



## David Willows Curriculum Vitae

### PRINCIPAL GEOTECHNICAL ENGINEER

#### SUMMARY OF EXPERIENCE

##### August 2015 to Present

Alliance Geotechnical Pty Ltd  
Principal Geotechnical Engineer

Responsibilities include management of projects and staff resources, consultations and client relations, marketing, scope, budgets, site inspections, geotechnical investigations, land stability risk assessments, analysis, reporting, geotechnical input for structural design and construction review.

##### March 2002 to July 2015

Shirley Consulting Engineers Pty Ltd  
Senior Associate

Responsibilities included project management, scope, resources, budgets, contracts, staff supervision & mentoring, client relations, marketing and sourcing new work opportunities. Consulting, geotechnical investigations, land stability risk assessments, forensic engineering, analysis, reporting and remedial works design.

#### QUALIFICATIONS & AFFILIATIONS

- 2002 BE (Hons.) - Bachelor of Engineering (Civil), University of Newcastle
- 2003 "Earth Dynamics, Materials & the Environment" (Distinction), Macquarie University
- 2004 Accredited Slope Stability Assessor, RTA Slope Guide Version 3.1  
Occupational Health & Safety General Induction, WorkCover NSW
- 2005 "Human Resources Management" (Credit) - Deakin University, VIC  
Senior First Aid, St John Ambulance Australia (Certificate 908818, ID 268211)
- 2007 CPEng (Civil) - Chartered Professional Engineer  
MIEAust - Engineers Australia (2417109)  
NPER - National Professional Engineers Register
- 2011 Australian Geomechanics Society (AGS) - Corporate Member
- 2012 RPEQ (11969) - Registered Professional Engineer of Queensland  
Member - Civil & Structural Panel (Sydney Division)
- 2013 Associate Member - College of Investigative and Remedial Consulting Engineers of Australia (CIRCEA)
- 2014 Deputy Chair - Civil & Structural Panel (Engineers Australia - Sydney Division)  
Presentation to Engineers Australia – "Risk Management for Development of Former Quarry Sites"
- 2015 Chair - Civil & Structural Panel (Engineers Australia - Sydney Division)
- 2016 The Hills Shire Council – Member of Independent Expert Geotechnical Review Panel  
Rail Infrastructure Industry Worker training certificate (safely access the rail corridor)  
Board Member - College of Investigative and Remedial Consulting Engineers of Australia (CIRCEA)
- 2017 Presentation to non-technical audience on "AS2870 – Residential Slabs and Footings"

## PROFESSIONAL BACKGROUND & EXPERIENCE

### Geotechnical & Ground Engineering

- landslide risk management, hillside building and subdivisions
- peer review of geotechnical reports
- excavation support, retaining structures, anchors and rock bolts
- hazard mapping and coastline cliff recession

### Forensic & Remedial Works Engineering

- investigations to assess failed and damaged structures
- remedial works consulting services and design advice
- Council orders and technical assistance with dispute resolution

### Civil Engineering

- subsoil and surface drainage
- earthworks and access driveways
- construction review

## SELECTED EXPERIENCE BY EXPERTISE

### 1. Geotechnical and Ground Engineering

#### a) Landslide Risk Management, Hillside Building and Subdivisions

Review of geotechnical reports for proposed subdivisions and residential developments in Castle Hill, Dural and West Pennant Hills, appointed as member of the Hills Shire Council's Independent Geotechnical Review Panel.

Land stability awareness seminars to the Gosford City Council, including the preparation and presentation of lectures, workshop and a field excursion, to develop Council's awareness of the landslide risk management process and geotechnical reports.

Advice to Gosford City Council and preparation of updated text for Council's DCP 163 "Geotechnical Reports for Development Applications".

Many projects involving the identification of stability hazards and advice on landslide risk management, for hillside building developments, difficult access areas and sites in close proximity to sensitive structures. Regularly applies the Landslide Risk Management practice note guidelines, published by the Australian Geomechanics Society (AGS).

Reports, drawings, technical specifications and consultations with Gosford Council in relation to planning of risk reduction works along the road into Pearl Beach, including cliff face scaling, rock bolting, sprayed concrete, drain lining, road re-alignment, etc.

Identification of land stability hazards and potential risks to property, for proposed developments at Castle Hill, West Pennant Hills, Roseville, Alexandria, Queens Park, Forestville, Warriewood, Newport, Elanora Heights, Bayview and Palm Beach.

Site investigations and risk assessment of proposed 5-lot subdivision on sloping land in Castle Hill.

Risk assessment of cliff stability hazards & potential rock falls at Bardwell Valley, Earlwood, Bellevue Hill, Bilgola Beach and Forestville.

Risk management inspections, computer modelling analysis and recommendations to maintain the global stability of benched excavations in large open pit for infrastructure construction at Marsden Park.

Design and construction advice of rock fall netting, rock bolts, catch fences and drainage for cliff stabilisation works at Woy Woy, Tempe and Bellevue Hill.

Risk assessment of illegal excavation at Somersby, geotechnical advice and engineering design drawings to manage the risks and resolve the Council order.

Risk assessment calculations & design of risk reduction / stabilisation works for Cockatoo Island.

Drilling investigation, soil sampling and laboratory testing of a soft and inadequate building foundation for a large subdivision and residential housing at Westleigh.

Drilling investigation & geotechnical advice on the foundation conditions and deep screw pile footing design for the development of a rural fire station on a swamp site at Brooklyn.

Geotechnical reports for proposed subdivisions & building developments at Avoca Beach, Cabbage Tree Harbour, Terrigal, Gunderman, Northwood, Elanora Heights, Palm Beach, Hornsby Heights, Newport, Queenscliff, Darling Point and Castle Hill.

#### **b) Coastline Cliff Recession and Hazard Mapping**

Extensive coastline cliff stability and hazard study along the Wyong Shire Council coastline, to identify the coastline recession models that apply to the rock bluffs, based on geology, historical records and existing recession patterns. The output from this study was the publication of a series of geotechnical hazard maps for use in the Council's land zoning and Development Control Plan.

Assessment of slope stability and geotechnical hazards at Cabbage Tree Harbour, including the investigation, design and specification of coastal erosion control & drainage systems.

Inspection and geotechnical report for proposed residential development, adjacent to the coastline in Palm Beach.

Investigation of Warringah Council coastline from South Curl Curl to Collaroy, and provision of geotechnical & civil engineering advice in relation to the coastal walkway development and the various hazards for construction in the coastal environment.

#### **c) Excavation Support, Retaining Structures, Anchors and Rock Bolts**

Specialist design input for the rock anchors to be used in a pile & shotcrete wall excavation support system, for a basement construction in Wentworthville. Interaction with structural engineers to incorporate the anchors into the structural design drawings.

Review excavations for lift shaft at Cremorne and recommendations for the design and installation of rock bolts.

Preparation of technical manual for plate anchors to be used for structure tie-downs, including load capacity tables, installation & testing specification, drawings and charts.

Wallap analysis and post-failure calculations for a contiguous pile & ground anchor failure on a deep sand site in Alexandria.

Advice on rock bolts to stabilise loose boulders on residential properties at Queenscliff, Lindfield and Woy Woy.

Peer review of proposed rock anchor and shotcrete stabilisation works at Tempe, and recommended changes to the design and specification.

Subsurface investigation, soil anchor, subsoil drainage and sprayed concrete design for a temporary basement excavation support system (to a height of 6 metres) and high-rise commercial building at West Gosford, with inspections and construction advice to verify compliance with the design.

Review effect of settlement on the performance of a reinforced soil wall at Glebe, inspection of the condition of the plastic geogrids, organisation of regular surveys, risk assessment and advice on the compromised structure.

## **2. Forensic & Remedial Works Engineering**

Experienced with investigating and assessing physical evidence, raw data, maps, drawings, reports, etc. to determine the likely cause of damage to a variety of ground structures, identify remedial works options, prepare engineering designs, drawings & specifications and undertake construction review.

Prepared expert reports for court and mediation purposes in relation to civil engineering failures and Council orders on damaged structures. Worked in a team environment with other expert engineers and legal professionals. Forensic investigations require a disciplined, systematic approach and careful documentation.

### **a) Investigations of Failed and Damaged Structures**

Investigations of damaged and failed commercial unit buildings, houses, slabs, footings, retaining walls, anchors, excavation support, drainage, underground services, etc.

Investigations and remedial works advice at Dawes Point, Middle Cove, Darling Point, Blacktown, Wollstonecraft, Cromer, Collaroy, Wahroonga, Lindfield, Roseville, Chatswood, Ashfield, Glebe, Stanmore, Redfern, Bondi, Beecroft, Castle Hill, Rouse Hill, Ambarvale, Dangar Island, Pearl Beach, Niagara Park, Wyoming, Daleys Point, Terrigal, Ourimbah, Toowoomb Bay, Wyongah, Morisset, Valentine, Ulmarra and Safety Beach (VIC).

### **b) Remedial Works Design**

Landslide investigation and remedial works design at Tumut, Bilgola Beach, Middle Cove, Wahroonga, Cabbage Tree Harbour and Umina.

Design of a gabion retaining wall for Wyong Council to stabilise a sewer trench and slope area damaged by a landslide at Wyongah, with inspections and construction advice.

Subsurface drilling investigation and design of stabilisation works to a sandstone block wall in Collaroy, using anchors, mesh, drainage and sprayed concrete.

Retaining walls at Dawes Point, Cromer, Darling Point, Daleys Point and Woy Woy. House cracking & cosmetic remedial works at Lindfield, Chatswood, Blacktown and Roseville.

### **c) Expert Reports and Consulting Services**

Expert reports and advice on a concrete block wall failure at Daleys Point, including causation, remedial works options, safety issues and construction repair costs.

Expert advice in relation to a Council order to stabilise a retaining wall across multiple properties at Darling Point, with extensive engineering, boundary & land title issues.

Expert report on proposed stabilisation works to a detached boulder on a property at Lindfield, with engineering advice on preferred alternative works to reduce the site risks.

Expert report on the causes of settlement damage and cracking to a residential dwelling at Lugarno, following adjacent property construction works.

Preliminary assessment and advice to solicitors, loss adjusters and insurers on the cause(s) of failed / damaged structures at Belmore, Fairlight and Pennant Hills.

Investigations, risk assessment & risk reduction advice on an unstable former quarry cliff face, affecting multiple properties and adjacent to a residential unit building at Undercliffe.

Geotechnical assessment and ground engineering advice is based on a fundamental approach, which includes a review of regional geology maps, topography, publications, historical records, site mapping, subsurface investigation and testing to develop a reliable geological model.

Good appreciation of the influence of soil chemistry on ground behaviour and soil-structure interaction.

Experience with design of ground engineering structures including rock bolts, anchors, soil nails and retaining walls.

### **3. Civil Engineering**

Civil engineering advice on various projects, with a focus the design and construction of site drainage, excavations, vibrations and earthworks. Review of filled sites, proof roll inspections and advice on subgrade improvement for structural designs, access roads and industrial developments.

Experience with planning discussions, negotiations with neighbours, engineers, builders, Councils, etc. in relation to proposed developments, difficult site access constraints and construction.

#### **a) Access Roads and Earthworks**

Inspections, designs and construction advice on fill placement and other foundation improvement methods for an access road and recreational park development by Hornsby Council, on a deep, variable landfill site at Thornleigh.

Inspections, review of aerial photographs and site meetings to identify areas for fill remediation, overview of remedial works and compaction testing during remedial works on a large industrial site at Ingleburn.

Site advice and subsequent sketch remedial work design advice to remediate soft and wet trench backfill materials on an industrial site at Horsley Park.

Inspection and specification on fill placement, compaction & test requirements at Menangle Park.

#### **b) Residential Driveways and Drainage**

Design, technical drawings and construction advice for a residential access driveway, surface & subsoil drainage and Keystone segmental block retaining wall at North Rocks.

Inspections and regular advice on the construction of a shared access driveway at Newport, including drainage structures, retaining walls and associated earthworks.

Advice in relation to the use of a shared right-of-way for an adjacent site development at Bayview, in relation to potential damage to houses, services and the concrete driveway.

Inspection and concept design advice for a driveway on sloping land at Palm Beach.

Advice on a proposed rock face excavation on a shared residential driveway at Forestville, including the potential for significant damage and safety risks.