ENVIRONMENTAL MANAGEMENT PLAN

243-261 Forrester Road

North St Marys, NSW 2760

Home Co. – July 2021

Geo-Logix
environment • geotech

DOCUMENT CONTROL

ENVIRONMENT MANAGEMENT PLAN

243–261 Forrester Road
North St Marys, NSW 2760

PREPARED FOR

Home Co.
Andrew Boustred
Development Director
PO Box 19
Double Bay NSW 2028

Report reference: 2101028Rpt02FinalV02_20Jul21

Date: 20 July 2021

DISTRIBUTION AND REVISION REGISTER

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V02	20/07/2021	Final Report 2101028Rpt02FinalV02_20Jul21	Home Co.	1 Electronic Copy

Issued by: Geo-Logix Pty Ltd

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Associate Engineer

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ATTACHMENTS

1. INTRODUCTION

Geo-Logix Pty Ltd (Geo-Logix) was engaged by Home Co. (client) to prepare an Environmental Management Plan (EMP) of the property located at 243–261 Forrester Road, North St Marys NSW (Figure 1).

Geo-Logix understands that Home Co. proposes to redevelop the site as a Health and Wellness Precinct including medical centres, health services, a pharmacy, gym, childcare centre, children's recreation facilities, specialised retail, convenience shopping, restaurants/cafes and a residential aged care facility.

This EMP has been prepared for use by the client and relates to the management of an asbestos containment cell that exists beneath the north eastern corner of the site (Attachment A). During operation of the former Masters Home Improvement Store at the site, the encapsulated asbestos was managed under an Asbestos Management Plan (AMP) prepared by GETEX in 2013.

This EMP is intended to supersede the previous AMP and specifically relates to the development of, and continued operation of the site as a Health and Wellness Precinct, and includes provision for accidental and other unplanned breaches of the containment cell. This EMP may not be suitable for other land uses or development proposals.

It is understood that the asbestos containment cell is covered by a white geofabric marking layer overlain by at least 1 m of crushed shale fill. Proposed utility connections, including new sewer connections (Attachment B) are to be above the top elevation of the cell. Footings, landscaping and other ground disturbing activities, infrastructure and utilities are not expected to result in penetrations of the cell. If penetrations are required or unplanned penetrations occur they are to be managed in accordance with the procedures in this EMP.

1.1 Contamination

Bonded asbestos containing material (ACM) were encountered onsite in the location of the former football field during development of the site into a bulky goods store building with associated carpark.

The bonded ACM were remediated by onsite containment, which entailed placing a grey geo-fabric liner over the area of asbestos contaminated soil (containment cell) and placement of 1 m thick layer of clean fill over the top. The containment cell is beneath the current paved carpark and northern portion of the bulky goods store.

The bonded asbestos inside the containment cell does not present unacceptable health risks to construction workers or site users whilst it is left undisturbed.

1.2 EMP Objectives

The objective of the EMP is to manage site contamination in a manner that protects construction workers and users of the proposed Health and Wellness Precinct. Specific objectives of the EMP include:

- Describe the nature and location of the asbestos containment cell;
- Define the hierarchy of responsibilities for asbestos related works;
- Define safe work procedures for asbestos related works; and
- Define incident response and reporting requirements.

1.3 Key Stakeholders and Responsibilities

Stakeholder	Responsibility	Actions
Penrith City Council	Planning Approvals EMP Enforceability Planning Certificate	Update 10.7 Planning Certificate to identify the land as Contaminated Land and identify existence of the EMP
Site Owner Home Co.	Covenant on title Implement EMP	Ensure the EMP is readily available, up to date and relevant for those who may come in contact with site contamination. Provide council updated land title certificate with covenant on title binding the current owners and future owners to be responsible for management of existing asbestos containment cell.

1.4 Definitions

Asbestos Related Works: Any activities that may disturb the asbestos containment cell in any way.

Property Owner: Person conducting a business or undertaking.

Construction Foreman: Person with management or control of a construction workplace.

Facility Manager: Person with management or control of the proposed Health and Wellness Precinct.

Contractor: Other persons at the workplace.

Qualified Person: Licensed Asbestos Assessor.

2. SITE INFORMATION

2.1 Site Identification

Street Address	Lot and Deposited Plan (DP)	Approximate Area (m^2)
243-261 Forrester Road, North St Marys NSW 2760	Lot 12 DP 1192443	32,500

2.2 Site Zoning and Land Use

Under the Penrith Local Environmental Plan 2010 (PLEP 2010), the site is zoned as Light Industrial (IN2).
Surrounding Land Use

At the time of the investigation, the surrounding land use comprised the following:

- **North** – Forrester Road with large undeveloped land beyond;
- **South** – St Marys Rugby League Club with Boronia Road beyond;
- **East** – St Marys Rugby League Stadium, large dam and undeveloped land beyond; and
- **West** – Forrester Road and industrial properties beyond.

3. ENVIRONMENTAL BACKGROUND

3.1 Phase I ESA, Geo-Logix 2010

Geo-Logix previously completed a Phase I Environmental Site Assessment (ESA) in April 2010, prior to construction of a bulky goods store at the site. The scope of works included review of historical data, site inspection and limited soil sampling. Geo-Logix concluded that the site was suitable for redevelopment as a bulky goods store.

Historical information gathered for that report was incorporated into the Geo-Logix PSI (2020).

3.2 Asbestos Management Plan, GETEX 2013

GETEX prepared an Asbestos Management Plan (AMP) for the Masters Home Improvement Store in May 2013. The asbestos management approach entailed placing a grey geo-fabric liner over the area of contaminated soil and placement of 1 m thick layer of clean fill over the top. The plan further defined methodologies and control measures to be adhered to in the event future subsurface excavation encounters the contained asbestos impacted soils. The encapsulated asbestos was identified as Non-Friable (Bonded) Asbestos. The frequency and/or concentration of bonded asbestos in the impacted soil was not discussed in the AMP.

The AMP intended for application during operation of the former the Masters Home Improvement Store is superseded by this EMP for the proposed Health and Wellness Precinct.

3.3 Preliminary Site Investigation, Geo-Logix 2020

Geo-Logix prepared a Preliminary Site Investigation (PSI) in August 2020 to establish whether activities have occurred on site which may have resulted in contamination of the land. The PSI found that the site has been subject to uncontrolled filling and identified a number of contaminants of potential concern (COPCs) associated with this filling.

Geo-Logix concluded that the site can be made suitable for the proposed development as a health and wellness precinct subject to the implementation of a site-specific Environmental Management Plan (EMP) and completion of a detailed site investigation (DSI).

3.4 Detailed Site Investigation, Geo-Logix 2021

Geo-Logix prepared a DSI in April 2021. The DSI comprised completion of 20 borings on a 40 m grid through fill to native soil. The DSI concluded that the site was suitable for the proposed health and wellness precinct subject to the implementation of this EMP.

4. ASBESTOS

Asbestos is the generic term for a number of fibrous silicate minerals. There are two major groups of asbestos: the serpentine group (i.e. chrysotile) and the amphibole group (i.e. amosite, crocidolite, tremolite, actinolite and anthophyllite). Asbestos has widely been used in building products due to its insulation and fire-resistant properties. The toxic effects of asbestos are well recognised and primarily result from the

inhalation of free fibres. If fibres are inhaled into the lungs, they can initiate diseases that take many years to produce major health effects. These effects include asbestosis, lung cancer and mesothelioma (WA DOH, 2009).

The National Environmental Protection Council (NEPC) recognises the following forms of asbestos contamination:

- Asbestos-containing material (ACM) which is in sound condition and the asbestos is bound in a matrix (cement sheeting, tiles). This is also restricted to ACM that cannot pass through a 7mm x 7mm sieve. ACM represents a low human health risk;
- Fibrous Asbestos (FA) encompasses asbestos in the form of loose fibrous material such as insulation and severely weathered ACM defined by its crumbly nature under hand pressure; and
- Asbestos Fines (AF) includes free fibres of asbestos, small fibre bundles and ACM fragments that pass through a 7mm x 7mm sieve.

Both FA and AF have the potential to generate airborne fibres and can pose a considerable inhalation risk if made airborne.

The remaining pipework is comprised of bonded ACM in good condition and does not pose a risk to human health whilst left undisturbed.

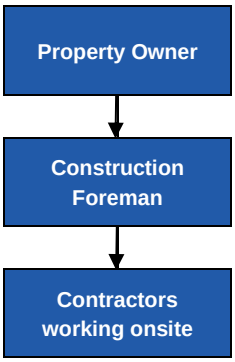
5. RELEVANT LEGISLATION

Where applicable, the following legislation, codes of practice and guidance documents provide the framework for the management of site contamination:

- NSW Work Health and Safety Act 2011;
- NSW Work Health and Safety Regulation 2017;
- Protection of Environment Operations Act 1997
- Contaminated Land Management Act 1997
- National Environment Protection (Assessment of Site Contamination) Measure 2013 Amendment (NEPC, 1999);
- Managing asbestos in or on soil (WorkCover NSW, 2020);
- How to Safely Remove Asbestos Code of Practice (NSW Government, 2019a);
- Code of Practice for the Safe Removal of Asbestos 2nd Edition (NOHSC: 2002 (2005));
- How to Manage and Control Asbestos in the Workplace Code of Practice (NSW Government, 2019b);
- Code of Practice for the Management and Control of Asbestos in Workplaces (NOHSC: 2018 (2005));
- Waste Classification Guidelines (NSW EPA, 2014); and
- Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres, 2nd Edition, (NOHSC: 3003 (2005)).

6. SUBSURFACE WORKS MANAGEMENT – CONSTRUCTION

The below measures are to be put in place for the management of asbestos during the construction phase of the site.



6.1 Induction

The Construction Foreman is to ensure all employees and sub-contractors undertaking work on the site have completed a site-specific induction in relation to the asbestos containment cell location.

The induction program is to include the following:

- Information about the nature of the hazards arising from exposure to asbestos (Section 4);
- Identification of the location of bonded asbestos by reference to the plan of the approximately cell location and the high visibility white geotextile marker layer placed immediately above the containment cell (Section 1.1);
- Procedures to be followed in the event the bonded asbestos is disturbed or to be removed to facilitate construction (Section 7 and 9);
- Exposure monitoring that may be required for working with asbestos (Section 9); and
- Incident reporting.

Records of all inductions must be kept for 5 years after the day the worker stops carrying out the Asbestos Related Works. These records must also be made available for inspection by the Property Owner or Safe Work regulator (SafeWork NSW) as required.

An example induction register is included as Attachment C.

6.2 Accessing the EMP

The Construction Foreman must ensure the EMP is retained on the site and is readily accessible to:

- Any worker (and their employers and/or health and safety representatives) who has carried out, carries out, or intends to carry out Asbestos Related Works.

6.3 Containment Cell Breaches

If the cell is breached during construction, work in the affected area is to be stopped and a Qualified Person engaged to determine specific procedures for asbestos related works in accordance with Section 8 below.

All breaches of containment cells, whether intentional or incidental, must be rectified to maintain integrity of containment system and verified by a Qualified Person.

Rectification is to include the isolation and re-placement or offsite disposal of any material removed from the cell and the repair of the cell marker layer (geofabric).

At completion of construction the record of containment rectifications is to be prepared by a Qualified Person verifying the containment system has been repaired correctly. The verification report is to be held onsite with the EMP Records.

7. ENVIRONMENTAL MANAGEMENT PLAN – SITE OPERATION

The EMP procedures defined in this section below are to ensure the following:

- There will be appropriate public notification of the contamination condition that applies to the land so that potential purchasers or other interested individuals are aware of the restrictions; and
- Outline hierarchy of responsible parties for implementation of the EMP during commercial operation.

7.1 Environmental Management Plan Public Notification

The Site owner is to register a covenant on title of the land binding the owners and future owners to the following:

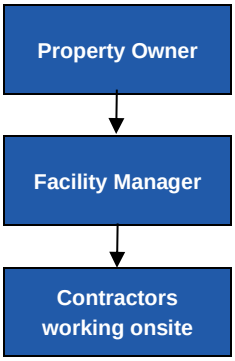
- Responsibility for ongoing maintenance of the asbestos containment cell in accordance with the EMP; and
- Responsibility for any future management of site contamination that may be required by NSW Environment Protection Authority to ensure that the site remains suitable for present or proposed land uses and to ensure risks to human health remain low and acceptable.

Penrith City Council is to amend the Section 10.7 (2) Planning Certificate to include the following notations:

- The site is identified as Contaminated Land; and
- The existence of the Environmental Management Plan.

7.2 Hierarchy of EMP Responsibilities

The Property Owner is to ensure that a hierarchy of responsibilities is established between individuals identified within each level of control, and those individuals are made responsible for the effective implementation of the EMP.



A responsible person for the EMP should be appointed by the Property Owner to ensure that the EMP is effectively implemented, typically that would include the facility manager.

A register of responsible persons has been included in Attachment D and must be completed by the person appointed by the Property Owner.

The responsible person is accountable for the following:

- Ensure sub-surface workers are made aware of this EMP and the location of the asbestos containment cell by reference to Section 1.1 of the EMP.

In the event sub-surface workers are required to disturb locations of bonded asbestos ensure they are aware of and adhere to the following:

- Information about the nature of the hazards arising from exposure to asbestos (Section 4);
- Identification of the location of bonded asbestos by reference to the plan of the approximately cell location and the high visibility white geotextile marker layer placed immediately above the containment cell (Section 1.1);
- Record induction and maintain induction register (Section 7.3);
- Procedures to be followed in the event the bonded asbestos is disturbed (Section 8);
- Exposure monitoring that may be required for working with asbestos (Section 8); and
- Incident reporting (Section 8).

7.3 Induction

The responsible person for the on-going management of the site is required to ensure all contractors undertaking work at the location of the asbestos containment cell have undergone an appropriate site-specific induction. The induction program is to be inclusive of the following:

- Information about the nature of the hazards, identifying ACM and the risks to health arising from exposure to asbestos;
- Details of the asbestos onsite, including processes and safe work procedures to be followed to prevent exposure; and
- Incident reporting procedures to be followed in case of disturbance of the asbestos containment cell.

Records of all inductions must be kept for 5 years after the day the worker stops carrying out the Contamination Related Works. These records must also be available for inspection by property owner or the regulator (WorkCover NSW). An induction register is included as Attachment C.

7.4 Accessing the Environmental Management Plan

The responsible person must ensure the EMP is provided and readily accessible to:

- All users of the site; and
- Any contractor or subcontractor (and their employees and/or health and safety representatives) undertaking subsurface works at the Site.

Records of the individuals supplied with the EMP must be kept by the Facility Manager for 5 years.

7.5 Review of the Environmental Management Plan

The responsible person must ensure the EMP is kept up to date and a copy is readily accessible on the Site. The EMP must be reviewed by a Qualified Person when either of the following occurs:

- The site use has changed;
- The asbestos containment cell has been disturbed; and
- The plan is no longer adequate for managing risks to human health and/or the environment.

8. PROCEDURE FOR ASBESTOS RELATED WORKS

In the event of a breach of the containment cell the following general procedure is to be followed. Additional situation-specific procedures are to be provided by a Qualified Person and adhered to:

- Construction Foreman / Facility Manager to provide information to contractors regarding the requirements of compliance with this EMP;
- Contractors to provide to the Project/Property Manager, a Health and Safety Plan including Safe Work Method Statements and an Environmental Works Plan. These plans are to be prepared by a Qualified Person;
- Construction Foreman / Facility Manager to ensure all persons working on the site are inducted into the requirements of the EMP, the contractor's Health and Safety Plan and the contractor's Environmental Works Plan;
- All Asbestos Related Works (i.e. works involving breach of the containment cell) is to be undertaken by a Class B licensed asbestos removal contractor for bonded asbestos. The contractor is to notify WorkCover of the removal works 7 days prior to commencement;
- An exclusion zone from the work areas is to be established, barricaded and access restricted;
- Establish area for decontamination facilities (area for wetting down and disposal of PPE);
- All appropriate signage is to be erected, including appropriate asbestos warning signs;

- All workers to wear appropriate PPE (in accordance with Health and Safety Plan) while working in the exclusion zone, including respiratory protection using a half face mask equipped with P2 (or higher) particulate filter, gloves, disposable overalls and safety shoes;
- When leaving the exclusion zone all workers are to use the decontamination facilities. All used PPE is to be placed in 200um thick plastic bags and disposed of as asbestos contaminated waste;
- Material to be disposed offsite should be disposed of to an appropriately licensed facility;
- Water spray to be used during earthmoving to suppress dust and potential generation of airborne asbestos fibres;
- NATA accredited asbestos air monitoring is to be undertaken during all asbestos related works by a licensed Asbestos Assessor. The method to be used for asbestos air monitoring is that detailed in Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres, 2nd Edition, (NOHSC: 3003(2005));
- All disturbance of the bonded asbestos in the containment cell and details of any material disposed off-site is to be recorded in the Contamination Related Works Activity Register (Attachment E); and
- All complaints and environmental incidents are to be recorded in the Complaints and Environmental Incidents Register (Attachment F).

9. LIMITATIONS

This report should be read in full, and no executive summary, conclusion or other section of the report may be used or relied on in isolation, or taken as representative of the report as a whole. No responsibility is accepted by Geo-Logix, and any duty of care that may arise but for this statement is excluded, in relation to any use of any part of this report other than on this basis.

This document is limited to providing general Environmental Management Procedures for management of subsurface contamination beneath the site for a proposed Health and Wellness Precinct. This document may not be suitable for other land uses or development proposals. The Client indemnifies Geo-Logix against all loss, including without limitation consequential loss, damage and/or liability, howsoever arising in connection, with any use or reliance on this document for land uses or developments other than the proposed Health and Wellness Precinct.

It is the responsibility of any party using this report to fully check to their satisfaction if this report is suitable for their intended use.

10. REFERENCES

Contaminated Land Management Act 1997.

NEPC (1999) *Amended National Environmental Protection Measure (2013)*, National Environmental Protection Council.

NSW EPA (2014*) Waste Classification Guidelines*, NSW Environment Protection Authority, Sydney, 2014.

Protection of the Environment Operations Act 1997 (NSW).

Safe Work Australia (2020a) *How to Safely Remove Asbestos Code of Practice*, Safe Work Australia, July 2020.

Safe Work Australia (2020b) *How to Manage and Control Asbestos in the Workplace Code of Practice*, Safe Work Australia. Safe Work Australia, July 2020.

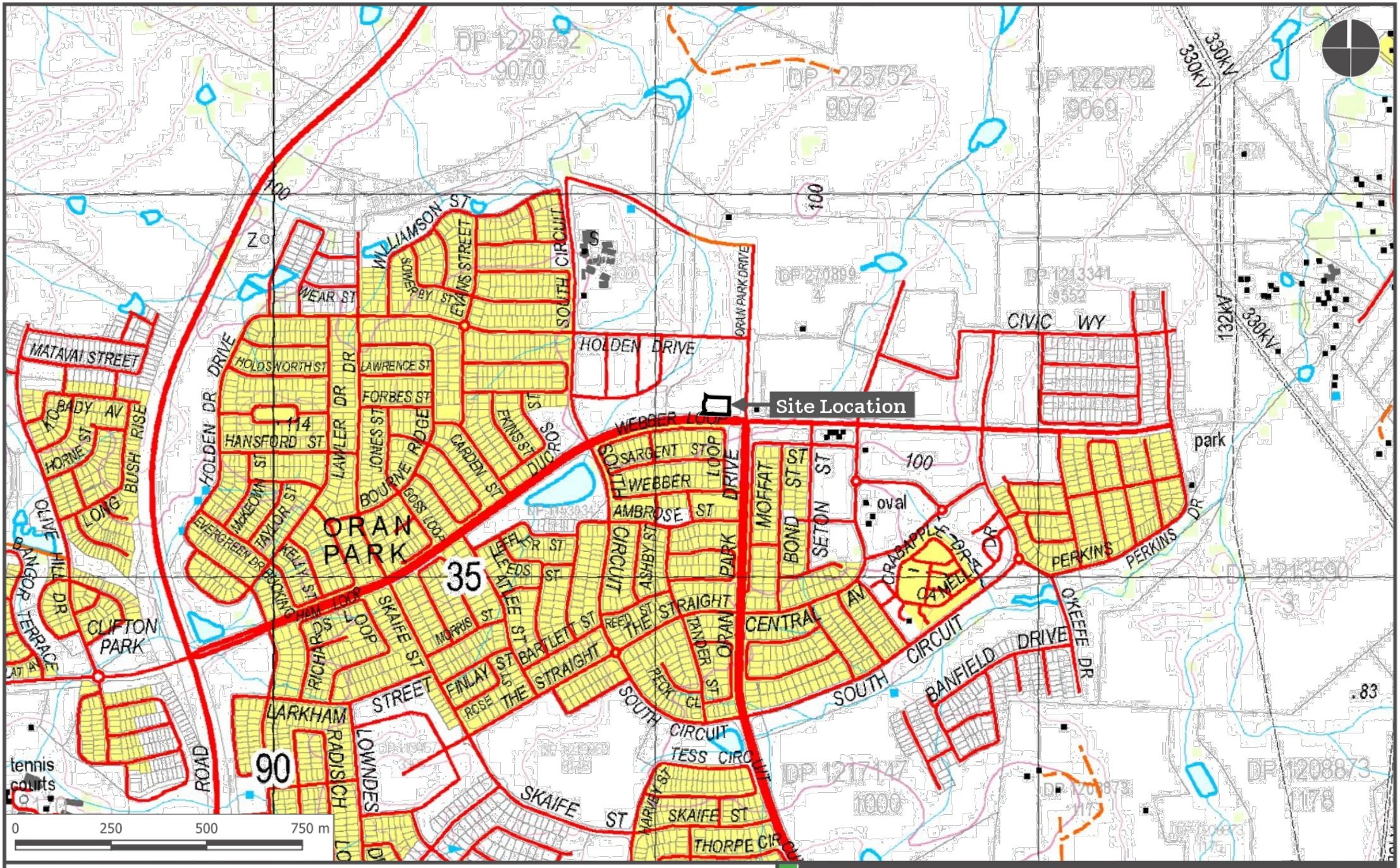
Safe Work Australia (2019) *Workplace Exposure Standards for Airborne Contaminants*, Safe Work Australia, 16 December 2019.

WorkCover NSW (2020) *Managing Asbestos in or on Soil*, WorkCover, NSW Government, 2020.

Work Health and Safety Act 2011 (NSW).

Work Health and Safety Regulation 2017 (NSW)

FIGURES



Geo-Logix

SITE LOCATION

Geotechnical Investigation
Cnr. Peter Brock Drive and Oran Park Drive, Oran Park NSW

Project No. 2101053 | Figure 1

Geo-Logix

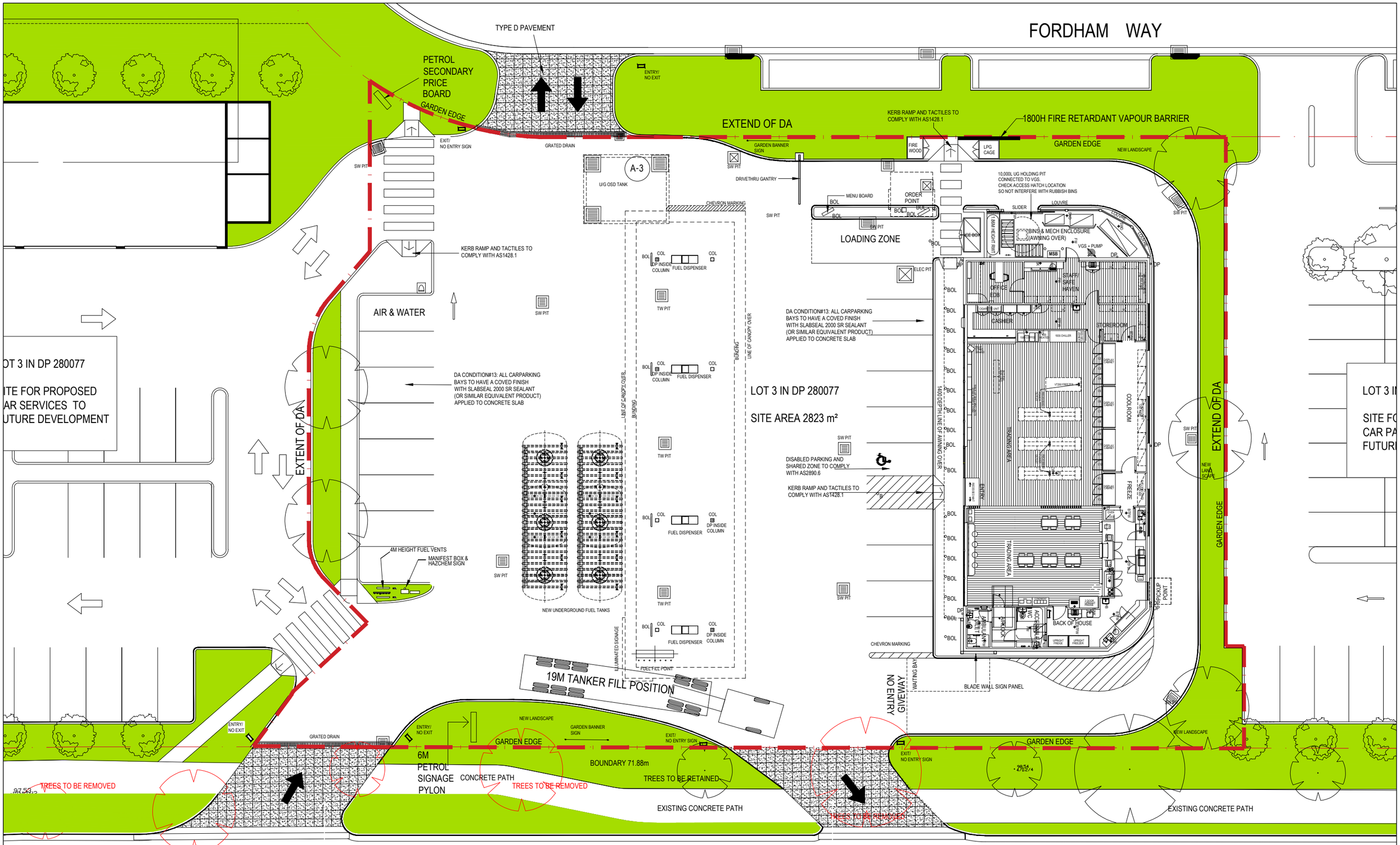
SITE MAP

Geotechnical Investigaiton
Cnr. Peter Brock Drive and Oran Park Drive, Oran Park NSW

Project No. 2101053

Figure 2

ATTACHMENT A



ISSUE FOR CC / TENDER

EG Fuelco (Australia) Limited
ABN 39 627 348 645
Euro Garages Australia
Level 39 Northpoint, 100 Miller Street
North Sydney NSW 2060

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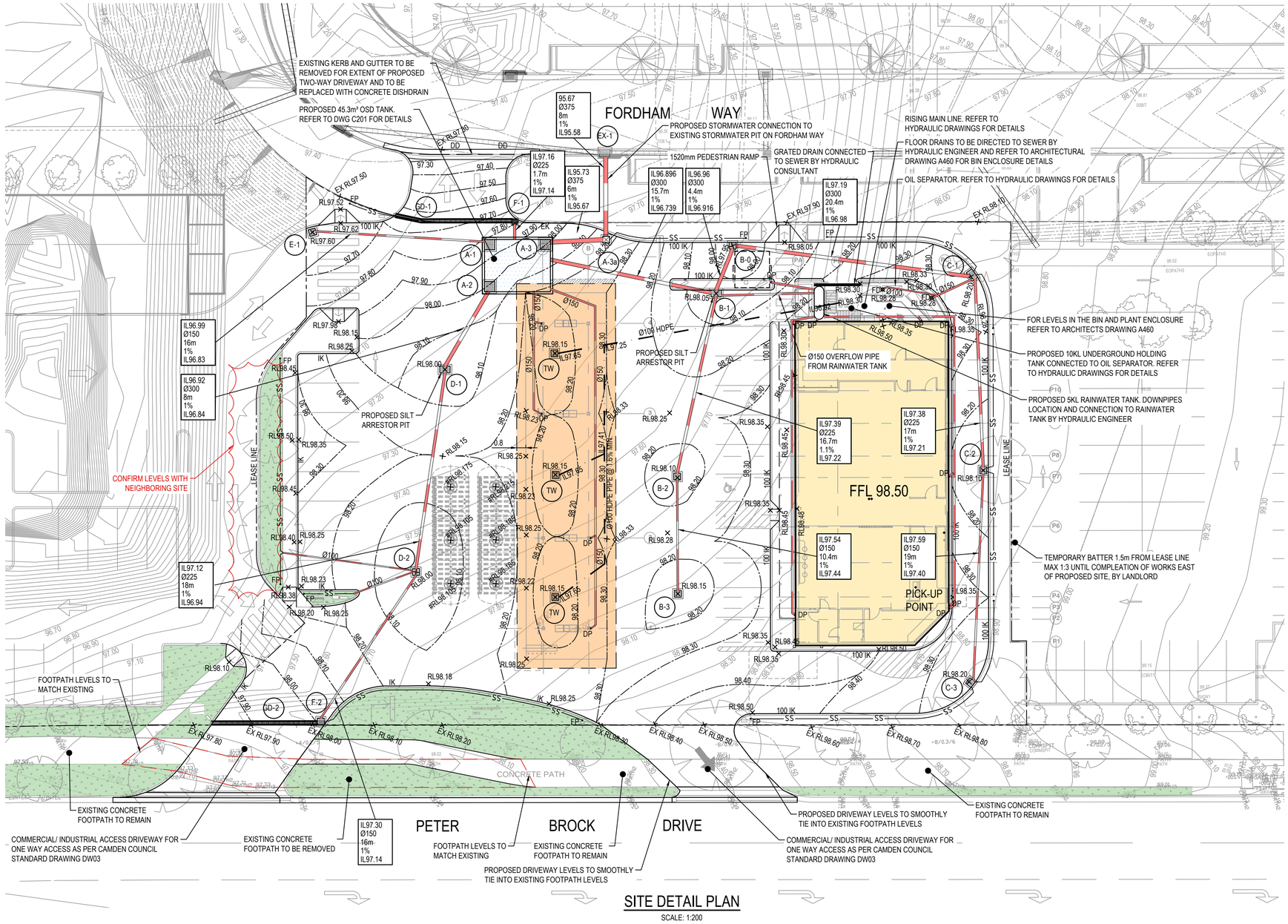
Projectvision Consulting Pty Ltd
Unit 11/ 8 Avenue of Americas
Newington NSW 2128
Tel +61 2 9748 8831
www.projectvision.com.au
Registered Architect Amitav Goswami NSW #11405 QLD#5722 VIC#20858

PROJECT LOCATION	PETER BROCK DRIVE, ORAN PARK, NSW
PROJECT NO.	19012
PROJECT NAME	EGF ORAN PARK
TITLE	LAYOUT PLAN
DRAWING NO.	CC-A030
DRAWN BY	MD
CHECKED BY	BP
SCALE 1:250	0 2.5 5 10M

REV	DESCRIPTION	DATE	BY
1	DRAFT CC/TENDER	07.05.2021	MD
2	DRAFT CC/TENDER	17.05.21	MD
3	DRAFT CC/TENDER	17.05.21	MD
4	ISSUE FOR CC / TENDER	17.05.21	MD
5	ISSUE FOR CC / TENDER	11.06.21	MD

REV. 5

N



SITE DETAIL PLAN

SCALE: 1:200

0 4 8 12 16 20m

4 3 2 1

SCALE 1:200

LEGEND

- PROPERTY LEASE LINE
- PROPOSED SURFACE INLET PITS
- PROPOSED JUNCTION PITS
- PROPOSED GRATED DRAIN
- EXISTING STORMWATER PIPE
- PROPOSED STORMWATER PIPE
- PROPOSED HDPE LINE
- LINE OF DEMOLISION
- RM — RM — PROPOSED RISING MAIN
- DP — PROPOSED DOWNPIPE
- FP — PROPOSED FLUSHING POINT
- IR — PROPOSED INTERMEDIATE RISER
- FD — PROPOSED FLOOR DRAIN
- IK — PROPOSED INTEGRAL KERB
- IK 100 — PROPOSED 100mm INTEGRAL KERB
- EK — PROPOSED ELEVATED KERB
- DD — PROPOSED DISH DRAIN
- RL98.35 — PROPOSED SPOT LEVEL
- 98.10 — PROPOSED CONTOURS
- 98.10 — EXISTING CONTOURS
- PROPOSED BATTER LINE
- IL97.19 Ø300 30m 1% IL96.89 — STORMWATER UPSTREAM INVERT RL. / STORMWATER PIPE DIAMETER & CLASS / STORMWATER PIPE LENGTH / STORMWATER PIPE GRADE / STORMWATER DOWNSTREAM INVERT RL.
- EXISTING TREE TO BE REMOVED

NOTE:

- CONTRACTOR TO INVESTIGATE PRESENCE OF UTILITIES, SIZE AND DEPTH OF ALL IN-GROUND UTILITIES, PRIOR TO CONSTRUCTION. SERVICES SHOWN ON THIS DRAWING DEPICTED FROM SERVICES SEARCH PLANS AND CANNOT BE GUARANTEED.
- ALL STORMWATER PITS TO HAVE Ø100 uPVC SLOTTED SUBSOIL PIPES CONNECTED TO THEM. THESE SUBSOILS TO EXTEND 3m UPSTREAM OF THE PIT AT A MINIMUM GRADE.
- INVERT LEVEL TO EXISTING STORMWATER DRAINAGE LINES TO BE CHECKED AND CONFIRMED PRIOR TO COMMENCEMENT OF WORK.
- SERVICES SHOWN ON THIS DRAWING ARE DEPICTED FROM SERVICES SEARCH PLANS AND CAN NOT BE GUARANTEED. THE EXACT DEPTH AND LOCATION OF ALL IN-GROUND UTILITIES TO BE DETERMINED BY POT HOLING OR CABLE SEARCH.
- #RL LEVELS ARE INDICATED 25mm ABOVE SURROUNDING PAVEMENT AREAS. REFER TO DRAWING C501 FOR DETAILS.
- FOR ALL ROOF DOWNPIPES AND CONNECTION TO RAINWATER TANK, REFER TO HYDRAULIC ENGINEER'S DRAWINGS FOR DETAILS.
- LEVELS OF THE KERB ADJACENT TO NEIGHBORING SITE TO BE CONFIRMED WITH NEIGHBORS PRIOR CONSTRUCTION.

FOR CONSTRUCTION CERTIFICATE

SURVEY INFORMATION
SURVEYED BY:
JMD DEVELOPMENT CONSULTANTS

REVISION	AMENDMENT	DRAWN	DESIGNED	DATE
05	ISSUED FOR CONSTRUCTION CERTIFICATE	JK	LV	11.06.2021
04	ISSUED FOR CONSTRUCTION CERTIFICATE	JK	LV	10.06.2021
03	ISSUED FOR CONSTRUCTION CERTIFICATE	JK	LV	08.06.2021
02	ISSUED FOR CONSTRUCTION CERTIFICATE	JK	LV	31.05.2021
01	ISSUED FOR CO-ORDINATION	JK	LV	25.05.2021

Client: EG GROUP
Architect: AJ&C ARCHITECTS

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Telephone +61 2 9417 8400
Facsimile +61 2 9417 8337
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Web www.henryandhymas.com.au
henry&hymas

Project: PROPOSED EG PETROL STATION
PETER BROCK DRIVE, ORAN PARK NSW

Title: SITE DETAIL PLAN

Drawn	Designed	Date
J.Knight	L.Villa	JUNE 2020
Checked	Approved	Scale @A1
B.Seizov	A.Francis	1:200

Drawing number: 19B85_CC_C100
Revision: 05

ATTACHMENT B

WaterNSW

home help contact customise

State Overview
State Overview

Rivers and Streams
favourites search
download sites
find a site
Real Time Data - Riv...

Daily River Reports
Daily River Reports

Dams
favourites search
download sites
find a site
Real Time Data - Ma...

Groundwater (Telemetered data)
favourites search

contact WaterNSW

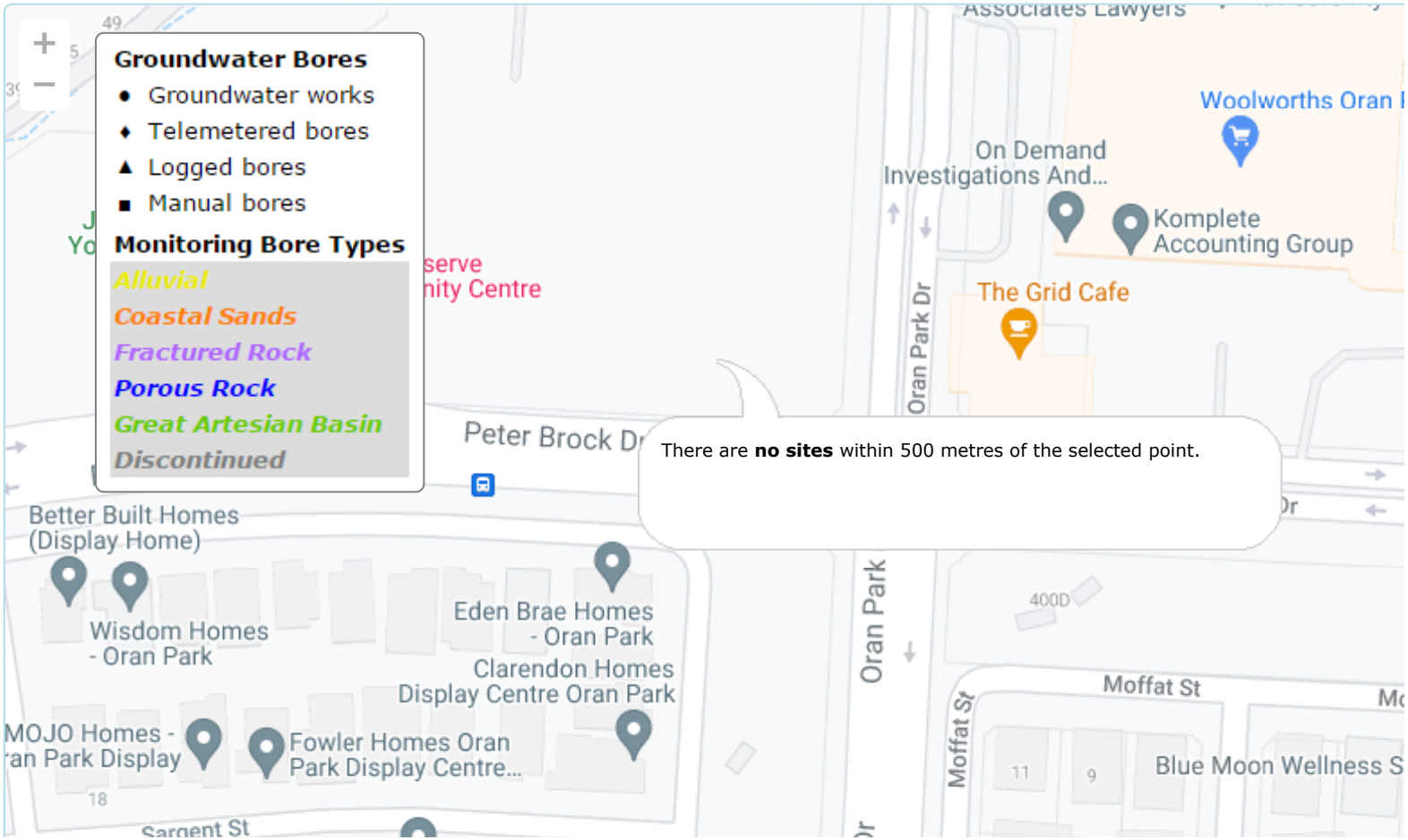
All Groundwater Site Details

ALL GROUNDWATER MAP

bookmark this page

All data times are Eastern Standard Time

Map Info



ATTACHMENT C

TEST PIT LOG: TP1

Geo-Logix Pty Ltd
Building Q2, Level 3
Unit 2309 / 4 Daydream Street
Warriewood NSW 2102
www.geo-logix.com.au

Project Number:	**2101053**
Hole Depth:	**2.50 m**
Date Started:	**08/06/2021**
Date Completed:	**08/06/2021**

Project Name: **Geotechnical Investigation**
Location / Site: **Cnr Oran Park Drive & Peter Brock Drive, Oran Park NSW**
Client: **Projectvision**
Contractor: **C & D Camilleri Excavations Pty Ltd**
Method: **Test Pit (Excavator)**

Method	Water Level	Depth (mBGL)	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Observations / Comments
EX		0.30	Fill			**FILL**- reddish brown / moderate brown (5YR 4/4), 70% clay, 20% sand, 10% gravel, medium plasticity, well compacted.	damp	
		1.20	Fill			**FILL**- yellowish red / light brown (5YR 5/6) and reddish brown / moderate brown (5YR 4/4), 70% clay, 20% sand, 10% gravel, medium plasticity, well compacted.	damp	Sandstone, shale, plastic, etc.
		1.60	Natural	CL		**CLAY**- red / moderate reddish brown (10R 4/6), 85% clay, 15% sand, medium plasticity, very stiff.	damp	
		2.30	Natural	CL		**CLAY**- white / pinkish grey (5YR 8/1) and light red / moderate reddish orange (10R 6/6), 85% clay, 15% sand, medium plasticity, very stiff, shale fragments.	damp	
			Natural	CL		**CLAY with Sand**- white / pinkish grey (5YR 8/1) and light red / moderate reddish orange (10R 6/6), 70% clay, 30% sand, medium plasticity, very stiff, increased shale fragments.	damp	
						Terminated at 2.50 m		

Abbreviations

Hydrocarbon Odour
H High
M Medium
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed
B Bulk
R Representative
C Continuous
J Jar
Asb Asbestos

Strength Testing
SPT Standard Penetration Test
DCP Dynamic Cone Penetrometer
PP Pocket Penetrometer

Water Levels
Encountered Groundwater
Stabilised Groundwater

Additional Comments
CBR sample = TP1/CBR.

Log Drawn By: Laurie White
Contact: laurie.white@reumad.com.au

Logged By: **Kiran Baby** Date: **08/06/2021**
Checked By: **Kiran Baby** Date: **24/06/2021**

TEST PIT LOG: TP2

Geo-Logix Pty Ltd
Building Q2, Level 3
Unit 2309 / 4 Daydream Street
Warriewood NSW 2102
www.geo-logix.com.au

Project Number:	**2101053**
Hole Depth:	**3.00 m**
Date Started:	**08/06/2021**
Date Completed:	**08/06/2021**

Project Name: **Geotechnical Investigation**
Location / Site: **Cnr Oran Park Drive & Peter Brock Drive, Oran Park NSW**
Client: **Projectvision**
Contractor: **C & D Camilleri Excavations Pty Ltd**
Method: **Test Pit (Excavator)**

Method	Water Level	Depth (mBGL)	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Observations / Comments
EX		0.40	Fill			**FILL**- light reddish brown / light brown (5YR 6/4) and dark grey (N3), 65% clay, 20% sand, 15% gravel, high plasticity, well compacted, PP=550kPa.	wet	
		1.70	Fill			**FILL**- light reddish brown / light brown (5YR 6/4) and yellowish red / light brown (5YR 5/6) and red / moderate reddish brown (10R 4/6), 60% clay, 25% sand, 15% gravel, medium plasticity, well compacted, PP=500kPa.	damp	Sandstone, shale.
		2.60	Natural	CL		**CLAY**- light red / moderate reddish orange (10R 6/6), 85% clay, 15% sand, medium plasticity, very stiff, PP=390kPa.	damp	
		2.90	Natural	CL		**CLAY**- white / pinkish grey (5YR 8/1) and light red / moderate reddish orange (10R 6/6), 85% clay, 15% sand, medium plasticity, very stiff, PP=280-330kPa.	damp	
		3	Natural	CL		**CLAY with Sand**- white / pinkish grey (5YR 8/1) and light red / moderate reddish orange (10R 6/6), 70% clay, 30% sand, medium plasticity, very stiff, with shale fragments.	damp	
						Terminated at 3.00 m		

Abbreviations

Hydrocarbon Odour
H High
M Medium
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed
B Bulk
R Representative
C Continuous
J Jar
Asb Asbestos

Strength Testing
SPT Standard Penetration Test
DCP Dynamic Cone Penetrometer
PP Pocket Penetrometer

Water Levels
Encountered Groundwater
Stabilised Groundwater

Additional Comments
Water logging on top.
CBR sample = BTP2/CBR.

Log Drawn By: Laurie White
Contact: laurie.white@reumad.com.au

Logged By: **Kiran Baby** Date: **08/06/2021**
Checked By: **Kiran Baby** Date: **24/06/2021**

TEST PIT LOG: TP3

Geo-Logix Pty Ltd
Building Q2, Level 3
Unit 2309 / 4 Daydream Street
Warriewood NSW 2102
www.geo-logix.com.au

Project Number:	**2101053**
Hole Depth:	**3.60 m**
Date Started:	**08/06/2021**
Date Completed:	**08/06/2021**

Project Name: **Geotechnical Investigation**
Location / Site: **Cnr Oran Park Drive & Peter Brock Drive, Oran Park NSW**
Client: **Projectvision**
Contractor: **C & D Camilleri Excavations Pty Ltd**
Method: **Test Pit (Excavator)**

Method	Water Level	Depth (mBGL)	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Observations / Comments
EX		0.30	Fill			**FILL**- yellowish red / light brown (5YR 5/6), 70% clay, 20% sand, 10% gravel, medium plasticity, medium dense, well compacted.	damp	
		2.50	Fill			**FILL**- yellowish red / light brown (5YR 5/6) and red / moderate reddish brown (10R 4/6) and pink / moderate orange pink (5YR 8/4), 60% clay, 20% sand, 20% gravel, medium plasticity, well compacted.	damp	Sandstone fragments, shale.
		3.30	Natural	CL		**CLAY**- pinkish white / greyish orange pink (10R 8/2) and light red / moderate reddish orange (10R 6/6), 85% clay, 15% sand, medium plasticity, very stiff.	damp	
			Natural	CL		**CLAY**- pinkish white / greyish orange pink (10R 8/2) and light red / moderate reddish orange (10R 6/6), 85% clay, 15% sand, medium plasticity, very stiff.	damp	
						Terminated at 3.60 m		

Abbreviations

Hydrocarbon Odour
H High
M Medium
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed
B Bulk
R Representative
C Continuous
J Jar
Asb Asbestos

Strength Testing
SPT Standard Penetration Test
DCP Dynamic Cone Penetrometer
PP Pocket Penetrometer

Water Levels
Encountered Groundwater
Stabilised Groundwater

Additional Comments
CBR sample = TP3/CBR.

Log Drawn By: Laurie White
Contact: laurie.white@reumad.com.au

Logged By: **Kiran Baby** Date: **08/06/2021**
Checked By: **Kiran Baby** Date: **24/06/2021**

TEST PIT LOG: TP4

Geo-Logix Pty Ltd
Building Q2, Level 3
Unit 2309 / 4 Daydream Street
Warriewood NSW 2102
www.geo-logix.com.au

Project Number:	**2101053**
Hole Depth:	**2.50 m**
Date Started:	**08/06/2021**
Date Completed:	**08/06/2021**

Project Name: **Geotechnical Investigation**
Location / Site: **Cnr Oran Park Drive & Peter Brock Drive, Oran Park NSW**
Client: **Projectvision**
Contractor: **C & D Camilleri Excavations Pty Ltd**
Method: **Test Pit (Excavator)**

Method	Water Level	Depth (mBGL)	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Tests: DCP TP4 (blows/100mm, 6 12 18 24)	Observations / Comments
EX		0.50	Fill			**FILL**- reddish brown / moderate brown (5YR 4/4), 70% clay, 20% sand, 10% gravel, medium plasticity, well compacted, PP=220kPa.	damp		
		1.00	Fill			**FILL**- yellowish red / light brown (5YR 5/6) and reddish brown / moderate brown (5YR 4/4), 5% clay, 75% sand, 20% gravel, medium plasticity, well compacted, PP=550kPa.	damp		Sandstone, shale fragments.
		1.60	Natural	CL		**CLAY**- red / moderate reddish brown (10R 4/6), 90% clay, 10% sand, medium plasticity, very stiff, PP=500kPa.	damp		
		2.30	Natural	CL		**CLAY**- white / pinkish grey (5YR 8/1) and light red / moderate reddish orange (10R 6/6), 85% clay, 15% sand, medium plasticity, very stiff, PP=440kPa.	damp		
			Natural	CL		**Gravelly CLAY**- white / pinkish grey (5YR 8/1) and light red / moderate reddish orange (10R 6/6), 60% clay, 40% gravel, medium plasticity, very stiff, with shale fragments.	damp		
						Terminated at 2.50 m			

Abbreviations

Hydrocarbon Odour
H High
M Medium
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed
B Bulk
R Representative
C Continuous
J Jar
Asb Asbestos

Strength Testing
SPT Standard Penetration Test
DCP Dynamic Cone Penetrometer
PP Pocket Penetrometer

Water Levels
Encountered Groundwater
Stabilised Groundwater

Additional Comments

Log Drawn By: Laurie White
Contact: laurie.white@reumad.com.au

Logged By: **Kiran Baby** Date: **08/06/2021**
Checked By: **Kiran Baby** Date: **24/06/2021**

TEST PIT LOG: TP5

Geo-Logix Pty Ltd
Building Q2, Level 3
Unit 2309 / 4 Daydream Street
Warriewood NSW 2102
www.geo-logix.com.au

Project Number:	**2101053**
Hole Depth:	**4.20 m**
Date Started:	**08/06/2021**
Date Completed:	**08/06/2021**

Project Name: **Geotechnical Investigation**
Location / Site: **Cnr Oran Park Drive & Peter Brock Drive, Oran Park NSW**
Client: **Projectvision**
Contractor: **C & D Camilleri Excavations Pty Ltd**
Method: **Test Pit (Excavator)**

Method	Water Level	Depth (mBGL)	Sample Type	HC Odour	Sample ID	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Observations / Comments
EX		0	D	Z	TP5/0.6-0.8	Fill			**FILL**- yellowish red / light brown (5YR 5/6) and light reddish brown / light brown (5YR 6/4) and red / moderate reddish brown (10R 4/6), 65% clay, 20% sand, 15% gravel, medium plasticity, well compacted.	damp	Sandstone, shale fragments, plastic strands.
			B	Z	TP5/0.7-1.0						
		1									
		1.40									
			D	Z	TP5/1.6-1.7	Natural	CL		**CLAY**- light red / moderate reddish orange (10R 6/6), 85% clay, 15% sand, medium plasticity, very stiff, PP>600kPa.	damp	
			B	Z	TP5/1.8-1.9						
		2									
		2.20									
			B	Z	TP5/2.3-2.4		CL		**CLAY**- white / pinkish grey (5YR 8/1) and light red / moderate reddish orange (10R 6/6), 85% clay, 15% sand, medium plasticity, very stiff, PP>600kPa.	damp	
			D	Z	TP5/2.4-2.5						
		2.80									
		3							**Weathered SHALE with Clay**- red / moderate reddish brown (10R 4/6) and white / pinkish grey (5YR 8/1), medium plasticity, very stiff, PP>600kPa.	damp	
			D	Z	TP5/3.2-3.3						
		3.50									
			B	Z	TP5/3.5-3.6				**SHALE**- red / moderate reddish brown (10R 4/6) and white / pinkish grey (5YR 8/1), very stiff to hard.	damp	
		4	B	Z	TP5/3.8-4.0						
		4.10							**SHALE**- red / moderate reddish brown (10R 4/6) and white / pinkish grey (5YR 8/1), hard.	damp	
									Terminated at 4.20 m		

Abbreviations

Hydrocarbon Odour
H High
M Medium
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed
B Bulk
R Representative
C Continuous
J Jar
Asb Asbestos

Strength Testing
SPT Standard Penetration Test
DCP Dynamic Cone Penetrometer
PP Pocket Penetrometer

Water Levels
Encountered Groundwater
Stabilised Groundwater

Additional Comments

Log Drawn By: Laurie White
Contact: laurie.white@reumad.com.au

Logged By: **Kiran Baby** Date: **08/06/2021**
Checked By: **Kiran Baby** Date: **24/06/2021**

TEST PIT LOG: TP6

Geo-Logix Pty Ltd
Building Q2, Level 3
Unit 2309 / 4 Daydream Street
Warriewood NSW 2102
www.geo-logix.com.au

Project Number:	**2101053**
Hole Depth:	**3.30 m**
Date Started:	**08/06/2021**
Date Completed:	**08/06/2021**

Project Name: **Geotechnical Investigation**
Location / Site: **Cnr Oran Park Drive & Peter Brock Drive, Oran Park NSW**
Client: **Projectvision**
Contractor: **C & D Camilleri Excavations Pty Ltd**
Method: **Test Pit (Excavator)**

Method	Water Level	Depth (mBGL)	Sample Type	HC Odour	Sample ID	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Observations / Comments
EX		0.40	D	Z	TP6/2.0-2.2	Fill			**FILL**- yellowish red / light brown (5YR 5/6), 60% clay,30% sand, 10% gravel, medium plasticity, well compacted, PP=340kPa..	damp	
		2.00							**FILL**- yellowish red / light brown (5YR 5/6) and pale red / moderate orange pink (10R 7/4) and red / moderate reddish brown (10R 4/6), 60% clay, 20% sand, 20% gravel, medium plasticity, well compacted, PP=390-550kPa..	damp	Sandstone, shale fragments.
		2.20							**FILL**- medium grey (N5), 60% clay, 40% sand, medium plasticity, well compacted.	damp	Old topsoil fill.
		2.30							**FILL**- yellowish red / light brown (5YR 5/6) and pale red / moderate orange pink (10R 7/4), 80% clay, 10% sand, 10% gravel, medium plasticity, well compacted, PP=390-550kPa..	damp	Sandstone, shale fragments.
						Natural	CL		**CLAY**- very pale brown / very pale orange (10YR 8/2) and light red / moderate reddish orange (10R 6/6), 95% clay, 5% sand, medium plasticity, very stiff, PP=280-340kPa..	damp	
		3.00					CL		**CLAY with Gravel**- very pale brown / very pale orange (10YR 8/2) and light red / moderate reddish orange (10R 6/6), 75% clay, 25% gravel, medium plasticity, very stiff, with shale.	damp	
									Terminated at 3.30 m		

Abbreviations

Hydrocarbon Odour
H High
M Medium
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed
B Bulk
R Representative
C Continuous
J Jar
Asb Asbestos

Strength Testing
SPT Standard Penetration Test
DCP Dynamic Cone Penetrometer
PP Pocket Penetrometer

Water Levels
Encountered Groundwater
Stabilised Groundwater

Additional Comments

Log Drawn By: Laurie White
Contact: laurie.white@reumad.com.au

Logged By: **Kiran Baby** Date: **08/06/2021**
Checked By: **Kiran Baby** Date: **24/06/2021**

TEST PIT LOG: TP7

Geo-Logix Pty Ltd
Building Q2, Level 3
Unit 2309 / 4 Daydream Street
Warriewood NSW 2102
www.geo-logix.com.au

Project Number:	**2101053**
Hole Depth:	**3.70 m**
Date Started:	**08/06/2021**
Date Completed:	**08/06/2021**

Project Name: **Geotechnical Investigation**
Location / Site: **Cnr Oran Park Drive & Peter Brock Drive, Oran Park NSW**
Client: **Projectvision**
Contractor: **C & D Camilleri Excavations Pty Ltd**
Method: **Test Pit (Excavator)**

Method	Water Level	Depth (mBGL)	Sample Type	HC Odour	Sample ID	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Observations / Comments
EX		0.30				Fill			**FILL**- yellowish red / light brown (5YR 5/6), 50% clay,40% sand, 10% gravel, medium plasticity, well compacted, PP=170kPa.	damp	
		1	B	Z	TP7/0.8-1.0				**FILL**- dark yellowish brown (10YR 4/6) and very pale brown / greyish orange (10YR 7/4) and yellowish red / light brown (5YR 5/6), 60% clay, 20% sand, 20% gravel, medium plasticity, well compacted, PP=390-470kPa.	damp	Sandstone, gravel, shale.
		1.70	B	Z	TP7/1.5-1.7				Boulders of different fill between 1.5-1.7m, 70% Clay, 30% Sand, medium grey (N5).		
		2				Natural	CL		**CLAY**- light red / moderate reddish orange (10R 6/6), 90% clay, 10% sand, medium plasticity, very stiff, PP>600kPa.	damp	
		2.50									
		3					CL		**CLAY**- very pale brown / very pale orange (10YR 8/2) and light red / moderate reddish orange (10R 6/6), 85% clay, 15% sand, medium plasticity, very stiff, PP=500-550kPa.	damp	
		4							**Terminated at 3.70 m**		

Abbreviations

Hydrocarbon Odour
H High
M Medium
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed
B Bulk
R Representative
C Continuous
J Jar
Asb Asbestos

Strength Testing
SPT Standard Penetration Test
DCP Dynamic Cone Penetrometer
PP Pocket Penetrometer

Water Levels
Encountered Groundwater
Stabilised Groundwater

Additional Comments

Log Drawn By: Laurie White
Contact: laurie.white@reumad.com.au

Logged By: **Kiran Baby** Date: **08/06/2021**
Checked By: **Kiran Baby** Date: **24/06/2021**

TEST PIT LOG: TP8

Geo-Logix Pty Ltd
Building Q2, Level 3
Unit 2309 / 4 Daydream Street
Warriewood NSW 2102
www.geo-logix.com.au

Project Number:	**2101053**
Hole Depth:	**3.80 m**
Date Started:	**08/06/2021**
Date Completed:	**08/06/2021**

Project Name: **Geotechnical Investigation**
Location / Site: **Cnr Oran Park Drive & Peter Brock Drive, Oran Park NSW**
Client: **Projectvision**
Contractor: **C & D Camilleri Excavations Pty Ltd**
Method: **Test Pit (Excavator)**

Method	Water Level	Depth (mBGL)	Sample Type	HC Odour	Sample ID	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Tests: DCP TP8a (blows/100mm 6 12 18 24)	Tests: DCP TP8b (blows/100mm 6 12 18 24)	Observations / Comments
EX		0.50	B	Z	TP8/0.1-0.3	Fill			**FILL**- yellowish red / light brown (5YR 5/6), 70% clay, 20% sand, 10% gravel, medium plasticity, well compacted.	damp			Gravel, shale,
			D	Z	TP8/0.3-0.4								
		1.70	B	Z	TP8/1.0-1.3	Fill			**FILL**- yellowish red / light brown (5YR 5/6) and red / moderate reddish brown (10R 4/6) and pink / moderate orange pink (5YR 8/4), 70% clay, 10% sand, 20% gravel, medium plasticity, well compacted.	damp			Sandstone pieces, shale.
			D	Z	TP8/1.2-1.3								
		3.00	D	Z	TP8/1.8-1.9	Natural	CL		**CLAY**- light red / moderate reddish orange (10R 6/6), 95% clay, 5% sand, medium plasticity, very stiff.	damp			
			B	Z	TP8/2.5-2.7								
		3.40	D	Z	TP8/3.2-3.3	Natural	CL		**CLAY**- pinkish white / greyish orange pink (10R 8/2) and light red / moderate reddish orange (10R 6/6), 85% clay, 15% sand, medium plasticity, very stiff.	damp			
			B	Z	TP8/3.2-3.4	Natural	CL		**Gravelly CLAY**- pinkish white / greyish orange pink (10R 8/2) and light red / moderate reddish orange (10R 6/6), 65% clay, 35% sand, 35% gravel, medium plasticity, very stiff, white shale.	damp			
									Terminated at 3.80 m				

Abbreviations

Hydrocarbon Odour
H High
M Medium
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed
B Bulk
R Representative
C Continuous
J Jar
Asb Asbestos

Strength Testing
SPT Standard Penetration Test
DCP Dynamic Cone Penetrometer
PP Pocket Penetrometer

Water Levels
Encountered Groundwater
Stabilised Groundwater

Additional Comments
DCP TP8a & TP8b located either side of TP8.

Log Drawn By: Laurie White
Contact: laurie.white@reumad.com.au

Logged By: **Kiran Baby** Date: **08/06/2021**
Checked By: **Kiran Baby** Date: **24/06/2021**

TEST PIT LOG: TP9

Geo-Logix Pty Ltd
Building Q2, Level 3
Unit 2309 / 4 Daydream Street
Warriewood NSW 2102
www.geo-logix.com.au

Project Number:	**2101053**
Hole Depth:	**3.20 m**
Date Started:	**08/06/2021**
Date Completed:	**08/06/2021**

Project Name: **Geotechnical Investigation**
Location / Site: **Cnr Oran Park Drive & Peter Brock Drive, Oran Park NSW**
Client: **Projectvision**
Contractor: **C & D Camilleri Excavations Pty Ltd**
Method: **Test Pit (Excavator)**

Method	Water Level	Depth (mBGL)	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Observations / Comments
EX		1 2 2.30	Fill			**FILL**- light reddish brown / light brown (5YR 6/4) and yellowish red / light brown (5YR 5/6), 60% clay, 20% sand, 20% gravel, medium plasticity, well compacted.	damp	Shale, sandstone fragments.
		2.60	Natural	CL		**CLAY**- light red / moderate reddish orange (10R 6/6), 90% clay, 10% sand, medium plasticity, very stiff.	damp	
		3		CL		**CLAY**- pinkish white / greyish orange pink (10R 8/2) and light red / moderate reddish orange (10R 6/6), 85% clay, 15% sand, medium plasticity, very stiff, with shale fragments.	damp	
		4				**Terminated at 3.20 m**		

Abbreviations

Hydrocarbon Odour
H High
M Medium
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed
B Bulk
R Representative
C Continuous
J Jar
Asb Asbestos

Strength Testing
SPT Standard Penetration Test
DCP Dynamic Cone Penetrometer
PP Pocket Penetrometer

Water Levels
Encountered Groundwater
Stabilised Groundwater

Additional Comments

Log Drawn By: Laurie White
Contact: laurie.white@reumad.com.au

Logged By: **Kiran Baby** Date: **08/06/2021**
Checked By: **Kiran Baby** Date: **24/06/2021**

Sheet: 1 of 1

GLLOG2021 2101053 ORAN PARK.GPJ GL.GDT 6/24/21 9:45:47 AM - drawn by laurie white at www.reumad.com.au

ATTACHMENT D

SOIL CLASSIFICATION REPORT

Client	Geo-Logix Pty Ltd	**Source**	TP5 0.70-1.00m
Address	Building Q2, Level 3, 2309/4 Daydream St, Warriewood, NSW 2102	**Sample Description**	Silty CLAY trace of Sand
Project	Oran Park Geotech (2101053)	**Report No.**	S68347-PI
Job No.	S21212-1	**Lab No.**	S68347

Test Procedure

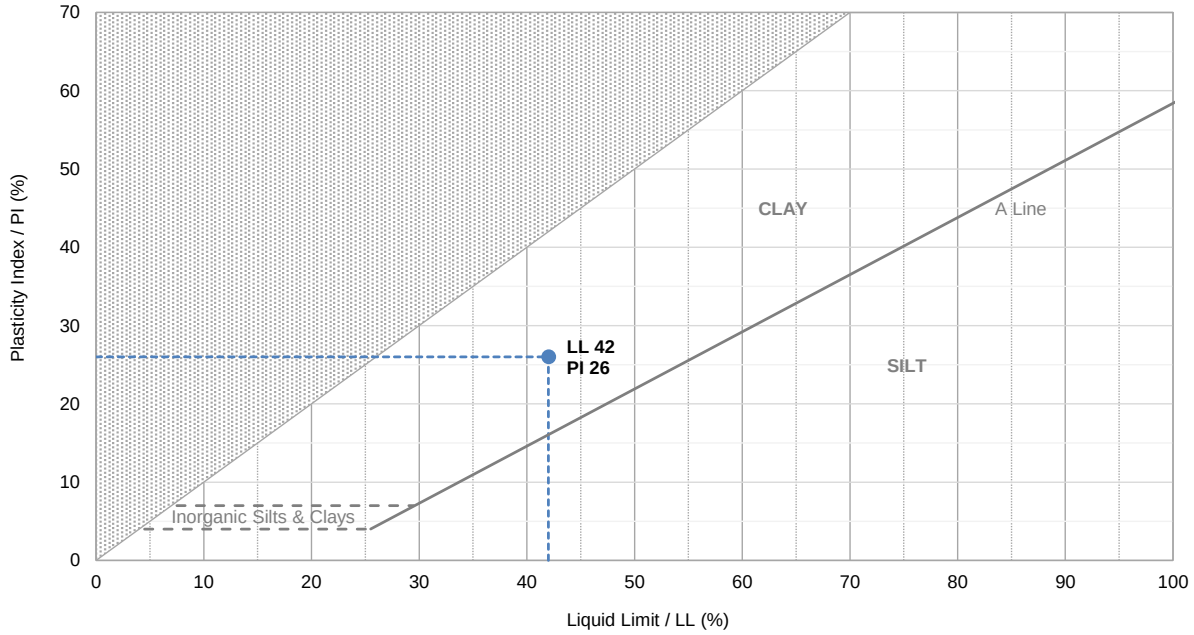
☐	AS1289 3.1.1	Liquid Limit - Four point Casagrande method
☑	AS1289 3.1.2	Liquid Limit - One point Casagrande method
☑	AS1289 3.2.1	Plastic Limit - Standard method
☑	AS1289 3.3.1	Calculation of the Plasticity Index
☑	AS1289 3.4.1	Linear Shrinkage - Standard method

Sampling Sampled by Client - results apply to the sample as received — **Date Sampled** Unknown

Preparation Prepared in accordance with the test method — **Date Tested** 16/6/21

Plasticity Chart for Classification of Fine-Grained Soils

AS 1726:2017 Clause 6.1.6 (Figure 5)



Preparation	
Method of Preparation	**Dry Sieved**
History of the Sample	**Air Dried**

Results	
Liquid Limit / LL (%)	**42**
Plastic Limit (%)	**16**
Plasticity Index / PI (%)	**26**
Linear Shrinkage (%)	**12.5**
Condition upon Drying	**Linear**

Notes

Accredited for compliance with ISO/IEC 17025 - Testing.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. This document shall not be reproduced, except in full. Results relate only to the samples tested.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Chris Lloyd

6/17/2021

Date:

MACQUARIE GEOTECH

Macquarie Geotechnical
U7/8 10 Bradford Street
Alexandria NSW 2015

SOIL CLASSIFICATION REPORT

Client	Geo-Logix Pty Ltd	**Source**	TP5 1.80-1.90m
Address	Building Q2, Level 3, 2309/4 Daydream St, Warriewood, NSW 2102	**Sample Description**	Silty CLAY
Project	Oran Park Geotech (2101053)	**Report No.**	S68348-PI
Job No.	S21212-1	**Lab No.**	S68348

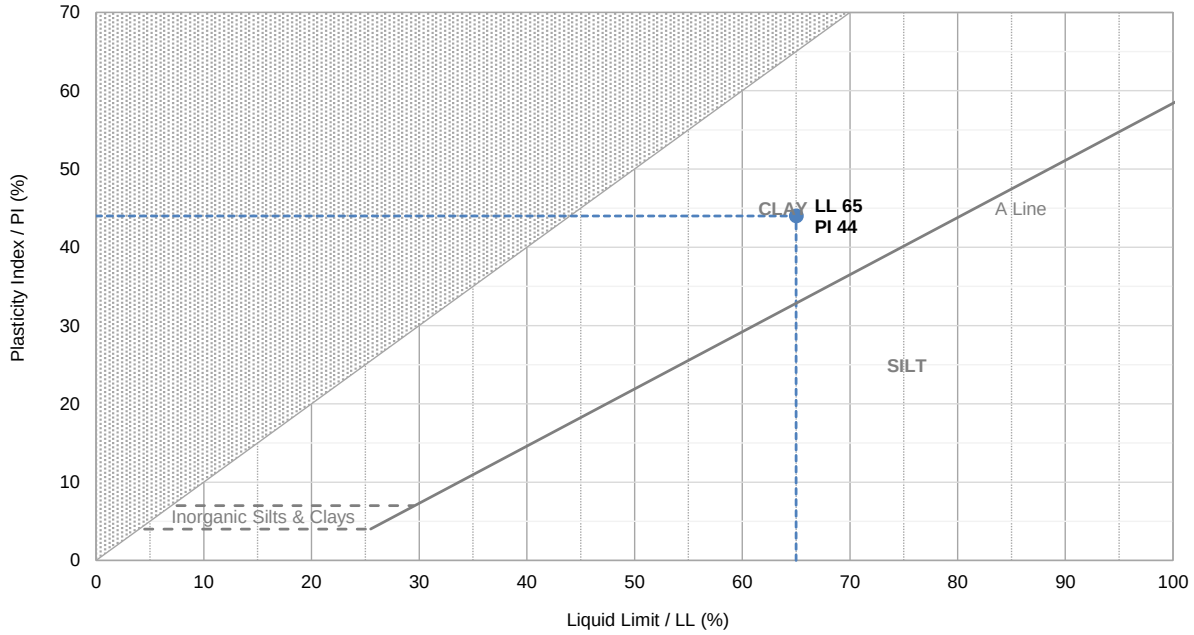
Test Procedure

- ☐ AS1289 3.1.1 Liquid Limit - Four point Casagrande method
- ☑ AS1289 3.1.2 Liquid Limit - One point Casagrande method
- ☑ AS1289 3.2.1 Plastic Limit - Standard method
- ☑ AS1289 3.3.1 Calculation of the Plasticity Index
- ☑ AS1289 3.4.1 Linear Shrinkage - Standard method

Sampling	Sampled by Client - results apply to the sample as received	**Date Sampled**	Unknown
Preparation	Prepared in accordance with the test method	**Date Tested**	16/6/21

Plasticity Chart for Classification of Fine-Grained Soils

AS 1726:2017 Clause 6.1.6 (Figure 5)



Preparation	
Method of Preparation	**Dry Sieved**
History of the Sample	**Air Dried**

Results	
Liquid Limit / LL (%)	**65**
Plastic Limit (%)	**21**
Plasticity Index / PI (%)	**44**
Linear Shrinkage (%)	**16.0**
Condition upon Drying	**Linear**

Notes

Accredited for compliance with ISO/IEC 17025 - Testing.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. This document shall not be reproduced, except in full. Results relate only to the samples tested.

NATA Accredited Laboratory Number: 14874

Authorised Signatory:

Chris Lloyd

6/17/2021

Date:

MACQUARIE GEOTECH

Macquarie Geotechnical
U7/8 10 Bradford Street
Alexandria NSW 2015

Geo-Logix P/L
Bld Q2 Level 3, 2309/4 Daydream St
Warriewood
NSW 2102

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Ted Lilly**

Report **801984-S-V2**
Project name ORAN PARK GEOTECH
Project ID 2101053
Received Date Jun 09, 2021

Client Sample ID			**TP5/0.6-0.7**	**TP5/1.6-1.7**	**TP5/3.2-3.3**	**TP8/0.3-0.4**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-Jn20323**	**S21-Jn20324**	**S21-Jn20325**	**S21-Jn20326**
Date Sampled			**Jun 08, 2021**	**Jun 08, 2021**	**Jun 08, 2021**	**Jun 08, 2021**
Test/Reference	LOR	Unit				
Chloride	10	mg/kg	510	44	510	23
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	490	48	320	47
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	7.4	5.2	5.3	8.8
Resistivity*	0.5	ohm.m	20	210	31	210
Sulphate (as SO4)	10	mg/kg	440	< 10	190	14
% Moisture	1	%	14	5.4	1.5	8.3

Client Sample ID			**TP8/1.2-1.3**
Sample Matrix			**Soil**
Eurofins Sample No.			**S21-Jn20327**
Date Sampled			**Jun 08, 2021**
Test/Reference	LOR	Unit	
Chloride	10	mg/kg	380
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	440
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	8.4
Resistivity*	0.5	ohm.m	23
Sulphate (as SO4)	10	mg/kg	220
% Moisture	1	%	3.3

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Chloride	Sydney	Jun 11, 2021	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Conductivity (1:5 aqueous extract at 25°C as rec.)	Sydney	Jun 11, 2021	7 Days
- Method: LTM-INO-4030 Conductivity			
pH (1:5 Aqueous extract at 25°C as rec.)	Sydney	Jun 11, 2021	7 Days
- Method: LTM-GEN-7090 pH in soil by ISE			
Sulphate (as SO4)	Sydney	Jun 11, 2021	28 Days
- Method: E045 Anions by Ion Chromatography			
% Moisture	Sydney	Jun 09, 2021	14 Days
- Method: LTM-GEN-7080 Moisture			

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Rolleston, Christchurch 7675
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IANZ # 1290

Company Name:	Geo-Logix P/L	**Order No.:**	PO4671KB	**Received:**	Jun 9, 2021 5:13 PM
Address:	Bld Q2 Level 3, 2309/4 Daydream St Warriewood NSW 2102	**Report #:**	801984	**Due:**	Jun 17, 2021
		Phone:	02 9979 1722	**Priority:**	5 Day
		Fax:	02 9979 1222	**Contact Name:**	Ted Lilly
Project Name:	ORAN PARK GEOTECH				
Project ID:	2101053				

Eurofins Analytical Services Manager : Ursula Long

Sample Detail						HOLD	Aggressivity Soil Set	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	BH5/0.6-0.7	Jun 08, 2021		Soil	S21-Jn20323		X	X
2	BH5/1.6-1.7	Jun 08, 2021		Soil	S21-Jn20324		X	X
3	BH5/3.2-3.3	Jun 08, 2021		Soil	S21-Jn20325		X	X
4	BH8/0.3-0.4	Jun 08, 2021		Soil	S21-Jn20326		X	X
5	BH8/1.2-1.3	Jun 08, 2021		Soil	S21-Jn20327		X	X
6	BH5/2.4-2.5	Jun 08, 2021		Soil	S21-Jn20328	X		
7	BH6/2.0-2.2	Jun 08, 2021		Soil	S21-Jn20329	X		
8	BH8/1.8-1.9	Jun 08, 2021		Soil	S21-Jn20330	X		
9	BH8/3.2-3.3	Jun 08, 2021		Soil	S21-Jn20331	X		

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Company Name: Geo-Logix P/L
Address: Bld Q2 Level 3, 2309/4 Daydream St
Warriewood
NSW 2102

Project Name: ORAN PARK GEOTECH
Project ID: 2101053

Order No.: PO4671KB
Report #: 801984
Phone: 02 9979 1722
Fax: 02 9979 1222

Received: Jun 9, 2021 5:13 PM
Due: Jun 17, 2021
Priority: 5 Day
Contact Name: Ted Lilly

Eurofins Analytical Services Manager : Ursula Long

Sample Detail	HOLD	Aggressivity Soil Set	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271			
Sydney Laboratory - NATA Site # 18217	X	X	X
Brisbane Laboratory - NATA Site # 20794			
Perth Laboratory - NATA Site # 23736			
Mayfield Laboratory - NATA Site # 25079			
External Laboratory			
Test Counts	4	5	5

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Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ug/L: micrograms per litre
ppm: Parts per million
ppb: Parts per billion
%: Percentage
org/100mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Conductivity (1:5 aqueous extract at 25°C as rec.)	uS/cm	< 10			10	Pass	
LCS - % Recovery							
Conductivity (1:5 aqueous extract at 25°C as rec.)	%	93			70-130	Pass	
Resistivity*	%	93			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S21-Jn20487	NCP	uS/cm	310	310	1.0	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S21-Jn20487	NCP	pH Units	10	10	<1	30%	Pass	
Resistivity*	S21-Jn20487	NCP	ohm.m	33	32	1.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Jn20324	CP	%	5.4	5.7	5.0	30%	Pass	

Comments

This report was revised V2 to amend client sample IDs.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

John Nguyen	Analytical Services Manager
Charl Du Preez	Senior Analyst-Inorganic (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Sample Receipt Advice

Company name:	Geo-Logix P/L
Contact name:	Ted Lilly
Project name:	ORAN PARK GEOTECH
Project ID:	2101053
Turnaround time:	5 Day
Date/Time received	Jun 9, 2021 5:13 PM
Eurofins reference	801984

Sample Information

✓	A detailed list of analytes logged into our LIMS, is included in the attached summary table.
✓	Sample Temperature of a random sample selected from the batch as recorded by Eurofins Sample Receipt : .2 degrees Celsius.
✓	All samples have been received as described on the above COC.
✓	COC has been completed correctly.
✓	Attempt to chill was evident.
✓	Appropriately preserved sample containers have been used.
✓	All samples were received in good condition.
✓	Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
✓	Appropriate sample containers have been used.
✓	Sample containers for volatile analysis received with zero headspace.
X	Split sample sent to requested external lab.
X	Some samples have been subcontracted.
N/A	Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Ursula Long on phone : or by email: UrsulaLong@eurofins.com

Results will be delivered electronically via email to Ted Lilly - tlilly@geo-logix.com.au.

Global Leader - Results you can trust

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CHAIN OF CUSTODY

Project Manager: TED LILLY
Contact email: tlilly@geo-logix.com.au, kbaby@geo-logix.com.au
Project Name: Oran Park Geotech.
Project Number: 2101053 Date Submitted: 9/6/21

Page 1 of 1
Purchase Order No: P04671KB
Quote Reference:
Send Invoice to: accounts@geo-logix.com.au
TAT required: STD.

ANALYSIS REQUIRED

Lab ID	Sample ID	Date	Matrix: soil	water	air	paint, filters	other	Comments	COMPOSITE	TRH - C6 - C10	TRH - C10 - C40	VOCs	BTEXN	PAHs	PCBs	OCPs	OPPs	Phenols	Metals - M8	Metals - Lead	Metals - Specify **	MOISTURE	Asbestos (ID only)	Asbestos (WA DOH)	Foreign Materials	Conductivity (EC)	pH	SULPHATE	CHLORIDE	Hold	SUITE
✓	BH5/0.6-0.8	8/6	✓					L2														✓				✓	✓	✓	✓		L2
✓	BH5/1.6-1.7	"	✓					L2														✓				✓	✓	✓	✓		L2
✓	BH5/2.4-2.5	"	✓																										✓	
✓	BH5/3.2-3.3	"	✓					L2														✓				✓	✓	✓	✓		L2
✓	BH6/2.0-2.2	"	✓																										✓	
✓	BH8/0.3-0.4	"	✓					L2														✓				✓	✓	✓	✓		L2
✓	BH8/1.2-1.3	"	✓					L2														✓				✓	✓	✓	✓		L2
✓	BH8/1.8-1.9	"	✓																										✓	
✓	BH8/3.2-3.3	"	✓																										✓	

Eurofins MGT Suite Codes

B1	TRH/BTEXN
B1A	TRH/MAH
B2	TRH/BTEXN/Pb
B2A	TRH/MAH/Pb
B3	PAH/Phenols
B4	TRH/BTEXN/PAH
B4A	TRH/BTEXN/PAH/Phenols
B5	TRH/BTEXN/M7
B6	TRH/BTEXN/M8
B7	TRH/BTEXN/PAH/M8
B7A	TRH/BTEXN/PAH/Phenols/M8
B8	TRH/VOC/PAH/M8
B9	TRH/BTEXN/PAH/OCP/M8
B10	TRH/BTEXN/PAH/OCP/OPP/M8
B11	Na/K/Ca/Mg/Cl/SO_4/CO_3/HCO_3/NH_3/NO_3
B11A	B11/Alkalinity
B11B	B11/EC/TDS
B12	TRH/BTEXN/Oxygenates/Ethanol
B12A	TRH/BTEXN/Oxygenates
B13	OCP/PCB
B14	OCP/OPP
B15	OCP/OPP/PCB
B16	TDS/SO_4/CH_4/Alk/BOD/COD/HPC/CUB
B17	SO_4/NO_3/Fe++/HPC/CUB
B18	Cl-/SO_4/pH
B19	N/P/K
B20	CEC/%ESP/Ca/Ma/Na/K

Metals(circle)** As, Cd, Cr, Cu, Ni, Pb, Zn, Hg, Cr^{6+}, Cr^{3+}, Fe^{2+}, Fe^{3+}, Be, B, Al, V, Mn, Fe, Co, Se, Sr, Sn, Mo, Ag, Ba, Tl, Bi, Sb

Chain of Custody

Relinquished by: KB Date/Time: 9/6 Signature:
Received by: Brae Date/Time: 9/6 5:13 Signature:
#SO1984

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