



Douglas Partners

Geotechnics | Environment | Groundwater

Report on
Preliminary Site Investigation (Contamination)

Glenmore Park Town Centre Development
Town Terrace, Glenmore Park

Prepared for
Home Consortium

Project 208929.00
September 2021

Integrated Practical Solutions



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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.



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Report on Preliminary Site Investigation (Contamination) Glenmore Park Town Centre Development Town Terrace, Glenmore Park

1. Introduction

Douglas Partners Pty Ltd (DP) has been engaged by Home Consortium to complete this Preliminary Site Investigation (Contamination) (PSI) for the proposed development at Glenmore Park Town Centre shopping centre. It is understood that the proposed development includes:

- Demolition of an existing single storey commercial building;
- Construction of a four-storey commercial type building with lower ground floor car parking and services area, and upper ground floor comprising of a common foyer area and business-type occupancy. Upper levels are to comprise a medical centre;
- Construction of a pavilion type building for food and beverage type occupancy;
- Alterations to existing facades and reconfiguration of existing pedestrian terraces, ramps, stairways and pathways; and
- Establishment of outdoor dining and associated awnings.

The site for the proposed development is shown on Drawing 1, Appendix A.

The objective of the PSI is to assess the potential for contamination at the site based on past and present land uses and to comment on the need for further investigation and/or management with regard to the proposed development. It is understood that the report will be used to support a development application.

The investigation was undertaken in accordance with DP's proposal 208929.00.P.001.Rev0 dated 10 September 2021.

The following key guidelines were consulted in the preparation of this report:

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013); and
- NSW EPA *Guidelines for Consultants Reporting on Contaminated Land* (NSW EPA, 2020).

This report must be read in conjunction with all appendices including the notes provided in Appendix B.

2. Background

DP has previously prepared the following report which related to a large area next to the main shopping centre building, part of which covered the northern part of the subject site:

- DP, *Report on Phase 1 Contamination Assessment, Proposed Shopping Centre Extension, Glenmore Park Town Centre, Town Terrace, Glenmore Park, Project 71169.01, November 2010* (DP, 2010).

Penrith City Council, the local government authority has identified that they have a copy of DP (2010). Information has been sourced from DP (2010) for the current PSI, where appropriate.

3. Scope of Works

The scope of work, in brief, for the PSI was as follows:

- Review and source information (as appropriate) from DP (2010);
- Review of NSW EPA databases relating to identified contaminated sites, environment protection licences and Notices;
- Review of soil and geology maps;
- Review of registered groundwater bore data;
- Review of historical aerial photographs;
- Conduct a site walkover to observe site conditions; and
- Preparation of this report.

4. Site Information

The site is the area for the proposed development which covers an unusual shape of approximately 0.45 ha. The site boundary is shown Drawing 1, Appendix A.

The site covers:

- Part of Lot 9100, Deposited Plan 1022720 (which has street addresses of 19-31 and 41 Town Terrace, Glenmore Park, according to NSW Spatial Services, SIX Maps);
- Most of Lot 9107 Deposited Plan 1022720 (which has a street address of 33 Town Terrace, Glenmore Park, according to SIX Maps); and
- A small part Council land.

Lot 9100 and Lot 9107, Deposited Plan 1022720 are zoned B2 Local Centre (to provide a range of services including retail, business, community and entertainment functions). The small part of Council land at the site is zoned RE1 Public Recreation.

5. Environmental Setting

The environmental setting at the site is summarised below.

Topography	The site is at approximately 47 m AHD. The general area of the site slopes down to the east and north-east towards neighbouring playing fields.
Soil Landscape	According to the Penrith 100,000 Soils Landscape Sheet, the site is in the Blacktown soil landscape which comprises residual soils, gently undulating rises, broad rounded crests and ridges with gently inclined slopes.
Geology	According to Penrith 1: 100,000 Geology Sheet, the site is underlain by Ashfield Shale which typically comprises black to dark grey shale and laminite.
Acid Sulfate Soils	The site is not in or close to an area associated with a risk of acid sulfate soils.
Surface Water	The nearest surface water body is School House Creek which is located approximately 230 m to the north of the site.
Groundwater	Groundwater at the site is expected to migrate to the east or north-east towards the neighbouring playing fields, and then to the north towards School House Creek.

According to the WaterNSW website, there are four registered groundwater bores within 500 m of the site including:

- Three bores at 9105 Glenmore Parkway which is an operational service station located approximately 100 m to the west of the site. These were installed in 2009 as monitoring bores to depths of 9 m. Water bearing zones were indicated to be at a depth of 7 m to 9 m. The soil and rock profile was recorded as silt and shale; and
- One bore at 9 Prunus Close which is approximately 450 m to the south-west of the site. The bore was installed to a depth of 144 m in 2003 for domestic purposes. Water bearing zones were indicated to be at depths of 90 to 91 m, 108 to 109 m, 120 to 121 m, and 137 to 138 m. The soil and rock profile was recorded as clay underlain by shale and sandstone.

Registered groundwater bore search results are shown in Appendix C.

A geotechnical investigation was undertaken currently with DP (2010). One test bore was positioned at the northern part of the subject site where gravelly sand fill and silt clay filling was encountered to a depth of 1.65 m, beneath pavers. Fill was underlain by silty clay and silty sandy clay to a depth of 4.45 m.

6. Site History

6.1 Online Information

According to Shopping Centre News website (www.shoppingcentrenews.com.au), Glenmore Park Town Centre first opened in 1999. Home Consortium entered into a contract to acquire the shopping centre in 2020.

6.2 Aerial Photographs

Selected historical aerial photographs were obtained and reviewed to determine previous site uses and features. The aerial photographs are provided in Appendix D. A summary of key features observed for the site and surrounding land is presented in Table 1.

Table 1: Summary of Historical Aerial Photographs

Year	Land Use and Features
1947	The site and surrounding land were vacant. For this reason, the exact site location cannot be determined. The site appears to have had some native vegetation and may have been used for animal grazing
1970	The site and surrounding land appear to have had vegetation clearance since 1947. The land was probably used for grazing.
1986	The site and surrounding land appear to have had more dense vegetation since 1970. The land was probably used for grazing.
1994	The site appears to have been vacant. Some vegetation was present. Residential development had occurred at some of the nearby surrounding land. Neighbouring land to the east had been cleared, probably for recreational purposes.
2005	The shopping centre had been developed. The site comprised mainly walkways and landscaping for the shopping centre. Adjacent to the west of the site was the main shopping centre building and car parking. A service station had been established further to the west. Adjacent to the north of the site was vehicle access and a commercial building. Adjacent to the west of the site was car parking and playing fields. Adjacent to the south was a commercial building and car parking.
2009	The site was similar to that in 2005 except that a commercial building had been established at the south. The surrounding land uses appear to have been similar to that in 2005.
2021	The site appears to have been relatively unchanged since 2009. Shade structures had been constructed at the car park to the north. Further residential development had occurred at land beyond the shopping centre.

6.3 Historical Title Deeds

A historical title deeds search was conducted for DP (2010) to determine possible previous site uses. Part of the area subject to the search covered the northern part of the subject site. A summary of the site owners is provided in Table 2. The likely site uses, based on title information and other sources (particularly aerial photographs) are also listed.

Table 2: Historical Title Deeds for the Northern Part of the Site (1915 to 2009)

Date of Acquisition	Registered Proprietor(s) & Occupations	Inferred Land Use
25.01.1915	George Edward Jessup (Contractor)	Grazing / Farming
02.11.1933	Thomas Stein (Farmer)	Grazing / Farming
23.12.1959	Penrith Sales and Service Pty Limited	Grazing / Farming or vacant
27.06.1973	Emu Plains Industrial Estate Pty Limited	Grazing / Farming or vacant
04.06.1975	Housing Commission of New South Wales (Now New South Wales Land and Housing Corporation)	Grazing / Farming or vacant
08.01.1998	Glenmore Park Estate Limited (Now Lensworth Glenmore Park Limited)	Development of shopping centre
19.01.1999	Penrith City Council (for north-east part of subject site)	Road for shopping centre and neighbouring parkland
08.05.2001	Lensworth Glenmore Park Limited (for north-east part of subject site)	Road for shopping centre and neighbouring parkland
08.07.2002	AMP Henderson Global Investors Limited (Now AMP Capital Investors Limited)	Shopping centre

6.4 Anecdotal Evidence (2009)

An interview with shopping centre management staff in 2009 revealed that:

- There were no known contamination issues relating to the shopping centre;
- There were no known underground storage tanks at the shopping centre (although it was noted that there was an adjacent service station); and
- Dry cleaning operations were not undertaken at the shopping centre.

6.5 Section 149 Certificates

The Section 149 (2) and (5) planning certificate for Lot 1 Deposited Plan 1022720 from May 2009 was obtained for DP (2010). The certificate stated that the land:

- Is not declared to be an investigation area or a remediation site under Part 3 of the *Contaminated Land Management Act 1997*;

- Is not subject to an investigation order or a remediation order within the meaning of the *Contaminated Land Management Act 1997*;
- Is not subject of a voluntary investigation proposal (or voluntary remediation proposal) the subject of the Environmental Protection Authority's agreement under section 19 or 26 of the *Contaminated Land Management Act 1997*; and
- Is not subject of a site audit within the meaning of Part 4 of the *Contaminated Land Management Act 1997*.

6.6 WorkCover Dangerous Goods Search

For DP (2010), a search of the WorkCover NSW database on 3 June 2009 did not reveal any records for licences to keep dangerous goods at Lot 9100 Deposited Plan 1022720.

6.7 EPA Registers

A search of the NSW EPA website on 14 September 2021 revealed that:

- No property at the suburb of Glenmore Park has been listed as a contaminated site notified to the EPA under Section 60 of the *Contaminated Land Management Act 1997*;
- No property at the suburb of Glenmore Park has been listed on the contaminated land record of notices; and
- The suburb of Glenmore Park does not have any listings of Environment Protection Licences, applications, notices, audits or pollution studies and reduction programs.

7. Site Walkover

A site walkover was conducted on 14 September 2021. Observations are summarised below. Site photographs are provided in Appendix E.

The southern end of the site was occupied by a one-storey building which was partially being used by a realty office / shop and was partially vacant. To the west of the one-storey building is a loading dock for the shopping centre which is at the western site boundary. The remainder of the site comprises pedestrian walkways and landscaping for the shopping centre. The walkway to the north of the one-storey building slopes down to the north. Slopes at the site are otherwise generally down to the east and north-east. Pavements at the site appeared to be in good condition. Vegetation (trees, shrubs and lawn) was in a healthy condition.

Numerous retaining walls, mainly associated with landscaping, of up to approximately 2 m high were observed at the site. A batter slope was also present to the north of the one-story building.

The shopping centre building was occupied by a supermarket, food outlets and medical-related businesses.

A service station was located approximately 100 m to the west (up-gradient) of the site, on the other side of the shopping centre building. Groundwater monitoring well Gatic covers were observed at the service station. The underground storage tank dip / fill points were observed on the western side of the service station property.

A restaurant was located on the neighbouring land to the south of the site. A youth centre was located at neighbouring land to the north. Parking areas and roadways were located to the east and north-west. There were significant batter slopes down towards the playing fields at the east to the site.

8. Discussion and Preliminary Conceptual Site Model

8.1 Site History Summary and Potential Sources of Contamination

The site was probably used for animal grazing up until the 1980s or early 1990s (according to aerial photographs). The site may have been publicly accessible private land or parkland during the 1990s until the shopping centre was developed in the late 1990s and then opened in 1999. The commercial building at the south of the site appears to have been constructed in circa 2008. It is presumed that the (off-site and up-gradient) service station was constructed at a similar time as the shopping centre.

As indicated by topography, other site and surrounding features (such as retaining walls and batter slopes) and geotechnical investigations, there appears to have been significant earthworks to form the site. The earthworks likely occurred in the 1990s as part of wider subdivision works and then particular to the shopping centre.

Based on the above, potential sources of contamination at the site are considered to be:

- S1: The use of pesticides. Potential contaminants include organochlorine pesticides (OCP);
- S2: Importation and placement of fill sourced from contaminated sources. Various potential contaminants may be associated with fill such as petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAH), metals, OCP, polychlorinated biphenyls (PCB) and asbestos; and
- S3: Contaminated groundwater from the up-gradient service station. Potential contaminants include petroleum hydrocarbons.

Farming practices at the site appear to have been associated with animal grazing rather than intensive cropping and, therefore, the application of pesticides at the site in the farming context is considered unlikely.

Given that the site and surrounding land was probably subject to earthworks in the 1990s, fill at the site may primarily be engineered fill.

It is noted that the service station, although up-gradient of the site, is not in close proximity of the site and has not been listed by the EPA as a contaminated site. It is also noted that the service station is less than 25 years old and appears to have a leak detection system (groundwater monitoring wells).

Based on the above, the potential for contamination at the site is considered to be low.

8.2 Preliminary Conceptual Site Model

A Conceptual Site Model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM provides the framework for identifying how the site became contaminated and how potential receptors may be exposed to contamination either in the present or the future i.e., it enables an assessment of the potential source - pathway - receptor linkages (complete pathways).

The following potential human receptors for the proposed development have been identified:

- R1: Future site users (visitors and workers);
- R2: Construction workers (for the proposed development);
- R3: Maintenance workers (post-development);
- R4: Adjacent site users;
- R5: Groundwater;
- R6: Off-site surface water body (School House Creek);
- R7: Terrestrial ecology; and
- R8: In ground structures.

The following potential pathways have been identified:

- P1: Ingestion and dermal contact;
- P2: Inhalation of dust;
- P3: Inhalation of vapours;
- P4: Surface water run-off;
- P5: Leaching of contaminants and vertical migration into groundwater;
- P6: Lateral migration of groundwater providing base flow to water bodies;
- P7: Contact with terrestrial ecology; and
- P8: Contact with in-ground structures.

A 'source - pathway - receptor' approach has been used to assess the potential risks of harm being caused to human or environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways (potential complete pathways). The possible pathways between the above sources and receptors are provided in below Table 3.

Table 3: Summary of Potentially Complete Exposure Pathways

Source	Transport Pathway	Receptor
S1: Pesticides	P1: Ingestion and dermal contact P2: Inhalation of dust	R1: Future site users R2: Construction workers R3: Maintenance workers
	P2: Inhalation of dust	R4: Adjacent site users
	P4: Surface water run-off	R6: Off-site surface water body
	P5: Leaching of contaminants and vertical migration into groundwater	R5: Groundwater
	P6: Lateral migration of groundwater providing base flow to water bodies	R6: Off-site surface water body
	P7: Contact with terrestrial ecology	R7: Terrestrial ecology
S2: Importation and placement of fill	P1: Ingestion and dermal contact P2: Inhalation of dust P3: Inhalation of vapours	R1: Future site users R2: Construction workers R3: Maintenance workers
	P2: Inhalation of dust P3: Inhalation of vapours	R4: Adjacent site users
	P4: Surface water run-off	R6: Off-site surface water body
	P5: Leaching of contaminants and vertical migration into groundwater	R5: Groundwater
	P6: Lateral migration of groundwater providing base flow to water bodies	R6: Off-site surface water body
	P7: Contact with terrestrial ecology	R7: Terrestrial ecology
	P8: Contact with in-ground structures	R8: In ground structures
S3: Contaminated groundwater from the up-gradient service station	P3: Inhalation of vapours	R1: Future site users R2: Construction workers R3: Maintenance workers

9. Conclusions and Recommendations

Based on the review of available site history information summarised in this report, the overall potential for contamination at the site is assessed to be low. This evaluation has not been confirmed by any intrusive sampling and laboratory analysis.

It is recommended that some intrusive sampling be undertaken to assess the contamination status of the site as well as to provide a (preliminary) waste classification assessment for off-site disposal purposes.

10. Limitations

Douglas Partners (DP) has prepared this report (or services) for this project at Town Terrace, Glenmore Park in accordance with DP's proposal dated 10 September 2021 and acceptance received from John Stewart of Home Consortium dated 10 September 2021. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Home Consortium for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the (geotechnical / environmental / groundwater) components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Douglas Partners Pty Ltd

Appendix A

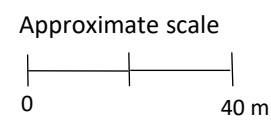
Drawings

Photograph source: SIX Maps



Site Location

Legend
 Approximate site boundary



Douglas Partners Geotechnics Environment Groundwater	CLIENT: Home Consortium	Site Location and Boundary Glenmore Park Town Centre Development Town Terrace, Glenmore Park	PROJECT No: 208929.00
	OFFICE: Sydney		DWG No: 1
	DATE: 10 Sep 2021		REVISION: 0

Appendix B

Notes About this Report

About this Report

Douglas Partners



Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

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Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

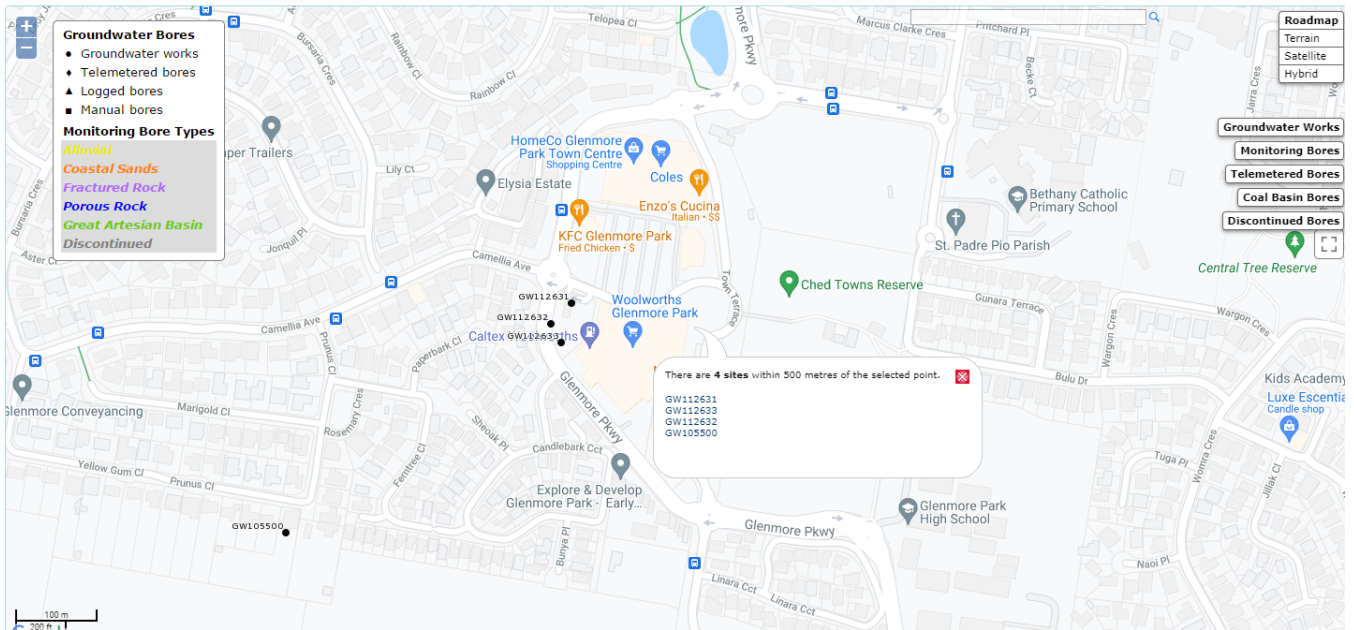
Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Appendix C

Results of Registered Groundwater Bore Search



Results of registered groundwater bore search (10 September 2021, WaterNSW website)

WaterNSW

Work Summary

GW105500

Licence: 10WA108629

Licence Status: CURRENT

Authorised Purpose(s): DOMESTIC
Intended Purpose(s): DOMESTIC

Work Type: Bore
Work Status:
Construct.Method: Rotary
Owner Type:

Commenced Date:
Completion Date: 12/12/2003

Final Depth: 144.00 m
Drilled Depth: 144.00 m

Contractor Name: Ultra Drilling
Driller: Bradley Alan Dodd
Assistant Driller:

Property: PUTRA 9 Prunus Ct
GLENMORE PARK 2745 NSW
GWMA: -
GW Zone: -

Standing Water Level (m):
Salinity Description:
Yield (L/s): 1.100

Site Details

Site Chosen By:

	County	Parish	Cadastre
Form A:	CUMBERLAND	MULGOA	2071 812223
Licensed:	CUMBERLAND	MULGOA	Whole Lot 2071/812223

Region: 10 - Sydney South Coast
River Basin: 212 - HAWKESBURY RIVER
Area/District:

CMA Map: 9030-3N

Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation (Unknown)
Source:

Northing: 6258580.000
Easting: 283773.000

Latitude: 33°47'27.1"S
Longitude: 150°39'52.2"E

GS Map: -

MGA Zone: 56

Coordinate Unknown
Source:

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	72.00	170			Down Hole Hammer
1		Hole	Hole	72.00	144.00	140			Down Hole Hammer

1	1	Casing	P.V.C.	0.20	72.00	140			Driven into Hole, Riveted and Glued
1	1	Casing	Steel	0.20	1.00	168	158		Driven into Hole

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
90.00	91.00	1.00	Unknown		92.00	0.20	92.00		1400.00
108.00	109.00	1.00	Unknown		110.00	0.45	110.00		1040.00
120.00	121.00	1.00	Unknown		122.00	0.75	122.00		1120.00
137.00	138.00	1.00	Unknown		144.00	1.10	144.00	01:00:00	1020.00

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	4.00	4.00	CLAY	Clay	
4.00	65.00	61.00	SHALE	Shale	
65.00	110.00	45.00	SANDSTONE/SHALE	Sandstone	
110.00	144.00	34.00	SANDSTONE	Sandstone	

*** End of GW105500 ***

Warning To Clients: This raw data has been supplied to the WaterNSW by drillers, licensees and other sources. WaterNSW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

WaterNSW

Work Summary

GW112631

Licence:	Licence Status:
	Authorised Purpose(s):
	Intended Purpose(s): MONITORING BORE
Work Type: Bore	
Work Status: Equipped	
Construct.Method: Rotary - Percu	
Owner Type: Private	
Commenced Date:	Final Depth: 9.00 m
Completion Date: 03/09/2009	Drilled Depth: 9.00 m
Contractor Name: Numac Drilling Services	
Driller: Christopher McMullen	
Assistant Driller:	
Property:	Standing Water Level (m):
GWMA:	Salinity Description:
GW Zone:	Yield (L/s):

Site Details

Site Chosen By:			
	County	Parish	Cadastre
	Form A: CUMBERLAND	MULGOA	9105//1022720
	Licensed:		
Region: 10 - Sydney South Coast	CMA Map:		
River Basin: - Unknown	Grid Zone:		Scale:
Area/District:			
Elevation: 0.00 m (A.H.D.)	Northing: 6258830.000	Latitude: 33°47'19.2"S	
Elevation: Unknown	Easting: 284070.000	Longitude: 150°40'04.0"E	
Source:			
GS Map: -	MGA Zone: 56	Coordinate: Unknown	
		Source:	

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	9.00	118			Rotary - Percussion (Down Hole H)
1		Annulus	Waterworn/Rounded	5.50	9.00				Graded
1	1	Casing	Pvc Class 18	0.00	6.00	60	50		Seated on Bottom, Other

1	1	Opening	Slots - Horizontal	6.00	9.00	60		0	Casing - Machine Slotted, PVC Class 18, Other, SL: 40.0mm, A: 3.80mm
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Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
7.00	9.00	2.00	Unknown						

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	4.00	4.00	SILT AND SHALE GREY	Silt	
4.00	9.00	5.00	SILT AND SHALE WET GREY	Silt	

Remarks

22/07/2014: Nat Carling, 22-July-2014; Added status & work name, updated work type.

*** End of GW112631 ***

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WaterNSW

Work Summary

GW112632

Licence:

Licence Status:

Authorised Purpose(s):
Intended Purpose(s): MONITORING BORE

Work Type: Bore
Work Status: Equipped
Construct.Method: Rotary - Percu
Owner Type: Private

Commenced Date:
Completion Date: 03/09/2009

Final Depth: 9.00 m
Drilled Depth: 9.00 m

Contractor Name: Numac Drilling Services
Driller: Christopher McMullen
Assistant Driller:

Property:

Standing Water Level (m):

GWMA:
GW Zone:

Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

County Form A: CUMBERLAND
Parish: MULGOA
Cadastre: 9105//1022720
Licensed:

Region: 10 - Sydney South Coast
River Basin: - Unknown
Area/District:

CMA Map:
Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Unknown Source:

Northing: 6258808.000
Easting: 284049.000

Latitude: 33°47'19.9"S
Longitude: 150°40'03.2"E

GS Map: -

MGA Zone: 56

Coordinate Source: Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	9.00	118			Rotary - Percussion (Down Hole H
1		Annulus	Waterworn/Rounded	5.50	9.00				Graded
1	1	Casing	Pvc Class 18	0.00	6.00	60	50		Seated on Bottom, Other

1	1	Opening	Slots - Horizontal	6.00	9.00	60		0	Casing - Machine Slotted, PVC Class 18, Other, SL: 40.0mm, A: 3.80mm
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Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
7.00	9.00	2.00	Unknown						

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	4.00	4.00	SILT AND SHALE GREY	Silt	
4.00	9.00	5.00	SILT AND SHALE WET/ GREY	Silt	

Remarks

22/07/2014: Nat Carling, 22-July-2014; Added status & work name, updated work type.

*** End of GW112632 ***

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WaterNSW

Work Summary

GW112633

Licence:

Licence Status:

Authorised Purpose(s):
Intended Purpose(s): MONITORING BORE

Work Type: Bore
Work Status: Equipped
Construct.Method: Rotary - Percu
Owner Type: Private

Commenced Date:
Completion Date: 03/09/2009

Final Depth: 9.00 m
Drilled Depth: 9.00 m

Contractor Name: Numac Drilling Services
Driller: Christopher McMullen
Assistant Driller:

Property:

Standing Water Level (m):

GWMA:
GW Zone:

Salinity Description:
Yield (L/s):

Site Details

Site Chosen By:

County Form A: CUMBERLAND
Parish: MULGOA
Cadastre: 9105//1022720
Licensed:

Region: 10 - Sydney South Coast
River Basin: - Unknown
Area/District:

CMA Map:
Grid Zone:

Scale:

Elevation: 0.00 m (A.H.D.)
Elevation Unknown Source:

Northing: 6258788.000
Easting: 284060.000

Latitude: 33°47'20.6"S
Longitude: 150°40'03.6"E

GS Map: -

MGA Zone: 56

Coordinate Source: Unknown

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	9.00	118			Rotary - Percussion (Down Hole H
1		Annulus	Waterworn/Rounded	5.50	9.00				Graded
1	1	Casing	Pvc Class 18	0.00	6.00	60	50		Seated on Bottom, Other

1	1	Opening	Slots - Horizontal	6.00	9.00	60		0	Casing - Machine Slotted, PVC Class 18, Other, SL: 40.0mm, A: 3.80mm
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Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
7.00	9.00	2.00	Unknown						

Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	4.00	4.00	SILT AND SHALE GREY	Silt	
4.00	9.00	5.00	SILT AND SHALE WET AND GREY	Silt	

Remarks

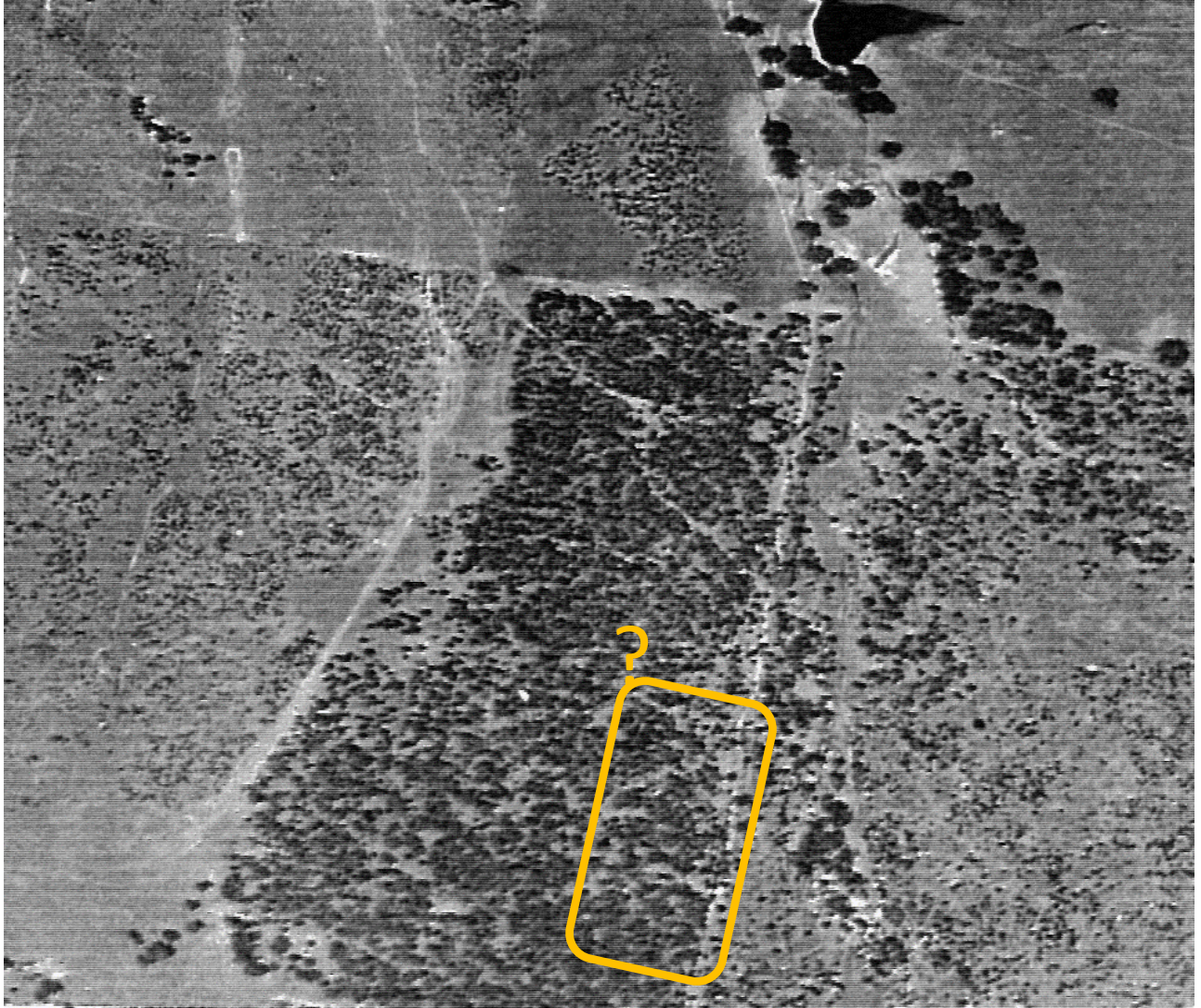
22/07/2014: Nat Carling, 22-July-2014; Added status & work name, updated work type.

*** End of GW112633 ***


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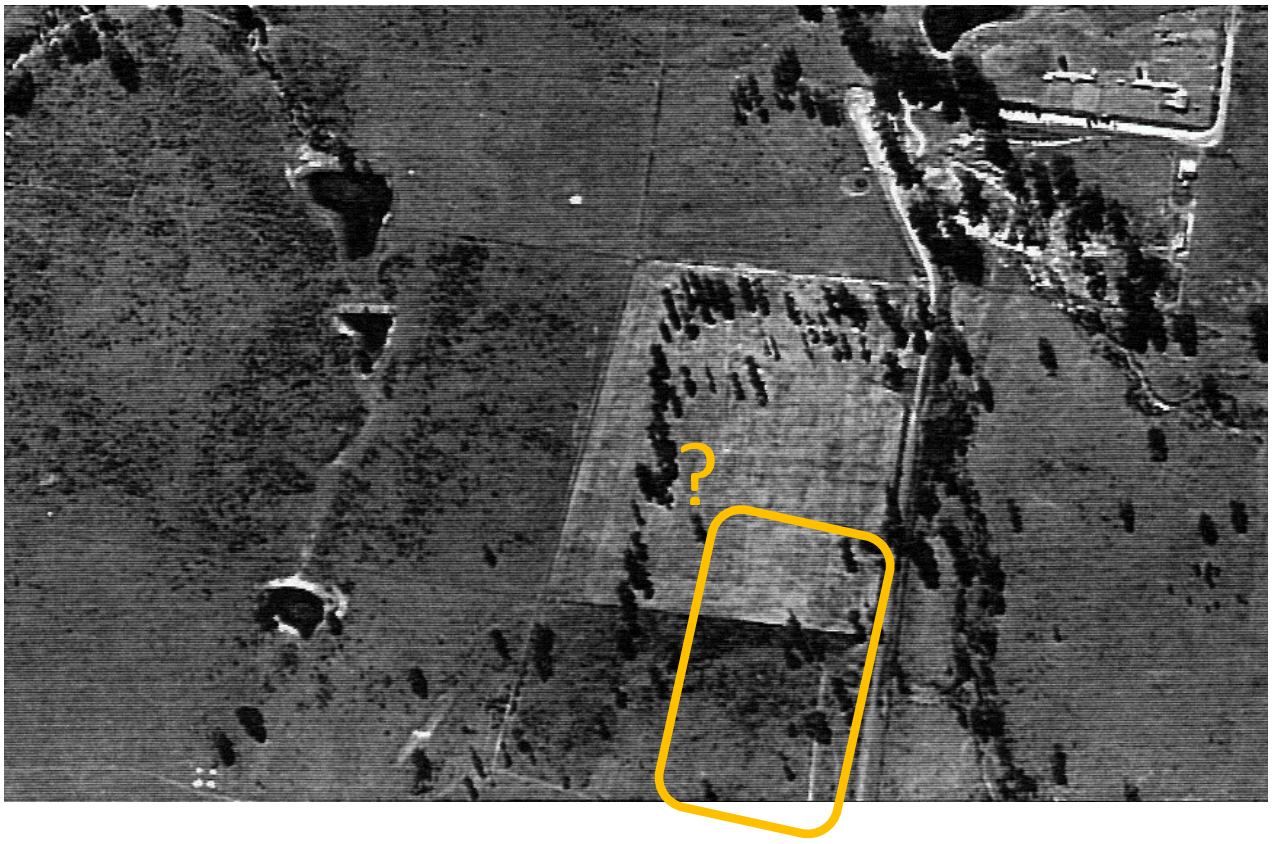
Appendix D

Aerial Photographs




Source: NSW Spatial Services

	1947 Aerial Photograph	PROJECT: 208929.00
	Glenmore Park Town Centre	PLATE No: D1
	Town Terrace, Glenmore Park	REV: 0
	CLIENT: Home Consortium	DATE: 10-Sep-21




Source: NSW Spatial Services

	1970 Aerial Photograph	PROJECT: 208929.00
	Glenmore Park Town Centre	PLATE No: D2
	Town Terrace, Glenmore Park	REV: 0
	CLIENT: Home Consortium	DATE: 10-Sep-21




Source: NSW Spatial Services

	1986 Aerial Photograph	PROJECT: 208929.00
	Glenmore Park Town Centre	PLATE No: D3
	Town Terrace, Glenmore Park	REV: 0
	CLIENT: Home Consortium	DATE: 10-Sep-21



Source: NSW Spatial Services

 Douglas Partners <i>Geotechnics Environment Groundwater</i>	1994 Aerial Photograph	PROJECT: 208929.00
	Glenmore Park Town Centre	PLATE No: D4
	Town Terrace, Glenmore Park	REV: 0
	CLIENT: Home Consortium	DATE: 10-Sep-21



Source: Metromap



2005 Aerial Photograph Glenmore Park Town Centre Town Terrace, Glenmore Park CLIENT: Home Consortium	PROJECT: 208929.00
	PLATE No: D5
	REV: 0
	DATE: 10-Sep-21



Source: Metromap



2009 Aerial Photograph
Glenmore Park Town Centre
Town Terrace, Glenmore Park

CLIENT: Home Consortium

PROJECT: 208929.00

PLATE No: D6

REV: 0

DATE: 10-Sep-21



Source: Metromap



2021 Aerial Photograph
Glenmore Park Town Centre
Town Terrace, Glenmore Park

CLIENT: Home Consortium

PROJECT: 208929.00

PLATE No: D7

REV: 0

DATE: 10-Sep-21

Appendix E

Site Photographs



Photo 1: Commerical building at south of site



Photo 2: Loading dock



Site Photographs

**Glenmore Park Town Centre
Town Terrace, Glenmore Park**

CLIENT: Home Consortium

PROJECT: 208929.00

PLATE No: E1

REV: 0

DATE: 14-Sep-21



Photo 3: Batter slope near western site boundary



Photo 4: Landscaped area with retaining walls at north of site



Site Photographs

**Glenmore Park Town Centre
Town Terrace, Glenmore Park**

CLIENT: Home Consortium

PROJECT: 208929.00

PLATE No: E2

REV: 0


DATE: 14-Sep-21



Photo 5: Retaining walls at site



Photo 6: Service station (off-site)

	Site Photographs	PROJECT: 208929.00
	Glenmore Park Town Centre	PLATE No: E3
	Town Terrace, Glenmore Park	REV: 0
	CLIENT: Home Consortium	DATE: 14-Sep-21