

<b>Project Location:</b>	Sydney, NSW
<b>Commencement Date:</b>	November 2018
<b>Completion Date:</b>	Ongoing
<b>Client:</b>	LLBJV (Lend Lease Bouygues Joint Venture)
<b>Project Value:</b>	\$4 Billion
<b>Contract Value:</b>	\$4 Million
<b>Key People:</b>	Matt Bradley, Tim Hawkins, Nick Cuevas, George Mansour, Tapas Thakker



### Overview:

The Sydney NorthConnex project is a large road and tunnel infrastructure project linking Sydney's M1 at Hornsby to M2 at Pennant Hills. The project involves a new 9 km tunnel.

### Scope:

Supporting the LLBJV team from November 2018, Key members of the Coengineer team lead the design, development, and commissioning of the plant management control system (PMCS). Responsibilities & scope included the following:

- Project / Design Management
  - Acted as Principle SME for PMCS Design from March 2019.
  - Lead Design team from March 2019
  - Draft and management of project timeline / planning
- PMCS (Systems)
  - HV
  - LV
  - Ventilation
  - Egress
  - Water / Drainage
  - MVAC
  - Lighting
  - Emergency Lighting
- Planning & Design / documentation (EN50128)
  - Update Software Quality Plan
  - Updated Verification & Validation Plan
  - Verification Activities and reports
  - Test Specifications
  - Redraft Sys Req development
  - Redrafted Software design specifications
  - Drafted Detailed Component Design specifications
  - Complete redraft of Software Module specifications
  - Complete redraft of Software Component specifications
  - Complete redraft of Component and module test specs
  - Alignment of documentation and activities with EN50128
- Software Development
  - Significant recode of all PLC module logic for all devices / systems (Rockwell STUDIO 5000)
  - Configuration and update of Stand Alone SCADA (FactoryTalk)



- Safety
    - HAZOP / PHA – Review / Audit
    - SIL Assignment / LOPA report – Review /audit
    - Software SIL Assessment participation – review and response
    - Hardware SIL Verification Report – input, review, and response
  
  - Verification / Testing
    - Lead test team
    - Design and draft Functional Test Specification
    - Design and draft Component Test Specification
    - Design and implement test methodology using “Test Rail” and Redmine
    - Perform all component and module level tests (FAT and FIT)
  
  - PMCS Electrical Design
    - Control Panel Design
    - Cable Schedules, Termination Schedules, PLC I/O lists
    - Oversee Panel Testing
      - Point to Point
      - Power Up Tests
      - Electrical Functional checks
      - Electrical drawing audit
    - Electrical Site support/ work Instructions for Site Electricians
    - Maintain Traceability for drawing changes, Drawing register
    - Site Panel Checks - Audits
    - Site Commissioning
    - General Electrical and Control Engineering.
  
  - Site Commissioning
    - Oversee PMCS electrical commissioning
    - Network & Control Hardware configuration, implementation, and commissioning – Switches, RTU’s, Gateways, Servers etc.
    - Complete commissioning of control system
- Project Challenges:**
- Existing project well underway prior to joining - inherited legacy project issues placing constraints on possible solutions.
  - Significant project deliverables incomplete or non-existent
  - Redesign was required for significant aspects of the PMCS system.
  - Significant pressure on project timeframe requirements, compounded by late stage head agreement to bring forward delivery dates.
- Project Achievements:**
- Integrated quickly with the existing team to identify requirements, progress, challenges, and key risk areas after being asked to join the project mid-way (approximately 2.5 years in).
  - Quickly built rapport and confidence with key stakeholders. Effectively navigated the political landscape to ensure efficient progress on critical issues.
  - Filled the Software Design Manager and Test Manager roles and took on development lead roles for PMCS after demonstrating specialist expertise and correcting several major pre-existing technical issues.
  - Brought key experience and capability not present in existing project team to assist with Design and Safety / SIL areas of the PMCS (EN50128).
  - Quickly built experienced and effective project team of 15 engineers