

Construction engineering



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.

EIC Activities services

EIC Activities is an integrated multidisciplinary business specialising in:

- structures and construction engineering (temporary works)
- methodology
- geotechnical and tunnels
- civil
- mechanical and electrical
- parametric design and digital engineering

About CIMIC Group

CIMIC Group is an engineering-led services, construction and natural resources leader with a history dating back to 1899.

Powered by 39,000 people, and pioneering technology and engineering, we deliver high-value and sustainable solutions across the lifecycle of assets, infrastructure and resources projects in around 20 countries.

CIMIC Group comprises our engineering and construction businesses CPB Contractors and Leighton Asia, our integrated solutions providers UGL and Sedgman, our natural resources company Thiess (60% ownership), and our development and investment arm Pacific Partnerships – all supported by our in-house engineering consultancy EIC Activities.

Our mission is to generate sustainable returns by delivering innovative and competitive solutions for clients and safe, fulfilling careers for our people. We strive to be known for our principles of Integrity, Accountability, Innovation and Delivery, underpinned by Safety.





Our construction engineering and temporary works services

As a member of CIMIC Group, EIC Activities provides services to CIMIC's 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' construction engineering team provides the following services:

Safe designs

Our construction engineering team always carry out safety and safety-in-design assessments to mitigate and control the risks associated with construction activities, temporary and permanent works.

Quality design

EIC Activities has an ISO9001 compliant EMS along with various authority approvals. We have approval from CPB Contractors to undertake high-risk temporary works design and are experienced at delivering designs for CPB Contractors' projects.

Leveraging EIC Activities' expertise

We have a team of experienced chartered professional engineers and designers who are trained and certified in the latest industry standards and regulations. EIC Activities' construction engineering and temporary works solutions leverage the internal expertise of our structures, geotechnical, tunnels, civil, heavy lift and virtual builder teams to ensure best-for-project and best for CIMIC solutions.

Our construction engineering capabilities

The EIC Activities construction engineering team has strong in-house capability specialising in the design and engineering of temporary works solutions and methods for construction projects. We understand the constraints of construction and the critical interface with permanent works design and always work with project teams to integrate the sequencing of the project and the temporary works solutions into the permanent solutions.

Our construction engineering capabilities and expertise include:

Bridge erection - complex

Construction staging analysis and temporary works design for multi-stage, continuous and complex bridges. EIC Activities' construction engineering team identifies the gaps between the permanent works design and the many changing constraints and requirements of the site team. Bridge structures include, continuous curved steel box, curved cable-stay and network arch.

Demolition - bridge, building and plant

Design and certification of multi-stage high risk demolition of structures, buildings, bridges and plant. Includes detailed demolition push over, explosive demolition and tensioned structures using advanced finite element analysis.

Precast, formwork and batching plants

Design, construction, lifting and transportation solutions for structural building and infrastructure precast. Bespoke modular, curved, single sided, high risk formwork systems. Batching plant structural design.

Jetties and temporary water structures

Design and construction methodologies of jetties and temporary platforms for construction plant, mobile and tower cranes.

Underground structures and retention

Multi-stage deep basement construction methodologies, retention wall and propping design, cut and cover designs and methodologies and design of associated temporary works.

Tunnel boring machine - launching and recovery

Design of launching, traversing, breakthrough and recovery methodologies and temporary works design.

Tall building construction

Full construction engineering and temporary works services including:

- tower crane strategies
- foundation
- grillage and tie design
- climbing, skating and recovery
- jumpform and slipform design
- man and material hoist design
- perimeter and protection screens and platforms.

Lifting and heavy transportation

Design of heavy lift solutions using various methods and equipment, bespoke rigging design, specialised transport (SPMT) and jacking and skidding solutions for all areas of construction from concept development to delivery support. Delivery of technical training and promoting knowledge sharing and lessons learned.

4D construction visualisation

ToBe Builder, a software developed in-house, improves communication at all stages of construction and plays a vital role in conceptual and detailed design, ensuring we fully understand key site interfaces, constraints and preferred construction methodologies.

Temporary access and protection

Construction design and certification of proprietary and bespoke temporary access and protection platforms, screens, walkways and stages. This includes crane pads, piling pads and ground improvements required for plant. Site access design and assessment.

Asset protection and damage assessment

Soil structure interaction analysis, underground asset assessment. Structural and ground improvement solution options. Advanced damage assessment using finite element analysis of buckled, yielded and cracked sections.



Case studies

West Gate Tunnel Project Bridge 91 - CPB John Holland JV

Staged erecting and temporary works design

The EIC Activities construction engineering team was engaged by the West Gate Tunnel Project to support construction of Bridge 91. CPB Contractors is a Joint Venture partner of Spark Consortium.

About the project

CPB Contractors was selected by Transurban and the State Government of Victoria as the preferred contractor for the West Gate Tunnel project, in a 50:50 joint venture with John Holland.

The West Gate Tunnel project, one of Victoria's largest ever urban road projects, delivers a vital alternative to the West Gate Bridge, provides quicker and safer journeys, and removes thousands of trucks from residential streets.

Challenge

Construction of a new pedestrian cable stay bridge over a major arterial road on ground known for its high settlement properties.

The complicated geometry of the bridge combined with the temperature impacts on steel, posed challenges in connecting the steel pieces to tolerance within critical timeframes.

Solution

EIC Activities provided the following construction design services:

- erection manual
- construction sequencing, staged structural analysis modelling
- temporary works design
- geotech – working platforms and tower foundations
- heavy lift – strategy and lift operation modelling.

The superstructure was delivered to site in six pieces and was erected over a four-week period.

Temporary towers supporting the superstructure were designed to accommodate settlement and provide the necessary restraint to ensure stability of the bridge works throughout construction.

All construction solutions were designed to minimise traffic disruption.



- # design optimisation
- # integrated design and construction methods
- # permanent and temporary works
- # 3D & 4D interactive technology



Case studies

Sydney Metro - Western Sydney Airport - CPB Ghella JV

TBM temporary works at the Sydney Metro – Western Sydney Airport

The EIC Activities construction engineering team was engaged to deliver the design works supporting the tunnel boring machines (TBMs) and back-up gantries for the Sydney Metro - Western Sydney Airport, Station Boxes and Tunnelling works.

About the project

CPB Contractors, in joint venture with Ghella, was selected by the NSW Government to deliver the Sydney Metro – Western Sydney Airport, Station Boxes and Tunnelling works.

It provides a public transport service to the new airport and makes a lasting economic contribution to Sydney's west.

Challenge

A new metro railway that involves the design and construction of 9.8km of twin tunnels and excavations for four stations and service facilities at two more.

Solution

Temporary works modular steelwork

EIC Activities designed the temporary works modular steelwork supporting the tunnel boring machine (TBM) and back-up gantries at the interfacing for eight station boxes and shafts and while launching, traversing through open excavations and during breakthrough.

Detailed designs were delivered for the thrust frames to support TBM launch thrust loads, steel runners for the TBM traverse and back-up gantry traverse, concrete blind ring supports, breakthrough stop-thrust brackets, TBM antiroll brackets for launching, and other supporting steelwork.

Site-specific solutions were developed such as for the steel runners supporting the back-up gantry wheel bogies, allowing the steelwork to be installed in a retracted position prior to the TBM passing and extended to support the back-up gantry, as well as a precast concrete option.

Foundations

EIC also designed the supporting foundations and slabs tailored to the relevant station boxes/shafts and site-specific ground conditions, including stressed ground anchors and micropiles for the tension forces of the launch frame. The Airport dive foundation included the integration of a tower crane foundation. At Orchard Hills, a bespoke steel platform was designed to allow the TBM to be assembled off the tunnel axis line and pushed laterally using hydraulic struts.

- 
- # design optimisation
 - # integrated design and construction methods
 - # permanent and temporary works
 - # 3D & 4D interactive technology



Integrated Digital Planning

Our proprietary Integrated Digital Planning (IDP) software, developed in-house by EIC Activities design and planning engineers, allows design solutions to be engineered, modelled and visualised (using [IDD Tech](#)'s proprietary [ToBe Builder](#) software) in near-real time – complete with critical time and cost related data such as quantities, rates, plant and equipment and resources.

Linking designs directly to ToBe Builder through the IDP software allows design and construction teams to collaborate and align on proposed solutions and documentation requirements early in the design process, ensuring that industry foundation class (IFC) designs are fit for construction purposes.

Further, the ToBe Builder models used during the design phase can be handed over directly to construction teams, allowing them to fully develop their construction methodologies and Work Packs, including key details such as access and logistics, traffic management, exclusion zones, and critical crane lifts.



Contacts



Jeff Roper

Principal - Major Projects, Structures and Construction Engineering

Jeff.Roper@eicactiv.com
+61 428 575 642
Melbourne

Summary

- 22 years' experience in design, consultancy and construction in the infrastructure, commercial building, industrial, HV infrastructure and water sectors
- BE Hons (1st Class) University of Canterbury, NZ
- MIEAust, CPEng, NER, RPEV.

Relevant experience

- heavy civil construction including bridges, tunnels, cut and cover
- specialist design and construction - integration of permanent works, construction methods and temporary works
- critical temporary works design
- structural steel and heavy industrial structures
- commercial and institutional buildings
- construction methods
- civil structures - rail, roads and marine
- experienced engineering and design manager.



Clinton Lourens

Group Manager - Structures and Construction Engineering

Clinton.Lourens@eicactiv.com
+61 417 783 736
Brisbane

Summary

- 30 years' design and construction experience in the delivery of complex multidisciplinary major infrastructure projects in Africa, Asia, Australasia from concept through to commissioning phase in transport, infrastructure, offshore marine and resource markets
- Bachelor of Science, Engineering - University of Natal, South Africa
- MIEAust, CPEng, RPEQ.

Relevant experience

- technical lead bridges (consultant experience) including cable stay, balanced cantilever or in-situ box girder, deck unit or steel composite bridges
- significant design and construction experience including bid development, early contractor involvement and alliance management
- strong working relationships with a variety of stakeholders across all project delivery phases.

Contacts



Colin Edmonds

Technical Director - Structures

Colin.Edmonds@eicactiv.com
+61 428 678 606
Sydney

Summary

- over 30 years' experience in the design and construction of bridges and civil structures
- MEng - Engineering, Economics and Management - Oxford University
- MICE, CEng.

Relevant experience

- worked in a variety of countries including UK, Malaysia, Vietnam and Australia
- design experience including cast-in-situ, precast segmental, launched segmental viaducts, cable stay bridges and cut and cover tunnels
- experience in design delivery on major projects.



John Potts

Principal - Heavy Lift

John.Potts@eicactiv.com
+61 417 690 738
Brisbane

Summary

- 25 years' experience in construction industry, specialising in heavy lift design and alternative heavy lift and transport methodologies across various industry sectors throughout Europe and Australia
- BEng (Hons) Mechanical Engineering (1st class)
- MSc Engineering
- CPEng, RPEQ, NER.

Relevant experience

- design engineering and project management of turnkey heavy lift projects (factory to foundation)
- extensive design experience of specialised transport and heavy lift systems including temporary works requirements.



contact@eicactiv.com
www.eicactiv.com

A MEMBER OF THE CIMIC GROUP
 **CIMIC**