SOUTH-EAST SCANNING

GPR and Structural Assessment Report
Southern Downs Regional Council
WIRAC - 29 Palmerin St, Warwick QLD 4370

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

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ABOUT US

South-East Scanning is a Queensland-based NDT consultancy specialising in ground penetrating radar (GPR), utility locating, and non-destructive testing of concrete and subsurface structures.

Founded by brothers Aidan and Dion Waszaj, the company was established to deliver a higher standard of subsurface investigation across South-East Queensland. With a focus on accuracy, clarity, and practical outcomes, South-East Scanning supports engineers, contractors, and asset owners in making informed decisions where subsurface conditions are uncertain.

Operating across the Sunshine Coast, Brisbane, and the Gold Coast, the team delivers high-resolution GPR surveys, void detection, structural assessment, and utility mapping, with an emphasis on risk mitigation and clear, decision-ready reporting.

We combine advanced technology with field experience to deliver reliable insight in complex environments, from residential construction through large-scale civil and infrastructure projects.

ONGOING SUPPORT

Subsurface conditions often require staged investigation and verification.

South-East Scanning is available to support throughout the next phase of works, including on-site support, additional scanning, and real-time interpretation during remediation to ensure outcomes align with this report.

For further information, please contact our team.

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SUBSURFACE INVESTIGATION SPECIALISTS.

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Executive Summary

The purpose of this investigation was to undertake a non-destructive ground penetrating radar (GPR) and concrete scanning assessment of the Warwick Indoor Recreation and Aquatic Centre (WIRAC) aquatic structures, with particular focus on identifying potential subsurface voiding, moisture ingress pathways, reinforcement configuration, and conditions that may contribute to differential settlement or loss of support beneath the pool shell structures. The investigation included assessment of the Olympic pool, children's pool, rapids pool, and selected surrounding slab and perimeter areas.

South-East Scanning utilised a combination of high-frequency concrete scanning and deeper-penetration GPR systems to assess both shallow structural characteristics and the subsurface conditions beneath the pool shells. The collected datasets generally exhibited strong, coherent, and repeatable reinforcement reflections across most scanned areas, indicating relatively consistent pool shell construction and reinforcement configuration throughout the facility. No evidence of widespread major voiding, large subsurface anomalies, or significant structural instability was identified within the scanned areas.

The Olympic pool datasets demonstrated generally clear and consistent radar responses throughout both shallow and deeper depth intervals. Minor localised anomalous reflections were identified within portions of the deeper 200 MHz datasets, particularly toward the deep end and within isolated perimeter areas; however, these responses were limited in extent and not considered indicative of widespread deterioration. A localised zone of increased signal variability was identified adjacent to the reported settlement area along the pool perimeter and may warrant targeted intrusive verification should further investigation be required. The suspended slab datasets similarly demonstrated consistent construction characteristics, including regular reinforcement spacing and an approximate slab thickness of 220 mm.

Executive Summary (cont.)

Assessment of the children's pool identified generally consistent construction conditions, with no significant voiding or major anomalies detected. Due to the curved geometry of portions of the pool shell, complete grid-based C-scan acquisition was not achievable across all areas. Representative B-scan datasets collected along these curved sections yielded responses consistent with the broader C-scan data, indicating generally uniform pool-shell conditions throughout the structure. Minor elevated dielectric responses adjacent to reinforcement were observed in isolated locations and may indicate localised moisture ingress or early-stage material variation.

The rapids pool investigation identified clear and consistent reinforcement reflections throughout the base slab. Representative B-scan datasets collected along portions of the exterior pool shell exhibited comparatively noisier radar responses and several localised areas suggestive of minor subsurface washout or localised loss of support beneath the slab. While these responses appear relatively minor and may be typical of ageing aquatic infrastructure, targeted intrusive verification, such as core sampling, may be considered if further confirmation is required.

Overall, the investigation identified generally well-constructed, structurally consistent pool shell conditions across most of the facility. We identified several isolated areas with elevated dielectric response or anomalous reflections and will consider them for further targeted investigation as part of future maintenance or remediation planning.

Contents

Project Description

South-East Scanning was engaged by Warwick Indoor Recreation and Aquatic Centre (WIRAC) to undertake a non-destructive ground penetrating radar (GPR) investigation of the drained Olympic pool, children's pool, rapids pool, and associated suspended slab areas within the aquatic facility in Warwick, Queensland. The investigation was commissioned to assess the general condition of the pool shell structures and surrounding slabs, with particular focus on identifying potential subsurface anomalies, moisture ingress pathways, possible loss of support beneath the pool shell, reinforcement configuration, and areas potentially associated with observed movement or level variation within the facility.

The investigation used both high-frequency concrete scanning equipment and deeper-penetration GPR systems to assess the pool shell construction and underlying subsurface conditions at varying depths. The works included grid-based C-scan acquisition where site geometry permitted, as well as representative linear B-scan analysis in areas where curved pool geometry and indoor positioning constraints prevented full georeferenced grid collection. Attention was given to areas identified by the client as exhibiting historical movement, differential settlement, or suspected deterioration.

The findings of this investigation are intended to provide Warwick Indoor Recreation and Aquatic Centre with a non-destructive assessment of the current condition of the pool shell structures and surrounding slabs, while assisting in determining whether further intrusive verification or engineering assessment may be warranted in specific areas of interest identified during the survey.

Methodology

South-East Scanning undertook a non-destructive subsurface investigation of the Warwick Indoor Recreation and Aquatic Centre (WIRAC) aquatic structures using a combination of high-frequency concrete scanning and deeper penetration ground penetrating radar (GPR) systems. The investigation methodology was designed to assess both the shallow structural characteristics of the pool shell and the subsurface conditions beneath the slabs and in the surrounding interface zones.

High-frequency concrete scanning was carried out using an IDS C-Thrue GPR system to assess shallow reinforcement configuration, reinforcement cover depth, slab consistency, and localised anomalies within the upper pool shell structure. Grid-based scanning was generally performed with 250 × 250 mm scan intervals to generate high-resolution C-scan datasets and detailed reinforcement mapping across the surveyed areas.

A deeper-penetration GPR assessment was undertaken using a Leica DS4000 dual-frequency GPR system operating at 900 MHz and 200 MHz. The 900 MHz antenna configuration was utilised to assess intermediate slab conditions, reinforcement response, pipework, expansion joints, and localised dielectric variation within the upper portions of the structure. The 200 MHz antenna configuration was utilised to assess deeper subsurface conditions beneath the pool shell, including potential voiding, washout, moisture-affected materials, and inconsistencies in support conditions beneath the slab.

Grid-based C-scan acquisition was undertaken where site geometry and access conditions permitted. Due to the curved geometry of portions of the children's pool and the figure-eight geometry of the rapids pool, complete georeferenced grid acquisition was not achievable across all areas. In these locations, representative linear B-scan datasets were instead collected and analysed. Linear scan acquisition was undertaken at approximately 200 mm spacing within the rapids pool investigation areas to provide representative subsurface coverage across both the pool base and surrounding shell structures.

The investigation was conducted in an indoor environment where satellite positioning and RTK correction were unavailable. As such, datasets were interpreted using relative positioning and representative scan alignment rather than fully georeferenced acquisition. The use of total station positioning was considered unnecessary for the objectives and required level of assessment associated with this investigation.

Collected radar datasets were processed and interpreted using Geolitix software to generate depth slices, C-scan imagery, representative B-scans, reinforcement mapping, and comparative subsurface condition assessments. Interpretation focused on identifying changes in radar response characteristics, including elevated dielectric response, signal attenuation, anomalous reflections, inconsistent layer response, and noisy or disrupted radar signatures, which may indicate localised changes in material condition, moisture ingress, subsurface variability, or possible loss of support beneath the pool shell.

All findings presented within this report are based on non-destructive GPR interpretation and should be considered indicative of subsurface conditions only. GPR does not directly confirm material type, corrosion, or structural integrity, and where required, further intrusive verification, such as core sampling or engineering assessment, may be recommended to further characterise identified anomalies.

Site Conditions / Limitations

The investigation was undertaken while the aquatic facility was drained and undergoing maintenance and reinstatement works. At the time of inspection, the Olympic pool, children's pool, and rapids pool were accessible for non-destructive scanning; however, residual moisture within the pool shells and surrounding materials persisted due to the nature of the structure and the relatively recent draining of the pools. Residual moisture and saturated subsurface materials can influence radar signal behaviour and dielectric response characteristics throughout GPR datasets.

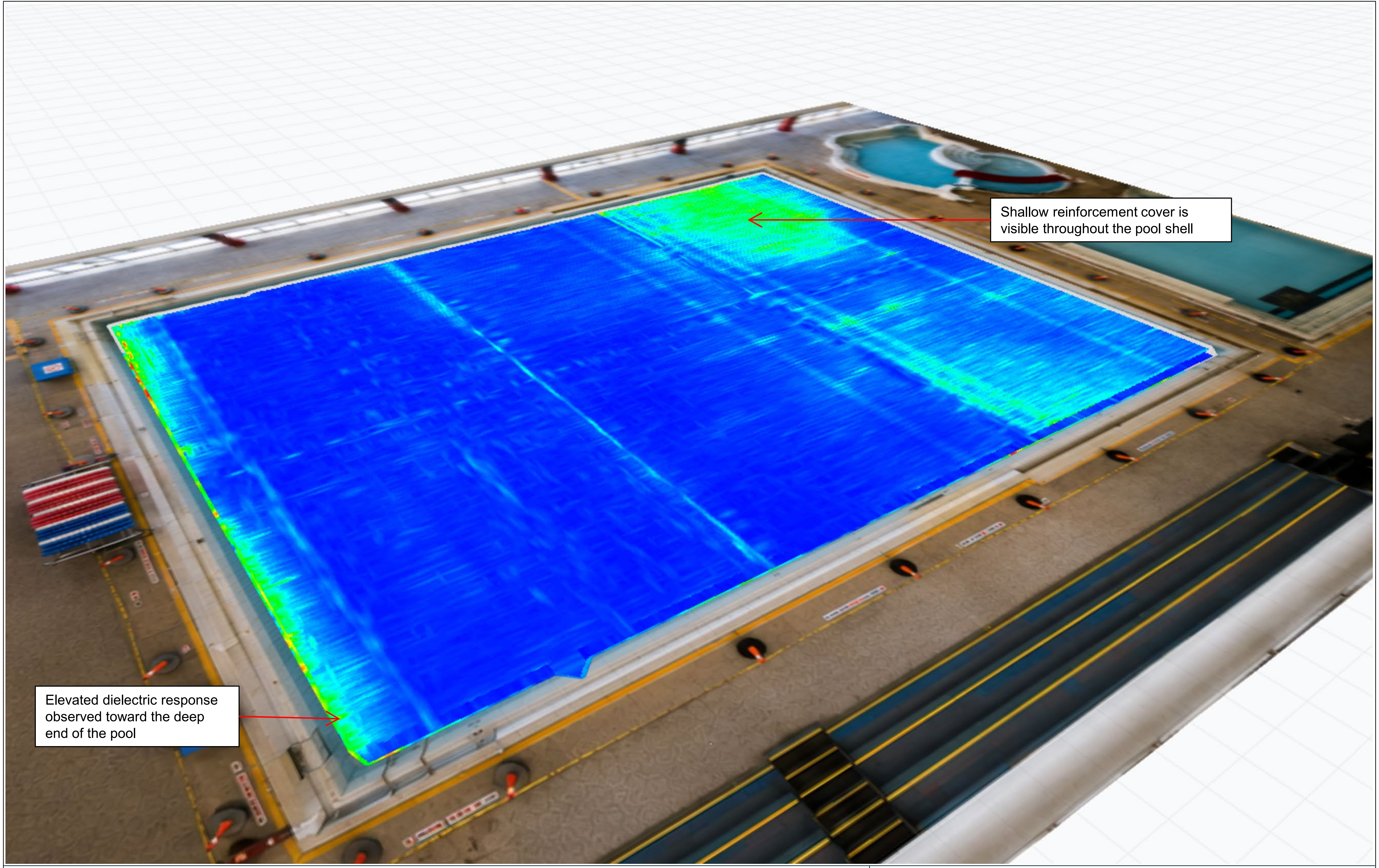
The investigation was conducted within an indoor aquatic facility where RTK correction and satellite positioning were unavailable. As a result, grid-based C-scan acquisition was limited to areas where manual positioning and regular scan geometry could be reliably maintained. Portions of the children's pool and rapids pool exhibited curved, irregular geometry that prevented the acquisition of a complete georeferenced grid. In these locations, representative linear B-scan datasets were instead collected and analysed. While these datasets are considered representative of the scanned areas, the lack of full georeferenced positioning limits the ability to generate continuous depth-slice imagery across irregular pool geometries.

Ground-penetrating radar is a non-destructive, interpretive investigation method that identifies changes in electromagnetic response within subsurface materials. Radar reflections may be influenced by factors including reinforcement density, moisture content, dielectric variation, embedded services, construction interfaces, changes in material composition, and subsurface geometry. Interpretation of anomalous radar responses is therefore inferential in nature and does not directly confirm the presence of voids, corrosion, delamination, or material deterioration without intrusive verification.

The presence of reinforcement in reinforced concrete structures can reduce radar penetration depth and cause signal scattering or attenuation in deeper datasets. Similarly, moisture-affected materials and conductive environments may reduce signal clarity and increase noise within portions of the radar response. Areas exhibiting noisy or disrupted radar signatures should therefore be interpreted as indicative of changing subsurface conditions rather than definitive evidence of structural failure.

The investigation did not include destructive testing, core sampling, hydrostatic testing, half-cell potential testing, laboratory analysis, or structural engineering certification. South-East Scanning has assessed the subsurface conditions only within the accessible scanned areas and makes no representation regarding the long-term structural performance of the aquatic facility.

Where anomalous radar responses or areas of increased signal variability have been identified within this report, further intrusive verification or engineering assessment may be recommended to further characterise underlying conditions.



Olympic Pool – Shallow Reinforcement and Upper Pool Shell Assessment

High-frequency 900 MHz GPR assessment of the Olympic pool shell revealed clear, consistent reinforcement reflections throughout the upper slab profile. Reinforcement cover appeared relatively shallow across the pool shell, with stronger dielectric reflections observed toward the deep end of the pool (left side of the dataset). These elevated reflections may indicate increased moisture retention, differing concrete properties, or localised changes in subsurface conditions; however, no evidence of significant voiding or major structural anomalies was identified within this depth range.

PROJECT:	WIRAC GPR and Structural Analysis
CLIENT:	Southern Downs Regional Council
ADDRESS:	29 Palmerin St, Warwick QLD 4370
TECHNICIAN:	A Waszaj, H Murray
DATE(S):	Wednesday, 6 May 2026
DRAWING:	1/11

Geolitix link: https://app.geolitix.com/e/1IC9ttFY

Reflection Amplitude

Weak Strong

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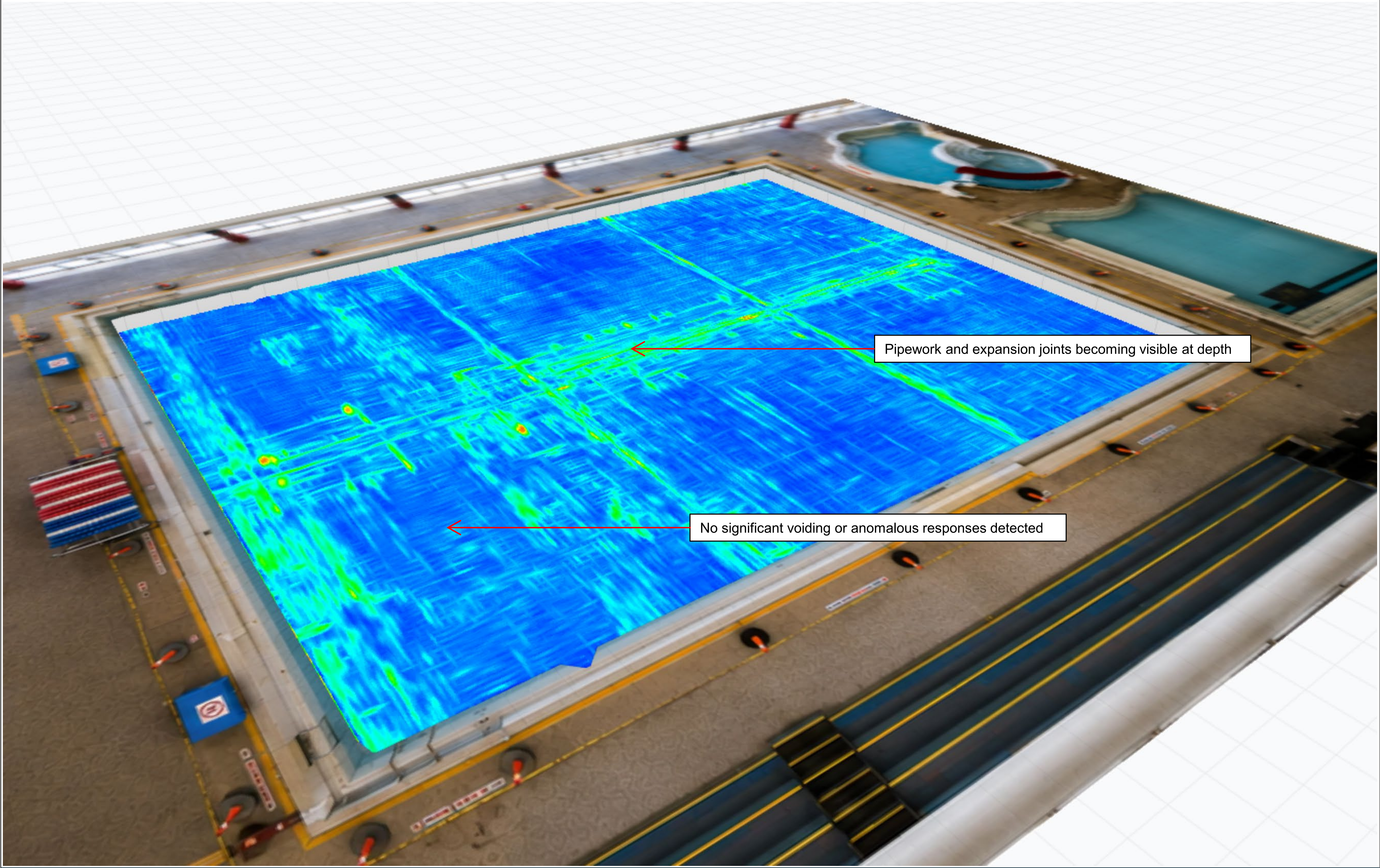

Olympic Pool – Intermediate Depth Assessment

The 900 MHz GPR assessment within the approximate 200–400 mm depth range identified generally consistent subsurface conditions beneath the Olympic pool shell. Pipework alignments and expansion joint features became increasingly visible at this depth interval. Minor reflective patches were observed locally; however, no significant voiding, anomalous subsurface responses, or major inconsistencies were identified within the dataset.

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Reflection Amplitude

Weak Strong

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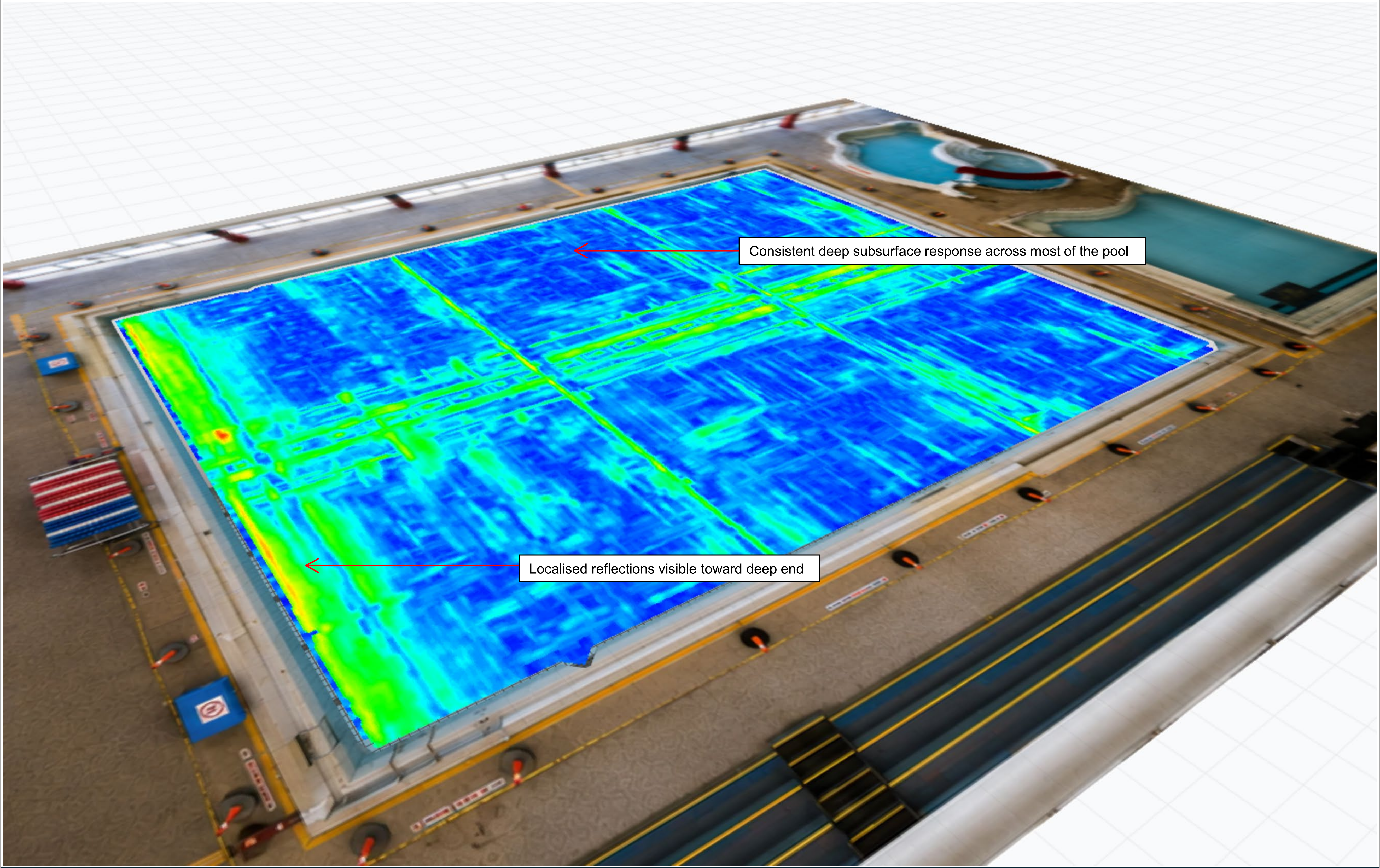

Olympic Pool – Deep Subsurface Assessment (500–600 mm)

The 200 MHz GPR assessment identified generally consistent subsurface conditions beneath the Olympic pool shell at greater depth. Pipework reflections remained visible throughout the dataset, while the deep end of the pool exhibited localised reflective responses that may indicate changes in subsurface material conditions or moisture content. No significant structural anomalies or widespread subsurface inconsistencies were identified.

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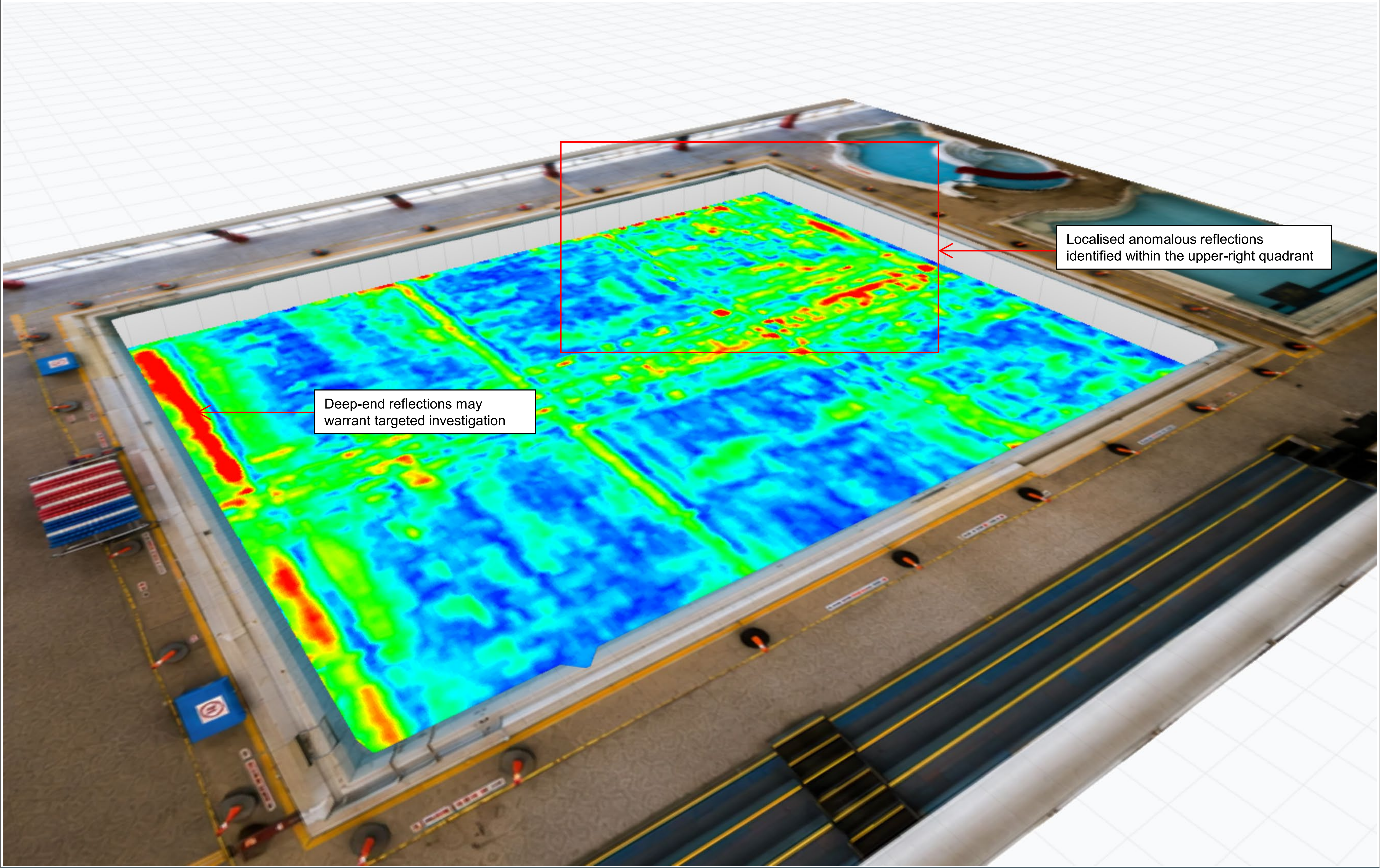
DRAWING:	3/11

Geolitix link: https://app.geolitix.com/e/1IC9ttFY

Reflection Amplitude
Weak — Strong



Olympic Pool – Deep Subsurface Assessment (600–1000 mm)

The deeper 200 MHz GPR assessment identified several localised anomalous reflections within the upper-right quadrant of the dataset, along with increased reflectivity beneath the deep end of the pool. These responses may warrant further targeted investigation to better characterise underlying conditions. Despite these localised areas, the overall dataset remained clear and relatively consistent, with no evidence of major voiding, widespread washout, or significant structural instability beneath the Olympic pool shell.

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Geolitix link: https://app.geolitix.com/e/1IC9ttFY

Reflection Amplitude
Weak — Strong

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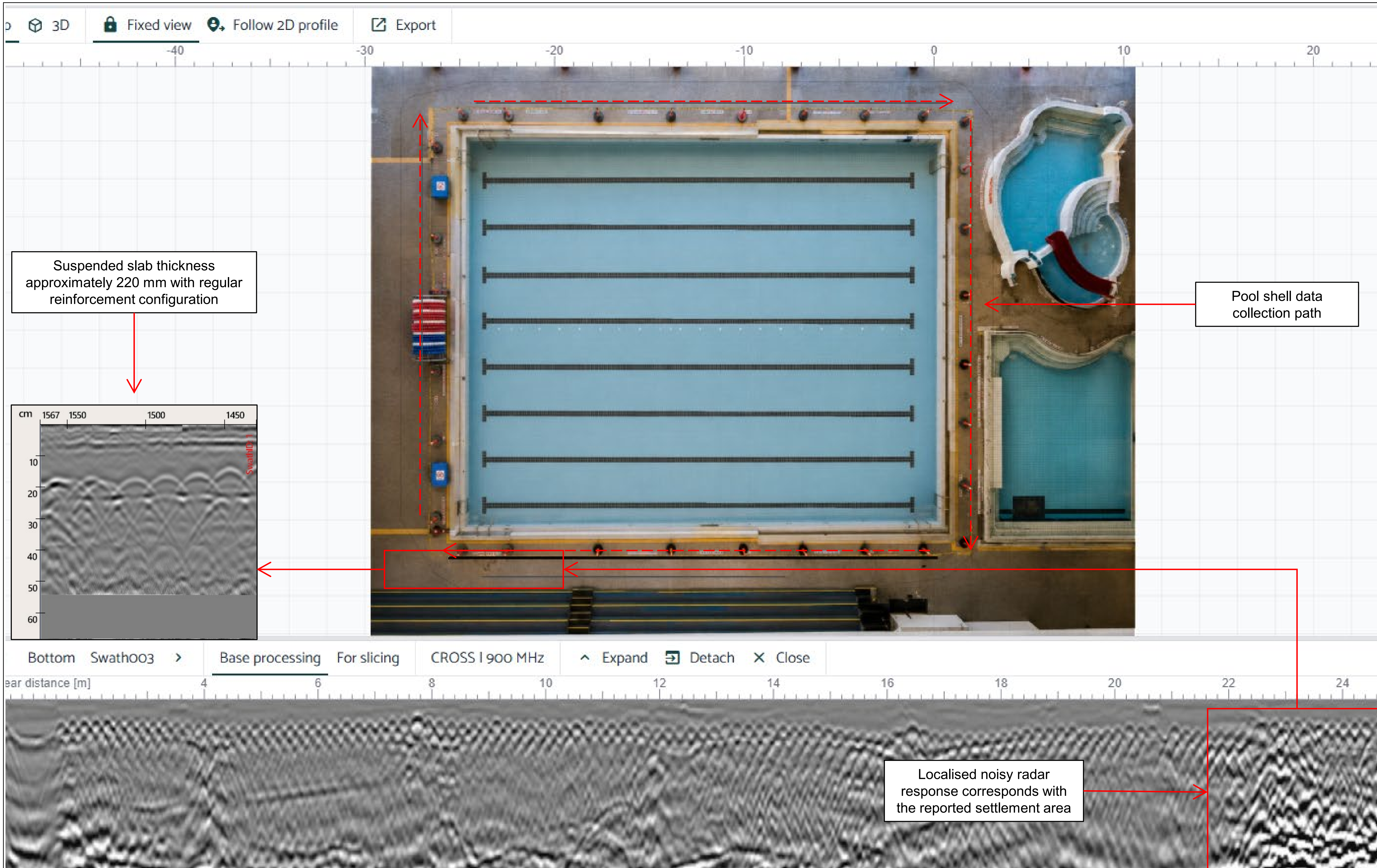

Olympic Pool Perimeter and Suspended Slab Assessment

GPR assessment along the perimeter of the Olympic pool identified generally consistent subsurface conditions across the majority of the dataset. However, a localised noisy radar response was identified toward the far-right section of the B-scan data, corresponding approximately with an area where historical settlement or level variation had reportedly been observed onsite. While the exact cause of this response cannot be confirmed using GPR alone, the localised increase in signal variability may warrant further targeted investigation.

The suspended slab dataset identified an approximate slab thickness of 220 mm, regular reinforcement, and estimated concrete cover depths of 150–175 mm. Reinforcement reflections appeared clear and consistent, with no significant anomalies identified.

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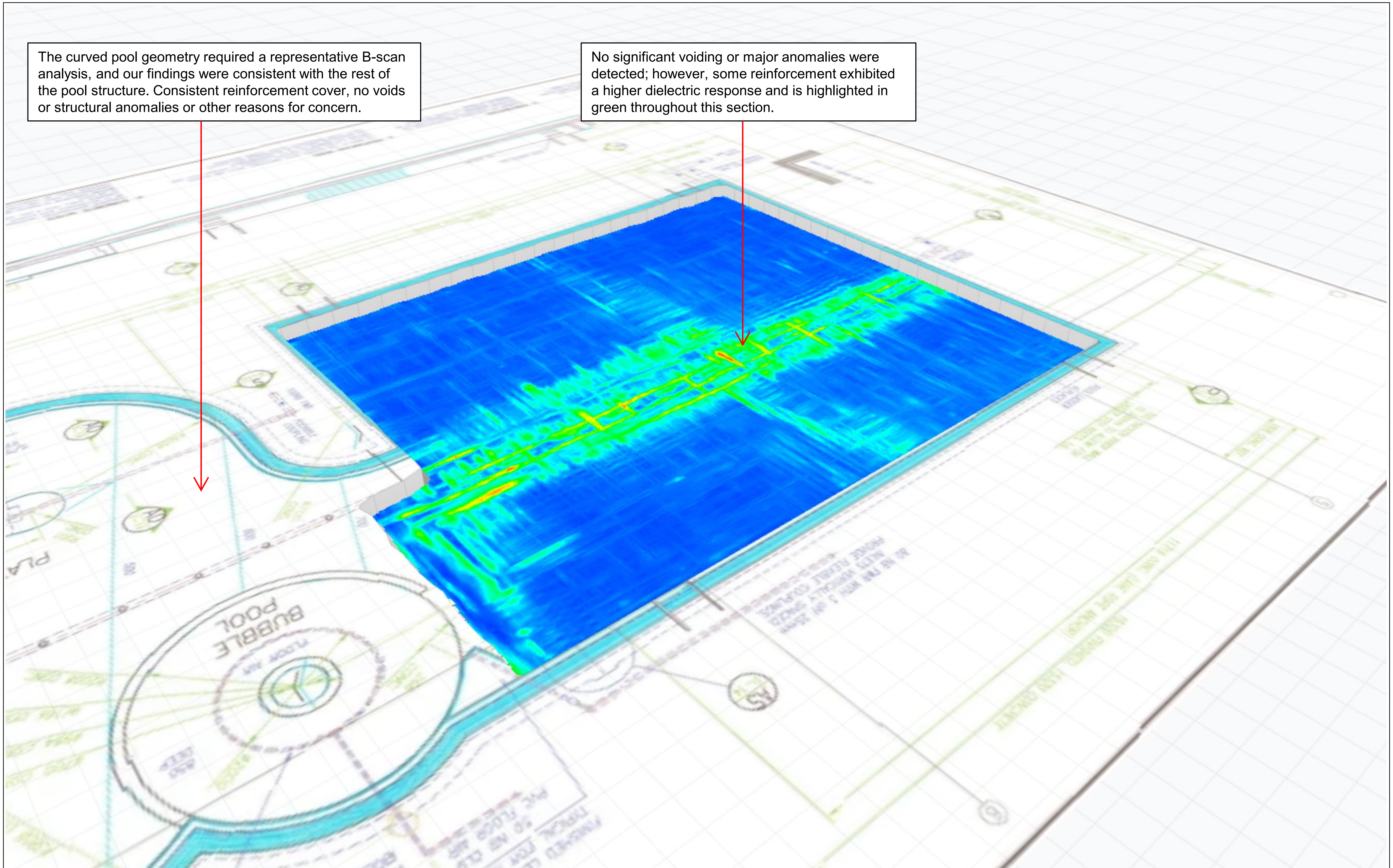
Geolitix link: https://app.geolitix.com/e/YNMY8fsW

Reflection Amplitude

Weak — Strong



Children's Pool – Pool Shell Assessment

High-frequency GPR assessment of the children's pool identified clear and consistent reinforcement reflections and a generally uniform pool shell response throughout the scanned area. Due to the curved geometry of portions of the pool shell, full grid-based C-scan acquisition was not achievable across all areas. In these locations, a representative 2D B-scan analysis was utilised instead. The B-scan datasets exhibited responses consistent with the C-scan results, indicating generally uniform construction conditions with no evidence of significant voiding or major anomalies. Some localised, elevated dielectric reflections associated with reinforcement were identified and may indicate minor moisture ingress or early-stage localised delamination.

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AUS CERTLOC CERTIFIED LOCATOR

Geolitix link: https://app.geolitix.com/e/1dPdeO8G

Reflection Amplitude

Weak — Strong

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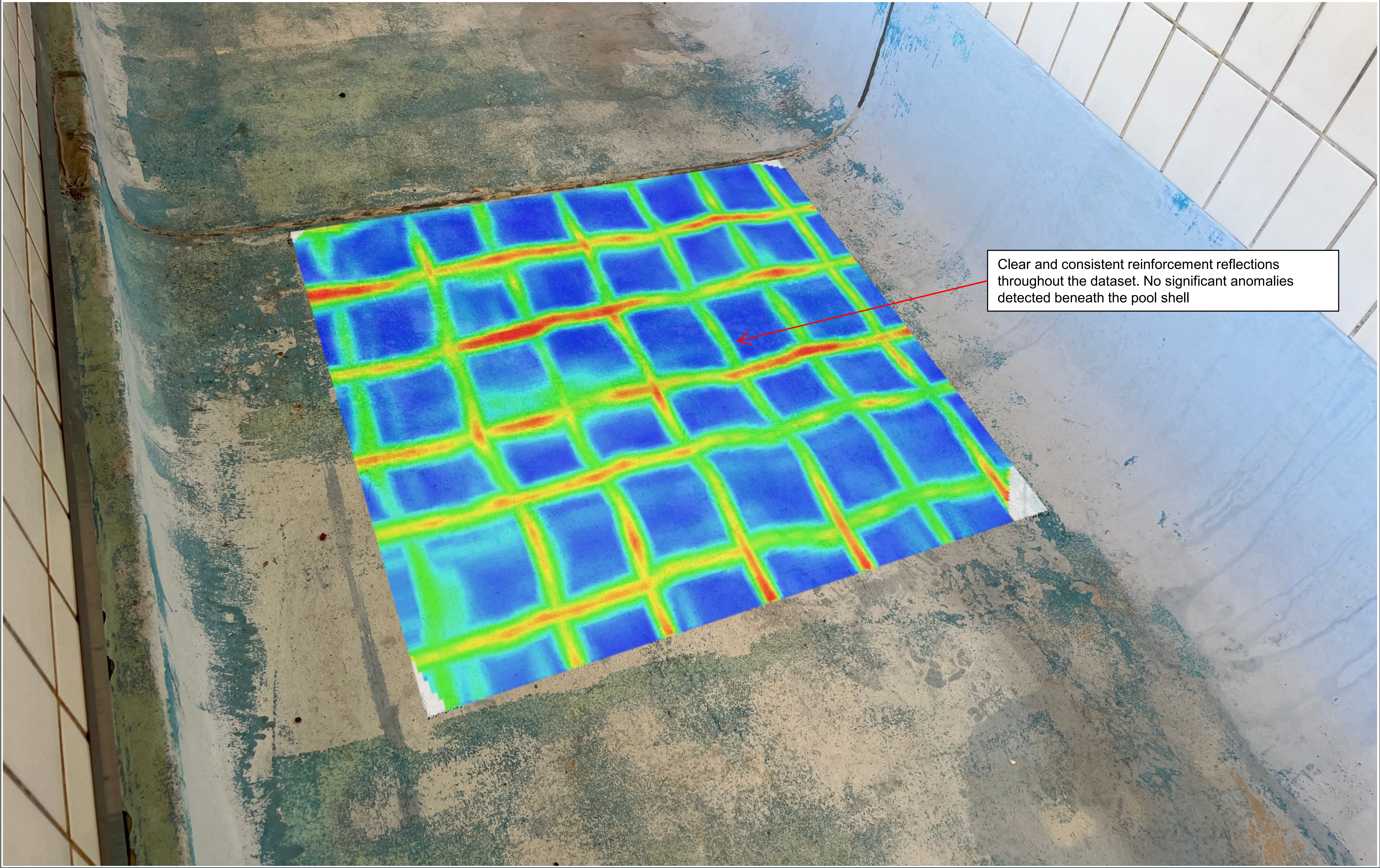

Rapid Pool – Base Slab Assessment

GPR assessment of the rapids pool base slab revealed clear, consistent reinforcement reflections throughout the surveyed area. The dataset demonstrated a generally uniform pool-shell response, with no evidence of significant voiding, washout, or structural anomalies beneath the slab. Overall data quality was considered strong and representative of consistent construction conditions.

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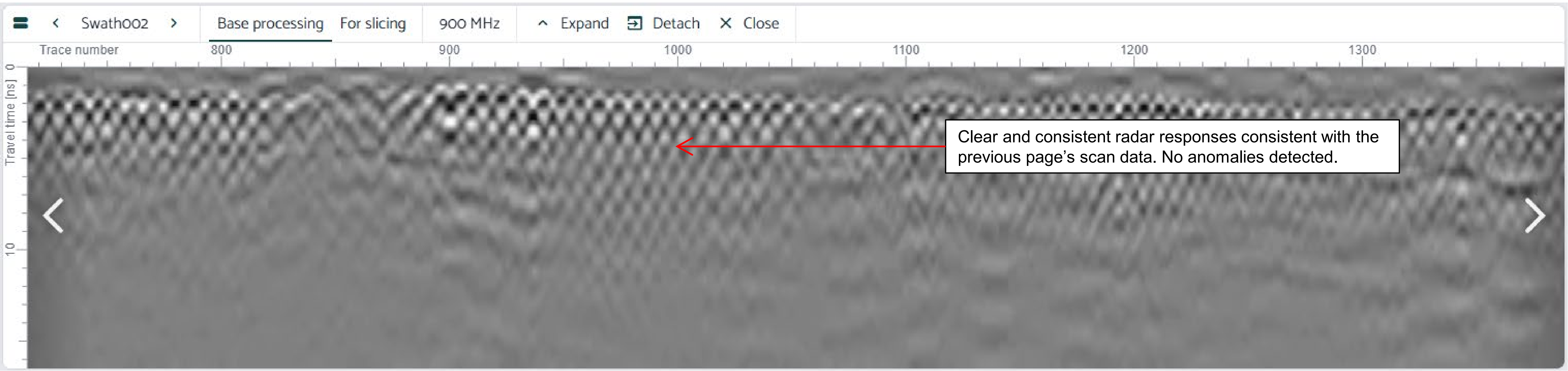
Geolitix link: https://app.geolitix.com/e/D0AQUW5i

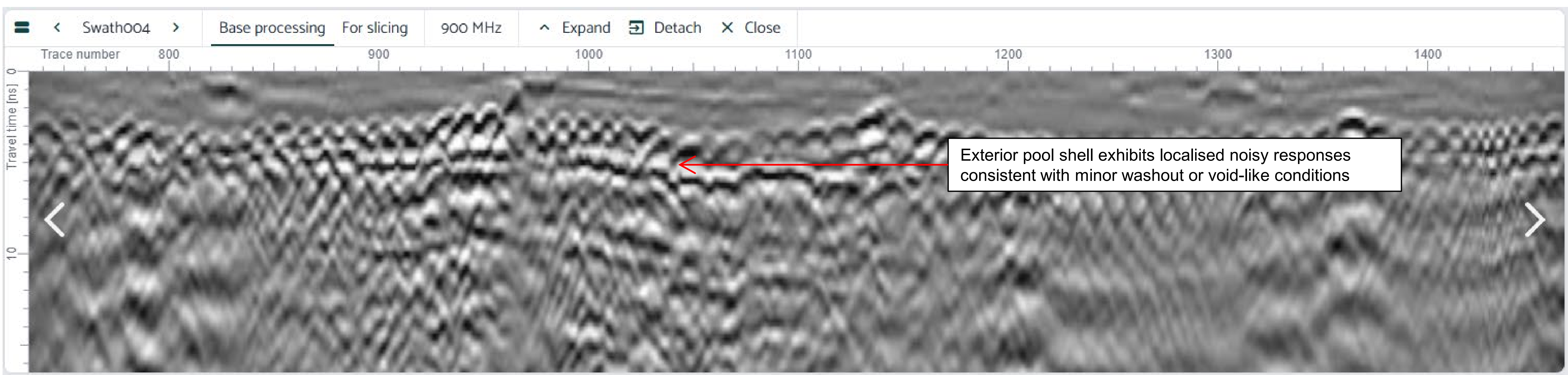
Reflection Amplitude
Weak — Strong

Rapids Pool: Representative B-scans utilised due to complex pool geometry

Rapids Pool – Slab Bottom (Swath 2 – Centre)

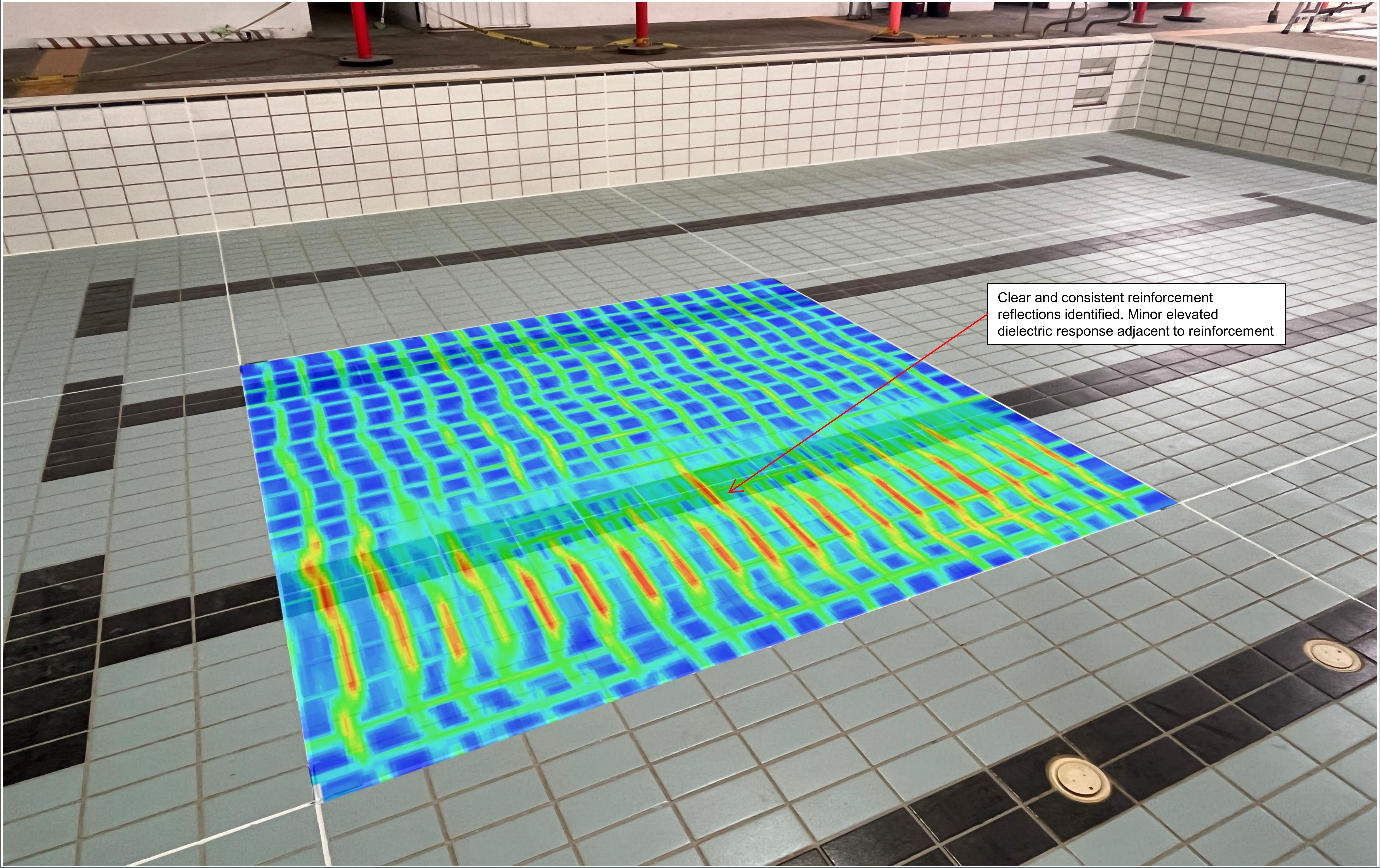


Rapids Pool – Pool Surrounding Slab (Swath 4)



Rapids Pool – Representative B-Scan Assessment

Due to the complex figure-eight geometry of the rapids pool and the lack of indoor positioning capability, full grid-based C-scan acquisition was not feasible in this area. Representative B-scan datasets were therefore collected across both the pool base and the exterior pool shell using linear-scan acquisition at approximately 200 mm spacing. The upper dataset, representing the pool base slab, showed clear, consistent reinforcement reflections with no evidence of significant voiding or anomalous subsurface conditions. The lower dataset, representing the exterior pool shell, exhibited a comparatively noisier radar response with several localised areas suggestive of minor subsurface washout or void-like conditions beneath the slab. While these responses appear relatively minor and may be typical of ageing aquatic structures, targeted intrusive verification, such as core sampling, may help further characterise these areas.



Kids Pool – Reinforcement Verification Scan

High-frequency IDS C-Thrue GPR assessment using a 250 × 250 mm scan grid identified clear and highly consistent reinforcement reflections throughout the pool shell. Reinforcement spacing and slab construction appeared regular and uniform, with no evidence of major structural anomalies. Some localised, elevated dielectric responses associated with reinforcement reflections were identified and may indicate minor moisture ingress or localised changes in the concrete condition adjacent to the reinforcement.

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Geolitix link: https://app.geolitix.com/e/qBmc987D

Reflection Amplitude
Weak — Strong

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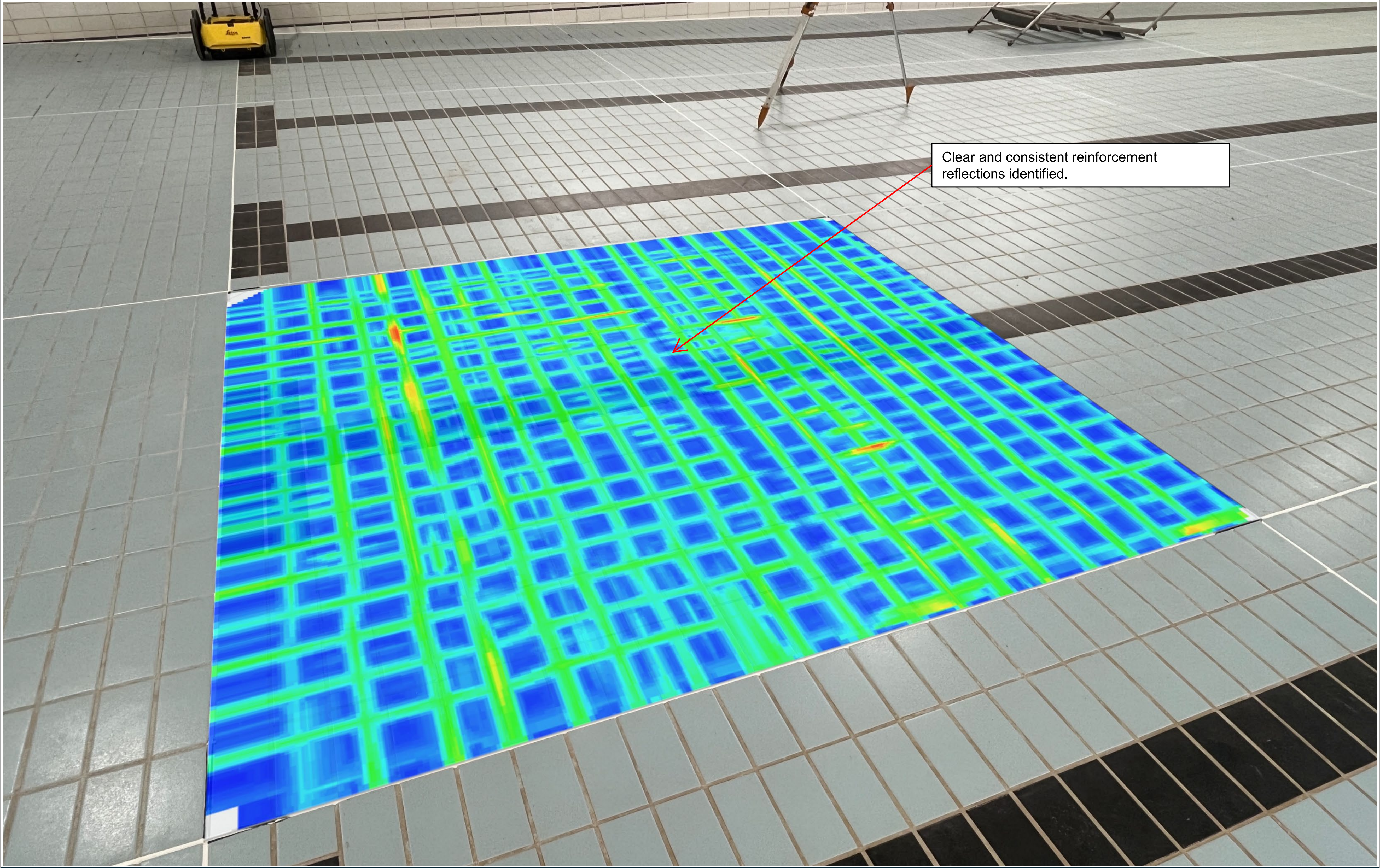

Olympic Pool – Reinforcement Verification Scan (Shallow End)

The IDS C-Thrue reinforcement assessment identified strong, repeatable reinforcement reflections throughout the scanned area, consistent with a well-constructed, relatively uniform pool shell. No evidence of significant discontinuities, voiding, or major structural irregularities was identified within the dataset. Localised dielectric variations associated with reinforcement were present but remained relatively minor.

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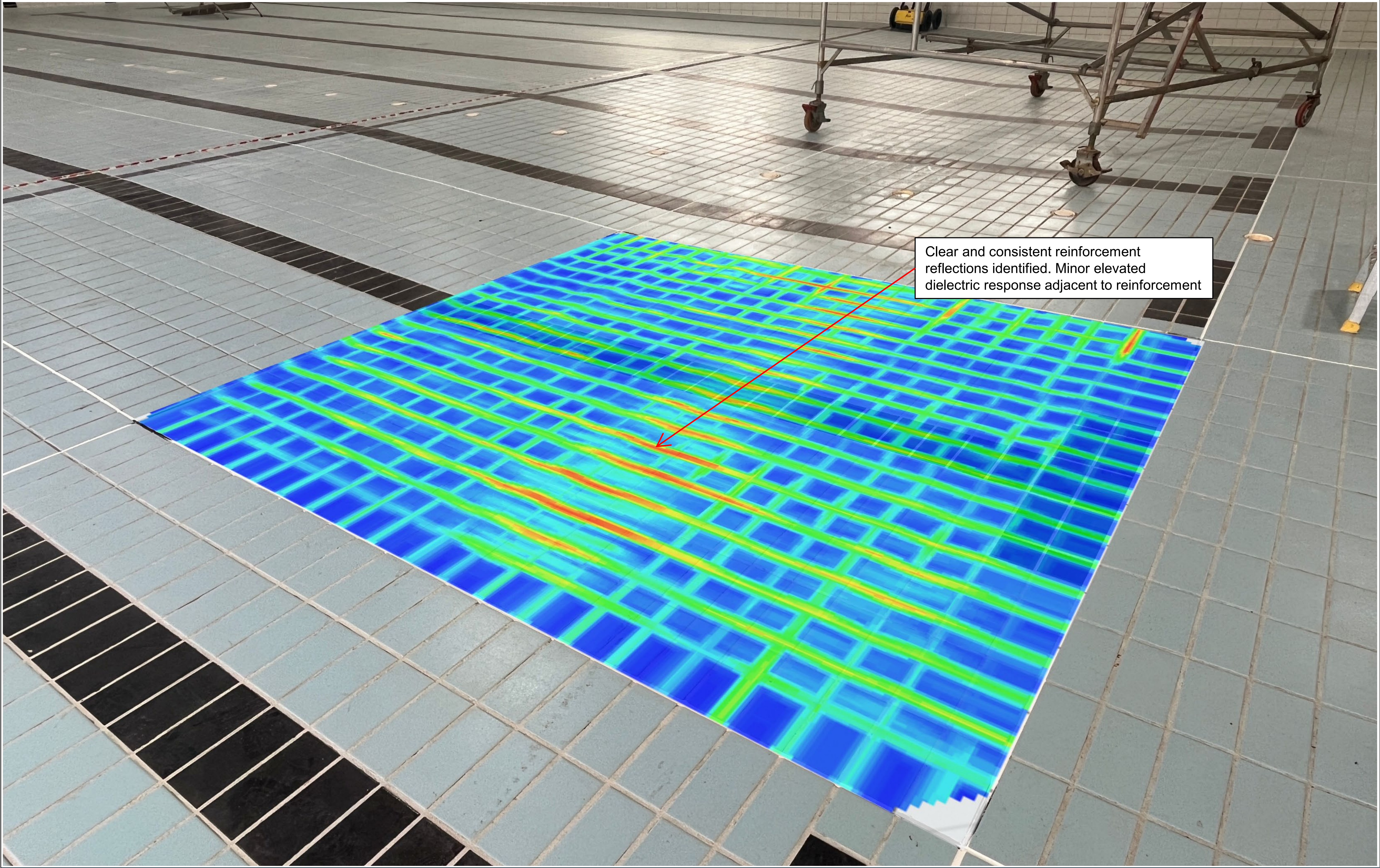
Geolitix link: https://app.geolitix.com/e/Dn8PQ7tb

Reflection Amplitude: Weak – Strong



Olympic Pool – Reinforcement Verification Scan 2 (Deep End)

Detailed reinforcement assessment using high-frequency concrete scanning identified highly coherent and consistent radar responses across the surveyed area. Reinforcement configuration and slab response appeared regular, with no major anomalies identified. Minor elevated dielectric responses associated with reinforcement may indicate localised moisture presence or early-stage material variability adjacent to reinforcement.

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Geolitix link: https://app.geolitix.com/e/iNITufp6

Reflection Amplitude
Weak — Strong

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Findings

Olympic Pool

1. The Olympic pool datasets generally exhibited clear, coherent, and repeatable radar responses throughout both shallow and deeper depth intervals. High-frequency concrete scanning identified a regular reinforcement configuration and relatively shallow reinforcement cover throughout the upper pool shell, with no evidence of significant discontinuities, major voiding, or large-scale structural anomalies in the shallow datasets. Minor elevated dielectric responses were observed toward the deep end of the pool and adjacent to isolated reinforcement zones. These responses may indicate localised moisture retention, changes in material properties, or early-stage localised deterioration; however, the responses remained relatively minor and were not considered indicative of widespread structural distress.
2. Intermediate-depth 900 MHz datasets identified generally consistent subsurface conditions beneath the Olympic pool shell, with pipework alignments and expansion joint features becoming increasingly visible at depth. Minor reflective patches were observed locally; however, no significant voiding, anomalous subsurface conditions, or major inconsistencies were identified within these datasets.
3. The deeper 200 MHz assessments identified generally consistent subsurface conditions beneath most of the Olympic pool slab. Localised anomalous reflections were identified toward portions of the deep end and within isolated areas of the upper-right quadrant of the dataset. While these responses may warrant further targeted investigation, the overall radar response remained comparatively coherent and consistent relative to typical ageing aquatic infrastructure datasets. No evidence of widespread washout, major support loss, or large subsurface voiding was identified beneath the Olympic pool shell.
4. Additional perimeter scanning identified a localised noisy radar response corresponding approximately with the area where historical level variation and settlement had reportedly been observed onsite. While the exact cause of this response cannot be confirmed using GPR alone, the increased signal variability within this localised zone may indicate changing subsurface conditions, localised moisture ingress, or possible variations in slab support beneath the perimeter slab. The suspended slab datasets adjacent to this area indicated a slab thickness of approximately 220 mm, regular reinforcement spacing, and estimated concrete cover depths of 150–175 mm. Reinforcement reflections within the suspended slab remained clear and consistent with no major anomalies identified.

Children’s Pool

1. The children’s pool datasets identified generally consistent conditions for pool shell construction throughout the surveyed area. High-frequency concrete scanning identified clear and repeatable reinforcement reflections, regular reinforcement spacing, and generally uniform radar responses across the accessible portions of the pool shell. No significant voiding, major anomalies, or widespread inconsistencies were identified within the collected datasets.
2. Due to the curved geometry of portions of the pool shell, complete grid-based C-scan acquisition was not achievable throughout all areas of the structure. Representative linear B-scan datasets were therefore collected and analysed within these curved sections. The representative B-scan responses were generally consistent with the broader C-scan datasets, indicating relatively uniform construction of the pool shell and no evidence of significant localised deterioration within the inaccessible curved zones.
3. Some localised, elevated dielectric responses adjacent to the reinforcement were identified in portions of the pool shell. These responses may indicate minor moisture ingress, localised material variability, or early-stage localised delamination adjacent to reinforcement; however, the overall datasets remained coherent and structurally consistent.

Rapids Pool

1. The rapids pool base slab datasets identified generally clear and consistent reinforcement reflections throughout the surveyed areas. High-frequency GPR responses demonstrated relatively uniform pool shell construction conditions with no evidence of significant voiding, major washout, or widespread structural anomalies beneath the base slab. Overall radar response quality throughout the primary slab areas was considered strong and representative of relatively consistent construction conditions.
2. Due to the complex figure-eight geometry of the rapids pool and the lack of indoor positioning capability, complete grid-based C-scan acquisition was not achievable throughout this area. Representative linear B-scan datasets were therefore collected across both the pool base slab and the exterior pool shell at approximately 200 mm spacing to provide representative subsurface coverage.
3. The representative B-scan datasets collected across the pool base slab exhibited clear and consistent reinforcement reflections with no evidence of significant anomalous subsurface conditions. In contrast, portions of the exterior pool shell datasets exhibited comparatively noisier radar responses with several localised areas suggestive of minor subsurface washout, localised support variability, or small void-like conditions beneath the slab. While these responses appear relatively limited in extent and may be typical of ageing aquatic infrastructure, the affected areas may warrant targeted intrusive verification, such as core sampling, should further characterisation be required.

Reinforcement Verification Scans

1. Additional high-frequency IDS C-Thrue reinforcement verification scans were undertaken across selected portions of the Olympic pool and children's pool structures. These datasets consistently identified strong, repeatable reinforcement reflections and relatively uniform reinforcement spacing throughout the scanned areas. No evidence of major reinforcement discontinuities, widespread delamination, or significant structural irregularities was identified within these datasets.
2. Several localised elevated dielectric responses adjacent to reinforcement reflections were identified throughout portions of the scanned structures. These responses may indicate minor localised moisture ingress or early-stage changes in material condition adjacent to reinforcement; however, the overall reinforcement datasets remained highly coherent and consistent throughout the facility.

Interpretation and Discussion

The GPR and concrete scanning datasets indicate that most aquatic facility structures are consistent, coherent, and well-formed, with no evidence of widespread subsurface instability, major voiding, or significant structural irregularity within the scanned areas. The Olympic pool, children's pool, rapids pool base slab, and selected suspended slab areas generally produced clear radar responses, repeatable reinforcement reflections, and consistent slab behaviour across most of the investigation area.

The Olympic pool appears to be the most structurally consistent of the surveyed pool structures. Shallow- and intermediate-depth datasets identified regular reinforcement and generally uniform pool-shell conditions, while the deeper 200 MHz datasets showed no evidence of widespread washout or large subsurface voiding beneath the pool shell. Localised reflective responses toward the deep end and within isolated deeper zones may indicate changes in subsurface material condition, moisture content, or construction interface behaviour. These responses do not, based on the available data, appear consistent with major structural failure, but they may warrant targeted verification if future intrusive testing is undertaken.

The localised noisy radar response identified along the Olympic pool perimeter is considered the most relevant finding in relation to the client's reported level variation. While GPR cannot directly determine whether the observed variation in level was caused by historical settlement, original construction tolerances, infiltration, or ground movement, the increased signal variability in this area suggests that subsurface conditions differ from those at the surrounding pool perimeter. This may be consistent with localised moisture ingress, changes in support conditions, or localised material variation beneath or adjacent to the pool shell. Further intrusive verification would be required to confirm the underlying cause.

The children's pool appears to be generally consistent in construction, with no evidence of significant voiding or major subsurface anomalies. Although curved geometry prevented full C-scan acquisition throughout all sections, the representative B-scan datasets were consistent with the broader C-scan results. This indicates that the curved portions of the pool shell are likely to exhibit structural and subsurface conditions like those in the scanned grid areas. Minor elevated dielectric responses adjacent to some reinforcement may indicate localised moisture presence or early-stage material variability, but these findings are limited and do not indicate widespread deterioration.

The rapids pool base slab also appears generally consistent, with clear reinforcement reflections and no evidence of significant anomalies beneath the main pool base. The exterior pool shell, however, produced comparatively noisier radar responses with several localised areas suggestive of minor subsurface washout, support variability, or small void-like conditions beneath the slab.

These responses appear localised and relatively minor, but they represent the clearest potential evidence of variability in support identified during the investigation. Given the geometry of the rapids pool and the likelihood of complex water movement around curved external interfaces, these areas would be suitable candidates for targeted intrusive verification if the client requires further confirmation.

The elevated dielectric responses observed adjacent to reinforcement in several high-frequency concrete scans may indicate minor moisture retention, localised material variability, or early-stage delamination. However, the reinforcement reflections themselves remained clear, strong, and repeatable, suggesting that the scanned reinforcement configuration is generally regular and coherent. The GPR data do not directly confirm reinforcement corrosion, or "concrete cancer," and no widespread radar response pattern was identified to suggest advanced deterioration throughout the scanned pool shells.

Overall, the data support the interpretation that the facility is generally performing as a coherent reinforced concrete aquatic structure, with isolated areas of potential concern rather than widespread structural distress. The main areas warranting further attention are the reported settlement zone along the Olympic pool perimeter, the deeper reflective responses toward the Olympic pool deep end, and the localised noisy responses beneath portions of the rapids pool exterior shell.

These findings should be treated as targeted areas for further investigation, monitoring, or intrusive verification rather than evidence of broad structural failure.

Geolitix Web Viewer for Further Discussion of Findings

Each A3 GPR data sheet in this report includes a direct link to an interactive Geolitix web viewer. These links allow the client to independently review the processed radar datasets, including depth slices, scan alignment, and representative B-scan data in a dynamic digital environment.

The Geolitix platform provides enhanced visualisation of the collected GPR data and allows for improved interpretation of subsurface conditions beyond the static report figures presented herein.

Recommendations

Based on the findings of this investigation, South-East Scanning recommends that the following be considered as part of future maintenance, monitoring, or remediation planning for the Warwick Indoor Recreation and Aquatic Centre aquatic structures:

- No widespread intrusive investigation is considered necessary across most of the Olympic pool, children's pool, or rapids pool base slab currently, as the collected datasets generally indicate consistent pool shell construction and relatively uniform subsurface conditions throughout the scanned areas.
- The localised perimeter zone adjacent to the reported settlement area at the Olympic pool should be considered for further targeted investigation should ongoing movement, cracking, drainage issues, or further level variation continue to be observed. Targeted intrusive verification, such as core sampling or localised excavation, may further characterise subsurface support conditions in this area.
- The deeper reflective responses identified toward portions of the Olympic pool deep end may warrant targeted intrusive verification if future remediation works or engineering assessment are planned within this area. While the responses do not currently indicate widespread instability, additional verification may help further characterise underlying material conditions.
- The localised noisy radar responses identified beneath portions of the rapids pool exterior shell are considered suitable candidates for targeted intrusive investigation, particularly if concerns regarding support loss, water ingress, or ongoing deterioration persist. Core sampling or limited verification works may help confirm whether localised washout or minor void-like conditions are present beneath the slab.
- Minor elevated dielectric responses identified adjacent to reinforcement throughout portions of the scanned structures may indicate localised moisture ingress or early-stage material variability. While no evidence of widespread deterioration in reinforcement was identified, continued monitoring of these areas during future maintenance works is recommended.
- If concerns regarding reinforcement corrosion or "concrete cancer" persist, supplementary corrosion-specific assessment methods such as half-cell potential testing, cover verification, or targeted destructive testing should be considered, as these conditions cannot be directly confirmed using GPR alone.
- Ongoing monitoring of the reported settlement-prone perimeter zones is recommended, particularly with respect to changes in surface levels, cracking, drainage behaviour, or water retention patterns. Should further movement be observed over time, a detailed structural engineering assessment and a formal level survey may help determine whether active movement is occurring.
- Existing waterproofing systems, perimeter joints, drainage interfaces, and overflow/gutter systems should continue to be maintained and monitored, as these interface zones are the most likely pathways for long-term moisture ingress and localised subgrade degradation within aquatic structures of this type.

Concluding Remarks

The findings presented in this report are based solely on non-destructive GPR interpretation and should be considered in conjunction with future maintenance observations, engineering review, and any intrusive verification works that may be undertaken. Overall, the investigation indicates that the aquatic structures are generally performing consistently, with isolated areas of interest identified for potential future assessment rather than evidence of widespread structural concern.

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

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