

GEOTECHNICAL SITE REPORT

54 MOORINA AVE, MATRAVILLE NSW 2036

LOT / PLAN 168//DP16138
LOCAL GOV. RANDWICK
REPORT REF. —
DATE 18 March 2026



DATA CONFIDENCE



PREPARED BY
LayeredGeo Pty Ltd

SITE & GEOLOGY

Location, lot details and regional geological context

• ANTHROPOGENIC DEPOSITS

REGIONAL GEOLOGY MAP



SITE DETAILS

LOT / PLAN 168//DP16138	LOCAL GOV. RANDWICK
ELEVATION 11.5–13.4 m AHD	SLOPE CLASS Gentle (~3.3%)
EASTING (MGA ZONE 56) 336,527	NORTHING 6,240,133

REGIONAL GEOLOGY

FORMATION Anthropogenic deposits
DESCRIPTION Anthropocene deposits varying from large man-made clasts (concrete blocks to building demolition rubble) to quarried natural boulders, with interstitial sand-sized to clay matrix.. Anthropogenic material. Quaternary (base) to Now (top)

GEOLOGICAL DESCRIPTION & LEGEND

The site is underlain by **Anthropogenic deposits**. This formation is characterised by Anthropocene deposits varying from large man-made clasts (concrete blocks to building demolition rubble) to quarried natural boulders, with interstitial sand-sized to clay matrix.. Anthropogenic material. Quaternary (base) to Now (top).

The geological formation underlying a site determines the type of rock or sediment encountered during excavation, influencing foundation design, excavation difficulty, and groundwater behaviour.

Note: Geological mapping is based on regional surveys and may not reflect localised variations. Site-specific investigation is recommended for critical structures.

MAP LEGEND

- Selected Property
- Anthropogenic deposits
- Anthropogenic deposits - reclaimed estuarine areas
- Coastal deposits - bay sand sheet (subaqueous)
- Coastal deposits - bedrock-mantling dune facies
- Coastal deposits - dune facies
- Hawkesbury Sandstone

NEARBY BOREHOLE RECORDS

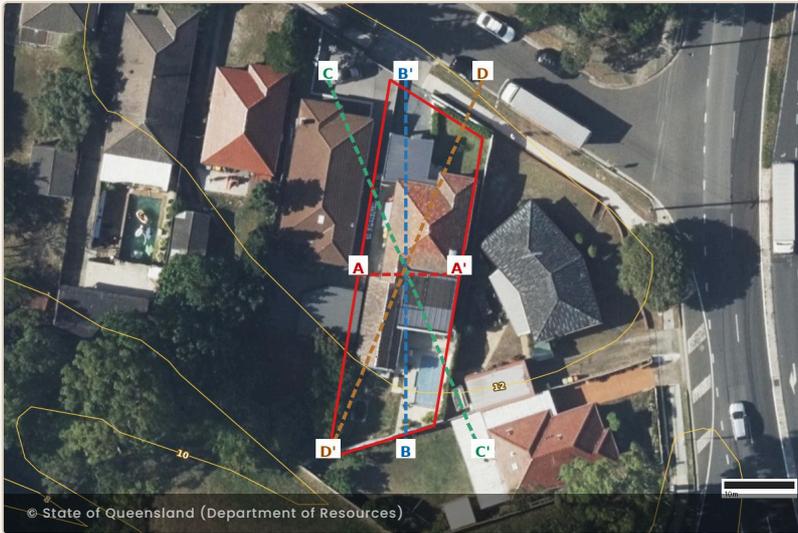
BH ID	DISTANCE	DEPTH (M)	WATER DEPTH	YEAR	SUMMARY
GW110525	123m	–	–	2009	No log available
GW111240	175m	–	–	2002	No log available
GW108408	210m	–	–	2007	No log available
GW075019	213m	21.0m	8.2m	1998	Sand, Rock
GW075019.1	213m	–	–	–	No log available
GW075019.1.1	213m	–	–	–	No log available
GW101447	226m	–	–	1997	No log available
GW104828	236m	7.0m	–	2003	Sand
GW109170	239m	4.8m	–	2008	Fill/Topsoil, Sand
GW101473	252m	–	–	1998	No log available

TOPOGRAPHY

Site slope, elevation profile and terrain classification

• GENTLE (~3.3%)

TOPOGRAPHIC MAP



TERRAIN SUMMARY

MIN ELEVATION	MAX ELEVATION
11.5 m AHD	13.4 m AHD
TOTAL FALL	SLOPE CLASS
1.9 m	Gentle (~3.3%)
AVG SLOPE	ASPECT
3.3%	South-facing

SLOPE CLASSIFICATION

Gentle

Low gradient. Standard construction applies; minor cut/fill may be needed.

LEGEND

-  Selected Property
-  Contour Lines

ENGINEERING IMPLICATIONS

CONSIDERATIONS

Understanding the topography of a site is essential for construction planning, drainage design, retaining wall requirements and foundation selection. Steep sites may require cut and fill operations, while flat sites may have drainage challenges.

Note: Elevation data is sourced from government LiDAR surveys and is indicative only. A formal survey is recommended prior to design.

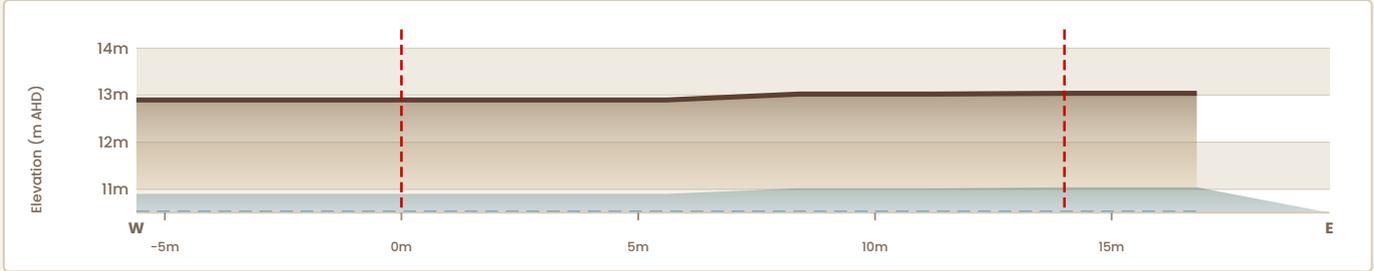
QUESTIONS TO CONSIDER

- Will retaining walls or cut/fill be required?
- How does the slope affect drainage and stormwater management?
- Are there landslide or erosion risks on steep portions?
- What foundation type suits the slope conditions?

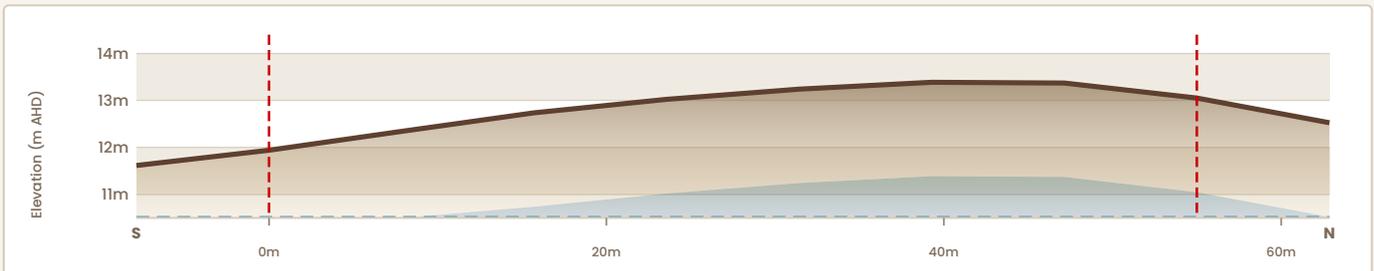
TOPOGRAPHY – ELEVATION CROSS SECTIONS

Four directional transects across the subject parcel

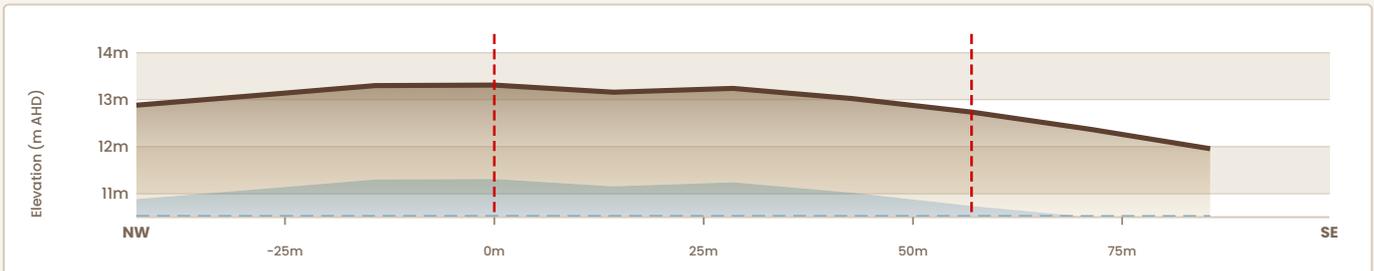
A-A' W → E TRANSECT



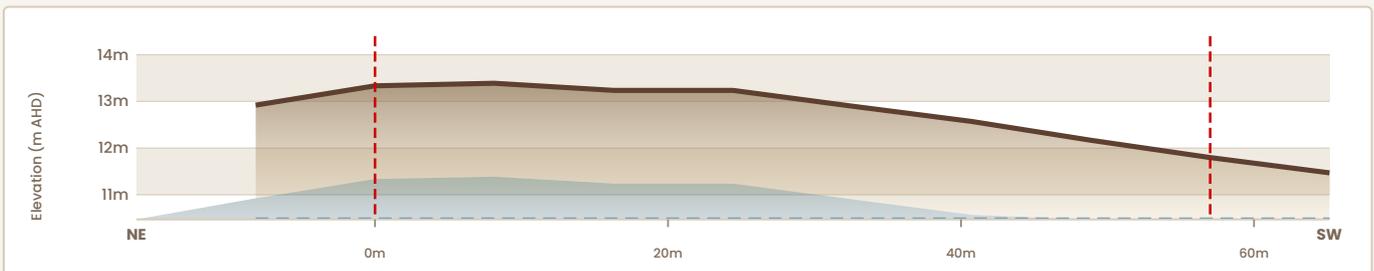
B-B' S → N TRANSECT



C-C' NW → SE TRANSECT



D-D' NE → SW TRANSECT



ABOUT CROSS SECTIONS

Each profile shows indicative ground surface elevation along a transect through the parcel. Cardinal sections (A-A', B-B') capture E-W and N-S slope. Diagonal sections (C-C', D-D') reveal the maximum fall direction across the site.

NOTE

Profiles are derived from the Queensland 1m Digital Elevation Model (DEM). Estimated groundwater depth is indicated where bore data is available. A formal survey is required for design.

LEGEND

- - - Property Boundary
- Ground Surface
- Est. Groundwater
- Soil Zone (~2m)
- Rock Zone

SOILS

Soil types, stratigraphy and AS 2870 reactivity class

• MODERATELY REACTIVE (M)

SOIL MAP



NSW Soil and Land Information (Environment NSW) ASC mapping; NGIS bore logs

INDICATIVE SOIL PROFILE

0–11.2m	Sand, Med Grained, Yellow Brown — Granular, variable density. Check for loose zones.
11.2–19.5m	Silty Sand, Very Fine To Fine Grained, White — Granular, variable density. Check for loose zones.
19.5–21.0m	Bed Rock — Strong to very strong. Low compressibility.

AS 2870 SITE CLASS

M-H

Moderately reactive clay soils. Slab and footing design must account for moisture-driven movement.

REACTIVITY CLASS

M

AS 2870 moisture-driven soil movement classification.

TYPICAL VS MOVEMENT

20-40_{mm}

Characteristic surface movement (AS 2870 indicative range).

ENGINEERING NOTES

This site has been assessed as **M** soils under AS 2870. Moderately reactive clay soils. Slab and footing design must account for moisture-driven movement.

Soil classification determines how a site responds to moisture changes. Reactive clays shrink and swell seasonally, placing stress on footings and slabs. Foundation design must account for the AS 2870 site class, particularly for slab-on-ground construction.

Note: Soil mapping is derived from regional surveys. A site-specific geotechnical investigation is required to confirm soil types and reactivity class for design.

MAP LEGEND

- Selected Property
- Podosols (PO)
- Not assessed

SOIL PROPERTIES BY DEPTH – EST. SOIL DEPTH: 2.0 M (RANGE 2.0-2.2 M)

DEPTH	CEC (MEQ+/100G)			CLAY %			SAND %		
	5TH	EV	95TH	5TH	EV	95TH	5TH	EV	95TH
0–5 cm	6	13	22	2.3	16.2	30.1	40.0	64.0	71.0
5–15 cm	6	12	21	2.6	17.3	32.1	42.0	65.0	74.0
15–30 cm	6	12	21	6.4	22.2	38.1	43.0	69.0	78.0
30–60 cm	6	12	21	12.9	30.1	47.3	43.0	71.0	81.0
60–100 cm	6	12	21	16.1	33.2	50.4	36.0	65.0	78.0
100–200 cm	6	12	21	16.4	34.9	53.5	38.0	66.0	78.0

Source: CSIRO ACLEP / TERN (csiro:55865) — CEC (BaCl₂), Clay (<2µm), Sand (20µm–2mm), Depth of Soil. ACLEP / TERN.

HISTORICAL IMAGERY – 1943

• HISTORICAL DATA AVAILABLE

What does the historical aerial record show for this site and surrounds?

AERIAL PHOTOGRAPH



Source: Queensland Government Historical Aerial Photography Program

THINGS TO KNOW

Historical aerial imagery provides a record of past land use and site conditions. Evidence of previous industrial activities, agriculture, vegetation clearing, landfill, or earthworks can indicate potential soil disturbance, contamination, or the presence of fill material that may affect foundation design.

Changes in drainage patterns, watercourse alignments, and low-lying areas visible in historical imagery can also indicate flood risk or acid sulphate soil potential that may not be apparent from current mapping.

QUESTIONS TO ASK

- ▶ Was this site previously used for industrial, agricultural, or waste disposal purposes?
- ▶ Is there evidence of imported fill or significant earthworks?
- ▶ Have drainage lines or watercourses been altered or culverted?
- ▶ Was vegetation cleared from low-lying or estuarine areas?
- ▶ Are there any unexploded ordnance (UXO) risk areas nearby from wartime use?

DATA NOTES

Historical aerial photography is sourced from the Queensland Government's State Capture Program archive. Coverage and resolution varies by location and era. Imagery dates from approximately the 1940s to present.

This page provides contextual information only. A Phase 1 Environmental Site Assessment (ESA) should be undertaken where historical land use concern is identified.

ACID SULPHATE SOILS

• NO MAPPED RISK

Is this site within an area of known or potential acid sulphate soil risk?

ASS RISK MAP



Source: Queensland Government Soils and Land Resource mapping

RISK CLASSIFICATION

i No mapped ASS risk

This site is not within a mapped acid sulphate soil risk area based on available Queensland Government data.

ASS RISK CLASSES

- **Actual ASS** — pH < 4, acid confirmed
- **Potential <1m** — shallow, high excavation risk
- **Potential 1–2m** — moderate risk
- **Potential >2m** — low disturbance risk
- **Not mapped** — outside survey extent

THINGS TO KNOW

Acid sulphate soils (ASS) contain iron sulphides that, when exposed to air through excavation or drainage, oxidise to produce sulphuric acid. This can cause severe environmental damage to waterways, corrosion of infrastructure, and risks to human health.

In Queensland, disturbing ASS is regulated under the *Environmental Protection Act 1994* and associated guidelines. A mandatory notification and management plan may be required before excavation below the water table in risk areas.

QUESTIONS TO ASK

- ▶ Is a Preliminary or Detailed ASS Assessment (PASS/MASS) required before works?
- ▶ Does the proposed excavation depth trigger ASS management obligations?
- ▶ Is an ASS Management Plan required under the EP Act?
- ▶ Are there dewatering or drainage works planned that could expose ASS?
- ▶ What treatment or neutralisation procedures are required for disturbed material?

REGULATORY CONTEXT

Under the *Environmental Protection Act 1994*, ASS disturbance that causes or threatens environmental harm is a prescribed activity. Works must comply with the Queensland Government's *Acid Sulfate Soils Technical Manual* and relevant planning scheme overlays.

Note: Mapping coverage is variable. Absence of mapped ASS does not guarantee that ASS are not present. Site-specific investigation is recommended where excavation will extend below the natural water table.

GROUNDWATER

• MODERATE DEPTH

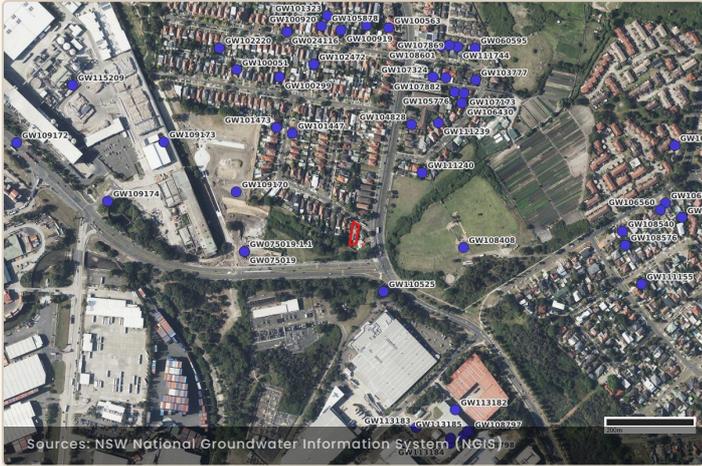
Is groundwater likely to be encountered during excavation or construction?

ESTIMATED GWL DEPTH
~8.2m

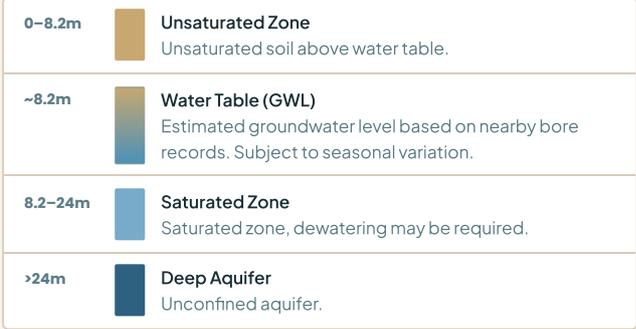
AQUIFER TYPE
Unconfined

YIELD ESTIMATE
Low-Moderate

SALINITY
Variable



INDICATIVE DEPTH PROFILE



Construction Implication
Dewatering likely required for excavations below 8.2m. Assess basement feasibility carefully.

THINGS TO KNOW

Groundwater is water held in the saturated zone beneath the earth's surface. Its depth and behaviour directly affects excavation planning, basement feasibility, dewatering requirements, and the corrosivity of ground conditions toward buried infrastructure.

Seasonal variation can cause groundwater levels to rise significantly — particularly after extended rainfall events — which may impact sites that appear dry at surface during investigation.

Note: Groundwater depths are estimated from nearby bore records held in government databases. They are indicative only and subject to seasonal and spatial variation.

QUESTIONS TO ASK

- ▶ At what depth is groundwater likely to be encountered?
- ▶ Will dewatering be required during construction?
- ▶ Is there a risk of groundwater ingress into basements or sub-floor areas?
- ▶ How does seasonal variation affect the groundwater level on this site?
- ▶ Are there any groundwater contamination concerns in the vicinity?

LEGEND

- Selected Property
- Shallow GWL (<3m)
- Moderate GWL (3-8m)
- Deep GWL (>8m)

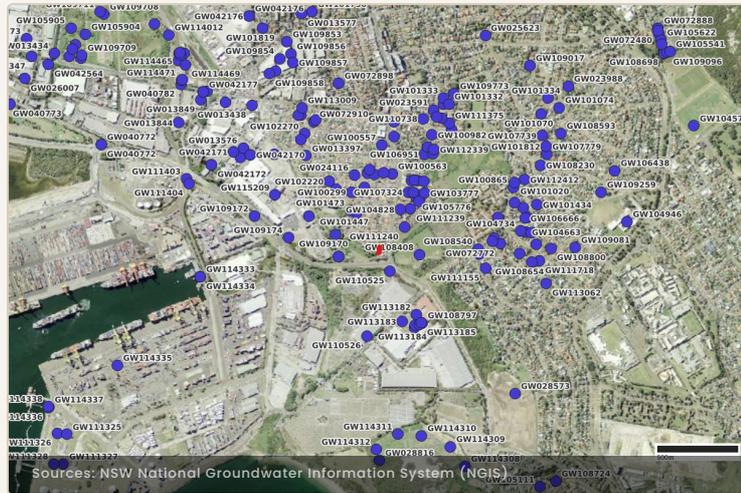
NEARBY BORE RECORDS
50 bores within 2000m radius
Deepest record: 21.0m
Source: NSW National Groundwater Information System (NGIS)

HISTORICAL BOREHOLES

Nearby borehole records used to model subsurface conditions

• 50 RECORDS FOUND

BOREHOLE LOCATION MAP



ANTICIPATED GROUND CONDITIONS

0–11.2m		Sand, Med Grained, Yellow Brown Granular, variable density. Check for loose zones.
11.2–19.5m		Silty Sand, Very Fine To Fine Grained, White Granular, variable density. Check for loose zones.
19.5–21.0m		Bed Rock Strong to very strong. Low compressibility.

LEGEND

- Selected Property
- Borehole Location

NEARBY BOREHOLE RECORDS

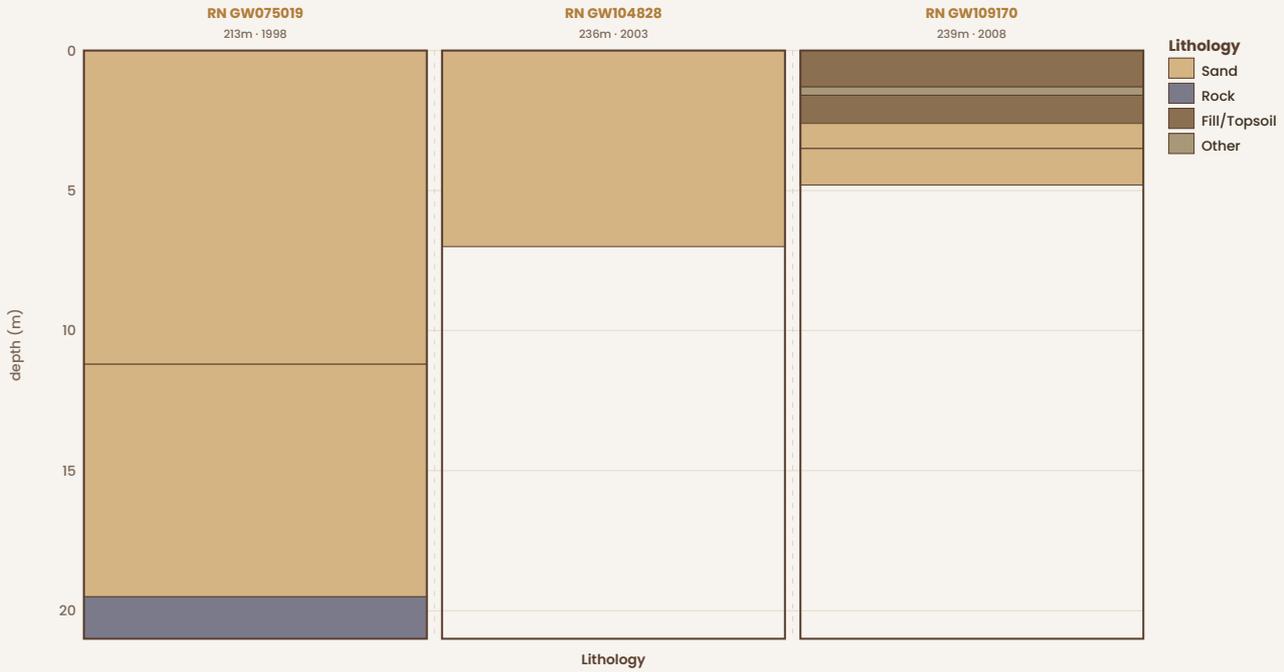
ID	DIST.	EASTING	NORTHING	DEPTH	GWL	YEAR	STRATA LOG
GW110525	123m ↘	336,584	6,240,024	—	—	2009	No log available
GW111240	175m ↗	336,654	6,240,253	—	—	2002	No log available
GW108408	210m ➡	336,735	6,240,111	—	—	2007	No log available
GW075019	213m ⬅	336,317	6,240,096	21.0m	8.2m	1998	0.0–11.2m Sand, Med Grained, Yellow Brown 11.2–19.5m Silty Sand, Very Fine To Fine Grained, White 19.5–21.0m Bed Rock
GW075019.1	213m ⬅	336,317	6,240,096	—	—	—	No log available
GW075019.1.1	213m ⬅	336,317	6,240,096	—	—	—	No log available
GW101447	226m ↖	336,405	6,240,324	—	—	1997	No log available
GW104828	236m ↗	336,632	6,240,345	7.0m	—	2003	0.0–7.0m Sand
GW109170	239m ↙	336,300	6,240,210	4.8m	—	2008	0.0–1.3m Fill-Rubble 1.3–1.6m Concrete 1.6–2.6m Fill, Ash
GW101473	252m ↖	336,375	6,240,335	—	—	1998	No log available
GW111239	266m ↗	336,683	6,240,349	—	—	2010	No log available
GW106430	323m ↗	336,727	6,240,387	6.1m	—	2004	0.0–6.1m Sand, Unsolidated
GW105776	332m ↗	336,713	6,240,408	—	—	2004	No log available
GW100299	333m ↖	336,379	6,240,431	—	—	1995	No log available
GW102472	334m ↖	336,443	6,240,457	8.0m	—	1999	0.0–8.0m Sand

Strata log shows actual layer boundaries from GWDB records. Source: NSW National Groundwater Information System (NGIS)

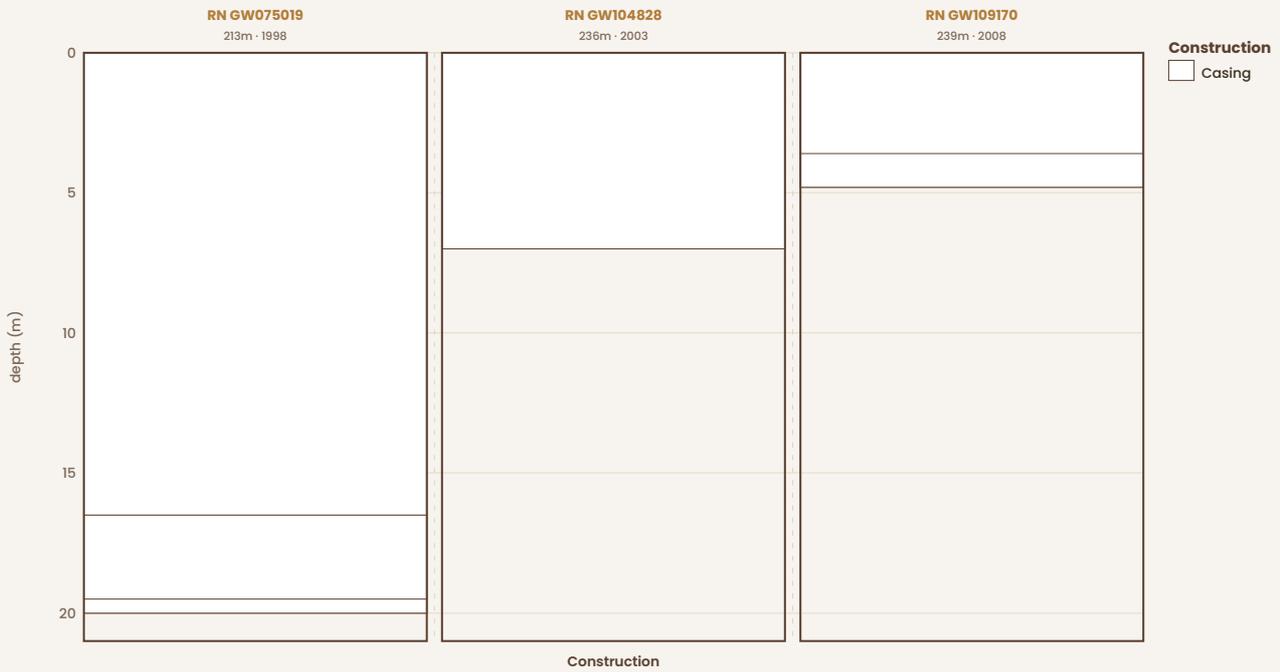
BORE LOGS

Nearest bores – lithology and construction records

LITHOLOGY LOG



CONSTRUCTION LOG



ENGINEERING PARAMETERS

Indicative geotechnical design values derived from regional data and borehole records



Indicative Values Only

The parameters below are desk-study estimates based on regional geology and nearby borehole data. They must not be used for final design without confirmation from a site-specific geotechnical investigation conducted by a qualified geotechnical engineer.

PARAMETER	UNIT	INDICATIVE RANGE	NOTES
Bearing Capacity (shallow) Net allowable for pad/strip footings	kPa	100-150	Indicative only
Subgrade Reaction (k) Modulus of subgrade reaction	MN/m ³	10-30	
Undrained Shear Strength (Su) Upper clay horizon	kPa	25-75	
Friction Angle (φ') Effective, drained	degrees	25-32	
Cohesion (c') Effective, drained	kPa	0-25	
Elastic Modulus (E) Drained secant	MPa	5-20	
Permeability (k) Saturated hydraulic	m/s	1×10 ⁻⁶ -1×10 ⁻⁸	
AS 2870 Site Class Residential slab design	—	M-H	
Min. Footing Depth To competent material	m	0.3-0.6	
Pile Type Recommendation If piling required	—	Bored pier	

DATA SOURCES

Queensland GWDB, regional geological mapping

RECOMMENDED NEXT STEPS

- ▶ Commission site-specific geotechnical investigation
- ▶ Conduct laboratory testing on recovered samples
- ▶ Engage a registered geotechnical engineer for final design

STANDARDS REFERENCED

- ▶ AS 2870 — Residential Slabs
- ▶ AS 1726 — Site Investigations
- ▶ AS 4678 — Earth Retaining Structures

WHO SHOULD READ THIS REPORT

- ✓ Property buyer or owner
- ✓ Architect or building designer
- ✓ Mortgage broker or lender
- ✓ Structural or civil engineer
- ✓ Builder or contractor
- ✓ Town planner or council officer

LIMITATIONS OF THIS REPORT

This report is a **desk-study assessment only**. All geotechnical parameters, soil profiles, and ground condition estimates presented herein are derived from publicly available data sources including regional geological mapping, government borehole databases, and published literature. **No physical site investigation has been conducted** as part of this report.

The information is provided as a preliminary guide to assist early-stage planning and should not be relied upon for detailed engineering design, construction, or legal decisions without further site-specific investigation by a suitably qualified geotechnical professional.

DATA SOURCES & ACCURACY

All data layers sourced from third-party government and regulatory bodies are provided in good faith. LayeredGeo does not warrant the accuracy, completeness, or currency of this information.

Fire Ant zone boundaries are updated regularly by Biosecurity Queensland and should be independently verified prior to commencement of any earthworks. **Topographic data** is derived from LiDAR surveys and may not reflect recent earthworks or changes to the site.

PROFESSIONAL ADVICE

LayeredGeo strongly recommends that a registered geotechnical engineer conduct a site-specific investigation in accordance with **AS 1726 – Geotechnical Site Investigations** before finalising foundation design, retaining wall design, or any significant earthworks. Engineering parameters contained in this report should be treated as indicative only and superseded by laboratory testing and in-situ investigation results.

REPORT DETAILS

Report generated: **18 March 2026** · Reference: · Prepared by: **LayeredGeo Pty Ltd**

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