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PRELIMINARY (ENVIRONMENTAL) SITE ASSESSMENT

5 HUNTINGDALE DRIVE THORNTON, NSW

Lot 812 DP 1032401

For: Stevens Holdings Pty Ltd

03/02/2022

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EXECUTIVE SUMMARY

We are pleased to provide this Preliminary Environmental Site Assessment (formerly known as a Stage 1 Environmental Site Assessment) at the above-mentioned site to assess the possible extent of contamination on the site.

The aim of this assessment is to provide an environmental assessment characterising potential contamination of the site from previous occupiers and to provide current contamination status of the site, drawing conclusions on the suitability of the site for its proposed redevelopment and making recommendation to enable such conclusions.

Data obtained in this assessment indicates that further assessment of the site is not required and the site is suitable for the proposed commercial / light industrial use with construction or long-term environmental management not required.

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Assessment Objectives:

The project objectives of a Preliminary Environmental Site Assessment (PESA) are to satisfy the general requirements of State Environmental Planning Policy No.55 (SEPP 55) in accordance with the NSW EPA Guidelines for Consultants Reporting on Contaminated Land – Contaminated Land Guidelines (2020).

Specifically, this PESA will consider the potential for historical activities to have caused contamination at the Site and determine the suitability of the land for future land use consistent with Commercial / Industrial 'D' in the National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1) ('NEPM', NEPC, 2013).

Scope of Works:

Desktop study including a review of available current and historical information and previous investigation work;

Assessment of previous site use;

Systematic & targeted intrusive investigations including the collection of soil samples from boreholes/testpits;

Data assessment and reporting including comparison with relevant EPA made or endorsed guideline investigation and screening levels;

Assessment of weather previous site uses have caused contamination;

Assessment of whether the site is suitable, from a contamination perspective for its ongoing / proposed land use;

Provision of recommendations in the event that remedial and management actions are required or if management of the contamination is required to render the Site suitable;

Preparation of this PESA report in accordance with relevant EPA made or endorsed guidelines, and

Provision of baseline data for comparisons against future data resulting from future commercial / industrial land use activities.

The PESA was conducted in accordance with:

• ASC NEPM 2013.

• Australian Standard ('AS') 4482.1-2005: Guide to the investigation and sampling of sites with potentially contaminated soil, Part 1: Non-volatile and semi-volatile compounds.

• AS 4482.2-1999: Guide to the investigation and sampling of sites with potentially contaminated soil, Part 2: Volatile substances.

• Australia New Zealand Environmental and Conservation Council ('ANZECC') and Agriculture and Resource Management Council of Australia and New Zealand ('ARMCANZ') (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 1, The Guidelines ('ANZECC 2000').

• ANZECC and ARMCANZ (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality ('ANZECC 2018').

• Department of Urban Affairs and Planning and Environment Protection Authority ('EPA') (1998) Managing Land Contamination, Planning Guidelines, SEPP 55 – Remediation of Land.

• Friebel, E & Nadebaum, P 2011, Health Screening Levels for Petroleum Hydrocarbons in soil and Groundwater. Part 1: Technical development document, CRC CARE Technical Report no. 10, CRC for Contamination Assessment and Remediation of the Environment ('CRC CARE'), Adelaide, Australia.

• National Health and Medical Research Council ('NHMRC') (2008) Guidelines for Managing Risk in Recreational Waters.

• NHMRC and National Resource Management Ministerial Council ('NRMMC') (2011) National Water Quality Management Strategy, Australian Drinking Water Guidelines 6, 2011 (version 3.5 updated August 2018) ('ADWG 2011').

• NSW Department of Environment and Conservation ('DEC') Guidelines for the Assessment and Management of Groundwater Contamination ('NSW DEC Groundwater Guidelines').

• NSW Environment Protection Authority ('EPA') (1995) Sampling Design Guidelines.

• NSW EPA (2014) Technical Note: Investigation of Service Station Sites.

• NSW EPA (2017) Guidelines for the NSW Auditor Scheme (3rd Edition) ('NSW Auditor Guidelines').

• NSW OEH (2011) Contaminated Sites Guidelines for Consultants reporting on Contaminated Sites.

• United State Environment Protection Agency ('USEPA') (2006) Guidance on Systematic Planning Using the Data Quality Objectives Process, ref: EPA QA/G-4.

• NSW EPA Excavated Natural Material Order (2014).

• Acid Sulfate Soil Manual (1998), NSW Acid Sulfate Soils Management Advisory Committee ('NSW ASS Manual').

• National Acid Sulfate Soils Guidance (2018) National Acid Sulfate Soils Sampling and Identification Methods Manual), Water Quality Australia ('National ASS Guidance').

1 INTRODUCTION

The purpose of this PESA investigation is to obtain past and current information about possible contamination levels and distribution on the site, to review all data on the site and to complete an intrusive soil investigation.

Proposed development of the site comprises the construction of a commercial development. The exact design details were not available at the time of assessment.

Based on this information and the previous known site use, a Stage 1 Environmental Site Assessment, including intrusive soil assessment has been completed to provide the required data to assess the current contamination status of the site and to determine if the site is suitable for the proposed commercial / light industrial use or if further assessment is required.

1.1 Existing and Proposed Development Details

Existing developments were not observed on site during the site walkover as can be seen in the attached site photographs.

Proposed development will likely involve the construction of new commercial / light industrial buildings, categorised as HIL 'D' – Commercial / Industrial with minimal opportunities for soil access,

1.2 Summary of Previous Site Assessments

Previous assessments of the site have not been made to our knowledge.

2 SITE DETAILS

The site is located in the eastern portion of the commercial section of Thornton, on the southern side of Huntingdale Drive between Pipeclay Drive to the west and Thornton Road to the east as shown on the attached Figure 1 with Site Boundaries shown on the attached Figure 2.

The site is located in a commercial area comprising commercial buildings to the east, west and south of the site, with Huntingdale Drive to the north of the site.

Table 1 below contains a summary of the site details.

TABLE 1 – SUMMARY OF SITE DETAILS

SITE ADDRESS:	5 Huntingdale Drive, Thornton, NSW
SITE AREA:	Total – 3,138 m^2
SITE IDENTIFICATION	Lot 812 DP 1032401 Lat 32°47'12"S Long 151°38'13”E
ZONING	Commercial / Light Industrial
CURRENT AND PREVIOUS LANDUSE:	The site was vacant land adjacent to farmland during the 1940’s with mining operations to the north west of the site. During the 1980’s and 1990’s and a rail loop intersected the site that was removed between 1998 and 2001 when the site became a part of the current commercial and light industrial area. Currently the site is vacant.
PROPOSED LANDUSE:	The proposed land use involves construction of a commercial / light industrial development.
ADJOINING SITE USES:	The site is surrounded by commercial buildings in all directions with the exception of Huntingdale Drive on the northern boundary.

3 SITE TOPOGRAPHY, GEOLOGY AND HYDROLOGY

3.1 Site Topography

Topographically the site is located on the toe of a moderately undulating north facing residual hillside with relatively flat alluvial swamp deposits about 1km to the east of the site.

Locally the site falls at a relatively rate from the rear south western corner of the site to the existing fence line near the northern boundary. A batter of 1V:4H then extends from the fence down to the boundary and the road beyond as can be seen on the attached site survey.

Small retaining structures were observed on the southern and western boundaries comprising upright kerb with structures greater than 600mm in height not noted.

3.2 Site Geology

Reference to the 1:250K Newcastle Regional Geology Map SI 56-2 indicates that the site is located in residual Permian aged Tomago Coal Measures comprising shale, sandstone, mudstone, tuff and coal as shown on the attached Figure 3.

Boreholes indicate that the soil profile comprises historical fill overlying topsoil and residual clay with rock material not encountered above 3m depth.

3.3 Acid Sulfate Soil Risk

Reference to the eSpade ASS Risk maps indicate that the site is not in a known area of ASS, however there is an area of High Probability of ASS Occurrence within 1m below the existing surface level comprising alluvial material is immediately to the north east of the site as shown on the attached Figure 4.

3.3 Soil Landscape

Reference to eSpade Soil Landscape Maps indicate that the site is located in Beresfield (be) soil landscape (report attached), that has the following properties:

Landscape—undulating low hills and rises on Permian sediments in the East Maitland Hills region. Slope gradients 3–15%, local relief to 50 m, elevation is 20–50 m. Partially cleared tall open-forest.

Landscape Variant—bea—steeper upper slopes (15–<25%).

Soils—moderately deep (<120 cm), moderately well to imperfectly drained Yellow Podzolic Soils (Dy2.21), Brown Podzolic Soils (Db1.21) and brown Soloths (Db2.41) occur on crests with moderately deep (<120 cm), well-drained Red Podzolic Soils (Dr2.21) and red Soloths (Dr2.41) on upper slopes, moderately well to imperfectly drained brown Soloths (Db2.41, Db1.41) and yellow Soloths (Dy3.41) on sideslopes and deep (>200 cm), imperfectly to poorly drained Yellow Podzolic Soils (Dy2.21), yellow Soloths (Dy2.41, Dy3.41) and Gleyed Podzolic Soils (Dg2.41) on lower slopes.

Qualities and Limitations—high foundation hazard, water erosion hazard, Mine Subsidence District, seasonal waterlogging and high run-on on localised lower slopes, highly acid soils of low fertility.

3.4 Groundwater

Groundwater seepage was not detected above a depth of 3.5m in any of the boreholes at the time of assessment.

It should be noted that groundwater levels can fluctuate due to such factors as rainfall, tidal influences, soil permeability and other such environmental and geological conditions.

4 SUMMARY OF HISTORICAL INFORMATION AND CONTAMINANTS / AREAS OF CONCERN

4.1 Site Uses

The site was vacant land adjacent to farmland during the 1940's with mining operations to the north west of the site. During the 1980's and 1990's and a rail loop intersected the site that was removed between 1998 and 2001 when the site became a part of the current commercial and light industrial area.

A Storage of Hazardous Chemicals Search has not been carried out on the site with SafeWork NSW as it has been ascertained that the site has never been used as a commercial service station and there is no historical evidence of Underground Petroleum Storage Systems (UPSS) being used on the site. In addition to this there was no physical evidence onsite of abandoned or remediated UPSS's.

4.2 Review of Aerial Photographs:

Photographs have been attached for the following years with features noted below:

1943

The site appears to be bushland with probable farming operations including a homestead immediately east of the site.

Evidence of the main rail line to the north of the site can be seen and it appears mining operations have commenced north west of the site.

1954

The site remains bushland, with evidence of a dwelling to the immediate east of the site, and the majority of the farm complex removed.

There is now a road to the east of the site that connects to the newly constructed dwellings to the north east of the site.

Expanded mining operations can be seen to the north west of the site.

1966

This image is similar to the previous one, with expanded mining operations and a likely access road to the immediate south of the site.

1976

This image is also similar to the previous one, with expanded mining operations and the dwelling still visible to the immediate east of the site.

1986

A rail loop can now be seen circling from the mine operations to the north west, intersecting the site and returning to the nine to the north west.

The dwelling can still be seen to the immediate east of the site.

1998

Mining operations have now ceased with the rail loop still evident.

The dwelling can still be seen to the immediate east of the site and commercial buildings are now present to the south of the site.

2001

The evidence of the rail loop can still be seen to the north of the site, but is lo longer visible on the site. Commercial development now extends to the southern boundary of the site.

2007

The site is now surrounded by commercial development with vegetation and bare patched visible on the site.

2012

The western portion of the site is gravelled with vehicles parked in this area. The eastern portion is vacant.

2016

The entire site is gravelled and it appears that the site is being used for the storage of machinery and vehicles.

2018

As per 2016.

2019

The site is vacant with the exception of a shipping container.

2020

The site is vacant and gravelled as at the time of assessment.

4.3 Search of the NSW EPA Contaminated Sites Register:

A search of the NSW EPA Contaminated Sites Register indicates the following sites have Contaminated Land Record Notices in the Maitland City Council LGA:

Search results

Your search for: LGA: MAITLAND CITY COUNCIL

Matched 4 notices relating to 2 sites.

Search Again | Refine Search

Suburb	Address	Site Name	Notices related to this site
EAST MAITLAND	Corner Melbourne Street and Brisbane STREET	Former Gasworks Site	2 former
MAITLAND	Charles STREET	Maitland Gasworks	2 current

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Both sites are located >5km from the site and does not have any current notices.

4.4 Summary of Areas of Concern (AoC's) and Chemicals of Concern (CoC's)

A summary of the AEC's and COC's is contained in Table 3 below:

TABLE 3 – POTENTIAL AECS AND COCS

AEC	POTENTIAL CONTAMINATING ACTIVITY	POTENTIAL COCS	LIKELIHOOD OF CONTAMINATION*	COMMENT
1 Imported / Generated Fill	Importation of fill material during the 1980's when the rail line was constructed through the site.	Metals, TRH, OCP, OPP, Asbestos Foreign Material	Low - Med	Contaminated material may be present onsite in fill that has been used to achieve construct and remove the rail line and create the existing site levels. Data suggests that CoC's are not present above guideline thresholds in any of the fill material tested. Significant anthropogenic material was not noted in the fill with the exception of surface material including steel, timber, concrete and bricks.
2 Former Site Uses	Agriculture prior to the 1980's and rail loop line construction, operation and removal during the 1980's and 1990's	TRH, BTEX, PAH's, Metals,	Low	It appears agriculture did not occur in the site as it was vegetated until rail loop construction. The majority of evidence of the former rail line had been previously removed from the site. Potential CoC's were NOT detected in any of the soil samples tested.
3 Adjacent commercial and industrial activities	Light industrial surrounding the site.	TRH, BTEX, PAH's, metals	Low	The surrounding activities are commercial or light industrial, with heavy industry not located near the site. CoC's were not detected in any of the soil samples tested.

NOTES:

** = It is important to note that this is not an assessment of the financial risk associated with the AEC in the event contamination is detected, but a qualitative assessment of the probability of contamination being detected at the potential AEC. Metals – Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel and Zinc; TPH – Total Petroleum Hydrocarbons; PAH – Polycyclic Aromatic Hydrocarbons; OCP – Organochlorine Pesticides; OPP – Organophosphorus Pesticides, UPSS denoted Underground Petroleum Storage Systems*

4.6 Assessment of Information Integrity

It is assessed that the integrity of the assessment of information is correct as supplied by the relevant regulatory sources, attached documents and QA/QC information.

5 VISUAL ASSESSMENT

A site investigation was undertaken on 11/11/2021 that involved the excavation of 6 bore holes. Visual assessment of the site indicated the following possible visual sources of contamination;

- Imported fill and contamination associated with the former rail loop on the site;
- Machinery storage and vehicle parking areas;

Vegetation on the site appeared very healthy with no die back or dead areas, Shrubs were located on some of the boundaries as can be seen on the attached site photographs.

Drums and other signs of chemical waste material were NOT noted over the main portion of site at the time of assessment. Odours were not noted at the time of assessment

Visual assessment of the boreholes indicates that imported fill material comprising Clays, Gravelly Clays, and Sands with silt and gravel was encountered at the following depths with locations as shown on the attached Figure 6;

- BH1 – 1.4m
- BH2 – 1.8m
- BH3 – 2.0m
- BH4 – 2.0m
- BH5 – 2.0m
- BH6 – 1.8m

6 SOIL ASSESSMENT

Section 3.1 of the *NSW EPA Sampling Design Guidelines 1995* indicates that a Judgmental Sampling Pattern is required for a Preliminary Environmental Site Assessment.

Based on the site layout and the known site usage it was assessed that six (6) test locations were required with twelve (12) primary samples and one (1) duplicate sample taken at depths where contamination is likely to be expected.

6.1 Sampling Methodology

Borehole locations were selected prior to commencement of excavation based on a grid pattern and onsite features such as location of previous commercial activities ensuring an appropriate spread of the site was sampled including up gradient and down gradient areas. All borehole locations are shown on the attached Figure 3.

All boreholes were excavated using a truck mounted drilling rig equipped with solid flight augers as shown in the attached photographs.

Soil samples were taken from various depths from BH1 to BH6. The depth at which the soil samples were taken and tested was dictated by changes in soil characteristics and other such factors as odour and colour. Out of these collected samples, the selected samples were forwarded to Envirolabs NATA Laboratory for analytical testing.

All sampling was undertaken in accordance with all relevant Australian Standards, including *AS 1726 – 1993 – Geotechnical Site Investigations*, *NSW EPA Sample Design Guidelines* with reference to the CLM Act, NEPM (2013) Schedules and associated guidelines as detailed in the reference list. All laboratories used were NATA Certified.

6.2 QA/QC

New neoprene gloves were worn during sampling and replaced prior to collection of each sample directly from the excavator's bucket. All collected samples were placed in laboratory supplied glass with Teflon coated lids. Decontamination of sampling equipment was carried out with Decon 90 and clean water. Samples were then placed on ice and transported to a fridge at our premises prior to dispatch to the laboratory.

Field screening involved visual observation to determine if the material was uncontrolled fill or natural topsoils or residual material. The GMWs were purged prior to sample collection. A Chain of Custody form was prepared and accompanied samples to the laboratory. Laboratory QA/QC procedures are detailed in the attached laboratory testing results.

All QA/QC documentation supplied by the laboratory is contained in Envirolabs document referenced in this report and a duplicate sample was collected, with results detailed in the attached Results table with Duplicate samples described there.

6.3 Soil Test Results

The attached Results Table in the Appendix detail the laboratory testing results of the collected soil samples compared to the relevant NEPM Health Based Investigation Levels (HBIL's) for Commercial / Industrial "D" and Ecological Screening Level (ESL) - Commercial and Industrial Guideline Thresholds.

6.3.1 Soil Test Results Summary

Hydrocarbons

Laboratory testing results for soil samples tested indicate that **TRH, BTEX or PAH's levels detected are below** laboratory detection limit concentrations at ALL test locations.

Pesticides

Laboratory testing results for soil samples tested indicate that **OC/OP levels detected are below** laboratory detection limits at ALL test locations.

Metals

Laboratory testing results for soil samples tested indicate that **metal levels detected are below** the relevant guideline threshold concentrations at ALL test locations with the following exception:

- **BH2 – 1.8m**

  Zink – 550 mg/kg detected

  Under the Health Investigation Limit (HIL) Threshold of 400,000 mg/kg

  1.5X the Ecological Screening Level (ESL) Threshold of 360mg/kg

  .

- **BH4 – 2.6m**

  Zink – 610 mg/kg detected

  Under the Health Investigation Limit (HIL) Threshold of 400,000 mg/kg

  1.7X the Ecological Screening Level (ESL) Threshold of 360mg/kg

7 RECOMMENDATIONS

Contaminants of Concern were NOT encountered above the relevant Health Investigation Level threshold guidelines in the soil samples collected, with the exception of the above-mentioned slight exceedances of Ecological Screening Levels and two locations only, with Health Investigation Limits not exceeded indicating that that do not present a significant risk of harm to human or environmental receptors.

It is assessed that former site uses have not resulted in contamination from CoC's on the site and it is recommended that the site is suitable for the proposed use on the following conditions;

- If any excavations are proposed for the new development, any material to be removed offsite requires either Waste Classification for imported fill material with anthropogenic material as per the referenced NSW EPA Waste Classification Guidelines or Excavated Natural Material Assessment as per the referenced NSW EPA ENM Guidelines with all receipts and reports from and soil material disposed offsite being retained.

8 CONTAMINATION SOURCES

The following sources of possible contaminated areas and possible contamination were identified;

Possible Onsite Contaminated Areas

- Onsite historical fill material;
- Hardstand areas used for vehicle storage;
- Data suggests Chemicals of Concern were not detected above threshold guidelines in the soil samples tested with the excepting of a slight exceedance of the ESL Threshold concentration of Zink, but the concentration did not exceed of the HIL Threshold concentration;

Contaminants of Concern (CoC's)

The following contaminants of concern were tested for in soil samples collected:

- TRH (Total Recoverable Hydrocarbons)
- Total PAH's (Polycyclic Aromatic Hydrocarbons)
- BTEX (Benzene, Toluene, Ethyl Benzene and Xylene) and
- Naphthalene
- Organochlorine Pesticides / Organophosphorous Pesticides (OC/OP)
- Lead and select heavy metals including cadmium, chromium, zinc, copper, mercury, arsenic and nickel;

9 CONCEPTUAL SITE MODEL

This Conceptual Site Model (CSM) is specific to this site and is based on a review of all available information, including site inspections / investigations and historical searches.

The following sensitive receptors have been identified on the site;

- Nearby residents and businesses in both the short and long term;
- Site personnel working on any service excavations on the site;
- Long term residents and businesses after construction of the development;
- Wetlands to the east of the site and Thornton Road;
- Any other nearby waterways;
- Groundwater.

All potential contamination sources are noted in Section 8 – Contamination Sources.

At the time of assessment, the site was covered in gravel material. Surface water exited the site by overland flow with some limited surface infiltration.

See Section 3 – Site Geology and Hydrology above for detailed site geology and groundwater information. In summary, soil material encountered comprised of imported CLAY and SAND fill up to 2.0m in depth in all locations underlain by Silty SAND topsoil and Gravelly CLAY. Rock was not encountered above 3m depth as shown on the attached logs and groundwater seepage was not detected above this depth as shown on the attached logs.

It is assessed that the following potential contamination migration pathways are present on the site;

- Contaminated material being removed offsite during bulk future excavations;
- Migration of contaminants into and through the groundwater during rain events.

The nature and extent of contamination considered likely to be found on the site is summarised above, with Environmental Management of the site NOT recommended as discussed above in Section 7 - Recommendations.

The site layout and possible contamination sources can be seen on the attached Figures.

10 DATA QUALITY OBJECTIVITIES (DQO's)

The objective of this investigation is to determine the extent of possible onsite contamination and provide baseline contamination data for the site. Further soil and groundwater assessment may be required during re-development of the site and if unexpected contamination is discovered.

The first stage of the process is to provide data to indicate that the site is suitable for the proposed continuing land use activity.

A conceptual Site Model has been detailed in Section 9 above.

Site boundaries are indicated on the attached Figures.

Decisions to be made and the criteria to be used is listed as follows;

- Assessment of the contamination type and distribution on the site will be made using all previous investigations carried out onsite with reference to the NSW EPA Guidelines for the NSW Site Auditor Scheme and the NEPM (2013);

- Assessment of the groundwater contamination using criteria described in the NEPM (2013);

To minimise the potential of decisions errors all data will be assessed against the NSW EPA Guidelines for the NSW Site Auditor Scheme – Appendix V – Quality Assurance and Quality Control.

It is assumed that some errors may be contained within the assembled data and information. If it is found during contaminated material excavation that conditions encountered onsite differ significantly from those suggested by the collected data, an environmental consultant should be contacted and made aware of the situation.

11 SAMPLING ANALYSIS PLAN

A judgemental sample pattern was based on a grid system, with areas visually identified and containing fill and locations being upslope and downslope of possible contamination sources targeted.

Location of sampling points and site features such as AEC's are shown on the attached Figure 6. Borehole locations were selected prior to commencement of excavation based on a grid pattern and onsite features such as location of former commercial operations ensuring an appropriate spread of the site was sampled including up gradient and down gradient of AEC's.

12 GUIDELINES TO BE USED

The following guidelines from the NEPM (2013) were followed during the assessment process;

Schedule B—General guidelines for the assessment of site contamination

The following general guidelines provide guidance on the possible ways of achieving the desired environmental outcome (PART 3 of the Measure) for the assessment of site contamination and should only be considered in relation to the assessment of site contamination.

Index of guidelines
Schedule B1—Guideline on Investigation Levels for Soil and Groundwater
Schedule B2—Guideline on Site Characterisation
Appendix A Possible analytes for soil contamination
Appendix B Data quality objective (DQO) process
Appendix C Assessment of data quality
Appendix D Example data presentation on scale drawings and borehole logs
Appendix E Dioxins and dioxin-like compounds
Schedule B3—Guideline on Laboratory Analysis of Potentially Contaminated Soils
Appendix A Determination of total recoverable hydrocarbons (TRH) in soil
Schedule B4—Guideline on Site-Specific Health Risk Assessment Methodology
Appendix A Structure of a risk assessment report
Schedule B5a—Guideline on Ecological Risk Assessment
Appendix A Summary of the EILs for fresh and aged contaminants in soil with various land uses
Appendix B Mixtures of chemicals
Schedule B5b—Guideline on Methodology to Derive Ecological Investigation Levels in Contaminated Soils
Appendix A Review and comparison of frameworks for deriving soil quality guidelines in other countries
Appendix B Method for deriving EILs that protect aquatic ecosystems
Schedule B5c—Guideline on Ecological Investigation Levels for Arsenic, Chromium (III), Copper, DDT, Lead, Naphthalene, Nickel and Zinc
Appendix A Raw toxicity for arsenic
Appendix B Raw toxicity for chromium (III)
Appendix C Raw toxicity for copper
Appendix D Explanation of the selection of the soil properties that control the added contaminant limits for copper
Appendix E Raw toxicity for DDT
Appendix F Raw toxicity for lead
Appendix G Raw toxicity for naphthalene
Appendix H Raw toxicity for nickel
Appendix I Raw toxicity for zinc
Schedule B6—Guideline on the Framework for Risk-Based Assessment of Groundwater Contamination
Schedule B7—Guideline on derivation of health-based investigation levels
Appendix A1 Derivation of HILs for Metals and Inorganics
Appendix A2 Derivation of HILs for PAHs and Phenols
Appendix A3 Derivation of HILs for Organochlorine Pesticides
Appendix A4 Derivation of HILs for Herbicides and Other Pesticides
Appendix A5 Derivation of HILs for PCBs and PBDEs
Appendix A6 Derivation of HILs for Volatile Organic Carbon Compounds
Appendix B Equations for derivation of HILs and Interim HILs
Appendix C Derivation of HILs for Generic Land Uses
Appendix D Blood lead model assumptions
Schedule B8—Guideline on Community Engagement and Risk Communication
Schedule B9—Guideline on Competencies and Acceptance of Environmental Auditors and Related Professionals

13 REMEDIAL ACTION PLAN (RAP)

A Remedial Action Plan is NOT required for the proposed development of the site.

14 LONG TERM SITE MANAGEMENT

Long term environmental management is NOT required for the site**.**

15 CONCLUSIONS

15.1 Site Characterisation

The following sources of possible types of environmental contamination were identified onsite:

- Historical fill material over the majority of the site associated with the former rail loop that was on the site during 1980's and 1990's;

- Vehicle and Machinery Storage – Some machinery and vehicle were stored onsite after 2000. It is unlikely that maintenance was performed onsite due to lack of facilities.

Contaminants of Concern were NOT encountered above the relevant threshold guidelines in the soil and groundwater sample collected, with the exception of the slight exceedances Zink concentrations of Ecological Screening Limits (with no exceedances of Health Investigation Levels) that do not present a significant risk of harm to human or environmental receptors with remediation and management NOT required.

15.2 Summary of Findings and Conclusion

The sampling regime and subsequent assessment and reporting of the site are sustainability of the site in accordance with the Central Coast Council, and the general requirements of the State Environmental Planning Policy No. 55 (SEP55). All reporting has been undertaken in accordance with the *Consultants Reporting on Contaminated Land – Contaminated Land Guidelines (NSW EPA 2020)* and the *Guidelines for the NSW State Auditor Scheme (NSW EPA 3nd Ed 2017).*

Soil samples collected from the site and tested for CoC's indicate that there is no chemical contamination at Health Investigation Levels by potential CoC's at the time of assessment.

This Environmental Site Assessment concludes that the site is considered suitable for the intended land use as per the conditions listed above in Section 7 and is consistent with the *National Environmental Protection Council (NEPC) National Environmental Protection (Assessment of Site Contamination) Measure (NEPM 2013) – Schedule B1, Table 1A(1), Column D – Commercial / Industrial* and that the site assessment objectives of this report have been achieved.

16 ASSUMPTIONS AND LIMITATIONS

It is the nature of contaminated site investigations that the degree of variability in site conditions cannot be known completely and no sampling and analysis program can eliminate all uncertainty concerning the condition of the site. Professional judgement must be exercised in the collection and interpretation of the data.

In preparing this assessment, current guidelines for assessment and management of contaminated land were followed. This work has been conducted in good faith in accordance with Sanko's understanding of the client's brief and general accepted practice for environmental consulting.

This assessment was prepared with the objective of providing guidance on the remediation and validation activities to be undertaken. No warranty, expressed or implied, is made as to the information and professional advice included in this report. Anyone using this document does so at their own risk and should satisfy themselves concerning the applicability of its application and where necessary should seek expert advice in relation to the particular situation.

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

For and on behalf of
Sanko Excavation Environmental and Civil Services P/L

Damien Sankowsky *BE(Env)*
Principal Environmental Engineer
Australian Geomechanics Society (AGS) Member – EA ID 5879317

Attachments:

- *Report Limitations*
- *Site Photographs*
- *Aerial Photographs*
- *Figure 1 – Site Location*
- *Figure 2 – Site Boundaries*
- *Figure 3 – Site Geology*
- *Figure 4 – ASS Map of Site*
- *Figure 5 – Site Survey*
- *Figure 6 – Borehole Locations and Site Features*
- *Log Explanation Sheets*
- *Engineering Borehole Logs*
- *Summary of Soil Test Results Table*
- *Laboratory Testing Results for Soil, Groundwater and QA/QC*

References:

- *NEPC National Environmental Protection Measures NEPM (2013)*
- *Guidelines for Consultants Reporting on Contaminated Land (NSW EPA 2020)*
- *NSW EPA Sampling Design Guidelines (1995)*
- *NSW EPA Waste Classification Guideline, Part 1: Classifying Waste*
- *NSW EPA Guidelines for the NSW Site Auditor Scheme (3nd edition)*
- *Guidelines for the Assessment and Management of Groundwater Contamination (DECC 2007)*
- *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997 (DECC 2009)*
- *Site Validation Reporting (DECCW 2010b)*
- *Decommissioning, Abandonment and Removal of UPSS Infrastructure (DECWW 2010)*

REPORT LIMITATIONS

Sanko Excavation Environmental and Civil Service Pty Ltd have undertaken a site assessment in accordance with current industry and professional standards. The scope of works were limited to that as set out in the proposal as refered to in this investigation. This report is based upon limited site investigation and subsurface sampling and laboratory testing of samples as set out in the forementioned proposal. Report findings are based upon site conditions at the time of investigation and as such can not be relied upon for unqualified warranties or assume liablity for site conditions not observed and/or accessable during or at the time of investigation. The works are restricted to the site detailed in the report with no offsite investigations conducted. Despite all resaonable care and dilligance taken ground conditions encountered and contaminant concentrations may not represent conditions between sample locations. Site characteristics may also change subsequent to this investigation due to natural processes, chemical reactions, spilling or leaking of contaminants, change in water levels or dumping of fill. All observations and interpretation is made from a limited number of observation points assuming geological and chemical conditions are representative across the site. No other warranties are made or intended. Third parties should seek their own independent advice regarding report contents. This report has been prepared exclusively for the client as detailed on the report and remains the property of this company and the client and can not be reproduced without the written consent of the client as detailed on the report and can then only be reproduced in its entirety.

PRELIMINARY SITE ENVIRONMENTAL SITE ASSESSMENT

5 HUNTINGDALE DRIVE THORNTON FEB 2022

BH1

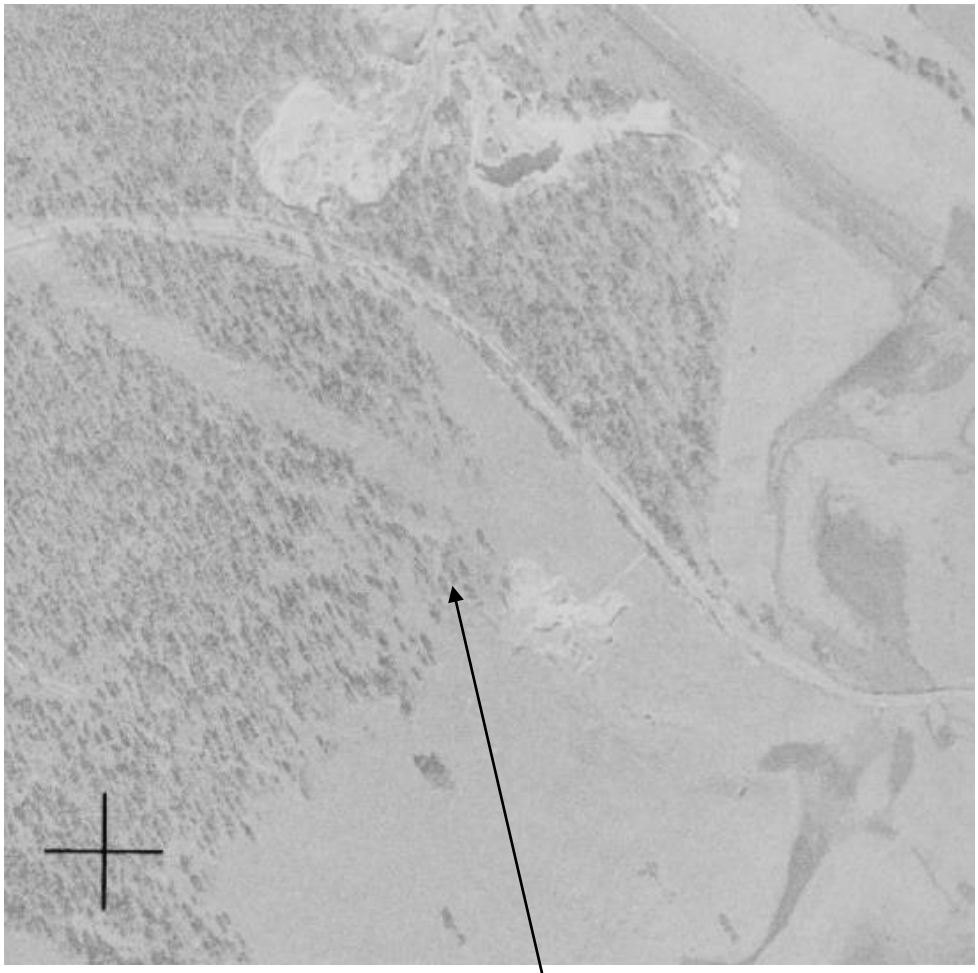
BH2

BH3

BH4 **BH5** **BH6**

PRELIMINARY SITE ENVIRONMENTAL SITE ASSESSMENT

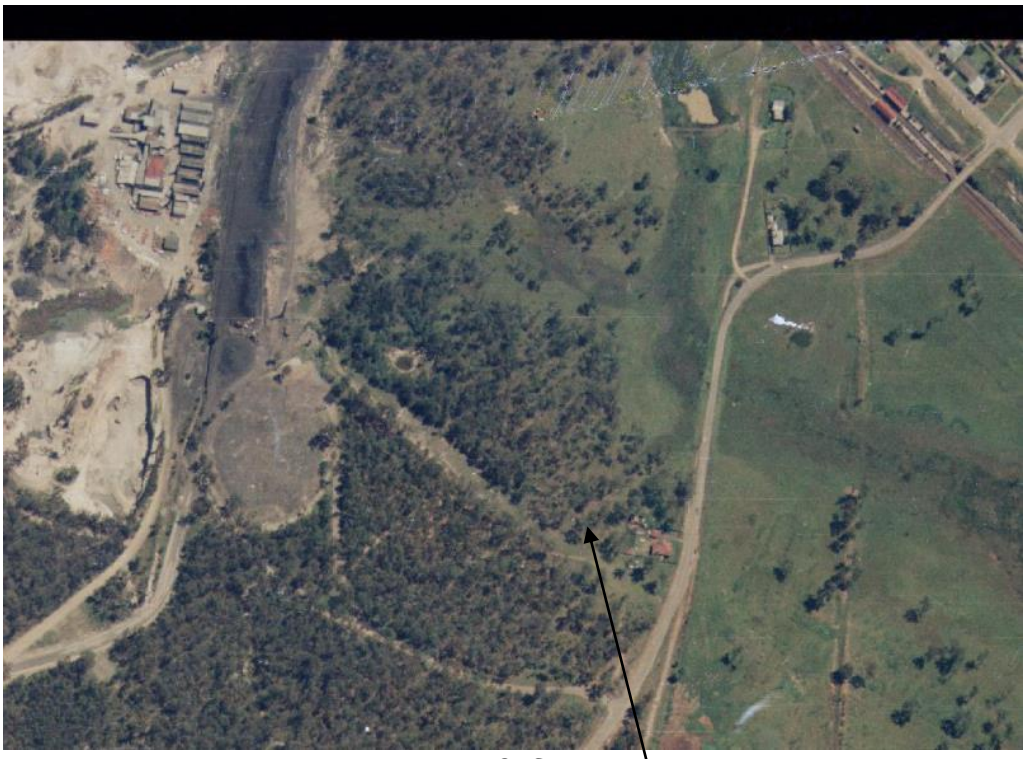
5 HUNTINGDALE DRIVE THORNTON FEB 2022



1943

1954

1966



1976

1986

1998

2001

2007

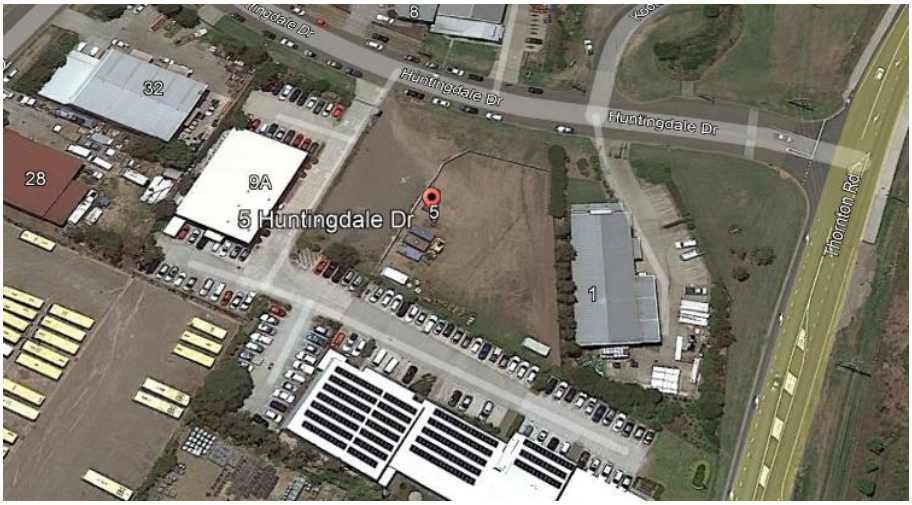
PRELIMINARY SITE ENVIRONMENTAL SITE ASSESSMENT

5 HUNTINGDALE DRIVE THORNTON FEB 2022

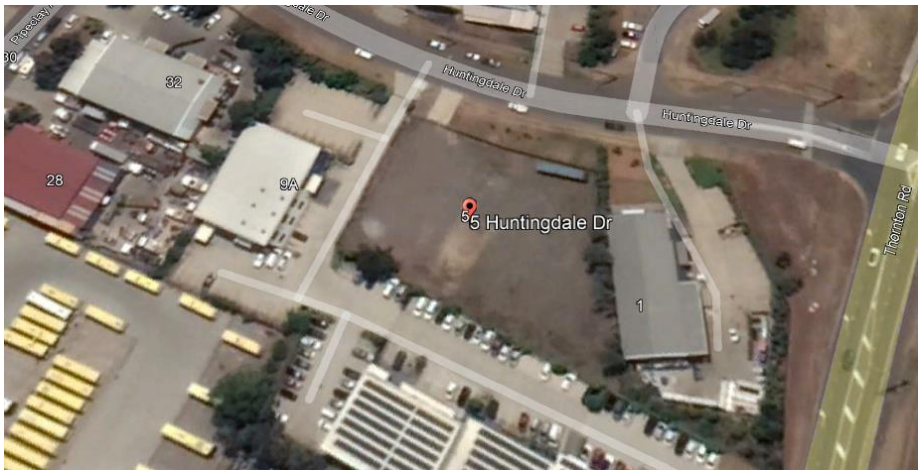
2012

2016

2018



2019



2020

DBYD showing position of former rail line through site

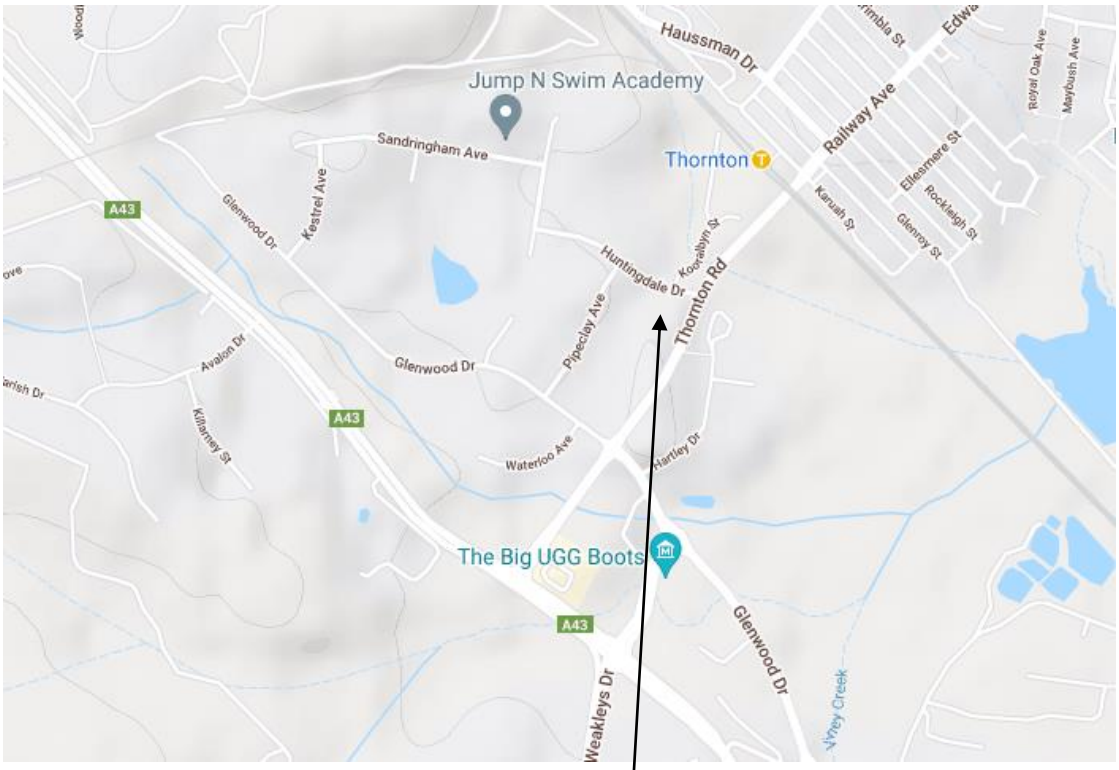


FIGURE 1 - SITE LOCATION

FIGURE 2 - SITE BOUNDARY

PRELIMINARY SITE ENVIRONMENTAL SITE ASSESSMENT

5 HUNTINGDALE DRIVE THORNTON FEB 2022

Sanko
Excavation Environmental & Civil Services P/L • Environmental and Geotechnical Engineering

Figure 3 - Geology Map of Site (Residual BLUE and Alluvium YELLOW)

Figure 4 – ASS Map of site

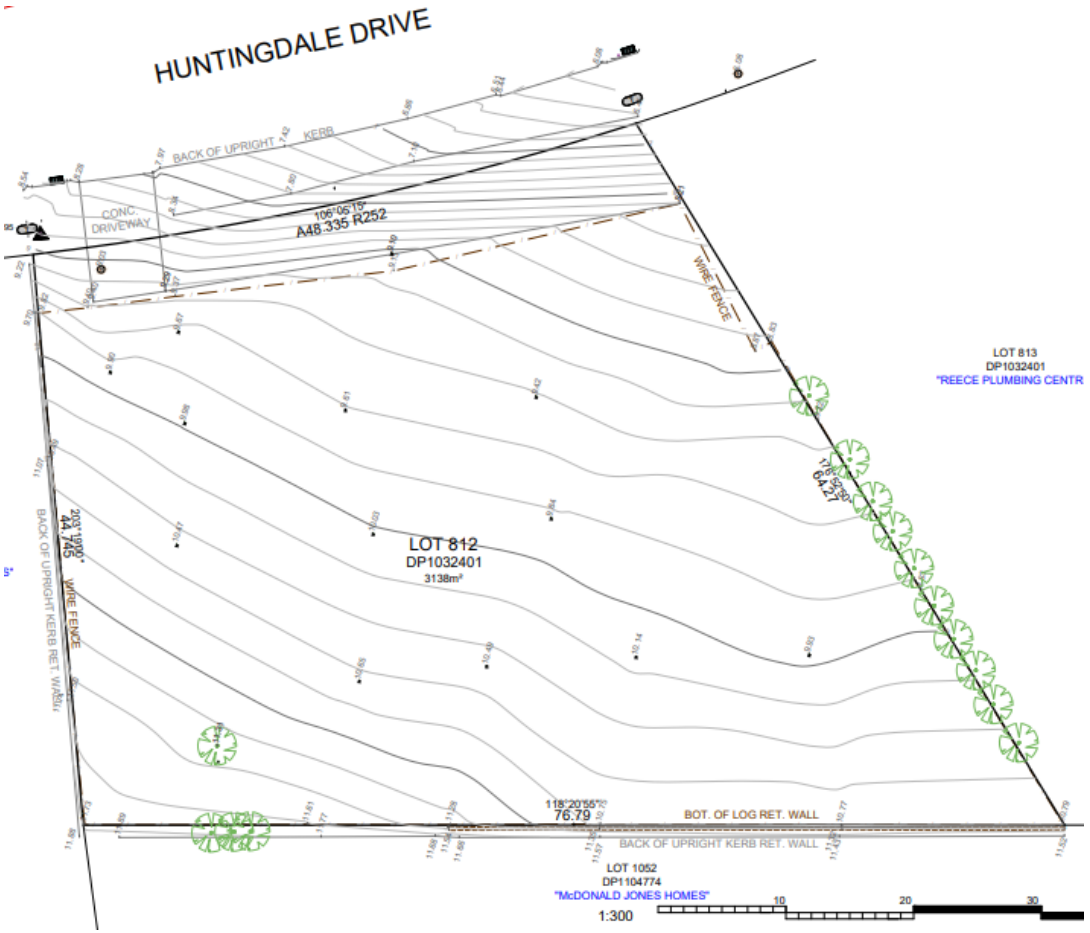


Figure 5 – Site survey

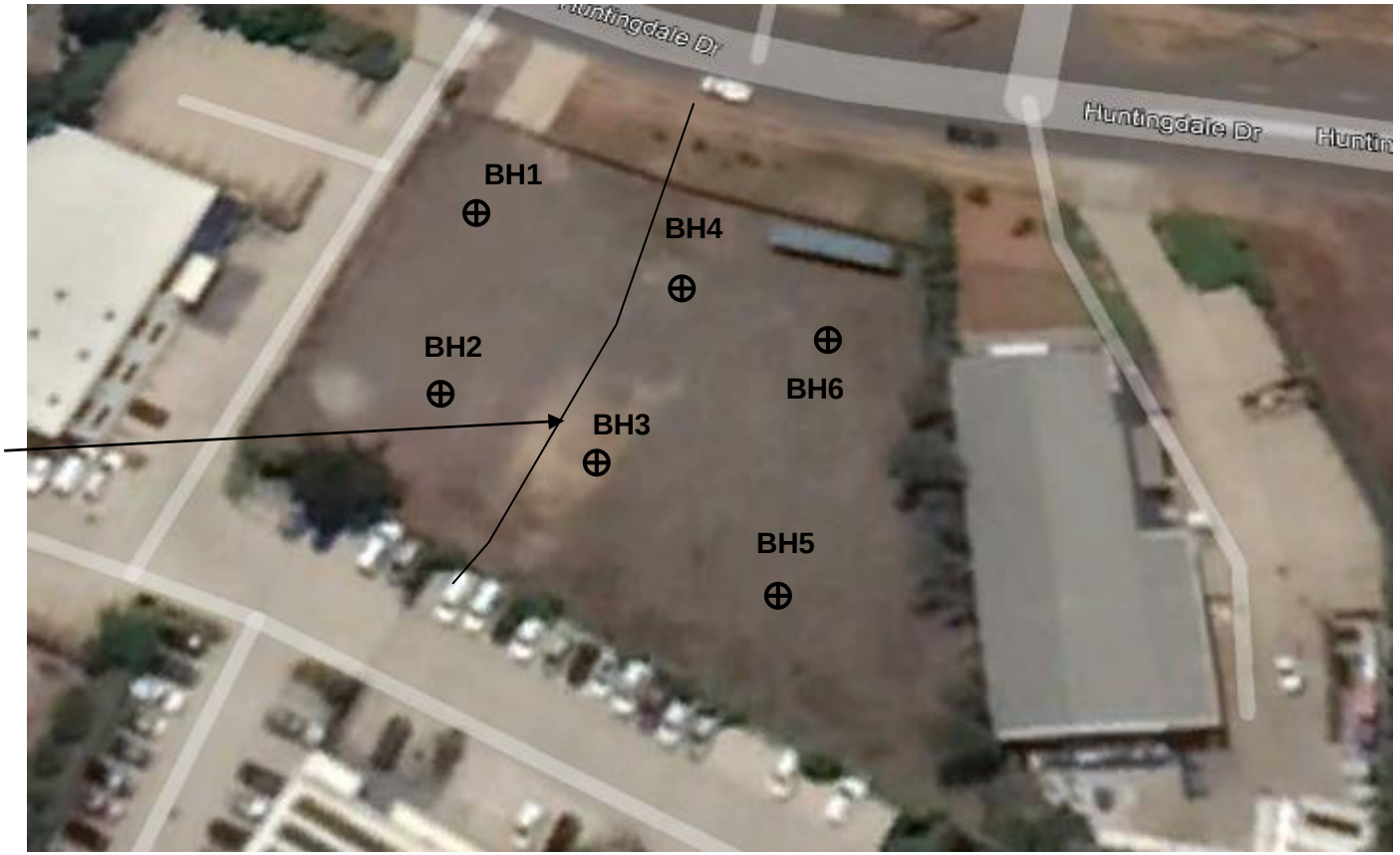


Figure 6 – Borehole Locations and Site Features

PRELIMINARY SITE ENVIRONMENTAL SITE ASSESSMENT

5 HUNTINGDALE DRIVE THORNTON FEB 2022

DEFINITION:

In engineering terms soil includes every type of uncemented or partially cemented inorganic or organic material found in the ground. In practice, if the material can be remoulded or disintegrated by hand in its field condition or in water it is described as a soil. Other materials are described using rock description terms.

CLASSIFICATION SYMBOL & SOIL NAME

Soils are described in accordance with the Unified Soil Classification (UCS) as shown in the table on Sheet 2.

PARTICLE SIZE DESCRIPTIVE TERMS

NAME	SUBDIVISION	SIZE
Boulders		>200 mm
Cobbles		63 mm to 200 mm
Gravel	coarse	20 mm to 63 mm
	medium	6 mm to 20 mm
	fine	2.36 mm to 6 mm
Sand	coarse	600 µm to 2.36 mm
	medium	200 µm to 600 µm
	fine	75 µm to 200 µm

MOISTURE CONDITION

Dry Looks and feels dry. Cohesive and cemented soils are hard, friable or powdery. Uncemented granular soils run freely through hands.

Moist Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere.

Wet As for moist but with free water forming on hands when handled.

CONSISTENCY OF COHESIVE SOILS

TERM	UNDRAINED STRENGTH s_u (kPa)	FIELD GUIDE
Very Soft	<12	A finger can be pushed well into the soil with little effort.
Soft	12 - 25	A finger can be pushed into the soil to about 25mm depth.
Firm	25 - 50	The soil can be indented about 5mm with the thumb, but not penetrated.
Stiff	50 - 100	The surface of the soil can be indented with the thumb, but not penetrated.
Very Stiff	100 - 200	The surface of the soil can be marked, but not indented with thumb pressure.
Hard	>200	The surface of the soil can be marked only with the thumbnail.
Friable	–	Crumbles or powders when scraped by thumbnail.

DENSITY OF GRANULAR SOILS

TERM	DENSITY INDEX (%)
Very loose	Less than 15
Loose	15 - 35
Medium Dense	35 - 65
Dense	65 - 85
Very Dense	Greater than 85

MINOR COMPONENTS

TERM	ASSESSMENT GUIDE	PROPORTION OF MINOR COMPONENT IN:
Trace of	Presence just detectable by feel or eye, but soil properties little or no different to general properties of primary component.	Coarse grained soils: <5% Fine grained soils: <15%
With some	Presence easily detected by feel or eye, soil properties little different to general properties of primary component.	Coarse grained soils: 5 - 12% Fine grained soils: 15 - 30%

SOIL STRUCTURE

ZONING		CEMENTING	
Layers	Continuous across exposure or sample.	Weakly cemented	Easily broken up by hand in air or water.
Lenses	Discontinuous layers of lenticular shape.	Moderately cemented	Effort is required to break up the soil by hand in air or water.
Pockets	Irregular inclusions of different material.		

GEOLOGICAL ORIGIN

WEATHERED IN PLACE SOILS

Extremely weathered material	Structure and fabric of parent rock visible.
Residual soil	Structure and fabric of parent rock not visible.

TRANSPORTED SOILS

Aeolian soil	Deposited by wind.
Alluvial soil	Deposited by streams and rivers.
Colluvial soil	Deposited on slopes (transported downslope by gravity).
Fill	Man made deposit. Fill may be significantly more variable between tested locations than naturally occurring soils.
Lacustrine soil	Deposited by lakes.
Marine soil	Deposited in ocean basins, bays, beaches and estuaries.

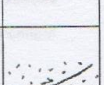
SOIL DESCRIPTION EXPLANATION SHEET 1/2

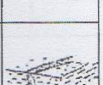
SOIL CLASSIFICATION INCLUDING IDENTIFICATION AND DESCRIPTION

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 60 mm and basing fractions on estimated mass)						USC	PRIMARY NAME
COARSE GRAINED SOILS More than 50% of materials less than 63 mm is larger than 0.075 mm	(A 0.075 mm particle is about the smallest particle visible to the naked eye)	GRAVELS More than half of coarse fraction is larger than 2.0 mm	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes.		GW	GRAVEL
				Predominantly one size or a range of sizes with more intermediate sizes missing.		GP	GRAVEL
			GRAVELS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below)		GM	SILTY GRAVEL
				Plastic fines (for identification procedures see CL below)		GC	CLAYEY GRAVEL
		SANDS More than half of coarse fraction is smaller than 2.0 mm	CLEAN SANDS (Little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate sizes missing		SW	SAND
				Predominantly one size or a range of sizes with some intermediate sizes missing.		SP	SAND
			SANDS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).		SM	SILTY SAND
				Plastic fines (for identification procedures see CL below).		SC	CLAYEY SAND
FINE GRAINED SOILS More than 50% of material less than 63 mm is smaller than 0.075 mm		IDENTIFICATION PROCEDURES ON FRACTIONS <0.2 mm.					
		SILTS & CLAYS Liquid limit less than 50	DRY STRENGTH	DILATANCY	TOUGHNESS		
			None to Low	Quick to slow	None	ML	SILT
			Medium to High	None	Medium	CL	CLAY
			Low to medium	Slow to very slow	Low	OL	ORGANIC SILT
		SILTS & CLAYS Liquid limit greater than 50	Low to medium	Slow to very slow	Low to medium	MH	SILT
			High	None	High	CH	CLAY
			Medium to High	None	Low to medium	OH	ORGANIC CLAY
HIGHLY ORGANIC SOILS		Readily identified by colour, odour, spongy feel and frequently by fibrous texture.				Pt	PEAT

• Low plasticity – Liquid Limit W_L less than 35%. • Modium plasticity – W_L between 35% and 50%.

COMMON DEFECTS IN SOIL

TERM	DEFINITION	DIAGRAM
PARTING	A surface or crack across which the soil has little or no tensile strength. Parallel or sub parallel to layering (eg bedding). May be open or closed.	
JOINT	A surface or crack across which the soil has little or no tensile strength but which is not parallel or sub parallel to layering. May be open or closed. The term 'fissure' may be used for irregular joints <0.2 m in length.	
SHEARED ZONE	Zone in clayey soil with roughly parallel near planar, curved or undulating boundaries containing closely spaced, smooth or slickensided, curved intersecting joints which divide the mass into lenticular or wedge shaped blocks.	
SHEARED SURFACE	A near planar curved or undulating, smooth, polished or slickensided surface in clayey soil. The polished or slickensided surface indicates that movement (in many cases very little) has occurred along the defect.	

TERM	DEFINITION	DIAGRAM
SOFTENED ZONE	A zone in clayey soil, usually adjacent to a defect in which the soil has a higher moisture content than elsewhere.	
TUBE	Tubular cavity. May occur singly or as one of a large number of separate or inter-connected tubes. Walls often coated with clay or strengthened by denser packing of grains. May contain organic matter	
TUBE CAST	Roughly cylindrical elongated body of soil different from the soil mass in which it occurs. In some cases the soil which makes up the tube cast is cemented.	
INFILLED SEAM	Sheet or wall like body of soil substance or mass with roughly planar to irregular near parallel boundaries which cuts through a soil mass. Formed by infilling of open joints.	

72810 / 07-06

SOIL DESCRIPTION EXPLANATION SHEET 2/2

LOCATION:	**5 HUNTINGDALE DV, THORNTON**
JOB NUMBER:	**E21 090**
DATE:	**11/11/2021**
MACHINE / LOGGED BY:	**TRUCK RIG / DS**

BH - 1

DEPTH (m BGL)	MATERIAL PROPERTIES	STRUCTURE AND ADDITIONAL OBSERVATIONS
0.0 – 0.1	Sandy GRAVEL; fine to medium grained, grey, fine to med sand, moist, dense	FILL
0.1 – 0.2	Silty Sandy GRAVEL; fine grained, black, fine to med sand, low plasticity fines, moist, dense	FILL
0.2 – 0.7	CLAY; medium to high plasticity, orange and grey layers, moisture greater than the plastic limit, stiff becoming very stiff	FILL
0.7 - 1.4	Sandy CLAY; low to medium plasticity, black, fine grained sand, moisture greater than the plastic limit, stiff	FILL
1.4 – 1.8	Silty SAND; fine to medium grained, black, vegetation, moist	TOPSOIL
1.8 – 2.2	CLAY; medium to high plasticity, grey, moisture greater than the plastic limit, stiff becoming very stiff	RESIDUAL
2.2 – 3.0	Gravelly CLAY; low plasticity, dark grey, moisture greater than the plastic limit, stiff becoming very stiff	RESIDUAL

BH1 TERMINATED AT 3.0m (Limit of Investigation)

GROUND WATER INFLOW NOT ENCOUNTERED

LOCATION:	**5 HUNTINGDALE DV, THORNTON**
JOB NUMBER:	**E21 090**
DATE:	**11/11/2021**
MACHINE / LOGGED BY:	**TRUCK RIG / DS**

BH - 2

DEPTH (m BGL)	MATERIAL PROPERTIES	STRUCTURE AND ADDITIONAL OBSERVATIONS
0.0 – 0.1	Sandy GRAVEL; fine to medium grained, grey, fine to med sand, moist, dense	FILL
0.1 – 0.4	Silty Sandy GRAVEL; fine grained, black, fine to med sand, low plasticity fines, moist, dense	FILL
0.4 – 1.6	CLAY; medium to high plasticity, orange and grey layers, moisture greater than the plastic limit, stiff becoming very stiff	FILL
1.6 – 1.8	Sandy CLAY; low to medium plasticity, black, fine grained sand, moisture greater than the plastic limit, stiff	FILL
1.8 – 2.2	Silty SAND; fine to medium grained, black, vegetation, moist	TOPSOIL
2.2 – 3.0	CLAY; medium to high plasticity, grey, moisture greater than the plastic limit, stiff becoming very stiff	RESIDUAL

BH2 TERMINATED AT 3.0m (Limit of Investigation)

GROUND WATER INFLOW NOT ENCOUNTERED

LOCATION:	**5 HUNTINGDALE DV, THORNTON**
JOB NUMBER:	**E21 090**
DATE:	**11/11/2021**
MACHINE / LOGGED BY:	**TRUCK RIG / DS**

BH - 3

DEPTH (m BGL)	MATERIAL PROPERTIES	STRUCTURE AND ADDITIONAL OBSERVATIONS
0.0 – 0.8	Silty SAND; fine to medium grained, grey, fine to med sand, moist, dense	FILL
0.8 – 1.0	Gravelly CLAY; low to medium plasticity, orange, fine gravel. M>Wp	FILL
1.0 – 2.0	CLAY; medium to high plasticity, orange and grey layers, moisture greater than the plastic limit, stiff becoming very stiff	FILL
2.0 – 2.5	Silty SAND; fine to medium grained, black, vegetation, moist	TOPSOIL
2.5 – 3.0	CLAY; medium to high plasticity, grey, moisture greater than the plastic limit, stiff becoming very stiff	RESIDUAL

BH3 TERMINATED AT 3.0m (Limit of Investigation)

GROUND WATER INFLOW NOT ENCOUNTERED

LOCATION:	**5 HUNTINGDALE DV, THORNTON**
JOB NUMBER:	**E21 090**
DATE:	**11/11/2021**
MACHINE / LOGGED BY:	**TRUCK RIG / DS**

BH - 4

DEPTH (m BGL)	MATERIAL PROPERTIES	STRUCTURE AND ADDITIONAL OBSERVATIONS
0.0 – 0.4	Sandy CLAY; low to medium plasticity, orange and brown, fine to med sand, moist, dense	FILL
0.4 – 1.0	Sandy CLAY; low to medium plasticity, orange, fine sand, M>Wp	FILL
1.0 – 2.1	Gravelly CLAY; medium to high plasticity, orange and grey layers, moisture greater than the plastic limit, stiff becoming very stiff	FILL
2.1 – 2.5	Silty SAND; fine to medium grained, black, vegetation, moist	TOPSOIL
2.5 – 3.0	CLAY; medium to high plasticity, grey, moisture greater than the plastic limit, stiff becoming very stiff	RESIDUAL

BH4 TERMINATED AT 3.0m (Limit of Investigation)

GROUND WATER INFLOW NOT ENCOUNTERED

LOCATION:	**5 HUNTINGDALE DV, THORNTON**
JOB NUMBER:	**E21 090**
DATE:	**11/11/2021**
MACHINE / LOGGED BY:	**TRUCK RIG / DS**

BH - 5

DEPTH (m BGL)	MATERIAL PROPERTIES	STRUCTURE AND ADDITIONAL OBSERVATIONS
0.0 – 0.5	Silty SAND; fine to medium grained, grey, fine to med sand, moist, dense	FILL
0.5 – 1.1	Gravelly CLAY; low to medium plasticity, orange, fine gravel. M>Wp	FILL
1.1 – 2.0	CLAY; medium to high plasticity, orange and grey layers, moisture greater than the plastic limit, stiff becoming very stiff	FILL
2.0 – 2.2	Silty SAND; fine to medium grained, black, vegetation, moist	TOPSOIL
2.2 – 3.0	CLAY; medium to high plasticity, grey, moisture greater than the plastic limit, stiff becoming very stiff	RESIDUAL

BH5 TERMINATED AT 3.0m (Limit of Investigation)

GROUND WATER INFLOW NOT ENCOUNTERED

LOCATION:	**5 HUNTINGDALE DV, THORNTON**
JOB NUMBER:	**E21 090**
DATE:	**11/11/2021**
MACHINE / LOGGED BY:	**TRUCK RIG / DS**

BH - 6

DEPTH (m BGL)	MATERIAL PROPERTIES	STRUCTURE AND ADDITIONAL OBSERVATIONS
0.0 – 0.5	Gravelly Clayey SAND; fine to medium grained, grey, fine to med sand, moist, dense	FILL
0.5 – 1.5	Gravelly CLAY; low to medium plasticity, orange, fine gravel. M>Wp	FILL
1.5 – 1.8	CLAY; medium to high plasticity, orange and grey layers, moisture greater than the plastic limit, stiff becoming very stiff	FILL
1.8 – 2.0	Silty SAND; fine to medium grained, black, vegetation, moist	TOPSOIL
2.0 – 3.0	CLAY; medium to high plasticity, grey, moisture greater than the plastic limit, stiff becoming very stiff	RESIDUAL

BH6 TERMINATED AT 3.0m (Limit of Investigation)

GROUND WATER INFLOW NOT ENCOUNTERED

RESULTS TABLE - SOIL

Sample	PQL	GUIDELINES*										BH1	BH1	BH2	BH2	BH3	BH3	BH4	BH4	BH5	BH5
Depth		HSL D[a]					ESL C&I[b]		NS ML[c]		DC D^	0.6	2.2	0.8	1.8	0.4	2.7	1.4	2.6	1.0	2.5
Date		Sand 0<1	Silt 0<1	Silt 1-2	Silt 2-4	Silt >4	Coarse	Fine	Coarse	Fine		11/11	11/11	11/11	11/11	11/11	11/11	11/11	11/11	11/11	11/11
Material Profile												S C	S C	S C	S C	S C	S C	S C	S C	S C	S C
Strata												SIlt	Silt	Silt	Silt	Silt	Silt	Fill	Silt	Silt	Silt
BTEX																					
Benzene	0.2	3	4	4	6	10	75	95			430	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Toluene	0.5	NL	NL	NL	NL	NL	135	135			99K	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ethylbenzene	0.5	NL	NL	NL	NL	NL	165	185			27K	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
m&p Xylene	0.5											BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ortho-xylene	0.5											BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Total Xylene	3	230	NL	NL	NL	NL	180	95			61K	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
PAH																					
Naphlhlalne	1	NL	NL	NL	NL	NL	370	370			11K	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
TRH																					
C6-10	10								700	800	26K	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
C>10-16	50						170	170	1000	1000	20K	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
C>16-34	100						1700	2500	3500	5000	27K	BDL	BDL	BDL	280	170	820	BDL	BDL	BDL	BDL
C>34-40	100						3300	6600	10000	10000	30K	BDL	BDL	BDL	BDL	BDL	110	BDL	BDL	BDL	BDL
F1	10	260	250	360	590	NL	215	215				BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
F2	50	NL	NL	NL	NL	NL						BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Bold RED exceedes guidelines from NEMP 1999 (Amended 2013) - Ecological Screening Levels (ESL) Commercial and Industrial (C&I)

BDL Denotes Below Detection Limits All units in mg/kg **NL** Denotes Not Limited as vapour considered not a risk for this compound

* Guidelines from NEMP 1999 (Amended 2013) ^ DC D from CRC Care TR10 2011 – Direct Contact (DC) 'D' (Commercial/Industrial)

[a] Vapour Based Health Screening Levels (HSL's) 'D' - Commercial and Industrial

[b] ESL C&I from Ecological Screening Levels - Commercial and Industrial (C&I)

[c] NS ML Management Limits of Non Sensitive Sites – Commercial and Industrial

RESULTS TABLE - SOIL

Sample	PQL	GUIDELINES*																			
Depth		HSL D[a]					ESL C&I[b]		NS ML[c]		DC D^	BH6	BH6	DUP							
Date		Sand 0<1	Silt 0<1	Silt 1-2	Silt 2-4	Silt >4	Coarse	Fine	Coarse	Fine		3.0	1.0	5/2.5							
												11/11	11/11	11/11							
Material Profile												S C	S C	S C							
Strata												SIlt	Silt	Silt							
BTEX																					
Benzene	0.2	3	4	4	6	10	75	95			430	BDL	BDL	BDL							
Toluene	0.5	NL	NL	NL	NL	NL	135	135			99K	BDL	BDL	BDL							
Ethylbenzene	0.5	NL	NL	NL	NL	NL	165	185			27K	BDL	BDL	BDL							
m&p Xylene	0.5											BDL	BDL	BDL							
Ortho-xylene	0.5											BDL	BDL	BDL							
Total Xylene	3	230	NL	NL	NL	NL	180	95			61K	BDL	BDL	BDL							
PAH																					
Naphlhlalne	1	NL	NL	NL	NL	NL	370	370			11K	BDL	BDL	BDL							
TRH																					
C6-10	10								700	800	26K	BDL	BDL	BDL							
C>10-16	50						170	170	1000	1000	20K	BDL	BDL	BDL							
C>16-24	100						1700	2500	3500	5000	27K	BDL	BDL	BDL							
C>24-40	100						3300	6600	10000	10000	30K	BDL	BDL	BDL							
F1	10	260	250	360	590	NL	215	215				BDL	BDL	BDL							
F2	50	NL	NL	NL	NL	NL						BDL	BDL	BDL							

Bold RED exceedes guidelines from NEMP 1999 (Amended 2013) - Ecological Screening Levels (ESL) Commercial and Industrial (C&I)

BDL Denotes Below Detection Limits All units in mg/kg **NL** Denotes Not Limited as vapour considered not a risk for this compound

* Guidelines from NEMP 1999 (Amended 2013) ^ DC D from CRC Care TR10 2011 – Direct Contact (DC) 'D' (Commercial/Industrial)

[a] Vapour Based Health Screening Levels (HSL's) 'D' - Commercial and Industrial

[b] ESL C&I from Ecological Screening Levels - Commercial and Industrial (C&I)

[c] NS ML Management Limits of Non Sensitive Sites – Commercial and Industrial

RESULTS TABLE - SOIL

Sample	PQL	Guidelines *		BH1	BH1	BH2	BH2	BH3	BH3	BH4	BH4	BH5	BH5
Depth		HIL 'D'[e]	ESL	0.6	2.2	0.8	1.8	0.4	2.7	1.4	2.6	1.0	2.5
Date			C&I[f]	11/11	11/11	11/11	11/11	11/11	11/11	11/11	11/11	11/11	11/11
			Profile	SIlt	Silt	Silt	Silt	Silt	Silt	Fill	Silt	Silt	Silt
PAH													
Naphthalene	0.5		370	BDL	BDL	BDL	0.5	BDL	0.2	BDL	0.6	BDL	BDL
Acenaphthylene	0.5			BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Acenaphthene	0.5			BDL	BDL	BDL	0.3	BDL	BDL	BDL	0.1	BDL	BDL
Fluorene	0.5			BDL	BDL	BDL	0.2	BDL	BDL	BDL	0.2	BDL	BDL
Phenanthrene	0.5			BDL	BDL	BDL	1.2	1.0	0.3	BDL	1.1	0.3	BDL
Anthracene	0.5			BDL	BDL	BDL	0.2	BDL	BDL	BDL	BDL	BDL	BDL
Fluoranthene	0.5			BDL	BDL	BDL	0.4	0.3	BDL	BDL	0.5	0.2	BDL
Pyrene	0.5			BDL	BDL	BDL	0.4	0.3	BDL	BDL	0.4	0.1	BDL
Benzo(a)anthracene	0.5			BDL	BDL	BDL	0.2	0.2	BDL	BDL	0.2	BDL	BDL
Chrysene	0.5			BDL	BDL	BDL	0.2	0.2	BDL	BDL	0.2	0.1	BDL
Benzo(b,j+k)fluoranthene	1			BDL	BDL	BDL	0.2	BDL	BDL	BDL	0.2	BDL	BDL
Benzo(a)pyrene	0.5	40	1.4	BDL	BDL	BDL	0.09	BDL	BDL	BDL	0.09	BDL	BDL
Indeno(1,2,3-c,d)pyrene	0.5			BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dibenzo(a,h) anthracene	0.5			BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzo(g,h,i)perylene	0.5			BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Total +PAH	0.5	4000		BDL	BDL	BDL	3.9	2.0	0.62	BDL	3.6	0.73	BDL
METALS													
Arsenic	5	3000	160	<4	<4	5	12	7	5	4	16	8	5
Cadmium	1	900		<0.4	<0.4	<0.4	1	<0.4	<0.4	<0.4	1	<0.4	<0.4
Chromium	2	3600	310	6	3	5	12	4	5	5	14	8	4
Copper	5	240K	400	2	7	1	42	13	12	<1	26	8	<1
Lead	5	1500	1800	14	24	13	200	14	72	11	120	34	6
Mercury	0.1	730		<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	2	6000	55	2	3	5	10	7	4	4	12	8	<1
Zink	5	400K	360	7	71	36	**550**	34	78	18	**610**	34	<1

* Guidelines from NEMP 1999 (Amended 2013)

Results in **Red BOLD** exceed Guideline Levels

[e] HIL - Health Investigation Levels 'D' Commercial and Industrial [f] EIL C&I from Ecological Investigation Levels - Commercial and Industrial (C&I)

RESULTS TABLE - SOIL

Sample	PQL	Guidelines *		BH6	BH6	DUP							
Depth		HIL 'D'[e]	ESL	3.0	1.0	5/2.5							
Date			C&I[f]	11/11	11/11	11/11							
			Profile	SIlt	Silt								
PAH													
Naphthalene	0.5		370	BDL	BDL	BDL							
Acenaphthylene	0.5			BDL	BDL	BDL							
Acenaphthene	0.5			BDL	BDL	BDL							
Fluorene	0.5			BDL	BDL	BDL							
Phenanthrene	0.5			BDL	BDL	BDL							
Anthracene	0.5			BDL	BDL	BDL							
Fluoranthene	0.5			BDL	BDL	BDL							
Pyrene	0.5			BDL	BDL	BDL							
Benzo(a)anthracene	0.5			BDL	BDL	BDL							
Chrysene	0.5			BDL	BDL	BDL							
Benzo(b,j+k)fluoranthene	1			BDL	BDL	BDL							
Benzo(a)pyrene	0.5	40	1.4	BDL	BDL	BDL							
Indeno(1,2,3-c,d)pyrene	0.5			BDL	BDL	BDL							
Dibenzo(a,h) anthracene	0.5			BDL	BDL	BDL							
Benzo(g,h,i)perylene	0.5			BDL	BDL	BDL							
Total +PAH	0.5	4000		BDL	BDL	BDL							
METALS													
Arsenic	5	3000	160	5	7	6							
Cadmium	1	900		<0.4	<0.4	<0.4							
Chromium	2	3600	310	4	5	4							
Copper	5	240K	400	6	5	<1							
Lead	5	1500	1800	12	10	6							
Mercury	0.1	730		<0.1	<0.1	<0.1							
Nickel	2	6000	55	5	3	<1							
Zink	5	400K	360	34	18	2							

* Guidelines from NEMP 1999 (Amended 2013)

Results in **Red BOLD** exceed Guideline Levels

[e] HIL - Health Investigation Levels 'D' Commercial and Industrial [f] EIL C&I from Ecological Investigation Levels - Commercial and Industrial (C&I)

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CERTIFICATE OF ANALYSIS 283716

Client Details

Client	Sanko excavation Environmental & Civil Services
Attention	Damien Sankowsky
Address	76 Wollombi Rd, Millfield, NSW, 2325

Sample Details

Your Reference	**E21 090-5 Huntingdale Dv,Thorton**
Number of Samples	13 Soil
Date samples received	24/11/2021
Date completed instructions received	24/11/2021

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	01/12/2021
Date of Issue	16/12/2021

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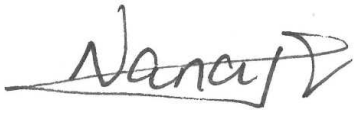
Results Approved By
Dragana Tomas, Senior Chemist
Hannah Nguyen, Metals Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		283716-1	283716-2	283716-3	283716-4	283716-5
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3
Depth		0.6	2.2	0.8	1.8	0.4
Date Sampled		11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/11/2021	25/11/2021	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021
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	%	112	105	100	109	104

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		283716-6	283716-7	283716-8	283716-9	283716-10
Your Reference	UNITS	BH3	BH4	BH4	BH5	BH5
Depth		2.7	1.4	2.6	1.0	2.5
Date Sampled		11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/11/2021	25/11/2021	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021
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	%	103	110	109	110	114

vTRH(C6-C10)/BTEXN in Soil				
Our Reference		283716-11	283716-12	283716-13
Your Reference	UNITS	BH6	BH6	DUP
Depth		3.0	1.0	-
Date Sampled		11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil
Date extracted	-	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	26/11/2021	26/11/2021	26/11/2021
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	<3	<3	<3
Surrogate aaa-Trifluorotoluene	%	101	112	124

svTRH (C10-C40) in Soil						
Our Reference		283716-1	283716-2	283716-3	283716-4	283716-5
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3
Depth		0.6	2.2	0.8	1.8	0.4
Date Sampled		11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/11/2021	25/11/2021	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	180	130
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	150	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	330	130
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	280	170
TRH >C_{34} -C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	280	170
Surrogate o-Terphenyl	%	100	101	101	112	110

svTRH (C10-C40) in Soil						
Our Reference		283716-6	283716-7	283716-8	283716-9	283716-10
Your Reference	UNITS	BH3	BH4	BH4	BH5	BH5
Depth		2.7	1.4	2.6	1.0	2.5
Date Sampled		11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/11/2021	25/11/2021	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	520	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	350	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	870	<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	820	<100	<100
TRH >C_{34} -C_{40}	mg/kg	<100	<100	110	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	100	<50	930	<50	<50
Surrogate o-Terphenyl	%	103	100	115	103	100

svTRH (C10-C40) in Soil				
Our Reference		283716-11	283716-12	283716-13
Your Reference	UNITS	BH6	BH6	DUP
Depth		3.0	1.0	-
Date Sampled		11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil
Date extracted	-	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	26/11/2021	26/11/2021	26/11/2021
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	%	100	100	99

PAHs in Soil						
Our Reference		283716-1	283716-2	283716-3	283716-4	283716-5
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3
Depth		0.6	2.2	0.8	1.8	0.4
Date Sampled		11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/11/2021	25/11/2021	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021
Naphthalene	mg/kg	<0.1	0.1	<0.1	0.5	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	0.3	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Phenanthrene	mg/kg	0.2	0.2	<0.1	1.2	1.0
Anthracene	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	0.4	0.3
Pyrene	mg/kg	<0.1	<0.1	<0.1	0.4	0.3
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	0.2	0.2
Chrysene	mg/kg	<0.1	<0.1	<0.1	0.2	0.2
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	0.09	<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	0.3	0.3	<0.05	3.9	2.0
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	%	99	110	110	100	95

PAHs in Soil						
Our Reference		283716-6	283716-7	283716-8	283716-9	283716-10
Your Reference	UNITS	BH3	BH4	BH4	BH5	BH5
Depth		2.7	1.4	2.6	1.0	2.5
Date Sampled		11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/11/2021	25/11/2021	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021
Naphthalene	mg/kg	0.2	<0.1	0.6	<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	0.2	<0.1	<0.1
Phenanthrene	mg/kg	0.3	<0.1	1.1	0.3	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	0.5	0.2	<0.1
Pyrene	mg/kg	<0.1	<0.1	0.4	0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	0.2	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	0.09	<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	0.62	<0.05	3.6	0.73	<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	%	102	108	94	102	100

PAHs in Soil				
Our Reference		283716-11	283716-12	283716-13
Your Reference	UNITS	BH6	BH6	DUP
Depth		3.0	1.0	-
Date Sampled		11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil
Date extracted	-	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	26/11/2021	26/11/2021	26/11/2021
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	0.4	0.3	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.2	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	0.64	0.4	<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	%	109	100	1.1

Organochlorine Pesticides in soil						
Our Reference		283716-1	283716-2	283716-3	283716-4	283716-5
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3
Depth		0.6	2.2	0.8	1.8	0.4
Date Sampled		11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/11/2021	25/11/2021	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021
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	%	104	122	112	114	105

Organochlorine Pesticides in soil						
Our Reference		283716-6	283716-7	283716-8	283716-9	283716-10
Your Reference	UNITS	BH3	BH4	BH4	BH5	BH5
Depth		2.7	1.4	2.6	1.0	2.5
Date Sampled		11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/11/2021	25/11/2021	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021
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	%	109	116	106	113	103

Organochlorine Pesticides in soil				
Our Reference		283716-11	283716-12	283716-13
Your Reference	UNITS	BH6	BH6	DUP
Depth		3.0	1.0	-
Date Sampled		11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil
Date extracted	-	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	26/11/2021	26/11/2021	26/11/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	122	111	1.1

Organophosphorus Pesticides in Soil						
Our Reference		283716-1	283716-2	283716-3	283716-4	283716-5
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3
Depth		0.6	2.2	0.8	1.8	0.4
Date Sampled		11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/11/2021	25/11/2021	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021
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	%	104	122	112	114	105

Organophosphorus Pesticides in Soil						
Our Reference		283716-6	283716-7	283716-8	283716-9	283716-10
Your Reference	UNITS	BH3	BH4	BH4	BH5	BH5
Depth		2.7	1.4	2.6	1.0	2.5
Date Sampled		11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/11/2021	25/11/2021	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021
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	%	109	116	106	113	103

Organophosphorus Pesticides in Soil				
Our Reference		283716-11	283716-12	283716-13
Your Reference	UNITS	BH6	BH6	DUP
Depth		3.0	1.0	-
Date Sampled		11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil
Date extracted	-	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	26/11/2021	26/11/2021	26/11/2021
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	122	111	1.1

PCBs in Soil						
Our Reference		283716-1	283716-2	283716-3	283716-4	283716-5
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3
Depth		0.6	2.2	0.8	1.8	0.4
Date Sampled		11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/11/2021	25/11/2021	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021
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	%	104	122	112	114	105

PCBs in Soil						
Our Reference		283716-6	283716-7	283716-8	283716-9	283716-10
Your Reference	UNITS	BH3	BH4	BH4	BH5	BH5
Depth		2.7	1.4	2.6	1.0	2.5
Date Sampled		11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	25/11/2021	25/11/2021	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021
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	%	109	116	106	113	103

PCBs in Soil				
Our Reference		283716-11	283716-12	283716-13
Your Reference	UNITS	BH6	BH6	DUP
Depth		3.0	1.0	-
Date Sampled		11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil
Date extracted	-	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	26/11/2021	26/11/2021	26/11/2021
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	122	111	1.1

Acid Extractable metals in soil						
Our Reference		283716-1	283716-2	283716-3	283716-4	283716-5
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3
Depth		0.6	2.2	0.8	1.8	0.4
Date Sampled		11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	25/11/2021	25/11/2021	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	25/11/2021	25/11/2021	25/11/2021	25/11/2021	25/11/2021
Arsenic	mg/kg	<4	<4	5	12	7
Cadmium	mg/kg	<0.4	<0.4	<0.4	1	<0.4
Chromium	mg/kg	6	3	5	12	4
Copper	mg/kg	2	7	1	42	13
Lead	mg/kg	14	24	13	200	14
Mercury	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Nickel	mg/kg	2	3	5	10	7
Zinc	mg/kg	7	71	36	550	34

Acid Extractable metals in soil						
Our Reference		283716-6	283716-7	283716-8	283716-9	283716-10
Your Reference	UNITS	BH3	BH4	BH4	BH5	BH5
Depth		2.7	1.4	2.6	1.0	2.5
Date Sampled		11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	25/11/2021	25/11/2021	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	25/11/2021	25/11/2021	25/11/2021	25/11/2021	25/11/2021
Arsenic	mg/kg	5	4	16	8	5
Cadmium	mg/kg	<0.4	<0.4	1	<0.4	<0.4
Chromium	mg/kg	5	5	14	8	4
Copper	mg/kg	12	<1	26	8	<1
Lead	mg/kg	72	11	120	34	6
Mercury	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Nickel	mg/kg	4	4	12	8	<1
Zinc	mg/kg	78	18	610	34	3

Acid Extractable metals in soil					
Our Reference		283716-11	283716-12	283716-13	283716-14
Your Reference	UNITS	BH6	BH6	DUP	BH6 - [TRIPLICATE]
Depth		3.0	1.0	-	3.0
Date Sampled		11/11/2021	11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	25/11/2021	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	25/11/2021	25/11/2021	25/11/2021	25/11/2021
Arsenic	mg/kg	5	7	6	10
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	4	5	4	4
Copper	mg/kg	6	5	<1	5
Lead	mg/kg	12	10	6	10
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	3	<1	4
Zinc	mg/kg	34	18	2	21

Moisture						
Our Reference		283716-1	283716-2	283716-3	283716-4	283716-5
Your Reference	UNITS	BH1	BH1	BH2	BH2	BH3
Depth		0.6	2.2	0.8	1.8	0.4
Date Sampled		11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	25/11/2021	25/11/2021	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021
Moisture	%	17	18	14	20	11

Moisture						
Our Reference		283716-6	283716-7	283716-8	283716-9	283716-10
Your Reference	UNITS	BH3	BH4	BH4	BH5	BH5
Depth		2.7	1.4	2.6	1.0	2.5
Date Sampled		11/11/2021	11/11/2021	11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	25/11/2021	25/11/2021	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	26/11/2021	26/11/2021	26/11/2021	26/11/2021	26/11/2021
Moisture	%	16	13	18	15	12

Moisture				
Our Reference		283716-11	283716-12	283716-13
Your Reference	UNITS	BH6	BH6	DUP
Depth		3.0	1.0	-
Date Sampled		11/11/2021	11/11/2021	11/11/2021
Type of sample		Soil	Soil	Soil
Date prepared	-	25/11/2021	25/11/2021	25/11/2021
Date analysed	-	26/11/2021	26/11/2021	26/11/2021
Moisture	%	15	15	12

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	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.

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-1	283716-2
Date extracted	-			25/11/2021	1	25/11/2021	25/11/2021		25/11/2021	25/11/2021
Date analysed	-			26/11/2021	1	26/11/2021	26/11/2021		26/11/2021	26/11/2021
TRH C_6 - C_9	mg/kg	25	Org-023	<25	1	<25	<25	0	85	84
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	1	<25	<25	0	85	84
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	80	78
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	80	77
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	88	88
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	89	89
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	83	84
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	115	1	112	111	1	109	112

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	25/11/2021	25/11/2021		[NT]	[NT]
Date analysed	-			[NT]	11	26/11/2021	26/11/2021		[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	101	115	13	[NT]	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	283716-2
Date extracted	-			25/11/2021	1	25/11/2021	25/11/2021		25/11/2021	25/11/2021
Date analysed	-			26/11/2021	1	26/11/2021	26/11/2021		26/11/2021	26/11/2021
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	1	<50	<50	0	101	93
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	1	<100	<100	0	111	111
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	1	<100	<100	0	127	96
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	1	<50	<50	0	101	93
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	1	<100	<100	0	111	111
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	1	<100	<100	0	127	96
Surrogate o-Terphenyl	%		Org-020	100	1	100	108	8	107	101

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	25/11/2021	25/11/2021		[NT]	[NT]
Date analysed	-			[NT]	11	26/11/2021	26/11/2021		[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	100	100	0	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	283716-2
Date extracted	-			25/11/2021	1	25/11/2021	25/11/2021		25/11/2021	25/11/2021
Date analysed	-			26/11/2021	1	26/11/2021	26/11/2021		26/11/2021	26/11/2021
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	105	111
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	110
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	111	122
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	0.2	<0.1	67	108	112
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	111	112
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	105
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	110	102
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	109	1	99	116	16	109	106

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	25/11/2021	25/11/2021		[NT]	[NT]
Date analysed	-			[NT]	11	26/11/2021	26/11/2021		[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	0.4	0.4	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	0.2	0.1	67	[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	109	105	4	[NT]	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	283716-2
Date extracted	-			25/11/2021	1	25/11/2021	25/11/2021		25/11/2021	25/11/2021
Date analysed	-			26/11/2021	1	26/11/2021	26/11/2021		26/11/2021	26/11/2021
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	112	122
HCB	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	106	114
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	117	121
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	111	113
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	114	116
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	107	109
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	112	108
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	103	119
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	110	112
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	106	110
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	98	1	104	118	13	105	113

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	25/11/2021	25/11/2021		[NT]	[NT]
Date analysed	-			[NT]	11	26/11/2021	26/11/2021		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	11	122	116	5	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	283716-2
Date extracted	-			25/11/2021	1	25/11/2021	25/11/2021		25/11/2021	25/11/2021
Date analysed	-			26/11/2021	1	26/11/2021	26/11/2021		26/11/2021	26/11/2021
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	83	93
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	112	116
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	89	105
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	128	128
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	118	126
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	89	109
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	98	119
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	98	1	104	118	13	105	113

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	25/11/2021	25/11/2021		[NT]	[NT]
Date analysed	-			[NT]	11	26/11/2021	26/11/2021		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	11	122	116	5	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	283716-2
Date extracted	-			25/11/2021	1	25/11/2021	25/11/2021		25/11/2021	25/11/2021
Date analysed	-			26/11/2021	1	26/11/2021	26/11/2021		26/11/2021	26/11/2021
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	120	120
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	98	1	104	118	13	105	113

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	11	25/11/2021	25/11/2021		[NT]	[NT]
Date analysed	-			[NT]	11	26/11/2021	26/11/2021		[NT]	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	11	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	[NT]	11	122	116	5	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	283716-2
Date prepared	-			25/11/2021	1	25/11/2021	25/11/2021		25/11/2021	25/11/2021
Date analysed	-			25/11/2021	1	25/11/2021	25/11/2021		25/11/2021	25/11/2021
Arsenic	mg/kg	4	Metals-020	<4	1	<4	6	40	109	92
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	105	90
Chromium	mg/kg	1	Metals-020	<1	1	6	6	0	106	94
Copper	mg/kg	1	Metals-020	<1	1	2	1	67	108	104
Lead	mg/kg	1	Metals-020	<1	1	14	14	0	107	#
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	95	125
Nickel	mg/kg	1	Metals-020	<1	1	2	2	0	108	95
Zinc	mg/kg	1	Metals-020	<1	1	7	7	0	110	#

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	25/11/2021	25/11/2021		[NT]	[NT]
Date analysed	-			[NT]	11	25/11/2021	25/11/2021		[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	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	11	4	4	0	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	11	6	4	40	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	11	12	11	9	[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	5	3	50	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	11	34	20	52	[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

Acid Extractable Metals in Soil:
- The laboratory RPD acceptance criteria has been exceeded for 283716-11 for Zn. Therefore a triplicate result has been issued as laboratory sample number 283716-14.
- # Percent recovery is not possible to report due to the inhomogeneous nature of the elements in the sample. However an acceptable recovery was obtained for the LCS.

CHAIN OF CUSTODY - Client

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Client: ATB MORTON (NSW)	**Client Project Name / Number / Site etc (ie report title):** E21090-5 HUNTINGDALE DV
Contact Person: Damien Sankowsky	**PO No.:** THORNTON
Project Mgr:	**Envirolab Quote No.:** 17SY108C3
Sampler:	**Date results required:**
Address: 26 LEARMONTH ST, WILLOW TREE, NSW, 2339	**Or choose:** standard / same day / 1 day / 2 day / 3 day *Note: Inform lab in advance if urgent turnaround is required - surcharges apply*
0407 434 604	
Phone: **Mob:**	**Additional report format:** esdat / equis /
Email: seecservices@hotmail.com	**Lab Comments:** TRH/BTEX/PAH/OCOP/PCB/HM8.

Sample information					Tests Required														Comments
Envirolab Sample ID	Client Sample ID or information	Depth	Date sampled	Type of sample	COMBO 6 SUITE														Provide as much information about the sample as you can
1	BH1	0.6	11/11	SOIL JAR	✓														
2	BH1	2.2			✓														
3	BH2	0.8			✓														
4	BH2	1.8			✓														
5	BH3	0.4			✓														
6	BH3	2.7			✓														
7	BH4	1.4			✓														
8	BH4	2.6			✓														
9	BH5	1.0			✓														
10	BH5	2.5			✓														
11	BH6	3.0			✓														
12	BH6	1.0			✓														
13	DUP				✓														

ENVIROLAB — Envirolab Services, 12 Ashley St, Chatswood NSW 2067, Ph: (02) 9910 6200

Job No: 203716

Date Received: 24-11-2021

Time Received: 1015

Received By: TJHAN

Temp: Cool/Ambient

Cooling: Ice/Icepack

Security: Intact/Broken/None

Relinquished by (Company): SANCO	**Received by (Company):** EVS SYDNEY	***Lab use only:***
Print Name: D. SANKOWSKY	**Print Name:** TJHAN	**Samples Received: Cool or Ambient (circle one)**
Date & Time: 16/11/21 1500	**Date & Time:** 24-11-2021 1015	**Temperature Received at:** 20 **(if applicable)**
Signature:	**Signature:**	**Transported by: Hand delivered / courier**

be BERESFIELD

Landscape—undulating low hills and rises on Permian sediments in the East Maitland Hills region. Slope gradients 3–15%, local relief to 50 m, elevation is 20–50 m. Partially cleared tall open-forest.

Landscape Variant—bea—steeper upper slopes (15–<25%).

Soils—moderately deep (<120 cm), moderately well to imperfectly drained Yellow Podzolic Soils (Dy2.21), Brown Podzolic Soils (Db1.21) and brown Soloths (Db2.41) occur on crests with moderately deep (<120 cm), well-drained Red Podzolic Soils (Dr2.21) and red Soloths (Dr2.41) on upper slopes, moderately well to imperfectly drained brown Soloths (Db2.41, Db1.41) and yellow Soloths (Dy3.41) on sideslopes and deep (>200 cm), imperfectly to poorly drained Yellow Podzolic Soils (Dy2.21), yellow Soloths (Dy2.41, Dy3.41) and Gleyed Podzolic Soils (Dg2.41) on lower slopes.

Qualities and Limitations—high foundation hazard, water erosion hazard, Mine Subsidence District, seasonal waterlogging and high run-on on localised lower slopes, highly acid soils of low fertility.

LOCATION

Undulating low hills and rises on Permian sediments in the East Maitland Hills region in the centre-west of the area, including Beresfield and East Maitland. Type location is south-west of Beresfield (Area reference 3 **71*****E, 63 **66*****N).

LANDSCAPE

Geology and Regolith

Permian Tomago Coal Measures—shale, mudstone, sandstone, coal, tuff and clay.

Permian Mulbring Siltstone—siltstone, claystone, thin sandstone, and limestone.

Small areas of Permian Waratah Subgroup also occur—cross-laminated grey brown sandstone.

Topography

Undulating low hills and rises. Local relief is 10–50 m. Elevation is 20–50 m. Slopes are 3–15%. Crests are broad (250–400 m). Sideslopes are long and gently inclined (350–750 m), with some very long footslopes up to 2 000 m long. Occasional short, steep sideslopes occur, with common terracetting. Drainage lines are deeply incised and narrow (2–3 m). Rock outcrop is generally absent.

Vegetation

Partially cleared tall open-forest comprising *Eucalyptus maculata* (spotted gum), *E. fibrosa* (broad-leaved ironbark), *E. punctata* (grey gum), *E. oblonga* (narrow-leaved stringybark), *E. eugenioides* (thin-leaved stringybark) and *E. paniculata* (grey ironbark). Understorey vegetation contains *Bursaria spinosa* (blackthorn), paperbarks including *Melaleuca nodosa,* and wattles, including *Acacia falcata.*

Eucalyptus tereticornis (forest red gum) occurs on some lower slopes.

In drainage lines, *Melaleuca styphelioides, Backhousia myrtifolia* (grey myrtle), *Alphitonia excelsa* (red ash) and *Lantana camera* (lantana) are common.

Land Use

Urban centres occur at East Maitland, Beresfield and some northern suburbs of Newcastle. Small areas have been cleared for grazing or poultry farming.

Existing Land Degradation

Disturbed areas suffer considerable erosion. Unsealed tracks which are poorly maintained exhibit minor gully erosion. Moderate to severe rill erosion may occur on exposed batters, occasionally batter collapse may occur due to tunnel erosion of subsoils. Moderate sheet erosion occurs where vegetative cover has been removed.

Minor salt scalds occur on some lower slopes.

Landscape Variants

Areas marked as **bea** on the map have steeper slopes (15–<25%); otherwise, they have similar landscape features to Beresfield soil landscape.

SOILS

Dominant Soil Materials

be1—Friable brownish black loam (topsoil—A_1 horizon)

Colour	brownish black (10YR 2/2, 10YR 2/3), occasionally black (10YR 2/1) or dark brown (10YR 3/3)
Texture	sandy loam to loam fine sandy or silt loam
Structure	weak, fine (10–20 mm) sub-angular blocky peds which part easily to <2 mm crumb peds
Fabric	rough ped
Field pH	moderately acid to neutral (pH 5.5–7.0)
Exposed condition	often friable, may be firm when dry
Permeability	highly permeable
Coarse fragments	gravel-sized platy ironstone and sub-angular sandstone generally few, but may be abundant. Very few fine charcoal fragments may occur
Roots	common to abundant, in-ped, fine
Type location	John Renshaw Drive, 200 m ENE of intersection with Minmi Road (Grid Ref. 3 **72**40*E, 63 **68**45*N). Soil Data System card 33, 0–10 cm

be2—Hardsetting dull yellowish brown sandy loam (topsoil—A_2 horizon)

Colour	dull yellowish brown (10YR 4/3) to dark brown (10YR 3/3, 7.5YR 3/3). Dry colour is often bleached dull yellow orange (10YR 7/2, 10YR 6/3). Few small rusty mottles may occur down root traces
Texture	ranges from sandy loam through clay loam to fine sandy clay loam
Structure	massive, rarely a weak to moderate (5–10 mm) sub-angular blocky ped occurs
Fabric	earthy, rarely rough ped
Field pH	moderately to slightly acid (pH 5.5–6.0)
Exposed condition	massive appearance, hardsetting and brittle when dry
Permeability	moderate
Coarse fragments	few to common gravel-sized tabular ironstone fragments may occur, occasionally in the form of a stone line at the base of this material. Few to common conglomerate pebbles and very few charcoal fragments may occur
Roots	few to common, fine
Type location	John Renshaw Drive, 200 m ENE of intersection with Minmi Road (Grid Ref. 3 **72**40*E, 63 **68**45*N). Soil Data System card 33, 10–15 cm

be3—Pedal brown plastic mottled clay (subsoil—B_2 horizon)

Colour	brown (7.5YR 4/4, 7.5YR 4/6), dark brown (7.5YR 3/3, 10YR 5/4), bright yellowish brown (10YR 6/6) and yellowish brown (10YR 5/6, 2.5Y 5/3) common, but ranging to greyish yellow brown (10YR 4/2) and dull yellowish brown (10YR 5/3, 10YR 4/3). Few to common red/grey/orange mottles occur
Texture	dominantly medium clay, ranging from light-medium to heavy plastic clay, occasionally fine sandy clay
Structure	strong, dense (10–20 mm) angular blocky peds. A 50–100 mm prismatic or angular blocky macrostructure is generally present
Fabric	smooth ped
Field pH	moderately to slightly acid (pH 5.0–6.0)
Exposed condition	when dry, fine 1–2 mm fragments form on the surface and cracking evident. When wet, a surface mulch is formed
Permeability	slow
Coarse fragments	common to many angular and sub-angular ironstone fragments may occur
Roots	few, fine, ex-ped
Type location	John Renshaw Drive, 200 m ENE of intersection with Minmi Road (Grid Ref. 3 **72**40*E, 63**68**45*N). Soil Data System card 33, 15–120 cm

be4—Reddish brown plastic pedal clay (subsoil—B_2, B_3 horizons)

Colour	reddish brown (5YR 4/6, 2.5YR 4/6), dull reddish brown (5YR 4/4), red/grey mottles may be common
Texture	medium to heavy plastic clay
Structure	primary 20–50 mm angular blocky peds which part easily to 10–20 mm angular blocky or polyhedral peds. A 100–200 mm prismatic macrostructure may occur
Fabric	smooth ped
Field pH	strongly to slightly acid (pH 4.5–6.0)
Exposed condition	when dry, fine (1–2 mm) fragments form on the surface. Cracking 2–5 cm in width common. Upon wetting, a surface mulch forms. Consistence is moderately firm to very firm when dry, weak and labile when moist
Permeability	slow to moderate
Coarse fragments	sub-angular and tabular ironstone fragments may occur and be common to many
Roots	few, ex-ped
Other	clay skins (cutans) abundant
Type location	John Renshaw Drive at Black Hill Road turnoff (Grid Ref. 3 **67**40*E, 63 **67**20*N). Soil Data System card 23, 40–85 cm

be5—Gleyed "puggy" silty clay (subsoil—B_2, B_3, C horizons)

Colour	dull yellow orange (10YR 7/2, 10YR 6/4), light grey (10YR 7/1), light yellow (2.5YR 7/3) occur. Red/orange/grey mottling may occur and be common
Texture	commonly silty clay, but ranging from sandy clay to light-medium clay
Structure	large (100–200 mm) prismatic peds part easily to 20–50 mm angular blocky or sub-angular blocky peds. Structure strong when dry, but massive when wet
Fabric	smooth ped
Field pH	moderately acid to neutral (pH 5.0–7.0)
Exposed condition	1–2 mm surface fragments form. When abundant tabular ironstones are present, surface condition is gravelly
Permeability	slow
Coarse fragments	few to abundant gravel-sized sub-angular tabular ironstone fragments, which may be stratified
Roots	few to absent, fine (<2 mm)
Type location	John Renshaw Drive at Black Hill Rd turnoff (Grid Ref. 3 **67**4**E, 63 **67**2**N). Soil Data System card 23, 85– 144 cm

Occurrence and Relationships

Moderately well-drained crests. 5–15 cm friable brownish black loam **(be1)** overlies 5–30 cm of hardsetting dull yellowish brown sandy clay loam **(be2)**, which in turn overlies 40–105 cm pedal brown plastic mottled clay **(be3)**. Soil boundaries are clear to sharp. Total soil depth is <120 cm [moderately well-drained Yellow Podzolic Soils (Dy2.21) and Brown Podzolic Soils (Db1.21, Db2.41)].

Sideslopes. 5–10 cm **be1** overlies 10–30 cm **be2** and commonly 16–65 cm **be3.** These materials may in turn be underlain by 25–80 cm of reddish brown plastic pedal clay **(be4)** and, in turn, often >200 cm gleyed "puggy" silty clay **(be5).** Where disturbed, **be1** has often been lost to erosion and **be2** is exposed at the surface. Soil boundaries are clear to abrupt. Total soil depth is >200 cm [moderately well-drained brown Soloths (Db2.41, Db1.41), some yellow Soloths (Dy3.41)].

On better drained upper slopes. Up to 10 cm **be1** overlies 10–35 cm **be2**, then 35–>80 cm **be4**, which in turn overlies <115 cm **be5.** Soil boundaries are abrupt to clear. Total soil depth is >120 cm [well-drained Red Podzolic Soils (Dr2.21) and some red Soloths (Dr2.41)].

On some lower slopes and more poorly drained flat low crests. Up to 10 cm **be1** overlies 10–30 cm **be2** which is underlain by 140–>400 cm **be5.** Soil boundaries are abrupt. Total soil depth is >200 cm [imperfectly drained Yellow Podzolic Soils (Dy2.21), yellow Soloths (Dy2.41, Dy3.41) and some poorly drained Gleyed Podzolic Soils (Dg2.41)].

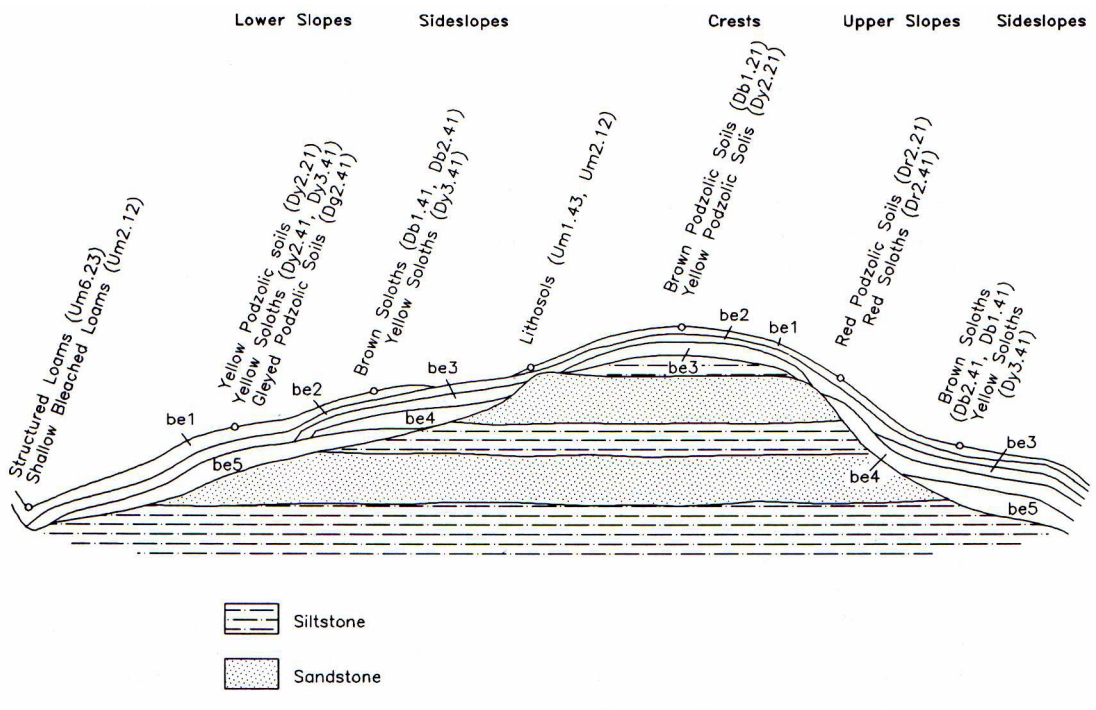
Drainage lines. 15–>180 cm **be1** occurs [imperfectly drained Structured Loams (Um6.23), some Earthy Loams (Um5.52)]. Occasionally, **be1** is underlain by 15 cm **be2.** Soil boundaries are clear. Total soil depth is 30–>180 cm [poorly drained Bleached Loams (Um2.12)].

Where sandstone outcrops occur. Up to 10 cm **be1** overlies 18–30 cm **be2.** Boundaries are clear. Total soil depth is <100 cm [rapidly drained Lithosols (Um1.43, Um2.12)].

QUALITIES AND LIMITATIONS

Landscape Limitations

Foundation hazard
Steep slopes (localised)
High run-on (localised)



■ *Schematic cross-section of Beresfield soil landscape illustrating the occurrence and relationship of the dominant soil materials.*

Water erosion hazard
Seasonal waterlogging (localised, lower slopes)
Rock outcrop (localised)
Mine Subsidence District

Landscape Limitations—bea

Steep slopes (localised)
Mass movement hazard
High foundation hazard
Water erosion hazard
Mine Subsidence District
High run-on

Soil Limitations

be1	Very strong acidity
	High potential aluminium toxicity
	Stoniness (localised)
	High erodibility
	Low fertility
be2	Hardsetting surface
	Strong acidity
	High potential aluminium toxicity
	Stoniness
	Low fertility
be3	High plasticity
	Moderate shrink-swell potential
	Low permeability
	Very strong acidity
	High aluminium toxicity potential
	Low fertility
	Stoniness (localised)
be4	High plasticity
	Very strong acidity
	Very high potential aluminium toxicity
	Low permeability
	Moderate shrink-swell potential
	Sodicity/dispersion
	Stoniness (localised)
	Low fertility
be5	High erodibility
	Low wet bearing strength
	Very strong acidity
	High potential aluminium toxicity
	Low fertility
	Stoniness (localised)
	Very low permeability
	High sodicity/dispersion
	High salinity

Fertility

Soil Materials as Plant Growth Media. Soil material suitability as growth media is moderate **(be1)** to low **(be2**, **be3**, **be4**, **be5)**. All soil materials are strongly to very strongly acid, with high potential aluminium toxicity . Topsoil **be1** is friable when moist and has moderate organic matter, but high phosphorus sorption.

Soil Profile Fertility. Soil profile suitability as a plant growth medium is low. Soil volumes available for root penetration are moderate.

Erodibility

	K factor	Non-concentrated flows	Concentrated flows	Wind
be1	0.028	moderate	high	V low
be2	0.033	moderate	moderate	V low
be3	0.017	low	high	V low
be4	0.018	low	moderate	V low
be5	0.048	high	high	V low

Erosion Hazard

	Non-concentrated flows	Concentrated flows	Wind
grazing	low	mod-high	slight
cultivation	high	extreme	low-mod
urban	mod-high	high	slight

Foundation Hazard

Generally high foundation hazard due to moderate to high shrink-swell (reactive) and highly plastic subsoils. Topsoil depth is 5–50 cm. Total soil depth is <120–>200 cm.

Urban Capability

Generally moderate limitations for urban development due to high foundation hazard.

Rural Capability

Generally moderate limitations for cultivation and low limitations for grazing.

Sustainable Land Management Recommendations

Care should be taken that topsoil loss is minimised by maintaining a permanent protective ground cover. If exposure of the hardsetting **be2** occurs, increased runoff and erosion will result. Incorporation of organic matter, and fertilisers, including phosphorus and lime, may be beneficial for pasture establishment. Areas of salt scalding should be fenced off to exclude stock and sown with salt tolerant grass species. Drainage or diversion of surface water may also be required. The Department (SCS) can provide advice on the management of areas effected by land degradation.

Soil Conservation Earthworks

Generally moderate limitations for earthworks due to high shrink-swell subsoils **(be4)** and highly aggregated subsoils **(be3)**. Localised limitations include shallow soils and imperfectly drained soils. Soils tested have earthworks categories J for **be1**, B for **be2** and **be5**, C for **be3** and G for **be4**. Soils are often highly dispersible and further testing is recommended prior to undertaking earthworks.