DISCIPLINE BROCHURE

Digital

OPPORTUNITIES THROUGH EXCELLENCE

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BG&E

BG&E is an international civil and structural engineering consultancy celebrated for its **innovative, cost-effective, and award-winning** designs.

With a dynamic team of over 700 people spanning 15 offices worldwide - including Australia, New Zealand, South East Asia, the United Kingdom, and Middle East - we unite local and international professionals to deliver practical solutions with a strong focus on constructability.

Our clients consistently return to us, attesting to our exceptional service, responsiveness, and track record for delivering tailored solutions for technically challenging projects. The quantity and scope of engineering awards we've received acknowledge our diverse industry contributions and the exceptional quality of the services we deliver across a host of regions, disciplines, and sectors.

The Future of Engineering is Digital

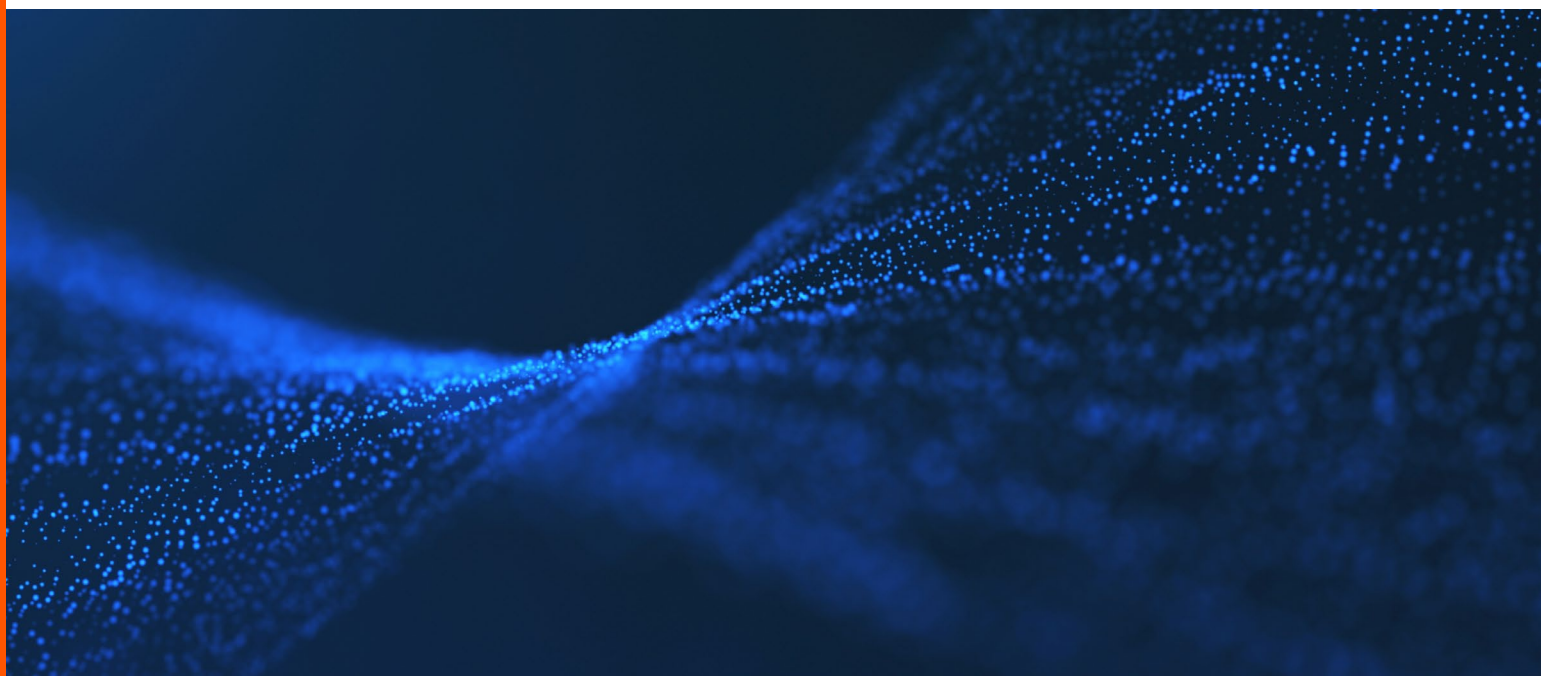
At BG&E, we help our clients navigate digital transformation by combining technical excellence with technology to deliver innovative solutions that provide value and solve complex, unique challenges.

We turn complexity into clarity, combining engineering expertise and digital innovation to build systems that drive measureable success.

Our core focus areas are:

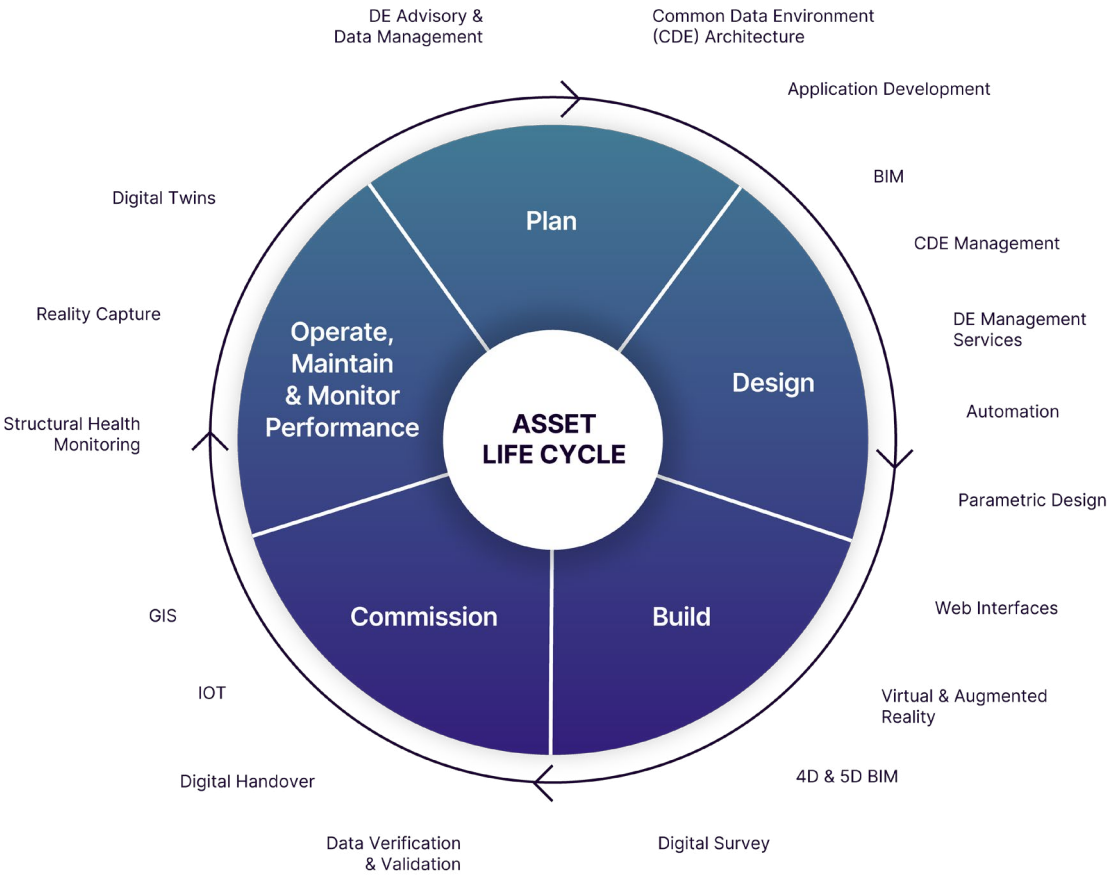
- Digital engineering, digital systems, GIS and BIM to manage data-rich projects.
- Computational engineering and software development using modern frameworks.
- Parametric design for value engineering and design-phase analysis.
- Analytics and AI to structure data, extract insights, guide decisions and improve processes.
- Interactive, high-quality web application development.

Our goal is simple: to solve real problems and create value by integrating engineering with digital expertise.



End-to-End Asset Management Through Digital Workflows

We support the full asset lifecycle – from architecting data at the planning stage, to developing tools and apps to streamline work during the design, construction and commissioning stages, through to applying analytics and AI to optimise operation, maintenance and performance of mature assets.



The Business Case

We design adaptive digital tools – built by engineers, for engineers – to improve efficiency and manage increasingly complex systems. Our goal is to free up time for problem-solving by improving processes that can be done smarter, faster and more effectively.

The Problem:
Inefficient Processes

- "There must be a better way to do this" moments.
- Repetitive, error-prone workflows.
- Large volumes of data needing processing.
- Legacy systems and data.
- Complex problems beyond manual resolution.

The Solution:
Adaptive Digital Technology

- Streamlined delivery with reduced overheads.
- Greater technical accuracy and consistency.
- Faster reporting with clearer insights.
- Informed, data-driven decision-making.
- Scalable tools tailored to your environment.
- Boosted productivity and improved project satisfaction.

Our Scopes of Work

We operate across four core disciplines: Digital Engineering, Data & Analytics, Computational Engineering, and AI, which are underpinned by Web Development. These areas often intersect, enabling integrated solutions such as user-facing digital tools powered by computational models, AI, and real-time data.

Digital Engineering

We deliver digital engineering solutions across large, multidisciplinary projects by implementing Common Data Environment (CDE) architectures, developing custom BIM workflows, and integrating GIS processes. Our team specialises in parametric design using tools like Grasshopper and create tailored Revit tools to enhance model accuracy and project coordination.

Computational Engineering

Our computational engineering tools capture in-house expertise and automate complex calculations. We've developed software to support internal and external groups.

Data & Analysis

We build robust data pipelines and analytical tools that generate actionable insights. From ProjectWise setup and migration tools to machine learning models that predict bridge load ratings – our work enables smarter, data-informed decisions. We also apply these capabilities internally to hit the ground running when solving problems for you.

AI & Large Language Models

We use AI and large language models to extract structured data from unstructured sources like Microsoft Word files and PDFs. This enables intelligent search across internal knowledge bases – for example, finding employees with relevant technical expertise. We also develop chatbots that streamline access to information and support key workflows.

Web Development

Our team builds user-friendly web applications that integrate with other digital focus areas. These apps are designed for broad accessibility – enabling engineers and project teams to interact with complex data and bespoke tools through simple, intuitive interfaces.

DIGITAL ENGINEERING (INC. BIM ACROSS MULTIPLE DISCIPLINES)

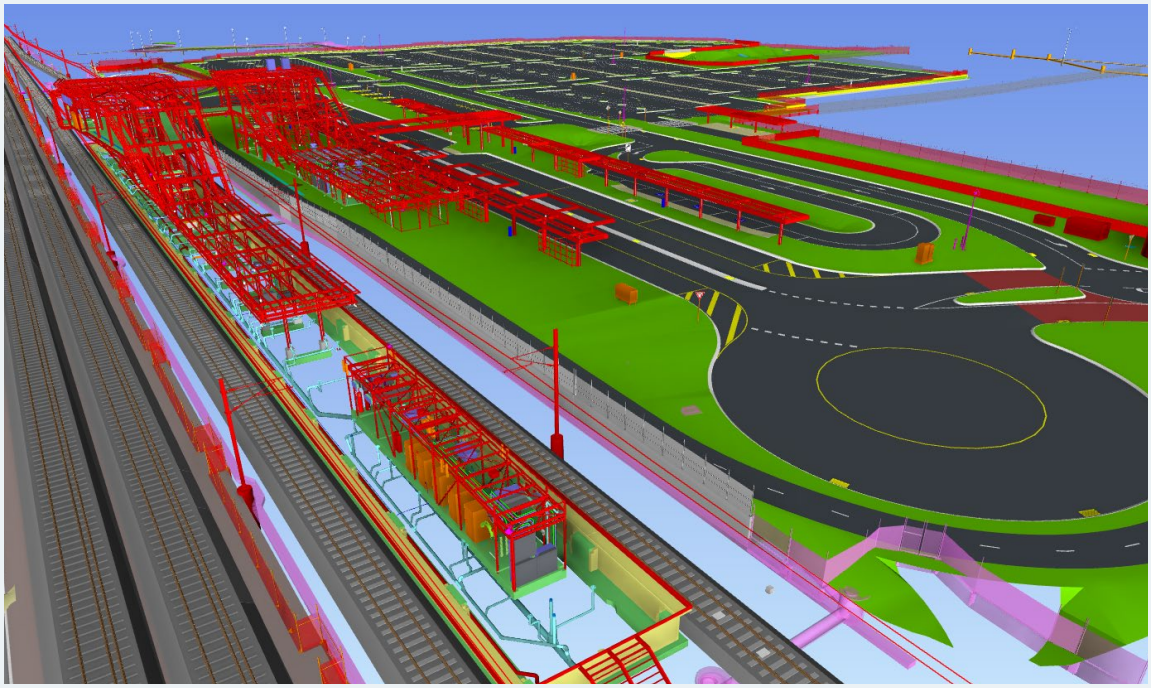
Digital Engineering is the strategic use of data to manage assets across their lifecycle – enabling smarter design, better coordination, and more efficient project delivery.

We support complex, multidisciplinary projects by integrating digital tools and data-centric workflows. This approach enhances collaboration, improves technical outcomes, and reduces risk – making Digital Engineering essential to modern infrastructure delivery.

CLIENT BENEFITS

- Improved design coordination and clash resolution.
- Streamlined workflows and structured data handover.
- Better decisions through connected, consistent information.

METRONET - MIDLAND STATION REDEVELOPMENT



LOCATION

Midland, Western Australia

SCOPE

Relocation and construction of a new Midland Station, featuring:

- Three platforms for six-car trains, and a 24/7 pedestrian overpass.
- 12-stand bus interchange.
- Multi-storey car park (800+ bays).
- Integration with Bellevue Railcar Facility.
- Links to Midland Gate and Health Campus.

SOLUTION

- BIM execution at LOD 300 for accurate coordination and estimation.
- Tools: Autodesk Revit (architecture, structure, MEP), Navisworks (clash detection), and custom Revit families for platforms, canopies, signage, and equipment layouts.

IMPLEMENTATION

- Real-time coordination in a shared model environment.
- Routine clash detection across disciplines.
- Centralised BIM model as a single source of truth.
- Seamless data auditing using internally developed BG&E tools.

IMPACT

- 95–98% accuracy in quantity take-offs.
- Reduced rework and delays through early clash resolution.
- Improved stakeholder engagement via detailed visualisations.

COMPUTATIONAL ENGINEERING ACROSS ENGINEERING DISCIPLINES

Computational engineering captures intellectual capital in software – transforming in-house expertise, design standards, and engineering principles into scalable tools.

We build tailored tools that automate complex calculations, apply consistent logic, and deliver repeatable, auditable outcomes. These solutions reduce manual effort, improve accuracy, and unlock efficiency across design workflows.

CLIENT BENEFITS

- Faster turnaround on technical deliverables.
- Improved consistency and reduced human error.
- Scalable tools deployable across projects or teams.

BRÜCKE & FOR EXCEL

CLIENT

BG&E (internal)

CHALLENGE

The existing tools for analysing complex prestressed concrete sections faced significant limitations, including a lack of verifiability, accuracy, and inability to integrate specific client standards (e.g., Main Roads WA requirements). Proprietary software lacked flexibility, while user-built spreadsheets were prone to complexity and errors.

SOLUTION

Brücke is an advanced computational engineering solution featuring:

- A verified, reusable back-end analysis library for reinforced, prestressed, and post-tensioned concrete design.
- A user-friendly front-end Excel add-in called “Brücke for Excel,” enabling quick and reliable access without extensive training.

IMPLEMENTATION

- Co-developed between WA Bridge and Digital teams with iterative testing.
- Continuous verification and enhancement of calculation modules.
- Built for future integration with Grasshopper, web platforms, and AI.

IMPACT

- Significantly reduced calculation time.
- Improved accuracy and consistency in engineering analyses.
- Enabled compliance with client-specific design standards.
- Broad adoption within the organisation.

DATA & ANALYTICS

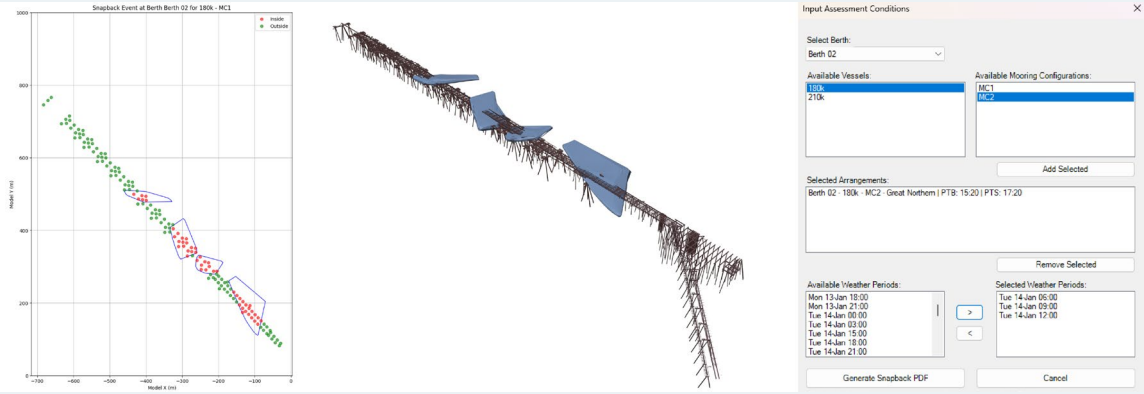
We turn organisational data into actionable insights – driving better decisions, clearer reporting, and streamlined delivery across projects.

Our team builds robust data pipelines, analytical tools, and visualisation platforms to help clients make sense of complex data. From automating reporting workflows to surfacing performance trends, we combine domain expertise with modern data practices to improve project and organisational outcomes.

CLIENT BENEFITS

- Machine learning and statistical tools to detect patterns and predict outcomes.
- Centralised, trusted data for informed decision-making.
- Automated workflows to reduce manual effort and delays.
- Real-time dashboards for improved visibility and insights.

SNAP TOOL



CLIENT

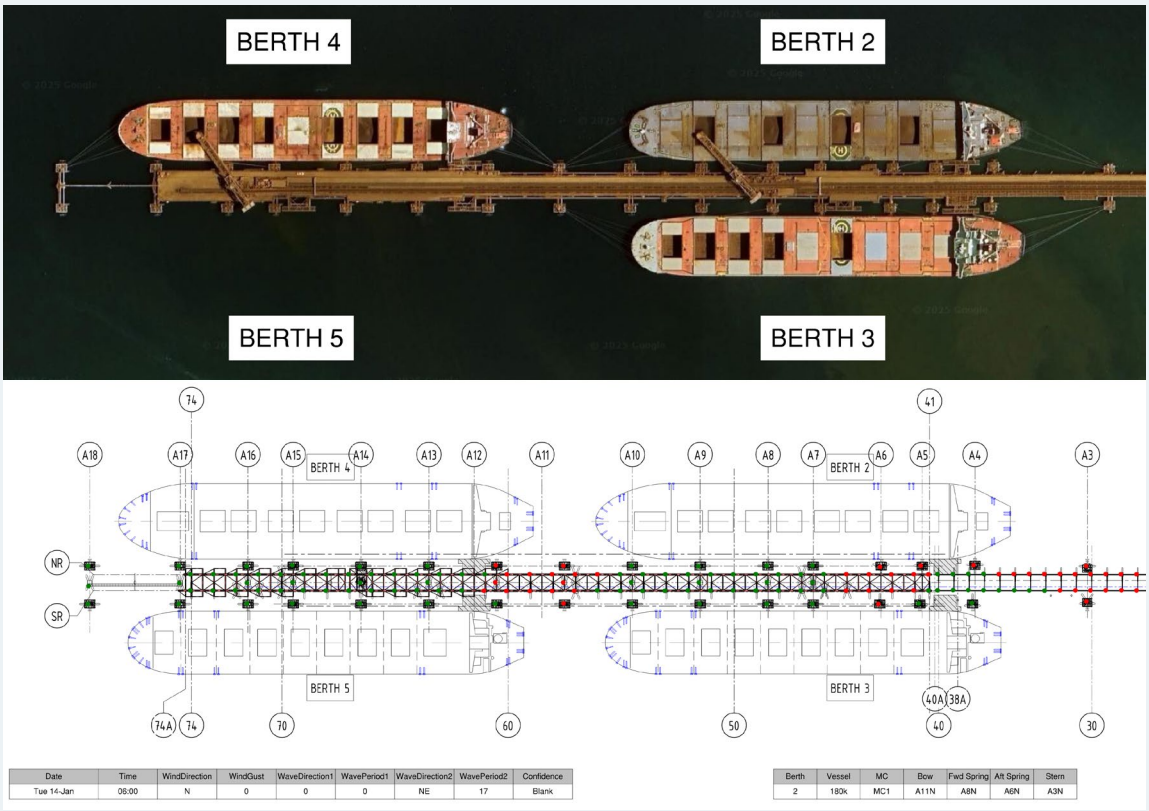
Rio Tinto Iron Ore (RTIO)

CHALLENGE

At Parker Point Terminal in WA, maintenance near moored vessels posed risk under varying weather conditions. RTIO sought to use existing data and weather forecasts to improve planning at the wharf.

IMPLEMENTATION

- Co-developed with RTIO Ports and BG&E Digital.
- Automated report generation based on forecasts.
- Real-time data from instruments used to validate forecasts and trigger alerts.
- Visualise risk levels at the wharf through a PowerBI dashboard.



SOLUTION

SnapTool integrates weather forecasts with RTIO's internal data to assess site risk in real time, supporting safe and efficient scheduling of inspections and maintenance.

IMPACT

- Clear assessment of snapback risk.
- Informed planning of works, reducing frequency of berth shutdowns.
- Significant cost savings through better scheduling and risk management.

AI & LARGE LANGUAGE MODELS

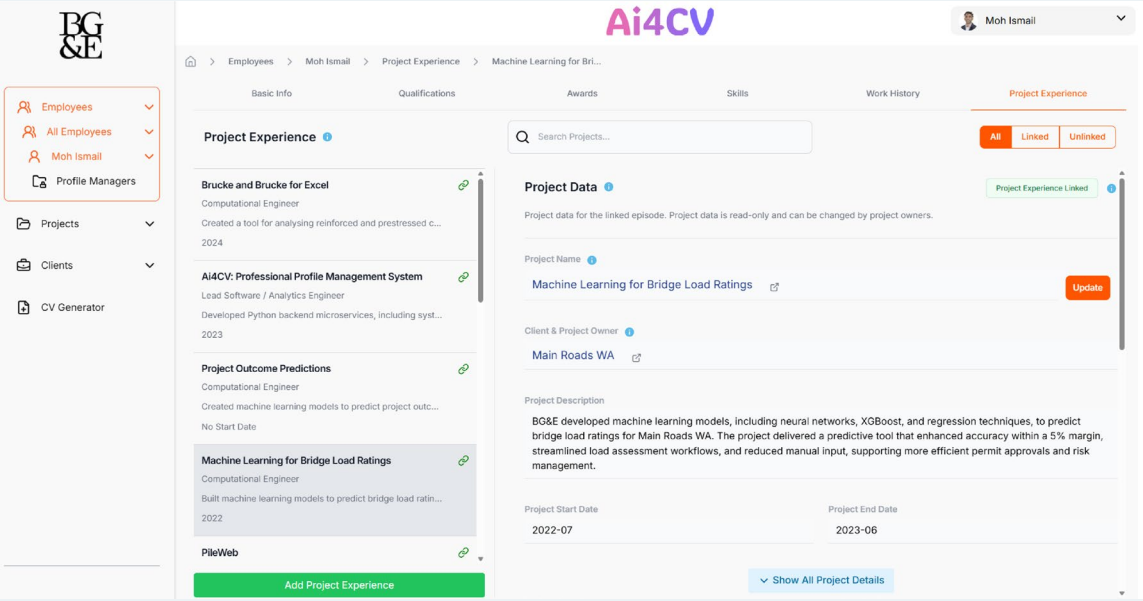
We use AI and large language models (LLMs) to automate workflows, capture and leverage data, and deliver scalable solutions that enhance project delivery and decision-making.

Our AI capabilities turn information hidden in CVs, reports, emails, and proposals into structured, searchable data. We build intelligent workflows that streamline resourcing, automate reporting, and enable instant access to project knowledge.

CLIENT BENEFITS

- Instant access to key project data.
- Reduced admin through automated data capture and lookup.
- Scalable, adaptive workflows aligned to evolving business needs.

Ai4CV



CLIENT

BG&E (internal)

CHALLENGE

Managing CVs, internal project and client information, and employees' project experience was time-consuming, error-prone, and lacked effective search functionality for ternders and bids.

SOLUTION

Ai4CV is an AI-driven solution leveraging Large Language Models (LLMs) to:

- Automatically scan and parse CVs, reports, and project documents to extract structured data on experiences, skills, projects and clients.
- Store extracted information in a central, searchable database.
- Automatically generate tailored CVs and project summaries for tender and proposal submissions.
- Power intuitive chatbots for rapid access to relevant employees, projects, and client history.

IMPLEMENTATION

- Joint development by Digital and CSG.
- Iterative improvements based on user feedback and validation.
- Easy-to-use interface for employees to update profiles and for managers to manage client and project data.
- Integrated tools to generate tailored CVs and project summaries.
- Chatbot interface for fast, intuitive access to employee, project, and client information.

IMPACT

- Access to consistent employee, project, and client information via a 'single source of truth'.
- Reduced administrative effort through automated data capture and management and CV generation.
- Improved efficiency and effectiveness in bid and proposal preparation.
- Enhanced ability to match capabilities with project needs – boosting responsiveness and competitiveness.

At BG&E, we are united by a common purpose – we believe that truly great engineering takes curiosity, bravery and trust, and is the key to creating extraordinary built environments.

Our team of more than 700 highly skilled people, in offices across Australia, New Zealand, Singapore, the United Kingdom and Middle East, design and deliver engineering solutions for clients in the Property, Transport, Ports and Marine, Water, Defence, Energy and Resources sectors.

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