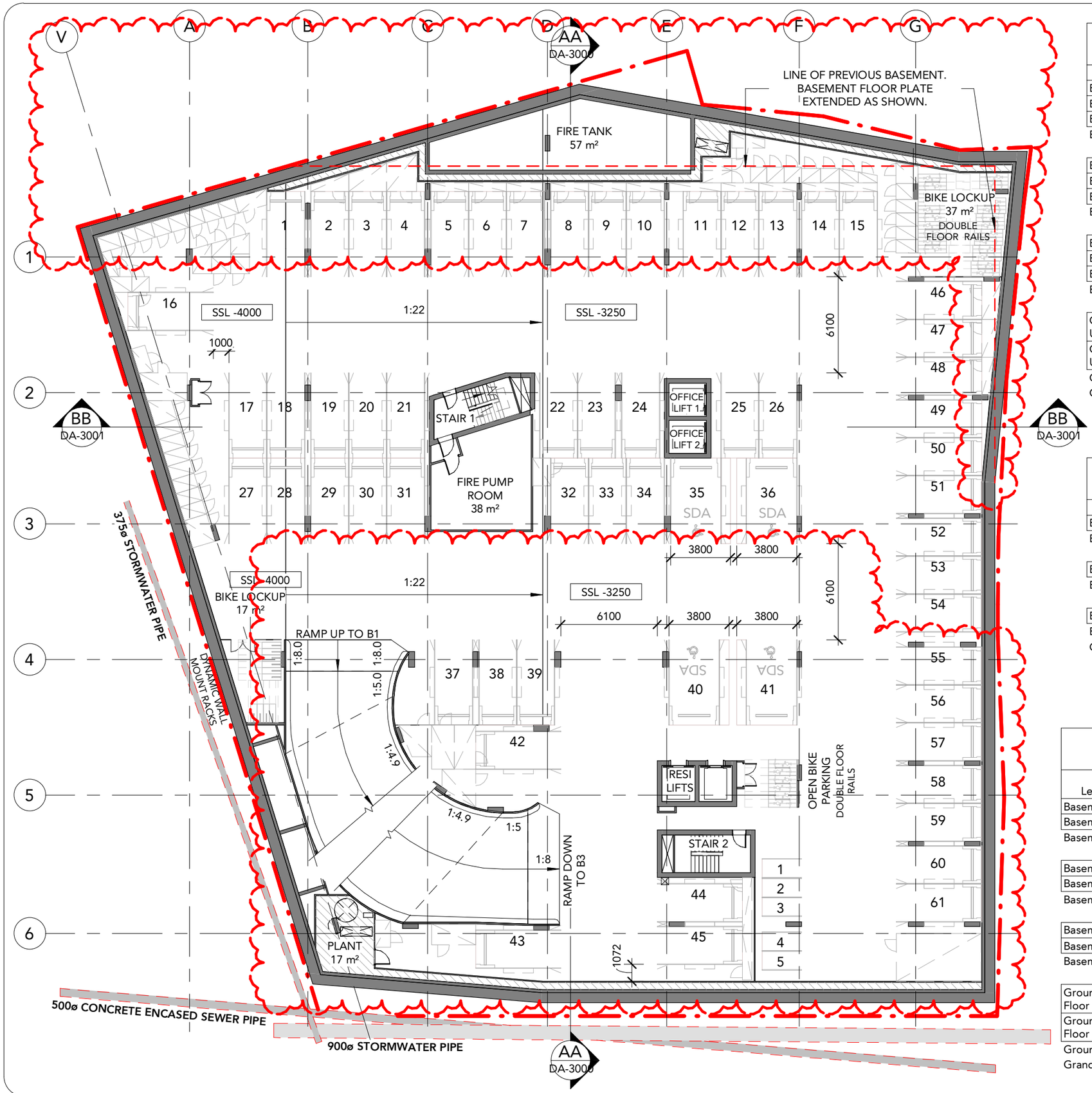
10 Dangar Street
Wickham NSW 2293

Title:
Basement 3 GA

Project #:	Scale:	Drw:	Ckd:
918	1 : 250 @A3	LR	ML

Drawing #: DA-1000

Rev: 6



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Overall Motorcycle Parking Schedule

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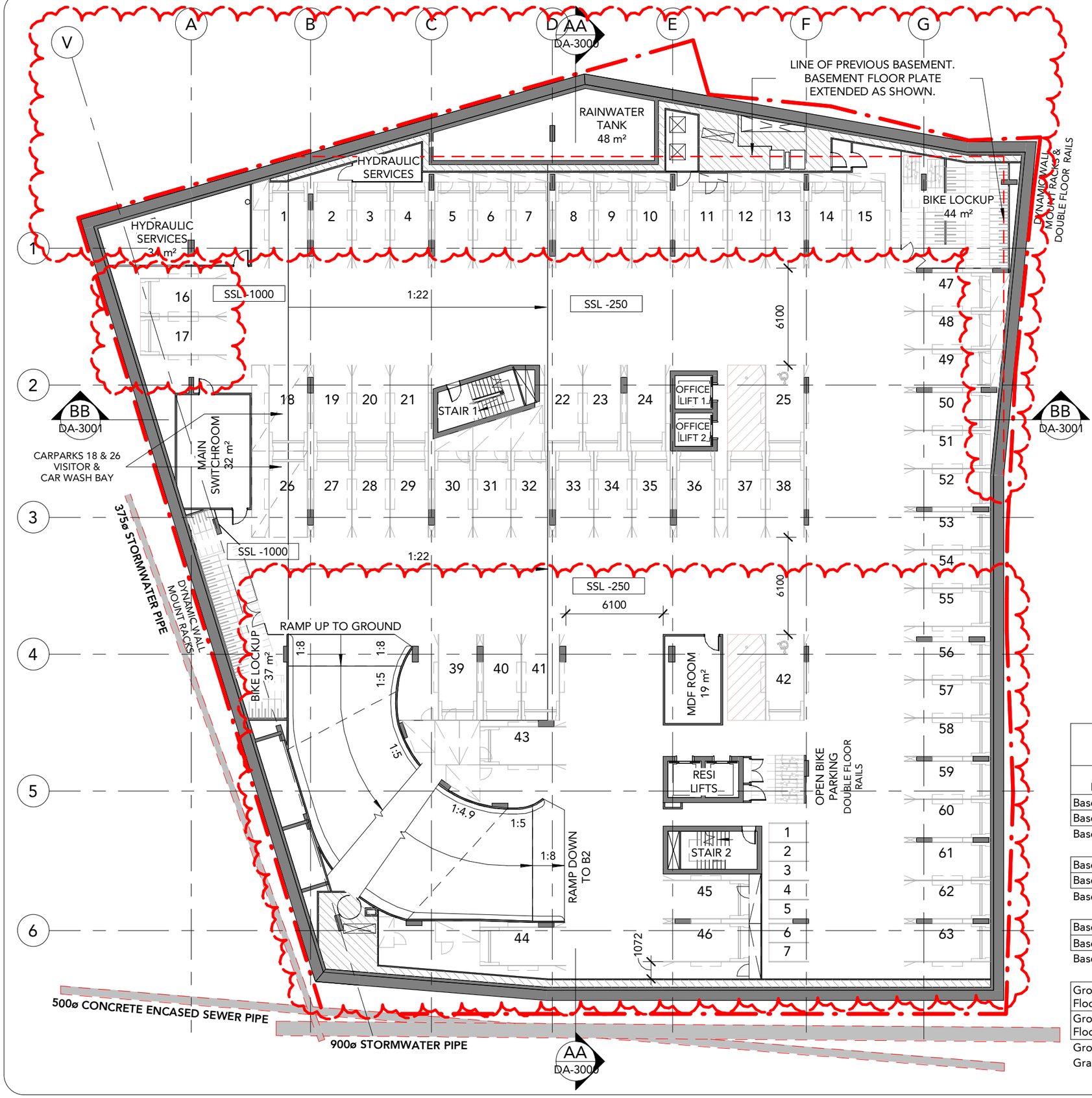
Drawing #: DA-1001

Rev: 6



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313/737 Burwood Road,
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ABN: 72 104 833 507
Reg Vic: 19340

Project:
BOWLINE

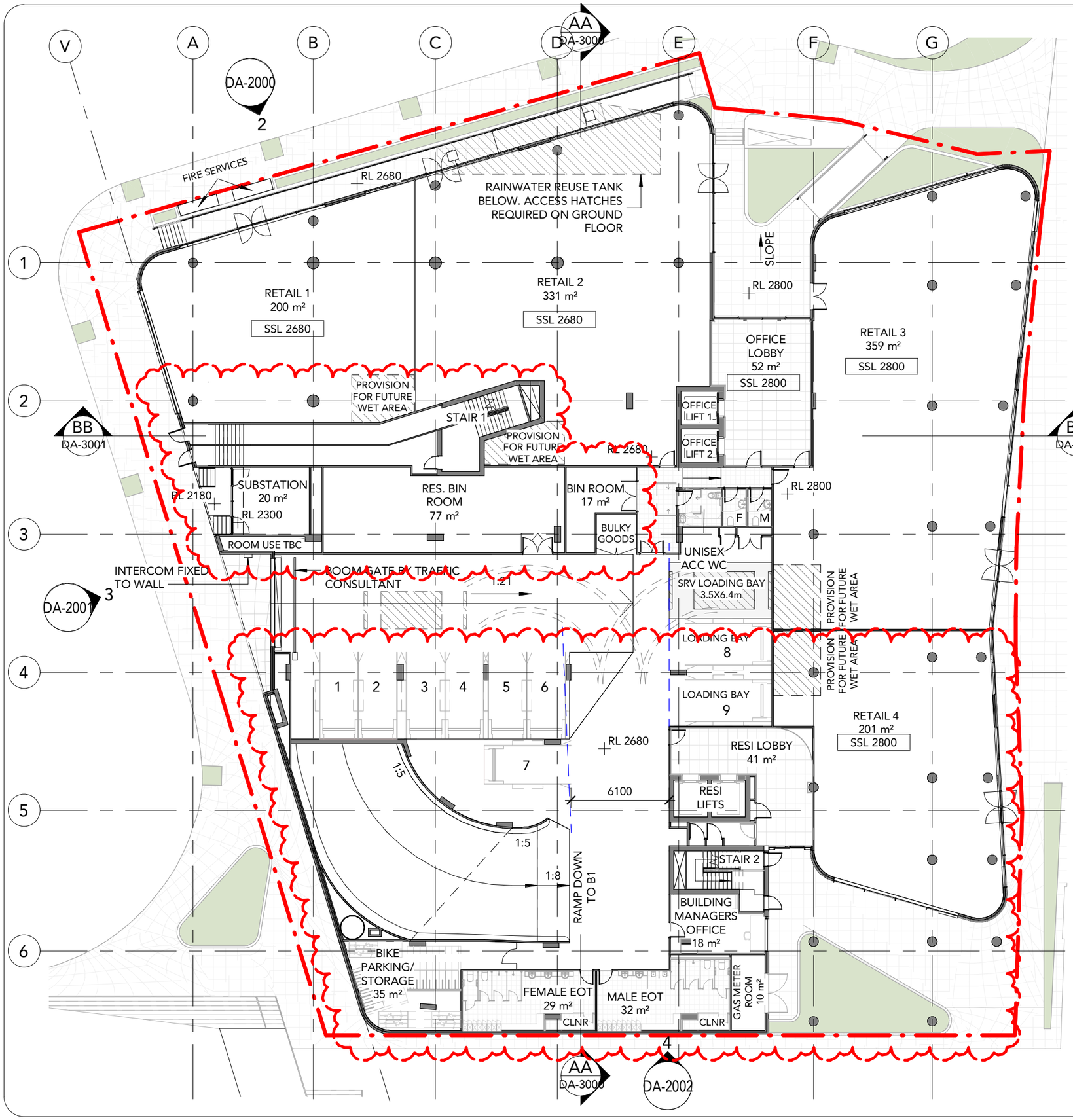
10 Dangar Street
Wickham NSW 2293

Title:
Basement 1 GA

Project #:	Scale:	Drw:	Ckd:
918	1 : 250 @A3	LR	ML

Drawing #: DA-1002

Rev: 6



Overall Vehicle Parking Schedule

Level	Type	Count
Basement 3	Tandem	1
Basement 3	Standard	66
Basement 3	Accessible	1
Basement 3		68
Basement 2	Tandem	1
Basement 2	Standard	56
Basement 2	Accessible- SDA	4
Basement 2		61
Basement 1	Tandem	1
Basement 1	Standard	60
Basement 1	Accessible	2
Basement 1		63
Ground Floor Upper	Standard	7
Ground Floor Upper	Loading Bay	2
Ground Floor Upper		9
Grand total		201

Overall Motorcycle Parking Schedule

Level	Description	Count
Basement 3	Motorbike Bay	7
Basement 3		7
Basement 2	Motorbike Bay	5
Basement 2		5
Basement 1	Motorbike Bay	7
Basement 1		7
Grand total		19

Overall Bicycle Parking Schedule

Level	Type	Count	No. of Spaces
Basement 3	Floor Rail Double	9	18
Basement 3	Wall Mount Single DYN	34	34
Basement 3		43	52
Basement 2	Floor Rail Double	14	28
Basement 2	Wall Mount Single DYN	10	10
Basement 2		24	38
Basement 1	Floor Rail Double	5	10
Basement 1	Wall Mount Single DYN	58	58
Basement 1		63	68
Ground Floor Upper	Floor Rail Double	3	6
Ground Floor Upper	Wall Mount Single DYN	15	15
Ground Floor Upper		18	21
Grand total		148	179

DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	Draft S4.55 Issue	14.08.20
2	Draft S4.55 Issue	28.08.20
3	Issue for Information	08.09.20
4	Draft S4.55 Issue	11.09.20
5	S4.55 Submission	17.09.20
6	S4.55 Submission	23.09.20

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Hawthorn East VIC 3123
ABN: 72 104 833 507
Reg Vic: 19340

Project:
BOWLINE

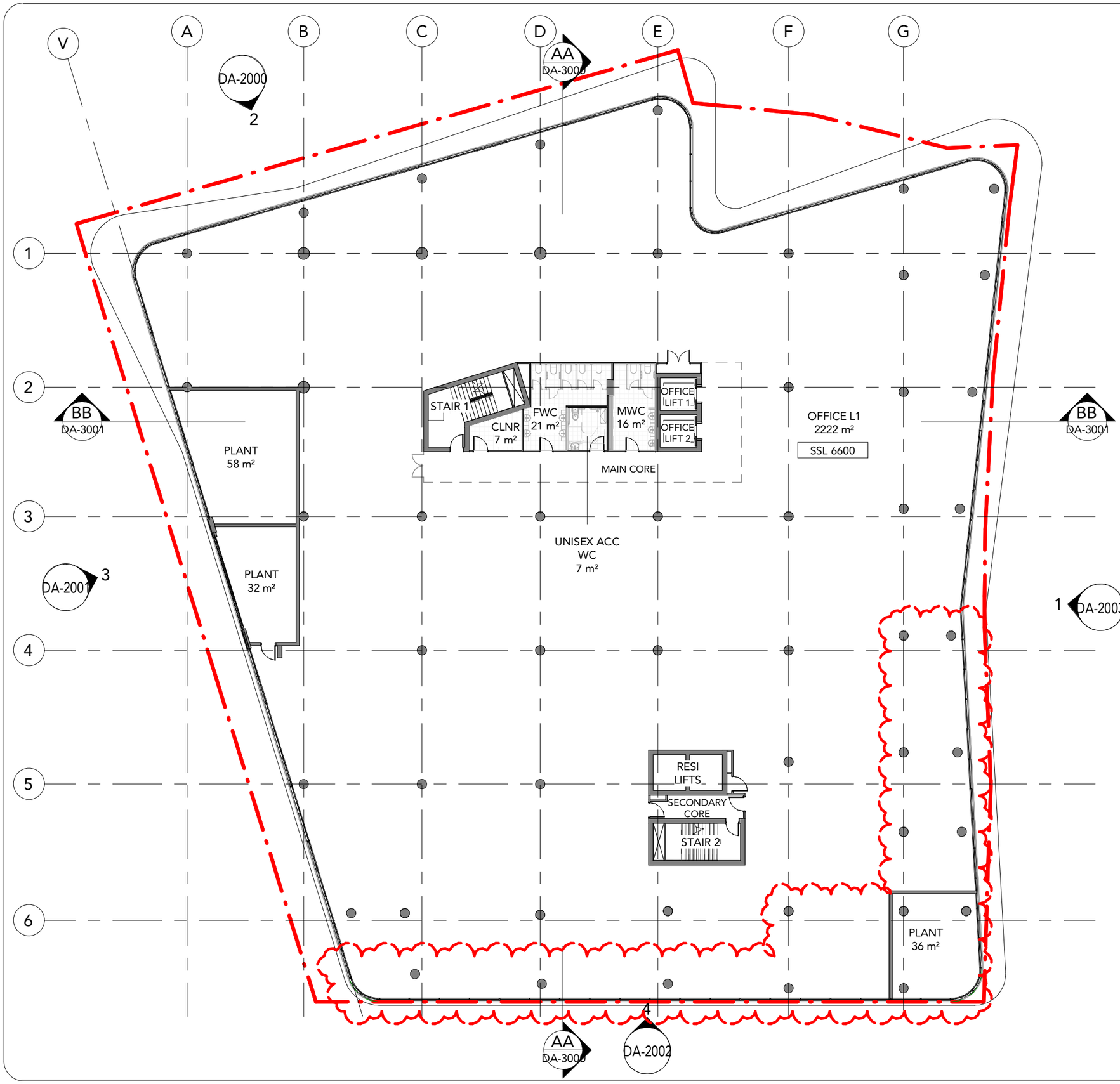
10 Dangar Street
Wickham NSW 2293

Title:
Ground Floor GA

Project #:	Scale:	Drw:	Ckd:
918	1 : 250 @A3	LR	ML

Drawing #: DA-1003

Rev: 6



DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	Draft S4.55 Issue	14.08.20
2	Draft S4.55 Issue	28.08.20
3	Draft S4.55 Issue	11.09.20
4	S4.55 Submission	17.09.20
5	S4.55 Submission	23.09.20

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Reg Vic: 19340

Project:
BOWLINE

10 Dangar Street
Wickham NSW 2293

Title:
Level 1-3 Typical GA

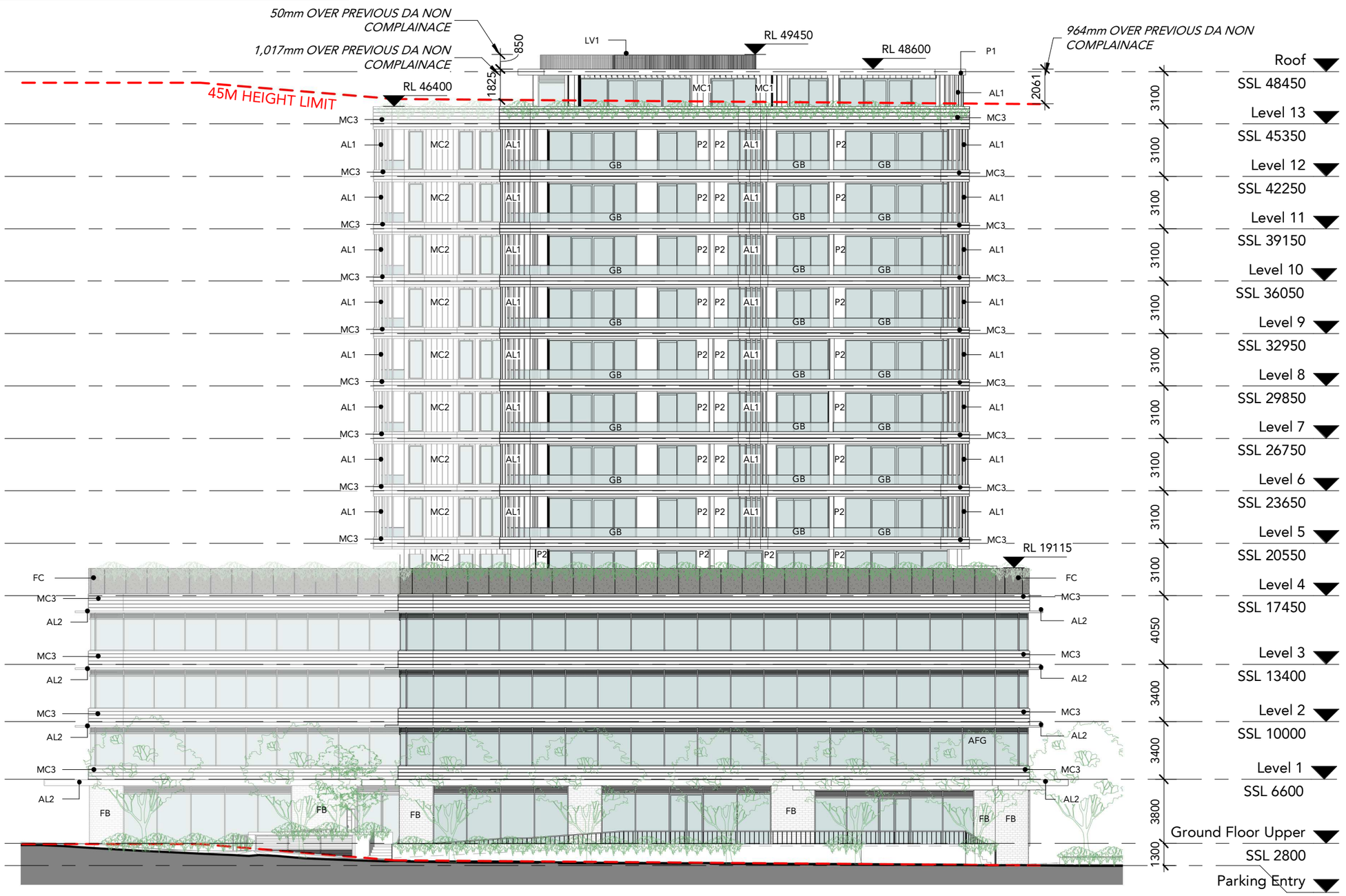
Project #:	Scale:	Drw:	Ckd:
918	1 : 250 @A3	LR	ML

Drawing #: DA-1004

Rev: 5

FINISHES KEY

AFG	ALUMINIUM FRAMED GLAZING
AL1	ALUMINIUM LOUVRE
AL2	HORIZONTAL ALUMINIUM SUNSHADE
FB	AUSTRAL FACE BRICK
FC	EQUITONE NATURA/LINES FIBRE CEMENT CLADDING
GB	FRAMELESS GLASS BALUSTRADE
LV1	VERTICAL SERVICES LOUVRE
MC1	METAL CLADDING
MC2	METAL CLADDING
MC3	METAL CLADDING
P1	PAINT DULUX ZEUS BLACK MATT
P2	PAINT MILTON MOON 94



DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	Draft S4.55 Issue	14.08.20
2	Draft S4.55 Issue	28.08.20
3	Draft S4.55 Issue	11.09.20
4	S4.55 Submission	17.09.20
5	S4.55 Submission	23.09.20

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Reg Vic: 19340

Project:
BOWLINE

10 Dangar Street
Wickham NSW 2293

Title:
North Elevation

Project #:	Scale:	Drw:	Ckd:
918	1 : 250 @A3	LR	ML

Drawing #: DA-2000

Rev: 5

FINISHES KEY

AFG	ALUMINIUM FRAMED GLAZING
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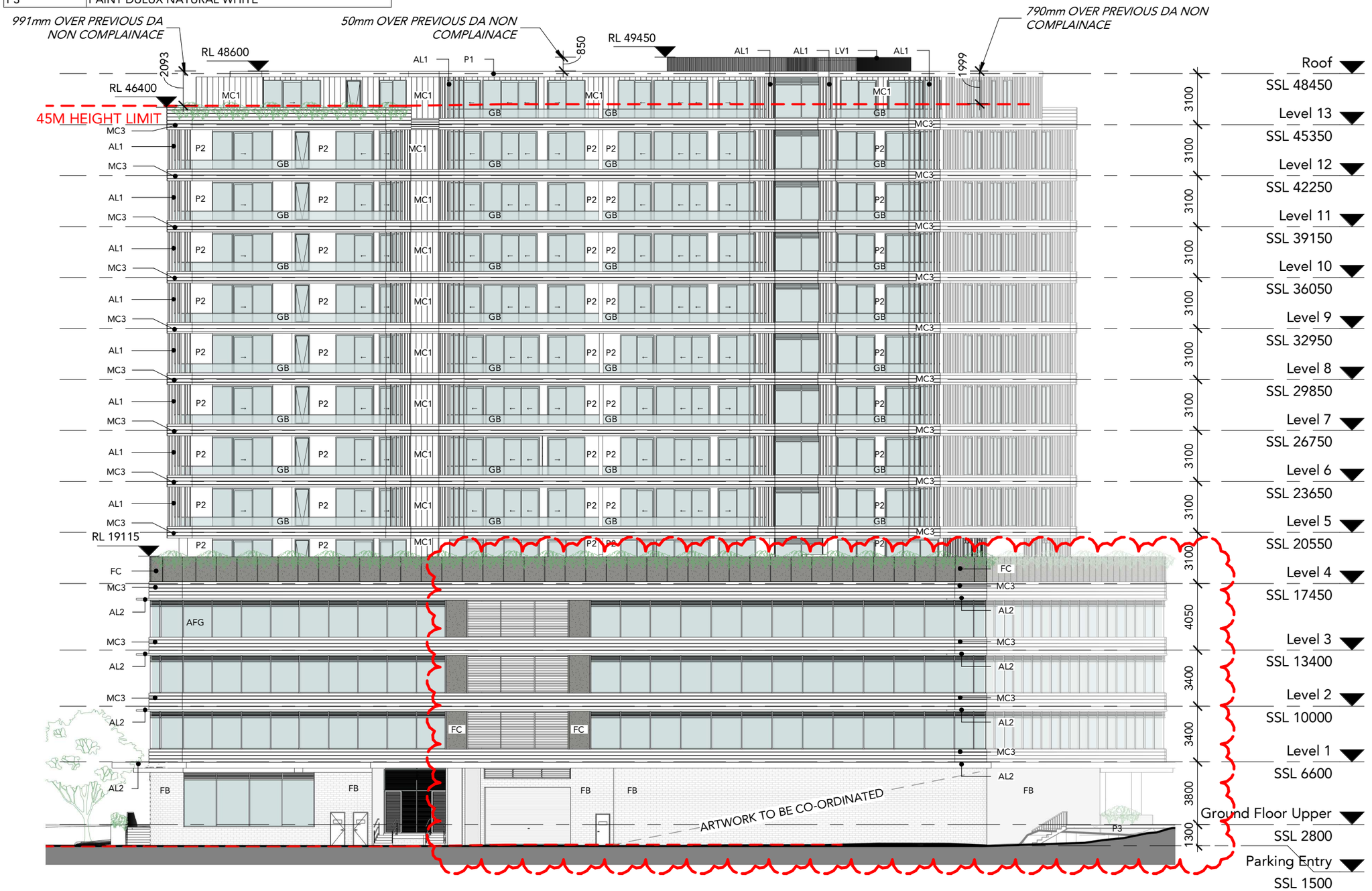
AL2	HORIZONTAL ALUMINIUM SUNSHADE
FB	AUSTRAL FACE BRICK
FC	EQUITONE NATURA/LINES FIBRE CEMENT CLADDING
GB	FRAMELESS GLASS BALUSTRADE
LV1	VERTICAL SERVICES LOUVRE
MC1	METAL CLADDING
MC3	METAL CLADDING
P1	PAINT DULUX ZEUS BLACK MATT
P2	PAINT MILTON MOON 94
P3	PAINT DULUX NATURAL WHITE



DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	Draft S4.55 Issue	14.08.20
2	Draft S4.55 Issue	28.08.20
3	Draft S4.55 Issue	11.09.20
4	S4.55 Submission	17.09.20
5	S4.55 Submission	23.09.20

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Reg Vic: 19340

Project:
BOWLINE
10 Dangar Street
Wickham NSW 2293

Title:
West Elevation

Project #:	Scale:	Drw:	Ckd:
918	1 : 250 @A3	LR	ML

Drawing #: DA-2001

Rev: 5

FINISHES KEY

AFG	ALUMINIUM FRAMED GLAZING
AL1	ALUMINIUM LOUVRE
AL2	HORIZONTAL ALUMINIUM SUNSHADE
FB	AUSTRAL FACE BRICK
FC	EQUITONE NATURA/LINES FIBRE CEMENT CLADDING
GB	FRAMELESS GLASS BALUSTRADE
LV1	VERTICAL SERVICES LOUVRE
MC1	METAL CLADDING
MC3	METAL CLADDING
P1	PAINT DULUX ZEUS BLACK MATT

DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	Draft S4.55 Issue	14.08.20
2	Draft S4.55 Issue	28.08.20
3	Draft S4.55 Issue	11.09.20
4	S4.55 Submission	17.09.20
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Project:
BOWLINE

10 Dangar Street
Wickham NSW 2293

Title:
South Elevation

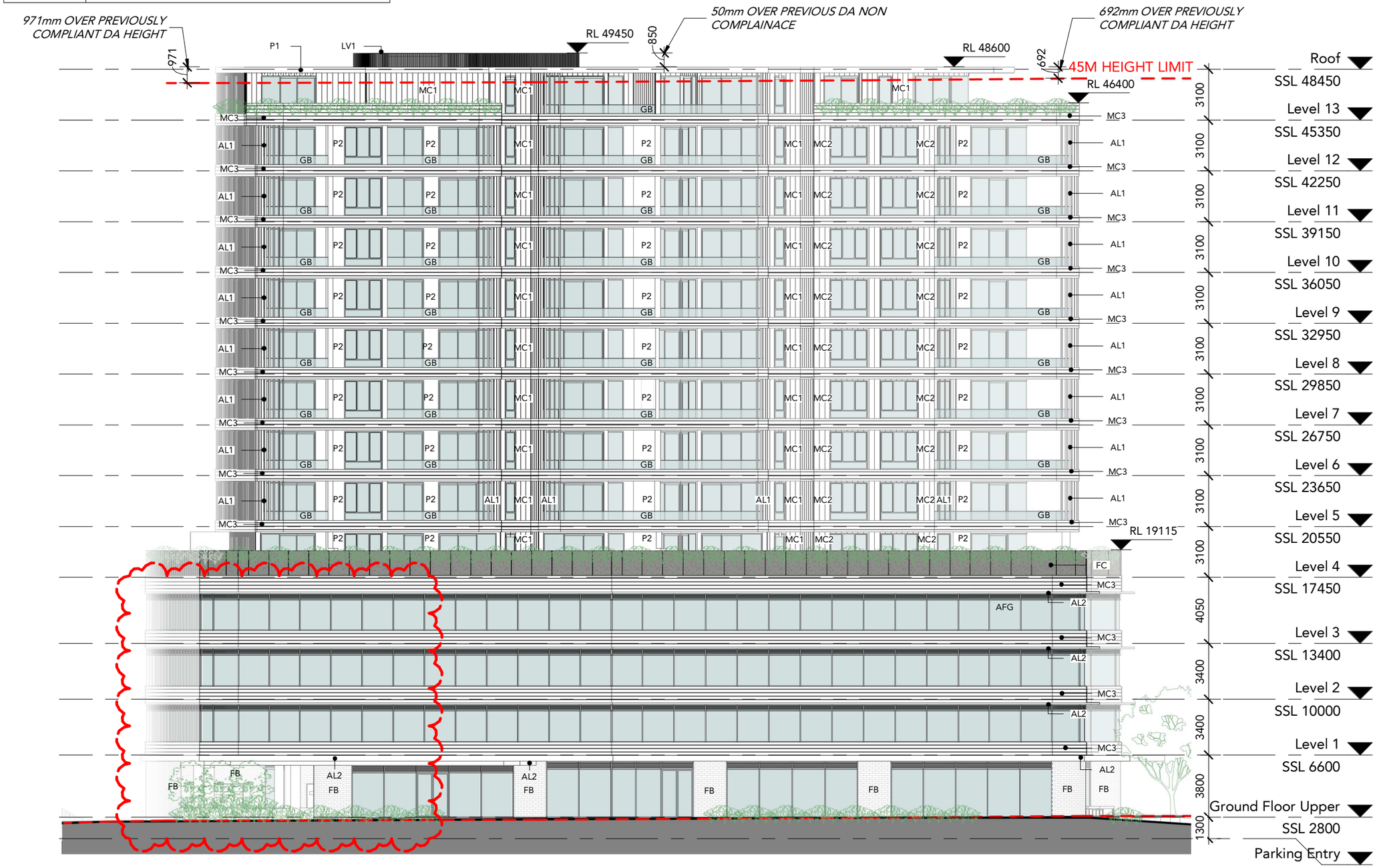
Project #:	Scale:	Drw:	Ckd:
918	1 : 250 @A3	LR	ML

Drawing #: DA-2002

Rev: 5

FINISHES KEY

AFG	ALUMINIUM FRAMED GLAZING
AL1	ALUMINIUM LOUVRE
AL2	HORIZONTAL ALUMINIUM SUNSHADE
FB	AUSTRAL FACE BRICK
FC	EQUITONE NATURA/LINES FIBRE CEMENT CLADDING
GB	FRAMELESS GLASS BALUSTRADE
LV1	VERTICAL SERVICES LOUVRE
MC1	METAL CLADDING
MC2	METAL CLADDING
MC3	METAL CLADDING
P1	PAINT DULUX ZEUS BLACK MATT
P2	PAINT MILTON MOON 94



DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	Draft S4.55 Issue	14.08.20
2	Draft S4.55 Issue	28.08.20
3	Draft S4.55 Issue	11.09.20
4	S4.55 Submission	17.09.20
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Reg Vic: 19340

Project:
BOWLINE

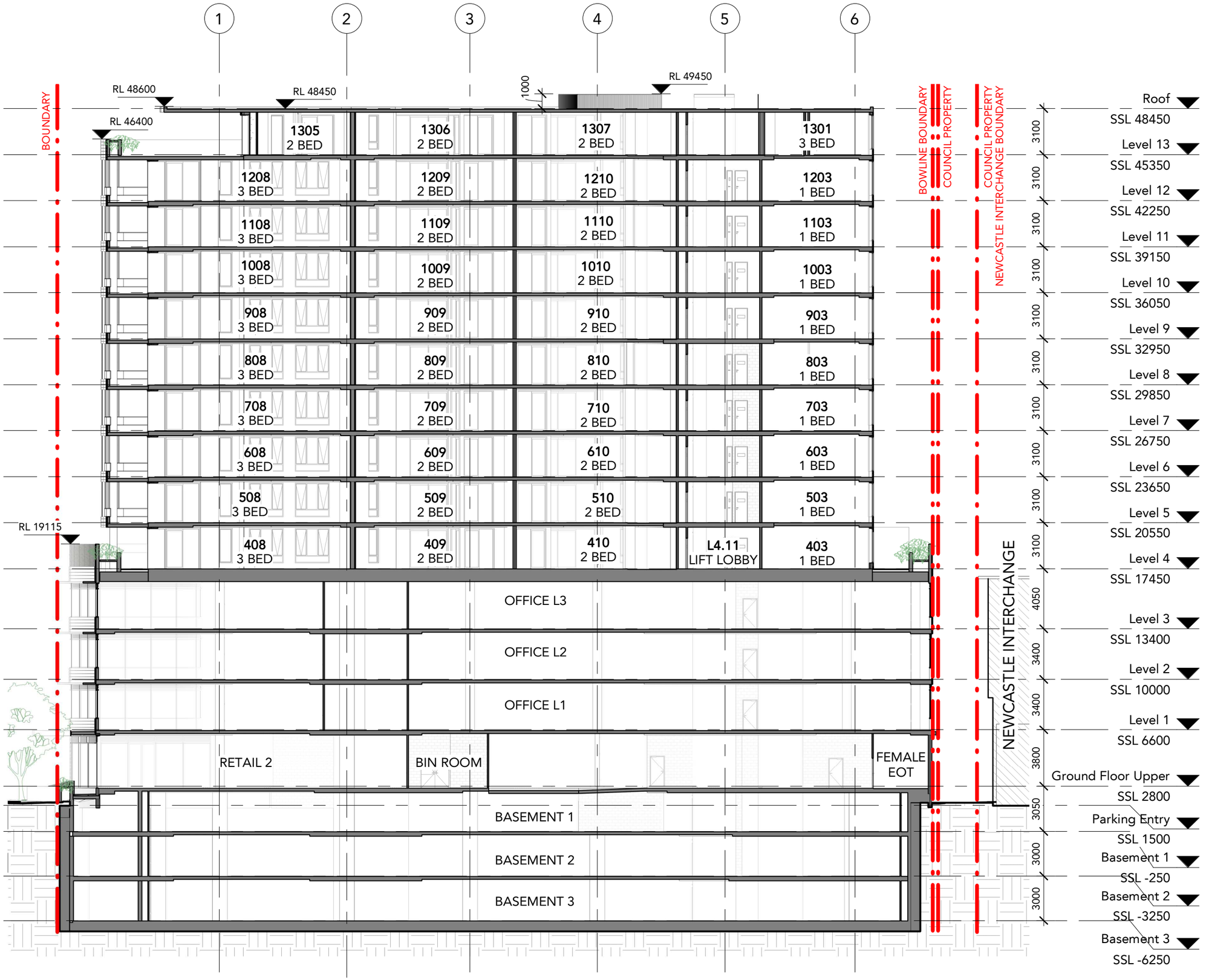
10 Dangar Street
Wickham NSW 2293

Title:
East Elevation

Project #:	Scale:	Drw:	Ckd:
918	1 : 250 @A3	LR	ML

Drawing #: DA-2003

Rev: 5



DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	Draft S4.55 Issue	14.08.20
2	Draft S4.55 Issue	28.08.20
3	Draft S4.55 Issue	11.09.20
4	S4.55 Submission	17.09.20
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Project:
BOWLINE
10 Dangar Street
Wickham NSW 2293

Title:
Building Section AA

Project #:	Scale:	Drw:	Ckd:
918	1 : 250 @A3	LR	ML

Drawing #: DA-3000
Rev: 5

DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	Draft S4.55 Issue	14.08.20
2	Draft S4.55 Issue	28.08.20
3	Draft S4.55 Issue	11.09.20
4	S4.55 Submission	17.09.20
5	S4.55 Submission	23.09.20

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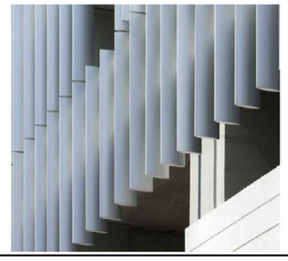
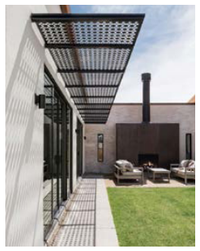
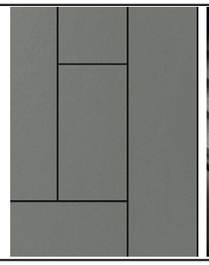
Project:
BOWLINE

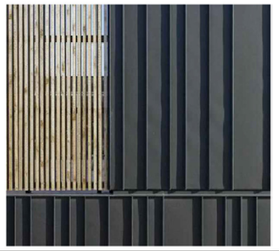
10 Dangar Street
Wickham NSW 2293

Title:
Building Section BB

Project #:	Scale:	Drw:	Ckd:
918	1 : 250 @A3	LR	ML

Drawing #: DA-3001
Rev: 5

CODE	ITEM	LOCATION	IMAGE
AFG	Aluminium framed glazing	All glazing	
AL1	Vertical aluminium louvres	Apartment balconies	
AL2	Horizontal aluminium sunshade	Podium levels	
FB	Face brick	Ground level	
FC	Fibre cement panels “Equitone” Natura & Lines	Building facade	
GB	Frameless glass balustrade	Balconies	

CODE	ITEM	LOCATION	IMAGE
LV1	Vertical services louvre	Roof Level Plant equipment enclosure	
MC1	Vertical metal cladding Standing seam Dark Grey	Apartment facade	
MC2	Vertical metal cladding Standing seam Shale Grey	Apartment facade	
MC3	Horizontal metal cladding Interlocking Shale Grey	Apartment Balcony and Office level upstands	
P1	Paint- Powdercoat “Black Matt”	Aluminium framed glazing, awnings	
P2	Paint “Milton Moon”	Exterior walls	
P3	Paint “Natural White”	Rendered walls, upstands	

DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	Draft S4.55 Issue	17.08.20
2	Draft S4.55 Issue	28.08.20
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Reg Vic: 19340

Project:
BOWLINE

10 Dangar Street
Wickham NSW 2293

Title:
Materials Schedule

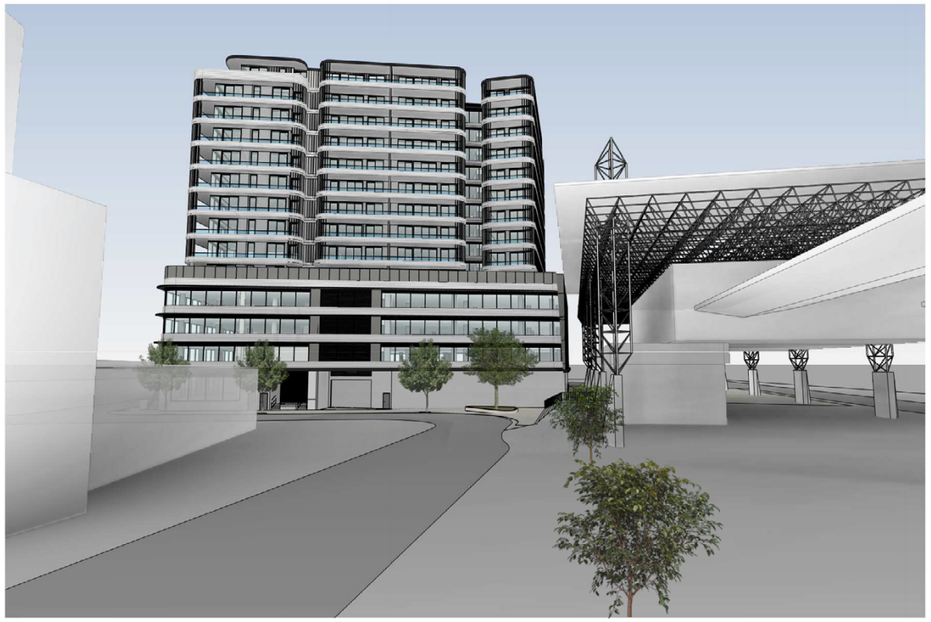
Project #:	Scale:	Drw:	Ckd:
918		LR	ML

Drawing #: DA-4000

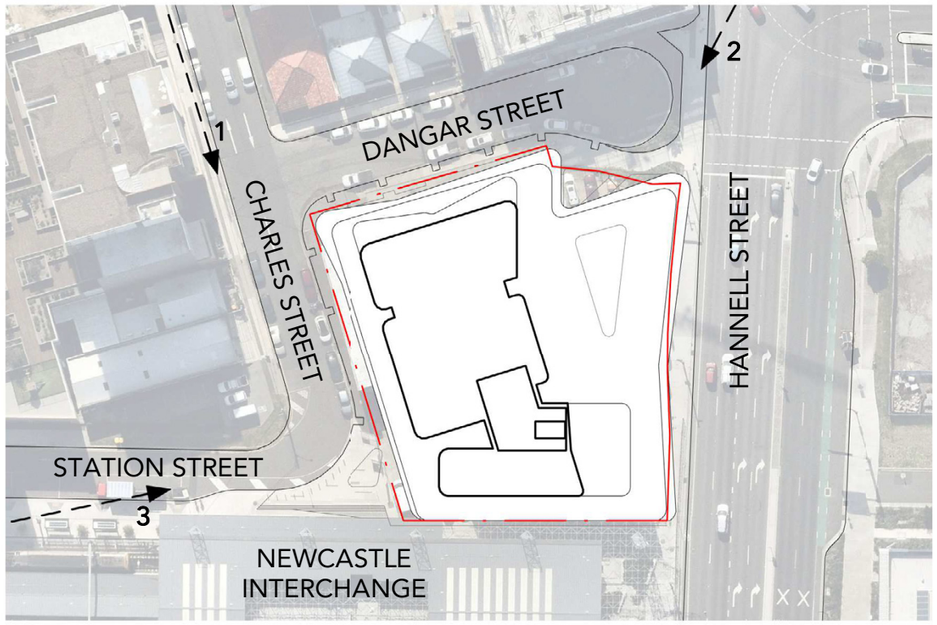
Rev: 5

1 North View (Charles Street)
Scale:

2 East View (Hannell Street)
Scale:



3 West View (Station Street)
Scale:



DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	Draft S4.55 Issue	18.08.20
2	Draft S4.55 Issue	28.08.20
3	Draft S4.55 Issue	11.09.20
4	S4.55 Submission	17.09.20
5	S4.55 Submission	23.09.20

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ABN: 72 104 833 507
Reg Vic: 19340

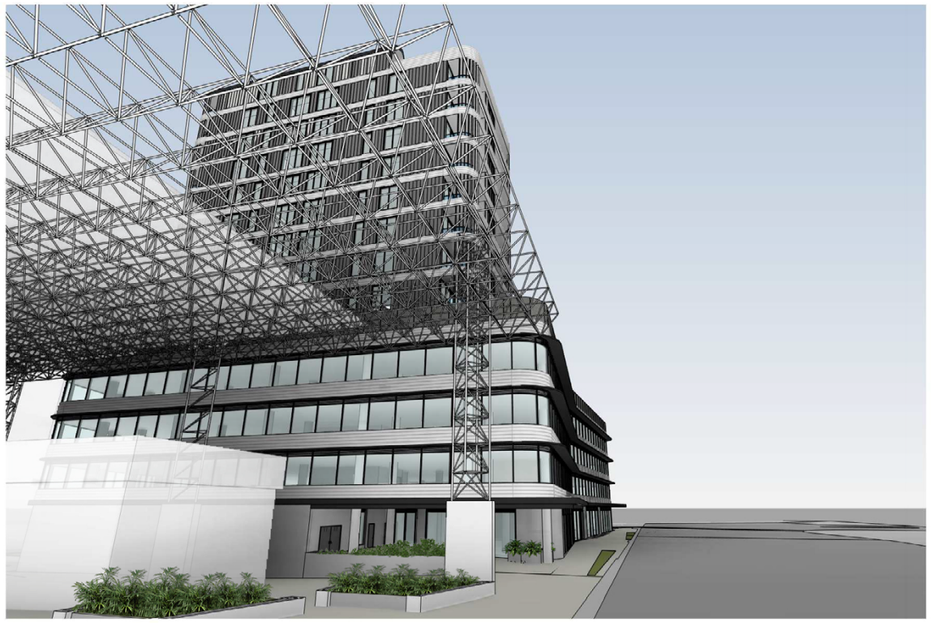
Project:
BOWLINE

10 Dangar Street
Wickham NSW 2293

Title:
Visual Impact Analysis 01

Project #:	Scale:	Drw:	Ckd:
918	NTS	LR	ML

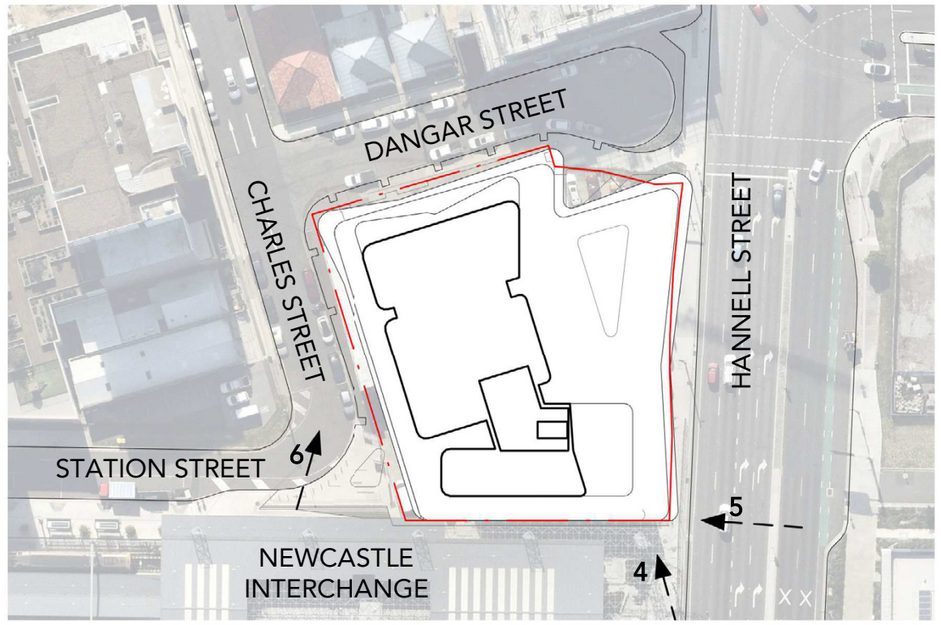
Drawing #: DA-4001
Rev: 5



4 South View (Hannell Street)
Scale:

5 South-East View (Hannell Street)
Scale:

6 South View (Charles Street)
Scale:



DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	Draft S4.55 Issue	18.08.20
2	Draft S4.55 Issue	28.08.20
3	Draft S4.55 Issue	11.09.20
4	S4.55 Submission	17.09.20
5	S4.55 Submission	23.09.20

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Project:
BOWLINE

10 Dangar Street
Wickham NSW 2293

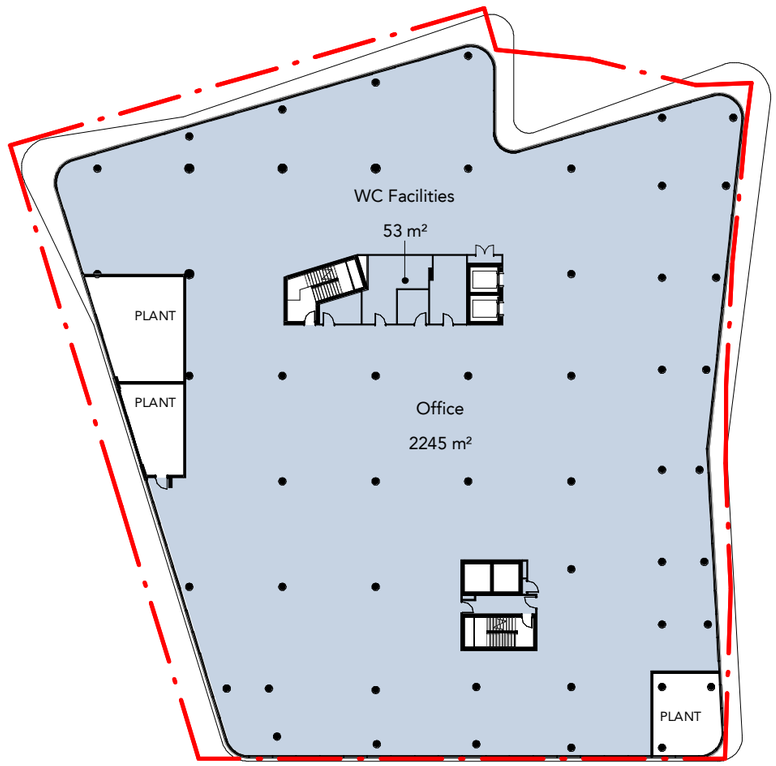
Title:
Visual Impact Analysis 02

Project #:	Scale:	Drw:	Ckd:
918	NTS	LR	ML

Drawing #: DA-4002
Rev: 5

1 Ground Floor GFA
Scale: 1 : 500

ROOM	AREA
RETAIL 1	202m²
RETAIL 2	333m²
RETAIL 3	366m²
RETAIL 4	206m²
OFFICE LOBBY	53m²
RESI LOBBY	43m²
WC'S+LOBBY	33m²
EOT+LOBBY	114m²
BM OFFICE	20m²
TOTAL	1370m²



2 Levels 1-3 TYPICAL GFA
Scale: 1 : 500

ROOM	AREA
OFFICE	2247m²
WC FACILITIES	53m²
TOTAL	2300m²

Podium Levels GFA	
Level	Area
Ground Floor Upper	1370 m²
Level 1	2300 m²
Level 2	2300 m²
Level 3	2300 m²
Total Podium Gross Floor Area	8260 m²

Newcastle Local Environmental Plan 2012

Gross floor area means the sum of the floor area of each floor of a building measured from the internal face of external walls, or from the internal face of walls separating the building from any other building, measured at a height of 1.4 metres above the floor, and includes:

(a) the area of a mezzanine, and
(b) habitable rooms in a basement or an attic, and
(c) any shop, auditorium, cinema, and the like, in a basement or attic,

but excludes:

(d) any area for common vertical circulation, such as lifts and stairs, and
(e) any basement:
(i) storage, and
(ii) vehicular access, loading areas, garbage and services, and
(f) plant rooms, lift towers and other areas used exclusively for mechanical services or ducting, and
(g) car parking to meet any requirements of the consent authority (including access to that car parking), and
(h) any space used for the loading or unloading of goods (including access to it), and
(i) terraces and balconies with outer walls less than 1.4 metres high, and
(j) voids above a floor at the level of a storey or storey above.

DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	Draft S4.55 Issue	14.08.20
2	Draft S4.55 Issue	28.08.20
3	Draft S4.55 Issue	11.09.20
4	S4.55 Submission	17.09.20
5	S4.55 Submission	23.09.20

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0 5 10 20
SCALE 1:500

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ABN: 72 104 833 507
Reg Vic: 19340

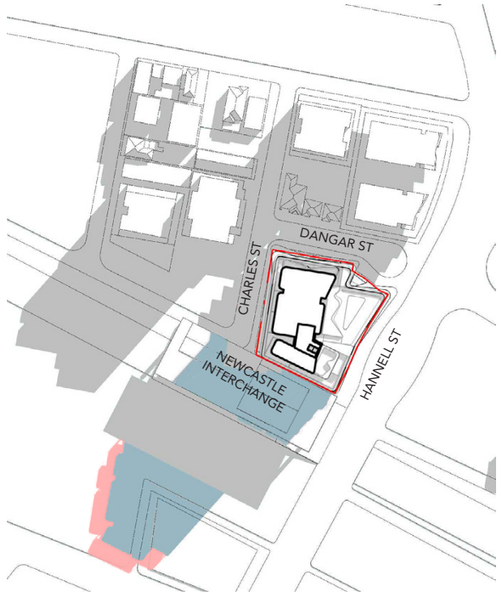
Project:
BOWLINE

10 Dangar Street
Wickham NSW 2293

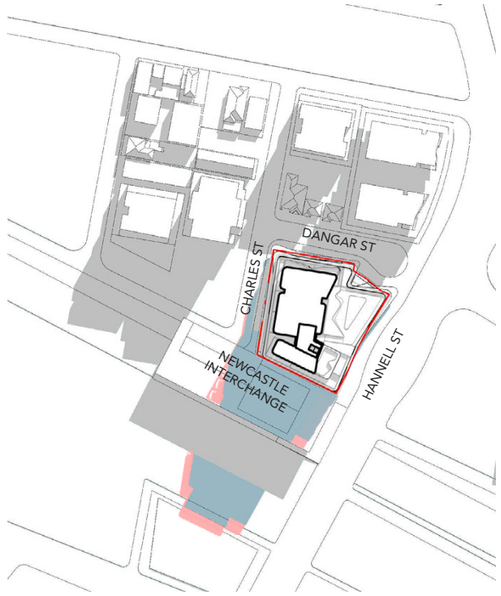
Title:
GFA Diagram 01

Project #:	Scale:	Drw:	Ckd:
918	1 : 500 @A3	LR	ML

Drawing #: DA-5000
Rev: 5



1 21ST JUNE 9AM



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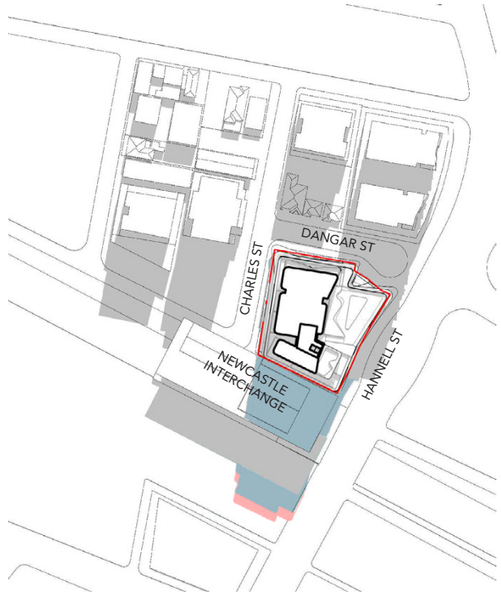

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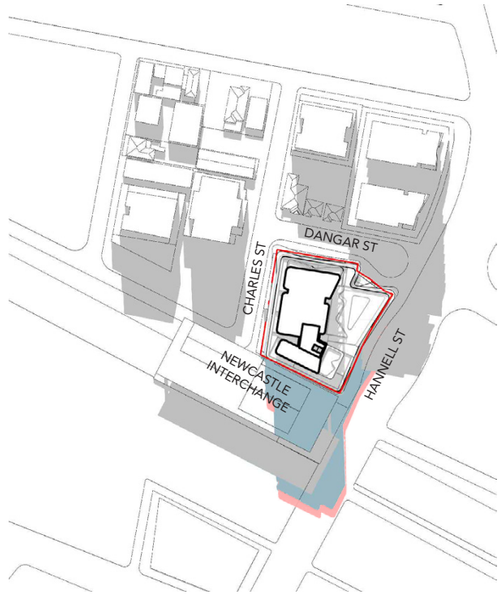

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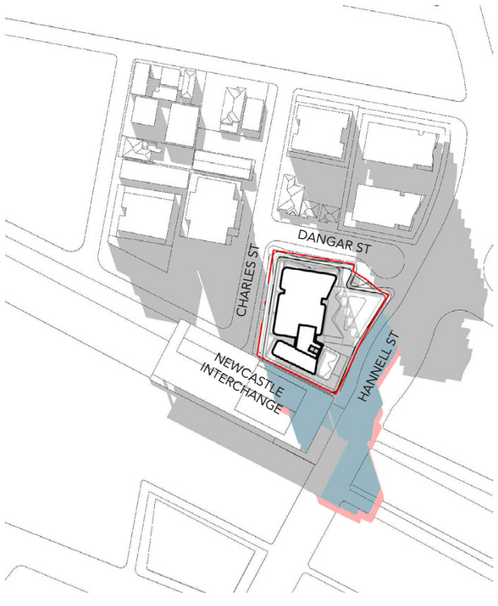

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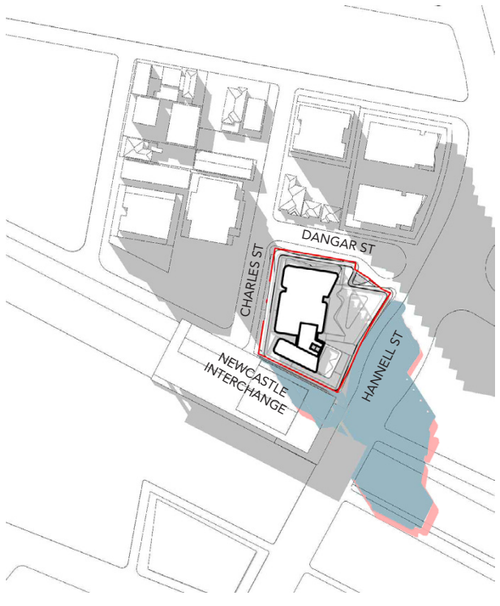
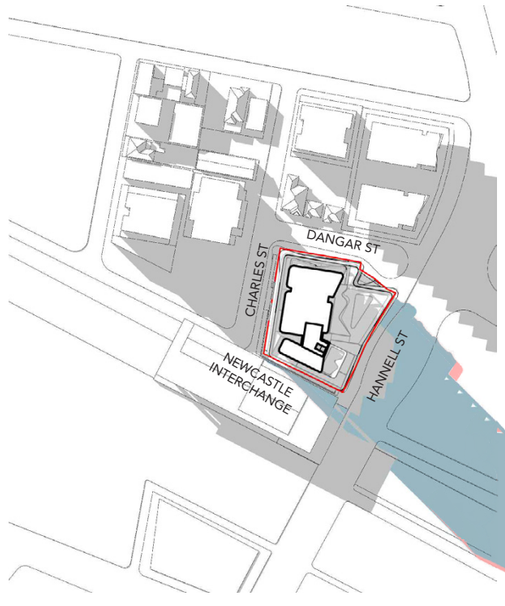


6 21ST JUNE 2PM



7 21ST JUNE 3PM

DRAWING STATUS:

S4.55 APPLICATION

Rev	Revision Description	Date
1	S4.55 Submission	23.09.20

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KEY TO SHADOW DIAGRAMS

SHADOW CAST BY DEVELOPMENT UNDER PREVIOUS DA SUBMISSION

SHADOW CAST BY PROPOSED DEVELOPMENT

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Reg Vic: 19340

Project:
BOWLINE

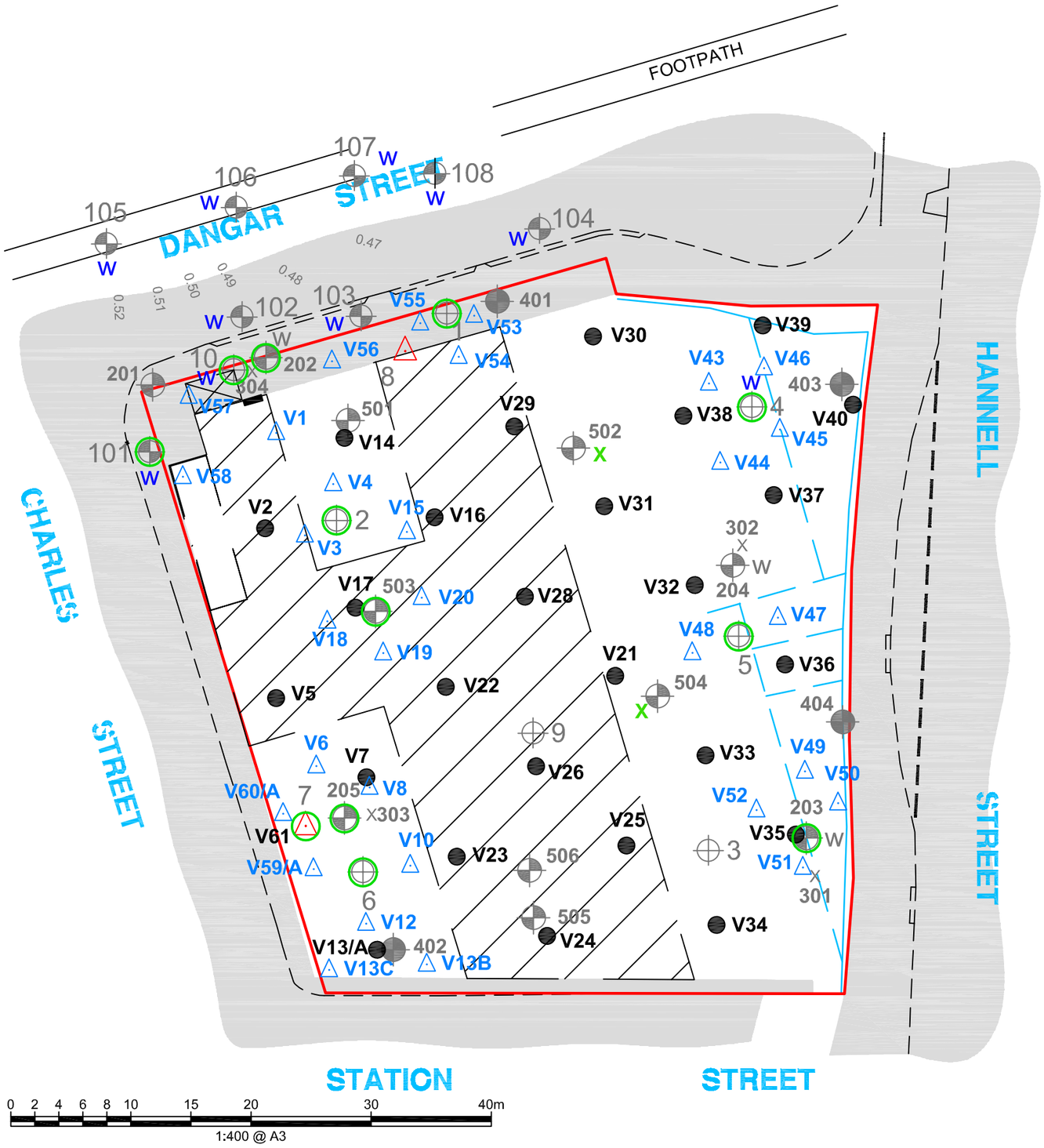
10 Dangar Street
Wickham NSW 2293

Title:
Shadow Diagrams 01

Project #:	Scale:	Drw:	Ckd:
918		LR	ML

Drawing #: DA-6000

Rev: 1



Locality Plan

NOTES

1. Drawing adapted from survey plan by Parker Scanlon Pty Ltd, Ref B122 dated 25.1.08.

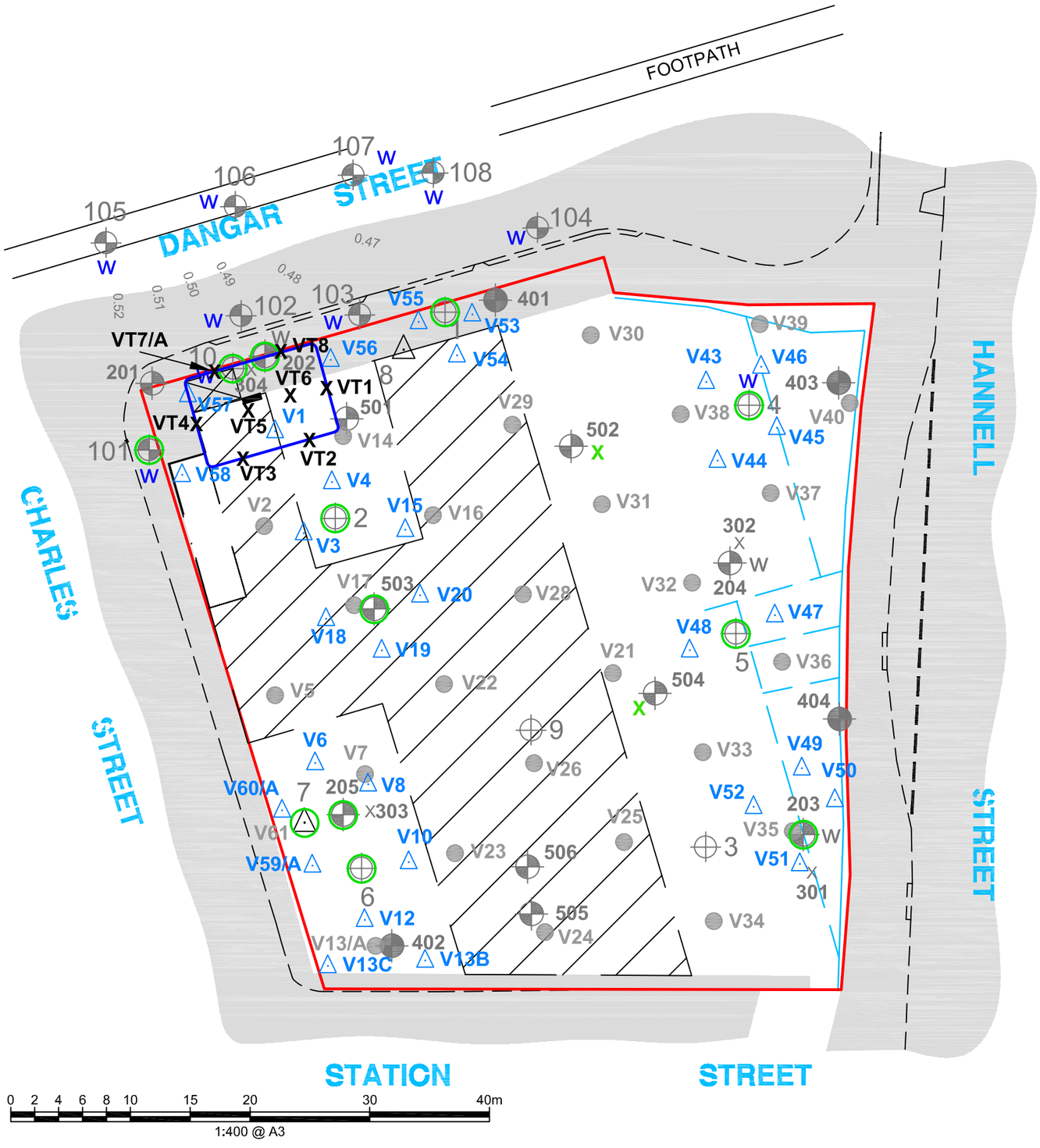
LEGEND

- Approximate Location of Systematic Validation Locations
- Approximate Location of Targeted Validation Locations
- X Approximate Location of Additional Validation Locations (previous inaccessible areas)
- Approximate Location of Targeted Validation Locations for Delineation
- Approximate Borehole Location (current investigation, 39961.08) - Bores 501 to 506
- Approximate Borehole Location (previous investigation, 39961.03, March 2019) - Bores 401 to 404
- Approximate Borehole Location (previous investigation, 39961.02, Nov 2018) - Bores 201 to 203
- Approximate CPT Location (previous investigation, 39961.02, Nov 2018)
- Approximate Borehole Location (previous investigation 39961.01, Nov 2008) - Bores 101 to 108
- Approximate Borehole Location (previous investigation 39961, Sept 2008)
- Approximate Location of Raised Concrete Floor
- Approximate Surface / Near Surface Sampling Location (previous investigation 39961, Sept 2008)
- Approximate Location of Possible Former Bowser(s)
- Approximate of Possible Underground Storage Tank(s)
- W Groundwater Monitoring Well
- Site Boundary

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: Eastern Pacific		TITLE: **Test Location Plan, Validation of Remediation, Removal of Upper Fill Proposed Apartment Development 10 Dangar Street, Wickham**
OFFICE: Newcastle	DRAWN BY: PLH	
SCALE: 1:400@A3 Sheet	DATE: 27.04.2022	

PROJECT No:	39961.11
DRAWING No:	R.002.D002
REVISION:	0



Locality Plan

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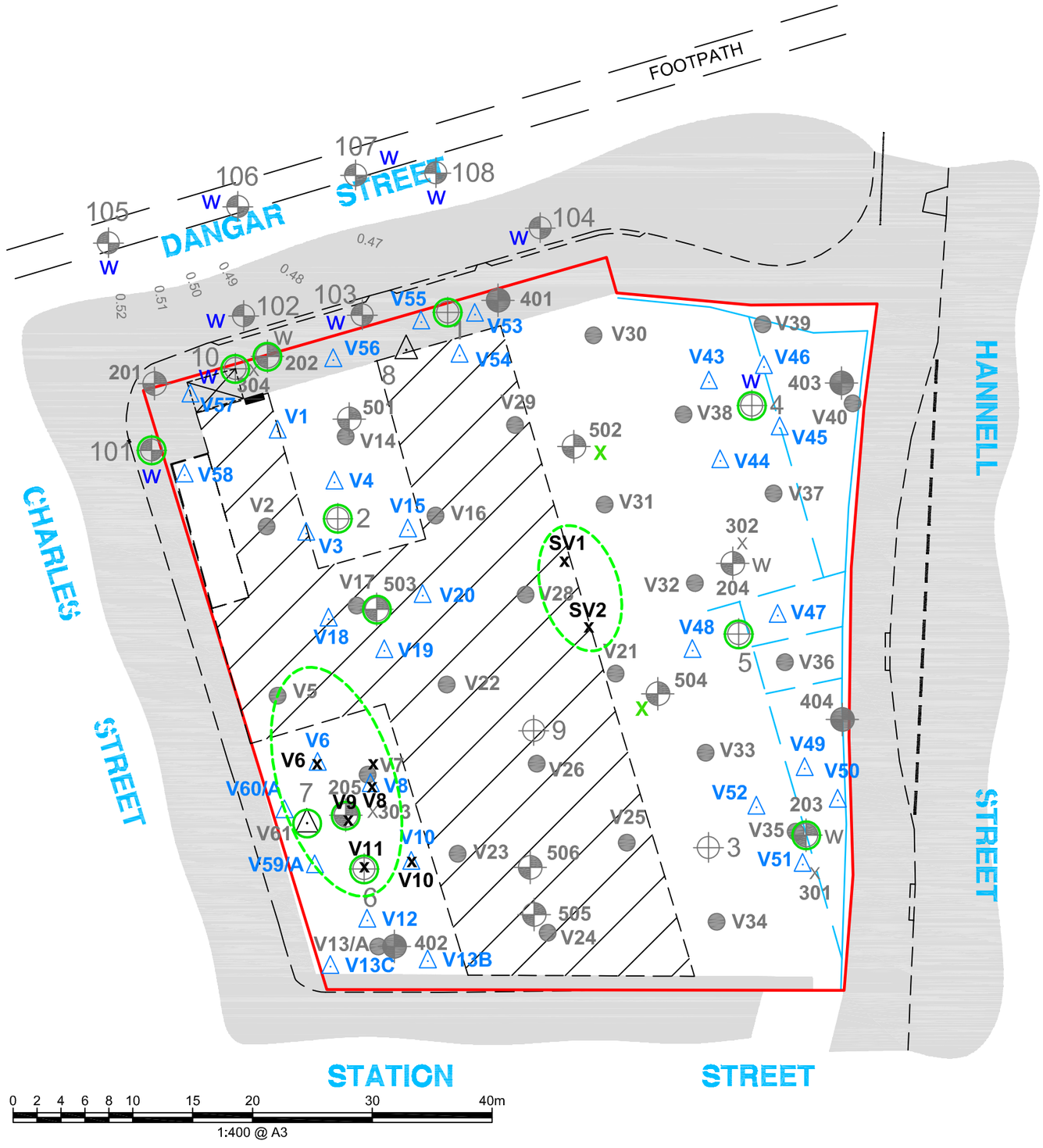
- Approximate Borehole Location (previous investigation 39961, Sept 2008)
- Approximate Location of Raised Concrete Floor
- Approximate Surface / Near Surface Sampling Location (previous investigation 39961, Sept 2008)
- Approximate Location of Possible Former Bowser(s)
- Approximate Extent of Excavation - Hydrocarbon-Impacted Soils
- X Approximate Location of Validation Sample - Hydrocarbon-Impacted Soils
- W Groundwater Monitoring Well
- Site Boundary

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: Eastern Pacific		
OFFICE: Newcastle	DRAWN BY: PLH	
SCALE: 1:400@A3 Sheet	DATE: 27.04.2022	

TITLE: **Test Location Plan, Validation of Remediation, Hydrocarbon Impacted Soils Proposed Apartment Development 10 Dangar Street, Wickham**

PROJECT No:	39961.11
DRAWING No:	R.002.D002
REVISION:	0



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- Approximate of Possible Underground Storage Tank(s)
- W Groundwater Monitoring Well
- Site Boundary
- Approximate Location of PAH / Metal / Asbestos Impacted Fill
- X Approximate Location of Validation Sample

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: Eastern Pacific		TITLE: **Test Location Plan, Validation of Stockpile Removal** **Proposed Apartment Development** **10 Dangar Street, Wickham**
OFFICE: Newcastle	DRAWN BY: PLH	
SCALE: 1:400@A3 Sheet	DATE: 27.04.2022	

PROJECT No:	39961.11
DRAWING No:	R.002.D.003
REVISION:	0