



# THOMAS BAGGS, BSc (Hons.)

Co-director - Stone Initiatives

## Laboratory Quality Manager

Consulting Geomaterials Scientist | Dimension Stone Specialist  
ASTM C18 Committee Member · NATA Compliant Quality Management

*"Expert consulting in failure investigation and risk mitigation for prominent architectural projects. I leverage deep expertise in mineral geoscience to provide scientific certainty in stone selection, ensuring longevity and protecting multi-million dollar construction investments." - Tom*

## contact.

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## professional profile.

Thomas Baggs is a Geomaterials Scientist with a First Class Honours geoscience degree from the University of Adelaide specializing in the forensic mineralogical analysis of dimension stone. He bridges the gap between geological science and high-end architectural execution, providing developers and architects with the technical certainty required for complex material selection and risk mitigation.

With almost 9 years experience at Stone Initiative, Tom has provided technical oversight for over 35 prominent architectural projects, ensuring that geomaterials are not only aesthetically durable, but also structurally fit for purpose. For a comprehensive list of all consulting engagements and technical projects, please see the *Forensic Failure Investigations Highlights* on page 3 & *Consultancy Engagement Highlights* on page 4.

*Outside of the lab and his consulting work, Tom is a competitive amateur triathlete and swimmer who believes a healthy lifestyle is the foundation of professional quality. He is also a keen outdoor enthusiast who enjoys the technical challenges of capturing the night sky and the simplicity of a weekend camping / hiking trip.*

## education.

### BACHELOR OF SCIENCE (MINERAL GEOSCIENCE)

First Class Honours

2014 – 2017

THE UNIVERSITY OF ADELAIDE

### SPECIALISATION (MAJORS):

Advanced Geology, Geophysics, and Applied Geology

#### Consulting & Testing Application:

Utilising mineralogical and scientific principles to conduct testing, petrological analysis & data analysis for geo-material assessment.

Find Tom on...



## professional certifications.

### QUALITY MANAGEMENT IN THE LABORATORY (NATA)

2022

*Expertise in maintaining ISO/IEC 17025 standards throughout the laboratory, ensuring all material testing for clients meets the highest international benchmarks for accuracy and confidence.*

### CERTIFICATE II IN CONSTRUCTION (WHITE CARD)

2017

*White card credentialed for any active construction site forensic investigations, inspections or visits as required.*

## affiliations.

### ASTM INTERNATIONAL | PARTICIPATING MEMBER | C18 (DIMENSION STONE) COMMITTEE

*General Interest Representative for Stone Initiatives*

*Active review, technical appraisal and voting member, contributing to the development and refinement of international standards for testing of natural stone.*

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## core expertise.

### STRATEGIC CONSULTING & RISK MITIGATION

*Expert Materials Consulting:* Providing strategic guidance on geomaterial selection and the development of bespoke testing frameworks to ensure long-term performance and mitigate risk in high-end construction.

*Project Leadership:* Managing large-scale testing projects and liaising with stakeholders to translate complex technical needs into actionable project requirements.

*Scientific Advisory:* Delivering high-level analysis of results, including fitness-for-purpose determinations and (where required) the design of secondary testing protocols to resolve material uncertainty.

### FORENSIC SCIENCE & PETROGRAPHY

*Failure Investigation:* Delivering forensic mineralogical analysis and petrographic assessments to diagnose the root causes of material instability and provide data-driven remediation strategies for complex architectural failures.

*Petrographic Examination:* Asbestiform mineral screening and detection and the evaluation of stone surface finishes to determine fitness for purpose. Utilising ancillary specialists and methods such as X-ray diffraction for additional confidence.

*Laboratory Testing Specialist:* Expert execution and oversight of physical material testing to ISO/IEC 17025 quality requirements, ensuring the highest confidence in comprehensive technical reporting.

### OPERATIONAL & QUALITY ASSURANCE

*Quality System Manager:* Overseeing the continuous development and improvement of laboratory Quality Management Systems (QMS); ensuring strict adherence to NATA standards for high-level confidence in results produced by the laboratory.

*IT Systems Manager:* Overseeing the development and improvement of Laboratory Information Management Systems (LIMS) and maintenance of the ITC infrastructure, to ensure data integrity, security and operational efficiency.

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## scientific contributions & research.

M. A. Williams, D. E. Kelsey, **T. Baggs**, M. Hand, K. L. Alessio, "Thorium distribution in the crust: Outcrop and grain-scale perspectives," *Lithos*, Volumes 320–321, Pages 222–235, 2018 (Peer-reviewed Journal Publication)

**T. Baggs.** "The behaviour of metamorphic apatite from mid-amphibolite to granulite facies metapelites and metapsammites: insights from the Stafford Member from the Arunta region, Australia" The University of Adelaide, 2017. (First Class Honours Thesis)

## industry publications & technical articles.

### **“WILL CRYSTALLINE SILICA CONCERNS SEE ENGINEERED STONE BANNED?”**

STONE INITIATIVES, 2023

*Scope & Impact:* Published prior to the 2024/25 Australian national bans; provided critical early-warning analysis on regulatory shifts and health risks, enabling clients to navigate complex compliance transitions and material de-risking.

### **“ASBESTOS IN DIMENSION STONE: THE DANGERS AND HOW TO MINIMISE RISK”**

STONE INITIATIVES, 2021

*Scope & Impact:* Established best practices for initial (first-step) screening and risk mitigation of high-consequence hazardous minerals in dimension stone. This article provides a critical safety framework for identifying Naturally Occurring Asbestos (NOA) during the procurement phase, protecting both workers and project stakeholders from long-term liability.

### **“USING PETROGRAPHY TO EVALUATE DIMENSION STONE”**

STONE INITIATIVES, 2023

*Scope & Impact:* Simplified complex mineralogical concepts for architectural audiences, demonstrating how petrographic analysis may be utilised to help fore-see potential structural risks or failures, before they happen.

### **“MAGNIFIED IMAGES OF STONE: WHAT’S INSIDE?”**

STONE INITIATIVES, 2024

*Scope & Impact:* Focused on some of the common visual and structural characteristics of geomaterials at a microscopic level, and how these analyses may be used to assist in high-end evaluation of natural stone materials.

### **“TECHNICAL INFORMATION SHEET: ASBESTOS IN NATURAL STONE PRODUCTS”**

ASBESTOS SAFETY AND ERADICATION AGENCY (ASEA), 2023

*Role:* Technical Contributor & Review

*Scope & Impact:* Provided technical drafting and expert mineralogical input to Government agencies regarding the identification and management of naturally occurring asbestos (NOA) in imported and domestic stone. This document serves as the primary safety guide for the Australian stone industry and border force compliance.

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## forensic failure investigation highlights.

*Due to the sensitive nature of expert witness investigations, specific project names are withheld. The following represents a selection of complex diagnostic engagements (2017 – 2026).*

*Note: A comprehensive list of 30+ confidential forensic investigations and failure analyses is available upon request.*

### **MINERALOGICAL & CHEMICAL ANALYSIS (XRD/PETROGRAPHY)**

#### **OXIDATION & ‘RUST’ DIAGNOSTICS:**

Was responsible for multiple investigations into orange/yellow discolouration in granite and limestone installations (typically installed around pools and facades). Applied x-ray diffraction (XRD), petrographic, microscopic and moisture exposure techniques to distinguish between natural mineral oxidation (iron-bearing minerals) and external contaminants.

#### **EFFLORESCENCE & STAINING FORENSICS:**

Analyzed repeated efflorescence in situations from high-end residential driveways to commercial CBD lobbies. Collected XRD scrapings and Total Dissolved Solids (TDS) analyses to identify the likely source of soluble salts (from grout, substrate, or external source) and formulated successful remediation trials for the clients.

#### **MINERAL INCLUSION V STRUCTURAL CRACKING:**

Engaged as a technical expert in a luxury stone installation dispute to microscopically differentiate between natural inclusions and structural fractures (cracks), providing the scientific basis for determining liability for remediation.

## **MOISTURE DYNAMICS & DURABILITY TESTING**

### **HERITAGE BUILDING DAMP INVESTIGATIONS:**

Conducted and assisted with comprehensive moisture surveys and forensic audits of heritage schools and maritime museums. Analysed the intersection of rising damp, salt attack, and timber/stone decay to guide restoration strategies

### **SPALLING & PITTING ANALYSIS:**

Investigated "peeling" and surface decay in various limestones in luxury installations installed at coastal environments or surrounding pools. Customised durability tests (sealed vs. unsealed conditions) to provide scientific guidance for arbitration.

### **DIMENSIONAL STABILITY (WARPING/CURLING):**

Diagnosed root causes of warping and subsequent cracking in bluestone and limestone tiles, attributing failure to thermal expansion and moisture-related curling through dimensional stability testing.

## **OPERATIONAL & INSTALLATION FAILURE AUDITS**

### **LARGE-SCALE CONDITION SURVEYS:**

Managed a condition survey of over 30,000 tiles in a high-end shopping precinct. Developed a trend-analysis strategy to categorize failure types and guide asset management.

### **ADHESION & 'DRUMMINESS' INVESTIGATIONS:**

Led on-site forensic audits for luxury residential properties exhibiting severe 'drumminess' (debonding) in large-format porcelain tiles, providing objective comparisons against Australian Standards for installation.

### **PEDESTAL/POD SYSTEM FAILURES:**

Designed custom test methods based on withdrawn Australian standards to investigate rupture and failure in stone and porcelain tiles installed on pedestal systems - a methodology now used for pre-emptive risk testing.

## **SPECIALIST WET AREA & POOL FORENSICS**

### **GLASS MOSAIC & POOL TILE DEBONDING AND CRAZING:**

Led laboratory investigations into the cracking, debonding and staining of glass mosaic pool tiles, utilizing permeability and microscopic analysis to determine the role of pool chemistry vs. manufacturing defects.

### **GROUT & ADHESIVE EXPANSION:**

Investigated expansive grout issues in aquatic facilities using TDS and XRD to determine chemical incompatibility or construction residue.

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## **consultancy engagement highlights.**

### **LUXURY RESIDENTIAL & MIXED-USE HIGH-RISES**

#### **ONE CIRCULAR QUAY & ONE SYDNEY HARBOUR, SYDNEY**

Evaluation of premium stone for flooring, benchtops, and vanities.

#### **CROWN RESORTS, SYDNEY**

Extensive testing of stone finishes for public areas and luxury apartments.

#### **JEWEL, GOLD COAST**

Petrographic analysis and testing of stone for a three-tower 5-star hotel/residential development.

#### **AIRA RESIDENCE, KUALA LUMPUR**

International consultation on stone finishes for luxury apartments.

#### **WEST SIDE PLACE, MELBOURNE**

Quality assurance for external stone facades (Ritz-Carlton).

## **HEALTHCARE & RESEARCH FACILITIES**

### **QUEEN ELIZABETH HOSPITAL REDEVELOPMENT, ADELAIDE**

Overseeing an extensive concrete moisture and slip resistance testing programme.

### **AUSTRALIAN BRAGG CENTRE, ADELAIDE**

Slip resistance testing for a major biomedical research hub.

### **WESTMEAD HOSPITAL REDEVELOPMENT, SYDNEY**

Specialized petrographic analysis and risk assessment of limestone cladding/soffits.

## **COMMERCIAL & HERITAGE OFFICE UPGRADES**

### **205 NORTH QUAY, BRISBANE**

Physical property testing of granite dimension stone for a 38-storey tower.

### **80 COLLINS ST, MELBOURNE**

Evaluation of stone types for lobby refurbishments and facades.

### **ADELAIDE GPO BUILDING**

Slip resistance testing for new flooring finishes.

### **469 LATROBE ST, MELBOURNE**

Evaluation of stone types for lobby refurbishments and facades.

### **1 CASTLEREAGH STREET, SYDNEY**

Evaluation of limestone, granite, and trachyte for cladding.

## **PUBLIC INFRASTRUCTURE & TRANSPORT**

### **METRO TUNNEL PROJECT, MELBOURNE**

Petrographic analysis and mineral content testing for underground station finishes.

### **BRISBANE METRO PROJECT**

Testing the suitability of recycled "Brisbane Tuff" stone for blended paving.

### **PRINCES BRIDGE, MELBOURNE**

Petrographic analysis of heritage bluestone (basalt) for restoration.

### **SOUTH EASTERN FREEWAY & NORTH-SOUTH MOTORWAY**

Skid resistance testing for high-traffic bitumen and pedestrian areas.

## **PUBLIC SPACES & RETAIL**

### **ADELAIDE FESTIVAL SQUARE & GAWLER PLACE**

Evaluation of stone pavers and site-wide slip resistance testing.

### **QUEENS WHARF, BRISBANE**

Testing stone finishes for a major entertainment precinct.

### **PITT ST TIFFANY STORE, SYDNEY**

Specialized evaluation of architecturally designed external cladding.

### **ADELAIDE OVAL**

Stadium-wide slip resistance testing and safety consultation.

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**Expertise inquiries** for project-specific consulting, investigation requests, or to discuss the application of test standards to your current development, please contact Tom Baggs directly.