



# DAVID DUFF

Technical Director | Geotechnics

## EDUCATION

**1991 | University of Sydney**

Bachelor of Engineering (Honours)

**1997 | University of NSW (MEngSc)**

Master of Engineering Science

**Institution of Engineers Australia, FIEAust CPEng**

**Registered Engineer, NER**

**Registered Professional Engineer of Queensland, RPEQ**

**APEC Engineer IntPE(Aus)**

## LANGUAGES

English

## CONTACT

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## PROFILE

David has 30 years of experience working in geotechnical consultancies in Australia. He has extensive experience in investigation, design and construction of major infrastructure and transport projects as well as small scale residential, commercial, and industrial developments.

His practical experience, positive attitude, technical, managerial and commercial acumen is well respected, and these attributes deliver substantial benefits to the projects he works on.

## AREAS OF EXPERTISE

- Geotechnical Engineering
- Slope Stability
- Construction Phase Services
- Project Management

**alliance**

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## EXPERIENCE

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### **LSBJV (LEND LEASE SAMSUNG BOUYGUES JOINT VENTURE) | WESTCONNEX 3A M4-M5**

- AG were engaged for geotechnical, earthworks and environmental testing at the St Peters Interchange and Haberfield portals and the temporary access at Pymont Bridge Road. David was the project and technical director responsible for project management, piling platform assessments and technical direction and review of other works. The work included plate load tests, foundation and proof roll inspections, meetings with the Independent Certifier, contamination assessment and testing, material assessments and temporary works designs for surface works.
- Our contribution to the project included assessment and verification of the pre-existing platform at St Peters Interchange that enabled its use for the project and avoided the need to place an additional 750mm of ripped sandstone over the entire hardstand area, with enormous cost and time savings for the client.

### **RA SMITH CONTRACTING / JOHN HOLLAND CPB JOINT VENTURE (JHCPB) | WESTCONNEX 3B ROZELLE INTERCHANGE | BALMAIN TRUNK SEWER REALIGNMENT**

- As part of the Westconnex 3B Rozelle Interchange, our client RA Smith Contracting undertook the Balmain Trunk Sewer Realignment. This work involved the excavated of deep manhole launch and receival pits. The pits typically had a shallow soil profile over sandstone bedrock. David provided technical advice and reports for the construction, inspection and installation of temporary support including details for potential rock support, including rock bolts, mesh and strip drains. He was also called on to provide a reasoned and practical assessment of the likely stress induced ground movements, which were found to be negligible.

### **ARENCO | LACHLAN'S LINE BRIDGE | M2-DLEHI ROAD, RYDE NSW**

- The project comprised the construction of an iconic double helix bridge across Delhi Road and the M2. This involved the construction of working platforms at the top of the M2 cuttings and operation of heavy lift cranes over and in close proximity to critical underground services infrastructure. David was the geotechnical Technical Director for the project delivering the design of piling platforms, including for an 800t crane and assessment of underground services, slope stability modelling and certification. He was also brought in as a Technical expert and successfully assisted a breakthrough in design review between the designers and project verifier at a critical stage of the works.
- The construction phase services involved certification of piled foundations by chartered engineers, bearing capacity assessments and earthworks testing.



## EXPERIENCE

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### **CPB | TNR5/6 THE NORTHERN ROAD UPGRADE STAGES 5 AND 6 | LUDDENHAM NSW**

- David was the technical director for the provision of geotechnical engineering services including foundation inspections, recommendations for foundation treatments in accordance with R44, proof rolls, Benkelman Beam Testing and interpretation and trouble shooting. The scope of works was expanded to include compaction testing of Asbestos Containing Materials (ACM) and the provision of asbestos clearances and occupational hygienists.

### **Ward/Diona Joint Venture | Parramatta Light Rail Enabling Works, NSW**

- David was the technical director for the provision of geotechnical engineering services for the Parramatta Light Rail Enabling Works, which comprised movement of underground utilities and roadworks for temporary and permanent traffic diversions for the project. AG was also provided earthworks compaction and laboratory testing as well as environmental and contamination services including asbestos clearances and site hygienist services.

### **CELTIC CIVIL / AUSTEIRE FOR CPBDJV | PARRAMATTA LIGHT RAIL MAIN WORKS NSW**

- David was the technical director for the provision of geotechnical engineering services for the Parramatta Light Rail Main Works, with initial works comprising the assessment and certification of piling platforms at main road crossings. movement of underground utilities and roadworks for temporary and permanent traffic diversions for the project. AG was also provided earthworks compaction and laboratory testing as well as environmental and contamination services including asbestos clearances and site hygienist services.

### **TALIS CIVIL | WEDDERBURN BRIDGE REPLACEMENT | WEDDERBURN NSW**

- The Wedderburn Bridge Replacement comprised the construction of a new bridge through David was the Principal Geotechnical Engineer for the project. Key issues comprised the deeper than expected rock levels in the middle of the creek, construction of the abutments with steeply dipping top of rock, crane foundations and earthworks testing and proof rolls.

### **GRS | SOLAR FARMS | PARKES AND MOLONG NSW, WINTON VIC AND CHINCHILLA QLD**

- AG has undertaken geotechnical investigations and reports for four sites in NSW, Victoria, and QLD. David was the technical director and reviewer for the reports. Key issues were to refine the borehole coverage of the sites, assessing the soil properties and depth of disturbance for the design of H pile foundations for uplift and lateral loads in particular.



## EXPERIENCE

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### **VARIOUS UNDERBORE DRILLERS | GREAT WESTERN HIGHWAY AT SPRINGWOOD, RAILWAY AT COBAR, RICHMOND AT MARSDEN PARK**

- AG has undertaken settlement analyses for numerous underbores for services under RMS road and railway embankments. David was the technical director and report reviewer for these projects. Key issues were the drilling methods, depth of existing underground services and soil parameters in estimating the settlements.

### **NORTHERN BEACHES COUNCIL | SYNTHETIC SURFACE PLAYING COURTS**

- AG has undertaken geotechnical investigations and settlement analyses for synthetic surface playing courts at Manly Vale. The key issue was that the site was low lying with a saturated alluvial soil profile. David was the technical director and reviewer of these report.

### **TOBCO | PLAYING FIELD LIGHT POLES | BONNET BAY, LOFTUS, BUNDEENA, WOOLLOOWARE AND MIRANDA - SUTHERLAND SHIRE, NSW**

- AG has undertaken geotechnical investigations and settlement analyses for playing field light poles in the Sutherland Shire. The key issue is that these sites typically have uncontrolled fill, or low lying saturated alluvial soil profiles. David was the technical director and reviewer of these reports.

### **ACCIONA | SYDNEY LIGHT RAIL CONSTRUCTION PHASE SERVICES | MOORE PARK NSW**

- The project involves the construction of the new tracks, relocation and upgrading of underground services, new stops, a tunnel through Moore Park and underground structures for the Moore Park Stop. The project involves extensive earthworks, piling, shoring, a temporary tunnel access ramp and haul road, extensive temporary works, material testing for compliance with specifications, design verification and testing.
- David was the Principal Geotechnical Engineer during construction and was responsible for geotechnical inspections, piling platform designs and certification, access road designs and design of temporary works for the construction of Moore Park Stop underground BOCC and subway buildings. He was responsible for a complete range of geotechnical inspections, advice and the design of temporary works for the construction of excavation shoring and excavations. Temporary works and their optimisation involved parameter interpretation, development of geological models and concept designs, safety in design and delivering complex analysis by a team of sub-consultant specialists.



## EXPERIENCE

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### **IMPREGILO SALINI JOINT VENTURE (ISJV) | NORTH WEST RAIL LINK, STATIONS VIADUCT CIVIL WORKS | SKYRAIL, BELLA VISTA TO CUDGEGONG, NSW**

- The project substructure works involved the construction of over 120 piers, with buried pile caps, four reinforced retaining walls, extensive earthworks, piling, shoring, infilling of the former Knights Quarry, construction haul roads, extensive temporary works, material testing for compliance with specifications, design verification and testing.
- David was the Principal Geotechnical Engineer during construction and was responsible for a complete range of geotechnical inspections, advice and the design and redesign of temporary works for the construction of the sub-structure including design of excavation shoring and excavations. Temporary works and their optimisation involved parameter interpretation, development of geological models and concept designs, safety in design and delivering complex analysis by a team of sub-consultant specialists. An innovative and practical approach enabled the optimisation and redesign of many temporary shoring structures for piers in close proximity to services and infrastructure and elimination of other shoring walls completely, which resulted in substantial savings in time and money for the client. He was responsible for assessing and advising on the stability of virtually all the temporary excavations and was instrumental in the client achieving the confidence of Transport for NSW in the operation of the works.

### **Regional Rail Link Authority | Regional Rail Link Package E, Detailed Design and Construction (AUD 600 million) | Melbourne, VIC**

- This project comprises construction of 25km of rail line between Deer Park and West Werribee Junction, including infrastructure such as bridges, stations, retaining walls, cuttings, embankments and culverts.
- David was the geotechnical team leader during the construction phase of the Wyndham Vale Cut, which was ~ 2.5km long and up to 8m deep in highly and moderately weathered basalt. David was responsible for the on site assessment of the cut soil and rock slope stability, identification of support requirements and review of mapping and the specified geotechnical support provided by the team. Typical geotechnical support requirements included one or more elements out of spot bolts, pattern bolts, soil nails, fibrecrete and drainage.
- During construction he unified the teams by focusing on what was needed, taking a pragmatic approach, addressing practical and technical queries and having effective communication with all staff – from foremen and engineers through to the project director. He was commended for his efforts and results and this led to the award of the Hyder Most Valuable Player in October 2013.



## EXPERIENCE

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### **ROADS AND MARITIME SERVICES (NSW) | HUNTER EXPRESSWAY ALLIANCE (AUD 825 MILLION) | NEWCASTLE, AUSTRALIA**

- Description of role, job, experience, etc. Detailed Design and construction of a 14km section of dual carriageway as part of the 40km Hunter Expressway Project. The project extends through a greenfield environment, varying from a floodplain near Kurri Kurri to the Sugarloaf Range near the F3 Freeway at Seahampton. The project consists of 29 bridges, including 3 viaduct concrete box girder structures, 2 grade separated interchanges, provision for mine subsidence, soft soil treatment, strict vegetation clearing limit and Aboriginal heritage sites and rest areas either side of the motorway.
- David was the team leader for the detailed design site investigations and brought together all the parties for justification and acceptance of the multi-million dollar investigation programme. Challenges in the role including co-ordinating the site drilling and office team, managing the financial and commercial activities, organising, and motivating the team through the breaking of the drought and managing the interdisciplinary communications process.

### **WATER DELIVERY ALLIANCE | SYDNEY DESALINATION PIPELINE | NSW**

- David was the project manager of the geotechnical investigations for the 16km long pipeline from Kurnell to Erskineville. The role included determination of the scope, cost estimation, negotiation and justification project and technical management of the geotechnical investigations. Their delivery and his ability to make others feel welcome and work together in the alliance was an important factor in the success of the project.

### **ABERGELDIE | GRAND PACIFIC WALK | LAWRENCE HARGRAVE DRIVE, COALCLIFF, NSW**

- The project involved the construction of a pedestrian walkway through multiple known landslips and involved the construction of mass gravity gabion retaining walls, elevated structures on piles and earthworks. David was the Principal Geotechnical Engineer on the project and reviewed and advised on the stability and treatment of temporary excavations and new retaining walls

### **Civil Constructions / Stocklands | Andrews Road Resurfacing | Cranebrook, NSW**

- The project involved the resurfacing and reconstruction of the existing road in front of the industrial development. By undertaking Benkelman Beam Testing and detailed assessment, we were able to demonstrate that resurfacing of the road was adequate for compliance with the Council DA and hence avoid the costly reconstruction and disruption of the heavily trafficked road. Through David's collaborative approach, technical expertise and positive attitude, the project was successfully completed to the satisfaction of the client and Penrith City Council.





## EXPERIENCE

### **ROADS AND MARITIME SERVICES (NSW) | PACIFIC HIGHWAY UPGRADE | SAPPHIRE TO WOOLGOOLGA (AUD 700 MILLION)**

- Sapphire to Woolgoolga is a design verification (verification of documentation) for the upgrade of a 25km stretch of the Pacific Highway, beginning north of Coffs Harbour and stretching to Arrawarra Beach Road, north of Woolgoolga, in northern New South Wales. The first 15km of the project involves the upgrade of the Pacific Highway and the second 10km involves a bypass.
- David was involved in the verification of geotechnical design packages and was the lead geotechnical technical adviser during the construction phase. This involved multiple site inspections and meetings to advise the client, contractor and IV team on geotechnical aspects of the project.

### **MORETON BAY REGIONAL COUNCIL | GAP ROAD SLOPE REMEDIATION (AUD 1 MILLION) | BELLTHORPE, QUEENSLAND**

- This project involved the investigation, assessment, preliminary and permanent design of slope remediation works undertaken as part of NDRRA (National Disaster Relief and Recovery Arrangements) following the floods in January 2011. David was involved as technical lead in the site assessment and design of the temporary and permanent works. He developed practical and cost-effective solutions to keep the road open that not only improved the road safety and standards but also led to significant efficiencies and savings for the client.

### **AUSTRALIAN RAIL TRACK CORPORATION | UPGRADING OF THE ULAN RAIL LINE (AUD 100 MILLION) | NSW, AUSTRALIA**

- This project involved the design and construction of eleven new passing loops, to increase the number of return paths available to coal trains and improve operational flexibility of trains travelling between Ulan and Muswellbrook. Project will also involve associated tunnel ventilation works.
- David is the geotechnical team leader and is involved in the geotechnical aspects of the project including assessment of existing and proposed rail tunnels and shafts, investigation and design of new rail passing loops and anchored retaining walls, and provided assistance in the development of geotechnical and earthworks specifications; and construction advice. His ability to address technical and constructability issues in the field and in design meetings greatly helped the success of the project.

### **ROADS AND MARITIME SERVICES (NSW) | GREAT WESTERN HIGHWAY UPGRADE, BULLABURRA WEST DESIGN ALLIANCE (AUD 60 MILLION) | NSW, AUSTRALIA**

- This Great Western Highway project comprises upgrade of 2.8 km of the existing 2 lane rural highway into a divided dual carriageway involving extensive retaining walls, complex drainage issues and a constrained corridor. David provided technical review and input into constructability. His technical expertise and practicality helped deliver the best for the project.



## EXPERIENCE

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### **BOVIS LEND LEASE | TOP RYDE SHOPPING CENTRE – ENTRY STRUCTURES AND TUNNELS (AUD 30 MILLION) | SYDNEY, AUSTRALIA**

- Hyder carried out the design of the drive structure and three tunnels under Delvin Street, Top Ryde. The work also included the upgrade of surrounding streets, services relocation, and STA bus route diversion. Extensive liaison with RMS was involved.
- David was responsible for supervision of the driven tunnels excavation under Devlin Street, face-mapping and verification of design ground conditions and support requirements

### **SYDNEY PORTS CORPORATION | PORT BOTANY EXPANSION (AUD 500 MILLION) | SYDNEY, AUSTRALIA**

- In a D&C contract with Baulderstone, Hyder were responsible for the detailed design of the Port Botany Expansion. This work included: 5 new container berths, associated tug berths and public areas and involved all the maritime, structural, geotechnical and environmental design.
- David was involved in the review of geotechnical design packages, specifically in relation to the Brotherson Dock, tug berth, crane beam and piles, counterforts, earthworks, blockwork, boat ramp and inter-terminal access

### **THIESS | ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT (AUD 700 MILLION) | SYDNEY, NSW**

- Hyder was responsible for the redevelopment on the main hospital building, including the mental health division, community health building, new 5-storey car park building, with 2 levels semi-basement and a 20-storey retail commercial precinct. The project involved an assessment of the parking availability and requirements at the Royal North Shore Hospital prior to the redevelopment. This information fed into the parking management plans for the redevelopment project.
- David was involved in the detailed design of anchored pile shoring walls, assessment of tenders and advising the client on key issues and providing practical solutions.

### **FULTON HOGAN | GREAT WESTERN HIGHWAY UPGRADE | WENTWORTH FALLS EAST DESIGN ALLIANCE (AUD 80 MILLION) NSW**

- This Great Western Highway project involves upgrading from a single carriageway to a two lane dual carriageway road along the existing alignment. The detailed design and contract documentation were undertaken by Hyder as part of one of the first RMS Design Alliances, and was successfully completed in February 2009.
- The Hyder Geotechnical team subsequently provided construction phase services, comprising on site geotechnical inspections and verification for Fulton Hogan, the contractors, for the project. David was responsible for construction stage inspection and verification, direction of resources, commercial management, technical direction and advice.





## EXPERIENCE

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### **LEIGHTON CONTRACTORS | LIVERPOOL TO ASHFIELD PIPELINE | SYDNEY, AUSTRALIA**

- David was responsible for project and technical management of construction phase services, which included the design of shoring and thrust blocks, stability analysis of excavations, design for shotcrete and dowels, and construction advice.

### **MIRVAC | PACIFIC PLACE DEVELOPMENT | CHATSWOOD, NSW**

- David provided full-time, on-site geotechnical supervision during construction of a deep basement excavation adjacent to the main northern railway line and residential streets. The work involved rock face mapping, assessment of allowable excavation lifts, specification of rock bolts, construction supervision, water-pressure and stress testing, stressing, lift off load testing, approval and acceptance of permanent rock anchors.

### **JA BRADSHAW | CHATSWOOD TRANSPORT INTERCHANGE | SYDNEY, AUSTRALIA**

- During this project, David was responsible for review and modification of anchor design, construction inspections of anchor construction, water pressure testing, stress testing, stressing and head protection works.

### **WARD CIVIL ENGINEERING/TRANSPORT INFRASTRUCTURE DEVELOPMENT CORPORATION | PARRAMATTA TRANSPORT INTERCHANGE | SYDNEY, AUSTRALIA**

- The Argyle Street retaining wall was an L-shaped retaining wall constructed by excavating into the operational railway embankment. David was responsible for analysis, construction inspections and technical advice.

### **WESTFIELD | CENTREPOINT DEVELOPMENT | SYDNEY, AUSTRALIA**

- David was responsible for geotechnical investigation for the proposed expansion and development of Westfield Centrepoint.

### **BILBERGIA | WATERPOINT APARTMENTS | MEADOWBANK, NSW**

- David was the project manager for the geotechnical investigation and construction inspections of a deep excavation in high strength sandstone which was intersected by a large thrust fault.