Engineering the Future

REMEDIATION ACTION PLAN (RAP) – UNDERGROUND PETROLEUM STORAGE SYSTEM (UPSS) REMOVAL

Liberty Service Station – Inverell, NSW

24-26 Glen Innes Road, Inverell, NSW

For:

Inverell Shire Council

By:

ENV Solutions

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Table of Contents

List of Tables

1 Introduction

1.1 Background

ENV Solutions Pty Ltd (ENV) was engaged by Inverell Shire Council (ISC) to prepare a Remediation Action Plan (RAP) for the Liberty branded service station situated at 24-26 Glen Innes Road, Inverell, NSW (hereafter referred to as the 'site'). The relative site location is presented on Figure 1, Appendix A.

This RAP has been prepared on the basis of previous environmental investigations conducted at the site; and the known site conditions. The previous investigations and current site conditions were described in the document entitled "Detailed Site Investigation (DSI), Liberty Service Station – Inverell, NSW" (ENV, 2021).

The focus of the RAP is the removal of the existing underground petroleum storage system (UPSS), which comprises five underground storage tanks (USTs) and associated dispensing bowsers and pipework. ENV understands that ISC intends to purchase the portion of the site which houses the UPSS, from its current owner, for construction of a new roundabout at the intersection of Glen Innes Road and Chester Street.

A small volume of hydrocarbon impacted soil will be removed with the UPSS; and from a separate location where hydrocarbons have been reported at elevated concentrations previously. These soils will require landfill disposal. The layout of the UPSS, and location of other remedial works, is indicated on Figure 4, Appendix A.

1.2 Scope of RAP

The NSW Environment Protection Authority (EPA) has prepared a document entitled *Consultants Reporting on Contaminated Sites (Contaminated Land Guidelines)* (2020), which provides a framework for reporting on contaminated land assessments, including preparation of a RAP. These Guidelines require that the following is presented by the RAP:

- Summarise the findings of the preliminary and detailed site investigations and risk assessment (where applicable), and present a refined conceptual site model (CSM).
- Document the identified contamination risks to human health and/or the environment (if any).
- Set remediation objectives that ensure the site will be suitable for its current and/or proposed use and which will result in no unacceptable risk to human health or to the environment and state remediation criteria.
- Define the extent of remediation required across the site.
- Assess options and remedial technologies to achieve the remediation objectives and select and justify a preferred approach, which must include consideration of the principles of ecologically sustainable development.
- Document in detail all procedures and plans to reduce risks posed by contamination to acceptable levels for the proposed site use.

- Identify the need for, and reporting requirements of, remedial technology pilot trials (if applicable).
- Establish the environmental safeguards required to complete the remediation in an environmentally acceptable manner, including consideration of the potential for off-site impacts (such as air quality, odour and aesthetics).
- Address contingencies and unexpected finds protocols.
- Identify the necessary approvals and licences required by regulatory authorities, including any items contained in development consent conditions.
- Clearly outline waste classification, handling and tracking requirements in accordance with the *Guidelines for the NSW Site Auditor Scheme* and *Waste Classification Guidelines* (EPA 2014).
- Ensure remediation is consistent with relevant laws, policies (including planning instruments and policies) and guidelines and reference these in the remedial action plan.
- Identify how successful implementation of the remedial action plan will be demonstrated, for example the validation requirements by documentation of site works and sampling and analysis etc (when sampling and analysis is required, a validation sampling and analysis quality plan must be included, with clearly defined acceptance validation criteria indicating what statistics will be used and any trend analysis following remediation, i.e. Mann-Kendall test).
- Identify the need for, and nature of, any long-term management and/or monitoring following the completion of remediation and, if required, provide an outline of an environmental management plan and include this in the remedial action plan.

This RAP has been prepared to address each of these items, where applicable.

1.3 Summary of Anticipated Remedial Activities

The activities covered by this document can be categorized as follows:

- Preliminaries, including the following:
    - site establishment
    - identification of underground and above ground utilities which may be affected by the works
    - implementation of environmental controls such as sediment and erosion control mechanisms
    - establishment of temporary stockpiling and loading areas.
- Demolition of above-ground infrastructure, including the canopy, bollards, signage and hardstand ground cover (concrete).
- Decommissioning of below-ground infrastructure, including three existing groundwater wells (MW1, MW2 and MW3).
- Removal of residual liquids from the five USTs to be removed. Note that this may

be undertaken prior to demolition occurring, depending on the required sequencing of works.

- Degassing of the USTs.
- Removal of each of the USTs and associated infrastructure, including but not limited to vent pipes, suction pipes, remote filling points and dispensing bowsers.
- Excavation of soils around the USTs and other UPSS infrastructure, with soil validation sampling.
- Re-use of excavated soils on-site (if suitable), or disposal off-site to an appropriately licensed landfill. Based on the results of the DSI (ENV, 2021), the soils to be excavated have been assigned a preliminary waste classification of General Solid Waste (GSW) for disposal purposes.
- Backfill of the final excavation extents with appropriate clean fill material which meets the site-specific remediation criteria. This may include site-won fill, if it is shown to be suitable for re-use on site (e.g. overburden soils above tanks), or imported quarry fill.

Further details regarding each of these tasks is included in later sections of the document.

1.4 Objectives

The primary objective of the remedial works is to remove the existing UPSS from the site; ensure that COPC concentrations in the remaining site soils meet the adopted remediation criteria for future commercial land use (road construction); or ensure that where exceedences of the remediation criteria exist – the soils represented by these exceedences do not pose a risk to any of the identified receptors.

1.5 Regulatory Framework

The following regulatory framework has been considered in preparing this document, and should be understood by the Remediation Works Contractor (RWC) and/or Remediation Consultant (RC, as required) prior to commencing the remedial program:

Acts, Policies and Regulations

- Contaminated Land Management Act (1997) ('CLM Act').
- Protection of the Environment Operations Act (1997) ('POEO Act').
- Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation (2019).
- Protection of the Environment Operations (Waste) Regulation (2014).
- State Environment Protection Policy 55 – Remediation of Land (SEPP 55) under the Environmental Planning and Assessment Act (1997) ('SEPP 55').
- Work Health and Safety Act (2011).
- Work Health and Safety Regulations (2011).

Guidelines and Standards

- DECCW (2009) Guidelines for Implementing the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2008 (now 2019) ('UPSS Guidelines').
- NSW EPA (1995) Sampling Design Guidelines.
- NSW EPA (2014a) Technical Note: Investigation of Service Station Sites.
- NSW EPA (2014b) Waste Classification Guidelines.
- NSW EPA (2014c) The Excavated Natural Material Order.
- NSW EPA (2020) Consultants Reporting on Contaminated Land (Contaminated Land Guidelines).
- NEPC (2013a) Schedule B(1) Guideline on Investigation Levels for Soil and Groundwater.
- NEPC (2013b) Schedule B(2) Guideline on Site Characterisation.
- NEPC (2013c) Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils.
- Standards Australia (2008). AS4976-2008: The removal and disposal of underground petroleum storage tanks.

2 Site Identification Details

Table 1 provides identification details of the subject land relevant to this RAP.

Table 1: Site Identification Details

Site Address	24-26 Glen Innes Road (corner of Chester Street), Inverell, NSW
Site Area	Total site – approximately 1,540 m^2 (Sixmaps, 2009)
Real Property Description	Lot 1 DP322074 and Lot 1 DP666824
Local Government Area	Inverell Shire Council (ISC)
Current Zoning	B2 – Local Centre
Existing Land Use	Service Station
Proposed Land Use	New service station (eastern portion) and road construction (western portion)

3 Site and Surrounding Area Characteristics

3.1 Site Description

The site comprises a service station shopfront (sales) with attached farming supply store and U-Haul trailer hire facility. The shopfront (sales) and farming supply store are situated in the central site portion. ENV understands the farming supply store was formerly used as a mechanical workshop. There is also an attached storage shed in the north western portion of the site used to store products for the shop. This shed was also formerly used as a mechanical workshop, and contained several 200 L waste oil drums at the time of the DSI field program (March 2021).

The north-eastern portion of the site consists of a gravel covered area where a U-Haul trailer hire facility was located. This area has been filled and is approximately 0.4 m higher than the adjacent building levels.

The southern and western site portions were used as the service station forecourt area; housing the USTs, dispensing bowsers and fuel lines. This area was entirely covered with concrete in fair to good condition (some cracking in places). Surface staining was noted on concrete around some fuel dispensing pumps, particularly the diesel bowsers in the western site portion.

The site's UPSS comprises of the following fuel related infrastructure (refer to Figures 2 to 4 in Appendix A):

- 1 x UST storing diesel – 20 kL;
- 1 x UST storing diesel – 4 kL;
- 1 x UST storing premium unleaded petrol (PULP 95) – 26 kL;
- 1 x UST storing premium unleaded petrol (PULP 98) – 9.6 kL;
- 1 x UST storing unleaded petrol (ULP) – 58 kL;
- Anecdotal information: 1 x UST formerly storing unknown product and abandoned – 5 kL (south of sales building; east site portion);
- 6 x fuel dispensing bowsers, situated in two groups. Four bowsers dispensing unleaded petroleum products are located beneath the canopy, while two additional bowsers dispensing diesel are located between the canopy and Chester Street, in the western site portion; and
- 7 x vent pipes, situated around the site.

An LPG bottle exchange facility and 2 x LPG decanting storages were situated along the eastern site boundary.

The only vegetation present on the site was contained in a small, raised garden bed in the south-west corner. No stressed vegetation was observed in this area.

Three existing groundwater monitoring wells are present at the site (MW1, MW2 and MW3), installed in 2012 by a third party. Groundwater samples were collected from these wells as part of the recent DSI (ENV, 2021).

Plans showing the layout of the fuel related infrastructure, building and groundwater well locations are provided as Figures 2 to 4, Appendix A.

3.2 Topography and Drainage

The site elevation is 594 m Australian Height Datum (AHD). The site has a steady gradient towards the south (Glen Innes Road). Stormwater run-off from the site most likely flows south from the operational (concrete covered) forecourt area, following the topography of the site. Concrete kerbing was located along the southern side of the forecourt, with openings for the entry and exit driveways.

The topography surrounding the site is relatively flat, but slopes to the south on the southern side of Glen Innes Road, towards the Macintyre River.

3.3 Geology and Soils

Soils beneath the subject site have been described in ENV (2018 and 2021). These reports indicate the site soils comprise of gravelly clay fill, overlying dense natural clays and gravelly clay. A thin layer of gravelly bedding sand is present beneath most concreted areas.

A search of the NSW Department of Planning, Industry and Environment's eSpade v2.1 identified that the site lies within a soil landscape identified as containing predominantly black vertosols.

Information presented in the eSpade v2.1 web app relating to a soil sampling point approximately 2.5 km west of the site indicates soils which are generally similar to those observed at the subject site.

3.4 Acid Sulfate Soils

Due to the site's elevation (594 m AHD) and significant distance from any intertidal/low lying floodplain area, acid sulfate soil (ASS) does not pose a risk to disturbance of soils at the site. Soils excavated during removal of the UPSS will not require management for ASS.

3.5 Surface Water Bodies

The Macintyre River (freshwater) is located approximately 150 m to the south of the site at its closest point; and flows east towards Lake Inverell.

3.6 Flooding

ISC has prepared a Fact Sheet – Flood Emergency Plan, which describes the extent of flooding risk in the Inverell township. The Plan presents areas of Inverell that are within the floodplain area of the Macintyre River. The Plan indicates that the site is unlikely to be affected by flood events, although it is noted that the site is close to the fringe of flood affected areas (refer to ENV, 2021).

3.7 Groundwater Resources

A search of the WaterNSW (formerly NSW Office of Water) Groundwater Bores online mapping (ENV, 2021) indicated there were 13 licensed bores within a 500 m radius of the site, including three existing on-site wells. A figure presenting the relative bore locations is presented in ENV (2021).

The licensed bores (other than the on-site wells) have been installed for a range of purposes; including domestic, industrial and recreational. The bores have been constructed to screen regional groundwater, and do not screen perched water which has been the subject of previous contamination investigations at the site.

3.8 Surrounding Land Uses

Land uses surrounding the site are described as follows:

- North: Low density residential housing.
- South: Inverell East Bowling Club Ltd. Further south (approximately 150 m) is the McIntyre River.
- East: Residential housing followed by the Sapphire City Motor Inn, past Chester Lane.
- West: Commercial buildings followed by the Inverell Caravan Park across Glen Innes Road.

The broader area around the site is a mixture of low density residential and commercial development. The central business area of the Inverell township is located approximately 1 km to the north-west. Beyond the township are predominantly medium to large rural properties with occasional dwellings.

4 Site History and Regulatory Information

4.1 Previous Investigations

Three known environmental investigations have been conducted previously at the site Two of these investigations were completed by ENV (2018 and 2021). A third investigation was completed by in March 2012, at which time the three existing monitoring wells were installed, however no report was available for review.

A summary of the two previous ENV investigations is provided in the following sub-sections.

4.1.1 ENV (2018) – Due Diligence Assessment

In 2018, ENV conducted a due diligence assessment on behalf of North Coast Petroleum (NCPT) for the site. The scope of work and results of the assessment are summarised as follows:

- The investigation was completed for due diligence purposes, to facilitate sale of the property.
- A desktop review of available site history information indicated the site had been used for service station purposes since the 1950s.
- A hazardous chemicals search indicated that various petroleum products have been stored in USTs and above ground gas cylinders at the site, dating from 1954 until the most recent information available in 2006.
- Seven (7) boreholes were drilled using a trailer mounted rig with solid flight augers to a maximum depth of 3.0 m bgl (auger refusal on bedrock). Boreholes were located across the various site areas. Groundwater was not encountered during drilling.
- Seven (7) soil samples were selected for laboratory analysis of petroleum hydrocarbons (TRH, BTEX and PAH) and metals – one per borehole.
- Three existing on-site monitoring wells (MW1, MW2 and MW3) were dry at the time of the investigation and could not be sampled.
- The soil results were either less than laboratory detection limits or less than the human health and ecologically-based screening and investigation levels adopted for a commercial (service station) land use.

On the basis of the results, ENV concluded that the site was suitable for continued commercial land use (ongoing operation as a service station).

Tabulated analytical results from the assessment are included in Appendix B.

4.1.2 ENV (2021) – Detailed Site Investigation (DSI)

ENV was engaged by ISC to undertake a Detailed Site Investigation (DSI) at the site in March 2021.

The scope of work and results of the DSI are summarised as follows:

- A site inspection and discussions with the current site operator were completed at the beginning of the field program.
- Ten (10) boreholes were drilled to a maximum depth of 3.8 metres below ground level (mBGL; depth of auger refusal on bedrock) across the site.
- A total of twenty-one (21) soil samples were laboratory analysed for the chemicals of potential concern (COPC), relating to the site's uses for service station and workshop activities (petroleum hydrocarbons, including total recoverable hydrocarbons (TRH); benzene, toluene, ethylbenzene and xylenes (BTEX) and polycyclic aromatic hydrocarbons (PAH)); metals and volatile halogenated compounds (VHCs, including chlorinated degreasing agents).
- Groundwater samples were collected from each of the three existing on-site monitoring wells (MW1, MW2 and MW3).
- COPC concentrations in the majority of the twenty one (21) primary soil samples analysed were less than the assessment criteria adopted for the investigation, or less than laboratory detection limits.
- Petroleum hydrocarbon concentrations in two samples from two boreholes (BH4 and BH6) exceeded ecologically-based criteria adopted for the assessment. Human health-based (vapour) criteria were exceeded by hydrocarbon concentrations in one borehole (BH4) only.
- A preliminary waste classification was prepared for soils which are likely to require excavation and management as part of future works to remove the existing UPSS and construct the new road and roundabout in the western site portion. A preliminary waste classification of General Solid Waste (GSW) was assigned to soils in the UPSS area, meaning the soils could be disposed to the Inverell Shire landfill as such. Some soils may also be re-used on site as fill. Further classification testing may be required once the soils are excavated and stockpiled on site.
- An evaluation of soil quality was also undertaken for the eastern site portion, which will be retained by the current site owner and developed as a new service station in the near future. Although the layout and detail of any future service station development has not yet been developed, the current soil conditions within the eastern site portion were considered suitable for ongoing commercial land use (service station) in the event that the site surfaces were sealed. However, a reasonable proportion (approximately one third) of the eastern site area was covered by buildings in March 2020, and the underlying soils were not sampled. ENV noted that consideration should be given to assessment of soils beneath the existing buildings once they are demolished – prior to future development of the area.

- Hydrocarbon concentrations exceeding one or more assessment criteria were reported in one of the existing wells – MW3. These COPC included benzene, ethylbenzene and naphthalene, with COPC concentrations exceeding only the criteria adopted for drinking water use of extracted groundwater, and recreational use and freshwater ecosystems associated with freshwater bodies (e.g. Macintyre River). None of the COPC were reported to exceed human health-based criteria for current (or future) site workers. As such, the current groundwater conditions pose no impediment to future development of the site for commercial/industrial purposes (e.g. road construction and service station development).
- On the basis of available licensed bore information, any risks posed by COPC concentrations reported in MW3 to users of licensed bores in the site vicinity were expected to be negligible.
- While the Macintyre River is located down slope (south) from the site, approximately 150 m away at is closest point, it was considered unlikely that the COPC concentrations reported in MW3 would reach the River without prior attenuation to levels which are less than the adopted assessment criteria or less than laboratory detection limits.

On the basis of the DSI results, the following recommendations were made:

- With respect to site owner obligations under Section 60 of the *Contaminated Land Management Act 1997* (the 'CLM Act'), the site owner (understood to be North Coast Petroleum (NCPT)) is considered to have an obligation to notify the NSW EPA of current groundwater conditions, for the following reasons:
  - Contaminants have entered or will foreseeably enter groundwater or surface water; AND
  - Concentrations of the contaminants in the groundwater or surface water are, or will foreseeably be, above the groundwater investigation level(s) for that contaminant; AND
  - Concentrations of the contaminants in the groundwater or surface water will foreseeably continue to remain above the specified concentration.

  Notification of the NSW EPA should occur as soon as is reasonably practicable, in accordance with the document entitled "Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997" (NSW EPA, 2015) and the provisions of the CLM Act.
- A minimum of one well should be installed to the south of MW3, across Glen Innes Road, on Council-owned land. The purpose of this well would be to delineate the impacts reported at MW3, and confirm that concentrations of hydrocarbons in off-site areas, between the contamination source and potential surface water and aquatic receptors associated with the Macintyre River, are less than relevant assessment criteria.

- A Remediation Action Plan (RAP) should be prepared which describes in detail the proposed remedial measures for removal of the existing UPSS and any associated contaminated soils. The RAP should be prepared by a suitably qualified environmental professional, in accordance with the requirements of the NSW EPA (2020) document entitled "Consultants Reporting on Contaminated Land (Contaminated Land Guidelines)".
- Until such time as the existing service station is demolished and a new facility is constructed, groundwater monitoring should continue at the site in accordance with the requirements of the *Protection of the Environment Operations Act 1997* ('POEO Act') and *POEO (Underground Petroleum Storage System (UPSS) Regulation) 2019*.

Tabulated analytical results from the assessment are included in Appendix B.

4.2 Storage of Dangerous Goods on Premises

Information regarding historical chemical (petroleum) storage at the site was obtained by ENV (2018) in the form of a Schedule 11, Hazardous Chemicals Notification search through SafeWork NSW.

The information indicated that hazardous chemicals (petroleum and liquefied petroleum gas (LPG)) have been stored within USTs and above ground cylinders, registered at the premises from 1954 until 2006 (last notification to SafeWork NSW).

The search information indicated the following about historical and current fuel storage at the site:

- The storages listed in the 2006 documentation are the same as those currently on the site, suggesting that no changes to fuel storage on the site have occurred since this time.
- Two of the storage tanks listed in the 1954 documentation have different capacities than those listed in the subsequent (1978) documentation. This suggests that either two of the three USTs were replaced with new tanks in this period (and the old tanks abandoned in situ or removed); or that the UST capacities listed in 1954 and/or 1978 are incorrect. Anecdotal information provided by Mr. Garry Campbell, the current site operator, during the DSI field program indicated there may be an abandoned UST to the south of the entrance for the farm supply store (eastern portion of the main building).

A summary of the UPSS infrastructure which is currently present on the western portion of the site and will be removed as part of the proposed remediation program is provided in Table 2. The relative location of the currently known fuel storages is presented on Figures 2, 3 and 4 (Appendix A).

Table 2: Summary of Existing (Known) UPSS Infrastructure

Item	Construction Material	Product	Class	Maximum Capacity
UST 1 (T1)	Assumed steel	Petrol – Unleaded (ULP)	3	58,000 L
UST 2 (T2)	Assumed steel	Diesel	C1	20,000 L
UST 3 (T3)	Assumed steel	Diesel	C1	4,000 L
UST 4 (T4)	Assumed steel	Petrol – Premium Unleaded (PULP) – 98 octane	3	9,600 L
UST 5 (T5)	Assumed steel	Petrol – Premium Unleaded (PULP) – 95 octane	3	26,000 L
Dispensing Bowsers (x 4)	-	ULP	-	-
Dispensing Bowsers (x 2)	-	Diesel	-	-
Suction Pipework	Polyethylene	ULP	-	-
Suction Pipework	Steel	Diesel	-	-
Vent Pipework	Assumed steel	All products	-	-

4.3 POEO Act Public Register Search

The NSW EPA *Protection of the Environment Operations Act 1997* ('POEO Act') Public Register contains information about environment protection licences, licence applications, notices issued under the POEO Act and pollution studies and reduction programs.

The EPA's POEO Act Public Register was searched for the Inverell area on 15 April 2021 (ENV, 2021). Several licences were located, including those for the Inverell waste facility (landfill), as well as others listed for the Inverell sewage treatment plant, Copeton water treatment plant, manufacturing businesses and mining exploration. None of these activities occurred in close proximity to the subject site and were therefore considered unlikely to affect the environmental condition of the site.

The Register for delicensed premises which are still regulated by the NSW EPA was also reviewed at the time (ENV, 2021) and indicated that there had previously been a licence for Australian Gemstone Resources Pty Ltd located at the property known as "Kew" on Waterloo Road, Inverell. The licence for the company was revoked on 18 May 2018 due to failure to pay the annual licence fee. It was also noted through the EPA's POEO Act Public Register website that the company had not operated since

2010. An entry for a delicensed premises relating to the former production or storage of hazardous, industrial or Group A waste at the Inverell District Hospital was also found. The Hospital is located approximately 1.2 km north-east of the site.

4.4 Contaminated Land – Record of Notices Search

The EPA triggers assessment and remediation of significantly contaminated land by sending written notices to those responsible for cleaning up the contamination. The EPA makes these notices, which include preliminary investigation orders, available to the public through the Record of Notices.

The Record of Notices was searched on 15 April 2021. No records were found.

4.5 Contaminated Land Record (EPA Notifications)

A site may be notified to the NSW EPA if the notifier considers the site to be contaminated (as defined by the CLM Act). The EPA then assesses the contamination status of the site and makes a decision as to whether the contamination is significant enough to warrant formal regulation by the EPA in accordance with the provisions of the CLM Act.

A review of information presented on the Contaminated Land Record was completed for the Inverell area on 15 April 2021. Seven (7) sites were identified in the Inverell area and were all related to petroleum and service station contamination activity - however, none of the 7 sites were "under assessment" by the EPA. This means that contamination identified at the sites was deemed by EPA to not be significant enough and warrant regulation under the CLM Act. The closest location to the site is the former Mobil Inverell Depot on the corner of Henderson and Otho Street, Inverell; approximately 600 m to the north-west.

4.6 Cattle Dip Site Locator

The NSW DPI cattle dip site locator was accessed on 20 July 2018 (ENV, 2018), to assess the potential for historic cattle dip sites in the Inverell region. The register did not identify any cattle dips within the Inverell region.

4.7 Historical Land Ownership

The online NSW Land and Property Information (LPI) Historical Land Records Viewer (HLRV) tool was used to search for historical parish maps for the Inverell region (ENV, 2018). Parish maps from 1893, 1905, 1910, 1916, 1926, 1930 and 1942 were available for the township of Inverell.

Each of these maps showed that the area of the subject site had not been developed for service station purposes at the time the maps were published; rather, it appeared that the subject land and surrounding property may have been developed for residential purposes.

4.8 Anecdotal Information

As part of the recent DSI (ENV, 2021), ENV conducted an interview with the site operator, Mr. Garry Campbell, at the time of the field-based activities (March 2021). Garry provided the following relevant information:

- Garry has been operating the site since approximately 2010.

- In approximately 2013, a steel fuel line from the unleaded UST to dispensing bowsers in the southern forecourt area (beneath the canopy) was noted to be leaking. The leak was repaired and at that time, all unleaded and premium unleaded petrol fuel lines (but not diesel lines) were replaced with polyethylene.
- The former mechanical workshop ceased operation on the site in approximately 2016.
- The three existing monitoring wells generally contain groundwater for brief periods only after significant rainfall, but are dry during periods without rainfall.
- The well located adjacent to the dispensing bowsers under the canopy (MW3) has been noted previously to contain hydrocarbon odours.

4.9 Product Loss and Spill History

According to information provided by Mr. Campbell during the DSI, one of the steel unleaded fuel lines is known to have leaked and been replaced in about 2013. ENV was not provided with any reports regarding these repairs, or environmental validation associated with the works. In ENV's experience, it is unlikely that any environmental validation works would have occurred at the time of the repairs.

5 Conceptual Site Model (CSM)

5.1 Contamination Sources

Based on historical and current use of the site for service station and mechanical workshop purposes, the site-based contamination sources are considered to include the following:

- Leaks from the five (5) existing USTs and associated fill pipes.
- Leaks from an abandoned UST situated just to the south of the main building (eastern portion, if it exists).
- Leaks from the existing fuel dispensing bowsers and associated suction pipework, including a former steel pipe from the unleaded UST to dispensing bowsers under the canopy, which is known to have leaked and has been replaced.
- Leaks from the filling points and spills during refuelling operations.
- Spills on the forecourt area. Although the forecourt was covered with concrete in fair to good condition, staining was observed in the vicinity of selected dispensing bowsers – particularly around the diesel refuelling area.
- Operation of the (former) mechanical workshop, including the storage of waste oil, small quantities of lubricants and other chemicals and potential degreasing activities.

5.2 Chemicals of Potential Concern

Based on the contamination sources described above, the chemicals of potential concern (COPC) associated with these sources are summarised in Table 3.

Table 3: Summary of Chemicals of Potential Concern (COPC)

Chemical	Comments
Total recoverable hydrocarbons (TRH): - F1: C_6-C_{10} minus BTEX - F2: >C_{10}-C_{16} minus naphthalene - F3: >C_{16}-C_{34} - F4: >C_{34}-C_{40}	Health risk-based fractions presented in the NEPM (2013)*. Associated with all forms of petroleum products.
Benzene, toluene, ethylbenzene, xylenes, naphthalene (BTEXN)	Associated primarily with unleaded petrol.
Polycyclic aromatic hydrocarbons (PAH)	Associated primarily with diesel.
Lead	Associated with formerly used leaded (super) petrol.
Volatile halogenated compounds (VHCs)	Associated with degreasing agents (chlorinated hydrocarbons) used for vehicle servicing and repairs (former workshop).

Notes:
*National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013)

It is noted that laboratory testing conducted during the DSI did not identify any detectable concentrations of VHCs. Notwithstanding, these chemicals are associated with the former workshop areas and are less likely to be present in the UPSS area. For the purposes of this RAP, VHCs have subsequently been excluded as COPC for validation sampling in the UPSS area.

5.3 Potentially Affected Environmental Media

Petroleum hydrocarbons from fuel related infrastructure may affect the quality of soil, groundwater and soil vapour beneath the subject site and adjacent areas. Soil and groundwater quality were assessed directly by the recent DSI (ENV, 2021). Soil vapour quality was assessed through the use of a photo-ionisation detector (PID) to measure vapour concentrations in soil samples. The DSI results show that all three environmental media have been impacted by petroleum hydrocarbons to some extent.

5.4 Potential Exposure Pathways and Receptors of Contamination

Potential exposure pathways and receptors of contamination at the site and in adjacent, off-site areas are summarised in Table 4.

Table 4: Summary of Potential Exposure Pathways and Receptors of Contamination

Potential Exposure Pathway	Potential Receptor(s)	Potentially Complete Pathway?	Potential Risk?	Comments
On-Site				
Direct contact with contaminated soil	Current above-ground workers (service station)	Unlikely	Unlikely	There is no need for above-ground workers to access sub-surface soils. The entire operational area is covered with concrete in fair to good condition.
	Future above-ground workers	Possible	Unlikely	Construction workers involved in future road and roundabout construction may be exposed to contamination in the top 1 m of soil. Construction workers involved in redevelopment of a new service station in the site's eastern portion may also be exposed to contamination in the top 1 m of soil. However, any exposure of construction workers, unlike commercial business workers, would be acute; and would not meet the exposure assumptions that underpin derivation of the chronic-based NEPM HILs and HSLs.
	Future sub-surface workers	Yes	Unlikely	Construction workers involved in future road and roundabout construction may be exposed to deeper contamination in the top 3-4 m of soil, should deep excavations be required for services such as sewer. Construction workers involved in redevelopment of a new service station in the site's eastern portion may also be exposed to deeper contamination in the top 4-5 m of soil (e.g. installation of new USTs). However, any exposure of sub-surface workers, unlike commercial business workers, would be acute; and would not meet the exposure assumptions that underpin derivation of the chronic-based NEPM HILs (direct contact criteria, soil).

	Potential Receptor(s)	Potentially Complete Pathway?	Potential Risk?	Comments
	On-Site			
	Terrestrial ecosystems and vegetation root zones	Unlikely	Unlikely	Contaminated soils on-site are accessible to terrestrial fauna and vegetation root zones which may reside in, or otherwise use, the top 2 m of the soil profile. However, where hydrocarbons have been reported, the entire area is sealed, or is likely be sealed as part of any future redevelopment works.
Direct contact with contaminated groundwater, including LNAPL	Current above-ground workers (service station)	No	No	Natural depth to groundwater is >3.8 m bgl.
	Future above-ground workers	No	No	Natural depth to groundwater is >3.8 m bgl.
	Future sub-surface workers	Possible	Possible (eastern site portion only)	Although natural depth to groundwater is >3.8 m bgl, excavations for future UST installation (eastern site portion) may extend to a depth of approximately 4 to 5 m bgl – noting that this will not occur in the site's western portion, which is the focus of this RAP. The deepest excavations expected in the western site portion would be for sewer connections or maintenance, at a depth of up to approximately 3-4 m.

Potential Exposure Pathway	Potential Receptor(s)	Potentially Complete Pathway?	Potential Risk?	Comments
On-Site				
Inhalation of vapours from contaminated soil, groundwater and/or LNAPL	Current above-ground workers (service station)	Yes	Unlikely	Although this exposure pathway may be potentially complete, the DSI results (ENV, 2021) show that concentrations of the volatile COPC were less than the NEPM HSLs (vapour-based criteria, soil and groundwater) for on-site commercial workers, in all but one location – BH4. Based on the magnitude of the exceedence at this location, which is almost equivalent to the assessment criterion; and the borehole location, which is more than 10 m from the sales building (where vapours may potentially accumulate), it is considered unlikely that vapour migration would occur into the sales building without prior attenuation of COPC concentrations to less than the NEPM HSLs. All groundwater concentrations were less than the NEPM HSLs.
	Future above-ground workers	Yes	Unlikely	Although this exposure pathway may be potentially complete, the DSI results (ENV, 2021) show that concentrations of the volatile COPC were less than the NEPM HSLs (vapour-based criteria) for on-site commercial workers in all but one location. COPC concentrations at this location (ethylbenzene, BH4) were approximately equivalent to the respective HSL. This concentration could only plausibly pose a potential risk if a bulding was constructed directly on top of the location, and there was no attenuation in COPC concnetrations over time (to less than the HSL).
	Future sub-surface workers, including utility pit workers (where vapours may accumulate)	Yes	Unlikely	Vapours may migrate into trenches or excavations made for construction of underground services or USTs. However, any exposure of sub-surface workers would be acute; and would not meet the exposure assumptions that underpin derivation of the chronic-based NEPM HSLs (vapour-based criteria, soil).

Potential Exposure Pathway	Potential Receptor(s)	Potentially Complete Pathway?	Potential Risk?	Comments
Off-Site				
Direct contact with contaminated soil and/or groundwater	Current and future residents (north and east)	No	Unlikely	COPC concentrations greater than human health-based criteria have only been reported near the site boundaries in one location to date – BH4 (ENV, 2021). This borehole is not situated near the site's northern or eastern boundaries. Natural depth to groundwater (>3.8 m bgl) precludes direct contact with it, unless it is extracted via a bore. Hydrocarbon concentrations greater than human health-based criteria have only been reported in one location – MW3. This well is not situated near the site's northern or eastern boundaries. Although there are four licensed bores situated within approximately 250 m of the site, none of these are constructed to screen the residual clay soils which the on-site wells monitor.
	Current and future above-ground workers	No	No	Commercial premises where workers may potentially be exposed to contamination are situated across Chester Street to the west and across Glen Innes Road to the south. Notwithstanding, the concentrations reported in soils and groundwater beneath the site did not exceed any human health-based criteria applicable to workers.
	Future sub-surface workers	No	Unlikely	Although sub-surface workers may conduct below ground activities along the roadway or footpath of Glen Innes Road (close to BH4 and MW3), any exposure of sub-surface workers would be acute; and would not meet the exposure assumptions that underpin derivation of the chronic-based NEPM HILs (direct contact criteria, soil).
	Recreational users of nearby surface water bodies (e.g. Macintyre River)	No	Unlikely	The distance of the nearest surface water body from the site (Macintyre River, approximately 150 m south) would likely preclude the discharge of contaminants from groundwater into the water body without prior attenuation (reduction in concentrations).

	Potential Receptor(s)	Potentially Complete Pathway?	Potential Risk?	Comments
	Off-Site			
	Aquatic ecosystems associated with nearby surface water bodies (e.g. Macintyre River)	No	Unlikely	The distance of the nearest surface water body from the site (Macintyre River, approximately 150 m south) would likely preclude the discharge of contaminants from groundwater into the water body without prior attenuation (reduction in concentrations).
Inhalation of vapours from soil and/or groundwater and/or LNAPL	Current and future residents (north and east)	No	No	COPC concentrations greater than human health-based criteria have only been reported near the site boundaries in one borehole location to date – BH4 (soil) and one well location – MW3 (groundwater) (ENV, 2021). These locations are not situated near the site's northern or eastern boundaries.
	Current and future above-ground workers	No	No	Commercial premises where workers may potentially be exposed to contamination are situated across Chester Street to the west and across Glen Innes Road to the south. Notwithstanding, the concentrations reported in soils and groundwater beneath the site did not exceed any human health-based criteria applicable to workers.
	Future sub-surface workers	Unlikely	Unlikely	Although sub-surface workers may conduct below ground activities along the roadway or footpath of Glen Innes Road (close to BH4 and MW3), any exposure of sub-surface workers would be acute; and would not meet the exposure assumptions that underpin derivation of the chronic-based NEPM HSLs (vapour-based criteria, soil and groundwater).

6 Date Quality Objectives (DQOs)

6.1 Step 1: Problem Identification

The existing UPSS requires removal for construction of a new roadway, including a roundabout.

Based on the results of previous investigations (ENV, 2021), soils surrounding the UPSS are likely to be free of gross hydrocarbon impacts. However, some impacts were reported in one location close to where a former suction line to the unleaded dispensing bowsers was located. Soils in this area, as well as any hydrocarbon impacted soils encountered during removal of the UPSS, will require removal and management as part of the remedial program.

For the purposes of establishing Data Quality Objectives (DQOs) for the remediation program, only soil impacts have been considered. The most recent groundwater data (ENV, 2021) indicates that the current groundwater conditions do not pose a plausible risk to current or future commercial workers at the site.

6.2 Step 2: Identify the Decisions

The principal decision (question) is:

- Once the UPSS infrastructure and previously identified soil contamination has been removed, do COPC concentrations in residual soils (those remaining in situ) meet the adopted remediation criteria (refer to Section 6.6).

6.3 Step 3: Inputs to the Decision

To address the decision in Step 2, the following activities are required:

- Validation of in-situ soils will need to be undertaken during the course of the remediation works and the results assessed relative to the accepted remediation criteria.
- If soil validation results exceed adopted remediation criteria, and practical limits of excavation have been met, further investigations may be required to determine if contaminant-receptor pathways are active (e.g. soil vapour and/or indoor air sampling).
- Excavation of contaminated soil will need to be undertaken under the supervision of a suitably qualified environmental scientist to ensure that excavated contaminated soil is managed in accordance with the correct Waste Classification and that validation sampling is completed in an appropriate manner.

6.4 Step 4: Define the Study Boundaries

For the purposes of this RAP, the study area is limited to the western site portion, where the UPSS is located and where the new roundabout will be constructed (refer to Figures in Appendix A). The study area does not extend to other areas of the site (including the eastern site portion, which will be retained by the current site owner), or to any off-site areas.

Temporally, the study will be limited to the timeframe required for removal of the UPSS and associated validation activities. That is, all field observations and soil validation sampling will be conducted across an expected period of 1 – 7 days.

If unforeseen circumstances result in soils being stockpiled on site, and the soil is treated on site (e.g. by landfarming), the temporal boundaries may extend beyond this timeframe.

6.5 Step 5: Develop a Decision Rule

Data from the soil investigation will be compared with the adopted remediation criteria (refer Section 6.6). These criteria were derived from generic (Tier 1) investigation and screening levels presented in the NEPM.

Both the maximum observed contaminant concentrations and 95% upper confidence limit (UCL) of the arithmetic mean contaminant concentrations (if applicable) will be compared to these criteria. If required, the UCLs will be calculated and applied in consideration of the geographical location, depth and soil type of the validation sample(s).

Given the objectives of the soil assessment, and the nature of hydrocarbon contamination typically associated with a UPSS, an approach which allows targeted sampling will be adopted. Soil samples will be collected in locations which are consistent with the requirements of the *NSW EPA Technical Note: Investigation of Service Station Sites* (2014a). These include the walls and base of the final excavation extents, beneath underground pipework and beneath dispensing bowser locations.

The precision (reproducibility), accuracy, representativeness and overall reliability of the data sets will be assessed using the information presented in Table 5. This includes the collection of appropriate quality assurance (QA) samples during sampling, and internal QA testing conducted by the analytical laboratories. The QA sampling regime will be adopted from the NEPM and from *AS4482.1 Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil – Part 1: Non-volatile and semi-volatile compounds (2005)*; and *Part 2: Volatile compounds* (1999).

Table 5: Summary of QA Sample Parameters for Assessing Data Reliability

QA Sample Type	Media	Frequency	Acceptable Range of Results
Precision (Reproducibility)			
Field Sampling			
Intra-lab duplicate	Soil	1 per 20 primary samples, or part thereof	Relative percent difference (RPD) ≤50%
Inter-lab duplicate	Soil	1 per 20 primary samples, or part thereof	RPD ≤50%
Laboratory Analysis			
Internal duplicate	Soil	1 per 10 primary samples	Laboratory specified, concentration dependent; Envirolab: (RPD of any % for concentrations < 5 x LOR; RPD of 0-50% for concentrations > 5 x LOR)
Accuracy			
Laboratory Analysis			
Matrix Spikes	Soil	1 per sampling batch (20 samples per batch)	Laboratory specified; Envirolab: 70-130% (inorganics); 60-140% (organics)
Surrogate Spikes	Soil	1 per sampling batch (20 samples per batch)	Laboratory specified; Envirolab: 70-130% (inorganics); 60-140% (organics)
Laboratory Control Samples	Soil	1 per sampling batch (20 samples per batch)	Laboratory specified; Envirolab: 70-130% (inorganics); 60-140% (organics)

Representativeness			
Field Sampling			
Equipment Rinsate Blank	Soil	1 per piece of reusable equipment used for sampling (e.g. trowel)	Results <LOR
Laboratory Analysis			
Laboratory Blank	Soil	1 per sampling batch (20 samples per batch)	Results <LOR

6.6 Step 6: Specify the Performance or Acceptance Criteria (Remediation Criteria)

6.6.1 In Situ Soils

The remediation criteria adopted for the RAP are the Tier 1 investigation and screening levels that were adopted for the DSI (ENV 2021). These were drawn from the following sources:

- National Environment Protection Council (NEPC, 2013a). The NEPM - Schedule B(1) Investigation and Screening Levels.
- Friebel, E. and Nadebaum, P. (2011). Health screening levels for petroleum hydrocarbons in soil and groundwater. Summary, CRC CARE Technical Report No. 10. CRC for Contamination Assessment and Remediation of the Environment, Adelaide, Australia.

Based on the information presented above, the following investigation and screening levels were adopted as remediation criteria:

- NEPM Health Investigation Levels (HILs) and Health Screening Levels (HSLs): exposure setting D (HIL/HSL D); for future commercial land use as a roadway/roundabout; for fine grained soil (clay). This exposure setting reflects the proposed development and known shallow soil conditions in the UPSS area.
- NEPM Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) for commercial land use (fine grained soil: clay). Generic EILs presented in the NEPM were adopted for selected chemicals. The Added Contaminant Limit (ACL) from the NEPM for lead was used as the remediation criterion, assuming a negligible background contribution.

Olfactory and visual indicators of contamination, such as staining and odours, will also be used to identify the potential presence of petroleum hydrocarbons in exposed soils. A PID will be used to screen the headspace of discrete sub-samples and provide 'real-

time' guidance for the extent of excavation works on site, as well as the selection of samples for laboratory analysis.

The remediation criteria are provided in Table 6.

Table 6: Summary of Remediation Criteria

Chemical of Potential Concern (COPC)	Source Guideline	Criterion (mg/kg)
Human Health-Based Criteria		
Benzene	NEPM HSL-D – CLAY	4; 6; 9; 20 (0 – 4m+)[1]
	CRC Care Direct Contact HSL (Commercial)	430
Toluene	NEPM HSL-D – CLAY	NL[2] (all depths)
	CRC Care Direct Contact HSL (Commercial)	99,000
Ethylbenzene	NEPM HSL-D – CLAY	NL (all depths)
	CRC Care Direct Contact HSL (Commercial)	27,000
Xylenes (total)	NEPM HSL-D – CLAY	NL (all depths)
	CRC Care Direct Contact HSL (Commercial)	81,000
F1 (TRH C6-C10 minus BTEX)	NEPM HSL-D – CLAY	310; 480; NL; NL (1 – 4 m+)
F2 (TRH C10-C16 minus naphthalene)	NEPM HSL-D – CLAY	NL (all depths)
TRH (C6-C10)	CRC Care Direct Contact HSL (Commercial)	26,000
TRH (C10-C16)	CRC Care Direct Contact HSL (Commercial)	20,000
TRH (C16-C34)	CRC Care Direct Contact HSL (Commercial)	27,000
TRH (C34-C40)	CRC Care Direct Contact HSL (Commercial)	38,000
Naphthalene	NEPM HSL-D – CLAY	NL (all depths)
Lead	NEPM HIL-D	1,500
Benzo(a)pyrene Toxic Equivalency Quotient (TEQ)	NEPM HIL-D	40
Total PAH	NEPM HIL-D	4,000

Chemical of Potential Concern (COPC)	Source Guideline	Criterion (mg/kg)
Ecologically-Based Criteria[3]		
Benzene	NEPM ESL (Commercial) – Clay	95
Toluene	NEPM ESL (Commercial) – Clay	135
Ethylbenzene	NEPM ESL (Commercial) – Clay	185
Xylenes (total)	NEPM ESL (Commercial) – Clay	95
F1 (TRH C6-C10 minus BTEX)	NEPM ESL (Commercial) – Clay	215
F2 (TRH C10-C16 minus naphthalene)	NEPM ESL (Commercial) – Clay	170
TRH C16-C34	NEPM ESL (Commercial) – Clay	2,500
TRH C34-C40	NEPM ESL (Commercial) – Clay	6,600
Benzo(a)pyrene	NEPM ESL (Commercial) – Clay	0.7
Lead	NEPM Added Contaminant Limit (ACL)[2]	1,800

[1]HSLs presented for 0-4 m+ depth range are: 0-<1m; 1-<2 m; 2-<4 m and 4m+, respectively.

[2]NL = non-limiting (actual concentration cannot exceed the theoretical highest risk-based concentration which will cause adverse health effects).

[3]Criteria apply only to the top 2 m of soil (where terrestrial fauna reside, other fauna have access to the soils and/or plant root zones commonly exist).

6.6.2 Excavated and Stockpiled Soil

Soils to be removed from the existing UPSS area have been assigned a preliminary waste classification of General Solid Waste (GSW) for disposal to NSW landfills.

Some more heavily contaminated soils may be encountered within the UST pit or beneath the USTs. These may be segregated and classified separately, such that the classification of soils as a whole is not unnecessarily elevated to Restricted Solid Waste (RSW) or other classification.

The expected volume of soils with COPC concentrations which exceed the remediation criteria and therefore require removal from the site is small. On this basis, disposal to a QLD landfill may not be economical. However, if the soils are disposed to a QLD landfill under Soil Disposal Permit (SDP), they would not be subject to the NSW Waste Classification Guidelines. Rather, they would be disposed of to a licensed landfill where they will either be initially treated and disposed, or otherwise disposed directly to either a lined or unlined landfill cell at an appropriately licensed facility.

6.6.3 Application of the Remediation Criteria

Where comparison of the soil validation sample results indicates that either a maximum COPC concentration in one or more locations exceeds the remediation criteria, or the 95% UCL of the arithmetic mean COPC concentration exceeds the remediation criteria, the results will first be evaluated in the context of the CSM. That is, the potential source-pathway-receptor (SPR) linkage associated with the result(s) will be assessed, with particular reference to whether the SPR linkage is complete.

If the SPR linkage is not considered to be complete, no further action will be taken (the soil represented by the exceedence will be left in situ).

If the SPR linkage is complete, further excavation will occur until such time as the COPC concentrations in soils remaining in situ are less than the remediation criteria.

6.7 Step 7: Optimise the Design for Obtaining Data

The sampling regime has been designed to collect data from soils which are representative of in situ conditions following removal of the UPSS, in consideration of the fact the area will be used for road construction.

The design incorporates guidance presented in AS4482.1 (1999 and 2005), the NEPM and other current industry standards relating to the objectives of the assessment. To optimise the design of the investigation, the sampling and analytical program was devised to specifically target information required to meet the project objectives.

7 Remediation Works Program

7.1 Preamble

This section provides a description of the expected remedial works required to remove the existing UPSS and ensure soils in the UPSS area are suitable for construction of a roadway and roundabout (commercial land use).

The scope of the remedial works is based on the known UPSS composition, reasonably anticipated ground conditions and sampling and other requirements specified in the *NSW EPA Technical Note: Investigation of Service Station Sites* (NSW EPA 2014a).

It is possible that unexpected conditions will be encountered during excavation works. If this is the case, the RAP may be revised to incorporate any changes required to the remedial program. Contingency measures for the remedial works are also presented in Section 10 (Table 12).

7.2 Responsibilities and Contacts

The overall responsibilities and contacts for the remedial works are summarised in Table 7.

Table 7: Responsibilities and Contacts

Responsible Party	Contact	Responsibilities
(Prospective) Property Owner	Inverell Shire Council (ISC)	- Engagement of Remediation Works Contractor (RWC) and Remediation Consultant (RC). - Future construction of roadway/ roundabout.
Remediation Works Contractor (RWC)	To be confirmed	- Ensure that all remediation activities are undertaken in accordance with this RAP and any other management plans required and approved by regulatory bodies for the works (e.g. ISC). - Induct all employees, subcontractors and authorised visitors to the site, with respect to work procedures, the requirements of this RAP and other approved management plans (if any). - Report any environmental issues to the Property Owner. - Maintain site induction, site visitor and complaint registers, as required.
Remediation Consultant (RC)	ENV Solutions Pty Ltd (ENV)	- Ensure that all soil validation, soil disposal and validation reporting activities are carried out in accordance with this RAP.

7.3 Preliminary Works

Preliminary works will be required at the site prior to the remediation program commencing. The preliminary works will include, but may not be limited to, the following:

- Erection of appropriate fencing and other appropriate screening material and associated signage around the UPSS area, to warn of the nature of works being conducted.
- Erection of appropriate sediment barriers (e.g. silt fence or hay bales) around the works areas and around the site perimeter.
- Implementation of appropriate OH&S and administrative protocols, including induction procedures, site inspection requirements, training registers, etc; as required.
- Removal of residual liquids from the component USTs.
- Demolition of the existing canopy and all above ground infrastructure required to safely access the UPSS area.
- Removal of concrete hardstand covering the UPSS area.
- Decommissioning of one existing groundwater monitoring well (MW2), in accordance with the requirements of the document entitled "Minimum Construction Requirements for Water Bores in Australia (Fourth Edition)" (National Uniform Drillers Licensing Committee (NUDLC, 2020). Given their proximity to the existing ULP UST (T1), it is likely that MW1 and MW3 will be destroyed during excavations made for removal of this tank. In this event, the base of the two wells (below excavation base level) should be filled with concrete slurry. If the wells are not destroyed by the excavation works, the entire length of the wells should be filled with concrete slurry.

7.4 UPSS Exhumation and Removal

The removal of all UPSS infrastructure will be conducted in accordance with AS4976-2008: *The removal and disposal of underground petroleum storage tanks*.

Each of the five USTs (T1, T2, T3, T4 and T5) will be uncovered, removed from the ground and disposed off-site. The following works are anticipated:

- The dispensing bowers will be dismantled, removed and disposed appropriately off-site.
- The overburden fill above the USTs and attached pipework will be excavated to expose this infrastructure. Data reported by the DSI (ENV, 2021) suggests that some of these soils may be impacted by hydrocarbons, particularly in the vicinity of BH4 (refer to Figure 4, Appendix A). These soils should be segregated from soils which exhibit no indicators of hydrocarbon contamination. Soils in the vicinity of BH04 will require excavation to an expected depth of 1.0 m bgl (refer to Section 7.7 for further details).
- Pipework attached to the USTs will be removed and hydrocarbon affected soils around the pipework excavated and segregated from clean soils under the

supervision of the RC.

- The USTs will be exhumed and removed from the excavations, degassed and transported off-site for disposal. Degassing may also occur during the preliminary phase of works (Section 7.3). If the USTs are not degassed on site, they will be removed from site by a contractor licensed to transport *Dangerous Goods*.
- Prior to transport off-site, each UST will be inspected by the RC for signs of corrosion and/or holing and the tanks photographed.
- The excavations from which the USTs and pipework are removed will be cleaned and the excavation surfaces made flat. Soil validation samples will then be collected by the RC from the excavation extents. The expected depths of the excavations are as follows (subject to removal of hydrocarbon affected soils):
  - UST excavations: 3 to 3.5 m below ground level (m bgl).
  - Pipework excavations: 1.0 m bgl.
- Imported fill material from a virgin quarry source (e.g. Virgin Excavated Natural Material (VENM)) will be used to fill the UST excavation(s) and bring the excavation(s) to design level. If appropriate certification of the VENM can be provided for the source quarry, chemical testing of the fill will not be required. If such documentation cannot be provided, chemical testing will be conducted prior to placement of the fill, to ensure it meets the remediation criteria.

7.5 Management of Excavated Spoil

Spoil from the excavations will be either temporarily stockpiled on site within a designated and suitably bunded area, or be direct loaded into trucks for off-site disposal to landfill. Stockpiling options may be dictated by the following factors:

- Volume of soil requiring off-site management/disposal.
- Available room for stockpiling on site. Note that this will be directly affected by the progress of demolition and redevelopment of the eastern site portion.

Soils across the UPSS area and overall western site portion have been assigned a preliminary classification for waste disposal in NSW as GSW. Soils classified as GSW may be disposed to the Inverell Shire Council landfill.

Alternatively, soils may be transported to a licensed landfill facility in QLD under Soil Disposal Permit (SDP), issued by the QLD Department of Environment and Science (DES). Transport to QLD may be economical if a large volume of soil requires off-site disposal. This is not anticipated based on the results of the DSI (ENV, 2021). If required, the SDP will require a lead time of up to 3 weeks, to obtain a Letter of Acceptance (LoA) from a QLD landfill and apply for, and receive the SDP from DES. Off-site transport of contaminated soils to QLD cannot commence prior to receiving the SDP.

7.6 Stockpiling of Spoil

If soil is not direct loaded into trucks, a suitable stockpiling area will be established on site. As a minimum, the stockpiling area should include the following characteristics:

- Plastic low density polyethylene (LDPE) liner should be placed onto a level ground surface. All stockpiled soil must be placed on top of the plastic liner. If concrete paved areas in good condition (no cracking) are available, these may be used instead of the plastic liner beneath stockpiled soils. Care should be taken to ensure that joins in plastic lengths are taped and sealed against water ingress/egress.
- Once all soils have been placed in the stockpiling area, bunding should be established around the stockpiled material. Bunding may take the form of hay bales, if the plastic basal liner is extended up and over the bales such that water collecting inside the stockpiling area is prevented from seeping through the hay bales. Alternatively, clean soil or other suitable material may be used and covered with the plastic basal liner.
- Once fully formed, the stockpiled soil should be covered to prevent rainwater ingress and fugitive dust emissions.
- The stockpiles should not exceed 2 m in height.

Once all stockpiled material has been loaded out and disposed off-site, the stockpiling area should be decommissioned by removing the bunding material and reusing it on site (soil) or removing it from site (hay bales); and removing the basal liner and disposing of it appropriately off-site (as general waste).

7.7 Expected Volumes of Contaminated Soil

The extent of hydrocarbon contaminated soil that will be excavated and disposed to landfill is based on the information available to date. Contamination was detected previously by ENV (DSI, 2021) in BH4, which occurs on the southern side of the existing canopy, where leaking suction lines were removed and replaced in about 2013. Minor hydrocarbon concentrations (less than the DSI assessment criteria) were also detected at BH8 and BH9, located close the UST area. Concentrations greater than the assessment criteria adopted for the DSI were not reported in soils collected from around the USTs. However, it is possible that hydrocarbon contamination exists in tank pit fill sands, or in residual soils beneath the USTs themselves. Hydrocarbon impacted soils may also beenath the dispensing bowsers.

The following estimates of soil to be excavated and disposed are considered at the upper end of the expected range:

- Assumed excavation extent required for removal of dispensing bowsers and underlying contaminated soils (if present)**:** 6 x bowsers x (1 m x 1 m x 1 m deep) = **~6 m^3.**
- Assumed excavation extent required for removal of soils around BH4 and pipework in this area: 5 m x 5 m x 1 m deep = **~25 m^3.**
- Assumed excavation extent required for removal of impacts above USTs (overburden soils on top of USTs), noting that these soils have not been

sampled to date: 15 m x 10 m x 0.7 m deep = **~100 m^3.**

In total, an appoximate bank volume of 130 m^3 of contaminated soil may be excavated and require landfill disposal. Allowing for a bulking factor of 1.5 x, approximately **200 m^3** may be disposed off-site to landfill.

All soils which are excavated and may be potentially impacted by hydrocarbons (based on field indicators), must be carefully segregated from clean soils in an effort to reduce the oveall volume of soils requiring transport and disposal off-site.

7.8 Soil Validation Sampling

7.8.1 Validation Methodology

Soil validation samples will be collected by the RC from within the excavations made during removal of the existing UPSS; from stockpiled spoil (if some soils are reclassified following segregation of GSW from potentially more contaminated soils) and from imported backfill materials prior to placement (if they are not from a certified VENM source).

The objective of the validation sampling is to ensure that:

- soil remaining in situ within the western site portion, following the remedial works, meets the adopted remediation criteria, or is otherwise not associated with a complete SPR linkage; and
- any soils that are transported off-site for landfill disposal are classified in accordance with Part 1 of the *NSW EPA Waste Classification Guidelines* (NSW EPA 2014b); or in accordance with QLD legislative requirements.

Table 8 provides a summary of the soil validation sampling, handling, transport and laboratory analysis activities that are anticipated for the remediation program. Changes to these activities may be required where unexpected contamination is encountered. Any changes will be discussed with the RWC and ISC prior to implementation and will conform to current statutory requirements and EPA guidance, as required.

Table 8: Summary of Soil Validation Activities

Activity	Details
Sample Collection	- All *in situ* soil samples will be collected directly from the face of excavation surfaces, or where this is not safe, from material brought to the surface by an excavator bucket. - All stockpiled soils will be sampled with consideration of the representativeness of different material types and total volumes. - A sub-sample of each sample will be screened using a PID to provide an indication of the potential for VOCs to be present in the samples. - A fresh pair of nitrile or other suitable disposable gloves will be worn to collect each sample and minimise the potential for cross-contamination. - Any reusable equipment such as trowels will be decontaminated between sample locations with potable water and Decon-90 or equivalent. - Samples for laboratory analysis will be placed into new glass jars with no headspace and kept chilled and secure in a cool box from sample collection to laboratory dispatch. All jars will be labelled with unique identifying information. Chain of Custody (COC) documentation will be prepared in accordance with NEPM (2013) requirements.
Location and Frequency	- Refer to Section 7.8.2.
Laboratory Analysis	- All primary soil validation samples will be submitted for analysis of TPH/TRH, BTEXN, PAH and heavy metals (8). - Imported fill samples will be submitted for analysis of TPH/TRH, BTEXN, PAH, 17 metals, OCPs, OPPs, phenols, PCBs and cyanide (if VENM documentation is not available). - If assessing off-site disposal options, leachability testing for lead and/or PAH may also be required.
Field QA/QC Sampling	- Field QA/QC samples will be collected and analysed in general accordance with the requirements of NEPM (2013). These will include duplicate and triplicate soil samples; and an equipment rinsate blank (in the event that reusable equipment such as a trowel is required to collect the soil samples).
Laboratory QA/QC Analysis	- The analytical laboratories will be required to conduct a minimum level of QA/QC analysis, in accordance with Schedule B(3) of the NEPM (2013). These analyses will include, but may not be limited to: reagent blanks, spike recoveries, laboratory duplicates, calibration standards and method blanks. The laboratories will perform their own statistical analyses on the QA/QC results, and report whether the results were within acceptable limits. Comments will be provided in the Validation Report (refer Section 12) on the validity of the laboratory results, with reference to the QA/QC data and statistical analyses.

7.8.2 Sampling Location and Frequency

Soil samples will be collected in accordance with the requirements of the NSW EPA (2014a) Technical Note: Investigation of Service Station Sites.

Validation samples will be collected from the locations specified in Table 9.

Additional samples may be collected where visual and/or olfactory indicators suggest contamination may be present and additional soils are excavated.

Soil samples will also be collected from stockpiled soil at the site (if they are reclassified following segregation), at the minimum frequency stipulated by Schedule B2 of the NEPM (NEPC 2013b) for classification purposes. A lower sampling frequency may be adopted for soils to be re-used on-site.

Table 9: Summary of Soil Validation Sampling

Work Area	Sampling Locations	Target Analytes	No of Samples Required	Estimated Number of samples for analysis
Existing UPSS				
Underground storage tanks	Underneath each tank (base of excavation)	TRH, BTEXN, PAH, 8 Metals	Tanks <4m long: 1 x sample Tanks >4 - <10m long: 2 x samples Tanks >10 m long: 3 x samples	Base: T1 and T5 – 2 x primary samples each; T2-T4 – 1 x primary sample each = 7 x primary samples Walls: T1 and T5 – 2 x samples/wall each = 16 x primary samples; T2-T4 – 1 x sample/wall each = 12 x primary samples. TOTAL = 7 x primary BASE samples and 28 x primary wall samples[1].
	Wall adjacent to each tank		Tanks <4m long: 1 x sample/wall Tanks >4 - <10m long: 2 x samples/wall Tanks >10 m long: 3 x samples/wall	
Dispensing bowsers	Area adjacent to line and dispenser junction		1 sample per bowser	6 primary samples
Fuel feed lines to bowsers	Underneath base of pipe		One sample every 5 linear m of pipework	Unknown (~5 - 10 primary samples)
Remote fill points	At fill point		One sample per fill point	One sample per fill point

Work Area	Sampling Locations	Target Analytes	No of Samples Required	Estimated Number of samples for analysis
Additional Excavations				
Vicinity of BH4	Walls and base	TRH, BTEXN, PAH, 8 Metals	1 sample per 5 m of lateral and/or vertical excavation	5 primary samples (provisional – depends on the extent of contamination detected during excavation)

[1]A smaller number of samples may be collected where USTs share common excavation walls, or where one large excavation is completed for several tanks.

8 Indicative Remediation Schedule

An estimated schedule for the remedial works is presented below in Table 10.

Table 10: Estimated Remediation Schedule

Action	Timeframe*
PRELIMINARIES	
On Site Preparation and Setup	1-3 days
Obtain Soil Disposal Permit (SDP) – QLD landfill disposal ONLY (if required)	3 weeks
Removal of Canopy and Concrete in UPSS Area	1 week
Degassing of USTs	1-3 days
UPSS REMOVAL	
Excavation of Soils Above and Around USTs	1-2 days
Removal of Existing USTs T1-T5; Associated Infrastructure (Pipework) and Hydrocarbon Impacted Soils	1-3 days
Excavation of Soils in Vicinity of BH4	0.5 days (concurrent with above activities)
Soil Validation Sampling	Concurrent with above activities
Laboratory Analysis of Soil Validation Samples	1 week
Backfilling of Excavations	1-3 days
Preparation and Submission of Validation Report	2 weeks after receiving all lab results

*Multiple actions may be undertaken concurrently, to shorten the overall timeframe of the works.

9 Site Environmental Management – Remediation Works

All remediation works will be undertaken by the RWC with due regard to the minimisation of adverse environmental effects, and to meet all statutory environmental and safety requirements.

Site environmental management measures which will apply to the remedial works are presented in Table 11.

Table 11: Site Environmental Management Measures

Item	Description/Requirements

Stormwater Management	- Measures will be adopted by the RWC to ensure that potentially contaminated water does not leave the site.
	- As a minimum, the following controls will be considered and implemented by the RWC:
	  - diversion and isolation of any stormwater from all potentially contaminated areas;
	  - provision of sediment traps;
	  - discharge of all water to drains and water bodies must meet the appropriate effluent discharge consent condition under the *Protection of the Environment Operations Act (1997).*

Soil Management	- The RWC will ensure that soils are excavated, transported and placed (backfill) using methodologies that will ensure nuisance dust and odours are not generated, and that no discernible (visible) dust crosses the property boundaries (refer also below – 'Dust' and 'Odour'). - The RWC will ensure that different soil types, where practicable, are not mixed, and that potentially contaminated soils are segregated from those that are considered unlikely by the RC to be contaminated. - During periods of heavy rain, site works will cease to prevent sediment run-off from the works area(s). - Wheel washes, or other methods which effectively remove soil from vehicle wheels, will be used to prevent the tracking of contaminated soil onto adjacent roadways. If soil is tracked onto adjacent roadways, the RWC will be responsible for cleaning the affected roadways as soon as reasonably practicable.

Dust	- The RWC will implement measures to ensure that no nuisance dust is generated during the remedial works. These may include:
	  - the use of a water cart to wet soils; and
	  - the use of sprinklers or spray to wet stockpiled soils (before they can be appropriately covered or transported off-site).
	- Excessively windy days should be avoided, and the scheduling of works should consider the weather forecast.
	- All heavy equipment used for the works will be appropriately serviced and maintained to minimise the generation of excessive diesel exhaust emissions.

Item	Description/Requirements
Odour	- The RWC will implement measures to ensure that no nuisance odour is generated during the remedial works. These may include the use of odour suppressing agents to control strong odours. Any odour suppressing agents used will contain only degradable and otherwise environmentally friendly constituents, and will not affect the contamination status of site soils, or alter the waste classification assigned to the soils by the RC (if required). Note: Based on the results of the DSI (ENV, 2021), excessively odorous soils are not anticipated). - Excessively windy days should be avoided, and the scheduling of works should consider the weather forecast. - All heavy equipment used for the works will be appropriately serviced and maintained to minimise the generation of excessive diesel exhaust emissions.
Noise and Vibration	- Noise and vibration will be restricted to reasonable levels. All plant and equipment used on site will have mufflers fitted (where practicable) to reduce noise generation. - Vibration levels from backfill compaction activities will be monitored by the RWC, and appropriate measures implemented to ensure that adjacent infrastructure, including off-site structures, are not damaged by the activities. This may require the completion of pre- and post-construction dilapidation surveys of nearby structures.

Hours of Operation	- Site works will be limited to the following hours:
	  - Monday to Friday: 7 am to 6 pm
	  - Saturday: 8 am to 1 pm
	  - Sunday: No operation.
	Any work outside of these hours will require prior authorisation from Inverell Shire Council.

Incident Management and Community Relations	- While this RAP includes management measures to reduce the risk of potential human health and environmental impacts from the site activities, it is possible that unforeseen circumstances may occur which lead to a perceived risk by stakeholders such as nearby residents, commercial workers and the general public. To mitigate impacts from such events, the RWC will include in its safety documentation details of responsible persons and the actions to be taken by them in such cases.

10 Contingency Management

During the remediation works, there is the potential for unexpected environmental conditions, or conditions for which management measures have not been provided in this RAP, to be encountered. This section provides a summary of conditions which have been reasonably anticipated based on previous experience with similar works programs, and the known site conditions. Contingency management measures to be adopted during the remediation works are summarised in Table 12.

Table 12: Contingency Management Requirements

Anticipated Issue	Required Action(s)
Chemical/Fuel Leak or Spill from Machinery	- Stop work immediately or as soon as practicable. - Use accessible soil or other appropriate absorbent material to absorb the spill (if practicable), remove the material and place it temporarily on LDPE or similar impervious plastic close to the work area. If free liquid is associated with the material(s), use additional soil or other suitable material to bund the area of stockpiled soil. The RC will conduct observation/testing of the material as soon as possible to define management options.
Excessive Dust	- Use water sprays to suppress the dust, or stop activities which are generating the dust as soon as practicable such that alternative methodologies can be discussed and agreed with the RC and Site Owner. - If the dust problem is caused by excessively windy conditions, consider stopping work and rescheduling works to a calmer day.
Excessive Noise	- Identify the source of noise, isolate the source if possible, and modify the actions of the source or replace it.
Excessive Odours/Vapours	- The RC will monitor the work area with a PID and lower explosive limit (LEL) meter at all times during excavation. If the PID measurement exceeds 50 ppm_v and/or the LEL measurement exceeds 5%, stop work and assess the source of the vapours. Do not re-commence work until the PID measurement is less than 50 ppm_v and the LEL measurement is less than 5%. - If excessive odours are noted, stop work and assess the source of the odours. Change work methods, if practicable, to reduce odours. If the odours persist, consider the use of an odour suppressant which has characteristics consistent with the requirements of Table 10 ('Odour').
Excessive Rainfall	- Excessive rainfall is considered any rainfall event whereby conditions at the site are likely to become unsafe to site workers or the general public, or create an increased risk to the environment not otherwise accounted for in this RAP. - Stop work immediately or as soon as practicable. - Ensure sediment and surface water controls are operating correctly. - If practicable, divert surface water away from open excavations, particularly if contaminated soils are still present within the excavation.

Anticipated Issue	Required Action(s)
Contaminated Groundwater (including LNAPL) is Encountered	- The RC may review groundwater conditions on site by collecting samples of the potentially contaminated water, and/or by sampling the existing groundwater wells.
Failure of Erosion or Sedimentation Control Measures	- Stop work and repair failed control measure.
Unearthing Unexpected Materials, Fill or Waste (including highly contaminated soils, asbestos, etc)	- Stop work. - The RC will inspect the materials and define appropriate management measures. These may require the collection and laboratory analysis of material samples. - The RWC should barricade and cover the materials, if requested by the RC. This would be particularly important for asbestos containing materials (ACM).
Identification of Potential Cultural Heritage Items	- No cultural heritage items are expected in the remediation area, based on available information. - If potential cultural heritage items are encountered, stop work immediately. - The RWC will discuss the find with the Property Owner, who will contact the NSW Office of Environment and Heritage (OEH) for direction. - The RWC will barricade the immediate area of the find to prevent access and/or potential damage.
Complaints	- The RWC will maintain a Complaints Register on site at all times. - The RWC will notify the Property Owner as soon as practicable after a complaint is made. - The Property Owner will discuss with the RC and RWC possible changes to the works program to address the complaint(s). The complainant will be contacted by the Property Owner or the RWC following implementation of the changes, to ensure that the complaint has been adequately addressed.

11 Work Health and Safety Requirements

The NSW Work Health and Safety Act (2011) and associated Regulation (2017) require the preparation of documentation that addresses project-specific risks when undertaking construction related work.

In accordance with these requirements, the RWC will have available on site a Work Health and Safety Manual, or similar documentation, which:

- contains a description of commonly completed activities (remedial works);
- identifies potential risks associated with the activities; and
- presents appropriate risk mitigation measures and responsibilities for these risks.

Project-specific Safe Work Method Statements (SWMS) for the works will also be prepared by both the RC and RWC, prior to the remedial program commencing. Copies of these documents will be available on site at all times during the remedial works program.

12 Reporting

Following completion of the proposed remediation program in its entirety, including laboratory analysis, the RC will prepare a Validation Report which presents the following information:

- Details of the methodology used for all elements of the remedial program, including removal of the UPSS and management of the excavated soils.
- Details of all validation sampling conducted by the RC.
- The results of all laboratory analyses, with comment on their reliability in consideration of the QA/QC data.
- Conclusions regarding the suitability of the western site portion for future construction of the roadway and roundabout.

The report will be prepared to meet the requirements of the NSW EPA (2020) Consultants Reporting on Contaminated Land (Contaminated Land Guidelines).

In accordance with the requirements of State Planning Policy No. 55 ('SEPP 55'), a copy of the Validation Report will be provided to ISC for its records no later than 60 days after completion of the remedial program.

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14 Glossary

Below is a list of commonly used abbreviations in the report:

COC – Chain of Custody

EILs – Ecological Investigation Levels

ESLs – Ecological Screening Levels

ENV – ENV Solutions PTY LTD

HILs – Health Investigation Levels

HSLs – Health Screening Levels

ISC – Inverell Shire Council

NEPC – National Environment Protection Council

NEPM – National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013)

NSW EPA – New South Wales Environment Protection Authority

OEH – NSW Office of Environment and Heritage

PID – Photo Ionisation Detector

ppm_v – Parts Per Million (by volume)

QA/QC – Quality Assurance and Quality Control

RC – Remediation Consultant

RWC – Remediation Works Contractor

UPSS – Underground Petroleum Storage System

UST – Underground Storage Tank

15 Document Control:

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		Name	Signed
0	06/05/21	Craig Helbig	

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16 Appendices

Appendix A	Figures
Appendix B	Tabulated Analytical Results (ENV, 2018 and 2021)

APPENDIX A

Figures

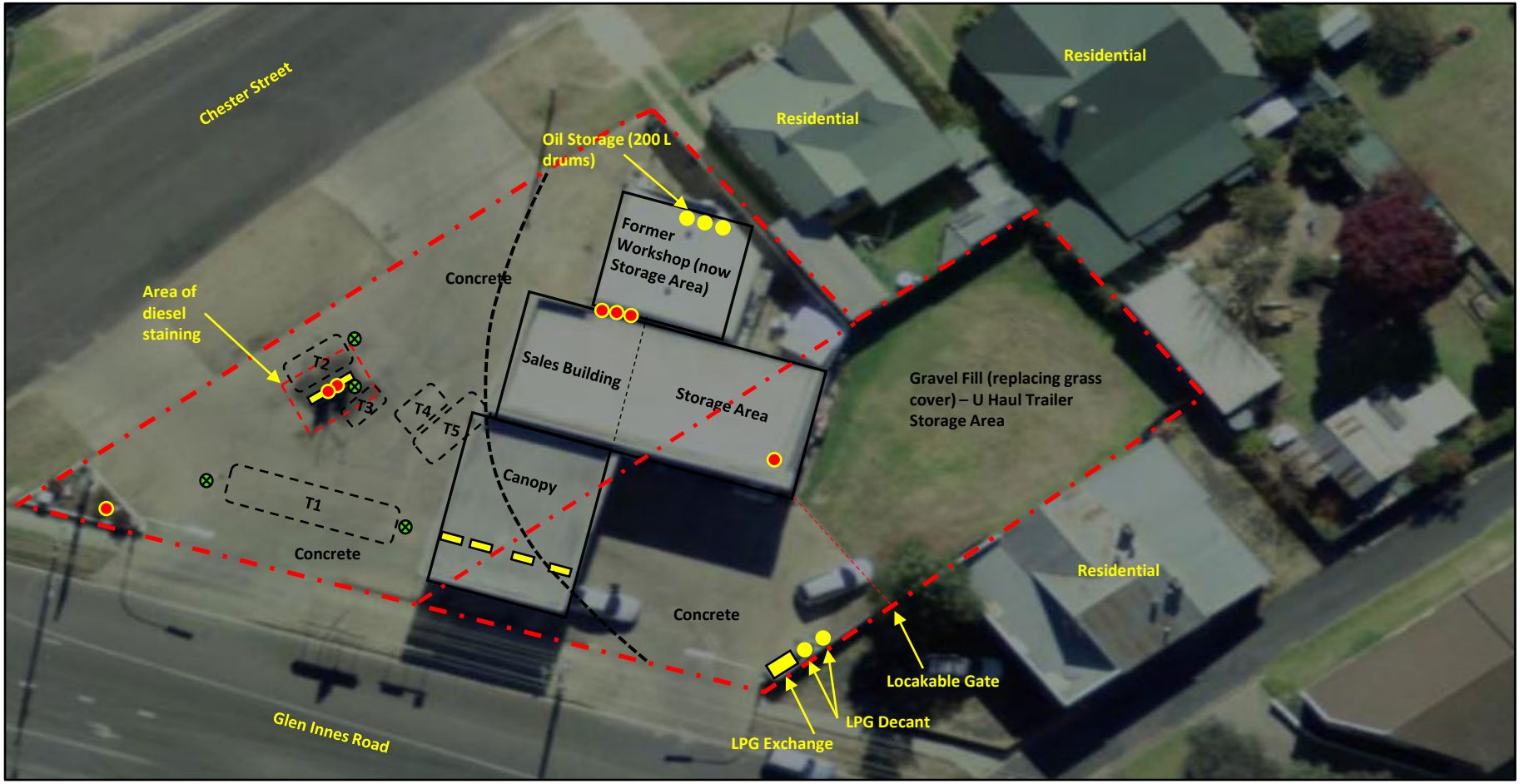
Site Area (approximate)

0 50 100 m

Image source: Six Maps (2009)

Figure 1 - Site Location
24-26 Glen Innes Road, Inverell, NSW 2360

Client: Inverell Shire Council
Project: Remediation Action Plan (RAP)
Job No: 21144



Site Boundary (approximate)

Dispensing Bowser

T3 Underground Storage Tank (UST):

T1 = unleaded (58 kL); T2 = diesel (20 kL); T3 = diesel (4kL); T4 = premium 98 (9.6 kL); T5 = premium 95 (26 kL)

Vent Pipe

Assumed Tank Pit Observation Well

Approximate Extent of Subdivision

0 5 10 m

Image source: Six Maps (2009)

ENV Solutions

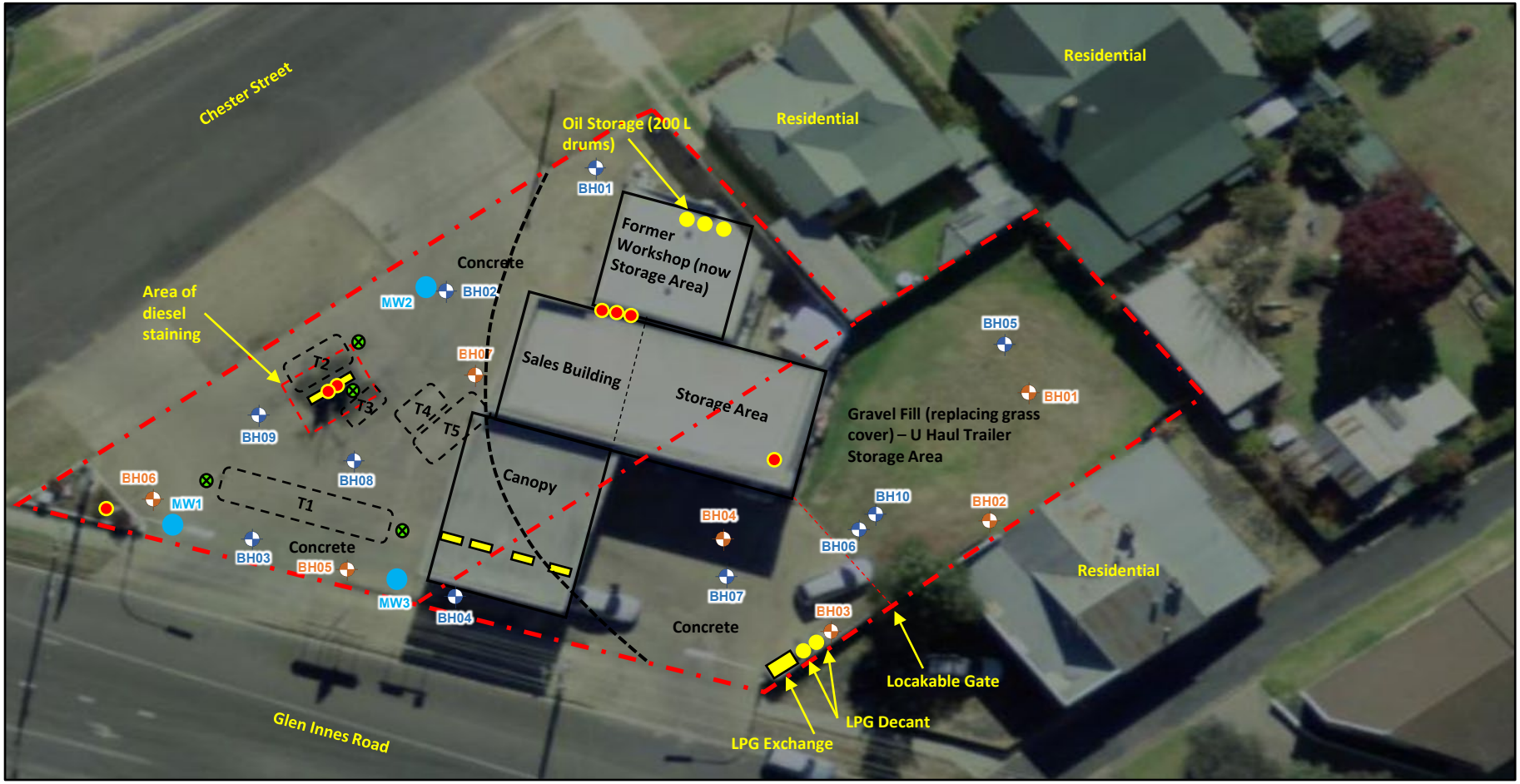
Figure 2 - Site Layout

24-26 Glen Innes Road, Inverell, NSW 2360

Client: Inverell Shire Council

Project: Remediation Action Plan (RAP)

Job No: 21144



Site Boundary (approximate)

Dispensing Bowser

T3 Underground Storage Tank (UST):

T1 = unleaded (58 kL); T2 = diesel (20 kL); T3 = diesel (4kL); T4 = premium 98 (9.6 kL); T5 = premium 95 (26 kL)

Vent Pipe

Borehole Location (ENV, 2018)

Borehole Location (ENV, 2021)

Assumed Tank Pit Observation Well

Groundwater Monitoring Well

Approximate Extent of Subdivision

0 5 10 m

Image source: Six Maps (2009)

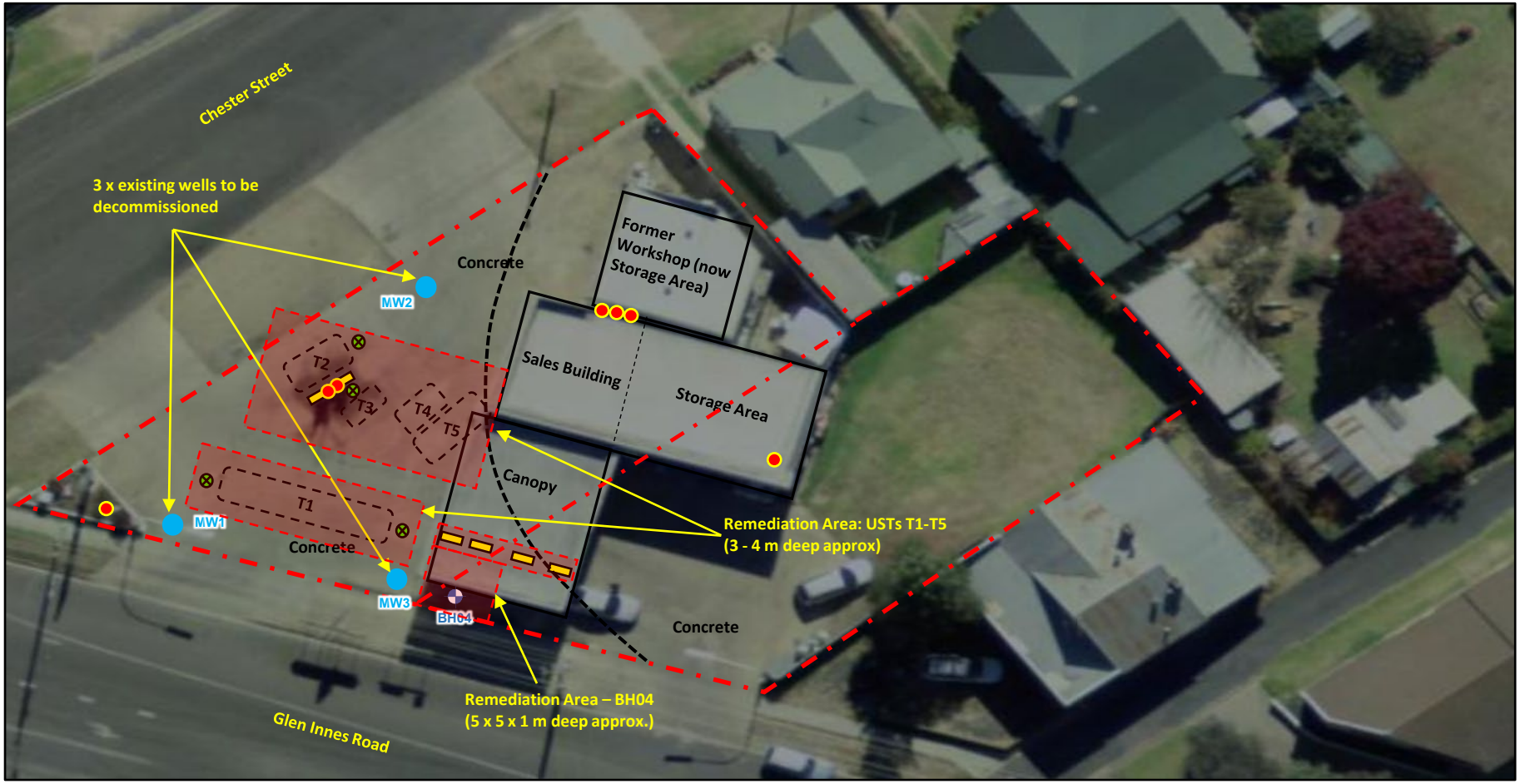
Figure 3 - Site Layout with All Sampling Locations

24-26 Glen Innes Road, Inverell, NSW 2360

Client: Inverell Shire Council

Project: Remediation Action Plan (RAP)

Job No: 21144



Site Boundary (approximate)

Dispensing Bowser

T3 Underground Storage Tank (UST):

T1 = unleaded (58 kL); T2 = diesel (20 kL); T3 = diesel (4kL); T4 = premium 98 (9.6 kL); T5 = premium 95 (26 kL)

Vent Pipe

Borehole Location (ENV, 2021)

Proposed Remediation Area (approximate)

Assumed Tank Pit Observation Well

Groundwater Monitoring Well

Approximate Extent of Subdivision

0 5 10 m

Image source: Six Maps (2009)

ENV Solutions

Figure 4 – Proposed Remediation Areas
24-26 Glen Innes Road, Inverell, NSW 2360

Client: Inverell Shire Council
Project: Remediation Action Plan (RAP)
Job No: 21144

APPENDIX B

Tabulated Analytical Results (ENV, 2018 and 2021)

18190 - Inverell Due Diligence

TABAULATED SOIL RESULTS

	Benzene, Toluene, Ethylbenzene and Xylenes (BTEX)						Lead	Metals						
	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	Lead	Arsenic	Cadmium	Chromium (III+VI)	Copper	Mercury	Nickel	Zinc
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.2	0.5	1	2	1	1	1	4	0.4	1	1	0.1	1	1
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Clay														
0-1m	4													
1-2m	6													
2-4m	9													
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand														
0-1m	3					230								
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind								160						
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil														
0-2m	75	135	165			180								
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Fine Soil														
0-2m	95	135	185			95								
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil							1,500	3,000	900		240,000	730	6,000	400,000
Lab Report Number	**Field ID**	**Matrix Type**	**Date**												
196369	**BH01**	**soil**	**11/07/2018**	<0.2	<0.5	<1	<2	<1	<1	**9**	<4	<0.4	**55**	**20**	<0.1	**40**	**17**
196369	**BH02**	**soil**	**11/07/2018**	<0.2	<0.5	<1	<2	<1	<1	**5**	<4	<0.4	**32**	**15**	<0.1	**39**	**15**
196369	**BH03**	**soil**	**11/07/2018**	<0.2	<0.5	<1	<2	<1	<1	**20**	**4**	<0.4	**34**	**22**	<0.1	**23**	**32**
196369	**BH04**	**soil**	**12/07/2018**	<0.2	<0.5	<1	<2	<1	<1	**6**	<4	<0.4	**47**	**16**	<0.1	**43**	**22**
196369	**BH05**	**soil**	**12/07/2018**	<0.2	<0.5	<1	<2	<1	<1	**11**	<4	<0.4	**46**	**21**	<0.1	**51**	**16**
196369	**BH06**	**soil**	**12/07/2018**	<0.2	<0.5	<1	<2	<1	<1	**7**	<4	<0.4	**45**	**18**	<0.1	**26**	**18**
196369	**BH07**	**soil**	**11/07/2018**	<0.2	<0.5	<1	<2	<1	<1	**6**	<4	<0.4	**41**	**15**	<0.1	**56**	**17**
Statistics															
95% UCL (Student's-t) *	**0.1**	**0.25**	**0.5**	**1**	**0.5**	**0.5**	**12.97**	**2.841**	**0.2**	**48.69**	**20.28**	**0.05**	**48.57**	**23.91**

* A Non Detect Multiplier of 0.5 has been applied.

TABAULATED SOIL RESULTS

	Polycyclic Aromatic Hydrocarbons (PAH)													
	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(g,h,i)perylene	Benzo(b+j+k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.1	0.1	0.1	0.1	0.05	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Clay														
0-1m														
1-2m														
2-4m														
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand														
0-1m														
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind													370	
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil														
0-2m					0.7									
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Fine Soil														
0-2m					0.7									
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil														
Lab Report Number / Field ID / Matrix Type / Date														
196369 / BH01 / soil / 11/07/2018	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
196369 / BH02 / soil / 11/07/2018	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
196369 / BH03 / soil / 11/07/2018	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
196369 / BH04 / soil / 12/07/2018	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
196369 / BH05 / soil / 12/07/2018	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
196369 / BH06 / soil / 12/07/2018	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
196369 / BH07 / soil / 11/07/2018	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Statistics														
95% UCL (Student's-t) *	**0.05**	**0.05**	**0.05**	**0.05**	**0.025**	**0.05**	**0.10**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**

* A Non Detect Multiplier of 0.5 has been applied.

18190 - Inverell Due Diligence

TABAULATED SOIL RESULTS

	PAH		Total Petroleum Hydrocarbons (TPH) / Total Recoverable Hydrocarbons (TRH)											Inorganics
	Pyrene	PAHs (Sum of positives)	C6-C9	C10-C14	C15-C28	C29-C36	C6-C10	C10-C16	C16-C34	C10-C40 (Sum of total)	C34-C40	F1 (C6-C9 minus BTEX)	F2 (>C10-C16 minus Naphthalene)	Moisture
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%
EQL	0.1	0.05	25	50	100	100	25	50	100	50	100	25	50	0.1
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Clay														
0-1m												310		
1-2m												480		
2-4m														
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand													0	
0-1m												260		
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind														
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil														
0-2m									1,700		3,300	215	170	
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Fine Soil														
0-2m									2,500		6,600	215	170	
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil														

Lab Report Number	Field ID	Matrix Type	Date												
196369	**BH01**	**soil**	**11/07/2018**	<0.1	<0.05	<25	<50	<100	<100	<25	<50	<100	<50	<100	<25	<50	**26**
196369	**BH02**	**soil**	**11/07/2018**	<0.1	<0.05	<25	<50	<100	<100	<25	<50	<100	<50	<100	<25	<50	**27**
196369	**BH03**	**soil**	**11/07/2018**	<0.1	<0.05	<25	<50	<100	<100	<25	<50	<100	<50	<100	<25	<50	**18**
196369	**BH04**	**soil**	**12/07/2018**	<0.1	<0.05	<25	<50	<100	<100	<25	<50	<100	<50	<100	<25	<50	**14**
196369	**BH05**	**soil**	**12/07/2018**	<0.1	<0.05	<25	<50	**470**	<100	<25	<50	**550**	**550**	<100	<25	<50	**22**
196369	**BH06**	**soil**	**12/07/2018**	<0.1	<0.05	<25	<50	<100	<100	<25	<50	<100	<50	<100	<25	<50	**22**
196369	**BH07**	**soil**	**11/07/2018**	<0.1	<0.05	<25	<50	<100	<100	<25	<50	<100	<50	<100	<25	<50	**21**

Statistics

95% UCL (Student's-t) *	**0.05**	**0.025**	**12.5**	**25**	**226.6**	**50**	**12.5**	**25**	**260.2**	**245.7**	**50**	**12.5**	**25**	**24.71**

* A Non Detect Multiplier of 0.5 has been applied.

TABULATED SOIL AND GROUNDWATER ANALYTICAL RESULTS

				Metals														
				Arsenic	Arsenic (filtered)	Cadmium	Cadmium (filtered)	Chromium (III+VI)	Chromium (III+VI) (filtered)	Copper	Copper (filtered)	Lead	Lead (filtered)	Mercury	Mercury (filtered)	Nickel	Nickel (filtered)	Zinc	Zinc (filtered)
				mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L	mg/kg	mg/L
EQL				4	0.001	0.4	0.0001	1	0.001	1	0.001	1	0.001	0.1	0.00005	1	0.001	1	0.001
ADWG 2018 Health					0.01		0.002				2		0.01		0.001		0.02		
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs							0.0002				0.0014		0.0034		0.0006		0.011		0.008
ANZECC 2000 FW 95%							0.0002				0.0014		0.0034		0.0006		0.011		0.008
ANZECC 2000 Recreational water quality and aesthetics					0.05		0.005		0.05		1		0.05		0.001		0.1		5
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Clay																			
0-1m																			
1-2m																			
2-4m																			
>=4m																			
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind				160								1,500#							
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Fine Soil																			
0-2m																			
NEPM 2013 Table 1C GILs, Drinking Water					0.01		0.002				2		0.01		0.001		0.02		
NEPM 2013 Table 1C GILs, Fresh Waters							0.0002				0.0014		0.0034		0.00006		0.011		0.008
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil				3,000		900				240,000		1,500		730		6,000		400,000	
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Clay																			
2-4m																			
4-8m																			
>=8m																			
Lab Report Number	**Field ID**	**Date**	**Depth (m)**																
265908	**BH1**	**29/03/2021**	**0.1 - 0.3**	<4		<0.4		**34**		**11**		**6**		<0.1		**11**		**9**	
265908	**BH1**	**29/03/2021**	**0.6 - 0.8**																
265908	**BH1**	**29/03/2021**	**1.3 - 1.5**	<4		<0.4		**47**		**18**		**8**		<0.1		**44**		**15**	
265908	**BH2**	**29/03/2021**	**0.2 - 0.4**	<4		<0.4		**37**		**14**		**16**		<0.1		**18**		**19**	
265908	**BH2**	**30/03/2021**	**2.8 - 3**	<4		<0.4		**42**		**15**		**6**		<0.1		**41**		**17**	
265908	**BH3**	**29/03/2021**	**0.2 - 0.4**	<4		<0.4		**53**		**18**		**16**		<0.1		**15**		**20**	
265908	**BH3**	**30/03/2021**	**3.6 - 3.8**	<4		<0.4		**70**		**93**		**5**		<0.1		**43**		**75**	
265908	**BH4**	**29/03/2021**	**0.2 - 0.4**	<4		<0.4		**57**		**21**		**79**		<0.1		**52**		**32**	
265908	**BH4**	**30/03/2021**	**1.4 - 1.6**	<4		<0.4		**43**		**16**		**5**		<0.1		**44**		**18**	
265908	**BH4**	**30/03/2021**	**2.8-3.0**	<4		<0.4		**83**		**16**		**6**		<0.1		**42**		**18**	
265908	**BH5**	**29/03/2021**	**0 - 0.2**	<4		<0.4		**34**		**15**		**16**		<0.1		**26**		**58**	
265908	**BH6**	**29/03/2021**	**0.5 - 0.7**	**5**		<0.4		**32**		**160**		**48**		<0.1		**36**		**650**	
265908	**BH7**	**30/03/2021**	**0.2 - 0.4**	<4		<0.4		**59**		**22**		**19**		<0.1		**65**		**28**	
265908	**BH7**	**30/03/2021**	**1.8 - 2**	<4		<0.4		**34**		**14**		**5**		<0.1		**38**		**12**	
265908	**BH8**	**30/03/2021**	**0.2 - 0.4**	<4		<0.4		**49**		**18**		**13**		<0.1		**30**		**19**	
265908	**BH8**	**30/03/2021**	**3.6 - 3.8**	**4**		<0.4		**120**		**360**		**6**		<0.1		**120**		**240**	
265908	**BH9**	**30/03/2021**	**0.2 - 0.4**	<4		<0.4		**48**		**16**		**10**		<0.1		**11**		**14**	
265908	**BH9**	**30/03/2021**	**0.4 - 0.8**	<4		<0.4		**54**		**22**		**9**		<0.1		**39**		**16**	
265908	**BH9**	**30/03/2021**	**3.6 - 3.8**	**4**		<0.4		**61**		**20**		**6**		<0.1		**45**		**23**	
265908	**BH10**	**30/03/2021**	**0.8 - 1**	<4		<0.4		**41**		**18**		**11**		<0.1		**45**		**12**	
265908	**BH10**	**30/03/2021**	**1.8 - 2**	**5**		<0.4		**30**		**15**		**79**		<0.1		**28**		**84**	
265908	**MW1**	**31/03/2021**	-		<0.001		<0.0001		<0.001		**0.003**		<0.001		<0.00005		**0.005**		**0.007**
265908	**MW2**	**31/03/2021**	-		<0.001		<0.0001		<0.001		**0.001**		<0.001		<0.00005		<0.001		**0.003**
265908	**MW3**	**31/03/2021**	-																
265908	**QA1**	**29/03/2021**	-	<4		<0.4		**50**		**19**		**66**		<0.1		**41**		**35**	
265908	**QA1**	**31/03/2021**	-		<0.001		<0.0001		<0.001		**0.003**		<0.001		<0.00005		**0.006**		**0.008**
265908	**QA2A**	**30/03/2021**	-	<4		<0.4		**48**		**18**		**6**		<0.1		**39**		**20**	

Notes and Abbreviations:

ADWG - Australian Drinking Water Guidelines (2018).
ANZECC - Australian and New Zealand Environment Conservation Council (2000): Guidelines for Fresh and Marine Water Quality.
ANZG - Australian and New Zealand Governments (2018): Guidelines for Fresh and Marine Water Quality
NEPM - National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013).
HSL - Health Screening Level; HIL - Health Investigation Level; GIL - Groundwater Investigation Level; EIL - Ecological Investigation Level; ESL - Ecological Screening Level
mg/kg- milligrams per kilogram; mg/L - milligrams per litre; µg/L - micrograms per litre
#EIL presented is the added contaminant limit (ACL) for lead.

TABULATED SOIL AND GROUNDWATER ANALYTICAL RESULTS

				Benzene, Toluene, Ethylbenzene and Xylenes (BTEX)										Total Petroleum Hydrocarbons (TPH)			
				Benzene		Toluene		Ethylbenzene		Xylene (m & p)		Xylene (o)		Xylene Total		C6-C9		C10-C14	
				mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg		mg/kg	µg/L	mg/kg	µg/L
EQL				0.2	1	0.5	1	1	1	2	2	1	1	3		25	10	50	50
ADWG 2018 Health					1		800		300										
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs					950		180		80				350						
ANZECC 2000 FW 95%					950								350						
ANZECC 2000 Recreational water quality and aesthetics					10														
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Clay				4 | 6 | 9 | 20															
0-1m				4															
1-2m				6															
2-4m				9															
>=4m				20															
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind																			
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Fine Soil				95		135		185						95					
0-2m				95		135		185						95					
NEPM 2013 Table 1C GILs, Drinking Water					1		800		300										
NEPM 2013 Table 1C GILs, Fresh Waters					950								350						
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil																			
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Clay					30,000 | 30,000 | 35,000														
2-4m					30,000														
4-8m					30,000														
>=8m					35,000														
Lab Report Number	**Field ID**	**Date**	**Depth (m)**																
265908	**BH1**	**29/03/2021**	**0.1 - 0.3**	<0.2		<0.5		<1		<2		<1		<3		<25		<50	
265908	**BH1**	**29/03/2021**	**0.6 - 0.8**																
265908	**BH1**	**29/03/2021**	**1.3 - 1.5**	<0.2		<0.5		<1		<2		<1		<3		<25		<50	
265908	**BH2**	**29/03/2021**	**0.2 - 0.4**	<0.2		<0.5		<1		<2		<1		<3		<25		<50	
265908	**BH2**	**30/03/2021**	**2.8 - 3**	<0.2		<0.5		<1		<2		<1		<3		<25		<50	
265908	**BH3**	**29/03/2021**	**0.2 - 0.4**	<0.2		<0.5		<1		<2		<1		<3		<25		<50	
265908	**BH3**	**30/03/2021**	**3.6 - 3.8**	<0.2		<0.5		<1		<2		<1		<3		<25		<50	
265908	**BH4**	**29/03/2021**	**0.2 - 0.4**	**0.3**		<0.5		**11**		<2		<1		<3		**270**		**110**	
265908	**BH4**	**30/03/2021**	**1.4 - 1.6**	<0.2		<0.5		**2**		<2		<1		<3		**100**		**77**	
265908	**BH4**	**30/03/2021**	**2.8-3.0**	<0.2		<0.5		<1		<2		<1		<3		**25**		<50	
265908	**BH5**	**29/03/2021**	**0 - 0.2**	<0.2		<0.5		<1		<2		<1		<3		<25		<50	
265908	**BH6**	**29/03/2021**	**0.5 - 0.7**	<0.2		<0.5		<1		<2		<1		<3		**59**		**1,100**	
265908	**BH7**	**30/03/2021**	**0.2 - 0.4**	<0.2		<0.5		<1		<2		<1		<3		<25		<50	
265908	**BH7**	**30/03/2021**	**1.8 - 2**	<0.2		<0.5		<1		<2		<1		<3		<25		<50	
265908	**BH8**	**30/03/2021**	**0.2 - 0.4**	<0.2		<0.5		<1		<2		<1		<3		<25		<50	
265908	**BH8**	**30/03/2021**	**3.6 - 3.8**	<0.2		<0.5		<1		<2		<1		<3		<25		**90**	
265908	**BH9**	**30/03/2021**	**0.2 - 0.4**	<0.2		<0.5		<1		<2		<1		<3		<25		**130**	
265908	**BH9**	**30/03/2021**	**0.4 - 0.8**	<0.2		<0.5		<1		<2		<1		<3		<25		**160**	
265908	**BH9**	**30/03/2021**	**3.6 - 3.8**	<0.2		<0.5		<1		<2		<1		<3		<25		**55**	
265908	**BH10**	**30/03/2021**	**0.8 - 1**	<0.2		<0.5		<1		<2		<1		<3		<25		<50	
265908	**BH10**	**30/03/2021**	**1.8 - 2**	<0.2		<0.5		<1		<2		<1		<3		<25		<50	
265908	**MW1**	**31/03/2021**	**-**		<1		<1		<1		<2		<1				<10		<50
265908	**MW2**	**31/03/2021**	**-**		<1		<1		<1		<2		<1				<10		<50
265908	**MW3**	**31/03/2021**	**-**		**4,500**		**12**		**1,500**		**830**		**77**				**15,000**		
265908	**QA1**	**29/03/2021**	**-**	**0.2**		<0.5		**9**		<2		<1		<3		**180**		**68**	
265908	**QA1**	**31/03/2021**	**-**		<1		<1		<1		<2		<1				<10		<50
265908	**QA2A**	**30/03/2021**	**-**	<0.2		<0.5		<1		<2		<1		<3		<25		**52**	

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mg/kg- milligrams per kilogram; mg/L - milligrams per litre; µg/L - micrograms per litre
#EIL presented is the added contaminant limit (ACL) for lead.

TABULATED SOIL AND GROUNDWATER ANALYTICAL RESULTS

				Total Petroleum Hydrocarbons (TPH) / Total Recoverable Hydrocarbons (TRH)																Polycyclic Aromatic Hydrocarbons (PAH)					
				C15-C28		C29-C36		C6-C10		C10-C16		C16-C34		C10-C40 (Sum of total)	C34-C40		F1 (C6-C9 minus BTEX)		F2 (>C10-C16 minus Naphthalene)		Benzo(b+j+k)-fluoranthene		Acenaphthene		Acenaphthylene	
				mg/kg	µg/L	mg/kg	µg/L	mg/kg	mg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	mg/L	mg/kg	µg/L	mg/kg	µg/L
EQL				100	100	100	100	25	0.01	50	0.05	100	0.1	50	100	0.1	25	0.01	50	0.05	0.2	0.002	0.1	1	0.1	1
ADWG 2018 Health																										
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs																										
ANZECC 2000 FW 95%																										
ANZECC 2000 Recreational water quality and aesthetics																										
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Clay																	310 | 480									
0-1m																	310									
1-2m																	480									
2-4m																										
>=4m																										
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind																										
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Fine Soil										170		2,500			6,600		215		170							
0-2m										170		2,500			6,600		215		170							
NEPM 2013 Table 1C GILs, Drinking Water																										
NEPM 2013 Table 1C GILs, Fresh Waters																										
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil																										
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Clay																										
2-4m																										
4-8m																										
>=8m																										
Lab Report Number	**Field ID**	**Date**	**Depth (m)**																							
265908	**BH1**	**29/03/2021**	**0.1 - 0.3**	<100		<100		<25		<50		<100		<50	<100		<25		<50		<0.2		<0.1		<0.1	
265908	**BH1**	**29/03/2021**	**0.6 - 0.8**																							
265908	**BH1**	**29/03/2021**	**1.3 - 1.5**	<100		<100		<25		<50		<100		<50	<100		<25		<50		<0.2		<0.1		<0.1	
265908	**BH2**	**29/03/2021**	**0.2 - 0.4**	<100		<100		<25		<50		<100		<50	<100		<25		<50		<0.2		<0.1		<0.1	
265908	**BH2**	**30/03/2021**	**2.8 - 3**	<100		<100		<25		<50		<100		<50	<100		<25		<50		<0.2		<0.1		<0.1	
265908	**BH3**	**29/03/2021**	**0.2 - 0.4**	<100		<100		<25		<50		<100		<50	<100		<25		<50		<0.2		<0.1		<0.1	
265908	**BH3**	**30/03/2021**	**3.6 - 3.8**	<100		<100		<25		<50		<100		<50	<100		<25		<50		<0.2		<0.1		<0.1	
265908	**BH4**	**29/03/2021**	**0.2 - 0.4**	<100		<100		**330**		**72**		<100		**70**	<100		**320**		**68**		<0.2		<0.1		<0.1	
265908	**BH4**	**30/03/2021**	**1.4 - 1.6**	<100		<100		**140**		<50		<100		<50	<100		**140**		<50		<0.2		<0.1		<0.1	
265908	**BH4**	**30/03/2021**	**2.8-3.0**	<100		<100		**39**		<50		<100		<50	<100		**39**		<50		<0.2		<0.1		<0.1	
265908	**BH5**	**29/03/2021**	**0 - 0.2**	<100		<100		<25		<50		<100		<50	<100		<25		<50		<0.2		<0.1		<0.1	
265908	**BH6**	**29/03/2021**	**0.5 - 0.7**	<100		<100		**280**		**950**		<100		**950**	<100		**280**		**950**		<0.2		<0.1		<0.1	
265908	**BH7**	**30/03/2021**	**0.2 - 0.4**	<100		<100		<25		<50		<100		<50	<100		<25		<50		<0.2		<0.1		<0.1	
265908	**BH7**	**30/03/2021**	**1.8 - 2**	<100		<100		<25		<50		<100		<50	<100		<25		<50		<0.2		<0.1		<0.1	
265908	**BH8**	**30/03/2021**	**0.2 - 0.4**	<100		<100		<25		<50		<100		<50	<100		<25		<50		<0.2		<0.1		<0.1	
265908	**BH8**	**30/03/2021**	**3.6 - 3.8**	**180**		<100		<25		**150**		**110**		**260**	<100		<25		**150**		<0.2		<0.1		<0.1	
265908	**BH9**	**30/03/2021**	**0.2 - 0.4**	<100		<100		<25		**140**		<100		**140**	<100		<25		**140**		<0.2		<0.1		<0.1	
265908	**BH9**	**30/03/2021**	**0.4 - 0.8**	<100		<100		**87**		**170**		<100		**170**	<100		**87**		**170**		<0.2		<0.1		<0.1	
265908	**BH9**	**30/03/2021**	**3.6 - 3.8**	<100		<100		<25		<50		<100		<50	<100		<25		<50		<0.2		<0.1		<0.1	
265908	**BH10**	**30/03/2021**	**0.8 - 1**	<100		<100		<25		<50		<100		<50	<100		<25		<50		<0.2		<0.1		<0.1	
265908	**BH10**	**30/03/2021**	**1.8 - 2**	<100		<100		<25		<50		<100		<50	<100		<25		<50		<0.2		<0.1		<0.1	
265908	**MW1**	**31/03/2021**	-		<100		<100		<0.01		<0.05		<0.1			<0.1		<0.01		<0.05		<0.002		<1		<1
265908	**MW2**	**31/03/2021**	-		<100		<100		<0.01		<0.05		<0.1			<0.1		<0.01		<0.05		<0.002		<1		<1
265908	**MW3**	**31/03/2021**	-						**15**									**8.1**								
265908	**QA1**	**29/03/2021**	-	<100		<100		**220**		<50		<100		<50	<100		**210**		<50		<0.2		<0.1		<0.1	
265908	**QA1**	**31/03/2021**	-		<100		<100		<0.01		<0.05		<0.1			<0.1		<0.01		<0.05		<0.002		<1		<1
265908	**QA2A**	**30/03/2021**	-	<100		<100		<25		<50		<100		<50	<100		<25		<50		<0.2		<0.1		<0.1	

Notes and Abbreviations:

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mg/kg- milligrams per kilogram; mg/L - milligrams per litre; µg/L - micrograms per litre
#EIL presented is the added contaminant limit (ACL) for lead.

TABULATED SOIL AND GROUNDWATER ANALYTICAL RESULTS

				Polycyclic Aromatic Hydrocarbons (PAH)									
				Anthracene		Benz(a)anthracene		Benzo(a) pyrene		Benzo(g,h,i)perylene		Chrysene	
				mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L
EQL				0.1	1	0.1	1	0.05	1	0.1	1	0.1	1
ADWG 2018 Health									0.01				
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs					0.4				0.2				
ANZECC 2000 FW 95%													
ANZECC 2000 Recreational water quality and aesthetics									0.01				
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Clay													
0-1m													
1-2m													
2-4m													
>=4m													
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind													
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Fine Soil								1.4					
0-2m								1.4					
NEPM 2013 Table 1C GILs, Drinking Water									0.01				
NEPM 2013 Table 1C GILs, Fresh Waters													
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil													
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Clay													
2-4m													
4-8m													
>=8m													
Lab Report Number	**Field ID**	**Date**	**Depth (m)**										
265908	**BH1**	**29/03/2021**	**0.1 - 0.3**	<0.1		<0.1		<0.05		<0.1		<0.1	
265908	**BH1**	**29/03/2021**	**0.6 - 0.8**										
265908	**BH1**	**29/03/2021**	**1.3 - 1.5**	<0.1		<0.1		<0.05		<0.1		<0.1	
265908	**BH2**	**29/03/2021**	**0.2 - 0.4**	<0.1		<0.1		<0.05		<0.1		<0.1	
265908	**BH2**	**30/03/2021**	**2.8 - 3**	<0.1		<0.1		<0.05		<0.1		<0.1	
265908	**BH3**	**29/03/2021**	**0.2 - 0.4**	<0.1		<0.1		<0.05		<0.1		<0.1	
265908	**BH3**	**30/03/2021**	**3.6 - 3.8**	<0.1		<0.1		<0.05		<0.1		<0.1	
265908	**BH4**	**29/03/2021**	**0.2 - 0.4**	<0.1		<0.1		<0.05		<0.1		<0.1	
265908	**BH4**	**30/03/2021**	**1.4 - 1.6**	<0.1		<0.1		<0.05		<0.1		<0.1	
265908	**BH4**	**30/03/2021**	**2.8-3.0**	<0.1		<0.1		<0.05		<0.1		<0.1	
265908	**BH5**	**29/03/2021**	**0 - 0.2**	<0.1		<0.1		<0.05		<0.1		<0.1	
265908	**BH6**	**29/03/2021**	**0.5 - 0.7**	<0.1		<0.1		<0.05		<0.1		<0.1	
265908	**BH7**	**30/03/2021**	**0.2 - 0.4**	<0.1		<0.1		<0.05		<0.1		<0.1	
265908	**BH7**	**30/03/2021**	**1.8 - 2**	<0.1		<0.1		<0.05		<0.1		<0.1	
265908	**BH8**	**30/03/2021**	**0.2 - 0.4**	<0.1		<0.1		<0.05		<0.1		<0.1	
265908	**BH8**	**30/03/2021**	**3.6 - 3.8**	<0.1		<0.1		<0.05		<0.1		<0.1	
265908	**BH9**	**30/03/2021**	**0.2 - 0.4**	<0.1		<0.1		<0.05		<0.1		<0.1	
265908	**BH9**	**30/03/2021**	**0.4 - 0.8**	<0.1		<0.1		<0.05		<0.1		<0.1	
265908	**BH9**	**30/03/2021**	**3.6 - 3.8**	<0.1		<0.1		<0.05		<0.1		<0.1	
265908	**BH10**	**30/03/2021**	**0.8 - 1**	<0.1		<0.1		<0.05		<0.1		<0.1	
265908	**BH10**	**30/03/2021**	**1.8 - 2**	<0.1		<0.1		<0.05		<0.1		<0.1	
265908	**MW1**	**31/03/2021**	-		<1		<1		<1		<1		<1
265908	**MW2**	**31/03/2021**	-		<1		<1		<1		<1		<1
265908	**MW3**	**31/03/2021**	-										
265908	**QA1**	**29/03/2021**	-	<0.1		<0.1		<0.05		<0.1		<0.1	
265908	**QA1**	**31/03/2021**	-		<1		<1		<1		<1		<1
265908	**QA2A**	**30/03/2021**	-	<0.1		<0.1		<0.05		<0.1		<0.1	

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mg/kg- milligrams per kilogram; mg/L - milligrams per litre; µg/L - micrograms per litre
#EIL presented is the added contaminant limit (ACL) for lead.

TABULATED SOIL AND GROUNDWATER ANALYTICAL RESULTS

				Polycyclic Aromatic Hydrocarbons (PAH)																NA	Phenols
				Dibenz(a,h)anthracene		Fluoranthene		Fluorene		Indeno(1,2,3-c,d)pyrene		Naphthalene		Phenanthrene		Pyrene		Benzo(a)pyrene TEQ	PAHs (Sum of positives)	PAHs (Sum of positives)	Moisture Content	Phenolics Total
				mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/L	mg/kg	mg/L	%	mg/kg
EQL				0.1	1	0.1	1	0.1	1	0.1	1	0.1	1	0.1	1	0.1	1	0.005	0.05	0.001	0.1	5
ADWG 2018 Health																						
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs							1.4						16		2							
ANZECC 2000 FW 95%													16									
ANZECC 2000 Recreational water quality and aesthetics																						
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Clay																						
0-1m																						
1-2m																						
2-4m																						
>=4m																						
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind												370										
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Fine Soil																						
0-2m																						
NEPM 2013 Table 1C GILs, Drinking Water																						
NEPM 2013 Table 1C GILs, Fresh Waters													16									
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil																						
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Clay																						
2-4m																						
4-8m																						
>=8m																						
Lab Report Number	**Field ID**	**Date**	**Depth (m)**																			
265908	**BH1**	**29/03/2021**	**0.1 - 0.3**	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1			<0.05		**20**	<5
265908	**BH1**	**29/03/2021**	**0.6 - 0.8**																		**24**	
265908	**BH1**	**29/03/2021**	**1.3 - 1.5**	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1			<0.05		**24**	
265908	**BH2**	**29/03/2021**	**0.2 - 0.4**	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1			<0.05		**21**	
265908	**BH2**	**30/03/2021**	**2.8 - 3**	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1			<0.05		**13**	
265908	**BH3**	**29/03/2021**	**0.2 - 0.4**	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1			<0.05		**23**	
265908	**BH3**	**30/03/2021**	**3.6 - 3.8**	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1			<0.05		**14**	
265908	**BH4**	**29/03/2021**	**0.2 - 0.4**	<0.1		<0.1		<0.1		<0.1		**1.6**		<0.1		<0.1			**1.6**		**26**	
265908	**BH4**	**30/03/2021**	**1.4 - 1.6**	<0.1		<0.1		<0.1		<0.1		**0.4**		<0.1		<0.1			**0.4**		**17**	
265908	**BH4**	**30/03/2021**	**2.8-3.0**	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1			<0.05		**16**	
265908	**BH5**	**29/03/2021**	**0 - 0.2**	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1			<0.05		**7.6**	<5
265908	**BH6**	**29/03/2021**	**0.5 - 0.7**	<0.1		<0.1		<0.1		<0.1		**4**		<0.1		<0.1			**4.9**		**19**	
265908	**BH7**	**30/03/2021**	**0.2 - 0.4**	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1			<0.05		**25**	
265908	**BH7**	**30/03/2021**	**1.8 - 2**	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1			<0.05		**25**	
265908	**BH8**	**30/03/2021**	**0.2 - 0.4**	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1			<0.05		**22**	
265908	**BH8**	**30/03/2021**	**3.6 - 3.8**	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1			<0.05		**15**	
265908	**BH9**	**30/03/2021**	**0.2 - 0.4**	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1			<0.05		**23**	
265908	**BH9**	**30/03/2021**	**0.4 - 0.8**	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1			<0.05		**23**	
265908	**BH9**	**30/03/2021**	**3.6 - 3.8**	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1			<0.05		**13**	
265908	**BH10**	**30/03/2021**	**0.8 - 1**	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1			<0.05		**24**	
265908	**BH10**	**30/03/2021**	**1.8 - 2**	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1			<0.05		**21**	
265908	**MW1**	**31/03/2021**	-		<1		<1		<1		<1		<1		<1		<1	<0.005		**0**		
265908	**MW2**	**31/03/2021**	-		<1		<1		<1		<1		<1		<1		<1	<0.005		**0**		
265908	**MW3**	**31/03/2021**	-										**570**									
265908	**QA1**	**29/03/2021**	-	<0.1		<0.1		<0.1		<0.1		**1.2**		<0.1		<0.1			**1.2**		**23**	
265908	**QA1**	**31/03/2021**	-		<1		<1		<1		<1		<1		<1		<1	<0.005		**0**		
265908	**QA2A**	**30/03/2021**	-	<0.1		<0.1		<0.1		<0.1		<0.1		<0.1		<0.1			<0.05		**15**	

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mg/kg- milligrams per kilogram; mg/L - milligrams per litre; µg/L - micrograms per litre
#EIL presented is the added contaminant limit (ACL) for lead.

TABULATED SOIL AND GROUNDWATER ANALYTICAL RESULTS

				Volatile Halogenated Compounds (VHCs)													
				1,1,1,2-tetrachloroethane		1,1,1-trichloroethane		1,1,2,2-tetrachloroethane		1,1,2-trichloroethane		1,1-dichloroethene		1,1-dichloroethene		1,1-dichloropropene	
				mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L
EQL				1	1	1	1	1	1	1	1	1	1	1	1	1	1
ADWG 2018 Health															30		
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs							270		400		6,500				700		
ANZECC 2000 FW 95%											6,500						
ANZECC 2000 Recreational water quality and aesthetics															0.3		
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Clay																	
0-1m																	
1-2m																	
2-4m																	
>=4m																	
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind																	
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Fine Soil																	
0-2m																	
NEPM 2013 Table 1C GILs, Drinking Water															30		
NEPM 2013 Table 1C GILs, Fresh Waters											6,500						
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil																	
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Clay																	
2-4m																	
4-8m																	
>=8m																	
Lab Report Number	**Field ID**	**Date**	**Depth (m)**														
265908	**BH1**	**29/03/2021**	**0.1 - 0.3**	<1		<1		<1		<1		<1		<1		<1	
265908	**BH1**	**29/03/2021**	**0.6 - 0.8**	<1		<1		<1		<1		<1		<1		<1	
265908	**BH1**	**29/03/2021**	**1.3 - 1.5**														
265908	**BH2**	**29/03/2021**	**0.2 - 0.4**														
265908	**BH2**	**30/03/2021**	**2.8 - 3**														
265908	**BH3**	**29/03/2021**	**0.2 - 0.4**														
265908	**BH3**	**30/03/2021**	**3.6 - 3.8**														
265908	**BH4**	**29/03/2021**	**0.2 - 0.4**														
265908	**BH4**	**30/03/2021**	**1.4 - 1.6**														
265908	**BH4**	**30/03/2021**	**2.8-3.0**														
265908	**BH5**	**29/03/2021**	**0 - 0.2**														
265908	**BH6**	**29/03/2021**	**0.5 - 0.7**														
265908	**BH7**	**30/03/2021**	**0.2 - 0.4**														
265908	**BH7**	**30/03/2021**	**1.8 - 2**														
265908	**BH8**	**30/03/2021**	**0.2 - 0.4**														
265908	**BH8**	**30/03/2021**	**3.6 - 3.8**														
265908	**BH9**	**30/03/2021**	**0.2 - 0.4**														
265908	**BH9**	**30/03/2021**	**0.4 - 0.8**														
265908	**BH9**	**30/03/2021**	**3.6 - 3.8**														
265908	**BH10**	**30/03/2021**	**0.8 - 1**														
265908	**BH10**	**30/03/2021**	**1.8 - 2**														
265908	**MW1**	**31/03/2021**	-		<1		<1		<1		<1		<1		<1		<1
265908	**MW2**	**31/03/2021**	-		<1		<1		<1		<1		<1		<1		<1
265908	**MW3**	**31/03/2021**	-		<10		<10		<10		<10		<10		<10		<10
265908	**QA1**	**29/03/2021**	-														
265908	**QA1**	**31/03/2021**	-		<1		<1		<1		<1		<1		<1		<1
265908	**QA2A**	**30/03/2021**	-														

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mg/kg- milligrams per kilogram; mg/L - milligrams per litre; µg/L - micrograms per litre
#EIL presented is the added contaminant limit (ACL) for lead.

TABULATED SOIL AND GROUNDWATER ANALYTICAL RESULTS

				Volatile Halogenated Compounds (VHCs)																					
				1,2,3-trichloropropane		1,2-dibromo-3-chloropropane		1,2-dichloroethane		1,2-dichloropropane		1,3-dichloropropane		2,2-dichloropropane		Bromochloromethane		Bromo-dichloromethane		Bromoform		Carbon tetrachloride		Chloro-dibromomethane	
				mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L
EQL				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ADWG 2018 Health									3														3		
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs									1,900		900		1,100										240		
ANZECC 2000 FW 95%																									
ANZECC 2000 Recreational water quality and aesthetics									10														3		
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Clay																									
0-1m																									
1-2m																									
2-4m																									
>=4m																									
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind																									
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Fine Soil																									
0-2m																									
NEPM 2013 Table 1C GILs, Drinking Water									3														3		
NEPM 2013 Table 1C GILs, Fresh Waters																									
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil																									
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Clay																									
2-4m																									
4-8m																									
>=8m																									
Lab Report Number	**Field ID**	**Date**	**Depth (m)**																						
265908	**BH1**	**29/03/2021**	**0.1 - 0.3**	<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
265908	**BH1**	**29/03/2021**	**0.6 - 0.8**	<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
265908	**BH1**	**29/03/2021**	**1.3 - 1.5**																						
265908	**BH2**	**29/03/2021**	**0.2 - 0.4**																						
265908	**BH2**	**30/03/2021**	**2.8 - 3**																						
265908	**BH3**	**29/03/2021**	**0.2 - 0.4**																						
265908	**BH3**	**30/03/2021**	**3.6 - 3.8**																						
265908	**BH4**	**29/03/2021**	**0.2 - 0.4**																						
265908	**BH4**	**30/03/2021**	**1.4 - 1.6**																						
265908	**BH4**	**30/03/2021**	**2.8-3.0**																						
265908	**BH5**	**29/03/2021**	**0 - 0.2**																						
265908	**BH6**	**29/03/2021**	**0.5 - 0.7**																						
265908	**BH7**	**30/03/2021**	**0.2 - 0.4**																						
265908	**BH7**	**30/03/2021**	**1.8 - 2**																						
265908	**BH8**	**30/03/2021**	**0.2 - 0.4**																						
265908	**BH8**	**30/03/2021**	**3.6 - 3.8**																						
265908	**BH9**	**30/03/2021**	**0.2 - 0.4**																						
265908	**BH9**	**30/03/2021**	**0.4 - 0.8**																						
265908	**BH9**	**30/03/2021**	**3.6 - 3.8**																						
265908	**BH10**	**30/03/2021**	**0.8 - 1**																						
265908	**BH10**	**30/03/2021**	**1.8 - 2**																						
265908	**MW1**	**31/03/2021**	-		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1
265908	**MW2**	**31/03/2021**	-		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1
265908	**MW3**	**31/03/2021**	-		<10		<10		<10		<10		<10		<10		<10		<10		<10		<10		<10
265908	**QA1**	**29/03/2021**	-																						
265908	**QA1**	**31/03/2021**	-		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1
265908	**QA2A**	**30/03/2021**	-																						

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mg/kg- milligrams per kilogram; mg/L - milligrams per litre; µg/L - micrograms per litre
#EIL presented is the added contaminant limit (ACL) for lead.

TABULATED SOIL AND GROUNDWATER ANALYTICAL RESULTS

				Volatile Halogenated Compounds (VHCs)																					
				Chloroethane		Chloroform		Chloromethane		cis-1,2-dichloroethene		cis-1,3-dichloropropene		Dibromomethane		Hexachlorobutadiene		Trichloroethene		Tetrachloroethene		trans-1,2-dichloroethene		trans-1,3-dichloropropene	
				mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L
EQL				1	10	1	1	1	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
ADWG 2018 Health																	0.7				50				
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs							770												330		70				
ANZECC 2000 FW 95%																									
ANZECC 2000 Recreational water quality and aesthetics																			30		10				
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Clay																									
0-1m																									
1-2m																									
2-4m																									
>=4m																									
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind																									
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Fine Soil																									
0-2m																									
NEPM 2013 Table 1C GILs, Drinking Water																	0.7				50				
NEPM 2013 Table 1C GILs, Fresh Waters																									
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil																									
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Clay																									
2-4m																									
4-8m																									
>=8m																									
Lab Report Number	**Field ID**	**Date**	**Depth (m)**																						
265908	**BH1**	**29/03/2021**	**0.1 - 0.3**	<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
265908	**BH1**	**29/03/2021**	**0.6 - 0.8**	<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<1	
265908	**BH1**	**29/03/2021**	**1.3 - 1.5**																						
265908	**BH2**	**29/03/2021**	**0.2 - 0.4**																						
265908	**BH2**	**30/03/2021**	**2.8 - 3**																						
265908	**BH3**	**29/03/2021**	**0.2 - 0.4**																						
265908	**BH3**	**30/03/2021**	**3.6 - 3.8**																						
265908	**BH4**	**29/03/2021**	**0.2 - 0.4**																						
265908	**BH4**	**30/03/2021**	**1.4 - 1.6**																						
265908	**BH4**	**30/03/2021**	**2.8-3.0**																						
265908	**BH5**	**29/03/2021**	**0 - 0.2**																						
265908	**BH6**	**29/03/2021**	**0.5 - 0.7**																						
265908	**BH7**	**30/03/2021**	**0.2 - 0.4**																						
265908	**BH7**	**30/03/2021**	**1.8 - 2**																						
265908	**BH8**	**30/03/2021**	**0.2 - 0.4**																						
265908	**BH8**	**30/03/2021**	**3.6 - 3.8**																						
265908	**BH9**	**30/03/2021**	**0.2 - 0.4**																						
265908	**BH9**	**30/03/2021**	**0.4 - 0.8**																						
265908	**BH9**	**30/03/2021**	**3.6 - 3.8**																						
265908	**BH10**	**30/03/2021**	**0.8 - 1**																						
265908	**BH10**	**30/03/2021**	**1.8 - 2**																						
265908	**MW1**	**31/03/2021**	-		<10		<1		<10		<1		<1		<1		<1		<1		<1		<1		<1
265908	**MW2**	**31/03/2021**	-		<10		<1		<10		<1		<1		<1		<1		<1		<1		<1		<1
265908	**MW3**	**31/03/2021**	-		<100		<10		<100		<10		<10		<10		<10		<10		<10		<10		<10
265908	**QA1**	**29/03/2021**	-																						
265908	**QA1**	**31/03/2021**	-		<10		<1		<10		<1		<1		<1		<1		<1		<1		<1		<1
265908	**QA2A**	**30/03/2021**	-																						

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mg/kg- milligrams per kilogram; mg/L - milligrams per litre; µg/L - micrograms per litre
#EIL presented is the added contaminant limit (ACL) for lead.

TABULATED SOIL AND GROUNDWATER ANALYTICAL RESULTS

				Volatile Halogenated Compounds (VHCs)																							
				Vinyl chloride		1,2,3-trichlorobenzene		1,2,4-trichlorobenzene		1,2-dichlorobenzene		1,3-dichlorobenzene		1,4-dichlorobenzene		2-chlorotoluene		4-chlorotoluene		Bromobenzene		Chlorobenzene		Hexachlorobenzene		1,2-dibromoethane	
				mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	mg/kg	µg/L
EQL				1	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.1	1	1
ADWG 2018 Health					0.3						1,500				40								300			1
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs					100		10		170		160		260		60								55			
ANZECC 2000 FW 95%							10		170		160		260		60											
ANZECC 2000 Recreational water quality and aesthetics																										
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Clay																										
0-1m																										
1-2m																										
2-4m																										
>=4m																										
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind																										
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Fine Soil																										
0-2m																										
NEPM 2013 Table 1C GILs, Drinking Water					0.3		30		30		1,500				40								300			
NEPM 2013 Table 1C GILs, Fresh Waters							3		85		160		260		60											
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil																							80			
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Clay																										
2-4m																										
4-8m																										
>=8m																										
Lab Report Number	**Field ID**	**Date**	**Depth (m)**																								
265908	**BH1**	**29/03/2021**	**0.1 - 0.3**	<1		<1		<1		<1		<1		<1		<1		<1		<1		<1		<0.1	<1		
265908	**BH1**	**29/03/2021**	**0.6 - 0.8**	<1		<1		<1		<1		<1		<1		<1		<1		<1		<1			<1		
265908	**BH1**	**29/03/2021**	**1.3 - 1.5**																								
265908	**BH2**	**29/03/2021**	**0.2 - 0.4**																								
265908	**BH2**	**30/03/2021**	**2.8 - 3**																								
265908	**BH3**	**29/03/2021**	**0.2 - 0.4**																								
265908	**BH3**	**30/03/2021**	**3.6 - 3.8**																								
265908	**BH4**	**29/03/2021**	**0.2 - 0.4**																								
265908	**BH4**	**30/03/2021**	**1.4 - 1.6**																								
265908	**BH4**	**30/03/2021**	**2.8-3.0**																								
265908	**BH5**	**29/03/2021**	**0 - 0.2**																					<0.1			
265908	**BH6**	**29/03/2021**	**0.5 - 0.7**																								
265908	**BH7**	**30/03/2021**	**0.2 - 0.4**																								
265908	**BH7**	**30/03/2021**	**1.8 - 2**																								
265908	**BH8**	**30/03/2021**	**0.2 - 0.4**																								
265908	**BH8**	**30/03/2021**	**3.6 - 3.8**																								
265908	**BH9**	**30/03/2021**	**0.2 - 0.4**																								
265908	**BH9**	**30/03/2021**	**0.4 - 0.8**																								
265908	**BH9**	**30/03/2021**	**3.6 - 3.8**																								
265908	**BH10**	**30/03/2021**	**0.8 - 1**																								
265908	**BH10**	**30/03/2021**	**1.8 - 2**																								
265908	**MW1**	**31/03/2021**	-		<10		<1		<1		<1		<1		<1		<1		<1		<1		<1				<1
265908	**MW2**	**31/03/2021**	-		<10		<1		<1		<1		<1		<1		<1		<1		<1		<1				<1
265908	**MW3**	**31/03/2021**	-		<100		<10		<10		<10		<10		<10		<10		<10		<10		<10				<10
265908	**QA1**	**29/03/2021**	-																								
265908	**QA1**	**31/03/2021**	-		<10		<1		<1		<1		<1		<1		<1		<1		<1		<1				<1
265908	**QA2A**	**30/03/2021**	-																								

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mg/kg- milligrams per kilogram; mg/L - milligrams per litre; µg/L - micrograms per litre
#EIL presented is the added contaminant limit (ACL) for lead.

TABULATED SOIL AND GROUNDWATER ANALYTICAL RESULTS

				Volatile Halogenated Compounds (VHCs)						Cyanide	Organochlorine Pesticides (OCPs)															
				Bromomethane		Dichloro-difluoromethane		Trichloro-fluoromethane	Trichloro-fluoromethane	Cyanide Total	4,4-DDE	a-BHC	Aldrin	b-BHC	Chlordane (cis)	Chlordane (trans)	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde
				mg/kg	µg/L	mg/kg	µg/L	mg/kg	µg/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				1	10	1	10	1	10	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
ADWG 2018 Health					1																					
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs																										
ANZECC 2000 FW 95%																										
ANZECC 2000 Recreational water quality and aesthetics																										
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Clay																										
0-1m																										
1-2m																										
2-4m																										
>=4m																										
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind																			640							
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Fine Soil																										
0-2m																										
NEPM 2013 Table 1C GILs, Drinking Water					1																					
NEPM 2013 Table 1C GILs, Fresh Waters																										
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil																			3,600					100		
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Clay																										
2-4m																										
4-8m																										
>=8m																										
Lab Report Number	**Field ID**	**Date**	**Depth (m)**																							
265908	**BH1**	**29/03/2021**	**0.1 - 0.3**	<1		<1		<1		<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
265908	**BH1**	**29/03/2021**	**0.6 - 0.8**	<1		<1		<1																		
265908	**BH1**	**29/03/2021**	**1.3 - 1.5**																							
265908	**BH2**	**29/03/2021**	**0.2 - 0.4**																							
265908	**BH2**	**30/03/2021**	**2.8 - 3**																							
265908	**BH3**	**29/03/2021**	**0.2 - 0.4**																							
265908	**BH3**	**30/03/2021**	**3.6 - 3.8**																							
265908	**BH4**	**29/03/2021**	**0.2 - 0.4**																							
265908	**BH4**	**30/03/2021**	**1.4 - 1.6**																							
265908	**BH4**	**30/03/2021**	**2.8-3.0**																							
265908	**BH5**	**29/03/2021**	**0 - 0.2**							<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
265908	**BH6**	**29/03/2021**	**0.5 - 0.7**																							
265908	**BH7**	**30/03/2021**	**0.2 - 0.4**																							
265908	**BH7**	**30/03/2021**	**1.8 - 2**																							
265908	**BH8**	**30/03/2021**	**0.2 - 0.4**																							
265908	**BH8**	**30/03/2021**	**3.6 - 3.8**																							
265908	**BH9**	**30/03/2021**	**0.2 - 0.4**																							
265908	**BH9**	**30/03/2021**	**0.4 - 0.8**																							
265908	**BH9**	**30/03/2021**	**3.6 - 3.8**																							
265908	**BH10**	**30/03/2021**	**0.8 - 1**																							
265908	**BH10**	**30/03/2021**	**1.8 - 2**																							
265908	**MW1**	**31/03/2021**	-		<10		<10		<10																	
265908	**MW2**	**31/03/2021**	-		<10		<10		<10																	
265908	**MW3**	**31/03/2021**	-		<100		<100		<100																	
265908	**QA1**	**29/03/2021**	-																							
265908	**QA1**	**31/03/2021**	-		<10		<10		<10																	
265908	**QA2A**	**30/03/2021**	-																							

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mg/kg- milligrams per kilogram; mg/L - milligrams per litre; µg/L - micrograms per litre
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TABULATED SOIL AND GROUNDWATER ANALYTICAL RESULTS

						Organophosphorous Pesticides (OPPs)												Polychlorinated Biphenyls (PCBs)							
				g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor	Azinophos methyl	Bromophos-ethyl	Chlorpyrifos	Chlorpyrifos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenitrothion	Malathion	Ronnel	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL				0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
ADWG 2018 Health																											
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs																											
ANZECC 2000 FW 95%																											
ANZECC 2000 Recreational water quality and aesthetics																											
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Clay																											
0-1m																											
1-2m																											
2-4m																											
>=4m																											
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind																											
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Fine Soil																											
0-2m																											
NEPM 2013 Table 1C GILs, Drinking Water																											
NEPM 2013 Table 1C GILs, Fresh Waters																											
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil					50		2,500			2,000																	7
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Clay																											
2-4m																											
4-8m																											
>=8m																											
Lab Report Number	**Field ID**	**Date**	**Depth (m)**																								
265908	**BH1**	**29/03/2021**	**0.1 - 0.3**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
265908	**BH1**	**29/03/2021**	**0.6 - 0.8**																								
265908	**BH1**	**29/03/2021**	**1.3 - 1.5**																								
265908	**BH2**	**29/03/2021**	**0.2 - 0.4**																								
265908	**BH2**	**30/03/2021**	**2.8 - 3**																								
265908	**BH3**	**29/03/2021**	**0.2 - 0.4**																								
265908	**BH3**	**30/03/2021**	**3.6 - 3.8**																								
265908	**BH4**	**29/03/2021**	**0.2 - 0.4**																								
265908	**BH4**	**30/03/2021**	**1.4 - 1.6**																								
265908	**BH4**	**30/03/2021**	**2.8-3.0**																								
265908	**BH5**	**29/03/2021**	**0 - 0.2**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
265908	**BH6**	**29/03/2021**	**0.5 - 0.7**																								
265908	**BH7**	**30/03/2021**	**0.2 - 0.4**																								
265908	**BH7**	**30/03/2021**	**1.8 - 2**																								
265908	**BH8**	**30/03/2021**	**0.2 - 0.4**																								
265908	**BH8**	**30/03/2021**	**3.6 - 3.8**																								
265908	**BH9**	**30/03/2021**	**0.2 - 0.4**																								
265908	**BH9**	**30/03/2021**	**0.4 - 0.8**																								
265908	**BH9**	**30/03/2021**	**3.6 - 3.8**																								
265908	**BH10**	**30/03/2021**	**0.8 - 1**																								
265908	**BH10**	**30/03/2021**	**1.8 - 2**																								
265908	**MW1**	**31/03/2021**	**-**																								
265908	**MW2**	**31/03/2021**	**-**																								
265908	**MW3**	**31/03/2021**	**-**																								
265908	**QA1**	**29/03/2021**	**-**																								
265908	**QA1**	**31/03/2021**	**-**																								
265908	**QA2A**	**30/03/2021**	**-**																								

Notes and Abbreviations:

ADWG - Australian Drinking Water Guidelines (2018).
ANZECC - Australian and New Zealand Environment Conservation Council (2000): Guidelines for Fresh and Marine Water Quality.
ANZG - Australian and New Zealand Governments (2018): Guidelines for Fresh and Marine Water Quality
NEPM - National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013).
HSL - Health Screening Level; HIL - Health Investigation Level; GIL - Groundwater Investigation Level; EIL - Ecological Investigation Level; ESL - Ecological Screening Level
mg/kg- milligrams per kilogram; mg/L - milligrams per litre; µg/L - micrograms per litre
#EIL presented is the added contaminant limit (ACL) for lead.

TABULATED SOIL AND GROUNDWATER ANALYTICAL RESULTS

				Pesticides
				Parathion
				mg/kg
EQL				0.1
ADWG 2018 Health				
ANZG (2018) Freshwater 95% LOSP Toxicant DGVs				
ANZECC 2000 FW 95%				
ANZECC 2000 Recreational water quality and aesthetics				
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Clay				
0-1m				
1-2m				
2-4m				
>=4m				
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind				
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Fine Soil				
0-2m				
NEPM 2013 Table 1C GILs, Drinking Water				
NEPM 2013 Table 1C GILs, Fresh Waters				
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil				
NEPM 2013 Table 1A(4) Comm/Ind HSL D GW for Vapour Intrusion, Clay				
2-4m				
4-8m				
>=8m				
Lab Report Number	**Field ID**	**Date**	**Depth (m)**	
265908	**BH1**	**29/03/2021**	**0.1 - 0.3**	<0.1
265908	**BH1**	**29/03/2021**	**0.6 - 0.8**	
265908	**BH1**	**29/03/2021**	**1.3 - 1.5**	
265908	**BH2**	**29/03/2021**	**0.2 - 0.4**	
265908	**BH2**	**30/03/2021**	**2.8 - 3**	
265908	**BH3**	**29/03/2021**	**0.2 - 0.4**	
265908	**BH3**	**30/03/2021**	**3.6 - 3.8**	
265908	**BH4**	**29/03/2021**	**0.2 - 0.4**	
265908	**BH4**	**30/03/2021**	**1.4 - 1.6**	
265908	**BH4**	**30/03/2021**	**2.8-3.0**	
265908	**BH5**	**29/03/2021**	**0 - 0.2**	<0.1
265908	**BH6**	**29/03/2021**	**0.5 - 0.7**	
265908	**BH7**	**30/03/2021**	**0.2 - 0.4**	
265908	**BH7**	**30/03/2021**	**1.8 - 2**	
265908	**BH8**	**30/03/2021**	**0.2 - 0.4**	
265908	**BH8**	**30/03/2021**	**3.6 - 3.8**	
265908	**BH9**	**30/03/2021**	**0.2 - 0.4**	
265908	**BH9**	**30/03/2021**	**0.4 - 0.8**	
265908	**BH9**	**30/03/2021**	**3.6 - 3.8**	
265908	**BH10**	**30/03/2021**	**0.8 - 1**	
265908	**BH10**	**30/03/2021**	**1.8 - 2**	
265908	**MW1**	**31/03/2021**	**-**	
265908	**MW2**	**31/03/2021**	**-**	
265908	**MW3**	**31/03/2021**	**-**	
265908	**QA1**	**29/03/2021**	**-**	
265908	**QA1**	**31/03/2021**	**-**	
265908	**QA2A**	**30/03/2021**	**-**	

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