

electrixline

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More substations for the Waikato



Growing energy demand in the Waikato has prompted local electricity distribution company WEL Networks to initiate a major programme of new and upgraded substations. Over the next few years, the company is building eight new zone substations and upgrading a further three.

This growth-driven initiative called for the specialist design-build expertise of Electrix who recently completed the first "greenfield" development as part of this programme.

Within twelve months an empty section in the Tasman commercial area was transformed into a fully commissioned zone substation.

Electrix Design Engineer George Potts, who led the design, considers this an exciting programme of projects, not least because it allows Electrix to prove its worth in this niche area. And while the client provided a generic blueprint with equipment specifications, the reality is never quite like a design solution, he remarks. That's where skills and experience come to the fore.

At Tasman Rd, for instance, it was tricky to deal with the space constraints. George Potts explains that the layout had to consider the limited footprint that was available. This had to be consolidated with maintenance requirements while also incorporating a high degree of future-proofing to ensure that the design would allow expansions that may be required over time.

Other issues, such as the need to minimise environmental noise are resolved through careful building design and the use of low noise transformers, which was done with much success in the case of Tasman Rd; a neighbour asked when the substation would finally be switched on, not realising that it had been quietly operational for a month already.

WEL are also happy with the implementation of the programme to date. Capital Projects Manager Warner Nichol credits Electrix with the ability to deliver. He says, "a particular strength was their ability to boost resources as required and, of course, their experience in building substations."

He also acknowledges that tight co-operation was imperative, especially since the transformers were sourced from Indonesia and switchgear arrived from Germany. Clearly any shift in the delivery date had the potential to affect outcomes; extra resources as and when needed were therefore vital to ensure completion by mid winter and increase the network capacity during this time of high load.

The Tasman Rd substation features two 23 MVA 33/11kV transformers, a suite of 33kV and 11kV gas insulated switch gear, and a suite of 11kV switchgear with a 2000a bus. It has seven 11kV feeder cables and uses sophisticated SEL electronic protection and communication equipment. A new fibreoptic cable – also laid as part of the project - connects the new substation with the supplying substation at Pukete and allows all data to be retrieved remotely.

Following commissioning, the team is swiftly continuing with the programme and building on lessons learned so far. And with the next new substation located in the midst of a residential area, there will no doubt be a host of different challenges to deal with.

Ground power for aircraft

Thanks to the installation of Ground Power Units and Preconditioned Air Units at the Auckland International Airport, parked aircraft can plug into a fixed access point direct at the air bridges. This provides aircraft with the necessary connection to these vital services and makes the cumbersome mobile equipment a thing of the past.

As a long-term high voltage electrical services provider to the airport, Electrix was commissioned to provide the required additional high-voltage capacity for this important project. It involved extending a 6-panel switchboard to 10 panels and installing four additional 11kV/400V transformers to complement the existing two transformers.

The airport and Electrix shared the responsibility for the safety management during the commissioning process across the respective existing and new components of the system. For our part the Electrix team relished this vote of client confidence and delivered a flawless permit management system which augmented that of the airport.



During the installation phase, the Electrix technicians proved their worth by proactively suggesting improvements that helped to provide several system benefits including a high degree of standardisation across the switchgear.

According to Electrix project manager Des Howard, the project success was largely a result of great planning, Electrix teamwork and tremendous support from the client. "We couldn't have asked for a better working relationship," he said.

A new transformer for Silverdale



Following the sustained residential and commercial growth in the area North of Auckland, Transpower recently added a second transformer at the Silverdale substation to cater for the increased demand.

Having already constructed the Silverdale substation, Electrix was also called upon to install the additional 220kV to 33kV transformer. Given the future-proof design of the substation, the upgrade was relatively straightforward for the company's substation experts.

However, the project required a reconfiguration of the Albany substation which hadn't been built with the same degree of foresight. As a result, it received a new 220kV bus to accommodate the additional 220kV line to Silverdale.

The entire project was delivered in a textbook manner - safely, on time and on budget.

New software for on-line training and assessing

The commitment to continuously improve business has led Electrix to adopt "Perception" - a new on-line tool that allows the company to assess employee competence and provide training that can be best delivered through on-line learning.

Electrix is using the software for a number of applications, including the company's induction programme which new employees can now work through at their own pace. Assessments of employees in renewing industry access and work permits are also conducted on-line which

eliminates the need for formal retraining.

This software also allows the assessment of new managers and supervisors on their knowledge and understanding of all of the company's manuals. Future stages will include the development of job-specific competency assessments.

Auckland's new busway

The recent practical completion of the Northern Busway represents the country's first purpose built bus transport corridor. It provides 8.5 km of new roadway on Auckland's Northern Motorway between the Harbour Bridge and Constellation Drive where a park and ride station was already completed in 2005.

Congestion-free bus travel was made a reality by a large committed project team; among them was Electrix who provided the electrical fitout for the three bus stations - Sunnynook, Westlake and Akoranga. Commissioned by NZ Strong, Electrix' task was to deliver a turnkey package with a non-negotiable timeframe for completion.

"Our portion of the works started in May," says Electrix Project Manager Doug McRobbie who oversaw the project.

"With our work spread across three greenfield sites along a 6 km stretch, we knew it would be a co-ordination effort." However, after a few initial teething problems with a 'roaming' project office, his communications-focused approach paid off.

He says it was fundamentally about getting everybody, including subcontractors, on board through regular meetings, carefully co-ordinating all activities and making sure that procedures were in line with the expectations of the many stakeholders. After all, with most work carried out adjacent to a busy motorway (or on top of it, in the case of the covered pedestrian bridge at Akoranga), there was no room for improvisation or errors.

Thanks to a tightly run operation, the team did a sterling job and dealt with



unexpected issues, like the delayed arrival of steelwork or weather-induced changes to the programme.



A section of one of the massive 50 metre high poles being installed in Highbrook.

Moving a line

The development of the Highbrook Industrial Park in South Auckland required the relocation of a 3km section of the Otahuhu-Penrose C transmission line. Transpower commissioned Electrix earlier this year to carry out the diversion of this vital supply line for Auckland City.

However, moving a line within an urban environment dominated by roads and industrial development resulted in a design solution that features very large poles - 50 metre high monopoles which will be the tallest in New Zealand.

For Electrix this represents a range of exciting challenges. 30 metre deep foundations are required to anchor the massive poles which measure 3 metres in diameter at their base. Electrix Transmission Lines Regional Manager Jeff Carew puts it in perspective, "That's 250 m³ of concrete, 40 truck loads worth for each foundation".

The erection of the 50-tonne poles is similarly spectacular with one of the nine poles to be erected once the circuit is live, to minimise the impact on the grid operations.

But it's not only about sheer size. There's also the matter of several underground services that have to be negotiated as part of the project. This means interfacing with a large number of stakeholders, contractors and infrastructure owners during planning and construction.

And lastly, the new line (together with two other lines which are being undergrounded as part of a separate contract) will need to be tied into the existing circuits. In itself a complicated process, this tie-in will be driven by the requirement to ensure continuity of service on this important line.

Jeff Carew is quietly confident that his team will overcome the tight time constraints and deliver project as scheduled in May.

Transformer troubleshooting



When the T11 transformer - one of two that supply the Winstone Pulp Mill recently tripped on a fault, the Electrix team immediately sprung into action as Transpower requested a series of comprehensive tests at the Tangiwai substation.

However, finding the fault involved a number of technicians and maintenance staff who worked frantically in adverse and challenging weather conditions as they eliminated potential causes that required the removal of various components for testing. In the end, it was confirmed that a faulty relay was the culprit. Having sourced, tested and installed a new relay, the transformer was soon in service again.

Electrix contract manager Nigel Shaw, acknowledges that it was an intense troubleshooting process but he says that it was an opportunity to show that they go the extra mile for their customers.

Maintaining lines in Australia

The recent award of a major inspection and maintenance contract in Victoria for Powercor and CitiPower is a fitting milestone for Electrix' decade-long client relationship with these distribution businesses.

The "find and fix" contract will require approximately 100 full-time personnel to inspect and maintain some 120,000 assets; it represents one of the largest contract wins by Electrix since its entry to Australia.

The scope builds on similar previous contracts undertaken for these companies and includes ground line and pole top inspection, minor maintenance of all distribution poles and the update of all asset data systems to "as built" status. Maintenance work will be carried out by two-man crews working in a single-man-aloft configuration.

As part of the contract, Electrix will work proactively with the clients to develop innovative solutions for delivering greater network asset performance.

Key challenges include the ramp up in resources to undertake the increased scope of work and the application of new technology to undertake detailed inspection of timber cross arms with image capture systems. The consolidation of inspection and maintenance activities together with improved assessment of cross arms will provide major operational and network reliability benefits for Powercor and CitiPower.

The contract runs for 3 years with two one-year extensions.



More expansion and upgrades

After years of strong organic growth in Australia, Electrix has - for the first time - adopted a different growth strategy with the acquisition of Power Services Victoria (PSV). Following the company's seamless integration, Electrix has now increased its reach east of Melbourne with two new depots in Pakenham and Bayswater.

In addition to the increased presence and resources in Victoria, Electrix has also undertaken an extensive office and depot relocation and upgrade programme to cater for the company's growth. This includes the expansion of the head office and depot in Spotswood (Victoria), new purpose-built facilities for the office and depot in

Toowoomba (Queensland) and Urangan, Hervey Bay (Queensland). Rockhampton and Adelaide also outgrew their former office and depot facilities and relocated to larger premises.