

SOUTH-EAST SCANNING



Nature Pools

Noosa Blue Resort

Pool Shell GPR and Strength Assessment

*Ground penetrating radar, structural analysis,
and utility detection specialists.*



QR code

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Executive Summary

South-East Scanning was engaged to undertake a non-destructive structural assessment of an existing reinforced concrete swimming pool shell at Noosa Blue Resort. The objective of the investigation was to identify the internal reinforcement configuration, determine the approximate concrete thickness, and provide an indicative assessment of concrete condition to assist the project engineer and pool builder in evaluating the suitability of the existing shell for refurbishment or modification works.

Ground-penetrating radar scanning identified a reinforced concrete base slab with two longitudinal reinforcement layers running toward the deep end of the pool, with an upper reinforcement layer located at approximately 75 mm concrete cover and a secondary reinforcement layer detected at approximately 100 mm depth. Longitudinal reinforcement spacing was approximately 200 mm centres. A single transverse reinforcement layer running across the width of the pool was detected at an approximate concrete cover of 100 mm, with an average spacing of approximately 150 mm centres. Additional reinforcement was identified in the circular deep-end section, likely associated with structural support for the curved formwork geometry of the deeper bowl.

The base slab thickness was measured at approximately 200 mm across most of the pool floor, increasing to approximately 300 mm in the deep end, where structural thickening was present. Pool walls were measured at approximately 300 mm in thickness and contained vertical reinforcement bars at approximately 200 mm centres and horizontal reinforcement bars at approximately 300 mm centres, with concrete cover ranging from approximately 100 mm to 120 mm.

Surface hardness testing undertaken using a Proceq Silver Schmidt rebound hammer produced an average rebound value of 43.5 Q, based on twenty-six valid readings.

Lower values were generally associated with impacts on the exposed pebblecrete finish, while readings taken on exposed concrete paste consistently returned higher rebound values between approximately 50 Q and 60 Q. Based on typical rebound correlations, the results are consistent with concrete likely meeting or exceeding the project target strength of 25 MPa, and potentially within the range of 30 MPa to 40 MPa equivalent compressive strength, noting that rebound hammer testing provides only an indicative assessment and laboratory core testing would be required for definitive strength verification.

Surface moisture testing returned readings between 2.8 per cent and 3.2 per cent, consistent with a drained pool shell that has been exposed to environmental drying. Visual inspection identified isolated areas of deterioration within the pebblecrete finish layer, including localised delamination and previous patch repair locations. Rust staining was observed within one repaired area of the finish layer; however, no reinforcement exposure, reinforcement displacement, or structural cracking associated with reinforcement corrosion was detected during the investigation.

Overall, the pool shell was found to contain a robust reinforcement configuration with relatively high concrete cover and consistent structural detailing typical of permanent in-ground reinforced concrete pool construction.



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Introduction

South-East Scanning was engaged to undertake a non-destructive structural assessment of an existing reinforced concrete swimming pool shell located at Noosa Blue Resort.

The purpose of the investigation was to determine the internal reinforcement configuration, concrete thickness, and general material condition of the pool shell to assist the project engineer and pool builder in assessing the pool shell's suitability for refurbishment or modification works.

The investigation incorporated multiple complementary non-destructive testing techniques, including ground penetrating radar scanning, rebound hammer testing, and surface moisture assessment. Ground-penetrating radar was used to identify reinforcement layouts and concrete cover depths within the base and wall elements of the pool shell. Surface hardness testing was conducted using a Proceq Silver Schmidt rebound hammer to provide an indicative assessment of the concrete's relative compressive strength. Moisture testing was conducted to evaluate the current condition of the drained shell following extended exposure.

The pool is of a free-form configuration with varying depths and includes a locally thickened base section within the deep end. Reinforcement mapping and structural observations were conducted across representative areas of the base slab and pool walls to determine the shell's structural arrangement.

The results of the investigation are summarised below and supported by annotated radar imagery and site photographs.

Summary of Findings

The reinforced concrete pool shell was found to contain a robust reinforcement arrangement comprising dual longitudinal reinforcement layers in the base slab, a single transverse reinforcement layer, and vertically and horizontally reinforced wall elements. Concrete cover to reinforcement was generally higher than typically observed in residential pool construction, ranging between approximately 75 mm and 120 mm, depending on location.

The base slab thickness was approximately 200 mm throughout most of the pool, increasing to approximately 300 mm within the deep end where structural thickening was present. Additional reinforcement was observed in the circular deep-end section, consistent with reinforcement placed to support the curved formwork geometry.

Surface hardness testing returned rebound values generally consistent with mid strength structural concrete. Moisture readings were low and consistent with a drained shell exposed to environmental drying.

No significant reinforcement displacement or structural anomalies were detected during the investigation. Localised surface deterioration of the pebblecrete finish layer was observed in isolated areas, including minor delamination and historic patch repair locations.

Reinforcement Layout

Ground-penetrating radar scanning identified a reinforced concrete base slab with two layers of longitudinal reinforcement running along the length of the pool toward the deep end. The upper longitudinal reinforcement layer was located at approximately 75 mm concrete cover, with a secondary deeper reinforcement layer detected at approximately 100 mm depth.

Longitudinal reinforcement spacing was measured at approximately 200 mm centres.

A single layer of transverse reinforcement running across the width of the pool was detected at an approximate concrete cover of 100 mm, with an average spacing of approximately 150 mm centres.

In the circular deep-end section, additional reinforcement was detected. This reinforcement appears to have been installed to provide structural support for the curved formwork geometry associated with the deeper bowl section of the pool.



The pool walls were found to contain vertical reinforcement bars at approximately 200 mm centres and horizontal reinforcement bars at approximately 300 mm centres. Concrete cover to wall reinforcement ranged between approximately 100 mm and 120 mm.

Concrete Thickness

Ground penetrating radar measurements indicate that the base slab thickness is approximately 200 mm across most of the pool floor.

A thickened structural section was identified within the deep end of the pool, where slab thickness increases to approximately 300 mm. This thickening corresponds to the pool's deeper circular section and is consistent with typical structural detailing used to resist hydrostatic and soil loading in deeper pool geometries.

Pool walls were measured to be approximately 300 mm thick.

Surface Hardness Assessment

Surface hardness testing was conducted using a Proceq Silver Schmidt rebound hammer to provide an indicative assessment of the concrete compressive strength.

A total of twenty-six valid rebound readings were recorded with an average rebound value of 43.5 Q and a standard deviation of 5.6 Q.

Lower rebound values recorded during testing were typically associated with impacts on the exposed pebblecrete aggregate finish. When testing was conducted on areas of exposed concrete paste, rebound values were consistently higher, generally ranging between 50 Q and 60 Q, indicating a relatively hard concrete matrix.

Based on typical correlations between rebound number and compressive strength, the results are consistent with concrete that is likely to meet or exceed the project target strength of 25 MPa, and potentially within the range of **30 MPa to 40 MPa equivalent compressive strength**.

Rebound hammer testing provides an indicative measure of surface hardness only and cannot be used as a definitive determination of compressive strength. Confirmation of in situ compressive strength would require extraction and laboratory testing of concrete core samples.

Moisture Content

Surface moisture testing of the concrete shell returned readings ranging between **2.8 per cent and 3.2 per cent**.

These values are consistent with a drained pool shell that has been exposed to environmental drying for an extended period.

Observed Surface Condition

Visual inspection identified isolated areas of deterioration within the pebblecrete finish layer, including localised delamination and previous patch repairs.

One area of surface repair showed rust staining in the finish layer, likely due to moisture migration through the repair mortar and surface aggregate. No reinforcement exposure, reinforcement displacement, or structural cracking associated with reinforcement corrosion was observed during the investigation.

Minor cracking was observed along sections of the pool expansion joint. No structural movement or displacement of reinforcement was detected in the radar data in these locations.

Limitations

Ground penetrating radar identifies changes in subsurface electromagnetic properties and is highly effective at locating embedded metallic reinforcement. The technique does not directly measure the reinforcement diameter, and interpretation depends on signal clarity and concrete cover depth.

Rebound hammer testing provides an indirect measure of surface hardness and cannot be used as a definitive measure of compressive strength. Where precise strength values are required, concrete core extraction and laboratory compression testing must be undertaken.



Concrete Thickness

- Base slab thickness approximately 200 mm
- Deep end thickening approximately 300 mm

Base Slab Reinforcement

- Longitudinal reinforcement
 - Two layers of steel
 - Upper layer at approximately **75 mm cover**
 - Secondary layer at approximately **100 mm depth**
- Bar spacing approximately **200 mm centres**

Transverse Base Reinforcement

- Single reinforcement layer
- Approximately 150 mm spacing
- Approximately 100 mm concrete cover
- Runs perpendicular to longitudinal bars

Pool Wall Reinforcement

- Vertical bars:
 - Approximately 200 mm spacing
- Horizontal bars:
 - Approximately 300 mm spacing
- Concrete cover:
 - Approximately 100 to 120 mm

Concrete Surface Hardness Testing

- Silver Schmidt rebound hammer testing
 - Average rebound value: 43.5 Q
 - Surface readings on exposed concrete: 50 to 60 Q
 - Indicative strength range:
 - Likely ≥ 25 MPa
 - Possibly within 30 to 40 MPa
- (Strength confirmation requires laboratory core testing)

Surface Condition Observations

- Localised pebblecrete delamination
- Historic patch repair visible
- Rust staining present within finish layer
- No reinforcement displacement detected
- No structural cracking associated with reinforcement observed

Pool detail

Ground-penetrating radar scanning, surface hardness testing, and visual inspection were conducted to assess the structural configuration and condition of the existing reinforced concrete pool shell. The investigation identified a reinforced base slab with two longitudinal reinforcement layers and a single transverse reinforcement layer, with additional reinforcement in the circular deep-end section. Concrete thickness was approximately 200 mm across the base slab, increasing to approximately 300 mm within the deep end. Rebound hammer testing returned surface hardness values consistent with mid-strength structural concrete, likely meeting or exceeding the project target strength of 25 MPa. Localised delamination of the pebblecrete finish layer and historic patch repairs were observed; no reinforcement displacement or structural anomalies were detected during the investigation.

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CLIENT: Nature Pools
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TECHNICIAN: Aidan Waszaj
DATE(S): 05/03/26

DRAWING:
1/1

Noosa Blue Rebound Hammer Assessment

Operator Aidan Waszaj
Folder Name All Measurements
Created Date 03/05/2026 10:43:26
Last Modified Date 03/05/2026 10:43:54
Measurement Average Compressive Strength 43.5 Q

Measurement Bar Graph

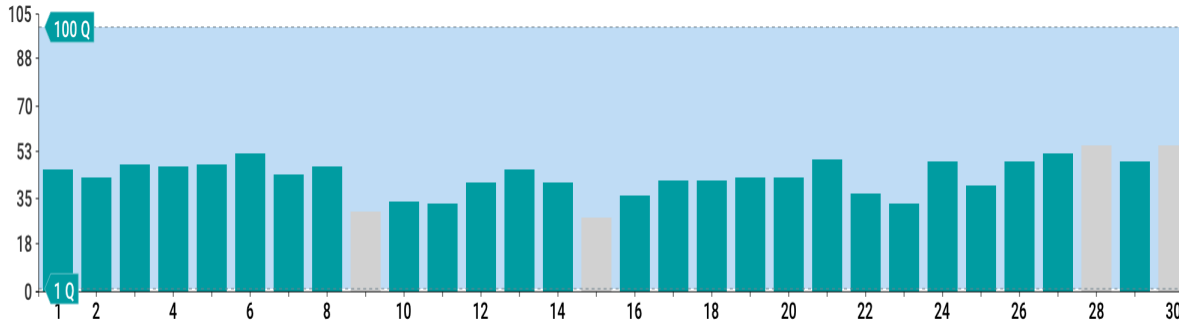


Table View

#	Angle (°)	Q	Q factor-corrected
1	0	46	46
2	0	43	43
3	0	48	48
4	0	47	47
5	0	48	48
6	0	52	52
7	0	44	44
8	0	47	47
9*	0	30	30
10	0	34	34
11	0	33	33
12	0	41	41
13	0	46	46
14	0	41	41
15*	0	28	28

#	Angle (°)	Q	Q factor-corrected
16	0	36	36
17	0	42	42
18	0	42	42
19	0	43	43
20	0	43	43
21	0	50	50
22	0	37	37
23	0	33	33
24	0	49	49
25	0	40	40
26	0	49	49
27	0	52	52
28*	0	55	55
29	0	49	49
30*	0	55	55

* Outlier

Statistics

Readings 26
 Average 43.5 Q
 Standard deviation 5.6 Q

Minimum	33 Q
Maximum	52 Q
Range	19 Q
Relative Span	43.5%

Settings

Conversion Standard	EN 12504-2
Conversion curve	None
Target Scale	Q factor-corrected
Unit	Q
Limits	High: 100 Q , Low: 1 Q
Angle Correction	Auto

Hammer Info

Serial Number	OS82-006-0061
Hardware Revision	B0
Firmware Revision	2.0.9

Bluetooth Module Info

Serial Number	BT42-000-6525
Hardware Revision	A0
Firmware Revision	2.5.0

Application Info

Platform	iOS
Version	4.2.0

If you have any queries about this document or its contents, don't hesitate to contact South-East Scanning.

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