APPLICATION NOTICE

PROPOSED NEW LARGE DISTRIBUTION NETWORK ASSET

ESTABLISHMENT OF A NEW 132/11Kv ZONE SUBSTATION AT EASTLAKE, ACT

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Executive Summary

This application notice has been prepared to provide a basis for ActewAGL to consult with National Electricity Market registered participants, AEMO and interested parties on options for the development of a 132/11kV zone substation in the East Lake area of inner-south Canberra to address the need for improved electrical network performance and capacity.

The proposed development would be classified as a new large distribution network asset under the National Electricity Rules.

This application notice is presented in the following sections:

Section 1 presents the scope and purpose of this augmentation including regulatory requirements.

Section 2 describes the limitations affecting the supply network in the area and the need for augmentation of supply to the area. The objectively measurable service standard (planning criteria), against which the need and effectiveness of augmentation options are to be assessed, is also discussed.

Section 3 presents three network augmentation options that have been identified to address the issues affecting the supply.

Option 1 : Upgrade existing Fyshwick zone substation.
Option 2 : Upgrade existing Telopea Park zone substation.
Option 3 : Establish a new zone substation at East Lake.

Section 4 provides an evaluation of the options and presents an economic analysis of the preferred option, which is to establish a new zone substation at East Lake.

At this stage, subject to outcomes of the consultation process, ActewAGL's recommended action is to construct Option 3.

The total capital cost of works associated with the construction of the zone substation is estimated to be $19M.

The proposed 132/11kV East Lake zone substation is planned to be commissioned by late 2012.

Any enquiry relating to this Application Notice should be directed to ActewAGL using the contact details provided in Section 6.

1. Introduction

1.1. Purpose and Scope

ActewAGL owns the sub transmission and distribution networks within the ACT and is responsible for planning, developing and operating those networks. The National Electricity Rules (The Rules) require that the Distribution Network Service Provider consults with NEM registered participants, AEMO and interested parties on emerging limitations within its network and options being considered to relieve them.

This application notice has been prepared in accordance with Clause 5.6.2(f) of the Rules. It relates to a proposal for a new large distribution network asset that is required to meet existing and expected growth in demand from Fyshwick, Canberra Airport and South Canberra.

It includes:

- A discussion of the background and the need for the network investment;
- A description of all reasonable options that have been identified to meet the criteria;
- An analysis of these options in accordance with the Australian Energy Regulator's (AER's) regulatory test;
- A preliminary assessment of the outcome of the regulatory test application and preferred course of action; and
- An invitation to NEM registered participants and interested parties to make submissions on this application notice.

1.2. Regulatory Requirements

1.2.1. Requirements of the National Electricity Rules

This application notice covers a proposal for a new large distribution network asset and is underpinned by Clauses 5.6.2 (a), (b) and (c) of The Rules, which require network service providers to:

- Analyse their networks and conduct joint annual planning reviews to identify necessities for augmentation or extension of those networks;
- Undertake joint planning in order to determine plans that can be considered by registered participants, AEMO and interested parties.
- Carry out an economic cost effectiveness analysis of possible options to identify options that satisfy the regulatory test;
- Publish the results of the consultation and regulatory test analysis in a report that recommends the action to be taken.

1.2.2. Requirements of the Regulatory Test

The regulatory test may be applied in either one of two ways. The regulatory test (Rule 5.6.5A) states that an option satisfies the test if:

(a) in the event the option is necessitated principally by inability to meet the service standards linked to the technical requirements of schedule 5.1 of the NER or in applicable regulatory instruments - the option minimises the costs of meeting those requirements, compared with alternative option/s in a majority of reasonable scenarios;

(b) in all other cases - the option maximises the expected net economic benefit to all those who produce, consume and transport electricity in the national electricity market compared to the likely alternative option/s in a majority of reasonable scenarios. Net economic benefit equals the market benefit less costs.

Thus for reliability or capacity driven augmentations clause (a) of the test should apply. That is, the option that satisfies the regulatory test is the one that minimises the cost of meeting the minimum network performance requirements set out in schedule 5.1 of the Rules or via a jurisdictional or customer requirement.

1.2.3. Material Internetwork Impact

The Rules require ActewAGL to assess whether a proposed new large distribution network asset is reasonably likely to have a material internetwork impact.

ActewAGL has determined that none of the works in the options described in Section 3 will impose power transfer constraints or adversely influence the quality of supply to adjoining transmission networks.

1.2.4. Demand Management

ActewAGL is currently developing technical guidelines and business processes to facilitate demand side management. These non-network solutions have been considered. However, no cost effective measures could be identified. While certain measures may defer the need of network augmentation by six months, these measures would require substantial amount of resource and time to implement and will not be cost effective in reducing network demand and deferring capital investment in this instance.

1.3. Supply Arrangement

South Canberra is the area on the south side of Lake Burley Griffin including Canberra International Airport and the north part of Jerrabomberra District. The South Canberra area has a large number of government and commercial facilities such as the Parliament House, government departments, national institutions, the Canberra International Airport, major hospitals, the Defence Communication Centre and large commercial and retail facilities. About one quarter of ACT residents live in this area.

The South Canberra area is presently serviced by three major sub transmission facilities, namely Telopea Park zone substation, Causeway Switching Station and Fyshwick zone substation.

Telopea Park zone substation supplies the central part of South Canberra where the load is predominantly from federal government departments and national institutions.

Fyshwick zone substation supplies the east part of South Canberra, mainly the Fyshwick commercial/light industrial area and the Canberra Airport with its associated commercial/retail facilities.

2. Identification of a Necessity for Augmentation

2.1.1. Load growth and Network Capacity

There has been a sustained high level of land development and redevelopment in the South Canberra region. Current large-scale developments in the area include Aeropark, Brindabella Park and Fairbairn in the Airport; Fyshwick Direct Factory Outlet; and Kingston Foreshore Development. The AFP facility in Majura is also supplied from the zone substations in South Canberra. Known coming large-scale developments include Russell Office Precinct, East Lake, Fyshwick Section 48 and 84, and Fyshwick North and East developments as well as continuing development at the Airport.

Based on information of the known current and future development in the short term and long term, it is anticipated that the demand in South Canberra will exceed the present zone substations' capacity by 2011 and that the total demand in South Canberra alone will increase by up to 60 MVA in the next ten years.

The Fyshwick zone substation emergency capacity is 46 MVA in summer. It is anticipated that this substation will run out of capacity by 2012/13. As the substation was originally constructed as a temporary facility, no provision was made for future load growth and the reliability level is lower than other zone substations. Its capacity cannot be increased due to physical limitations.

The Table below illustrates the projected summer load growth at Fyshwick zone substation under one in ten-year weather condition, if no action is taken.

MVA	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Fyshwick ZS	39	41	43	46	51	53

This forecast is based on doing nothing. The forecast submitted to the AER assumed the completion of the East Lake zone substation by 2012 and therefore projected lower loads in 2012/13 and 2013/14 for the Fyshwick facility.

2.1.2. Requirement to meet Performance Codes

The *Electricity Distribution (Supply Standards) Code* issued by the ICRC sets performance standards on the DNSP's network in the ACT that require the DNSP to

'take all reasonable steps to ensure that its Electricity Network will have sufficient capacity to make an agreed level of supply available'.

The proposed augmentation is necessary to meet the above requirement and is consistent with the design and planning guidelines established by ActewAGL management system procedure *No SR018 Network Augmentation Investment Criteria*. The process defined in this standard serves to limit network augmentation expenditure to instances where the increase in demand is clear and above the secure or firm capacity. The time-related components of the criteria (for example, 'exceeding secure capacity for one per cent of the time') reflect additional risk, which is quantifiable and considered acceptable.

3. Options

Several augmentation options were considered and narrowed down to three. These are discussed below.

3.1. Outline of Options

3.1.1. Option 1: Upgrade Fyshwick zone substation

This option involves upgrading the Fyshwick zone substation to increase its capacity. The existing configuration of the Fyshwick zone substation is 3 x 66/11kV transformers connected to a single 11kV bus. The firm rating of the substation is 46 MVA. This substation takes 66kV supply from TransGrid's connection point at Queanbeyan via two lines with a firm rating of 57 MVA.

The extent of upgrade work required would include:

- Increasing the building and switchyard footprint to accommodate the additional transformer and associated switchgear
- Modification and upgrades to existing equipment to accommodate the extension and revised configuration
- Upgrading the 66kV lines

3.1.2. Option 2: Upgrade Telopea Park zone substation

This option involves upgrading the Telopea Park zone substation to increase its capacity. The existing configuration is 3 x 50MVA, 132/11kV transformers connected to ActewAGL's Causeway switching station via three cables with a combined firm rating of 114 MVA.

The extent of upgrade work required would include:

- Increasing the building and switchyard footprint to accommodate the additional transformer and associated switchgear
- Modification and upgrades to existing equipment to accommodate the extension.

3.1.3. Option 3: New zone substation at East Lake

This option involves construction of a new 50 MVA zone substation at East Lake.

The estimated cost of the zone substation is $19 million. This cost includes:

- Switchyard works including 132kV GIS switchgear, 132kV circuits, buildings and land
- Two 50MVA transformers, 11kV switchboard, protection, control and communication systems.

3.2. Option Assessment

Option 1 is considered impractical and uneconomic for the following reasons:

- TransGrid's Queanbeyan 132kV substation that supplies Fyshwick zone substation will not have sufficient capacity to feed the projected Fyshwick zone substation load.
- The existing yard cannot be expanded due to physical constraints
- The existing 11kV switchboard cannot be upgraded to achieve the same level of reliability of other zone substations. Replacement requires major capital investment as well as building extension that, as noted above, is a limiting factor.
- Fyshwick zone substation is supplied from a 66kV system; there have been ongoing technical difficulties associated with interconnection with ActewAGL's 132kV network.

Option 2 is considered impractical for the following reasons:

- There is no space for the fourth transformer in the switchyard.
- A fourth transformer would require a new 132kV cable connection from Causeway Switching Station, and major modification in the Causeway Switching Station.
- There is no space for expansion of the existing switch and control room to accommodate the additional equipment for the fourth transformer.
- The area around Telopea Park zone substation is severely congested and it would be extremely difficult to run a new group of feeders out of Telopea Park zone substation.

In option 3 a new zone substation located in East Lake will provide an initial installed capacity of 2x50 MVA with provision for future addition of a third transformer. Option 3 is considered as the only viable option.

4. Economic Analysis of Option

The present value of cost for the development of a new zone substation in East Lake has been calculated for a base case of financial and technical assumptions. Sensitivity tests of these calculations due to reasonable variations in the assumptions have been carried out.

The base case assumptions and the range over which the sensitivity tests were carried out with results are shown in Table 2. Detailed calculations for the base case are shown in Appendix A.

Table 1 Cost of Option – Base Case

PV of Cost* ($M)
24.6

* Cost to establish the substation and 132kV underground cabling and connections to the 132kV system including operating and maintenance costs over a 30-year lifetime of the asset.

Table 2 Base Case Values and Range of Values Used in Sensitivity Tests

Sensitivity Case	PV of Costs ($M)
Base Case (7% Discount Rate, 2.5% Project Cost Inflation)	24.6
5% Discount Rate	27.1
10% Discount Rate	22.1
Higher Inflation	24.9
Lower Inflation	24.4
Higher Capital Cost	30.8
Lower Capital Cost	18.5

5. Preliminary Conclusions and Preferred Actions

ActewAGLs' preliminary recommendation is the implementation of Option 3 at a total upfront capital cost of $19M, to be completed by late 2012.

As an adjunct to this project, the existing Causeway switching station may be co-located with the proposed Eastlake zone substation. The Causeway switching station and associated sub transmission lines are a key switching point in the sub transmission network and ActewAGL has no business/operational reason to relocate or modify this facility. However, there is third party interest in the relocation of this facility to improve future development prospects within East Lake and Kingston Foreshore. The cost to relocate the Causeway switching station including provision in the design and construction for the co-located facility will be fully funded by the proponent and has not been included in this Regulatory Test.

6. Contact Details for Submissions and Enquiries

In accordance with the National Electricity Rules, ActewAGL invite written submissions from interested parties on this application notice.

Submissions are due by 17 January 2010.

Submissions or other enquiries should be directed by email to:

ActewAGL: mailto:brama.bramanathan@actewagl.com.au

Appendix A - Least Cost Analysis of Base Case (data shown to Year 9)

		Year	1	2	3	4	5	6	7	8	9
			09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18
Cost Element	**2009 Cost**	**PV**									
Zone substation cost	19,000,000	18,866,258	830,000	7,528,436	10,507,821	-	-	-	-	-	-
Annualised Maintenance Cost	355,300	5,779,513							314,932	307,055	299,409
Total Capital & Maintenance Cost		**24,645,770**	**830,000**	**7,528,436**	**10,507,821**	**-**	**-**	**-**	**314,932**	**307,055**	**299,409**