Broadcrest Consulting Pty Ltd

118 Maitland Street, Muswellbrook

Geotechnical Report

January 2024

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Wastewater | Stormwater | Flood | Environmental | Geotechnical | Acoustic | Structural

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Document controls

Approval and Authorisation

Title	118 Maitland Street, Muswellbrook Geotechnical Investigation
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Signed:	
Dated:	02/02/2024

Document Status

Date	Internal Reference	Document Status	Prepared by	Reviewed by
02/02/2024	3410-GEO-01-A	For Release	K. Ferry	C. Hudson

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1 EXECUTIVE SUMMARY

Broadcrest Consulting Pty. Ltd. were engaged by Curious Minds Early Learning Centre PTY LTD to conduct a Geotechnical Investigation at 118 Maitland Street, Muswellbrook ('the site'). The purpose of this report is to provide preliminary information on the subsurface conditions to guide the design of a new childcare centre. A desktop study was conducted on the 22/01/2024 to identify site features and constraints for the site inspection.

The objective of a geotechnical report is to collate data on the surface and subsurface conditions of the site, specifically:

- Soil classification
- Depth to rock (if encountered)
- Ground water level (if encountered)
- General geotechnical constraints
- Design parameters for retaining walls and foundations
- General comments and recommendations.

A site inspection was carried out on the 23/01/2024 which involved a visual assessment of the site, borehole sampling and DCP testing.

Subject to the recommendations in Section 6, the site is considered suitable for proposed development

2 INTRODUCTION

2.1 Background

Broadcrest Consulting Pty. Ltd. were engaged by Curious Minds Early Learning Centre PTY LTD to conduct a Geotechnical Investigation at 118 Maitland Street, Muswellbrook ('the site'). The purpose of this report is to provide preliminary information on the subsurface conditions to guide the design of a new childcare centre. A desktop study was conducted on the 22/01/2024 to identify site features and constraints for the site inspection.

A site inspection was carried out on the 23/01/2024 which involved a visual assessment of the site, borehole sampling and DCP testing.

Light rain had occurred within the 24 hours prior to the site inspection. Photographs were taken of the site features for future reference.

2.2 Objectives

The objective of a geotechnical report is to collate data on the surface and subsurface conditions of the site, specifically:

- Soil classification
- Depth to rock (if encountered)
- Ground water level (if encountered)
- General geotechnical constraints
- Design parameters for retaining walls and foundations
- General comments and recommendations.

2.3 Scope of works

- A desktop review of the site utilising a Spatial Data report
- An on-site inspection to verify the desktop review
- One full day of drilling, prioritising site coverage over depth
- Soil classification and logging
- Comments and recommendations relating to the proposed development.

3 SITE DESCRIPTION

3.1 Overview

The proposed development is located at 118 Maitland Street, Muswellbrook. The site is bounded by:

- South East: Residence
- South-West: New England Highway
- North-West: Residence
- North-East: Muscle Creek

The site is currently occupied by a residential dwelling, driveway and carport. The dwelling has been constructed on bearers and joists connected to brick piers. The remainder of the site consists of lawn and scattered trees at the rear.

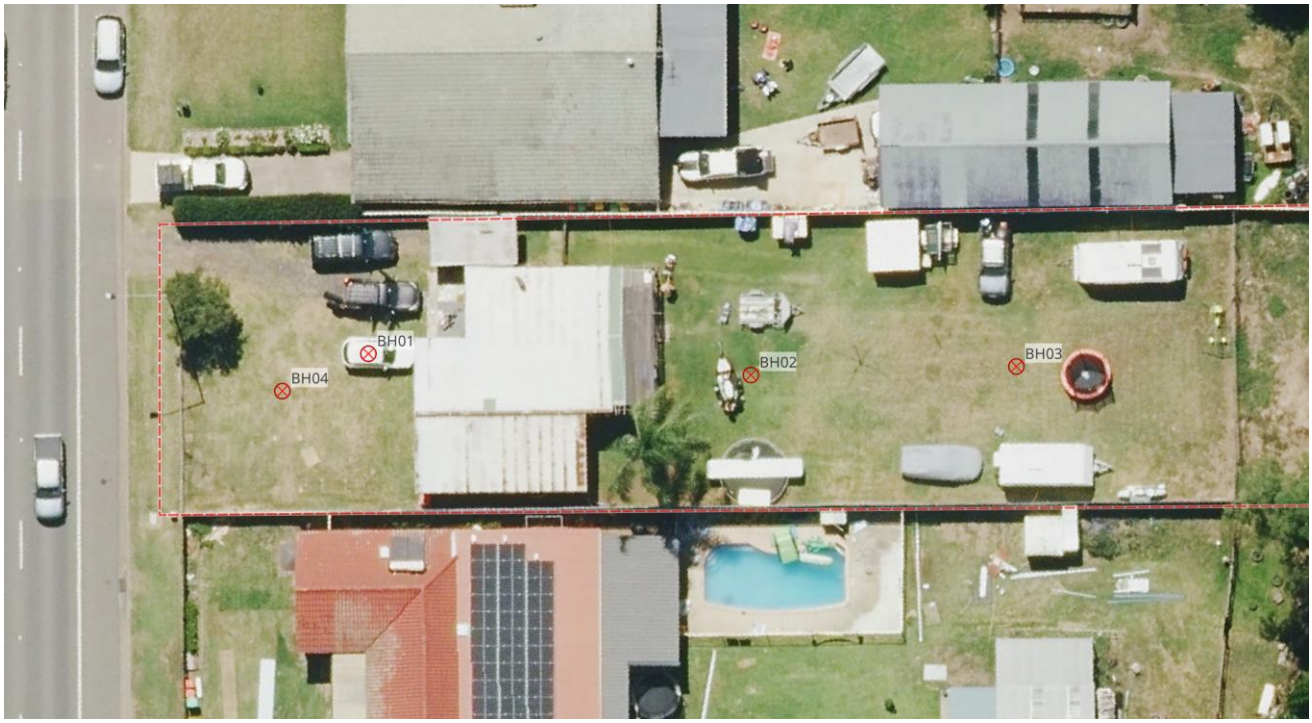

Figure 3.1: Site aerial imagery with borehole locations

3.2 Historical Aerial Photography

Figure 3.2.1: The 1975 imagery shows the house fully constructed. Prior imagery from 1958 shows a vacant lot.

Figure 3.2.2: The 2019 imagery shows earth works in the front yard

3.3 Surface Observations

Field work was conducted by Broadcrest on the 23rd of January 2024. During the inspections the following observations were made:

- The site is predominantly flat – with a moderate slope at the rear down to the creek.
- The residential dwelling has been constructed on bearers and joists, without obvious cut/fill works employed as part of the construction
- No signs of overland flow paths, springs, sedges or other groundwater features were identified during the inspection

Figure 3.1: North-east facing photo showing the rear yard and drilling works (BH02)

4 INVESTIGATION FINDINGS

4.1 Review of Surrounding Investigations

A desktop review was conducted surrounding the site to identify any publicly available investigations nearby. These investigations were read at a high level only to gain an understanding of the surrounding geology and subsurface conditions. The following investigations were identified:

Table 4.1.1: Nearby geotechnical assessments

Name	Distance	Relevance
Hunter Institute of Tafe – Geotechnical Report 09-GO41A - NSW Department of Commerce	900m	Moderate
Groundwater Bore 102946.1.1	<250m	Moderate

The existing geotechnical investigation identified interbedded Silty Clays, Gravels (in clay matrix), cobbles and some sand. Sandstone bedrock is identified to be encountered at 4.5m BEGL.

ground water bores are listed surrounding the site. The quality of the reporting for ground water bores is low, however they provide insight into the generalised conditions. The surrounding bores regularly identify gravel, sand and some clay – which corresponds with the geology mapping (section 4.2) and the investigation by the Department of Commerce.

4.2 Geology

4.2.1: Desktop Review

A review of the NSW Seamless Geology mapping situates the site within the Rowan Formation (Pgrr) and Clastic Sediment (Q_av) geology units (see figure 4.2.3).

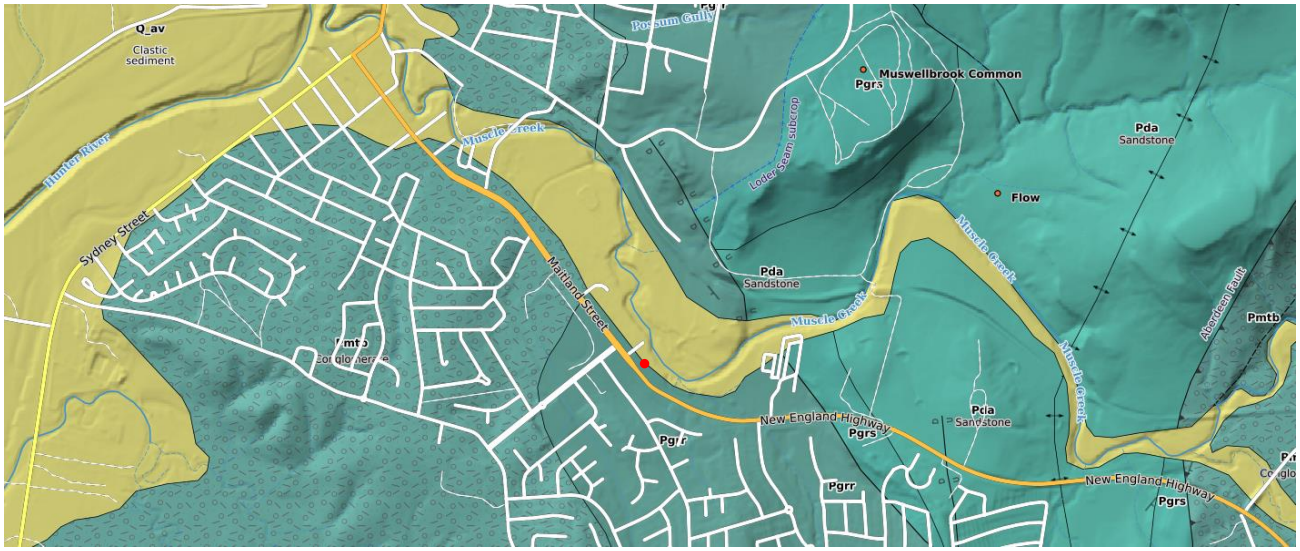

Figure 4.2.3: NSW Seamless Geology (site is indicated by red dot)

4.2.1: Site investigation findings

The site investigation revealed material consistent with the Conglomerate Unit (Pmtb) to the east, with refusal on interbedded mixed gravels and sands within a clay matrix.

It is noted that the soil formation process is difficult to determine with the information available. The soil layer could be fromed by:

- Residual processes of underling conglomerate material, or,
- Fluvial/alluvial processes transferring residual conflomerate material and depositing it in place.

Both mechanisms can result in subsurface conditions with a mixture of partial sizes from clay through to gravel and possibly cobbles. Lenses of specific particle sizes are possible depending on the conditions during the deposition process.

4.3 Soil Landscape

4.3.1: Desktop Review

The Soil Landscape mapping lists the site within the Hunter Soil Landscape (A-hu):

> *This soil landscape covers the floodplains of the Hunter River and its tributaries. The main soils are all formed in alluvium. They include Brown Clays and Black Earths (Ug5.34, Ug5.17) on prior stream channels and on tributary flats, with Chernozems (Uf5.1) on prior stream channels adjacent to Dartbrook and Brays Hill soil landscapes and in many of the valleys such as Martindale and Widden. Alluvial Soils (loams – Um5 and sands – Um5.52, Um6.1, Uc) occur on levees and flats adjacent to the present river channel. Red Podzolic Soils and Lateritic Podzolic Soils (Dr2.11, Db2.41) are located on old terraces, with Non-calcic Brown Soils (Db1.13) and Yellow Solodic Soils in some drainage lines*

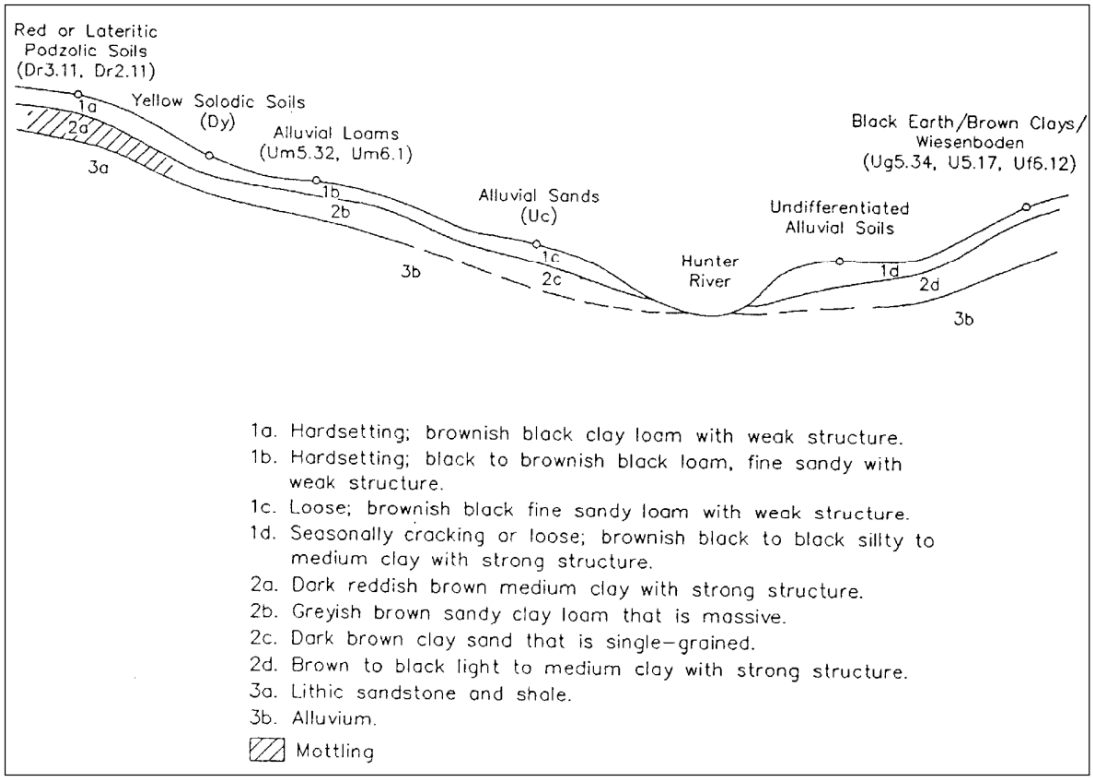

Figure 4.3.1: Typical soil distribution – Extracted from soil landscape A-hu.

4.4 Subsurface Soil Conditions

The subsurface investigation involved:

- CFA drilling of boreholes 1,2 and 4.
- Thin wall tube sampling of borehole 3
- DCP testing of boreholes 1 and 2
- Field classification of strata encountered
- Logging of recovered soil samples (see Appendix A)

Table 4.4.1: Borehole testing summary and termination

Borehole	Final Depth	DCP	Termination Reason
1	4.9m	YES	Refusal
2	5.2m	Yes	Refusal
3	1.0m	No	Terminated
4	2.7m	No	Terminated

The general subsurface conditions are summarised in table 4.2. The boreholes in Appendix A should be reviewed for more detail on the conditions encountered. It is noted that alluvial/fluvial process can result in highly variable conditions, with gravel and sand lenses likely to present within the Clay matrix.

Table 4.4.2: Borehole results

Layer	Material Description	Depth
1	Fill (front yard only)	0 – 0.3m
2	Silty CLAY with trace sand and gravel	0.3 – 1.6m
3	Silty Clayey SAND with gravel	1.6 – 4.9m
4	REFUSAL – assumed conglomerate or cobbles.	4.9m+

4.5 Groundwater

No groundwater was encountered during the investigation.

4.6 Cut and Fill

- Minor fill works were identified in the front yard.
- No fill material was identified within the rear yard.
- Given the variable soil composition, older fill material can be difficult to identify. No foreign material

5 PRELIMINARY DESIGN CRITERIA

The following sections provide data which may be used by engineers for the design phase of the project.

5.1 Soil Properties

Table 5.1a Soil properties

Soil Type	Soil Classification	Consistency	Dry Unit Weight (KN/m^3)	Undrained shear strength Cu (kPa)	Angle of internal friction (°)
1	CLAY (CI)	Firm	18	50	-
2	CLAY (CI)	Stiff	19	100	-
3	CLAY (CI)	Very Stiff	20	150	-
4	SAND	Dense	18.5	-	38

5.2 Bearing Capacities

Table 5.2.1 Bearing Capacity and shaft adhesion

Soil Type	Soil Type	Allowable Bearing Pressure[3] (kPa)
1	Clay (F)	100
2	Clay (ST)	150
3	Clay (V.ST)	300
4	SAND (D)[3]	400

Notes:

1. Saturation of the clay soil may reduce the overall bearing strength by 2 - 4x. Note that the inspection and testing was conducted in near dry soil conditions.
2. Estimated allowable bearing pressure is based on a minimum foundation with a minimum dimension of 0.4m (diameter for circular) at a minimum of 1.0m depth.
3. Assumes sand is fully confined by the building and/or surrounding undisturbed soil and at least 3.0m deep.

5.3 Earth Pressure Coefficients

We recommend the following geotechnical parameters for the design of retaining walls. Section 6.5 should be read in full. We recommend using the Terzaghi formula in clays using the undrained shear strength Cu as per table 5.1a. Full hydrostatic pressure should be assumed for all permeant structures.

Table 5.3.1: Earth pressure coefficients

Material	Ka		Kp	K_0
	Temporary	Long term		
CLAY (F)	0.35	0.39	2.88	0.52
CLAY (ST)	0.32	0.36	3.12	0.48
SAND (D)	0.24	0.28	4.20	0.38

Notes:

1. Flat ground behind the retaining wall has been assumed
2. No wall friction has been assumed
3. A geotechnical engineer should be consulted in the design of retaining walls using the above parameters
4. Parameters should be adjusted to account for groundwater where appropriate
5. Section 6.5 should be read for generalised comments and further design considerations.

5.4 Seismic Design – AS 2870

Based on the sub-surface conditions encountered at the borehole locations, the site has been assessed in accordance with Section 4 of AS 1170.4 - 2007 (Structural Design Actions: Part 4 - Earthquake Actions in Australia) and has been assigned to the site sub-soil Class Ce (Shallow Soil Site).

Based on Table 3.2 of AS 1170, the Hazard Factor (Z) for the site is 0.11.

6 COMMENTS AND RECOMMENDATIONS

6.1 Site Preparation

Material removed from the site will need to be managed in accordance with current legislation and may require material type classification in accordance with NSW EPA (2014) Waste Classification prior to removal. Soil should be disposed at appropriately licenced facilities. Natural soil and bedrock may be classified as excavated natural material and re-used on other sites rather than disposed at a landfill, although it must be proven to be free of contamination.

Removal of soil overburden should be performed in a manner that reduces the risk of sedimentation occurring in nearby waterways and on neighbouring land. All spoil on site should be properly controlled by soil erosion control methods in accordance with Landcom (2004) to prevent transportation of sediments off-site.

The fill material identified within the front yard should be removed from site. Reference to the Environmental Site Assessment by Broadcrest consulting (project 3410-ESA) should be reviewed as part of this process.

6.2 Groundwater

The infiltration of groundwater into an open excavation is likely to occur during and following rainfall events. Given the site location and soil structure, the infiltration rates are expected to be low and should be manageable with a sump pump.

6.3 Excavation

Soils can be readily excavated using conventional earthmoving equipment. All excavation work should be completed with reference to the Code of Practice 'Excavation Work' (Oct 2013) by Safe Work Australia. Excavation method statements will need to be prepared by the excavation contractor prior to the issue of a CC.

6.4 Vibration

6.4.1 Structural

During excavation it will be necessary to use appropriate methods and equipment to keep ground vibration within acceptable limits. A typical provisional allowed vibration limit of 8.0 mm/sec Vector Sum Peak Particle Velocity (VSPPV) is considered standard industry practice for earthworks.

The German Standard DIN 4150-3 (Structural Vibration: Effects of Vibration on Structures) provides guideline values for short term vibration velocity at foundations. Short term vibration is classified as vibrations which do not occur often enough to cause structural fatigue.

Table 6.4.1 - Structural Damage – Short Term Vibration (mm/s) – German DIN 4150-3

Type of Structure	Velocity values in mm/s at the foundation at a frequency of			Plane of floor of uppermost storey
	Less than 10Hz	10-50Hz	50-100Hz	All frequencies
Building use for commercial purposes, industrial buildings and buildings of similar design	20	20-40	40-50	40
Dwelling and buildings of similar design and/or occupancy	5	5-15	15-20	15
Structures that because of their particular sensitivity to vibration and are of great intrinsic value (e.g. heritage listed structures)	3	3-8	8-10	8

It is recommended that building condition (dilapidation) surveys of adjacent buildings be undertaken prior to commencement of excavation. The building foundation types and conditions should be determined where possible, so as to assess the maximum acceptable vibration level to reduce the likelihood of damage and to provide evidence in the event of any damage claims.

6.4.2 Human comfort criteria

The human annoyance vibration assessment should be undertaken using the EPA's publication 'Assessing Vibration: A Technical Guideline', based on the BS 6472 Standard. This Guideline covers the appropriate methods and criteria for the assessment of the intrusive vibration on living and working space. The guideline describes the following:

- The characteristics of vibration and associated effects that can cause community disturbance and concern to people, in particular the occupants of buildings.

- Criteria defining values of vibration to protect amenity.
- Procedures for the measurement and evaluation of vibration values and other associated emissions.

A summary of the VDV criteria for human comfort limits are adopted from the EPA's publication 'Assessing Vibration: A Technical Guideline and are presented in Table 6.4.2 below.

Table 6.4.2 - Acceptable vibration dose values for intermittent vibration ($m/s^{1.75}$)

Location	Daytime[1]		Night Time[1]	
	Preferred Value	Maximum Value	Preferred Value	Maximum Value
Critical Areas[2]	0.10	0.20	0.10	0.20
Residents	0.20	0.40	0.13	0.26
Offices, Schools, Educational, institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

1) Daytime is 7.00 am to 10.00 pm and night-time is 10.00 pm to 7.00 am.
2) Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. These criteria are only indicative, and there may be a need to assess intermittent values against the continuous or impulsive criteria for critical areas. Source: BS 6472–1992

6.5 Retaining Structures

Any excavation greater than 1.0m will require an appropriate shoring system or battering. For shoring of excavations greater than 3.0m, or within Peat material, are to be checked by a suitably qualified and experienced Geotechnical Engineer.

6.5.1 Batter Slopes

Recommended maximum temporary batter slopes for the sub-surface materials present are given in Table 7.5 for completeness (horizontal : vertical ratio).

Table 6.5: Allowable batter slopes (H : V ratio)

Material	Short term[2]	Long term[2]
Clay - Stiff	1.5 : 1	2 : 1
Clay - Firm	1.5 : 1	2.5 : 1

1) Subject to inspection by an experienced geotechnical engineer or engineering geologist
2) For cut heights no greater than 2.0m
3) Batters are not appropriate below ground water level

Suitable erosion and sediment prevention plans should be designed and implemented for all unsupported slopes. For long term batters, the slope is stabilised through the use of engineered design and/or appropriate vegetation. An environmental and risk analysis must be performed to ensure the risks from erosion, run-off and slope failure are managed and within acceptable limits.

6.5.2 Temporary shoring

Any temporary excavations into soil exceeding 1.5m depth should be supported by suitably designed and installed shoring system (in accordance with AS4678 Earth Retaining Structures). The soil pressure can be calculated using the Terzaghi formula for clay. The Engineer must include the ground water pressure in their capacity calculations unless a suitable external dewatering system is installed and maintained.

For temporary shoring, it is typically adequate to select a shoring system which won't retain water and monitor the ground water in and beside the excavation to ensure compliance. Dewatering near existing structures can cause settlement. If dewatering near a structure an assessment by an experienced engineer should be sought prior to commencing works.

6.5.3 Permanent shoring

All permanent retaining structures must be designed by a qualified and suitably experienced Engineer in accordance with AS4678 and/or all applicable standards, legislation and guidelines. Full hydrostatic pressure from surface level should be assumed to account for events such as heavy rain and flooding.

6.5.4 General

The retaining wall designer should consider the additional surcharge loading from existing structures, construction equipment, backfill compaction and ground water.

Backfill should comprise of engineered fill, free of organic material, contaminants and deleterious substances and having a maximum particle size of 30 mm. Backfill should be placed in maximum 300 mm thick layers compacted using a hand-held compactor. Care should be taken to ensure excessive compaction stresses are not transferred to retaining walls. Appropriate drainage should be provided between backfill/soil exposure and retaining walls (e.g. strip drains and ag-line in free draining gravel).

Use of heavy machinery should be avoided, where possible, within 2 m of the crest of any open soil excavation greater than 1.0m to prevent excessive local surcharge loads, vibrations and undue settlement within exposed soils. Careful consideration of nearby structures (e.g. footings, services, utilities, etc.) must be given when they are within the excavation zone of influence. The excavation zone of influence extends as a triangle from the base of the excavation to ground level at 2H:1V. If any structure, utilities, etc, fall within this zone a qualified and suitably experienced engineer shall design a shoring system and develop an installation methodology which limits the settlement and horizontal movement so the structure will not be affected.

6.6 Footings

Footings should be taken to firm material 1.0m and below. Bearing on soil profiles of different strengths may lead to differential settlement. Articulation joints or piering may be required to manage this risk.

The underlying material could not be confidentially classified. It is expected to have sufficient bearing capacity for the proposed structure, if the footings are designed correctly.

6.7 Compaction

Materials preferred for use as engineered fill are well-graded granular materials, such as ripped or crushed sandstone, free of deleterious substances and having a maximum particle size not exceeding 75mm. Such fill should be compacted in layers not greater than 200mm loose thickness, to a minimum density of 98% of Standard Maximum Dry Density (SMDD). After compaction, testing shall be conducted to verify that the level of compaction has been achieved though appropriate testing.

We recommend that at least Level 2 control of fill compaction, as defined in AS3798-2007, be adhered to on this site. However, if a floor slab is to rely on engineered fill for support, then we recommend a higher compaction control of Level 1. Preferably, the geotechnical testing authority (GTA) should be engaged directly on behalf of the client and not by the earthwork's subcontractor.

6.8 Engineering Plans

This report provides advice on geotechnical aspects for the proposed civil and structural design. As part of the documentation stage of this project, Contract Documents and Specifications may be prepared based on our report. However, there may be design features we are not aware of or have not commented on for a variety of reasons. The designers should satisfy themselves that all the necessary advice has been obtained.

Once preliminary / proposed plans are completed, they should be assessed by a geotechnical engineer to ensure the recommendations within this report are sufficient. If required, we could be commissioned to review the geotechnical aspects of contract documents to confirm the intent of our recommendations has been correctly implemented. All documentation should include construction notes with the relevant recommendations from this report included. A reference for the full geotechnical report and how to obtain it should be made within the construction notes.

7 LIMITATIONS OF THIS REPORT

This report has been prepared subject to a number of limitations. These include:

The application of conditions of approval or impacts of unanticipated future events could modify the outcomes described in this document. In particular, the occurrence of earthquakes of any magnitude, extreme rainfall events or the effects of climate change have not been considered but should they occur, may have a significant impact on the site. The client agrees that such events are possible but nevertheless accepts the risk that they pose;

The findings contained in this report are the result of discrete/specific methodologies used in accordance with normal practices and standards. To the best of our knowledge, they represent a reasonable interpretation of the general condition of the site in question. Under no circumstances, however, can it be considered that these findings represent the actual state of the site/sites at all point.;

In preparing this report, Broadcrest Consulting Pty Ltd has relied upon certain verbal information and documentation provided by the client and/or third parties. Broadcrest Consulting Pty Ltd did not attempt to independently verify the accuracy or completeness of that information. To the extent that the conclusions and recommendations in this report are based in whole or in part on such information, they are contingent on its validity. Broadcrest Consulting Pty Ltd assume no responsibility for any consequences arising from any information or condition that was concealed, withheld, misrepresented, or otherwise not fully disclosed or available to Broadcrest Consulting Pty Ltd; and

This report is not to be relied upon for any purpose other than that defined in this report.

Appendix A: Bore logs

Broadcrest **BOREHOLE ID** 01

PROJECT NUMBER 3410	**DRILLING DATE** 23/01/2024	**COORDINATES**
PROJECT NAME MUSWELLBROOK CHILDCARI	**DRILLING COMPANY** Sydney Geotech	**COORD SYS** WGS 84
CLIENT J. Angelovska	**DRILLER** SW	**SURFACE ELEVATION**
ADDRESS 118 Maitland Street, Muswellbrook	**DRILLING METHOD** CFA	**LOGGED BY** KF
	TOTAL DEPTH 4.9	**CHECKED BY**

COMMENTS

Depth (m)	SPT B/100mm	Samples	Graphic Log	Moisture	Consistency	Material Description
				D	L	Coal / Gravelly SAND: Black and Brown (dark), fine grained, poorly graded, sub-angular, dry, organic, formation appears to be Fill
						Clayey SAND (SC) with silt: Brown, fine grained poorly graded, angular, dry, not organic
0.5					S	CLAY (CL) with trace of gravel: Brown (dark) with red mottles, <PL, not organic, no dilation, high dry strength
1					F	Silty CLAY (CL) with trace of sand and gravel: Brown, <PL, not organic, no dilation, high dry strength, medium plasticity
1.5					ST	
2					V.ST / D	Silty Sandy CLAY (CL) with trace of gravel: Brown, <PL, not organic, no dilation, high dry strength, medium plasticity
2.5						Silty Clayey SAND (CS) with gravel: <PL, not organic, no dilation, high dry strength Occasional gravel / clay lenses. Gravel is conglomerate, upto 30mm.
3						
3.5						
4						
4.5						
5						Termination Depth at: 4.9m. TC Bit Refusal
5.5						

Contact: email: contact@broadcrest.com.au phone: 1300 554 945

Broadcrest **BOREHOLE ID** 02

PROJECT NUMBER 3410	**DRILLING DATE** 23/01/2024	**COORDINATES**
PROJECT NAME MUSWELLBROOK CHILDCAR	**DRILLING COMPANY** Sydney Geotech	**COORD SYS** WGS 84
CLIENT J. Angelovska	**DRILLER** SW	**SURFACE ELEVATION**
ADDRESS 118 Maitland Street, Muswellbrook	**DRILLING METHOD** CFA	**LOGGED BY** KF
	TOTAL DEPTH 5.2	**CHECKED BY**

COMMENTS

Depth (m)	SPT B/100mm	Samples	Graphic Log	Moisture	Consistency	Material Description
				D	L	Top Soil
0.5					F	Silty CLAY (CL) with trace of sand and gravel: Brown, <PL, not organic, no dilation, high dry strength. Gravel is fine (~5mm)
1						
					ST	
1.5						Silty Sandy CLAY (CS) with trace of gravel: Brown, <PL, not organic, no dilation, high dry strength
2						
					V.ST	
2.5					V.ST / D	Silty Clayey SAND (CS) with gravel: <PL, not organic, no dilation, high dry strength Occasional gravel / clay lenses. Gravel is conglomerate, upto 30mm.
3						
3.5						
4						
4.5						
5						
5.5						Termination Depth at: 5.2m. TC Bit Refusal

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Broadcrest **BOREHOLE ID** 03

PROJECT NUMBER 3410	**DRILLING DATE** 23/01/2024	**COORDINATES**
PROJECT NAME MUSWELLBROOK CHILDCARI	**DRILLING COMPANY** Broadcrest	**COORD SYS** WGS 84
CLIENT J. Angelovska	**DRILLER** KF	**SURFACE ELEVATION**
ADDRESS 118 Maitland Street, Muswellbrook	**DRILLING METHOD** UD 50	**LOGGED BY** KF
	TOTAL DEPTH 1.0	**CHECKED BY**

COMMENTS

Depth (m)	SPT B/100mm	Samples	Graphic Log	Moisture	Consistency	Material Description
				D	S	Top Soil
0.5					F	Silty CLAY (CL) with trace of sand and gravel: Brown, <PL, not organic, no dilation, high dry strength. Gravel is fine (~5mm)
1						Termination Depth at: 1.0m
1.5						
2						
2.5						
3						
3.5						
4						
4.5						
5						
5.5						

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Broadcrest **BOREHOLE ID** 04

PROJECT NUMBER 3410	**DRILLING DATE** 23/01/2024	**COORDINATES**
PROJECT NAME MUSWELLBROOK CHILDCARI	**DRILLING COMPANY** Sydney Geotech	**COORD SYS** WGS 84
CLIENT J. Angelovska	**DRILLER** SW	**SURFACE ELEVATION**
ADDRESS 118 Maitland Street, Muswellbrook	**DRILLING METHOD** CFA	**LOGGED BY** KF
	TOTAL DEPTH 4.9	**CHECKED BY**

COMMENTS

Depth (m)	SPT B/100mm	Samples	Graphic Log	Moisture	Consistency	Material Description
				D	L	Coal / Gravelly SAND: Black and Brown (dark), fine grained, poorly graded, sub-angular, dry, organic, formation appears to be Fill
						Clayey SAND (SC) with silt: Brown, fine grained poorly graded, angular, dry, not organic
0.5					F	CLAY (CL) with trace of gravel: Brown (dark) with red mottles, <PL, not organic, no dilation, high dry strength
1						Silty CLAY (CL) with trace of sand and gravel: Brown, <PL, not organic, no dilation, high dry strength, medium plasticity
1.5					ST	
						Silty Sandy CLAY (CL) with trace of gravel: Brown, <PL, not organic, no dilation, high dry strength, medium plasticity
2						
2.5						
						Termination Depth at: 4.9m. TC Bit Refusal
3						
3.5						
4						
4.5						
5						
5.5						

Contact: email: contact@broadcrest.com.au phone: 1300 554 945

Appendix B: Spatial Data Report

Broadcrest Consulting
MAPPING & SPATIAL SERVICES

LOCATION: 118 Maitland Street, Muswellbrook

REPORT 3410

DATE 31.1.2024

SITE AREA 0.1371 ha (approx)

Disclaimer
Broadcrest Consulting has taken all reasonable care in collating and providing the data within this report on the basis that any person given access to this report are responsible for assessing the relevance of the content. The purpose of this report is to provide an overview of the site based on some data collated from various government, public and private sources. You should obtain independent advice before you make any decision based on the information in this report.

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broadcrest.com.au | contact@broadcrest.com.au | 1300 554 945
Broadcrest Consulting Pty Ltd | ABN: 622 508 187

Client Jacky Angelovska	Map Site Aerial Photograph
Location 118 Maitland Street, Muswellbrook LOT: 34 DP 229637	LGA MUSWELLBROOK SHIRE COUNCIL

Data Source

Base map
DFSI Spatial Services Imagery | © Department of Finance, Services & Innovation 2024
Open Street Maps | Creative Commons 3.0 - OpenStreetMap Contributors

Scale
1:2,250

Project
3410

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Broadcrest Consulting Pty Ltd | ABN: 622 508 187

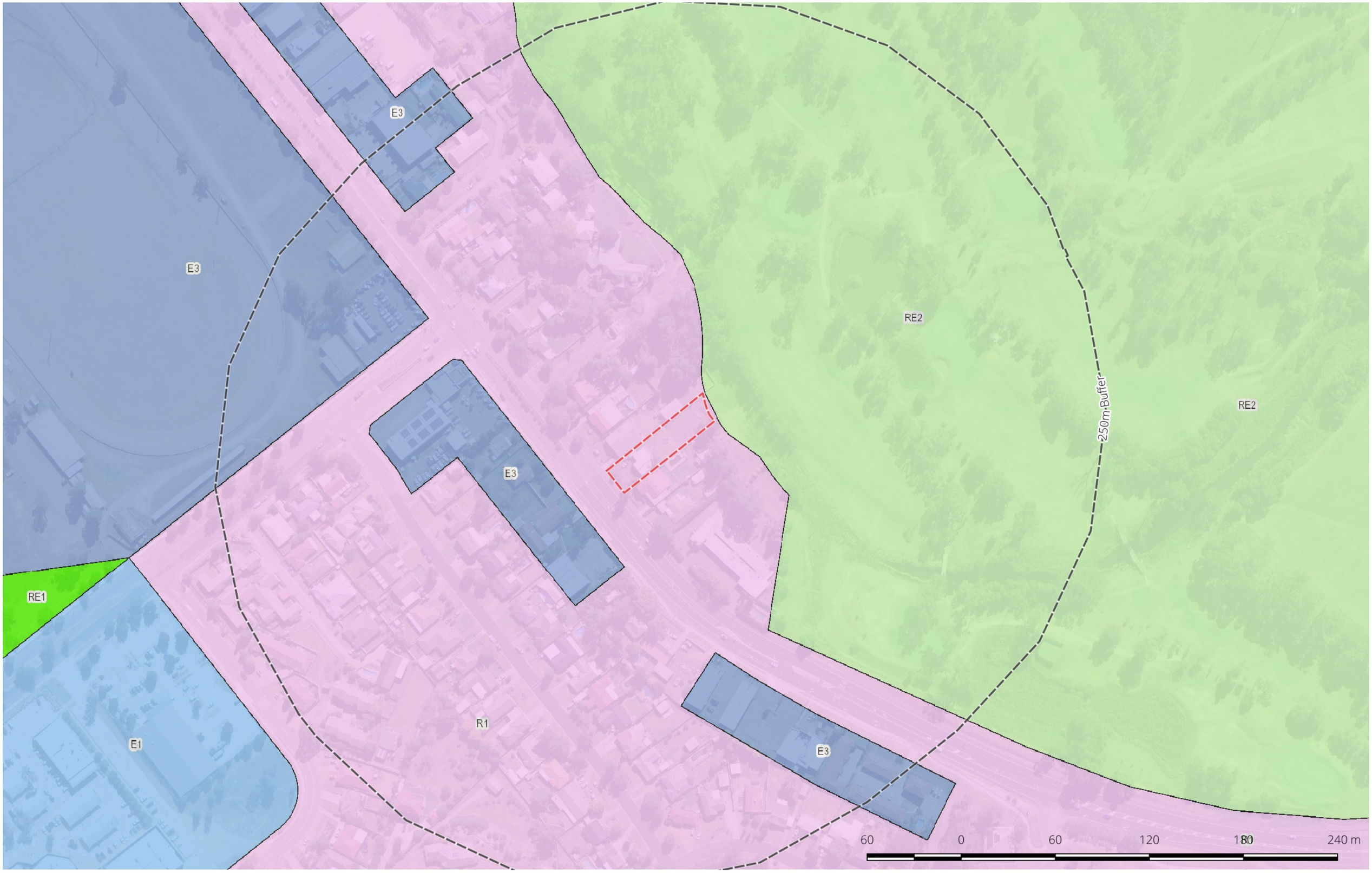
Client Jacky Angelovska	Map Site Location with Terrain
Location 118 Maitland Street, Muswellbrook	LGA MUSWELLBROOK SHIRE COUNCIL

Data Source
Geoscience Australia
Creative Commons 3.0 - Commonwealth of Australia

Base Map
DFSI Spatial Services Imagery | © Department of Finance, Services & Innovation 31.1.2024
Open Street Maps | Creative Commons 3.0 - OpenStreetMap Contributors

Scale
1:2,500

Project
3410



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Client Jacky Angelovska	Map Land Zone Map
Location 118 Maitland Street, Muswellbrook	LGA MUSWELLBROOK SHIRE COUNCIL

Data Source
NSW Planning and the Environment | Obtained on 31.1.2024
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Project
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Client Jacky Angelovska	Map Heritage Listed Sites
Location 118 Maitland Street, Muswellbrook	LGA MUSWELLBROOK SHIRE COUNCIL

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Project
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Client Jacky Angelovska	Map Bushfire Prone Land
Location 118 Maitland Street, Muswellbrook	LGA MUSWELLBROOK SHIRE COUNCIL

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Scale
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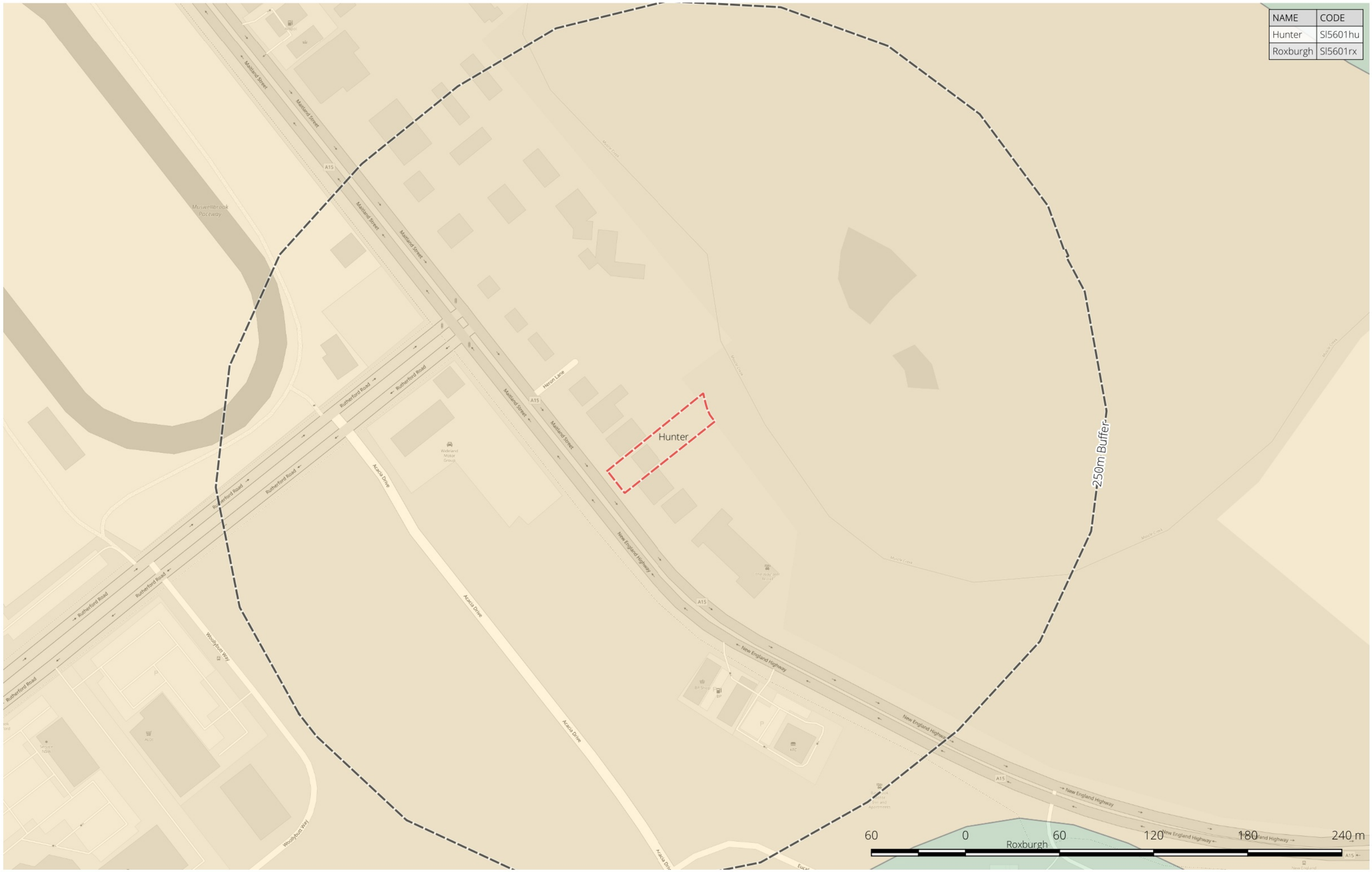
Project
3410



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Broadcrest Consulting Pty Ltd | ABN: 622 508 187

Client Jacky Angelovska	Map Soil Landscapes
Location 118 Maitland Street, Muswellbrook	LGA MUSWELLBROOK SHIRE COUNCIL

Data Source
Office of Environment and Heritage | Obtained on 18.07.2018
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Base Map
Open Street Maps | Obtained on 31.1.2024
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Scale
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Project
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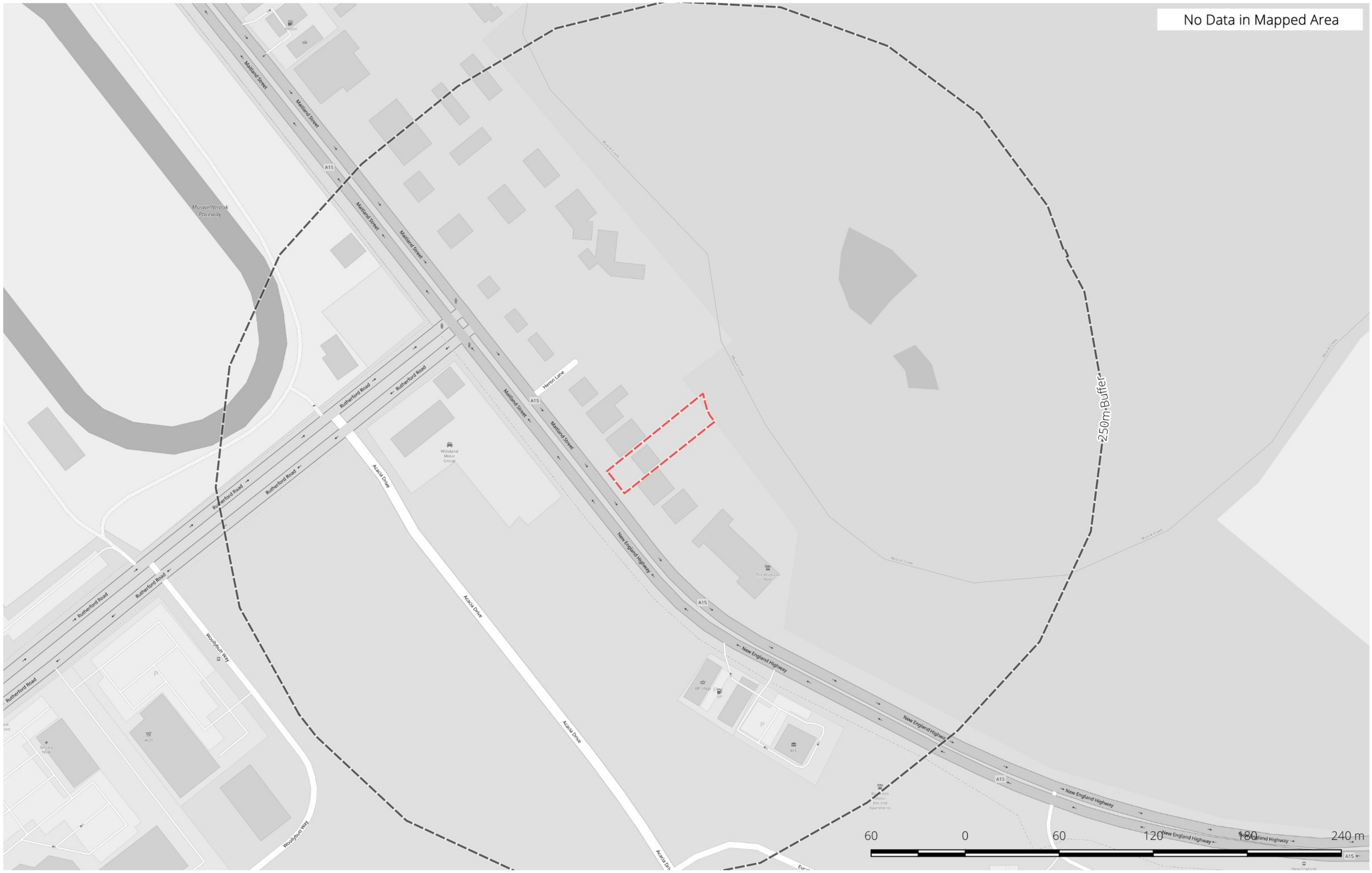

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1300 554 945
Broadcrest Consulting Pty Ltd |
ABN: 622 508 187

Client Jacky Angelovska	Map Hydrogeological Landscapes
Location 118 Maitland Street, Muswellbrook	LGA MUSWELLBROOK SHIRE COUNCIL

Data Source
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Project
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Client Jacky Angelovska	Map Acid Sulfate Risk map
Location 118 Maitland Street, Muswellbrook	LGA MUSWELLBROOK SHIRE COUNCIL

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Scale
1:2,500

Project
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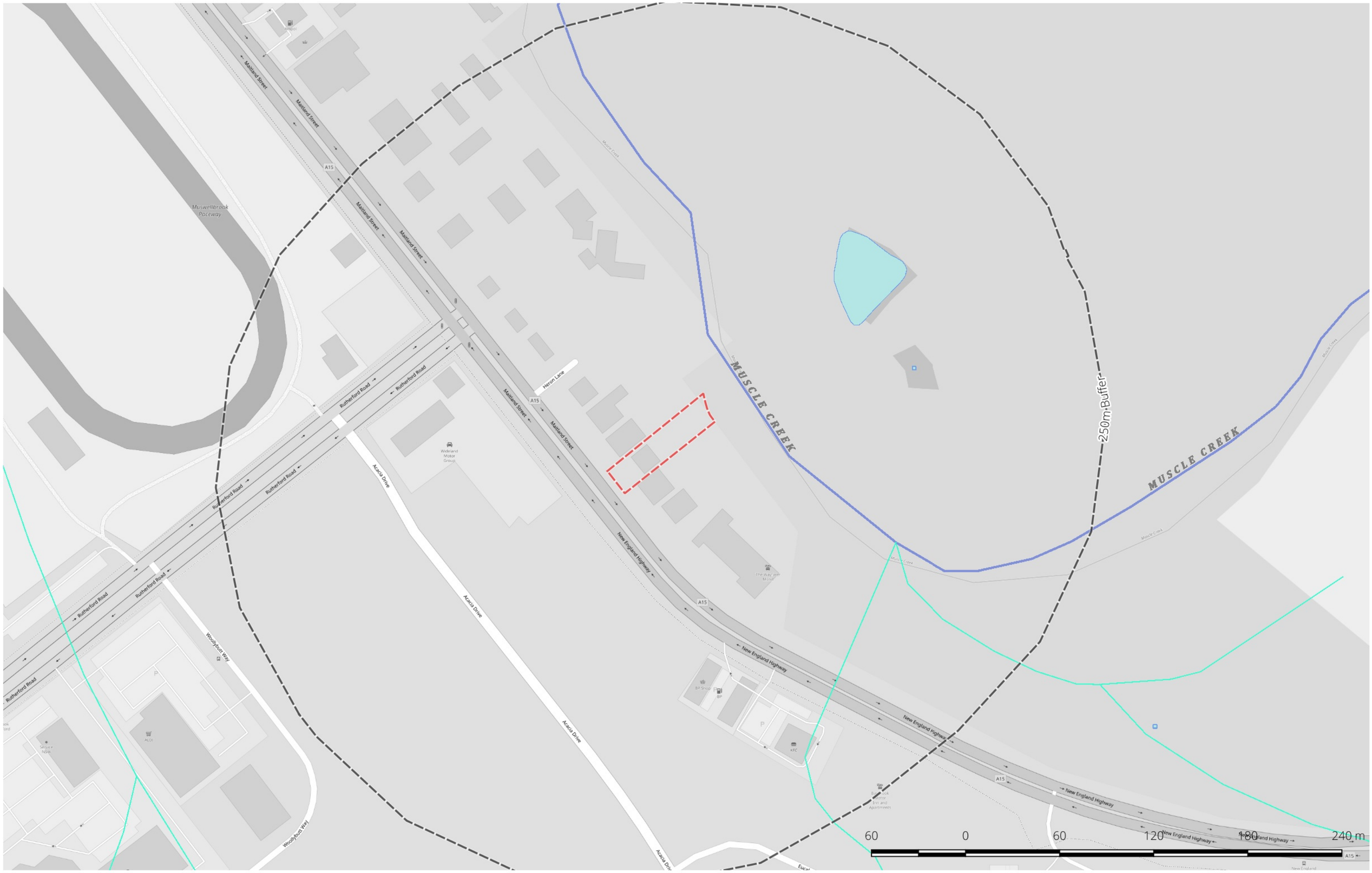

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broadcrest.com.au | contact@broadcrest.com.au
1300 554 945
Broadcrest Consulting Pty Ltd |
ABN: 622 508 187

Client Jacky Angelovska	Map Watercourses and Hydrology
Location 118 Maitland Street, Muswellbrook	LGA MUSWELLBROOK SHIRE COUNCIL

Data Source
Department of Finance, Services & Innovation| Obtained on 31.1.2024
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Scale
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Project
3410

HydroCode	Depth	Strata Description	Bore Data
21010151.1.1	NULL	NULL	Ref Elevation: 150.3 AHD Purpose: Unknown
GW022043.1.1	0m - 0.3m 0.3m - 0.91m 0.91m - 1.22m 1.22m - 1.83m 1.83m - 5.49m 5.49m - 6.1m	Soil Clay Gravel Clay Loam sandy Clay stones	Date Drilled: 01/08/1964 Ref Elevation: 151.73 AHD Purpose: Irrigation
GW022229.1.1	0m - 0.91m 0.91m - 3.05m 3.05m - 10.06m	Soil Clay Sand gravel	Date Drilled: 01/08/1963 Ref Elevation: 160.69 AHD Drill Depth: 10.1m Purpose: Irrigation
GW022230.1.1	NULL	NULL	Date Drilled: 01/01/1965 Ref Elevation: 151.33 AHD Drill Depth: 6.7m Purpose: Irrigation
GW023484.1.1	NULL	NULL	Date Drilled: 01/01/1965 Ref Elevation: 153.12 AHD Drill Depth: 7.6m Purpose: Irrigation
GW029528.1.1	0m - 0.3m 0.3m - 1.52m 1.52m - 6.4m	Soil Clay Sand gravel	Date Drilled: 01/05/1967 Ref Elevation: 151.24 AHD Drill Depth: 6.4m Purpose: Irrigation
GW032743.1.1	NULL	NULL	Date Drilled: 01/04/1968 Ref Elevation: 152.34 AHD Drill Depth: 5.7m Purpose: Irrigation
GW032825.1.1	NULL	NULL	Date Drilled: 1800/01/01 Ref Elevation: 151 AHD Drill Depth: 6m Purpose: Irrigation
GW034580.1.1	NULL	NULL	Date Drilled: 1800/01/01 Ref Elevation: 152.64 AHD Drill Depth: 9.1m Purpose: Irrigation
GW035339.1.1	NULL	NULL	Date Drilled: 01/08/1972 Ref Elevation: 153.13 AHD Drill Depth: 9.1m Purpose: Irrigation
GW035928.1.1	0m - 7.62m 7.62m - 8.07m	Clay Gravel river	Date Drilled: 01/02/1973 Ref Elevation: 153 AHD Purpose: Irrigation
GW043852.1.1	NULL	NULL	Date Drilled: 01/05/1967 Ref Elevation: 151.72 AHD Drill Depth: 6m Purpose: Irrigation
GW044696.1.1	NULL	NULL	Date Drilled: 01/07/1975 Ref Elevation: 152.44 AHD Drill Depth: 7.3m Purpose: Water Supply

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Client
Jacky Angelovska

Map
Groundwater Bores

Location
118 Maitland Street, Muswellbrook

LGA
MUSWELLBROOK SHIRE COUNCIL

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NSW Planning and the Environment | Obtained on 18.07.2018
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Project
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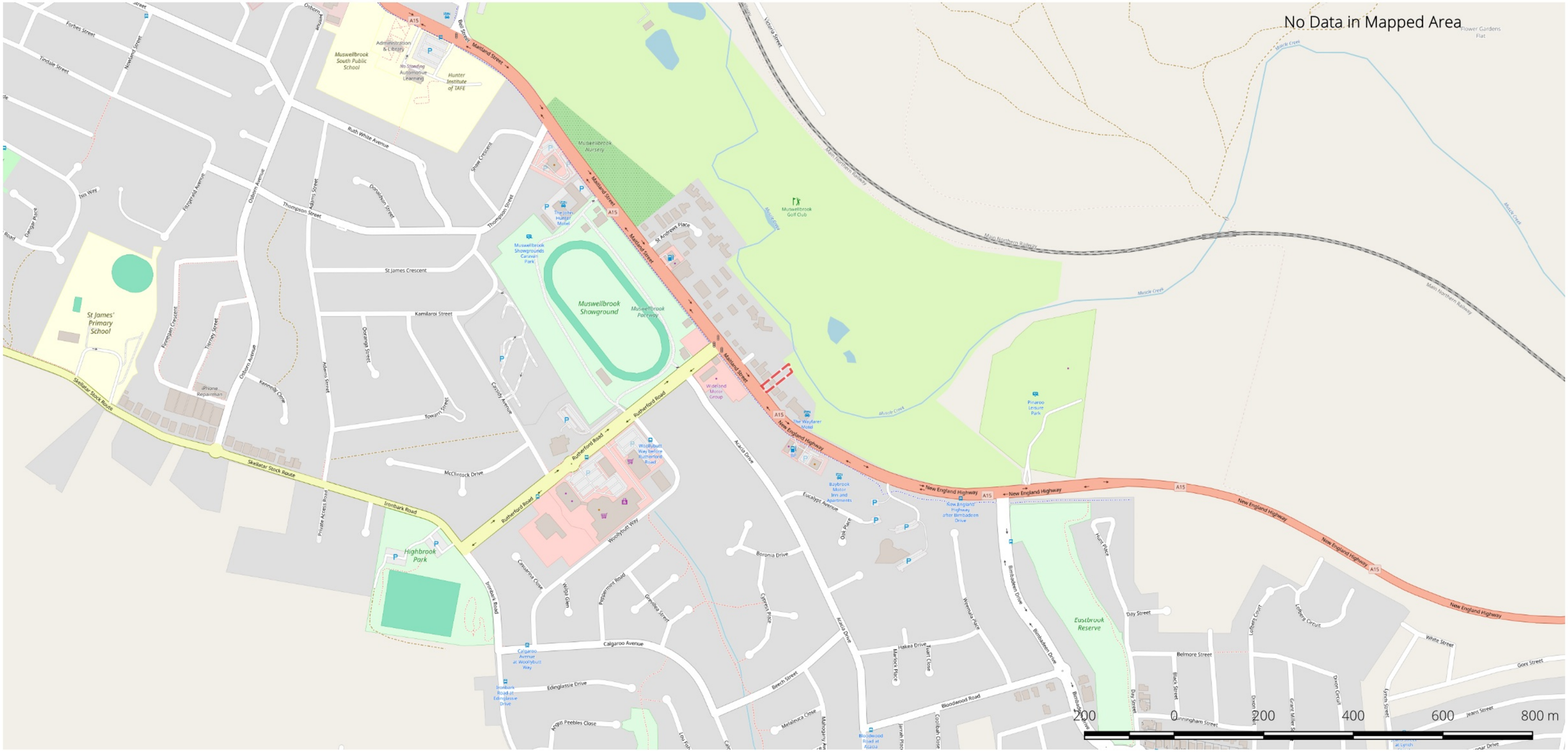

ID	Date	Hazard	Synopsis	Impact Comments
No data in mapped area.				

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Client Jacky Angelovska	Map Recorded Landslides
Location 118 Maitland Street, Muswellbrook	LGA MUSWELLBROOK SHIRE COUNCIL

Data Source
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Project
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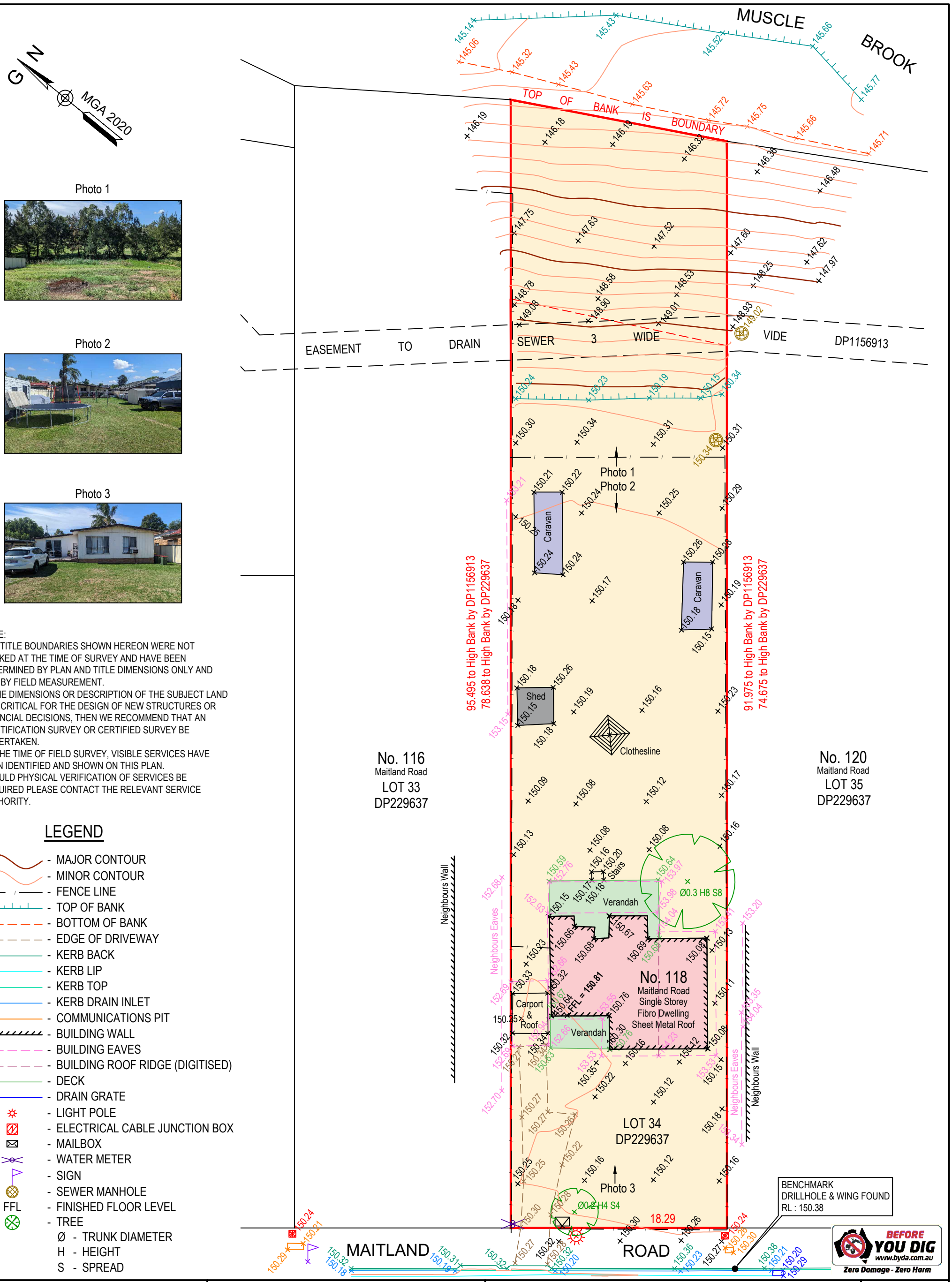
Appendix C: Site Survey and Proposed Layout



NOTE:
THE TITLE BOUNDARIES SHOWN HEREON WERE NOT MARKED AT THE TIME OF SURVEY AND HAVE BEEN DETERMINED BY PLAN AND TITLE DIMENSIONS ONLY AND NOT BY FIELD MEASUREMENT.
IF THE DIMENSIONS OR DESCRIPTION OF THE SUBJECT LAND ARE CRITICAL FOR THE DESIGN OF NEW STRUCTURES OR FINANCIAL DECISIONS, THEN WE RECOMMEND THAT AN IDENTIFICATION SURVEY OR CERTIFIED SURVEY BE UNDERTAKEN.
AT THE TIME OF FIELD SURVEY, VISIBLE SERVICES HAVE BEEN IDENTIFIED AND SHOWN ON THIS PLAN.
SHOULD PHYSICAL VERIFICATION OF SERVICES BE REQUIRED PLEASE CONTACT THE RELEVANT SERVICE AUTHORITY.

LEGEND

- MAJOR CONTOUR
- MINOR CONTOUR
- FENCE LINE
- TOP OF BANK
- BOTTOM OF BANK
- EDGE OF DRIVEWAY
- KERB BACK
- KERB LIP
- KERB TOP
- KERB DRAIN INLET
- COMMUNICATIONS PIT
- BUILDING WALL
- BUILDING EAVES
- BUILDING ROOF RIDGE (DIGITISED)
- DECK
- DRAIN GRATE
- LIGHT POLE
- ELECTRICAL CABLE JUNCTION BOX
- MAILBOX
- WATER METER
- SIGN
- SEWER MANHOLE
- FFL - FINISHED FLOOR LEVEL
- TREE
  - Ø - TRUNK DIAMETER
  - H - HEIGHT
  - S - SPREAD

FYFE
UPPER HUNTER
3/77-85 Bridge Street
PO Box 404
Muswellbrook, NSW 2333
T 61 2 6543 3600
www.fyfe.com.au

SCALE 0 3 6 9 12 15 METRES
SCALE 1 : 300 @ A3
LEVEL DATUM : AHD
LEVEL AUTHORITY : BM DH&W RL : 150.38
CO-ORD DATUM : MGA2020

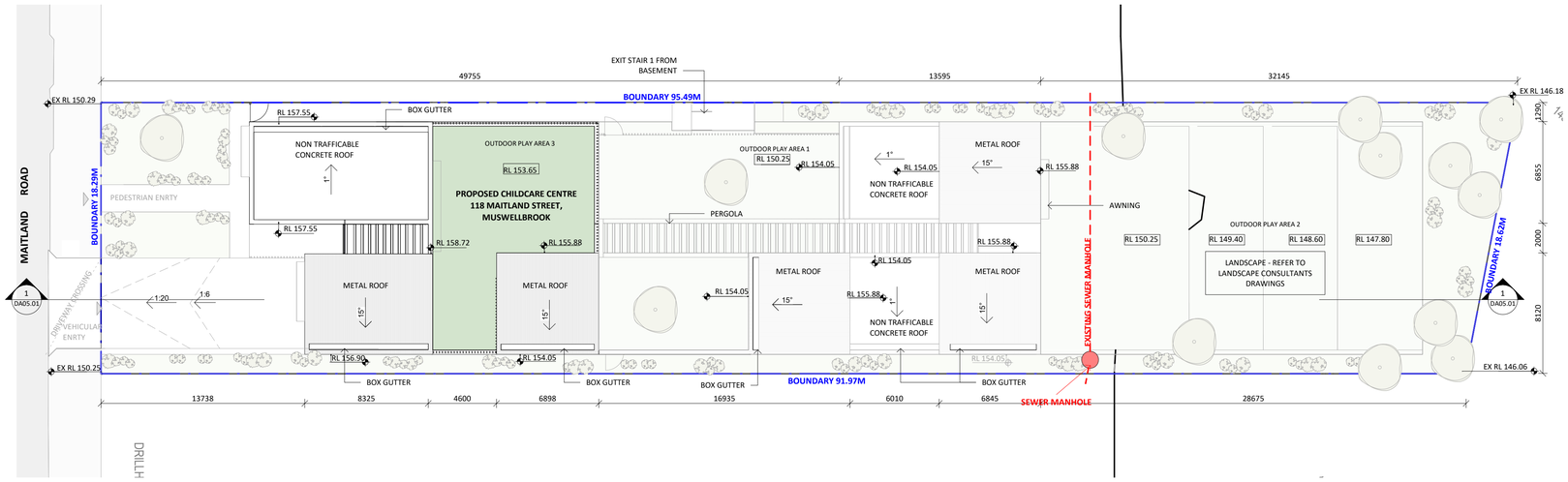
DYNAMIC PROPERTY DEVELOPMENTS

DETAIL SURVEY
118 MAITLAND ROAD (LOT 34 IN DP229637)
MUSWELLBROOK, NSW, 2333

SURVEYOR : BCJ
DATE OF SURVEY : 24/03/2023
DRAWING : 90906-1-1-SV-TO1-r0

INSTRUCTION 90906-1
DATE 30/03/2023
SHEET 1 OF 1
REV. 0

ORIGINAL SIZE A3



1 SITE PLAN
1 : 200

0 1 2 4 6 8 10
1 : 200

ABBREVIATIONS

ENG.	- ENGINEER
ESL	- EXISTING SLAB LEVEL
EXT	- EXTERIOR
FFL	- FINISH FLOOR LEVEL
F.	- FIXED
FSL	- FINISH SURFACE LEVEL
GL	- GROUND LINE
GLZ	- GLAZING
EX.GL	- EXISTING GROUND LINE
REQ.	- REQUIREMENTS
XX.XX	- PROPOSED LEVEL
XX.XX	- EXISTING LEVEL
XX.XX	- SPOT LEVEL (PLAN)
XX.XX	- SPOT LEVEL (ELEVATION)

LANDSCAPE LEGEND

- EXISTING TREE / TREE TO BE RETAINED
- TREE TO BE REMOVED
- NEW TREE
- LANDSCAPING / BUFFER
- TURF/ ARTIFICIAL TURF
- EXTERNAL FLOOR FINISH
- LINE OF STRUCTURAL ROOT ZONE (SRZ)
- LINE OF TREE EXCLUSION ZONE (TEZ)
- LINE OF TREE PROTECTION ZONE (TPZ)

NOTE: REFER TO ARBORIST REPORT FOR FURTHER DETAILS

GENERAL NOTES

- ALL EXISTING BUILDING ELEMENTS TO BE CHECKED ON SITE U.N.O
- DEMOLITION TO BE IN ACCORDANCE WITH AUSTRALIAN STANDARDS AND TO BE CARRIED OUT BY A LICENCED CONTRACTOR U. N.O
- REFER TO SW DRAWINGS FOR DRAINAGE DESIGN.
- REFER TO LANDSCAPE DRAWINGS FOR LANDSCAPE DESIGN.
- KITCHEN AREA TO BE ACCORDANCE WITH NSW AS4674, FOOD ACT 2003, FOOD REGULATION 2015 AND FOOD STANDARD CODES 3.2.2 AND 3.2.3.

SITE CALCULATIONS

TOTAL SITE AREA:	x,xx M^2
PERMITTED BUILDING HEIGHT	= x M
PERMITTED TOTAL FSR	= xx:1
PROPOSED TOTAL FSR	= xx:1
PERMITTED TOTAL FLOOR SPACE	= xx.xx M^2
PROPOSED TOTAL FLOOR SPACE	= xx.xx M^2
BASEMENT	= xx.xx M^2
GROUND	= xx.xx M^2
PERMITTED BUILT AREA	= xx% (XXM^2)
PROPOSED BUILT AREA	= xx% (XXM^2)
MIN REQUIRED LANDSCAPE	= X% (XXM^2)
PROPOSED LANDSCAPE	= X% (XXM^2)

NOT FOR CONSTRUCTION

ISSUE	DATE	DESCRIPTION
A	26.05.2023	Pre-DA

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CLIENT

J. Angelovska

ARCHITECT

ArtMade Architects

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PROJECT

CHILDCARE CENTRE

PROJECT ADDRESS

118 MAITLAND STREET
MUSWELLBROOK 2333

SHEET NAME

SITE PLAN / DEMOLITION

ISSUED FOR DEVELOPMENT APPLICATION

Project number	Sheet No.	Issue	Phase
23714	DA02.01	A	DA

Sheet Size	Scale	L.G.A.
A1	As indicated	MUSWELLBROOK

Drawn By	Checked By	Date
TA/MS1	MS/SS	26.05.2023

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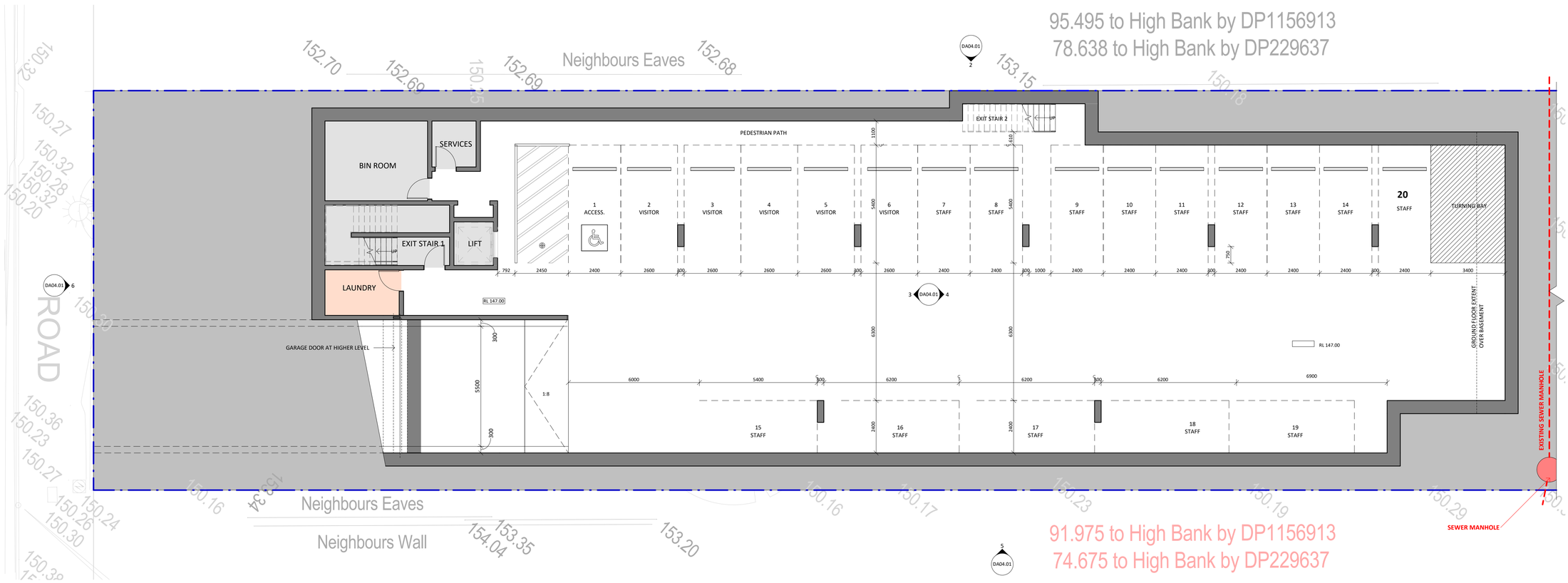

1 BASEMENT LEVEL
1 : 100

1 : 200

ABBREVIATIONS

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LANDSCAPE LEGEND

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ISSUE	DATE	DESCRIPTION

ASSOCIATED CONSULTANTS

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CLIENT

J. Angelovska

ARCHITECT

ArtMade Architects

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PROJECT

CHILDCARE CENTRE

PROJECT ADDRESS

118 MAITLAND STREET
MUSWELLBROOK 2333

SHEET NAME

BASEMENT FLOOR PLAN

ISSUED FOR DEVELOPMENT APPLICATION

Project number	Sheet No.	Issue	Phase
23714	DA03.01		DA

Sheet Size	Scale	L.G.A.
A1	As indicated	MUSWELLBROOK

Drawn By	Checked By	Date
Author	Checker	

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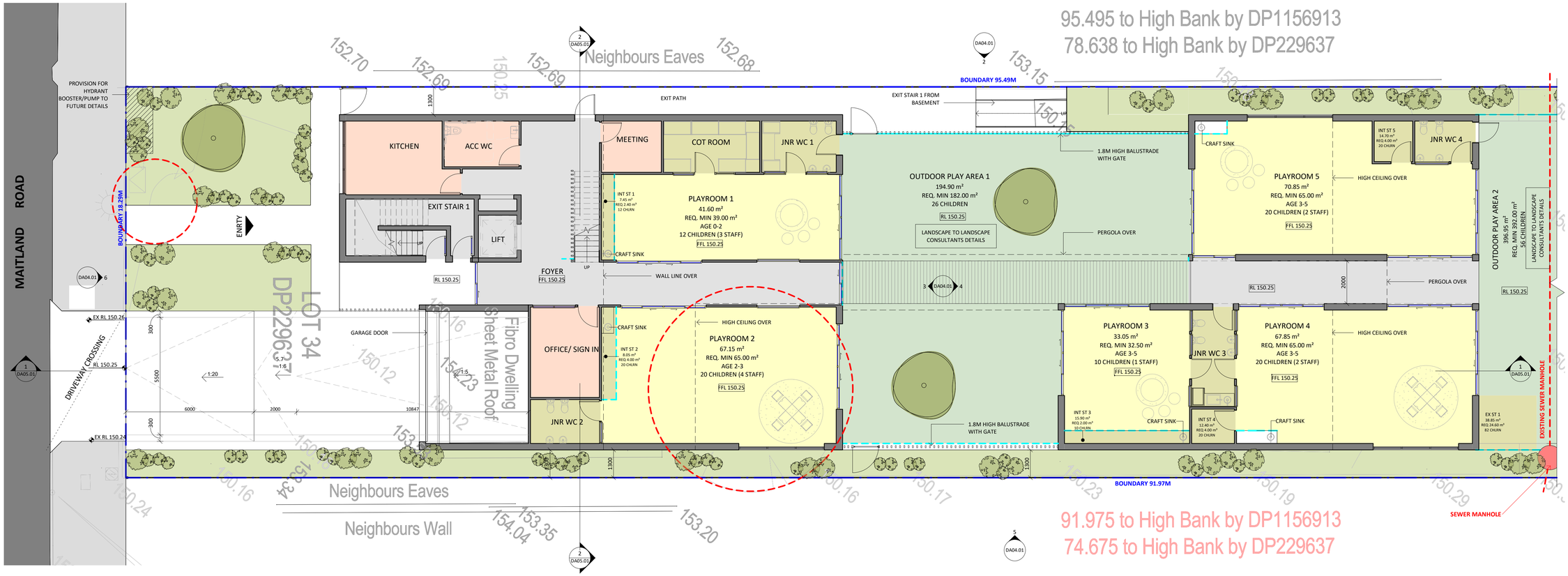

1 GROUND FLOOR PLAN
1 : 100

1 : 100

GENERAL NOTES

- ALL EXISTING BUILDING ELEMENTS TO BE CHECKED ON SITE U.N.O
- DEMOLITION TO BE IN ACCORDANCE WITH AUSTRALIAN STANDARDS AND TO BE CARRIED OUT BY A LICENCED CONTRACTOR U. N.O
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GLZ	- GLAZING
EX.GL	- EXISTING GROUND LINE
REQ.	- REQUIREMENTS
XX.XX (boxed)	- PROPOSED LEVEL
XX.XX	- EXISTING LEVEL
XX.XX	- SPOT LEVEL (PLAN)
XX.XX	- SPOT LEVEL (ELEVATION)

LANDSCAPE LEGEND

- EXISTING TREE / TREE TO BE RETAINED
- TREE TO BE REMOVED
- NEW TREE
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- LINE OF STRUCTURAL ROOT ZONE (SRZ)
- LINE OF TREE EXCLUSION ZONE (TEZ)
- LINE OF TREE PROTECTION ZONE (TPZ)

NOTE: REFER TO ARBORIST REPORT FOR FURTHER DETAILS

OUTDOOR PLAY AREA SCHEDULE				
AREA	AGE	NO. CHLDRN	UNENCUMBERED	
			REQ AREA	AREA
OUTDOOR PLAY AREA 1		26	182 m²	194.90 m²
OUTDOOR PLAY AREA 2		56	392 m²	396.95 m²
OUTDOOR PLAY AREA 3		10	70 m²	119.50 m²
TOTAL		92	644 m²	711.35 m²

EXTERNAL STORAGE SCHEDULE			
NAME	NO. CHLDRN	REQ VOL	VOL
EX ST 1	82	24.60 m³	38.85 m³
EX ST 2	10	3.00 m³	22.20 m³
TOTAL	92	27.60 m³	61.00 m³

INDOOR PLAYROOM SCHEDULE					
ROOM	AGE	NO. CHLDRN	NO. STAFF	UNENCUMBERED	
				REQ AREA	AREA
PLAYROOM 1	AGE 0-2	12	3	39 m²	41.60 m²
PLAYROOM 2	AGE 2-3	20	4	65 m²	67.15 m²
PLAYROOM 3	AGE 3-5	10	1	32.5 m²	33.05 m²
PLAYROOM 4	AGE 3-5	20	2	65 m²	67.85 m²
PLAYROOM 5	AGE 3-5	20	2	65 m²	70.85 m²
PLAYROOM 6	AGE 3-5	10	1	32.5 m²	37.25 m²
TOTAL		92	13	299 m²	317.80 m²

INTERNAL STORAGE SCHEDULE			
NAME	NO. CHLDRN	REQ VOL	VOL
INT ST 1	12	2.40 m³	7.45 m³
INT ST 2	20	4.00 m³	8.05 m³
INT ST 3	10	2.00 m³	15.90 m³
INT ST 4	20	4.00 m³	12.40 m³
INT ST 5	20	4.00 m³	14.70 m³
INT ST 6	10	2.00 m³	10.65 m³
TOTAL	92	18.40 m³	69.10 m³

NOT FOR CONSTRUCTION

ISSUE	DATE	DESCRIPTION
A	26.05.2023	Pre-DA

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PROJECT

CHILDCARE CENTRE

PROJECT ADDRESS

118 MAITLAND STREET
MUSWELLBROOK 2333

SHEET NAME

GROUND FLOOR PLAN

ISSUED FOR DEVELOPMENT APPLICATION

Project number	Sheet No.	Issue	Phase
23714	DA03.02	A	DA

Sheet Size	Scale	L.G.A.
A1	As indicated	MUSWELLBROOK

Drawn By	Checked By	Date
MS	MS	26.05.2023

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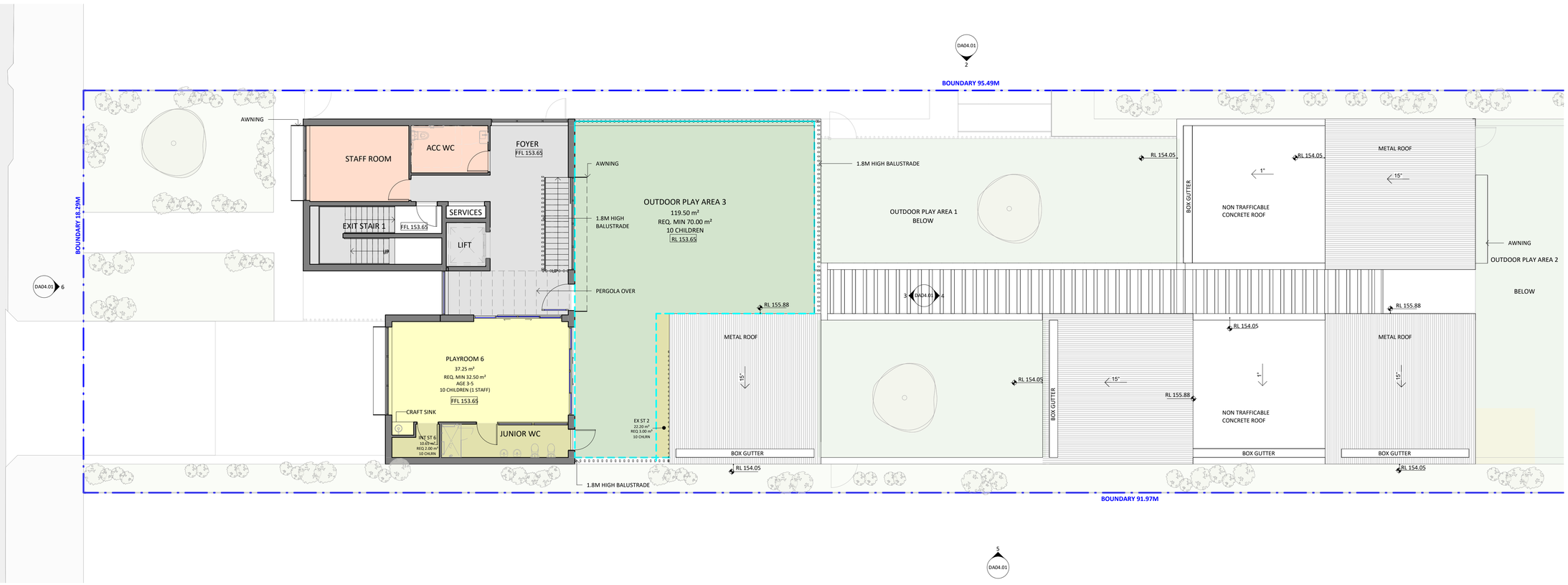

1 FIRST FLOOR PLAN
1 : 100

0 1 2 3 4 5
1 : 100

ABBREVIATIONS

ENG.	- ENGINEER
ESL	- EXISTING SLAB LEVEL
EXT	- EXTERIOR
FFL	- FINISH FLOOR LEVEL
F.	- FIXED
FSL	- FINISH SURFACE LEVEL
GL	- GROUND LINE
GLZ	- GLAZING
EX.GL	- EXISTING GROUND LINE
REQ.	- REQUIREMENTS
XX.XX	- PROPOSED LEVEL
XX.XX	- EXISTING LEVEL
XX.XX	- SPOT LEVEL (PLAN)
XX.XX	- SPOT LEVEL (ELEVATION)

LANDSCAPE LEGEND

- EXISTING TREE / TREE TO BE RETAINED
- TREE TO BE REMOVED
- NEW TREE
- LANDSCAPING / BUFFER
- TURF/ ARTIFICIAL TURF
- BELOW
- EXTERNAL FLOOR FINISH
- LINE OF STRUCTURAL ROOT ZONE (SRZ)
- LINE OF TREE EXCLUSION ZONE (TEZ)
- LINE OF TREE PROTECTION ZONE (TPZ)

NOTE: REFER TO ARBORIST REPORT FOR FURTHER DETAILS

GENERAL NOTES

- ALL EXISTING BUILDING ELEMENTS TO BE CHECKED ON SITE U.N.O
- DEMOLITION TO BE IN ACCORDANCE WITH AUSTRALIAN STANDARDS AND TO BE CARRIED OUT BY A LICENCED CONTRACTOR U. N.O
- REFER TO SW DRAWINGS FOR DRAINAGE DESIGN.
- REFER TO LANDSCAPE DRAWINGS FOR LANDSCAPE DESIGN.
- KITCHEN AREA TO BE ACCORDANCE WITH NSW AS4674, FOOD ACT 2003, FOOD REGULATION 2015 AND FOOD STANDARD CODES 3.2.2 AND 3.2.3.

OUTDOOR PLAY AREA SCHEDULE				
AREA	AGE	NO. CHLDRN	UNENCUMBERED	
			REQ AREA	AREA
OUTDOOR PLAY AREA 1		26	182 m²	194.90 m²
OUTDOOR PLAY AREA 2		56	392 m²	396.95 m²
OUTDOOR PLAY AREA 3		10	70 m²	119.50 m²
TOTAL		92	644 m²	711.35 m²

EXTERNAL STORAGE SCHEDULE			
NAME	NO. CHLDRN	REQ VOL	VOL
EX ST 1	82	24.60 m³	38.85 m³
EX ST 2	10	3.00 m³	22.20 m³
TOTAL	92	27.60 m³	61.00 m³

INDOOR PLAYROOM SCHEDULE					
ROOM	AGE	NO. CHLDRN	NO. STAFF	UNENCUMBERED	
				REQ AREA	AREA
PLAYROOM 1	AGE 0-2	12	3	39 m²	41.60 m²
PLAYROOM 2	AGE 2-3	20	4	65 m²	67.15 m²
PLAYROOM 3	AGE 3-5	10	1	32.5 m²	33.05 m²
PLAYROOM 4	AGE 3-5	20	2	65 m²	67.85 m²
PLAYROOM 5	AGE 3-5	20	2	65 m²	70.85 m²
PLAYROOM 6	AGE 3-5	10	1	32.5 m²	37.25 m²
TOTAL		92	13	299 m²	317.80 m²

INTERNAL STORAGE SCHEDULE			
NAME	NO. CHLDRN	REQ VOL	VOL
INT ST 1	12	2.40 m³	7.45 m³
INT ST 2	20	4.00 m³	8.05 m³
INT ST 3	10	2.00 m³	15.90 m³
INT ST 4	20	4.00 m³	12.40 m³
INT ST 5	20	4.00 m³	14.70 m³
INT ST 6	10	2.00 m³	10.65 m³
TOTAL	92	18.40 m³	69.10 m³

NOT FOR CONSTRUCTION

ISSUE	DATE	DESCRIPTION

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PROJECT

CHILDCARE CENTRE

PROJECT ADDRESS

118 MAITLAND STREET
MUSWELLBROOK 2333

SHEET NAME

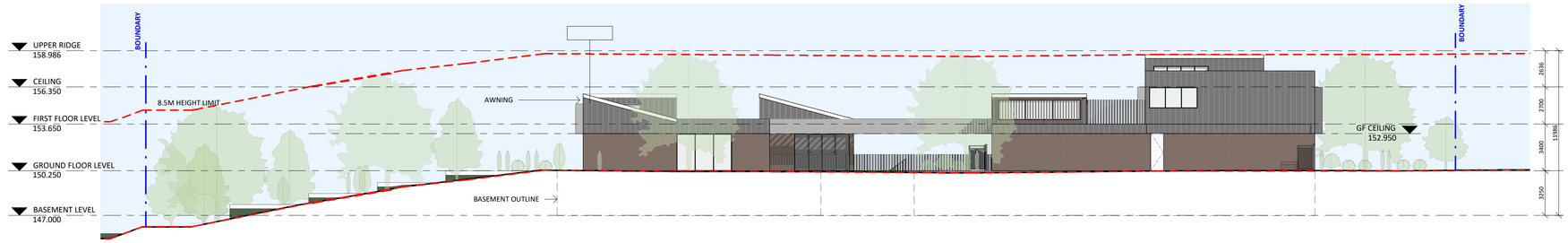
FIRST FLOOR PLAN

ISSUED FOR DEVELOPMENT APPLICATION

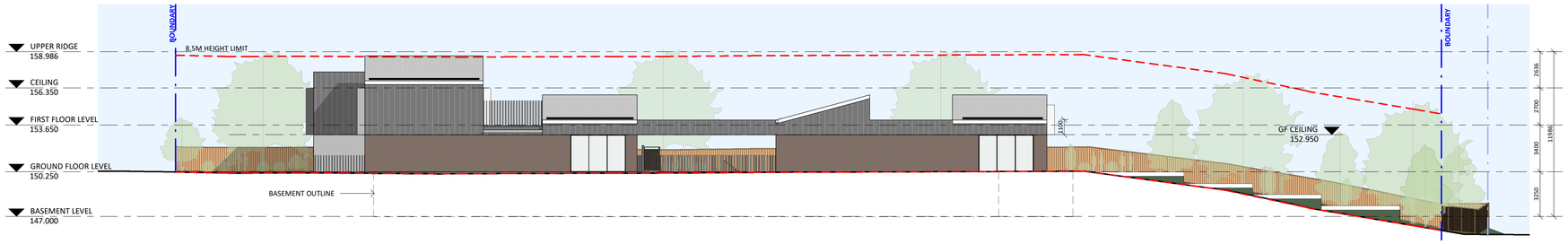
Project number	Sheet No.	Issue	Phase
23714	DA03.03		DA

Sheet Size	Scale	L.G.A.
A1	As indicated	MUSWELLBROOK

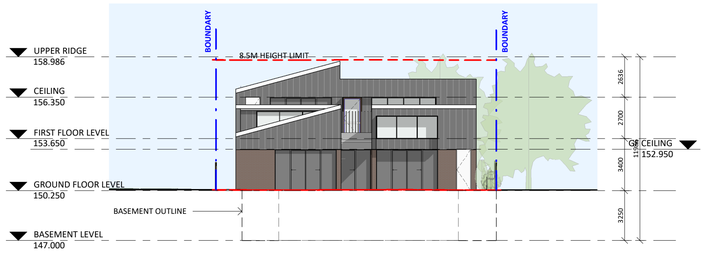
Drawn By	Checked By	Date
Author	Checker	



2 NORTH ELEVATION
1 : 200



5 SOUTH ELEVATION
1 : 200



1 EAST ELEVATION
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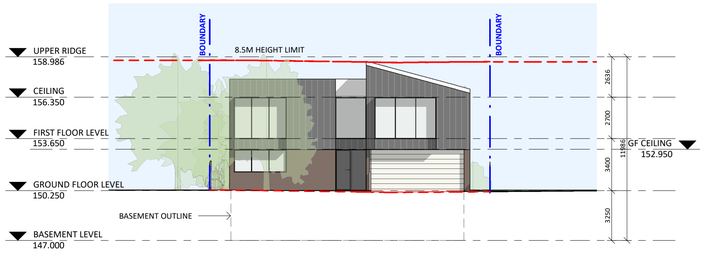
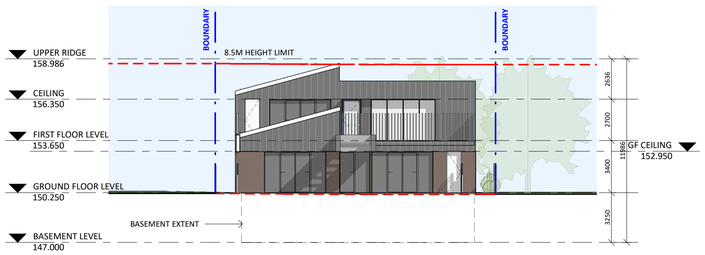
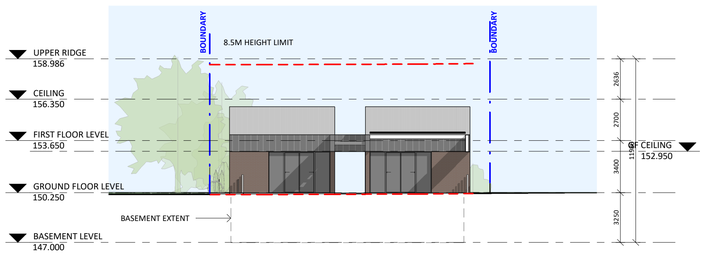


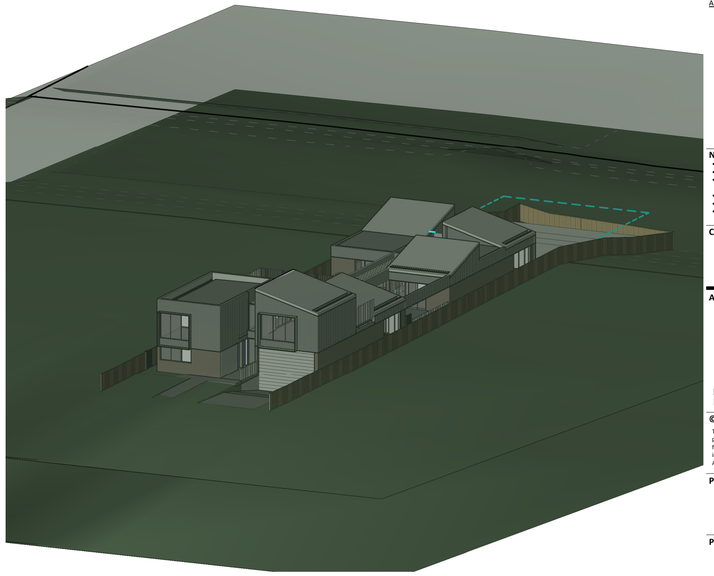
6 WEST ELEVATION
1 : 200



3 PRIMARY BUILDING - REAR ELEVATION
1 : 200



4 SECONDARY BUILDING - FRONT ELEVATION
1 : 200



7 HEIGHT DIAGRAM

0 1 2 3 4 5
1 : 100

EXTERNAL FINISHES

	BK-01	BRICK BAGGED DULUX COLOUR: SMOOTH CARAMEL OR SIMILAR
	CL-01	STANDING SEAM, ROOF COLORBOND LONG LINE COLOUR: SHALE GREY OR SIMILAR
	PC-01	ALUMINIUM WINDOW & DOOR FRAMES,PERGOLA DURALLOY POWDERCOAT COLOUR: SHALE GREY OR SIMILAR

ISSUE	DATE	DESCRIPTION
A	26.05.2023	Pre-DA

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PROJECT

CHILDCARE CENTRE

PROJECT ADDRESS

118 MAITLAND STREET
MUSWELLBROOK 2333

SHEET NAME

EXTERNAL ELEVATIONS

ISSUED FOR DEVELOPMENT APPLICATION

Project number	Sheet No.	Issue	Phase
23714	DA04.01	A	DA

Sheet Size	Scale	L.G.A.
A1	As indicated	MUSWELLBROOK

Drawn By	Checked By	Date
SH	MS	26.05.2023

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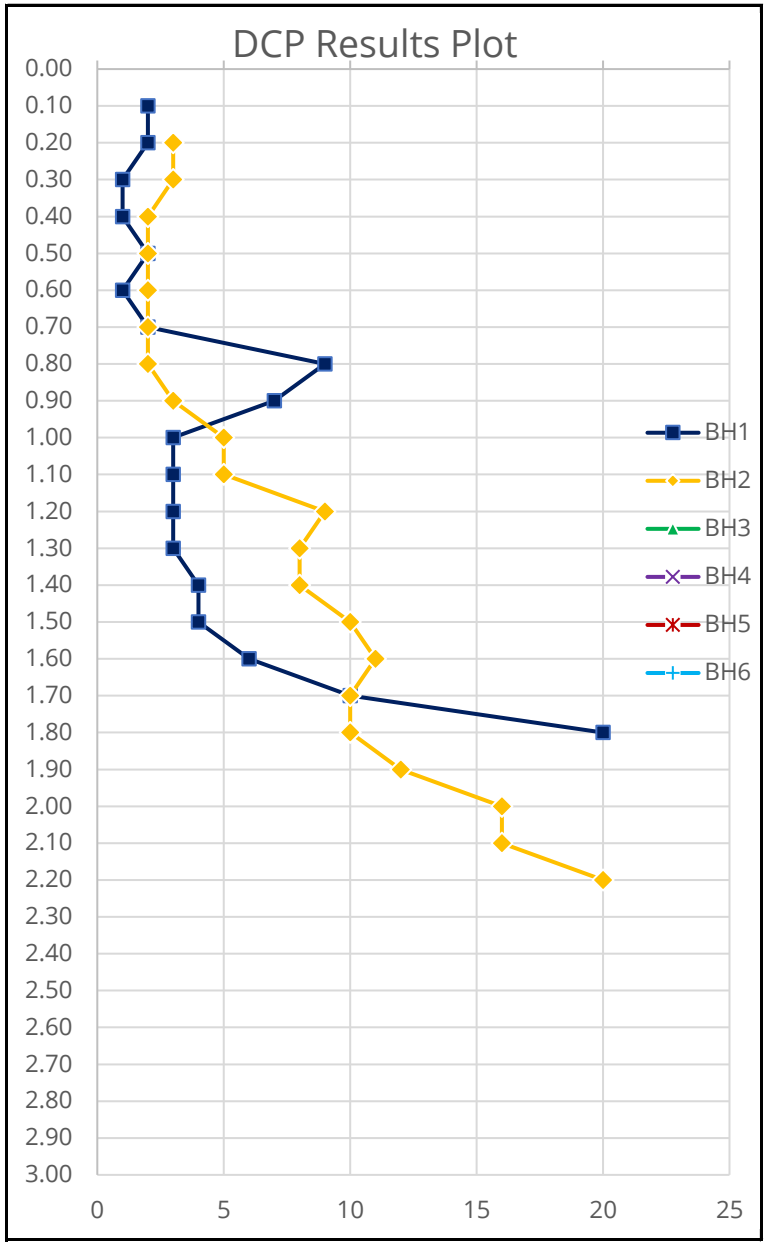
Appendix D: DCP Results

Broadcrest Consulting Pty Ltd - DCP RESULTS

Depth			Blows / 100mm					
			BH1	BH2	BH3	BH4	BH5	BH6
0.00	-	0.10	2					
0.10	-	0.20	2	3				
0.20	-	0.30	1	3				
0.30	-	0.40	1	2				
0.40	-	0.50	2	2				
0.50	-	0.60	1	2				
0.60	-	0.70	2	2				
0.70	-	0.80	9	2				
0.80	-	0.90	7	3				
0.90	-	1.00	3	5				
1.00	-	1.10	3	5				
1.10	-	1.20	3	9				
1.20	-	1.30	3	8				
1.30	-	1.40	4	8				
1.40	-	1.50	4	10				
1.50	-	1.60	6	11				
1.60	-	1.70	10	10				
1.70	-	1.80	20	10				
1.80	-	1.90		12				
1.90	-	2.00		16				
2.00	-	2.10		16				
2.10	-	2.20		20				
2.20	-	2.30						
2.30	-	2.40						
2.40	-	2.50						
2.50	-	2.60						
2.60	-	2.70						
2.70	-	2.80						
2.80	-	2.90						
2.90	-	3.00						
20th Percentile			**2**	**2**				

Soil Classification					
BH1	BH2	BH3	BH4	BH5	BH6
See Borelogs					



S = Sand, C = Clay, O = Organic, M = Silt, G = Gravel, L = Low Plasticity, H = High Plasticity, x,X Sub-type,PRIMARY-TYPE