

WINIM Developments Pty Ltd



Preliminary Site Investigation: 1 Gatacre Avenue and 5 Allison Avenue, Lane Cove, NSW

ENVIRONMENTAL



WATER



WASTEWATER



GEOTECHNICAL



CIVIL



PROJECT
MANAGEMENT



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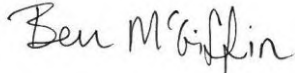
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General Abbreviations

AASS	Actual acid sulfate soil
ABC	Ambient background concentrations
ACM	Asbestos containing material
AEC	Area of environmental concern
AF	Asbestos fines
AMP	Asbestos Management Plan
ANZECC	Australia and New Zealand Environment Conservation Council
ANZG	Australian and New Zealand Governments
ASC NEPM	National Environmental Protection (Assessment of Site Contamination) Measure (2013)
ASS	Acid sulfate soil
ASSMAC	Acid Sulfate Soils Management Advisory Committee
AST	Above ground storage tank
BGL	Below ground level
BH	Borehole
BTEXN	Benzene, toluene, ethylbenzene, xylene, naphthalene
CEMP	Construction Environmental Management Plan
COC	Chain of custody
COPC	Contaminants of potential concern
DA	Development application
DBT	Dibutyltin
DEC	Department of Environment and Conservation
DECC	Department of Environment and Climate Change
DNAPL	Dense non aqueous phase liquid
DP	Deposited Plan
DPI	NSW Department of Primary Industry
DPIW	NSW Department of Primary Industry – Water
DQI	Data quality indicators
DQO	Data quality objectives
DSI	Detailed Site Investigation
EAC	Ecological assessment criteria
EIL	Ecological investigation level
EMP	Environmental Management Plan
EPA	NSW Environmental Protection Authority
EQL	Estimated quantitation limit (interchangeable with PQL and LOR)
ESA	Environmental Site Assessment
ESL	Ecological screening level
FA	Fibrous asbestos
GIL	Groundwater investigation level
HIL	Health investigation level
HM	Heavy metals
HSL	Health screening level
IA	Investigation area
ISQG	Interim Sediment Quality Guideline
ITP	Inspection Testing Plan
LGA	Local government area
LNAPL	Light non aqueous phase liquid
LOR	Limit of reporting (interchangeable with EQL and PQL)
MA	Martens & Associates Pty Ltd
mAHD	Metres, Australian Height Datum
mbgl	Metres below ground level

MBT	Monobutyltin
MNA	Monitored natural attenuation
MPE	Multi phase extraction
NAPL	Non aqueous phase liquid
NATA	National Association of Testing Authorities
ND	No data
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
OCP	Organochloride pesticides
OEH	NSW Office of Environment and Heritage
OPP	Organophosphorus pesticides
PACM	Potential asbestos containing material
PAH	Polycyclic aromatic hydrocarbons
PASS	Potential acid sulfate soil
PCB	Polychlorinated biphenyl
PCEMP	Post Construction Environmental Management Plan
PESA	Preliminary Environmental Site Assessment
PFAS	Per and polyfluoroalkyl substances
PID	Photoionisation detector
ppb	Parts per billion
ppm	Parts per million
PQL	Practical quantitative limit (interchangeable with EQL and LOR)
PSI	Preliminary Site Investigation
QA/QC	Quality assurance / quality control
RAC	Remediation acceptance criteria
RAP	Remedial Action Plan
HHRA	Human Health Risk Assessment
RPD	Relative percentage difference
SAC	Site assessment criteria
SAQP	Sampling and Analysis Quality Plan
SEPP	State Environmental Planning Policy
SIL	Soil investigation level
SOP	Standard operating procedure
SWL	Standing water level
SWMS	Safe Work Method Statement
TB	Trip blank
TBT	Tributyl tin
TCLP	Toxicity characteristics leaching procedure
TEQ	Toxic equivalency factor
TP	Test pit
TPH	Total petroleum hydrocarbons
TRH	Total recoverable hydrocarbons
TS	Trip spike
UCL	Upper confidence limit
UPSS	Underground petroleum storage system
UST	Underground storage tank
VHC	Volatile halogenated compounds
VOC	Volatile organic compounds
WHS	Work health and safety
WHSP	Work Health and Safety Plan

1 Introduction

1.1 Overview

This report prepared by Martens and Associates (MA) documents a Preliminary Site Investigation (PSI) completed for WINIM Developments Pty Ltd (the Client) at 1 Gatacre Avenue and 5 Allison Avenue, Lane Cove, NSW (the site).

Due to current access restrictions at 5 Allison Avenue, the investigation area (IA) for this PSI will only be limited to 1 Gatacre Avenue, as shown in Attachment A.

It should be noted that the scope of works completed as part of this PSI do not meet the requirements for a full detailed site investigation (DSI), primarily due to limited sampling density.

1.2 Proposed Development

MA understands that the client intends to complete a multi storey residential development which will include demolition of all existing structures at 1 Gatacre Avenue and 5 Allison Avenue, and the construction of a 6 storey residential development with 2 basement levels, requiring excavation to approximately 6 meters below ground level (mbgl).

The proposed development plans are provided in Attachment B.

1.3 Previous Assessment

MA has previously undertaken a Preliminary Contamination Screening Assessment (MA, 2020a), which was conducted in conjunction with MA's Preliminary Geotechnical Assessment (MA, 2020b). Works were completed in December 2020.

As part of this assessment, a single groundwater well (MW01) was installed during geotechnical drilling. Approximately 1 week following well installation, a single groundwater sample was collected and analysed for total recoverable hydrocarbons (TRH), BTEX (benzene, toluene, ethylbenzene and xylene), polycyclic aromatic hydrocarbons (PAH) and heavy metals. The selection of contaminants was based on the primary area of environmental concern being the adjacent service station.

Sampling results reported concentrations of TRH C6 – C10 (F1) (820 µg/L) within the collected groundwater sample. No odours were observed during groundwater sampling and soil samples collected during the well installation reported no detections of hydrocarbons. Due to the limited sampling, an additional investigation was recommended to further characterise the site's groundwater conditions and delineate the extent of hydrocarbon impacts.

1.4 Objectives

The main objective for this PSI is to:

- Identification of historical and current potentially contaminating site activities.
- Evaluation of areas of environmental concern (AEC) and associated contaminants of potential concern (COPC) within the IA.
- Assess identified AEC and associated COPC.
- Extend soil and groundwater sampling, in accessible areas of the site, to confirm and delineate hydrocarbon impacts to soil and groundwater.
- Provide comment on the suitability of the IA for the future use, and where required, provide recommendations for additional investigations.

1.5 Scope of Works

The scope of works includes:

- Review of previous site documentation (MA, 2020a).
- Intrusive subsurface investigation and sampling.
- Installation and sampling of groundwater wells.
- Laboratory analysis of samples for COPC.
- Preparation of a report in documenting the findings of the subsurface testing program.

2 Site Background Information

2.1 Site Details

Site information is summarised in Table 1, with the site area and general surrounds plans provided in Attachment A

Table 1: Site information.

Item	Description / Detail
Site address	1 Gatacre Avenue and 5 Allison Avenue, Lane Cove, NSW.
Legal identifier	1 Gatacre Avenue: Lot A in DP415448 and Lot 46 in DP11416 5 Allison Avenue: Lot 45 in DP11416 (Metwest, 2020)
Surveyed area	Lot A has an area of 1,853 m ² . Lot 45 and Lot 46 have a total area of 1,112.8 m ² . The total area is 2,965.8 m ² (Metwest, 2020).
Local Government Area	Lane Cove Municipal Council
Current zoning and land use	Zoned R4 – High density residential (NSW Spatial View). IA is currently used for as a motel.
Site description	At the time of investigation, 1 Gatacre Avenue consisted of: <ul style="list-style-type: none"> o A three storey brick building at the northern portion of the site, with adjacent car parks directly east and west of the building. o A two storey brick building at the southern portion of site, with a sheltered car park under the building. o A double storey brick building at the northeast corner of the site. At the time of investigation, 5 Allison Avenue consisted of a single storey brick residential development.
Surrounding land uses	The site is bounded by: <ul style="list-style-type: none"> o Gatacre Avenue to the north. o Allison Avenue to the south. o Residential buildings to the west. o Bicycle store to the northeast. o Shell service station to the southeast.
Topography	The site is relatively flat with grades at approximately 5 %, apart from the south eastern portion which consist of a steep 30% slope where the concrete ramp to Allison Avenue is located. Site elevation ranges between approximately 101.4 mAHD at the north eastern corner and 91.88 mAHD at north western corner (Metwest, 2020).
Geology and soil mapping	The site is underlain by Wianamatta Group, Ashfield Shale consisting of black to dark grey shale and laminite (Herbert C., 1983, Sydney 1:100 000 Geological Sheet 9130, 1st edition). The NSW Environment and Heritage eSPADE website identifies the site as having soils of the Glenorie landscape consisting of shallow to moderately deep red podzolic soils on crests, moderately deep red and brown podzolic soils on upper slopes, deep yellow podzolic soils and gleyed podzolic soils along drainage lines.

Item	Description / Detail
Surface hydrology	Drainage of the site is via overland flow towards the north west for the northern portion of the site to stormwater drains along Gatacre Avenue, and south west for the southern portion of the site to stormwater drains along Allison Avenue.

2.2 Hydrogeology

A review of WaterNSW Real-time Water Databases indicated that there are no groundwater wells within 500 m of the site.

Three monitoring wells have been installed during intrusive investigations (previously and as part of this PSI).

Based on groundwater gauging data, site groundwater levels are expected to be between approximal 6.64 – 8.40 meters below ground level.

3 Site Contamination Assessment

3.1 NSW EPA Records

One site within 500 m of the IA were identified on the list of NSW contaminated sites notified to the EPA as required by the Contaminated Land Management Act (1997) and the Environmentally Hazardous Chemicals Act (1985), is shown in Table 2.

Table 2: Available EPA contaminated lands record information.

Suburb	Address	Site Name	Distance / Direction from Site
Lane Cove	432 Pacific Highway	BP Artamon	300 m northeast

Due to the distance from the site, the above location is expected not to have impacted site soils.

No sites were listed on the EPA public register, within 500m of the site.

3.2 Council Historical Site Records

No Council records were available at the time of this investigation.

3.3 External Potentially Contaminating Activities

One potential contaminating activity within 500 m of the site are summarised in Table 3.

Table 3: Potentially contaminating activities.

Business Activity	Address	Approximate Distance From Site Boundary	Direction from Site	Gradient from Site
Service station	378 Pacific Highway	Directly adjacent to the east south eastern boundary	East / southeast	Up gradient
Former service station	382	Directly adjacent to the east norther eastern boundary	East / north east	Up gradient

Due to the service station and former services station being located directly up gradient from the site, there is potential for impacts in site soil an groundwater to be present.

3.4 Aerial Photograph Review

Aerial photographs taken of the site during between 1930 and 2021, were reviewed to investigate historical site land uses (Table 4). Copies of aerial photographs are provided in Attachment I.

The aerals indicated that the current site conditions were constructed between 1951 and 1978 for 1 Gatacre Avenue, and before 1930 for 5 Allison Avenue. Prior to 1978, 1 Gatacre Avenue was used for residential purpose.

Table 4: Aerial photograph observations from 1930 to 2021.

Year (Source)	Site Activity	Surrounding Land Use
1930 ¹	Residential dwellings observed at 1 Gatacre Avenue. Existing dwelling observed at 5 Allison Avenue.	Surrounding land consist of industrial buildings to the north east and low density residential in all other directions. Bulk earthworks observed to the east.
1951	Little to no change from previous.	Increase in low density residential dwellings to the north, west and south.
1978	Residential dwellings were demolished and existing motel development were observed.	Demolition of former commercial developments, and construction of existing commercial and industrial developments to the north east and east. High density residential developments constructed to the north and northwest. Petrol station constructed to the south east.
1983 ¹	Little to no change from previous.	Increase in commercial and industrial buildings to the east, otherwise little to no change from previous.
1994	Little to no change from previous.	Increase in commercial and industrial buildings to the east.
2002	Little to no change from previous.	Little to no change from previous.
2009	Little to no change from previous.	Increase in commercial and industrial buildings to the east.
2021	Little to no change from previous.	High density residential developments constructed to the north.

Notes

¹. Denotes poor image quality.

3.5 Areas of Environmental Concern / Contaminants of Potential Concern

Our assessment of site AEC and COPC (Table 5) for the IA was made based on available site history, aerial photograph interpretation, site walkover and drilling.

Table 5: Areas of environmental concern and contaminants of potential concern.

AEC	Potential for Contamination	COPC
AEC A Service station	Paints, fuels, oils, degreasers, construction materials.	HM, TRH, BTEXN, PAH, chlorinated hydrocarbons, phenols, asbestos
AEC B Fill (entire site)	Fill from unknown sources has the potential to add contamination including hydrocarbons, heavy metals, pesticides and asbestos.	HM, TRH, BTEXN, PAH, OCP / OPP and asbestos

3.6 Detailed Walkover

A detailed walkover of the IA and surrounding areas was completed with the following key observations:

- The IA is currently a working motel covered predominantly in hard stand.
- No observations of obvious potentially contaminating activities were noted in the day to day operation of the motel.
- No onsite storage of fuels or other potentially contaminating material were observed.
- An active service station was observed directly adjacent to the IA at 378 Pacific Highway.
- 382 Pacific Highway, located directly adjacent to the norther east is currently a bicycle store and repair centre. Evidence from visual assessments such as fill points suggest that a former service station is likely to have been located at this address prior to redevelopment to a retail store.
- No access to 5 Alison Avenue was available at the time of the walkover, however observation from the boundary indicate the Lot is used for residential purposes and includes a single story residential dwelling.

3.7 Conceptual Site Model

A conceptual site model based on the COPC identified in this PSI, and the associated exposure pathways to potential receptors, is summarised in Table 6.

Table 6: Conceptual site model.

AEC	COPC	Exposure Pathway	Potential Receptors	Likelihood of Complete Exposure Pathway
AEC A Service station	HM, TRH, BTEXN, PAH, chlorinated hydrocarbons, phenols, asbestos	Ingestion of contaminants. Dermal contact with contaminants. Inhalation of contaminated media (vapour, dust).	Current and future site users including students, staff and visitors. Construction and maintenance workers.	Medium (following demolition)
AEC B Potential fill	HM, TRH, BTEXN, PAH, OCP / OPP and asbestos		Current and future users of surrounding residences. Groundwater environments beneath, or in the vicinity of the site. Ecological receptors (flora & fauna)	Low to medium (where buildings to be demolished and / or excavation is to be undertaken)

3.8 CSM Discussion

The presence of an active and former services station, directly up gradient from the IA has the potential to have impacted site soils and groundwater beneath the site. Based on the proposed development, which includes significant excavation works, there is a potential for a complete exposure pathway to site receptors.

Based on the soils encountered during the previous geotechnical investigation, fill material is expected to be present across a majority of the IA. Due to the proposed excavation works, it is considered likely that a complete exposure pathway will become present to site receptors, particularly during proposed construction works.

4 Sampling, Analytical and Quality Plan

A Sampling Analytical and Quality Plan (SAQP) was developed to ensure that data collected for the PSI is representative and provides a robust basis for site assessment decisions. Preparation of the SAQP was completed in general accordance with ASC NEPM (2013) methodology and includes:

- Data quality objectives (DQO).
- Data quality indicators (DQI).
- Sampling methodologies and procedures.

Field screening methods:

- Sample handling, preservation and storage procedures.
- Analytical QA / QC.

The following sections summarise the DQO, DQI and QA / QC.

4.1 Data Quality Objectives

DQO were prepared as statements specifying qualitative and quantitative data required to support project decisions. DQO were prepared in general accordance with NSW EPA (2017), EPA (2020) and NEPM (2013) guidelines, and are presented in Table 7.

Table 7: Data quality objectives.

Step 1 Stating the Problem	Review of previous site documentation (MA, 2020s) identified hydrocarbon impact to site groundwater from limited sampling. Additional sampling is required to increase sampling density and better delineate potential hydrocarbon impacts which may impact on the future site development.
Step 2 Identifying the Decision(s)	To assess the potential hydrocarbon impacts, decisions are to be made based on the following questions: <ul style="list-style-type: none"> o What is the exposure pathway for petroleum products? o Has previous or current site use impacted the IA that may pose a risk to humans or the environment for future land use? o Does the IA require remediation or management prior to constructing the proposed development?
Step 3 Identification of Inputs to the Decision	The inputs to the assessment include: <ul style="list-style-type: none"> o Soil sampling at nominated locations across the site. o Groundwater sampling at constructed monitoring wells. o Laboratory analytical results for relevant COPC. o Assessment of analytical results against site suitable guidelines.
Step 4 Study Boundary Definitions	Study boundaries are as follows: <ul style="list-style-type: none"> o Lateral – Lateral boundary of the assessment is defined by the IA boundary. o Vertical – Vertical boundary is governed by the maximum depth reached during subsurface investigations. o Temporal – One rounds of soil and groundwater sampling has been completed as part of this PSI.
Step 5 Development of Decision Rules	The decision rule for this investigation is as follows: If the concentration of contaminants exceeds the adopted assessment criteria, a risk assessment is required. Should the risk be unacceptable, further investigations to remediate and / or manage the onsite impacts, in relation to the proposed development, will be undertaken.
Step 6 Specification of Limits on Decision Errors	Guidance found in ASC NEPM (2013) Schedule B2 regarding 95% upper confidence limit (UCL) states that the 95% UCL of the arithmetic mean provides a 95% confidence level that the true population mean will be less than or equal to this value. Therefore a decision can be made based on a probability that 95% of the data collected will satisfy the site acceptance criteria. A limit on decision error will be 5% that a conclusive statement may be incorrect.
Step 7 Optimisation of Sampling Design	Proposed sampling locations shall attempt to ensure that critical locations are assessed, sampled, and analysed for appropriate contaminants of concern. Sampling locations were set subject to site access and the existing building footprint, and selected by assessing proximity and gradient to the adjoining service station (MW01 and MW02 as expected hydrocarbon impacted locations and MW03 acting as a control).

4.2 Data Quality Indicators

In accordance with NSW EPA (2017), the investigation data set has been compared with DQI outlined in Table 8 to ensure that collected data meets the project needs and that DQO has been met.

Table 8: Data quality indicators.

Assessment Measure (DQI)	Comment
Precision – A measure of the variability (or reproducibility) of data.	<p>Precision is assessed by calculating the relative percent difference (RPD) between blind field duplicates and primary samples.</p> <p>Data precision is deemed acceptable where results are 0 - 10 x EQL or where RPDs <50% (10 - 30 x EQL) or <30% (>30 x EQL).</p> <p>Exceedance of this range may still be considered acceptable where heterogeneous materials such as fill are sampled.</p>
Accuracy – A measure of the closeness of reported data to the “true value”.	<p>Data accuracy is assessed by:</p> <ul style="list-style-type: none"> o Field spikes and blanks. o Laboratory control samples.
Representativeness – The confidence that data are representative of each media present on the site.	<p>To ensure data representativeness the following field and laboratory procedures are followed:</p> <ul style="list-style-type: none"> o Ensure that the design and implementation of the sampling program have been completed in accordance with MA standard operating procedures (SOP). o Trip blank and trip spike samples shall be used for volatiles during field sampling to ensure no cross contamination or laboratory artefacts. o Ensure that all laboratory hold times are met and that sample handling and transport are completed in accordance with the MA SOP.
Completeness – A measure of the amount of usable data from a data collection activity.	<p>To ensure data set completeness, the following is required:</p> <ul style="list-style-type: none"> o Confirmation that all sampling methodology was completed in general accordance with the MA SOP. o COC and receipt forms. o Results from all laboratory QA / QC samples (lab blanks, trip blank, trip spike, lab duplicates). o NATA accreditation stamp on all laboratory reports.
Comparability - The confidence that data may be considered to be equivalent for each sampling and analytical event.	<p>Data comparability is maintained by ensuring that:</p> <ul style="list-style-type: none"> o All site sampling events are undertaken following methodologies outlined in MA SOP and published guidelines. o NATA accredited laboratory methodologies shall be followed on all laboratory analysis.

4.3 Methodology and Quality Assurance / Quality Control

Site investigation and soil sampling methodology as shown in Table 9, was completed to meet the project DQO.

Table 9: Investigation and sampling methodology.

Activity	Detail / Comments
Fieldworks	<p>Field works were completed between 15, 16 and 25 February 2021, and involved:</p> <ul style="list-style-type: none"> Excavation of 2 boreholes (BH301 and BH302) using a 4wd mounted drill rig to a maximum investigation depth of 13.4 mbgl. Field screening for volatile organic compounds using a photo ionisation detector (PID) for collected borehole soil samples. Installation and development of two monitoring wells (MW02 and MW03) to complement the existing onsite well MW01. Collection and analysis of representative soil and groundwater samples. Collection of 3 QA / QC samples (2 soil and 1 water) for laboratory analysis. <p>Borehole and monitoring well locations are shown in Attachment A. Borehole and monitoring well logs are provided in Attachment B.</p>
Soil sampling	<p>Soil sampling was completed by the MA environmental consultant using a clean pair of nitrile gloves for each sample.</p> <p>Each sample was placed into a laboratory supplied, 250 mL glass jar with no headspace to limit volatile loss and labelled with a unique identification number.</p>
Field Screening	<p>All collected soil samples were field screened for potential volatile contaminants using a calibrated photoionization detector (PID). Calibration certificates are provided in Attachment H and PID recordings are shown in the borehole logs in Attachment C.</p>
Groundwater sampling	<p>Each well was developed on the same day after construction and purged dry. Groundwater sampling was completed by MA environmental consultants 7 days after monitoring wells were fully developed.</p> <p>Groundwater samples were collected only when water quality parameters (pH, electrical conductivity, oxidation and temperature) stabilised (3 consecutive similar readings), indicating chemical equilibrium has occurred.</p> <p>Groundwater quality parameter field sheets are provided in Attachment G.</p> <p>Groundwater sampling was conducted using a clean pair of nitrile gloves for each sample, and collected into laboratory supplied bottles with appropriate preservations via a low flow groundwater micro purge sampling bladder pump. Samples for metal analysis were field filtered.</p>
QA / QC sampling	<p>QA samples were collected for PSI are as follows:</p> <ul style="list-style-type: none"> Two soil duplicate sample was collected for intra laboratory analysis during investigations. One soil trip blank and one trip spike sample were used during soil sampling. One water duplicate sample was collected for intra laboratory analysis during the investigation. One water trip blank and one trip spike sample were used during groundwater sampling.

Activity	Detail / Comments
Sample handling and transport	<p>Sample collection, storage and transport were conducted according to MA SOP.</p> <p>Collected soil and groundwater samples were placed immediately into an ice chilled cooler box.</p> <p>Samples were dispatched to NATA accredited laboratories under chain of custody documentation within holding times.</p>

4.4 Laboratory Analytical Suite

Laboratory analysis was carried out by Envirolab Pty Ltd a NATA accredited laboratory. Summary of laboratory analyses is provided in Table 10.

Table 10: Summary of soil laboratory analyses.

COPC	Primary Samples Analysed	QA / QC Samples Analysed
BTEXN	5	1 trip spike
TRH	5	1 trip blank
PAH	5	
Heavy metals ¹	5	2 duplicate

Table 11: Summary of groundwater laboratory analyses.

COPC	Primary Samples Analysed	QA / QC Samples Analysed
BTEXN	3	1 duplicate, 1 trip spike
TRH	3	1 duplicate, 1 trip blank
PAH	3	1 duplicate
Heavy metals ¹	3	1 duplicate

Notes

¹Heavy metals – arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc.

Laboratory chain of custody documentation are provided in Attachment F.

5 Site Assessment Criteria

The site assessment criteria (SAC) adopted for this PSI, are listed in Table 12 and derived from the ASC NEPM (2013). Ecological receptors were not assessed for the purpose of this PSI as the site will have limited access to soil given the proposed multi storey residential development will involve excavation of approximately 6 mbgl for the construction of the proposed two levelled basement, covering the majority of the site in hardstand.

Table 12: Site assessment criteria.

Media	Adopted Guidelines	Applicability
Soil	ASC NEPM (2013)	<u>Health investigation levels (HIL)</u> HIL B – Residential with limited soil access was adopted based on the proposed high density residential development. <u>Health screening levels (HSL)</u> HSL D – In accordance with NEPM (2013) guidance, commercial / industrial HSLs have been adopted to assess potential vapour risks as the proposed development is understood to include a two level basement carpark. <u>Management Limits</u> Residential land use, coarse soil
Groundwater	ANZG (2018) ASC NEPM (2013)	<u>Freshwater</u> 95 % species protection. <u>Health screening levels (HSL)</u> HSL D – In accordance with NEPM (2013) guidance, commercial / industrial HSLs have been adopted to assess potential vapour risks as the proposed development is understood to include a two level basement carpark.

6 Results

6.1 General Field Observations

Borehole drilling and well installation works were undertaken between 15 and 16 February. All locations were examined for signs of contamination (odours, staining etc.). The following observations were made:

- The site was operating as a motel during the time of investigation.
- No surficial staining or odour were noted.

Groundwater sampling of monitoring wells were undertaken on 25 February 2021. The following observations were made:

- Groundwater was mostly dark brown and turbid.
- No sheen or hydrocarbon odour were noted during sampling.

6.2 Soil Conditions

Subsurface conditions generally consisted of fill comprising gravelly clayey sand to depths of 1.5 mbgl. Residual soil (silty clay) was encountered beneath overlying fill to a depth of 3.5 mbgl.

Hydrocarbon odours were noted within fill and residual soil layers of BH302 between 1.2 to 4.0 mbgl. PID reading of 305 parts per million (ppm) was recorded for sample collected in BH302 at depths of 1.3 to 1.5 mbgl. The PID reading ranges between 0.9 and 1.1 ppm for BH301, and 0.6 and 305 ppm for BH302.

Weathered shale was encountered from the depth of 3.5 mbgl to investigation termination depth of 13.4 mbgl. No observation of odours or positive PID measurements were made within the deeper shale profile.

Borehole and monitoring well locations are shown on the sampling plan in Attachment A. Borehole and monitoring well logs are provided in Attachment C.

6.3 Groundwater Conditions

Saturated soils were not encountered during borehole drilling to 4.0 mbgl. Based on site survey (METWEST, 2020) and dip meter readings from 25 February 2021, permanent water table is expected to be between 85.6 to 88.9 mAHD.

Three monitoring wells were installed during intrusive investigations. MW01 and MW02 were installed directly down gradient of the service

station in the south eastern portion of the site, while MW03 was installed in the north western portion of the site to act as a background monitoring well.

Monitoring well locations are shown on the sampling plan in Attachment A and construction details are provided in the borehole logs in Attachment C.

6.4 Analytical Results

The following sections summarise the results of field and laboratory analysis. Detailed tabulated results showing individual sample concentrations compared to the adopted SAC are available in Attachment D. Laboratory analytical documentation is available in Attachment F.

6.4.1 Soil Results

Laboratory analytical results for soil are summarised in Table 13.

Table 13: Summary of soil analytical results.

Analyte	Results Compared to SAC
Heavy metals	<u>HIL</u> Concentrations of heavy metals were all reported below the adopted SAC.
TRH/BTEXN	<u>HSL</u> TRH C ₆ – C ₁₀ F1 at 190 mg/kg reported in sample BH301/1.3 – 1.5 TRH C ₁₀ – C ₁₆ F2 at 590 mg/kg reported in sample BH301/1.3 – 1.5 Toluene at 2 mg/kg reported in sample BH301/1.3 – 1.5 Total Xylene at 40 mg/kg reported in sample BH301/1.3 – 1.5 Naphthalene at 7 mg/kg in sample BH301/1.3 – 1.5 Naphthalene at 0.5 mg/kg in sample BH301/1.8 – 2.0 Naphthalene at 0.4 mg/kg in sample BH301/2.8 – 3.0 All results (including above detections) were reported at concentrations below the adopted SAC. <u>Management Limits</u> All results below SAC.
PAH	<u>HIL</u> Minor detections of PAH compounds were reported in most of the shallow fill samples at concentrations below the adopted SAC.

6.4.2 Groundwater Results

Groundwater samples were collected on 25 February 2021, with field water quality parameters summarised in Table 14 and laboratory analytical results summarised in Table 15.

Table 14: Groundwater field water quality indicators.

Well ID	Water level [mbgl]	Temp. [°C]	DO [ppm]	EC [µS/cm]	pH	ORP (mV)
MW01	8.58	19.6	1.69	1.21	5.09	158
MW02	6.68	20.1	2.25	0.90	5.68	69.9
MW03	7.82	24.2	1.09	1.24	5.83	88.9

Table 15: Summary of groundwater analytical results.

Analyte	Results Compared to SAC
Heavy metals	<u>ANZG 95% Freshwater</u> MW01 (0.3 µg/L) exceeded the SAC for cadmium (0.2 µg/L). MW01 (3 µg/L), MW02 (4 µg/L) and MW03 (3 µg/L) exceeded the SAC for copper (1.4 µg/L). MW01 (54 µg/L), MW02 (52 µg/L) and MW03 (36 µg/L) exceeded the SAC for nickel (11 µg/L). MW01 (170 µg/L), MW02 (110 µg/L) and MW03 (240 µg/L) exceeded the SAC for zinc (8 µg/L). All other results below SAC.
TRH / BTEXN	<u>ANZG 95% Freshwater</u> All results below SAC.
PAH	<u>ANZG 95% Freshwater</u> All results below SAC.

6.4.3 Data QA / QC

Field QA / QC data was collected as per the SAQP. A review of QA / QC procedure has been completed and is presented in the data validation report in Attachment E.

The report concludes that data is suitable for the purposes of the assessment.

7

Discussion

The review of the site history indicated existing condition for 1 Gatacre Avenue was constructed between 1951 and 1978, and 5 Allison Avenue was constructed before 1930.

Potential contamination sources are summarised as:

- Neighbour service station (and former service station) directly up gradient from the site may have introduced heavy metals or hydrocarbons into the soil and / or groundwater.
- Fill from unknown origins could have introduced asbestos (possible construction material), pesticides (pest control) and heavy metals (paints, galvanised metals, pest control).

Field observation of hydrocarbon odours in BH301 and the laboratory confirmation of TRH and BTEX concentration in soil sample BH301/1.3 – 1.5 confirms that hydrocarbon impacts, possibly associated with the adjacent service station, are present within site soils. The data collected so far, suggests that soil hydrocarbon impacts may be isolated given that soil samples collected from BH201 and BH302 did not report concentrations of TRH or BTEX nor were any field observations such as odours or soil staining made during testing at these locations.

Detections of minor PAH concentrations was generally limited to shallow samples across the site and are likely attributed to the fill layer present at all testing locations. Concentrations of naphthalene (a PAH compound associated with petroleum products) were however identified in samples collected from BH301.

The concentrations of TRH, BTEX and PAHs identified in soil samples were all found to be below the SAC adopted for this investigation.

Additional groundwater monitoring wells MW02 and MW03 were installed following the detection of TRH C₆ – C₁₀ in MW01 in December 2020. Groundwater levels were recorded as being slightly shallower (6.7 mbgl) in the central portion and deeper (7.8 to 8.6 mbgl) in the northern and southern portion of the site. Water quality indicators suggest that the water was slightly acidic, slightly oxidising (69.9 - 158 mV) and regarded as freshwater (EC 0.9 to 1.24 µS/cm).

All three wells (MW01 – MW03) were sampled during this PSI and analysed for TRH, BTEX, PAH and heavy metals. Laboratory analytical results indicated all hydrocarbon analytes (BTEX, TRH and PAH) were below laboratory detection limit. Minor exceedances of heavy metal SAC concentrations were recorded, however these results are expected to

be representative of the wider regional aquifer quality and not indicative of any single point source of contamination (such as the nearby service station).

There are still data gaps present which will require further investigation. All groundwater samples collected for this PSI reported concentrations of hydrocarbons below the laboratory detection limit for hydrocarbon contaminants. However due to the December 2020 hydrocarbon detection in MW01, additional groundwater sampling will be required to measure site groundwater trends. Additionally, due to the site access restrictions, MW01 and MW02 are located approximately 10 m from the site boundary shared with the service station. Further assessment of soils and groundwater monitoring locations closer to the northern boundary will be required to further develop the conceptual site model and delineate potential hydrocarbon impacts from the service station.

Given the proposed development requires approximately 6.0 mbgl of excavation across a majority of the site, it is expected that any hydrocarbon impacted soil will be removed from site during this process. A formal waste classification assessment in accordance with the NSW EPA Waste Classification Guidelines (2014) will be required prior to any soil removal from site. A better understanding of offsite waste disposal requirements can be determined once the extent of hydrocarbon impact has been properly delineated in additional investigations.

Conclusions and Recommendations

Overall, the extent of hydrocarbon impacted soils appears to be localised and limited only to the southern portion of the site in the vicinity of MW01 and MW02. Due to limited sampling and restricted access on site, additional investigations will be required to further delineate the extent of hydrocarbon impacted soils (including 5 Allison Avenue).

All groundwater samples collected for this PSI reported concentrations below the laboratory detection limit for hydrocarbon contaminants. However due to the December 2020 hydrocarbon detection in MW01, additional groundwater monitoring rounds are recommended to measure site groundwater trends.

It is recommended that a detailed site investigation (DSI) is completed for the site to address site data gaps and confirm site suitability for the proposed development. The DSI should be prepared to meet the requirements outlined in NSW EPA (2020) *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites* and the NSW EPA (1995) *Contaminated Sites: Sampling Design Guidelines*.

9 Limitations

This PSI was undertaken in general accordance with current industry standards.

It is important to note that no land contamination study can be considered to be a complete and exhaustive characterisation of a site nor can it be guaranteed that any assessment shall identify and characterise all areas of potential contamination or all past potentially contaminating land uses. This is particularly the case where onsite filling has occurred or restrictions of sampling due to site access. Therefore, this report should not be read as a guarantee that only contamination identified shall be found on the site. Should material be exposed in future which appears to be contaminated, additional testing may be required to determine the implications for the site.

Martens & Associates Pty Ltd has undertaken this assessment for the purposes of assessing potential site contamination. No reliance on this report should be made for any other investigation or proposal. Martens & Associates Pty Ltd accepts no responsibility, and provides no guarantee regarding the characteristics of areas of the site not specifically studied in this investigation.

10

References

- Martens and Associates Pty Ltd (2020a) *Preliminary Contamination Screening Assessment: 1 Gatacre Avenue and 5 Allison Avenue, Lane Cove, NSW*. Ref. P2008014JC01V01.
- Martens and Associates Pty Ltd (2020b) *Preliminary Geotechnical Assessment: 1 Gatacre Avenue and 5 Allison Avenue, Lane Cove, NSW*. Ref. P2008014JR01V01.
- Herbert C., 1983, Sydney 1:100 000 Geological Sheet 9130, 1st edition. Geological Survey of New South Wales, Sydney.
- Metwest Surveys Pty Ltd (2019). Drawing numbers: 200082-DET, Revision No. 1, Sheet 1 of 1 and Sheet 2 of 2, dated 19.10.2020. (Metwest, 2020)
- NEPC (1999, amended 2013) *National Environmental Protection (Assessment of Site Contamination) Measure*. Referred to as ASC NEPM (2013).
- NSW Department of Environment & Heritage (2021), eSPADE, NSW soil and land information, www.environment.nsw.gov.au, accessed 02.03.2021.
- NSW EPA (1995) *Contaminated Sites: Sampling Design Guidelines*.
- NSW EPA (2017) 3rd Ed. *Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme*.
- NSW EPA (2020) *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites*.
- Standards Australia (1997) Australian Standard AS 4482.1 – *Guide to sampling and investigation of potentially contaminated soil: Part 2: Non-volatile and semi-volatile substances*.
- Standards Australia (1999) Australian Standard AS 4482.1 – *Guide to sampling and investigation of potentially contaminated soil: Part 2: Volatile substances*.
- State Environmental Planning Policy No. 55 – *Remediation of Contaminated Land*.

Attachment A: Site Plans

Legend

- Site Boundary
- Investigation Area
- Service Station
- Borehole/Monitoring Well Locations



1:500 @ A3

Source: Nearmap

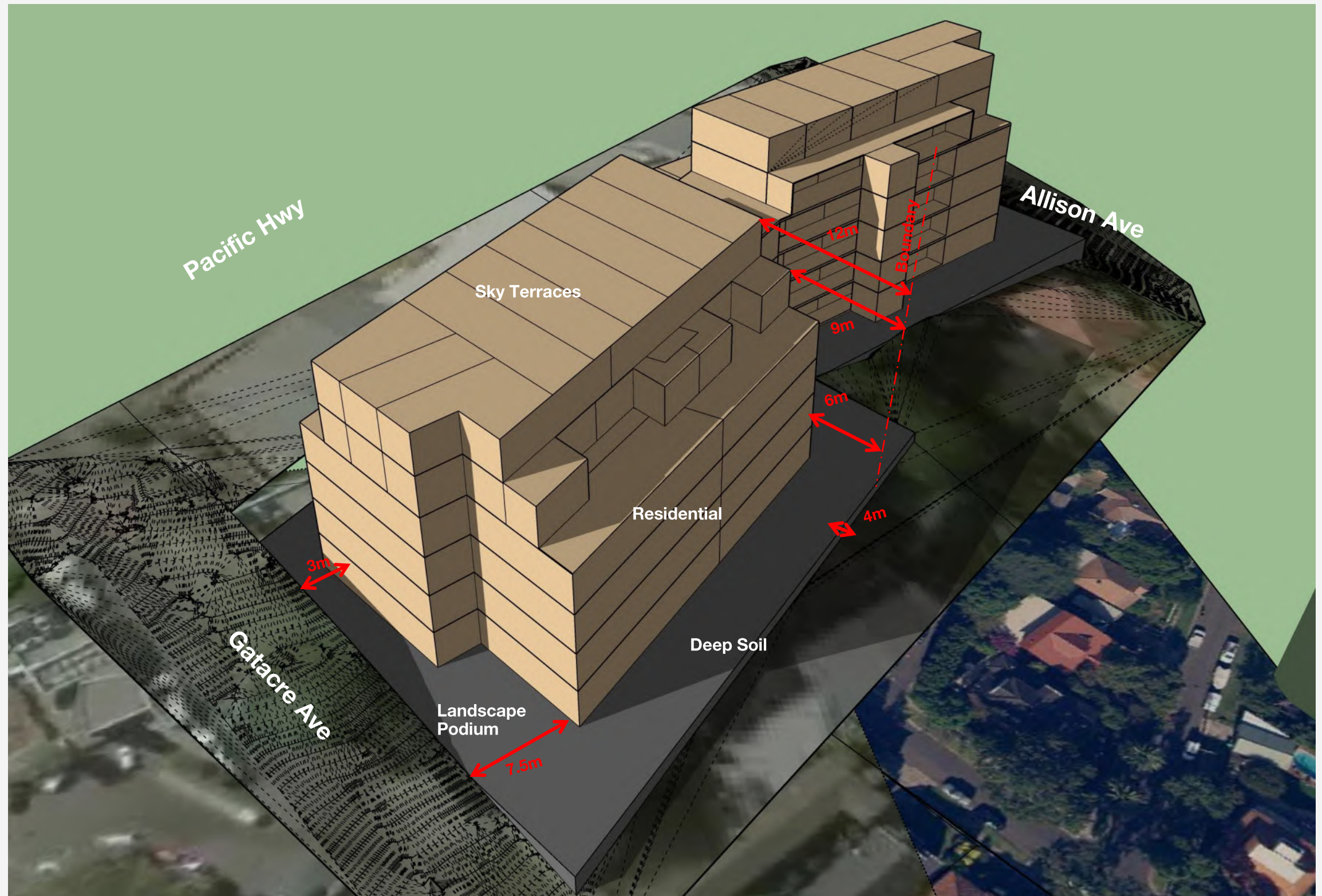
Map Title / Figure:
Site Investigation Plan

Map 01	Map
1 Gatacre Ave and 5 Allison Ave, Lane Cove, NSW	Site
Proposed Residential Development	Project
Preliminary Site Investigation	Sub-Project
WINIM Developments	Client
09/03/2021	Date

Attachment B: Proposed Development Plans

Preliminary Feasibility

**1 Gatacre, 5 Allison Ave
Lane Cove**



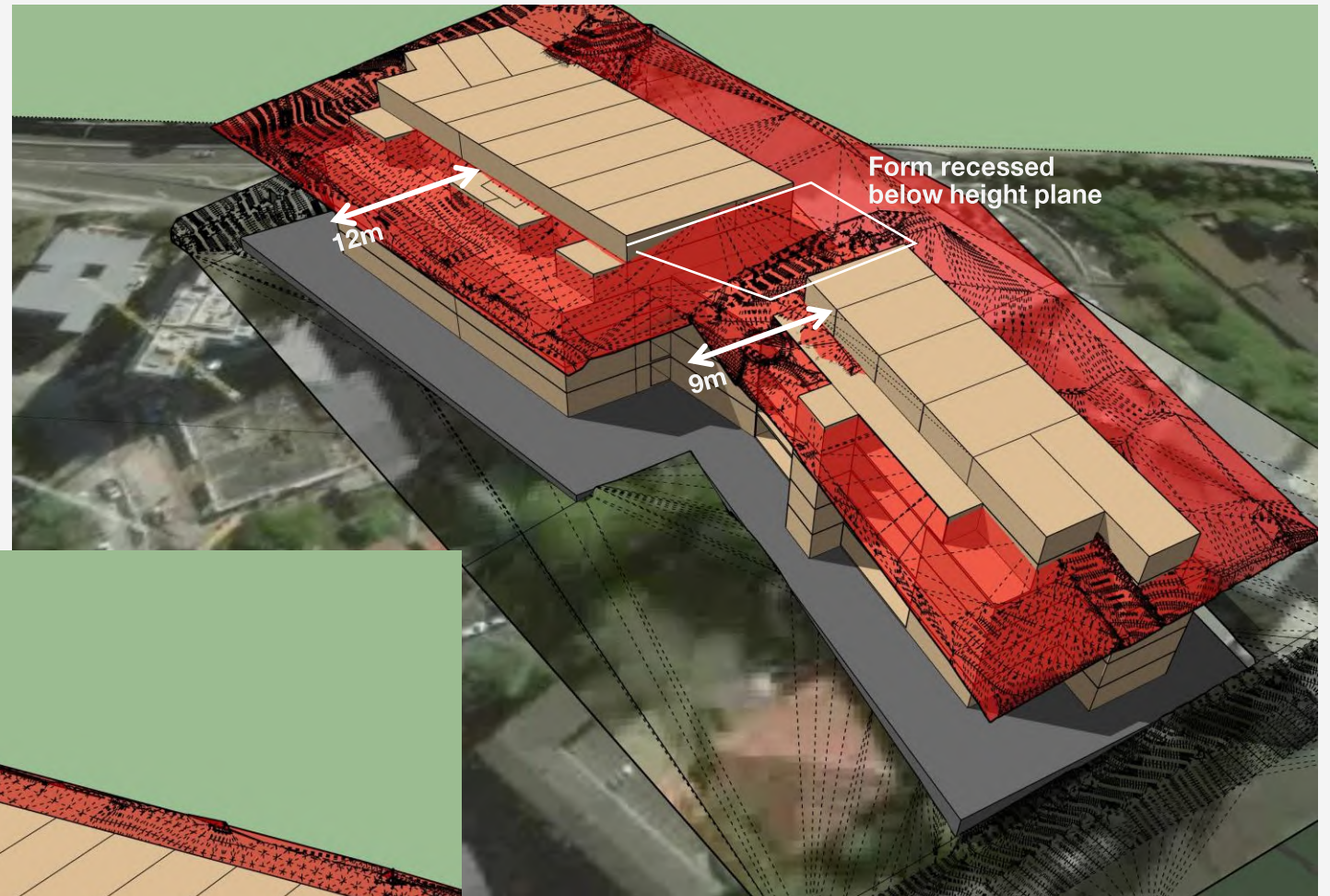
Overview 1



Overview 1



Overview 3



- To create visual break in form, area is redistributed to double storey apartments on the upper two levels.
- Protrusions through height plane partially setback from boundary further than required under ADG
- Upper level is bedroom floor (lower height)
- Can shape roof form as needed
- Portion of form above height plane approx. 850sqm.
- 300sqm of this is redistributed from level
- 150sqm is from increase in NSA
- A half floor on the basement level (circa 400sqm) would be required to regain this area

Height

Attachment C: Borehole and Monitoring Well Logs

Attachment D: Laboratory Summary Tables

	TRH							BTEX						PAH																	Metals												
	C6-C10	C6-C10 (F1 minus BTEX)	C10-C16	C10-C16 (F2 minus Naphthalene)	C16-C34	C34-C40	C10-C40 (Sum of total)	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	Benzo(b+j+k)fluoranthene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a) pyrene	Benzo(g,h,i)perylene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Benzo(a)pyrene TEQ calc (Half)	Benzo(a)pyrene TEQ (LOR)	Benzo(a)pyrene TEQ calc (Zero)	PAHs (Sum of positives)	Carcinogenic PAHs as B(a)p TPE	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	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	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
EQL	25	25	50	50	100	100	50	0.2	0.5	1	2	1	3	0.2	0.1	0.1	0.1	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.5	0.5	0.5	0.05		4	0.4	1	1	1	0.1	1	1	
NEPM 2013 Table 1A(1) HILs Res B Soil																													4	4	4	400	4	500	150	100	30000	1200	120	1200	60000		
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand																																											
0-1m		260		NL				3	NL	NL			230														NL																
1-2m		370		NL				3	NL	NL			NL														NL																
2-4m		630		NL				3	NL	NL			NL														NL																
NEPM 2013 Table 1B(7) Management Limits Comm / Ind, Coarse Soil	700		1000		3500	10000																																					
Field_ID																																											
8014/BH301/1.2-1.4	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3	<0.2	<0.1	<0.1	<0.1	<0.1	0.05	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.5	<0.5	<0.5	0.3	0.111	5	<0.4	12	41	130	0.2	7	140		
8014/BH302/0.3-0.5	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3	<0.2	<0.1	<0.1	<0.1	0.1	0.08	<0.1	0.1	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	0.6	0.1465	9	<0.4	15	50	100	0.2	5	170		
8014/BH302/1.3-1.5	230	190	600	590	250	<100	850	<0.2	2	<1	26	14	40	<0.2	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	7	0.2	0.1	<0.5	<0.5	<0.5	7.2	<0.172	<4	<0.4	3	15	6	<0.1	<1	2		
8014/BH302/1.8-2.0	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3	<0.2	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.5	<0.1	<0.1	<0.5	<0.5	<0.5	0.54	<0.172	<4	<0.4	5	26	12	<0.1	2	10		
8014/BH302/2.8-3.0	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3	<0.2	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.5	<0.5	<0.5	0.4	<0.172	<4	<0.4	4	29	10	<0.1	<1	3		
Statistical Summary																																											
Number of Results	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Number of Detects	1	1	1	1	1	0	1	0	1	0	1	1	1	0	0	0	0	1	2	0	1	0	2	1	0	3	1	3	0	0	0	5	2	2	0	5	5	5	5	5	2	3	5
Minimum Concentration	<25	<25	<50	<50	<100	<100	<50	<0.2	<0.5	<1	<2	<1	<3	<0.2	<0.1	<0.1	<0.1	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	0.3	0.111	<4	<0.4	3	15	6	<0.1	<1	2		
Minimum Detect	230	190	600	590	250	ND	850	ND	2	ND	26	14	40	ND	ND	ND	ND	0.1	0.05	ND	0.1	ND	0.1	0.1	ND	0.4	0.2	0.1	ND	ND	ND	0.3	0.111	5	ND	3	15	6	0.2	2	2		
Maximum Concentration	230	190	600	590	250	<100	850	<0.2	2	<1	26	14	40	<0.2	<0.1	<0.1	<0.1	<0.1	0.1	0.08	<0.1	0.1	<0.1	0.2	0.1	<0.1	7	0.2	0.2	<0.5	<0.5	<0.5	7.2	<0.172	9	<0.4	15	50	130	0.2	7	170	
Maximum Detect	230	190	600	590	250	ND	850	ND	2	ND	26	14	40	ND	ND	ND	ND	0.1	0.08	ND	0.1	ND	0.2	0.1	ND	7	0.2	0.2	ND	ND	ND	7.2	0.147	9	ND	15	50	130	0.2	7	170		
Average Concentration	56	48	140	138	90	50	190	0.1	0.6	0.5	6	3.2	9.2	0.1	0.05	0.05	0.05	0.06	0.041	0.05	0.06	0.05	0.09	0.06	0.05	1.6	0.08	0.1	0.25	0.25	0.25	1.8	0.1	4	0.2	7.8	32	52	0.11	3	65		
Median Concentration	12.5	12.5	25	25	50	50	25	0.1	0.25	0.5	1	0.5	1.5	0.1	0.05	0.05	0.05	0.05	0.025	0.05	0.05	0.05	0.05	0.05	0.05	0.4	0.05	0.1	0.25	0.25	0.25	0.54	0.086	2	0.2	5	29	12	0.05	2	10		
Standard Deviation	97	79	257	253	89	0	369	0	0.78	0	11	6	17	0	0	0	0	0.022	0.024	0	0.022	0	0.065	0.022	0	3	0.067	0.061	0	0	0	3	0.027	3.1	0	5.4	14	59	0.082	2.9	83		
Number of Guideline Exceedances	0	0	0	5	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Number of Guideline Exceedances(Detects Only)	0	0	0	5	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

				TRH						BTEX					PAH														Metals																	
				C6-C10	C6-C10 (F1 minus BTEX)		C10-C16	C10-C16 (F2 minus Naphthalene)		C16-C34	C34-C40	Benzene	Toluene	Ethylbenzene	Xylene (m & p)		Xylene (o)	Benzo(b+j+k)fluoranthene	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a) pyrene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	Benzo(a)pyrene TEQ	PAHs (Sum of positives)	Arsenic (Filtered)	Cadmium (Filtered)	Chromium (III+VI) (Filtered)	Copper (Filtered)	Lead (Filtered)	Mercury (Filtered)	Nickel (Filtered)	Zinc (Filtered)				
				µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L				
EQL				10	10	50	50	100	100	1	1	1	2	1	0.002	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.005	0.001	0.001	0.0001	0.001	0.001	0.00005	0.001	0.001	0.001			
ANZG (2018) Freshwater 95% toxicant DGVs										950					350															16						0.0002		0.0014	0.0034	0.0006	0.011	0.008				
Field_ID	LocCode	WellCode	Sampled_Date-Time																																											
8014/MW01	8014/MW01		25/02/2021	<10	<10	<50	<50	<100	<100	<1	<1	<1	<2	<1	<0.002	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
8014/MW02	8014/MW02		25/02/2021	<10	<10	<50	<50	<100	<100	<1	<1	<1	<2	<1	<0.002	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
8014/MW03	8014/MW03		25/02/2021	<10	<10	<50	<50	<100	<100	<1	<1	<1	<2	<1	<0.002	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Statistical Summary																																														
Number of Results				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3			
Number of Detects				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	2	0	3	0	0	3	3	3			
Minimum Concentration				<10	<10	<50	<50	<100	<100	<1	<1	<1	<2	<1	<0.002	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Minimum Detect				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration				<10	<10	<50	<50	<100	<100	<1	<1	<1	<2	<1	<0.002	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Maximum Detect				ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration				5	5	25	25	50	50	0.5	0.5	0.5	1	0.5	0.001	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.0025	0	0.0007	0.0002	0.0005	0.0033	0.0005	0.000025	0.047	0.17				
Median Concentration				5	5	25	25	50	50	0.5	0.5	0.5	1	0.5	0.001	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.0025	0	0.0005	0.0001	0.0005	0.003	0.0005	0.000025	0.052	0.17				
Standard Deviation				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0003	0.0001	0	0.00058	0	0	0.0099	0.065				
Number of Guideline Exceedances				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	3	3				
Number of Guideline Exceedances(Detects Only)				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0	0	3	3				

Attachment E: Data Validation Report

Sample Handling

Lab Report	Sample Chain of Custody (COC) Procedures	Sample Preservation	Sample Receipt Notification Matches COC	Samples Analysed Within Holding Time
262091 - S	Pass	Pass	Pass	Pass
262902 - W	Pass	Pass	Pass	Pass

All soil and water samples were delivered in chilled cooler boxes within holding times, with accompanying COC.

Precision / Accuracy

Lab Report	Analysed by NATA Laboratory	Trip Spike and Blank Used	Adequate Duplicates Analysed	Field Rinsate Analysed
262091 - S	Pass	Pass	Pass	NA
262902 - W	Pass	Pass	Pass	NA

Both soil and water trip spikes and blanks reported within the acceptable recovery range.

Both soil and water trip blanks reported less than LOR for volatile analysis.

Duplicates/ laboratory QA / QC

Lab Report	Field RPD	Laboratory Surrogate Recovery	Laboratory Duplicate RPD	Lab Blank and Matrix Spike Recovery	Laboratory Control Sample
262091 - S	Pass	Pass	Pass	Pass	Pass
262902 - W	Pass	Pass	Pass	Pass	Pass

RPD control limits were exceeded for lead, nickel and zinc in BH302/1.3-1.5 and Dup01. As the sample was in heterogeneous fill and all reported concentration were less than the SAC, the data is usable for this report.

Attachment F: Laboratory Certificates

CERTIFICATE OF ANALYSIS 262091

Client Details

Client	Martens & Associates Pty Ltd
Attention	William Xu
Address	Suite 201, 20 George St, Hornsby, NSW, 2077

Sample Details

Your Reference	<u>P2008014, 1Gatacre Ave & 5 Allison Ave Lane Cove</u>
Number of Samples	19 SOIL
Date samples received	16/02/2021
Date completed instructions received	17/02/2021

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
 Samples were analysed as received from the client. Results relate specifically to the samples as received.
 Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

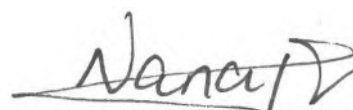
Report Details

Date results requested by	25/02/2021
Date of Issue	24/02/2021
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Results Approved By

Dragana Tomas, Senior Chemist
 Giovanni Agosti, Group Technical Manager
 Manju Dewendrage, Chemist

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil

Our Reference		262091-1	262091-2	262091-3	262091-4	262091-5
Your Reference	UNITS	8014/BH301/1.2-1.4	8014/BH302/0.3-0.5	8014/BH302/1.3-1.5	8014/BH302/1.8-2.0	8014/BH302/2.8-3.0
Date Sampled		15/02/2021	15/02/2021	15/02/2021	15/02/2021	15/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	19/02/2021	19/02/2021	19/02/2021	19/02/2021	19/02/2021
Date analysed	-	22/02/2021	22/02/2021	22/02/2021	22/02/2021	22/02/2021
TRH C ₆ - C ₉	mg/kg	<25	<25	110	<25	<25
TRH C ₆ - C ₁₀	mg/kg	<25	<25	230	<25	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	<25	<25	190	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	2	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	26	<2	<2
o-Xylene	mg/kg	<1	<1	14	<1	<1
naphthalene	mg/kg	<1	<1	7	<1	<1
Total +ve Xylenes	mg/kg	<3	<3	40	<3	<3
Surrogate aaa-Trifluorotoluene	%	97	87	94	106	85

vTRH(C6-C10)/BTEXN in Soil

Our Reference		262091-8	262091-9
Your Reference	UNITS	Trip Spike	Trip Blank
Date Sampled		15/02/2021	15/02/2021
Type of sample		SOIL	SOIL
Date extracted	-	19/02/2021	19/02/2021
Date analysed	-	22/02/2021	22/02/2021
TRH C ₆ - C ₉	mg/kg	[NA]	<25
TRH C ₆ - C ₁₀	mg/kg	[NA]	<25
vTPH C ₆ - C ₁₀ less BTEX (F1)	mg/kg	[NA]	<25
Benzene	mg/kg	93%	<0.2
Toluene	mg/kg	95%	<0.5
Ethylbenzene	mg/kg	97%	<1
m+p-xylene	mg/kg	97%	<2
o-Xylene	mg/kg	97%	<1
naphthalene	mg/kg	[NA]	<1
Total +ve Xylenes	mg/kg	[NA]	<3
Surrogate aaa-Trifluorotoluene	%	93	103

svTRH (C10-C40) in Soil						
Our Reference		262091-1	262091-2	262091-3	262091-4	262091-5
Your Reference	UNITS	8014/BH301/1.2-1.4	8014/BH302/0.3-0.5	8014/BH302/1.3-1.5	8014/BH302/1.8-2.0	8014/BH302/2.8-3.0
Date Sampled		15/02/2021	15/02/2021	15/02/2021	15/02/2021	15/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	19/02/2021	19/02/2021	19/02/2021	19/02/2021	19/02/2021
Date analysed	-	19/02/2021	19/02/2021	19/02/2021	19/02/2021	19/02/2021
TRH C ₁₀ - C ₁₄	mg/kg	<50	<50	700	<50	<50
TRH C ₁₅ - C ₂₈	mg/kg	<100	<100	140	<100	<100
TRH C ₂₉ - C ₃₆	mg/kg	<100	<100	170	<100	<100
TRH >C ₁₀ -C ₁₆	mg/kg	<50	<50	600	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	mg/kg	<50	<50	590	<50	<50
TRH >C ₁₆ -C ₃₄	mg/kg	<100	<100	250	<100	<100
TRH >C ₃₄ -C ₄₀	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	850	<50	<50
Surrogate o-Terphenyl	%	82	77	82	80	82

PAHs in Soil						
Our Reference		262091-1	262091-2	262091-3	262091-4	262091-5
Your Reference	UNITS	8014/BH301/1.2-1.4	8014/BH302/0.3-0.5	8014/BH302/1.3-1.5	8014/BH302/1.8-2.0	8014/BH302/2.8-3.0
Date Sampled		15/02/2021	15/02/2021	15/02/2021	15/02/2021	15/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date extracted	-	19/02/2021	19/02/2021	19/02/2021	19/02/2021	19/02/2021
Date analysed	-	19/02/2021	19/02/2021	19/02/2021	19/02/2021	19/02/2021
Naphthalene	mg/kg	<0.1	<0.1	6.8	0.5	0.4
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	0.2	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	0.2	0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.05	0.08	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	0.3	0.60	7.2	0.54	0.4
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate <i>p</i> -Terphenyl-d14	%	107	108	103	106	106

Acid Extractable metals in soil

Our Reference		262091-1	262091-2	262091-3	262091-4	262091-5
Your Reference	UNITS	8014/BH301/1.2-1.4	8014/BH302/0.3-0.5	8014/BH302/1.3-1.5	8014/BH302/1.8-2.0	8014/BH302/2.8-3.0
Date Sampled		15/02/2021	15/02/2021	15/02/2021	15/02/2021	15/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	22/02/2021	22/02/2021	22/02/2021	22/02/2021	22/02/2021
Date analysed	-	22/02/2021	22/02/2021	22/02/2021	22/02/2021	22/02/2021
Arsenic	mg/kg	5	9	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	12	15	3	5	4
Copper	mg/kg	41	50	15	26	29
Lead	mg/kg	130	100	6	12	10
Mercury	mg/kg	0.2	0.2	<0.1	<0.1	<0.1
Nickel	mg/kg	7	5	<1	2	<1
Zinc	mg/kg	140	170	2	10	3

Acid Extractable metals in soil

Our Reference		262091-6	262091-7
Your Reference	UNITS	8014/DUP01	8014/DUP02
Date Sampled		15/02/2021	15/02/2021
Type of sample		SOIL	SOIL
Date prepared	-	22/02/2021	22/02/2021
Date analysed	-	22/02/2021	22/02/2021
Arsenic	mg/kg	<4	8
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	7	20
Copper	mg/kg	22	57
Lead	mg/kg	43	120
Mercury	mg/kg	<0.1	<0.1
Nickel	mg/kg	3	5
Zinc	mg/kg	24	140

Moisture						
Our Reference		262091-1	262091-2	262091-3	262091-4	262091-5
Your Reference	UNITS	8014/BH301/1.2-1.4	8014/BH302/0.3-0.5	8014/BH302/1.3-1.5	8014/BH302/1.8-2.0	8014/BH302/2.8-3.0
Date Sampled		15/02/2021	15/02/2021	15/02/2021	15/02/2021	15/02/2021
Type of sample		SOIL	SOIL	SOIL	SOIL	SOIL
Date prepared	-	19/02/2021	19/02/2021	19/02/2021	19/02/2021	19/02/2021
Date analysed	-	22/02/2021	22/02/2021	22/02/2021	22/02/2021	22/02/2021
Moisture	%	25	27	13	17	15

Moisture			
Our Reference		262091-6	262091-7
Your Reference	UNITS	8014/DUP01	8014/DUP02
Date Sampled		15/02/2021	15/02/2021
Type of sample		SOIL	SOIL
Date prepared	-	19/02/2021	19/02/2021
Date analysed	-	22/02/2021	22/02/2021
Moisture	%	18	16

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

Method ID	Methodology Summary
Org-023	<p>Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.</p> <p>Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.</p>

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	262091-2
Date extracted	-			19/02/2021	1	19/02/2021	19/02/2021		19/02/2021	19/02/2021
Date analysed	-			22/02/2021	1	22/02/2021	22/02/2021		22/02/2021	22/02/2021
TRH C ₆ - C ₉	mg/kg	25	Org-023	<25	1	<25	<25	0	96	94
TRH C ₆ - C ₁₀	mg/kg	25	Org-023	<25	1	<25	<25	0	96	94
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	114	110
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	109	103
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	77	79
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	89	90
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	94	87
naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	110	1	97	105	8	105	98

QUALITY CONTROL: svTRH (C10-C40) in Soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	262091-2
Date extracted	-			19/02/2021	1	19/02/2021	19/02/2021		19/02/2021	19/02/2021
Date analysed	-			19/02/2021	1	19/02/2021	19/02/2021		19/02/2021	19/02/2021
TRH C ₁₀ - C ₁₄	mg/kg	50	Org-020	<50	1	<50	<50	0	118	128
TRH C ₁₅ - C ₂₈	mg/kg	100	Org-020	<100	1	<100	<100	0	102	100
TRH C ₂₉ - C ₃₆	mg/kg	100	Org-020	<100	1	<100	<100	0	108	126
TRH >C ₁₀ -C ₁₆	mg/kg	50	Org-020	<50	1	<50	<50	0	118	128
TRH >C ₁₆ -C ₃₄	mg/kg	100	Org-020	<100	1	<100	<100	0	102	100
TRH >C ₃₄ -C ₄₀	mg/kg	100	Org-020	<100	1	<100	<100	0	108	126
Surrogate o-Terphenyl	%		Org-020	90	1	82	83	1	119	77

QUALITY CONTROL: PAHs in Soil				Duplicate				Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	262091-2
Date extracted	-			19/02/2021	1	19/02/2021	19/02/2021		19/02/2021	19/02/2021
Date analysed	-			19/02/2021	1	19/02/2021	19/02/2021		19/02/2021	19/02/2021
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	90	92
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	94	97
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	98	102
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	103	105
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	0.1	0.2	67	102	102
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	0.1	0.2	67	102	102
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	0.1	0	108	113
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	0.05	0.07	33	105	110
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	108	1	107	107	0	106	102

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-4	262091-2
Date prepared	-			22/02/2021	1	22/02/2021	22/02/2021		22/02/2021	22/02/2021
Date analysed	-			22/02/2021	1	22/02/2021	22/02/2021		22/02/2021	22/02/2021
Arsenic	mg/kg	4	Metals-020	<4	1	5	6	18	108	84
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	102	71
Chromium	mg/kg	1	Metals-020	<1	1	12	13	8	106	78
Copper	mg/kg	1	Metals-020	<1	1	41	36	13	108	111
Lead	mg/kg	1	Metals-020	<1	1	130	110	17	105	108
Mercury	mg/kg	0.1	Metals-021	<0.1	1	0.2	0.2	0	98	82
Nickel	mg/kg	1	Metals-020	<1	1	7	8	13	108	79
Zinc	mg/kg	1	Metals-020	<1	1	140	130	7	110	#

Result Definitions

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

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

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

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

8 metals in soil - # Percent recovery is not possible to report due to the inhomogeneous nature of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.



SCB0191

Additional Testing									
Name		P2008014: 1 Gatacre Avenue and 5 Allison Avenue, Lane Cove, NSW							
Martens Contact Officer		William Xu				Contact Email		wxu@martens.com.au	
Sampling and Shipping		Sample Date		15 to 16 February 2021		Dispatch Date		16 February 2021	
		Our Reference		P2008014COC03V01		Shipping Method (X)		Hand <input checked="" type="checkbox"/> Post <input type="checkbox"/> Courier <input type="checkbox"/>	
		On Ice (X)		<input checked="" type="checkbox"/> No Ice (X) <input type="checkbox"/>		Other (X) <input type="checkbox"/>			
Laboratory									
Name		EnviroLab							
Sample Delivery Address		12 Ashley Street, Chatswood							
Delivery Contact		Name		Sampler Receipt		Phone		9910 6200	
						Fax			
Please Send Report By (X)		Post <input type="checkbox"/>		Fax <input type="checkbox"/>		Email <input checked="" type="checkbox"/>		Reporting Email Address	
								wxu@martens.com.au bmcgiffin@martens.com.au	

Sample ID	Combo 3	HM	TRH	BTEXN
1 8014/BH301/1.2-1.4	X			
2 8014/BH302/0.3-0.5	X			
3 8014/BH302/1.3-1.5	X			
4 8014/BH302/1.8-2.0	X			
5 8014/BH302/2.8-3.0	X			
6 8014/Dup01		X		
7 8014/Dup01 (Dup02)		X		
8 Trip Spike				X
9 Trip Blank			X	

EnviroLab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 262091

Date Received: 16/02/21

Time Received: 16.50

Received By: RL

Temp: Cool/Ambient

Cooling: Ice/Icepack

Security: Intact/Broken/None

7°C

Handwritten signature

Please do only 1 set of the TS and TB

extra
 10 BH 301 (0.2-0.4)
 11 BH 301 (0.6-0.8)
 12 BH 301 (1.2-3.0)
 13 BH 301 (2.3-2.5)
 14 BH 301 (3.0-3.2)
 15 BH 302 (0.8-1.0)
 16 BH 302 2.3-2.5
 17 BH 302 3.3-3.5
 18 BH 302 3.8-4.0
 19 Dup 3

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Ph 02 9476 9999 Fax 02 9476 8767

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> www.martens.com.au
MARTENS & ASSOCIATES P/L
ABN 85 070 240 890 ACN 070 240 890

CERTIFICATE OF ANALYSIS 262902

Client Details

Client	Martens & Associates Pty Ltd
Attention	William Xu
Address	Suite 201, 20 George St, Hornsby, NSW, 2077

Sample Details

Your Reference	<u>P2008014: Gatacre Avenue and 5 Allison Avenue</u>
Number of Samples	6 Water
Date samples received	26/02/2021
Date completed instructions received	26/02/2021

Analysis Details

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

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

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

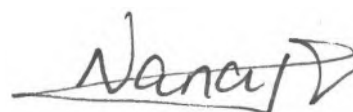
Report Details

Date results requested by	05/03/2021
Date of Issue	04/03/2021
NATA Accreditation Number 2901. This document shall not be reproduced except in full.	
Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *	

Results Approved By

Dragana Tomas, Senior Chemist
 Hannah Nguyen, Senior Chemist

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Water

Our Reference		262902-1	262902-2	262902-3	262902-4	262902-5
Your Reference	UNITS	8014/MW01	8014/MW02	8014/MW03	8014/Dup01	Trip Spike
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		Water	Water	Water	Water	Water
Date extracted	-	02/03/2021	02/03/2021	02/03/2021	02/03/2021	02/03/2021
Date analysed	-	03/03/2021	03/03/2021	03/03/2021	03/03/2021	03/03/2021
TRH C ₆ - C ₉	µg/L	<10	<10	<10	<10	[NA]
TRH C ₆ - C ₁₀	µg/L	<10	<10	<10	<10	[NA]
TRH C ₆ - C ₁₀ less BTEX (F1)	µg/L	<10	<10	<10	<10	[NA]
Benzene	µg/L	<1	<1	<1	<1	114%
Toluene	µg/L	<1	<1	<1	<1	107%
Ethylbenzene	µg/L	<1	<1	<1	<1	115%
m+p-xylene	µg/L	<2	<2	<2	<2	104%
o-xylene	µg/L	<1	<1	<1	<1	111%
Naphthalene	µg/L	<1	<1	<1	<1	[NA]
Surrogate Dibromofluoromethane	%	100	100	100	98	100
Surrogate toluene-d8	%	100	99	99	99	100
Surrogate 4-BFB	%	98	98	96	98	98

vTRH(C6-C10)/BTEXN in Water

Our Reference		262902-6
Your Reference	UNITS	Trip Blank
Date Sampled		25/02/2021
Type of sample		Water
Date extracted	-	02/03/2021
Date analysed	-	03/03/2021
TRH C ₆ - C ₉	µg/L	<10
TRH C ₆ - C ₁₀	µg/L	<10
TRH C ₆ - C ₁₀ less BTEX (F1)	µg/L	<10
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	100
Surrogate toluene-d8	%	99
Surrogate 4-BFB	%	98

svTRH (C10-C40) in Water					
Our Reference		262902-1	262902-2	262902-3	262902-4
Your Reference	UNITS	8014/MW01	8014/MW02	8014/MW03	8014/Dup01
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		Water	Water	Water	Water
Date extracted	-	01/03/2021	01/03/2021	01/03/2021	01/03/2021
Date analysed	-	01/03/2021	01/03/2021	01/03/2021	01/03/2021
TRH C ₁₀ - C ₁₄	µg/L	<50	<50	<50	<50
TRH C ₁₅ - C ₂₈	µg/L	<100	<100	<100	<100
TRH C ₂₉ - C ₃₆	µg/L	<100	<100	<100	<100
TRH >C ₁₀ - C ₁₆	µg/L	<50	<50	<50	<50
TRH >C ₁₀ - C ₁₆ less Naphthalene (F2)	µg/L	<50	<50	<50	<50
TRH >C ₁₆ - C ₃₄	µg/L	<100	<100	<100	<100
TRH >C ₃₄ - C ₄₀	µg/L	<100	<100	<100	<100
Surrogate o-Terphenyl	%	89	88	86	85

PAHs in Water					
Our Reference		262902-1	262902-2	262902-3	262902-4
Your Reference	UNITS	8014/MW01	8014/MW02	8014/MW03	8014/Dup01
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		Water	Water	Water	Water
Date extracted	-	01/03/2021	01/03/2021	01/03/2021	01/03/2021
Date analysed	-	01/03/2021	01/03/2021	01/03/2021	01/03/2021
Naphthalene	µg/L	<1	<1	<1	<1
Acenaphthylene	µg/L	<1	<1	<1	<1
Acenaphthene	µg/L	<1	<1	<1	<1
Fluorene	µg/L	<1	<1	<1	<1
Phenanthrene	µg/L	<1	<1	<1	<1
Anthracene	µg/L	<1	<1	<1	<1
Fluoranthene	µg/L	<1	<1	<1	<1
Pyrene	µg/L	<1	<1	<1	<1
Benzo(a)anthracene	µg/L	<1	<1	<1	<1
Chrysene	µg/L	<1	<1	<1	<1
Benzo(b,j+k)fluoranthene	µg/L	<2	<2	<2	<2
Benzo(a)pyrene	µg/L	<1	<1	<1	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1	<1	<1	<1
Dibenzo(a,h)anthracene	µg/L	<1	<1	<1	<1
Benzo(g,h,i)perylene	µg/L	<1	<1	<1	<1
Benzo(a)pyrene TEQ	µg/L	<5	<5	<5	<5
Total +ve PAH's	µg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate <i>p</i> -Terphenyl-d14	%	88	87	79	82

HM in water - dissolved					
Our Reference		262902-1	262902-2	262902-3	262902-4
Your Reference	UNITS	8014/MW01	8014/MW02	8014/MW03	8014/Dup01
Date Sampled		25/02/2021	25/02/2021	25/02/2021	25/02/2021
Type of sample		Water	Water	Water	Water
Date prepared	-	01/03/2021	01/03/2021	01/03/2021	01/03/2021
Date analysed	-	01/03/2021	01/03/2021	01/03/2021	01/03/2021
Arsenic-Dissolved	µg/L	<1	1	<1	<1
Cadmium-Dissolved	µg/L	0.3	<0.1	0.1	0.3
Chromium-Dissolved	µg/L	<1	<1	<1	<1
Copper-Dissolved	µg/L	3	4	3	3
Lead-Dissolved	µg/L	<1	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	54	52	36	54
Zinc-Dissolved	µg/L	170	110	240	170

Method ID	Methodology Summary
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-022	Determination of various metals by ICP-MS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-023	Water samples are analysed directly by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			02/03/2021	1	02/03/2021	03/03/2021		02/03/2021	[NT]
Date analysed	-			03/03/2021	1	03/03/2021	04/03/2021		03/03/2021	[NT]
TRH C ₆ - C ₉	µg/L	10	Org-023	<10	1	<10	<10	0	97	[NT]
TRH C ₆ - C ₁₀	µg/L	10	Org-023	<10	1	<10	<10	0	97	[NT]
Benzene	µg/L	1	Org-023	<1	1	<1	<1	0	99	[NT]
Toluene	µg/L	1	Org-023	<1	1	<1	<1	0	94	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	1	<1	<1	0	98	[NT]
m+p-xylene	µg/L	2	Org-023	<2	1	<2	<2	0	97	[NT]
o-xylene	µg/L	1	Org-023	<1	1	<1	<1	0	96	[NT]
Naphthalene	µg/L	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate Dibromofluoromethane	%		Org-023	99	1	100	100	0	101	[NT]
Surrogate toluene-d8	%		Org-023	99	1	100	101	1	100	[NT]
Surrogate 4-BFB	%		Org-023	97	1	98	99	1	99	[NT]

Client Reference: P2008014: Gatacre Avenue and 5 Allison Avenue

QUALITY CONTROL: svTRH (C10-C40) in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			01/03/2021	[NT]	[NT]	[NT]	[NT]	01/03/2021	[NT]
Date analysed	-			01/03/2021	[NT]	[NT]	[NT]	[NT]	01/03/2021	[NT]
TRH C ₁₀ - C ₁₄	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	104	[NT]
TRH C ₁₅ - C ₂₈	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	92	[NT]
TRH C ₂₉ - C ₃₆	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	113	[NT]
TRH >C ₁₀ - C ₁₆	µg/L	50	Org-020	<50	[NT]	[NT]	[NT]	[NT]	104	[NT]
TRH >C ₁₆ - C ₃₄	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	92	[NT]
TRH >C ₃₄ - C ₄₀	µg/L	100	Org-020	<100	[NT]	[NT]	[NT]	[NT]	113	[NT]
Surrogate o-Terphenyl	%		Org-020	97	[NT]	[NT]	[NT]	[NT]	92	[NT]

QUALITY CONTROL: PAHs in Water					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W2	[NT]
Date extracted	-			01/03/2021	[NT]	[NT]	[NT]	[NT]	01/03/2021	[NT]
Date analysed	-			01/03/2021	[NT]	[NT]	[NT]	[NT]	01/03/2021	[NT]
Naphthalene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	74	[NT]
Acenaphthylene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Acenaphthene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	77	[NT]
Fluorene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	80	[NT]
Phenanthrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	76	[NT]
Anthracene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Fluoranthene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	71	[NT]
Pyrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	71	[NT]
Benzo(a)anthracene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Chrysene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	70	[NT]
Benzo(b,j+k)fluoranthene	µg/L	2	Org-022/025	<2	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(a)pyrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	80	[NT]
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Dibenzo(a,h)anthracene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Benzo(g,h,i)perylene	µg/L	1	Org-022/025	<1	[NT]	[NT]	[NT]	[NT]	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	87	[NT]	[NT]	[NT]	[NT]	91	[NT]

QUALITY CONTROL: HM in water - dissolved					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W4	[NT]
Date prepared	-			01/03/2021	1	01/03/2021	01/03/2021		01/03/2021	[NT]
Date analysed	-			01/03/2021	1	01/03/2021	01/03/2021		01/03/2021	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	104	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	1	0.3	0.3	0	102	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	103	[NT]
Copper-Dissolved	µg/L	1	Metals-022	<1	1	3	3	0	102	[NT]
Lead-Dissolved	µg/L	1	Metals-022	<1	1	<1	<1	0	98	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	1	<0.05	[NT]		104	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	<1	1	54	53	2	104	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	<1	1	170	170	0	104	[NT]

QUALITY CONTROL: HM in water - dissolved					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	2	01/03/2021	01/03/2021		[NT]	[NT]
Date analysed	-			[NT]	2	01/03/2021	01/03/2021		[NT]	[NT]
Arsenic-Dissolved	µg/L	1	Metals-022	[NT]	2	1	[NT]		[NT]	[NT]
Cadmium-Dissolved	µg/L	0.1	Metals-022	[NT]	2	<0.1	[NT]		[NT]	[NT]
Chromium-Dissolved	µg/L	1	Metals-022	[NT]	2	<1	[NT]		[NT]	[NT]
Copper-Dissolved	µg/L	1	Metals-022	[NT]	2	4	[NT]		[NT]	[NT]
Lead-Dissolved	µg/L	1	Metals-022	[NT]	2	<1	[NT]		[NT]	[NT]
Mercury-Dissolved	µg/L	0.05	Metals-021	[NT]	2	<0.05	<0.05	0	[NT]	[NT]
Nickel-Dissolved	µg/L	1	Metals-022	[NT]	2	52	[NT]		[NT]	[NT]
Zinc-Dissolved	µg/L	1	Metals-022	[NT]	2	110	[NT]		[NT]	[NT]

Result Definitions

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

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.
Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.	
The recommended maximums for analytes in urine are taken from "2018 TLVs and BEIs", as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.	
Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2	

Laboratory Acceptance Criteria

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

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

Spikes for Physical and Aggregate Tests are not applicable.

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

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

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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

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

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


Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Additional Testing												
Name	P2008014: 1 Gatacre Avenue and 5 Allison Avenue, Lane Cove, NSW											
Martens Contact Officer	William Xu					Contact Email	wxu@martens.com.au					
Sampling and Shipping	Sample Date	25 February 2021			Dispatch Date	26 February 2021		Turnaround Time		standard		
	Our Reference	P2008014COC04V01				Shipping Method (X)			Hand		Post	
	On Ice (X)	<input checked="" type="checkbox"/>	No Ice (X)	<input type="checkbox"/>	Other (X)	<input type="checkbox"/>						
Laboratory												
Name	EnviroLab											
Sample Delivery Address	12 Ashley Street, Chatswood											
Delivery Contact	Name	Sampler Receipt			Phone	9910 6200		Fax			Email	samlereceipt@envirolabservices.com.au
Please Send Report By (X)	Post	<input type="checkbox"/>	Fax	<input type="checkbox"/>	Email	<input checked="" type="checkbox"/>	Reporting Email Address:		wxu@martens.com.au bmcgiffin@martens.com.au			

Sample ID	Combo 3	TRH	BTEXN
8014/MW01	X		
8014/MW02	X		
8014/MW03	X		
8014/Dup01	X		
Trip Spike			X
Trip Blank		X	

 **EnviroLab Services**
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 262902
Date Received: 26/02/21
Time Received: 10:30
Received By: [Signature]
Temp: Cool/Ambient
Cooling: Ice/Depack
Security: Intact/Broken/None

[Signature]

Attachment G: Water Quality Field Sheet

PRELIMINARY DRAFT
NOT FOR DISTRIBUTION

MWol

WATER SAMPLING RECORD FORM



PROJECT INFORMATION

PROJECT NUMBER: 8014

CLIENT: WINIM Developments Pty Ltd

SITE LOCATION: 5 Allison Avenue, Lane Cove, NSW

WATER SAMPLING FIELD PARAMETERS

[illegible]

Sample bottle codes: P-plastic, G - glass, V - vial

OBSERVATIONS

Weather conditions:

Temperature:.....

Precipitation:.....

WATER SAMPLING RECORD FORM

PROJECT INFORMATION

PROJECT NUMBER: 8014

CLIENT: WIN/M Developments Pty Ltd

SITE LOCATION: 5 Allison Avenue, Lane Cove, NSW

WATER SAMPLING FIELD PARAMETERS



martens
consulting engineers since 1999

DATE: 25/2/21

SAMPLED BY: BM & WX

[illegible]

Sample bottle codes: P-plastic, G - glass, V - vial

OBSERVATIONS

Weather conditions:

Temperature:.....

Precipitation:.....

WATER SAMPLING RECORD FORM

PROJECT INFORMATION

PROJECT NUMBER: 8014

CLIENT: WINIM Developments Pty Ltd

SITE LOCATION: 1 Grafton Avenue, Lane Cove, NSW

WATER SAMPLING FIELD PARAMETERS

DATE: 25/2/21

SAMPLED BY: BM & WX

[illegible]

ample bottle codes: P-plastic, G - glass, V - vial

OBSERVATIONS

Weather conditions:

Temperature:.....

Precipitation:.....

Attachment G: Water Quality Field Sheet

MWol

PROJECT INFORMATION

PROJECT NUMBER: 8014
CLIENT: WINIM Developments Pty Ltd

CLIENT: WINZIM Developments Pty Ltd
SITE LOCATION: 5 Allison Avenue, Lane Cove, NSW

WATER SAMPLING FIELD PARAMETERS

DATE: 25/2/21

SAMPLED BY: BM & WX

[illegible]

Sample bottle codes: P-plastic, G - glass, V - vial

OBSERVATIONS

Weather conditions:

Temperature:.....

Precipitation:.....

WATER SAMPLING RECORD FORM

PROJECT INFORMATION

PROJECT NUMBER: 8014

CLIENT: WIN/M Developments Pty Ltd

SITE LOCATION: 5 Allison Avenue, Lane Cove, NSW

WATER SAMPLING FIELD PARAMETERS

[illegible]

Sample bottle codes: P-plastic, G - glass, V - vial
Preservation Codes - U - unpreserved, S-sulfuric acid, N - nitric acid, H - hydrochloric acid

Weather conditions:

Temperature:.....

Precipitation:.....

71
72
73
74
75

WATER SAMPLING RECORD FORM

PROJECT INFORMATION

PROJECT NUMBER: 8014

CLIENT: WINIM Developments Pty Ltd

SITE LOCATION: 1 Grafton Avenue, Lane Cove, NSW

WATER SAMPLING FIELD PARAMETERS

[illegible]

ample bottle codes: P-plastic, G - glass, V - vial

OBSERVATIONS

Weather conditions:

Temperature:.....

Precipitation:.....

Attachment H: Calibration Certificates

Oil / Water Interface Meter

Instrument **Interface Meter (30M)**
Serial No. **348891**



Air-Met Scientific Pty Ltd
1300 137 067

[illegible]

Certificate of Calibration

This is to certify that the above instrument has been cleaned and tested.

Calibrated by: Lauren Tompkins

Calibration date: 24/02/2021

Next calibration due: 25/04/2021

Multi Parameter Water Meter



Air-Met Scientific Pty Ltd
1300 137 067

Instrument **YSI Quatro Pro Plus**
Serial No. **12D100011**

Item	Test	Pass	Comments
Battery	Charge Condition	✓	
	Fuses	✓	
	Capacity	✓	
Switch/keypad Display	Operation	✓	
	Intensity	✓	
	Operation (segments)	✓	
Grill Filter	Condition	✓	
	Seal	✓	
PCB	Condition	✓	
Connectors	Condition	✓	
Sensor	1. pH	✓	
	2. mV	✓	
	3. EC	✓	
	4. D.O	✓	
	5. Temp	✓	
Alarms	Beeper	✓	
	Settings	✓	
Software	Version	✓	
Data logger	Operation	✓	
Download	Operation	✓	
Other tests:			

Certificate of Calibration

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

Sensor	Serial no	Standard Solutions	Certified	Solution Bottle Number	Instrument Reading
1. pH 7.00		pH 7.00		355072	pH 7.05
2. pH 4.00		pH 4.00		351412	pH 4.04
3. pH 10.00		pH 10.00		355386	pH 9.93
3. mV		227.4mV		358632/358634	227.2mV
4. EC		2.76mS		350510	2.76mS
6. D.O		0.00 ppm		10959	0.00ppm
7. Temp		22.9°C		MultiTherm	22.3°C

Calibrated by: Kylie Rawlings

Calibration date: **24/02/2021**

Next calibration due: **27/03/2021**

Attachment I: Aerial Photographs

Legend

Site Boundary



1:1500 @ A3

Map Title / Figure:
Aerial Photograph 1930

Map 02	Map
1 Gatacre Ave and 5 Allison Ave, Lane Cove, NSW	Site
Proposed Residential Development	Project
Preliminary Site Investigation	Sub-Project
WINIM Developments	Client
09/03/2021	Date

Legend

Site Boundary



1:1500 @ A3



Map Title / Figure:
Aerial Photograph 1951

Map 03	Map
1 Gatacre Ave and 5 Allison Ave, Lane Cove, NSW	Site
Proposed Residential Development	Project
Preliminary Site Investigation	Sub-Project
WINIM Developments	Client
09/03/2021	Date

Legend

Site Boundary



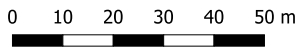
1:1500 @ A3

Map Title / Figure:

Aerial Photograph 1978

Legend

Site Boundary



1:1500 @ A3

Map Title / Figure:
Aerial Photograph 1983

Map 05	Map
1 Gatacre Ave and 5 Allison Ave, Lane Cove, NSW	Site
Proposed Residential Development	Project
Preliminary Site Investigation	Sub-Project
WINIM Developments	Client
09/03/2021	Date



Legend

Site Boundary



1:1500 @ A3



Map Title / Figure:

Aerial Photograph 1994



0 10 20 30 40 50 m

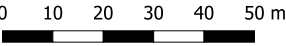
1:1500 @ A3

Map Title / Figure:

Aerial Photograph 2002

Legend

Site Boundary



1:1500 @ A3

Map Title / Figure:
Aerial Photograph 2009



Legend

Site Boundary

0 10 20 30 40 50 m

1:1500 @ A3

Map Title / Figure:

Aerial Photograph 2021