

Geotechnics



About EIC Activities

EIC Activities is CIMIC Group's engineering and technical services business.

Our engineering and risk mitigation expertise provides CIMIC Group with a competitive advantage for winning and delivering profitable projects that also generate value for clients.

EIC Activities ensures the Group's collective experience, technical capabilities, innovations and leading-edge technology applications are leveraged to deliver our client's objectives.

About CIMIC Group

CIMIC Group is an engineering-led construction, mining, services and public private partnerships leader working across the life-cycle of assets, infrastructure and resources projects.

EIC Activities works closely with CIMIC Group's other Operating Companies by providing in-house engineering consultancy services to our construction businesses CPB Contractors, Leighton Asia and Broad, our mining and mineral processing companies Thiess (joint control) and Sedgman, our services specialist UGL and our development and investment arm Pacific Partnerships.

Our mission is to generate sustainable returns by delivering innovative and competitive solutions for clients and safe, fulfilling careers for our people.

With a history since 1899, and around 25,500 people in around 20 countries, we strive to be known for our principles of Integrity, Accountability, Innovation and Delivery, underpinned by Safety.



Our geotechnical capabilities

EIC Activities' Geotechnics team has engineers with a diverse range of experience and capability to provide support throughout the project life-cycle - extending from site investigations and design, through to construction phase services and defect liability assessments.

The Geotechnics team brings together a group of industry experts and highly experienced geotechnical professionals with consulting, design and construction experience.

The Geotechnics team maintains close ties with Australian universities and undertakes cutting-edge research into construction industry challenges, continually improving solutions.

Our geotechnical capabilities and expertise include:

Geotechnical investigation and interpretation

Provision of site investigation planning, scoping and management and interpretation of geotechnical data for determination of parameters and profiles.

Soft soil engineering

Detailed assessment and review of soft soil parameters and design of ground improvement techniques such as preloading and surcharge, dynamic compaction, concrete injected columns, deep soil mixing, and stone columns.

Piling and foundations

Design of pile foundations, pile group analysis, review of pile test results, pile driveability assessments and constructability of cast in-situ piles and driven piles.

Retaining structures

Design and construction of all types of retaining structures including soil nail walls, bored pile walls, secant pile walls, diaphragm walls and reinforced soil walls.

Numerical modelling

Capabilities to undertake complex 2D/3D numerical modelling using advanced geotechnical packages such as PLAXIS 2D/3D, RS2/RS3, MIDAS, and Strand7.

Earthworks

Advice on earthworks, slope stability assessment and design of slope stabilisation measures, earthworks testing and quality assurance/ quality control, quarry material and reactive soils.

Instrumentation and monitoring

Implementation of CIMIC Group's proprietary Geosens solution - an intelligent multi-source data capture, analysis and reporting solution for real-time geotechnical condition monitoring and risk management.





Jeff Hsi

Technical Director -
Ground Engineering

“ EIC Activities’ geotechnics, tunnels and structures specialists work seamlessly together, delivering the highest level of technical advice and design services.

As an in-house engineering team, we fully align with CIMIC Group’s interests and can be rapidly mobilised to meet our client’s urgent requests.

Our efficiency and effectiveness in adding value to projects and tenders are evident in our track record. Our greatest reward is to see our ideas and life-cycle solutions realised and implemented successfully.



Idy Li

Group Manager -
Ground Engineering

“ The depth of technical experience and breadth of expertise within the Geotechnics team has allowed us to repeatedly deliver optimal ground engineering solutions that exceed the expectations of our clients.

We maintain market leading services by building knowledge, applying cutting-edge technologies, and developing software and research collaborations with internationally acclaimed universities.

We are proud to uphold our reputation as a trusted advisor for our clients – a position that continuously motivates and drives us to help our clients achieve their objectives.





Our geotechnical services

As a member of CIMIC Group, EIC Activities provides services to CIMIC Operating Companies exclusively. Our engineers are dedicated to work in the best interests of our clients in order to mitigate risk and identify opportunities to create value.

To achieve this, EIC Activities' Geotechnics team provides the following services:

- Review and challenge of designs to mitigate risk and optimise design outcomes
- Assessment and provision of alternative cost-effective design solutions
- Review of geotechnical reports and factual data to advise on geotechnical conditions and provision of geotechnical interpretive reports (GIR)
- Provision of geological ground profile modelling and subsurface 3D visualisation
- Advice on constructability and construction methods, and provision of construction phase services (CPS)
- Provision of implementation and monitoring data management platform Geosens to improve efficiency of monitoring data collection, visualisation and reporting
- Support with legal and commercial matters including claims, disputes and forensic engineering
- Provision of design/technical management services
- Provision of design delivery services including concept design, detailed design, reporting and documentation, design verification and proof engineering.

Case studies

WestConnex Stage 2 M8

CPB Dragados Samsung JV (NSW)

EIC conducted a joint research project with the University of Technology Sydney (UTS) at Alexandria Landfill above which Westconnex M8 St Peters Interchange was built. Detailed site investigation and laboratory testing of landfill material was undertaken to characterise landfill behaviour.

Key research outcomes included developing a practical methodology for predicting landfill behaviour - based on closely correlating results of landfill properties from laboratory tests, InSAR satellite monitoring and advanced field instrumentation. The monitoring data and predicted landfill properties proved invaluable for prediction of future settlement and development of remedial solutions.



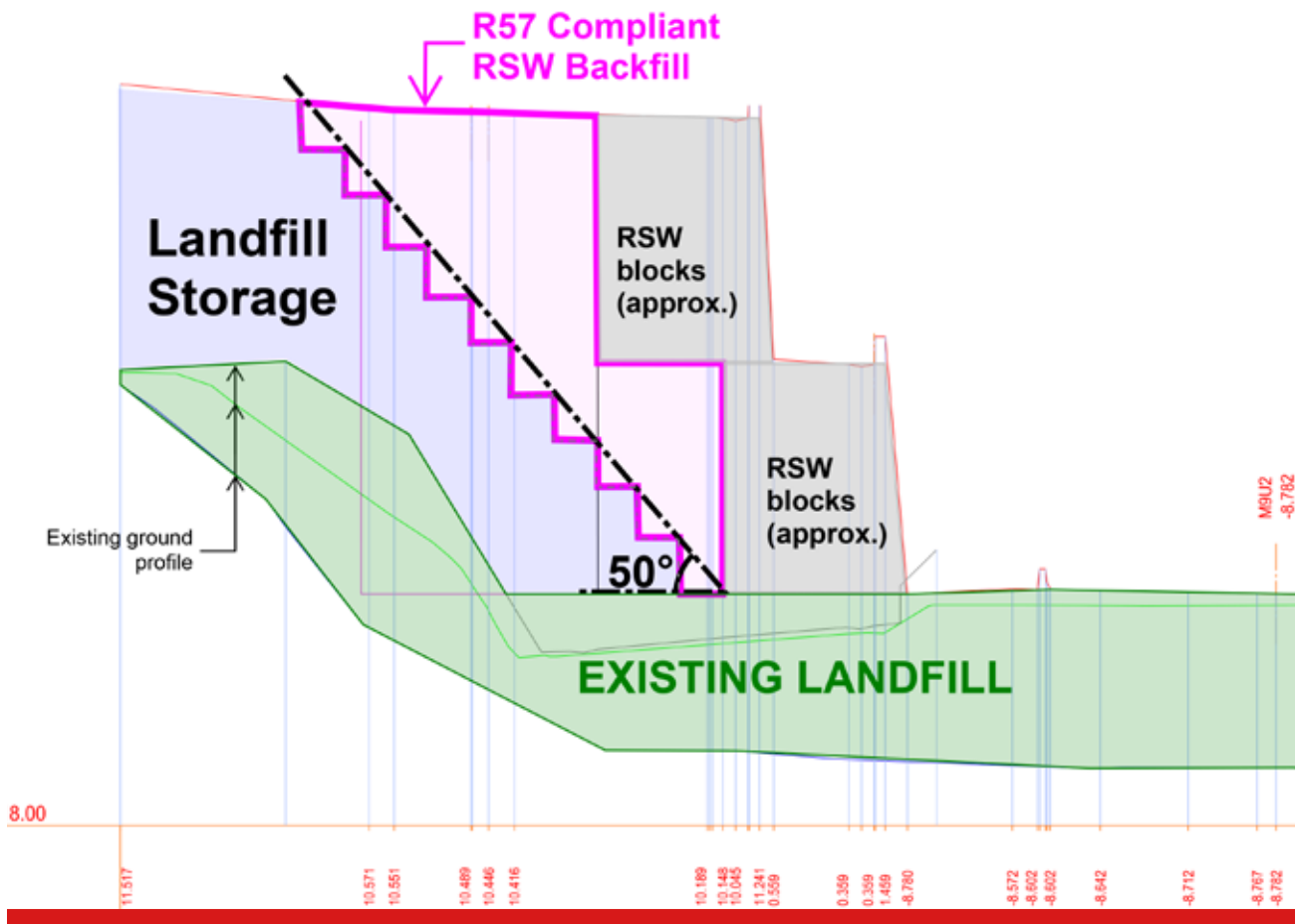
Field settlement monitoring devices installed at Alexandria landfill

WestConnex Stage 2 M8

CPB Dragados Samsung JV (NSW)

A two-tiered reinforced soil wall (RSW) up to 21m high was proposed to retain the existing landfill batter at St Peters Interchange. The RSW design specification required an extensive cut back of up to 15m behind the RSW for the placement of high quality fill.

EIC proposed replacing this zone with an 50° active wedge that reduced the amount of excavation into the existing landfill batter behind the wall. The solution was accepted by Transport for NSW and approximately 20,000m³ of landfill was retained on site.



West Gate Tunnel

CPB John Holland JV (VIC)

Eight heavy crane lifts were required along the east bank of Maribyrnong River underlain by soft soils. The temporary works designer proposed piled reinforced concrete slab as working platform for these lifts.

EIC proposed a working platform comprised of crushed rock and cement treated crushed rock layer (CTCR)

replacing the expensive structural piled slab foundation. EIC assessed the flexible working platform using 3D numerical finite element models which confirmed that the crane would remain stable with minimal tilt and settlement at the outriggers. EIC's proposal was adopted by CPBJH JV and the temporary works designer.



Waikeria Prison Development

CPB Contractors

Over 3000 steel tubes of 275mm diameter were proposed as the foundation to support the prison buildings. The existing solution required all piles be re-struck upon driving to a specified set, resulting in an unforeseen increase in the cost and time of construction.

EIC carried out a detailed assessment of the design and considered that re-striking the piles was unnecessary. EIC's advice was adopted and the requirement for re-strike was relaxed to an as-needed basis, leading to time and cost savings.



Wagga Wagga Water Treatment Plant PPP

CPB Contractors (NSW)

A cofferdam was required as part of the Wagga Wagga treatment plant construction to enable construction of an inlet structure on the Murrumbidgee River.

EIC provided the design of the double skin sheet pile cofferdam, undertook groundwater inflow and seepage assessment, provided advice on dewatering requirements and offered geotechnical support during construction.



Key contacts



Dr Jeff Hsi

Technical Director - Ground Engineering

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Sydney

Summary

- 30 years' professional experience in geotechnical engineering. Special areas of expertise include soft ground engineering, slope assessment and remediation, underground spaces and tunnels, deep foundations and retaining structures, earthworks and materials in the sectors of roads, rail, airports, water, ports, power and buildings
- BSC (Civil), MSC (Geotechnical), PHD (Geotechnical).

Relevant Experience

- Geotechnical investigation and interpretation, study, analysis and design
- Project management and coordination
- Construction advice and service
- Numerical modelling - groundwater and soil-structure interaction
- Expert witness for arbitration, litigation and legal cases
- Forensic engineering.



Idy Li

Group Manager - Ground Engineering

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Sydney

Summary

- 17 years' consulting in geotechnical site investigation and design
- MEngSC (High Distinction), UNSW
- BEng (Civil) (Hons) Auckland University
- MIEAust, NER, CPEng Chartered Professional Engineer
- MICE CEng, Member Institution of Civil Engineers.

Relevant Experience

- Geotechnical design of foundations, piles, retention structures, ground improvement and slope stability
- Review and preparation of expert witness opinion reports for large scale engineering projects brought before NSW Supreme Court
- Site investigation and data interpretation
- Project management and coordination of large-scale multidisciplinary infrastructure projects in Australia and NZ.

EIC
ACTIVITIES



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A MEMBER OF THE CIMIC GROUP

