



2.0 PROJECT JUSTIFICATION AND FEASIBLE ALTERNATIVES

2.1 PROJECT JUSTIFICATION

Electricity use in Southern Queensland has exhibited very strong growth during the past ten years and growth is expected to continue over the next ten years, due to population growth and the on going uptake of domestic air-conditioning.

Powerlink recognises the importance of maintaining a reliable electricity supply to its customers. Routine planning investigations have been carried out to identify the most appropriate course of action to meet future supply requirements in Southern Queensland.

The existing transfer capability of Powerlink's network between Central Queensland and Southern Queensland, as well as between Bulli, South West, and South East Queensland, is described by limit equations which dynamically maximise the transmission capability available to electricity market participants at any time. Notwithstanding this, it has been identified that the required power transfer between the Bulli and South West zones will reach the capability of the existing network from summer 2010/11. These limitations can be addressed incrementally until 2012/13 whereby a major augmentation is required between these two zones. In addition to power transfer limitations, fault level limitations at the Braemar substation are forecast to coincide. These will impose limits on the capability of that facility to meet system and security limits.

Powerlink has undertaken an assessment of options and carried out consultation as required by the National Electricity Rules prior to approving the option which has the lowest net present value cost, in accordance with the Australian Energy Regulator's regulatory test. Under this assessment, it was found that the option which satisfied the regulatory test involved establishment of Western Downs substation by 2012/13.

Because of the fault level limitations of the Braemar Substation, even the alternative options considered which did not require establishment of Western Downs Substation as early as 2012/13 still required this new substation within a further five years to address the fault level limitations at Braemar Substation.

2.2 FEASIBLE ALTERNATIVES

2.2.1 Options Considered by Powerlink Queensland

2.2.2 "Do Nothing" Option

In proposing this Project, Powerlink has also considered, and rejected on the grounds of Powerlink's mandated legal obligations for reliability, a 'do nothing' option. As previously noted, the expected population growth of South-east Queensland region, and ongoing increased use of air-conditioning, will result in increased load and peak demands. Establishment of further generation capacity within the South West Queensland sector will exacerbate the network limitations described above.

Under the *Electricity Act 1994*, the National Electricity Rules and the terms of its Transmission Licence, Powerlink is obliged to reinforce or augment the existing network where necessary to ensure reliability and quality of supply. The forecast increased electricity demand in the area therefore makes action non-discretionary.



Even if the demand growth proved to be slower than forecast, the identified short-term and long-term network limitations will still emerge, albeit slightly later than forecast. It is therefore strategically prudent (and consistent with the principles of the South-East Queensland Regional Plan) to undertake the required development. A similar conclusion applies if the demand growth proves to be higher than forecast.

2.2.3 Upgrade of Braemar Substation vs Establishment of a New Substation

Fault levels at Braemar substation will approach the operational limits of the substation equipment as additional generators are connected. Technical studies were undertaken to address these limits and assess alternative options within the substation site. These studies indicated that significant disruption and costs would be incurred in upgrading the substation. It was also identified that this may also require the upgrading of equipment within the power stations which were directly connected to Braemar. In consideration of this, it was concluded that the establishment of a substation remote from Braemar would provide the opportunity to manage the fault limits, avoid alterations to existing generators, and also provide an opportunity to marshal further generators. This new substation was identified as Western Downs Substation.

The studies undertaken in line with the Australian Energy Regulator's regulatory test showed that even the higher cost options which considered upgrading Braemar Substation by 2012/13 still required the establishment of a new substation at Western downs within a further five years to address the re-emerging fault level limitations at Braemar Substation.

2.2.4 Alternatives Considered for the location of the Western Downs Substation

Criteria used to assess suitable substation sites included:

- Maximise distance to Braemar Substation to address fault level issues;
- Close proximity to the Braemar to Kogan Creek transmission line to minimise connection length and an orientation that allows efficient connection to this line and to facilitate current and future requirements for corridor/s towards the QNI and the Halys area;
- Landuse and proximity to residences;
- Environmental impacts and ability to manage/mitigate these;
- Sufficient area for the initial site, rebuild, easement and turn in requirements; and
- A relatively "flat" site to minimise bulk earthworks.

From an operational and fault level perspective, it is necessary to maximise the distance of the Western Downs Substation from the Braemar Substation, and minimise the distance to the Kogan Braemar transmission line. A location adjacent to the Kogan Creek Power Station, in the vicinity of the Kogan Braemar transmission line would provide an optimum solution. The substation would avoid the Tong Park Piggery, the Wilkie Creek coal resource, and the smaller rural residential blocks north of Kogan. This would also avoid the scarps and higher country that occurs in the vicinity of Tong Park, the Kogan Warra Road and the Kogan North Road. The Kogan Creek coal resource and power station infrastructure (ash dam) are located to the east and south of the power station. A substation positioned to the west of the Banana Bridge Road, north, west or south of the power station would minimise the impacts if located in close proximity to this power station infrastructure.



5 potential sites were identified and an assessment undertaken in accordance with Powerlink's Substation Site Selection Policy (AM-POL-0891). This assessment identified a site on the western side of Banana Bridge Road and opposite the ash storage area as the preferred location for the Western Downs Substation (Figure 2.1). A field inspection confirmed this locality as suitable. The site was located on two properties (Lot 3 and Lot 4 on RP176346).

FIGURE 2.1 SUBSTATION SITE LOCATION AND PROPOSED LAYOUT

