

Puckapunyal Military Area High Voltage Power Supply Upgrade, Puckapunyal, Vic

- 3.1 The Department of Defence (Defence) seeks approval from the Committee to upgrade existing and purpose-build new facilities to support the high-voltage (HV) power requirements at the Puckapunyal Military Area (PMA).¹
- 3.2 PMA is situated close to the regional town of Seymour, 100km north of Melbourne.² It is a major Defence training base comprising several logistics units, training schools and residential quarters on approximately 50,000 hectares.³
- 3.3 The estimated cost of the project is \$32.7 million, excluding GST.
- 3.4 The project was referred to the Committee on 25 February 2016.

Conduct of the inquiry

- 3.5 Following referral, the inquiry was publicised on the Committee's website and via media release.
- 3.6 The Committee received one submission, one supplementary submission and one confidential submission regarding the project costs and risk register from Defence. A list of submissions can be found at Appendix A.
- 3.7 The Committee received a briefing from Defence and conducted public and in-camera hearings in Melbourne on 5 April 2016. A transcript of the public hearing and the public submissions to the inquiry are available on the Committee's website.⁴

1 Defence, submission 1, p. 9.

2 Defence, submission 1, p. 3.

3 Defence, submission 1, p. 1.

4 <www.aph.gov.au/pwc>.

Need for the works

- 3.8 The existing electrical distribution network at PMA has been developed in a piecemeal fashion over many years, with modifications occurring as required. In the event of a partial system failure, the network does not provide an alternate power supply route and some parts of the network have now reached end of life.⁵
- 3.9 At the public hearing Brigadier Beutel stated:
- As the requirements of the PMA change to meet the requirements of the Australian Defence Force, the original high-voltage power supply is now in need of an upgrade. The Puckapunyal Military Area high voltage power supply upgrade project was initiated to upgrade the current and future power capacity requirements of the PMA. It is vital to the sustainability of current and emerging Army capabilities.⁶
- 3.10 The majority of the network is above ground, and is therefore prone to failure during storms. Between 2011 and 2012, PMA recorded 22 power failures, the majority of which were caused by off-site faults. Most recently in 2015, PMA experienced a total of 15 power failures. While some critical, high dependency buildings may be brought back online quickly via the four existing Local Emergency Generator Sets (LEGS) which operate at Low Voltage (LV), this response offers only a limited solution in terms of duration and coverage. It leaves the majority of PMA without HV power.⁷
- 3.11 In addition, unplanned power outages carry the potential for negative implications upon Defence's Work Health and Safety obligations including:
- loss of temperature sensitive consumables (rations and medical stores);
 - compromise to the achievement of the directed training requirements; and
 - degraded living standards of many Defence families that reside in married quarters at PMA.⁸
- 3.12 PMA's HV supply comes from a single source, known as Seymour 1 (SMR1). This is a shared feeder located at the Seymour Zone Sub Station (SMR ZSS) and managed by AusNet Services, the Distribution Network

5 Defence, submission 1, p. 1.

6 Brigadier Noel Beutel, Defence, transcript of evidence, 5 April 2016, p. 1.

7 Defence, submission 1, p. 1.

8 Defence, submission 1, p. 1.

Service Provider (DNSP). The majority of power to PMA is supplied by a Defence-owned internal radial network, connected to the SMR1 feeder.⁹

- 3.13 The current maximum supply available to PMA from the SMR1 feeder is 6.8Megavolt Amps (MVA). PMA’s daily power use average is 2.2MVA, with a maximum demand of approximately 3.5MVA. This is well below the available supply. However, in the event of a major failure occurring on the SMR1 feeder, PMA could be without HV power for an extended period. In 2013, a mechanical failure of the incomer circuit breaker led to an outage which lasted 11 hours.¹⁰
- 3.14 Mr Bernard Richards from Aurecon Australia confirmed that there are approximately five power outages at PMA per year due to the age of the infrastructure and its configuration.¹¹
- 3.15 Looking forward to 2028, Defence has predicted the demand for electrical power to increase to 7.1MVA, which exceeds the available power by 0.3MVA.¹² Table 1 below details the electrical demand of current and planned major infrastructure assets within the PMA.

Table 1 PMA’s Load Calculation

Asset	Maximum Load (MVA)
Existing PMA Cantonment Load	3.5
Future Defined Projects	2.0
Load Growth (3% per annum over 15 years on existing loads – not compounded)	1.6
Total	7.1

Source Defence, submission 1, p. 2.

- 3.16 At the public hearing Brigadier Beutel listed the future defined projects driving the 2.0MVA demand on load, including LAND 400, LAND 121, LAND 17, Joint Health Command project, and the Combined Arms Museum to support the School of Armour and School of Artillery.¹³
- 3.17 Additionally, given that the internal HV network is in an overhead configuration, associated fuse arrangements are a potential fire source.¹⁴

9 Defence, submission 1, p. 1.

10 Defence, submission 1, pp. 1-2.

11 Mr Bernard Richards, Aurecon Australia, transcript of evidence, 5 April 2016, p. 3.

12 Defence, submission 1, p. 2; Brigadier Noel Beutel, Defence, transcript of evidence, 5 April 2016, p. 4.

13 Brigadier Noel Beutel, Defence, transcript of evidence, 5 April 2016, pp. 5-6.

14 Defence, submission 1, p. 2; Brigadier Noel Beutel, Defence, transcript of evidence, 5 April 2016, p. 1.

3.18 The Committee is satisfied that the need for the work exists.

Options considered

3.19 In recent years, a number of options studies including a risk-based upgrade of the external and internal HV power supply at PMA have been developed. In 2008, Defence undertook a study of the PMA HV Power Supply and subsequently prepared a HV Master Plan. In 2013, Defence prepared Corporate Services Infrastructure Request Part One and Part Two. This included a PMA HV Options Analysis Report. The PMA HV Options Analysis Report (2014) informed the Strategic Business Case (SBC), which was approved by the Defence Estate Committee in August 2014.¹⁵

3.20 The SBC considered range of options to meet the identified need as described below. They are separated into scope elements:

3.21 **1 - Upgrade External HV Power Supply.**

The SMR1 connects to PMA via an existing Intake Switching Station 1 (ISS). This will need to be rebuilt, to allow sufficient space to house the new electrical infrastructure and meet current electrical regulation requirements (see Scope Element 1 in section below). Various locations and configurations were considered for the rebuilt ISS1.¹⁶

3.22 **2 - Provide Redundancy in External HV Power Supply.**

Two options to address the lack of redundancy power were considered:

- The preferred option is to install a second HV power supply feeder (SMR4) to the PMA, and connect it at a new Intake Switching Station 2 (ISS2) geographically separated from SMR1 and ISS1. Within this option, consideration was made to select the least costly, technically acceptable solution, and this was to extend the existing SMR4 from the SMR ZSS through a combination of overhead and underground methods to a second point of supply located on the PMA boundary at Tooborac Road. The use of underground HV cabling reduces the bushfire ignition risk and it has been selected along the line route where appropriate. SMR4 is supplied from a separate SMR ZSS busbar, which will improve the reliability of power supply to the PMA.
- A second option is to install a Central Emergency Power Station (CEPS) in lieu of the shared feeder SMR4. The use of a CEPS is usually restricted to the generation of emergency standby power for critical areas within a base. The strategic planning for PMA has not identified the need for CEPS as there are existing LEGS and smaller

15 Defence, submission 1, p. 4.

16 Defence, submission 1, p. 4.

Uninterrupted Power Supplies for selected critical buildings and assets. As a CEPS is a back-up power supply in case of emergency, it is an unfeasible option for a main power supply to the PMA. Also, this option was considered much more costly and hence discounted.¹⁷

3.23 **3 - Upgrade Internal HV Power Reticulation within PMA.**

To increase the reliability and efficiency of the internal electrical distribution to PMA, only one feasible solution was identified, which would achieve the outcome. The proposed solution is to reconfigure the existing radial network to a ring main arrangement and increase its capacity to 7.1MVA to carry the maximum load anticipated.¹⁸

3.24 **4 - Provide offset to the PMA Power Usage.**

Given anticipated growth in power demand, consideration was given to offsetting power to PMA. The following options were reviewed by Defence in the PMA HV Options Analysis Report (2014), but were subsequently discounted, as they were either not technically appropriate or were not cost effective:

- reciprocating gas engines;
- gas turbines;
- diesel generation;
- diesel rotary uninterrupted power supply;
- wind turbine;
- geothermal;
- hydro; and
- bio-mass.¹⁹

3.25 The PMA HV Options Analysis Report (2014) recommended that Defence further investigate the Solar Photovoltaic (PV) option as a method to provide energy offsetting to the PMA. This was reviewed by Defence through the design development stages but was discounted, as the cost benefit analysis identified a payback period of 19 years.²⁰

3.26 As it did not present as a viable investment (Defence's SMART Infrastructure Manual requires a payback period of seven years), detailed design development of Solar PV was discontinued and as a result, energy offsetting to the PMA power usage was not recommended as part of the project scope.²¹

17 Defence, submission 1, p. 4.

18 Defence, submission 1, pp. 4-5.

19 Defence, submission 1, p. 5.

20 Defence, submission 1, pp. 5-6.

21 Defence, submission 1, pp. 5-6.

Ownership of and investment in infrastructure

3.27 At the public hearing the Committee queried Defence on the ownership of and investment in the electrical infrastructure at PMA. Defence advised that consideration of a public-private partnership approach was undertaken at the master planning feasibility report stage of the project and there was no market interest shown.²²

3.28 The proposed external works are to be undertaken by AusNet which owns and operates the external services. However, the majority of the proposed works are internal to the Defence base and the key reasons for not privatising electrical infrastructure is that it is inside a working operational military base:

It comes down to two aspects there: the first is that if we were to look to privatise our electrical infrastructure – both above ground and in-ground infrastructure – there would be a requirement to negotiate certain easements and access for private industry to access those easements and areas at any stage. The second part of my answer to your question relates back to operational risk for Defence, and between those two – the requirement for having those easements and also the potential for a risk element for access of private personnel on to the base, and noting that Defence just recently, in the last year or so, has increased our security vetting of contractors coming on to the base to quite a high level – it creates risk.²³

3.29 The Committee queried Defence about the return on investment to the Australian taxpayer. Brigadier Beutel commented that the return on the investment is ultimately in ensuring Defence capability:

The Puckapunyal Military Area has three significant schools: the school of armour, which is predominantly heavy vehicles; the school of artillery; and the school of transport. Within those three schools young recruits coming out of Kapooka come down and do what is called initial employment training at those activities before they are moved out into units to start operating that equipment. Approximately a third of all recruits coming out of Kapooka do come to Puckapunyal to do their initial employment training, to hone their skills, to make them safe in their skills before going out into our line units, our brigades and our logistics battalion. We are

22 Brigadier Noel Beutel, Defence, transcript of evidence, 5 April 2016, p. 9.

23 Brigadier Noel Beutel, Defence, transcript of evidence, 5 April 2016, p. 2.

ensuring that we are training our people go to out into their units and support the defence of Australia.²⁴

- 3.30 Brigadier Beutel stated that the PMA is located in a bushfire prone area, therefore another return on investment is a reduction in bushfire risk.²⁵
- 3.31 The Committee found that Defence has considered multiple options to deliver the project and has selected the most suitable option.

Scope of the works

- 3.32 Defence has split the proposed works into three scope elements:

3.33 **1 - Upgrade External HV Power Supply**

This upgrade will meet increased demand for power supply.²⁶ The proposed solution is to upgrade the SMR1 feeder, demolish and rebuild the existing ISS1 and connect the two. The ISS1 is past the end of its economic life and is of inadequate size to accommodate the new electrical equipment. The proposed new ISS1 will be a pre-cast concrete and steel building that complies with electrical standards and facilitates easy cut over connection to the internal network.²⁷

3.34 **2 - Provide Redundancy in External Power Supply.**

Increasing the redundancy of HV power supply will remove single points of failure and mitigate the risk of widespread interruption to power supply.²⁸ The proposed solution is to provide an additional (predominately underground) 22kV connection, with a continuous summer rating of at least 7.1MVA, utilising the existing SMR4 feeder. The SMR4 feeder will be extended to the PMA site, terminating at a new intake switching station (ISS2).²⁹

24 Brigadier Noel Beutel, Defence, transcript of evidence, 5 April 2016, p. 2.

25 Brigadier Noel Beutel, Defence, transcript of evidence, 5 April 2016, p. 2.

26 Defence, submission 1, p. 3.

27 Defence, submission 1, p. 10.

28 Defence, submission 1, p. 3.

29 Defence, submission 1, p. 10.

3.35 3 - Upgrade Internal Power Reticulation within PMA.

This upgrade will increase the reliability and efficiency of the internal electrical distribution to PMA, meet the maximum power requirement of 7.1MVA and reduce bushfire risks.³⁰

3.36 The proposed existing network will be reconfigured to an underground ring main arrangement, connecting the intake substation to distribution substations located throughout PMA. A Power Factor Correction System has been incorporated into the design, to allow for a 7.1MVA capacity. Additionally, some existing LV equipment will be replaced, after detailed engineering inspections revealed them to be in poor condition.³¹

3.37 The project will also deliver civil works, infrastructure/essential service works and landscaping. The proposed facilities are to be located on both 'brownfield' and 'greenfield' sites, both internal and external to PMA.³²

3.38 At the public hearing the Committee queried how much of the HV cabling is aerial and underground at PMA. Mr Bernard Richards from Aurecon Australia advised that of the current 34 kilometres of cable, there is 400 metres of cable underground and the rest is overhead. Following this project the majority of the cabling will be underground:

Most of it goes underground except for 3.5 kilometres of an overhead line that does not sit within the main system; it is a spur that supplies a smaller load. It is not really a critical load, so to go underground was not a cost-effective solution. We will be using what is called aerial bundled cable to mitigate the bushfire risk.³³

3.39 Representatives from Defence stated that part of the design stage of the project was to provide a value-managed solution for the base and an assessment was made about which infrastructure could be retained. Of the 44 kiosk substations to be worked on, six will be retained.³⁴

3.40 Subject to Parliamentary approval, construction is expected to commence in late 2016 and be completed by late 2017.³⁵

3.41 Defence assured the Committee that lessons associated with delays of 13 months to the HV Electrical Distribution Upgrade at Liverpool Military

30 Defence, submission 1, p. 3.

31 Defence, submission 1, p. 10.

32 Defence, submission 1, p. 3.

33 Mr Bernard Richards, Aurecon Australia, transcript of evidence, 5 April 2016, p. 8.

34 Mr Bernard Richards, Aurecon Australia, transcript of evidence, 5 April 2016, p. 6.

35 Defence, submission 1, p. 16.

Area have been identified and the risks to delays in completion of this project have been addressed.³⁶

- 3.42 The Committee finds that the proposed scope of works is suitable for the works to meet its purpose.

Community consultation

- 3.43 In accordance with its community consultation and communications strategy, Defence undertook the following consultative activities:

- detailed email correspondence with local groups and State and Federal members, with individual briefings conducted where requested;
- notices in the local newspapers providing information on opportunities for the public to comment on issues relating to the project; and
- two public consultation sessions were held on 22 March 2016 at the shopping precinct within the PMA and at the central shopping district in Seymour, Victoria.

- 3.44 No members of the public attended or approached the project team during the consultation sessions.

- 3.45 The HV works that are required to be delivered by AusNet Services does impact four property owners along the power line route known as SMR4. During the design development, these property owners were consulted and the line layout adjusted to suit landowner requirements. Further consultation with landholders will be conducted following parliamentary approval and Defence did not consider negotiations with landowners as being a major risk to delays.³⁷

Cost of the works

- 3.46 The estimated cost of the project is \$32.7 million, excluding GST.
- 3.47 At the public hearing Defence representatives confirmed that the expected design life of the proposed works is 50 years for electrical systems and building elements, 20 years for fire detection systems, and 15 years for building mechanical systems.³⁸
- 3.48 Defence provided further detail on the project costs in the confidential submission and during the in-camera hearing.
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36 Brigadier Noel Beutel, Defence, transcript of evidence, 5 April 2016, pp. 2-3. Also see Post-implementation report of HV Electrical Distribution Upgrade, Liverpool Military Area available on the Committees website <www.aph.gov.au/pwc>

37 Defence, submission 1.2, pp. 1-3; Brigadier Noel Beutel, Defence, transcript of evidence, 5 April 2016, p. 7.

38 Brigadier Noel Beutel and Lt Col. Matthew Gallagher, Defence, transcript of evidence, 5 April 2016, p. 4.

- 3.49 The Committee considers that the cost estimates for the project have been adequately assessed by Defence and the Committee is satisfied that the proposed expenditure is cost effective. As the project will not be revenue generating, the Committee makes no comment in relation to this matter.

Committee comments

- 3.50 The Committee did not identify any issues of concern with Defence's proposal and is satisfied that the project has merit in terms of need, scope and cost.
- 3.51 Having regard to its role and responsibilities contained in the *Public Works Committee Act 1969*, the Committee is of the view that this project signifies value for money for the Commonwealth and constitutes a project which is fit for purpose, having regard to the established need.

Recommendation 2

- 3.52 **The Committee recommends that the House of Representatives resolve, pursuant to Section 18(7) of the *Public Works Committee Act 1969*, that it is expedient to carry out the following proposed work: Puckapunyal Military Area High Voltage Power Supply Upgrade, Puckapunyal, Vic.**
- 3.53 Proponent agencies must notify the Committee of any changes to the project scope, time, cost, function or design. The Committee also requires that a post-implementation report be provided within three months of project completion. A report template can be found on the Committee's website.