Request for Information –

Emerging Transmission Network Limitations

Brisbane South/Logan Region

(including part of the Greater Brisbane metropolitan area, the Port of Brisbane and TradeCoast industrial area)

Powerlink Queensland
June 2001

1.0 Introduction

This document seeks information on potential solutions to emerging network limitations in the high growth Brisbane South/Logan region of south-east Queensland. Corrective action is required if reliable supply is to be maintained during credible contingencies. The paper is an integral part of Powerlink's approach to meeting National Electricity Code requirements that ensure adoption of the most cost-effective solution to future network limitations.

1.1 Purpose of the Discussion Paper

The purpose of this discussion paper is to:

- provide information about the existing transmission network in the relevant area
- provide information about emerging network limitations and the expected time at which action must be taken to maintain system reliability during contingencies
- seek information on solutions to the emerging limitations which may be able to be provided by solution providers other than Powerlink
- explain the process to be used to evaluate alternative solutions

1.2 Discussion Paper Context

Powerlink Queensland has a responsibility to ensure its network is operated with sufficient capacity to provide network services to customers[1]. If technical limits of its transmission system will be exceeded, Powerlink is required to notify Code Participants within the time required for corrective action. Prior to construction of any major network augmentation, Powerlink must also meet the following regulatory requirements[2]:

- consult with Code Participants and interested parties regarding alternative solutions, including those which may be provided by solution providers other than Powerlink such as local generation and demand side initiatives

- demonstrate proper consideration of various market development scenarios, including variations in electricity demand growth rates, and the ability of new or proposed demand-side responses and/or new or proposed generation capacity to satisfy emerging network limitations.

- ensure that the recommended solution meets reliability requirements at the lowest total net present value cost when compared with other feasible solutions.

This discussion paper is a critical step in fulfilling these regulatory obligations in relation to supply to the Brisbane South/Logan area.

[1] Powerlink's transmission authority includes a responsibility "to ensure as far as technically and economically practicable, that the transmission grid is operated with enough capacity (and if necessary, augmented or extended to provide enough capacity) to provide network services to persons authorised to connect to the grid or take electricity from the grid." (Electricity Act 1994, S34.2).

[2] As set by the ACCC and contained in Chapter 5 of the National Electricity Code

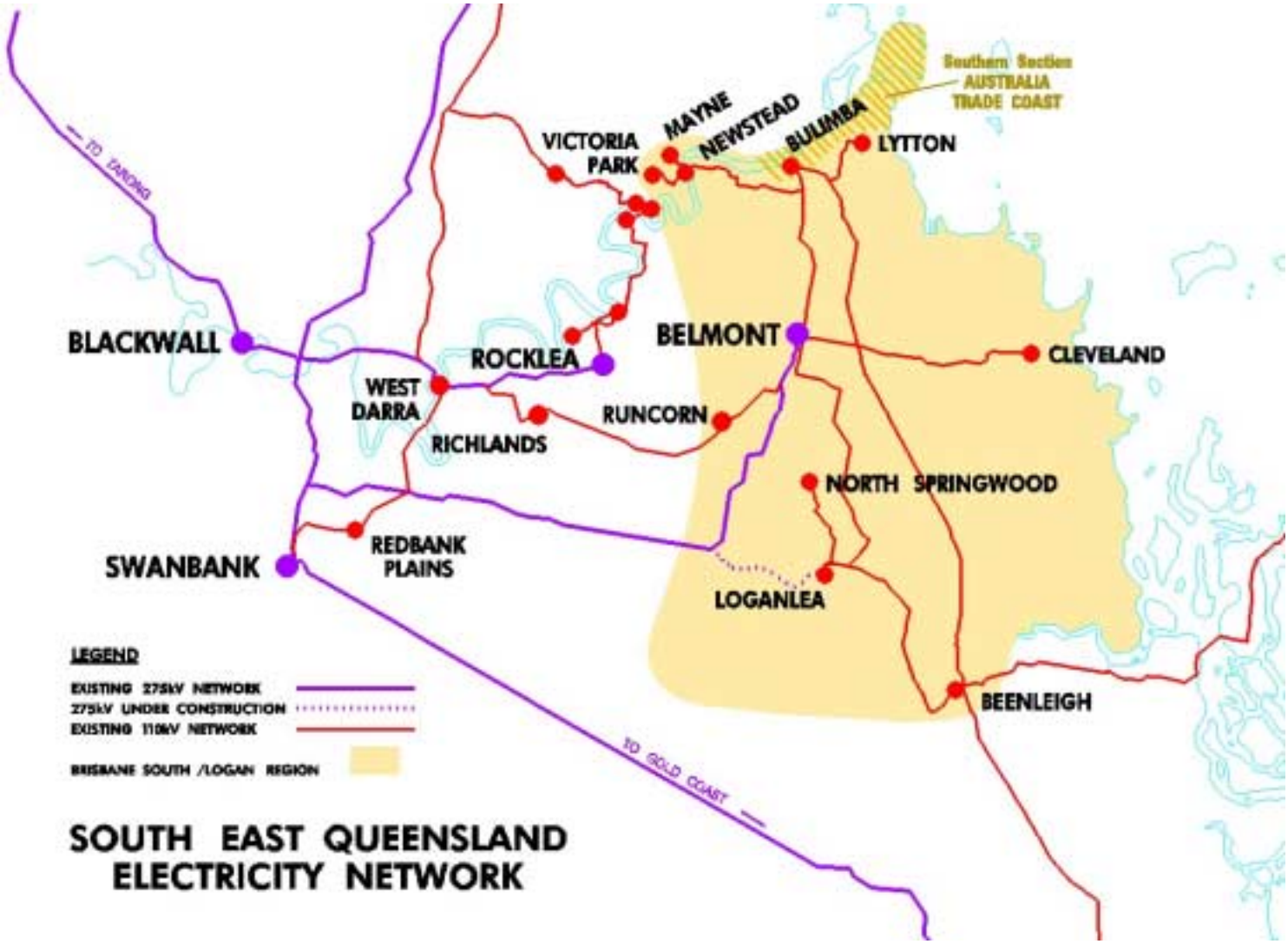
2.0 Existing Supply System to Brisbane South/Logan Region

2.1 Geographic Region

The relevant area is bounded approximately as follows:

- to the north by the Brisbane River (but includes some northside suburbs just to the north-east of the Central Business District)
- to the west by the Mt Lindsay Highway and Ipswich Rd
- to the south by the Albert River and
- to the east by Moreton Bay (see map below).

This area incorporates most of Brisbane's southern suburbs, part of the Brisbane central business district, a large proportion of the TradeCoast industrial area near the Port of Brisbane, and the fast-growing area around Logan City.



2.2 Existing Transmission System

The 275kV and 110kV supply system to the area is shown in Appendix 1. Primary supply to the region is via a double circuit 275kV transmission line between Swanbank/Blackwall (near Ipswich) and Powerlink's Belmont substation (in the south-east suburb of Mansfield). During normal conditions, the 275kV system supplies almost 95% of the electricity used in the relevant region. Minor support is provided by the 110kV system (Runcorn-Belmont and Richlands-Belmont feeders).

2.2.1. Technical Information

Substations	**Transformer No. x MVA Rating**
Belmont	2x250/2x200 MVA
Loganlea[3]	1x375 MVA

Transmission Circuits	Swanbank-Belmont 275kV	Blackwall-Belmont 275kV
Asset age	30 years	30 (part 19) years
Length	43.8km	73.9km
Circuit rating[4] (summer normal/emergency)	656/861 MVA	656/861 MVA
Circuit rating (winter normal/emergency)	938/1171 MVA	938/1171 MVA

2.2.2. Committed Transmission Augmentations

Construction of a new 275/110kV substation at Loganlea is underway. This substation will reduce the load on the Belmont substation transformers and is scheduled for completion by late 2001. It will also assist in increasing transfer capability to Loganlea during some contingencies. The Loganlea substation will be (initially) fed via a 7km double circuit line connected as a loop from the Swanbank-Belmont 275kV circuit.

2.3 Existing Distribution System

The 275kV injection point at Powerlink's Belmont substation presently provides supply into the Energex distribution system via 110kV substations at Wecker Road, Runcorn, Richlands, Newstead, Victoria Park, Mayne, Bulimba, Cleveland, Loganlea, Beenleigh, North Springwood,Stradbroke Island and Cades County. It will also supply committed 110kV substations at Browns Plains and Beaudesert once these substations are commissioned.

2.4 Existing and Committed Generation

There is no sizeable generation of electricity in the subject area. Small embedded generation developments, such as the future Rocky Point Sugar Mill cogeneration project near Beenleigh, have been accounted for as a reduction in the energy forecasts.

[3] Scheduled for commissioning late 2001

[4] As provided to NEMMCO for operational purposes. Circuit ratings are probabilistic calculations based on ambient temperature and wind condition assumptions.

3.0 Load Characteristics

3.1 Strategic Significance

The Brisbane South/Logan Region is part of the Greater Brisbane metropolitan area, with relatively high population density. The relevant area represents about one-third of total electricity demand in the South East Queensland region, and incorporates significant industrial load and metropolitan business and residential customers.

3.2 Load Growth Overview

Electricity demand in South East Queensland as a whole is currently growing at approximately 4.6% per annum.

Demand in the sub-area defined as the Brisbane South/Logan area has grown at approximately 3.6%p.a. Strong population growth has occurred, particularly in the Logan area, and this growth is expected to continue. Demand forecasts for the Brisbane South/Logan area show a steady increase in electricity demand over the next five years:

Table 1: Brisbane South/Logan Area Demand Forecasts

Brisbane South/Logan Area Demand (MW) at State Summer Peak	
Summer 2000/01 (actual)	877
Summer 2001/02	924
Summer 2002/03	950
Summer 2003/04	994
Summer 2004/05	1035
Summer 2005/06	1074

Powerlink obtains electricity demand forecasts over a ten-year horizon from Distribution Network Service Providers and customers at each connection point in Powerlink's transmission system. These forecasts thus take account of demand management programs in place or foreseen by distributors, and also the presence of embedded generation which may reduce the forecast of demand which needs to be supplied via each transmission connection point.

Forecasts in this section were obtained by aligning the local Energex forecast with an independent assessment of energy and demand forecasts for the Queensland region carried out by the National Institute of Economic and Industrial Research (NIEIR). This independent assessment included a review of the impact of potential future embedded generation.

Forecast demand at major substations within the relevant area also shows steadily increasing load growth:

Table 2: Forecast Demand on Major Substations in the Brisbane South/Logan Area

275 kV Substations Transformers No. x MVA Rating	Projected Transformer Load at Local Zone Peak (MW)[5]			
	Summer 2001/02	Summer 2002/03	Summer 2003/04	Summer 2004/05[6]
Belmont (2x250/2x200)	640	658	678	678
Loganlea (1x375)[7]	276	287	296	298

3.3 Forecast Network Flows

Examining flows on relevant parts of the transmission grid provides a more specific understanding of the demands on the network due to growth in the Brisbane South/Logan region.

Power flows across individual network elements are not necessarily directly proportional to the corresponding substation demand and load growth. They depend on a variety of factors including how particular circuits share flows with other circuits in the area.

The following forecasts show predicted peak loading on the 275kV circuits supplying the Brisbane South/Logan area with all elements of the transmission system in service. Power flows across the Blackwall-Belmont and Swanbank-Loganlea circuits are clearly increasing over time.

Table 3: Forecast Maximum Flows on 275 kV circuits to Belmont and Loganlea during system normal conditions[8]

275 kV Transmission Lines Continuous/Summer Emergency Rating	Projected MVA Loading at Local Zone Peak			
	Summer 2001/02	Summer 2002/03	Summer 2003/04	Summer 2004/05[9]
Blackwall - Belmont (656/861 MVA)	467	474	487	488
Belmont – Loganlea (656/861 MVA)	193	211	220	235
Swanbank - Loganlea (656/861 MVA)	460	489	513	493

3.4 Pattern of Use

Peak electricity demand occurs during the summer months from October to March. The pattern of electricity usage in the Brisbane South/Logan area follows a similar pattern to

[5] Projected loadings are an indication only based on typical generation and peak load condition. Belmont substation loading is presently in excess of 800MW. It is expected to reduce in the summer of 2001/02 to the forecast demand in this table following the commissioning of Loganlea substation.

[6] Reduced loadings in summer 2004/05 are due to the assumed commissioning of a second transformer at Loganlea and the assumed establishment of a new 275kV injection point at Molendinar by summer 2004/05. Without these assumed augmentations, loadings would be higher and may exceed plant ratings.

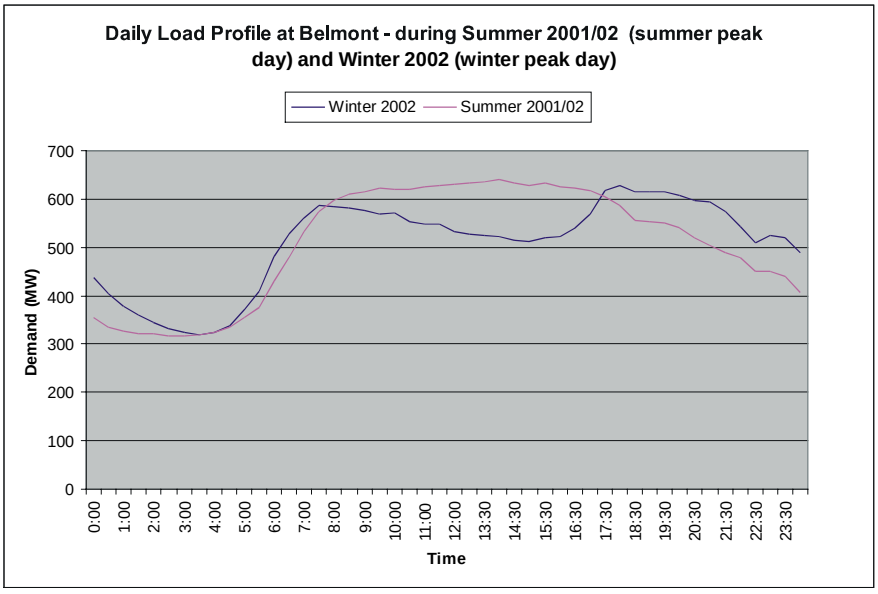
[7] To be commissioned in late 2001

[8] Load flow forecasts are based on a peak load condition and a typical generation pattern with all transmission plant in service, and should be considered an indication of possible network flows only. Much greater load flows than those shown can occur during critical contingencies.

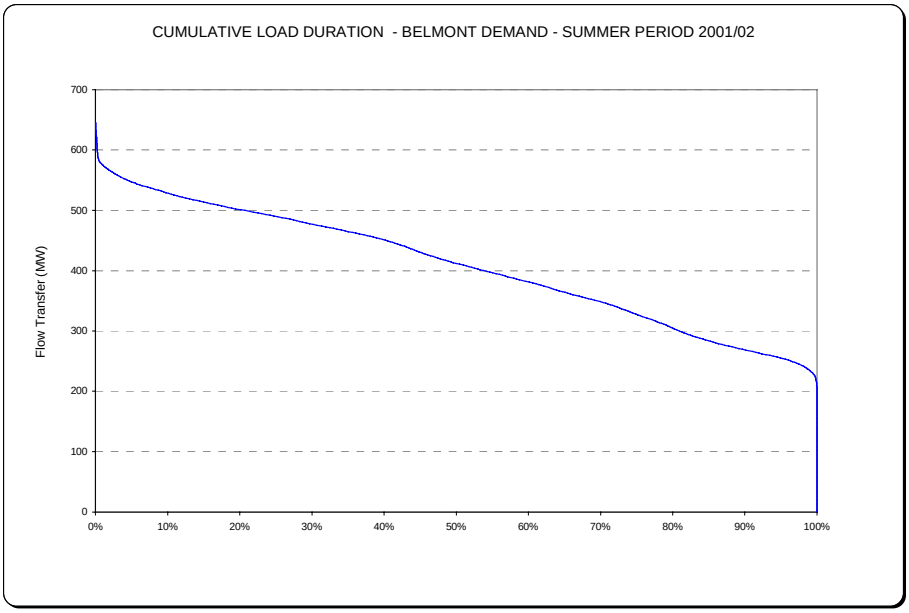
[9] As per footnote 6

that which is evident in much of Queensland – namely relatively constant electricity demand throughout the day during summer weekdays.

While peak electricity demand at Belmont substation in winter is almost equivalent to the summer peak demand, it is reached for a much shorter period. In addition, the lower temperatures in winter allow higher circuit ratings as noted in 2.2.1. It is for these reasons that summer is the critical period relevant to maintaining a reliable supply to the Brisbane South/Logan region.



Note: Based on historical load profiles mapped to predicted network flows



4.0 Transmission Planning Criteria

As a transmission network service provider (TNSP), Powerlink must comply with technical standards in the National Electricity Code. In particular, requirements relating to reliability and system security contained in Schedule 5.1 of the Code are relevant to planning for future electricity needs. This schedule includes details of credible contingencies to be considered in planning and operating the transmission network.

The National Electricity Code allows varying levels of reliability to be specified in connection agreements between Powerlink and connected Code Participants. Examples of differing levels of reliability include:

- 'N-1': able to meet peak load with the worst **single** credible fault or contingency
- 'N-2': able to supply all peak load during a **double** contingency, and
- 'System Normal': the absolute minimum level of reliability required. Defined as the ability to supply all load with all elements of the electricity system intact (ie – supply cannot be maintained during a single fault or contingency without loss of load).

Under the present arrangements, Powerlink plans its system in the south-east Queensland area to withstand a single contingency (ie an 'N-1' criterion). While Powerlink recognises that similar metropolitan and major industrial areas in other States may have higher standards, Powerlink considers that 'N-1' (ie – able to withstand a single contingency) is the appropriate criterion to meet its current Code and licence obligations.

The assessment of emerging network limitations in section 5.0 therefore covers the capability of the existing network to maintain supply during the loss of any single element (Ie: N-1 criterion). In the Brisbane South/Logan region, the most critical elements are the Blackwall-Belmont and Swanbank-Loganlea/Belmont 275kV circuits.

Some information is provided in section 5.0 on the supply capability during double contingencies. However, at present, Powerlink does not plan its system to satisfy N-2 criterion (ie – to withstand low probability double contingencies on the transmission grid), or any criterion higher than N-1.

5.0 Emerging Network Limitations

Analysis by Powerlink has determined that, without corrective action, the capability of its grid supplying the Brisbane South/Logan area will be exceeded during N-1 contingencies from the summer of 2003/04 onwards.

As electricity demand grows, a point will be reached where the existing network will be unable to supply all peak customer load during a single contingency on the 275kV lines supplying the area.

Therefore, corrective action is required to be in place prior to the summer of 2003/04 to ensure that the network can withstand a single contingency.

5.1 Capability During Single Contingencies

There are a range of technical factors which influence network capability, including line and equipment thermal ratings, protection requirements, transient stability, reactive support and voltage stability. Appropriate allowance must also be made for sufficient capability in the system to allow equipment to be maintained in accordance with Powerlink's asset management strategies.

The primary limiting factor on network capability to meet peak summer load in the Brisbane South/Logan area is the thermal line rating of the 275kV circuits in the area (see table below). This thermal rating refers to the safe maximum current carrying capacity of the equipment.

During the loss of items of transmission plant due to a fault or other contingency, the remaining elements of the transmission system must carry the total load. For supply to the Brisbane South/Logan region, the critical contingencies are the circuits from Blackwall to Belmont and from Swanbank to Loganlea/Belmont. Outages of either of these two transmission circuits require the remaining circuit to carry supply to Belmont and Loganlea. Some minor support is available from the 110kV subtransmission system during such an outage, with the West Darra-Richlands and Rocklea-Runcorn connections carrying additional flows. Some short-term relief is also available from the Energex distribution system through load transfers and switching arrangements.

Detailed load flow analysis has determined that, notwithstanding available subtransmission support, the capability of the existing network will be exceeded during a single contingency by the summer of 2003/04[10]. During a single contingency, the remaining Belmont circuit would be carrying approximately 880-900MVA, exceeding its summer emergency thermal limit of 861MVA[11]. If no action is taken to address this situation, customer loadshedding will be required during single contingencies. Thermal inertia of plant may allow ratings to be safely exceeded for very short periods, but extended operation at levels above these ratings will cause line conductors to sag below

[10] Assuming sufficient reactive reserves at Blackwall and the availability of both 50MVAr 110kV capacitor banks and at least one 120MVAr 275kV capacitor bank at Belmont.

[11] Assumes establishment of Loganlea substation in late 2001. Load flows have been predicted based on an assessment of the worst single contingency, at peak demand and assuming a typical generating pattern.

safe levels and/or items of equipment to burn out. Powerlink's licence requires it to protect its transmission grid to ensure the safe transmission of electricity. Loadshedding would be necessary to avoid transmission plant damage, to stay within statutory ground clearance requirements (a public safety issue), and to prevent wider system problems.

Current predictions indicate that from the summer of 2003-04 approximately 50MW of customer load would need to be interrupted to prevent line rating violations during single contingencies involving either of the Blackwall-Belmont or Swanbank-Loganlea circuits.

Table 4: Forecast Maximum Flows on 275 kV circuits to Belmont and Loganlea during system single contingencies

275 kV Transmission Lines Continuous/Summer Emergency Rating		**Projected MVA Loading at Local Zone Peak**			
		Summer 2001/02	**Summer 2002/03**	**Summer 2003/04**	**Summer 2004/05**
Loganlea – Belmont outage	Blackwall - Belmont (656/861 MVA)	589	605	622	630
	Swanbank - Loganlea (656/861 MVA)	332	358	382	374
Blackwall - Belmont outage	Loganlea – Belmont (656/861 MVA)	532	543	561	571
	Swanbank - Loganlea (656/861 MVA)	835	867[12]	904	889[13]
Swanbank - Loganlea outage	Blackwall - Belmont (656/861 MVA)	828	850	883	880[14]
	Loganlea – Belmont (656/861 MVA)	228	245	259	275

5.2 Factors Impacting Timing of Required Corrective Action

5.2.1. Assumed Electricity Demand

Section 5.1 identified that, without corrective action, the existing system will be unable to maintain supply during single contingencies by the summer of 2003/04.

The primary driver of this emerging network limitation is the forecast growth in electricity demand in the area. The 2003/04 timing conclusion was based on a load growth forecast that assumed normal summer temperatures and medium economic growth. Changes to this assumption can bring forward the required timing for corrective action by one year, or defer it by one year as follows:

[12] Loadflow analysis shows a minor overload of 6MVA above the summer emergency rating in summer 2002/03 if a single contingency occurs during peak load periods. This level of overload can be managed through operational measures.
[13] Summer 2004/05 loadings are based on an assumption that a new 275kV injection point will be established at Molendinar prior to summer 2004/05. Without this injection point, the overloading of the circuits supplying Belmont during single contingencies would be higher than shown in the table.
[14] As per footnote 12.

Very Hot Conditions: Using demand corresponding to extreme summer temperatures (hot conditions occurring one year in ten years), Powerlink's analysis has determined that the loading of the critical Loganlea to Swanbank and Belmont to Blackwall circuits could reach full emergency rating under outage conditions by the summer of 2002/03. The conclusion is that if one in ten year extreme summer temperatures coincide with a single contingency during the summer of 2002/03 (a very low probability), system capability would be exceeded and a loadshedding scheme of up to 5% of customer load (approx. 50MW) may need to be implemented. Such conditions result in electricity demand 2.7% higher[15] than the normal average summer weather forecast.

Mild Summer Conditions: For the other extreme, that of lower than average temperatures corresponding to a forecast which has a 90% probability of being exceeded, it is most likely that the network could supply the load during a single contingency until the summer of 2004/05. At this time, the emergency rating of the lines could again be exceeded during single contingencies.

Economic Growth: The base case projections assume medium economic growth. Powerlink is aware of government initiatives to promote the economic development of the area surrounding the Port of Brisbane. The early success of such initiatives would increase electricity demand in the area, and could therefore have an impact similar to Very Hot Conditions.

5.2.2. Assumed Generation Pattern

Powerlink has carried out analysis examining the flow across the 275kV lines between Blackwall and Belmont and Swanbank and Loganlea with a variety of assumptions about plausible generation patterns. It has been found that the time at which emergency line ratings will be exceeded is not sensitive to generation from existing and committed sources. That is, the existing network will be unable to supply all load during single contingencies in the summer of 2003/04 irrespective of the generation pattern assumed.

In particular, under normal conditions, generation at Swanbank[16] may increase flows on the Swanbank-Loganlea circuit compared with flows on the Blackwall-Belmont circuit. This pattern is reversed if power generating units at Swanbank are not operational. However, in single contingency conditions, the existence or absence of generation at Swanbank has no impact on the year in which emergency line ratings will be exceeded for an outage of either 275kV circuit supplying Belmont.

[15] Based on information from NIEIR, which estimates that the electricity demand in the SEQ area increases by 2% for each °C increase in the average daily temperature. The moderate summer demand forecast is based on a standard annual maximum summer average daily temperature (defined as the average between the minimum and maximum throughout the day) of 26.3°C, as derived from historical records. The 10% Probability of Exceedance forecast (one year in ten) is based on a 1.35°C increase in average daily temperature. Please note that this information is relevant to demand, and does not represent temperatures used in determining emergency circuit ratings.

[16] Generation output to the Swanbank 275kV bus – assumed to include Swanbank E.

5.2.3. Other Factors

There are no other factors, given the existing electricity supply system and committed augmentations, which have been identified to influence the timing of emerging network limitations in the Brisbane South/Logan area.

Reactive reserves (associated with maintaining healthy network voltages) are strained during outages if Swanbank power station is not operating. However, this can be managed in the short to medium term through the operation of the Blackwall Static Var Compensator and the switching of capacitor banks at Belmont. Voltage instability is therefore not considered a critical factor influencing the timing of required augmentation of supply to the Brisbane South/Logan area.

Augmentations to the distribution network may influence the flows on the 275kV and 110kV system in the relevant area. Powerlink has held discussions with Energex and it is agreed that there are no distribution augmentations likely to be committed in the near future that would impact the required timing for action to address the emerging transmission network limitations.

Injection of supply into South East Queensland from New South Wales via the Directlink interconnection does not influence the timing at which corrective action is required. If Directlink is importing power into Queensland, this reduces the load required to be supplied from Belmont into the Cades County area. However, even full operation of Directlink in a northward direction is insufficient to eliminate circuit overloads during contingencies in 2003/04 as Directlink does not supply directly into the Brisbane South/Logan area.

5.2.4. Conclusion

Any timing recommendation requires a balance of the risks associated with variations in electricity demand, temperature and other assumptions. It is Powerlink's conclusion that, on balance, the capability of the transmission network must be addressed before the summer of 2003/04 if supply reliability is to be maintained during a single contingency.

5.3 Capability During Double Contingencies

As noted, the Powerlink system has not been designed to withstand low probability, simultaneous double contingencies on the 275kV lines supplying Belmont. Consequences of double contingencies are outlined in this discussion paper for the purposes of providing a complete picture. Most affected parties would be aware of these consequences following two distinct occurrences of double contingency events caused by bushfires in July and September 2000.

A double circuit outage of the existing 275kV lines supplying Belmont can lead to major loss of supply in the Brisbane South/Logan area. A double contingency causes severe voltage problems and major overloads, particularly to the 110kV lines between West Darra and Belmont, and also to the Molendinar-Cades County and Beenleigh –Cades

County lines. Depending on the type of contingency and electricity demand at the time, it is estimated that the majority of the Brisbane South/Logan region load of approximately 900MW would be interrupted during double contingencies. That load includes major industrial plants where the loss of supply can lead to significant adverse environmental and economic outcomes. Load losses of this order of magnitude occurred as a result of the events of July and September 2000.

As noted in the previous section, Powerlink designs its system in South East Queensland to withstand a single contingency only, rather than a higher standard. However, a transmission alternative implemented to overcome the emerging network limitations for a single contingency would improve the supply capability during double contingencies for the foreseeable future. For example, a new double circuit 275kV supply to Belmont would be expected to eliminate customer loadshedding during double contingencies for many years (until load growth again resulted in flows exceeding the double contingency capability of the network). Other solutions may or may not be capable of achieving similar outcomes.

6.0 Market and Other Network Impacts

As noted in the previous section, the emerging network limitations in the Brisbane South/Logan area are not particularly sensitive to generation scenarios and market operations. The need for action is driven entirely by growth in electricity demand in the subject area.

However, solutions essential to maintaining a reliable electricity supply to the Brisbane South/Logan area may have broader impacts in the interconnected power system within South East Queensland. Market participants may wish to consider the following when developing alternative solutions:

- If it is recommended that a new local generation option is the most appropriate solution to the emerging reliability issues, this generator will be required to operate at certain times under contract with Powerlink. This will be essential for reliability purposes, and such operation will be required regardless of the pool price at the time (the National Electricity Code prevents a generator that is providing grid support from setting the market price).

- A demand side management initiative (eg – program to reduce electricity usage during the relevant summer peak period) must provide positive proof that it is capable of reducing flows on the relevant network elements below emergency ratings during single network contingencies within the required time. If this reduction is not achieved, the consequence is likely to be forced customer loadshedding during single contingencies and this is not an acceptable outcome.

- As noted earlier, there are no significant generation sources in the Brisbane South/Logan area at present, nor are there any new generation sources committed large enough to impact the needs outlined. If this situation does not change and load growth continues without demand side response, reliability standards will only be able to be met by reinforcing supply capability via a new transmission line between customers and existing generation sources. This may have an ongoing impact on market operations. A transmission augmentation is likely to increase the year-round network transfer capability, and reduce the likelihood of future network constraints, between power stations to the west of Brisbane and customers in the subject area.

7.0 Assessment of Alternative Solutions

7.1 Identifying Solutions

In February 2000, Powerlink published a public notice[17] advising it was reviewing electricity demand forecasts and analysis related to the transmission of electricity into the south-east suburbs of Brisbane, Logan City and the Gold Coast beyond 2002. The review sought to identify developments that might impact load forecasts and/or the need to augment supply to these areas.

Powerlink received no information on options which might satisfy emerging network limitations in the Brisbane South/Logan region in response to this advertisement. Nor has it received any information from prospective solution providers in the normal course of business or in response to its Annual Planning Statement released in May 2000[18].

This discussion paper, and subsequent consultation, provides a further opportunity for alternative solution providers to submit details of their proposals for consideration. The information provided in this document on emerging network limitations in the Brisbane South/Logan area is intended to enable interested parties to formulate and propose feasible and definitive local generation and demand side management solutions.

7.2 Criteria for Solutions

As outlined in section 5.1, it is essential that action be taken prior to the summer of 2003/04 to maintain a reliable electricity supply to the Brisbane South/Logan area. This action may involve augmentation of the transmission and/or distribution system, or the implementation of local generation and DSM options which reduce, defer or eliminate the need for new network investment.

To assist solution providers understand the technical and other requirements, Powerlink has identified the following criteria which must be satisfied if solutions are to meet the underlying need for augmentation of supply to the Brisbane South/Logan region:

Size: Feasible options must be large enough, individually or collectively, to meet the annual increase in power flow across the existing 275kV supply system feeding Belmont substation. Options must be able to supply at least 50MW to eliminate the load shedding risk in 2003/04. A further 30MW of capacity would be required in each subsequent year to meet average annual load growth.

Time of Year: Options must, at a minimum, be capable of meeting this demand growth during the peak summer months of October to March . The existing system is most in need of reinforcement during this summer peak, so options which do not reliably relieve this pressure do not represent viable

[17] Public notice advertisement in The Courier-Mail and Gold Coast Bulletin, 19th February 2000.
[18] The 2000 Annual Planning Statement advised of potential constraints in the Moreton South area.

options. Reinforcement is not likely to be required to maintain single contingency supply capability in winter until at least two years after summer capability is exceeded (ie –2005/06 or beyond)

Location: To be a viable 'standalone' non-transmission solution, an option must reduce the electricity that has to be transferred via the existing 275kV transmission system. This implies that any 'standalone' local generation option must be located so as to reduce the load at 110kV connection points supplied via the Belmont 275kV substation. Transmission augmentation combined with generation outside the relevant area may be a viable solution and generation proponents interested in this approach are requested to provide a preliminary proposal to Powerlink.

Timeframe: All options must be operational before the summer of 2003/04. As outlined, this is the required timing for corrective action to address emerging network limitations.

Reliability: Options must be capable of reliably delivering electricity under a range of conditions and, if a generator, must meet all relevant Code requirements related to grid connection.

Certainty: Options must be committed using proven technology and have funding and project management to deliver within the required timeframe. Corrective action is critical to the reliability of electricity supply to the Brisbane South/Logan area – it is not considered appropriate to rely on uncommitted developments that may or may not proceed.

7.3 Assessment of Solutions

The ACCC's Regulatory Test and Chapter 5 of the Code require Powerlink to consider local generation, DSM, and transmission options on an equal footing.

As the Brisbane South/Logan area augmentation is required to meet Code reliability standards, Powerlink is required to carry out economic cost-effectiveness analysis:

"In the event an augmentation is proposed to meet an objectively measurable service standard linked to the technical requirements of schedule 5.1 of the Code, the augmentation satisfies the Regulatory Test if it **minimises the net present value of the cost** of meeting those standards having regard to a number of alternative projects, timings and market development scenarios."

The Regulatory Test requires a public process, with disclosure of project costs. As the outcome of the economic analysis could be a recommendation to proceed with a regulated solution, it is important that all feasible options are considered in the process. If a non-network option satisfies technical requirements, is committed and can be implemented for a lower cost than a transmission augmentation, it may be necessary for Powerlink to enter into a grid support contract with the proponents of the alternative project to ensure supply reliability can be maintained. If regulated funding is required from Powerlink, it is necessary that support arrangements satisfy the Regulatory Test in terms of both economics and disclosure of relevant costs to the market.

8.0 Request for Information

Powerlink invites submissions and comments in response to this discussion paper from national electricity market participants, solution providers and any other interested parties.

Submissions should be presented in a written form and should clearly identify the proponent of the submission including contact details for subsequent follow-up if required. If parties prefer, they may request to meet with Powerlink ahead of providing a written response.

8.1 Submissions from Solution Providers

This is not a tender process – submissions are requested so that Powerlink can fulfil its regulatory obligations to compare the net present value cost of alternatives to the option of augmenting the transmission supply system to maintain supply reliability.

If your submission proposes a solution, it should contain the following information:

- Details of the party making the submission (or proposing the solution)
- Technical details of the project (capacity, proposed connection point if relevant etc) to allow Powerlink to assess the likely impacts on supply capability
- Sufficient information to allow the costs of the solution to be incorporated in a cost-effectiveness comparison in accordance with ACCC Regulatory Test guidelines.
- An assessment of the ability of the proposed solution to meet the technical requirements of the National Electricity Code
- Timing of the availability of the option, and whether it is a committed project
- Other material that would be relevant in the assessment of the proposed solution

As the submissions may be made public, any commercially sensitive material, or material that the party making the submission does not want to be made public, should be clearly identified. It should be noted that Powerlink is required to publish the outcomes of the Regulatory Test analysis. If solution providers elect not to provide specific project cost data for commercial-in-confidence reasons, Powerlink may rely on cost estimates from independent specialist sources.

8.2 Timetable for Submissions

Please provide information by Monday 30th July to:

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PO Box 1193
Virginia QLD 4014
Agray@powerlink.qld.gov.au
Tel: (07) 3860 2300
Fax: (07) 3860 2388

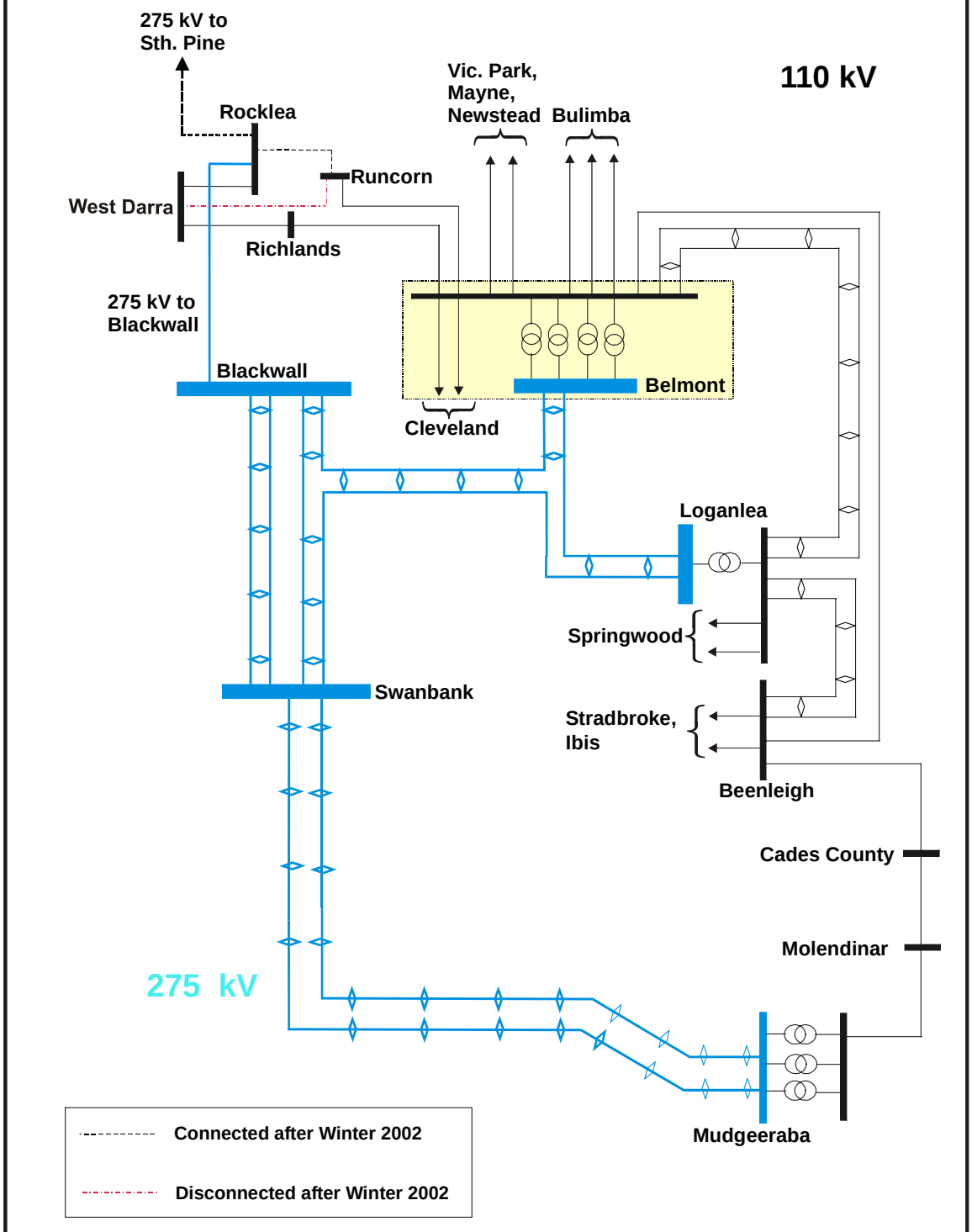
8.3 Assessment and Decision Process

Powerlink intends to carry out the following process to assess what action, if any, should be taken to address the identified network limitations:

Part 1	Initial Information Request (this paper). Submissions (responses to this paper).	Issued June 2001 Due by 30th July 2001
Part 2	Review and analysis. Likely to involve further consultation with Code participants and interested parties. Additional data may be requested to allow Powerlink to carry out the economic assessment process as required by the National Electricity Code and the ACCC Regulatory Test.	August - October 2001
Part 3	Presentation of draft report and recommendation of solution which satisfies the Regulatory Test Submissions on draft report Presentation of final report and recommendation	November 2001
Powerlink Queensland reserves the right to amend the timetable at any time. Amendments to the timetable will be made available on the Powerlink website (www.powerlink.com.au)		

The consultation timetable is driven by the need to make a decision by the end of 2001 if any option involving significant construction is to be in place by the summer of 2003/04. At the conclusion of the process, Powerlink intends to take immediate steps to implement the recommended solution to ensure that the reliability of the system can be maintained. For example, if the preferred solution is a network augmentation, it is anticipated that construction will begin by March 2002.

Appendix 1 –Transmission System as at Summer 2001/02:



SYSTEM AS AT 2001/02 SUMMER