Australian Government

Department of Defence

PUCKAPUNYAL MILITARY AREA

HIGH VOLTAGE UPGRADE

Puckapunyal Military Area, Victoria

STATEMENT OF EVIDENCE

TO THE

PARLIAMENTARY STANDING COMMITTEE

ON PUBLIC WORKS

Canberra, Australian Capital Territory

February 2016

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PUCKAPUNYAL MILITARY AREA HIGH VOLTAGE UPGRADE

PUCKAPUNYAL, VICTORIA

IDENTIFICATION OF THE NEED

1. Puckapunyal Military Area (PMA) is a major Defence training base and includes the Headquarters Combined Arms Training Centre (CATC), the School of Armour (SoARMD) and School of Artillery (SoARTY) as units of the CATC, and, Joint Logistics Unit Victoria (JLU-V) and the Army School of Transport (AST) from the Army Logistics Training Centre (ALTC). The PMA also supports training by other Australian Defence Force (ADF) Units, Defence Cadets and civilian organisations such as Police and Emergency Services. There is also an on-base community comprising of military members and their families who reside in married quarters, with supporting infrastructure including a commercial precinct and primary school. The PMA has an area of approximately 50,000 hectares.

2. The training regimes at the SoARMD, SoARTY, and AST are considerably affected when power outages occur. Power-dependent training modules[1] are embedded within a critical path of tightly scheduled activities which range from classroom to simulator systems to on-equipment/weapon system activities, which often cannot be rescheduled satisfactorily if interrupted due to a power outage or other unforeseen loss of training capacity/capability.

3. Between 2011 and 2012, there were 22 power failures at the Base, the majority of which were caused by off-base faults. Most recently in 2015, there were a total of 15 power failures at the Base. 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, and leaves the majority of the Base without High Voltage (HV) power. In addition, unplanned power outages carry the potential for negative implications upon Defence's Work Health and Safety obligations including:

a. loss of temperature sensitive consumables (rations and medical stores);

b. compromise to the achievement of the directed training requirements; and

c. degraded living standards of many Defence families that reside in married quarters on the Base.

4. The PMA has a single feed source of HV supply, known as Seymour 1 (SMR1) from the Seymour Zone Sub Station (SMR ZSS). SMR1 is an overhead shared feeder provided by AusNet Services, who are the Distribution Network Service Provider (DNSP). The majority of the Base is supplied by a Defence owned internal radial network which is connected to the AusNet Services SMR1 feeder. The current maximum supply available to the PMA from the SMR1 feeder is 6.8MVA. In the event of a major failure occurring on the SMR1 feeder, the PMA could be without HV power for an extended period. For example, in 2013, a mechanical failure of the incomer circuit breaker led to an outage which lasted 11 hours.

[1] "Modules" refers to a component of a training course and is not an electrical asset. While all classroom-based activities are reliant on power, specific HV-dependent training activities include simulator-based training within the School of Armour, School or Artillery and the Army School of Transport.

5. The existing electrical distribution network at the PMA has been developed in a piecemeal fashion over many years, with modifications occurring as they were required. The system, as developed, does not provide the redundancy required by Defence via an alternate supply route in the event of a partial system failure. As the majority of the existing electrical distribution network is above ground, it is also more prone to failure during storms, mainly as a result of trees and branches falling onto power cabling.

6. The HV supply and internal HV reticulation network at the PMA has become inadequate as power demand has increased over time and assets reach their end of life, this poses a risk to Defence capability. The situation is expected to deteriorate further as current in-delivery and planned construction projects are added to the PMA's power demand. Table 1 below details the electrical demand of current and planned major infrastructure assets within the PMA.

Table 1 – 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**

7. The key driver for the project is the need to provide the Base with sufficient reliable electrical power to enable operations to proceed, without the disruption and inefficiency caused by electrical power interruptions or systemic shortages. The HV power design solution must be cost effective, include provision for future anticipated load growth, and deliver power of a suitable quality in order to meet Defence needs.

BACKGROUND

8. Currently, the PMA experiences a maximum demand in the order of 3.5 Megavolt Amps (MVA), with an average daily demand of 2.2MVA. The anticipated electrical demand for the PMA is projected to increase to 7.1MVA by 2028 [2]. This is an expected increase of 3.6MVA against the current maximum demand. Based on this, it is expected that the capacity of the SMR1 feeder to the PMA will be exceeded by the end of the outlook period (2028). As the projected load growth to 2028 on the PMA is 7.1MVA, this leaves a shortfall of 0.3MVA If this is not addressed, the existing HV network will not have the capacity to support future development in the PMA, to meet Defence capability requirements.

9. As the PMA is supplied by a single incoming HV feeder (SMR1), there is a lack of redundancy in HV power supply in the event of a major failure occurring at either the SMR ZSS or SMR1 feeder. This would result in the PMA being without HV power for an extended period impacting critical Defence training outcomes.

10. The existing internal Defence owned HV network comprises of aging infrastructure which in some cases has reached end of life, and it is therefore likely to reduce in reliability performance over time. The existing internal HV network is in an overhead configuration and the associated fuse arrangements are a potential fire source. As the PMA contains areas which are prone to bushfires, there is an unacceptably high risk to Defence and the wider public through property loss and loss of life. Mitigating bushfire risk forms a key part of the

[2] The projected load growth includes projects currently in development and the mandated Manual of Infrastructure Engineering Electrical of 3% growth allowance per annum

development of the design and the overhead network should be replaced with an underground network where practicable. [3]

11. The internal Western Spur line[4] serving PMA has been recorded as operating at or above the limits of its electrical capacity. This presents a high risk of potential failure of the line and this may affect the wider site network. Further, there is a reputational risk that a Provisional Improvement Notice (PIN) could be issued by Contractors and/or operating authorities such as Energy Safe Victoria (ESV) and/or Ausnet Services on the line for breaches in Australian Standards and Victorian Service Installation Rules.

Description of Proposal

12. The Puckapunyal Military Area High Voltage Power Supply Project proposes to upgrade the external HV power supply to PMA, provide redundancy in the external HV Power supply, and upgrade the internal HV power reticulation within the PMA that are fit for purpose, compliant and provide value for money. The project will also deliver civil works, infrastructure/essential service works, landscaping and demolition of an existing Intake Switching Station 1 (ISS1). The proposed facilities are to be located on both 'brownfield' and 'greenfield' sites internal and external to the PMA.

13. The proposed facilities will improve reliability and redundancy of HV power supply for the PMA. The key requirements include:

a. **External HV Power Supply.** External HV power supply to meet the capacity demands of PMA.

b. **Redundancy in External Power Supply.** Redundancy of HV power supply to mitigate the risk of widespread power supply interruption, removing single points of failure.

c. **Upgrade Internal Power Reticulation within PMA.** To increase the reliability and efficiency of the internal electrical distribution to PMA, meet the requirements of Defence's Manual of Infrastructure Engineering - Electrical (MIEE) and reduce bushfire risks.

Project Location

14. Puckapunyal Military Area (PMA) is situated close to the regional town of Seymour, 100km north of Melbourne. A map indicating where PMA is located is included at Attachment 1 and specifically Puckapunyal itself at Attachment 2.

15. A site plan of PMA showing the location of the proposed internal works is at Attachment 3. The proposed external works are at Attachment 4

[3] Recommendation 27 of the 2009 Victorian Bushfires Royal Commission recommended the progressive replacement of all 22-kilovolt distribution feeders with aerial bundled cable, underground cabling or other technology that delivers greatly reduced bushfire risk as the feeders reach the end of their engineering lives. Priority should be given to distribution feeders in the areas of highest bushfire risk

[4] The Western Spur Line consist of substations 35, 36, 39 and 40 as indicated at Attachment 2

Options Considered to Fulfil the Identified Need

16. 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 a Corporate Services Infrastructure Request Part One and Part Two, and as part of that Defence prepared 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. The SBC considered range of options to meet the identified need as described below.

17. **Upgrade External HV Power Supply.** Upgrade of the existing SMR1 feeder from the SMR ZSS to PMA will be achieved through installation of new heavier conductors, pole replacement, minor vegetation removal and increasing the power capacity of the line. SMR1 connects to the PMA via an existing ISS1, which requires to be rebuilt to enable sufficient space to house the new electrical infrastructure and meet current electrical regulation requirements. Various locations and configurations were considered for ISS1. A schematic of the proposed ISS is at Attachment 5.

18. **Provide Redundancy in External HV Power Supply.** As the PMA is currently connected to the AusNet Services distribution network by a single feeder line SMR1, there is no redundant supply in the event of an electrical failure at either SMR1 or the SMR ZSS. As this is a shared feeder, the PMA is also susceptible to supply interruptions initiated by other customers drawing HV power from the SMR1 feeder line. Two options to address this issue were considered.

a. The preferred option to provide redundant external HV power 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[5], which will improve the reliability of power supply to the PMA.

b. A second option was 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 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 to much more costly and hence discounted.

19. **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 current electrical distribution system within

[5] "Separate" busbar refers to a different busbar to that which is connected to SMR1. A busbar is a piece of electrical apparatus used to distribute power to multiple connected customer loads.

the PMA is a 22kV radial network which is distributed by overhead lines and operates at a maximum demand of 3.5MVA. This internal network is of variable age, condition and capacity having been developed in a piecemeal manner over many years thus increasing risk of internal outages, other failures and maintenance risks.

c. 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. Configuring the network in a ring main arrangement is the preferred option as the MIEE recommends a ring arrangement for HV networks supplied via underground cables and any HV equipment failure can be bypassed in an automated manner to restore supply, to reduce the impact on the Base operations. This solution also reviewed the existing overhead network and proposes to remove it where practicable and install it underground in the ring main arrangement. This option reduces the bushfire risk associated with the existing ageing overhead power lines. Further, where existing HV network assets have reached end of life or do not comply with existing regulations, replacement has been proposed to reduce overall maintenance costs.

d. By providing a second point of supply to the PMA for redundancy, a second ISS2 is required, as is an interconnector between the new and existing intake switching stations. This ensures that in the event of a power failure on SMR1, the power supply to the PMA automatically switches to SMR4. The proposed replacement of the overhead radial network to an underground ring main arrangement, installation of the second HV point of supply and the replacement of selected aged assets, provides an efficient solution to meet Defence capability outcomes at the PMA.

20. **Provide offset to the PMA Power Usage.** Given anticipated growth in power demand to 2028, consideration has also been made to provide energy offsetting through other means of power generation. The following options were reviewed by Defence in the HV Options Analysis Report (2014), and were discounted as they were either not technically appropriate or were not cost effective:

a. reciprocating gas engines,

b. gas turbines,

c. diesel generation,

d. diesel rotary uninterrupted power supply,

e. wind turbine,

f. geothermal,

g. hydro, and

h. bio-mass.

21. The 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 and was discounted as the cost benefit analysis identified a payback period of 19 years. Defence's SMART Infrastructure

Manual requires a payback period of seven (7) years. As it did not present as a viable investment, 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.

ENVIRONMENT AND HERITAGE ASSESSMENT

Overview of the Assessment Process

22. Defence proactively manages its estate through the Defence Environmental Policy, Defence Environmental Strategy and the Defence Environmental Plan. These documents provide overarching guidance to the environmental and heritage management of the Defence estate. Further to this Defence has undertaken site assessments and investigations in accordance with the National Environment Protection (Assessment of Site Contamination) Measure 1999 to ensure consistency with industry best practice standards.

23. A number of environmental considerations have been identified during the development of this proposal. The considerations have assessed environmental risks with reference to the Environment Protection and Biodiversity Act 1999 (EPBC Act) as well as the associated need for detailed assessment or subsequent approvals. An Environmental Assessment Report has been completed, and key focus areas include land contamination, fauna and flora, air quality, noise, and water. The following paragraphs address each of the environmental and heritage related risks identified during these investigations.

Heritage Considerations

24. As required under s.341S of the Environmental Protection and Biodiversity Conservation (EPBC) Act, the PMA is managed by a cultural heritage management plan: the *Puckapunyal Military Area Heritage Management Plan* (HMP) (2009). This document identifies the known heritage items within the PMA, provides a statement of significance for each and outlines the management actions required for each item. The Cantonment is listed on the Commonwealth Heritage List (CHL) for its historic heritage, mainly involving the alignment and network of the buildings and roads within the Cantonment.

25. The heritage values of the PMA are associated with its continuous use as an Army training camp from 1939 and the use of the area for pastoral, mining and agricultural pursuits. The proposed works do not impact on any heritage values associated with the Commonwealth Heritage List.

Environmental Considerations

26. The Environmental Management Approach has been to avoid environmental risks where reasonably practical, through considered siting of fixed assets and micro-siting cable trenching away from areas of environmental significance (including flora/fauna, heritage and contamination). Where this has been unavoidable, further environmental field assessments have taken place with mitigation measures implemented in the design and documentation of the works.

27. Environmental impacts have been confirmed through design development as having been managed via the careful siting of the construction elements to avoid impacts and the project scope has no requirement for further assessment under the EPBC Act.

28. The main environmental aspect of the project work relates to the digging of trenches for the installation of new cabling as well as vegetation clearance. However, the majority of the work is beside existing roads and in existing services corridors and avoids known sensitive environments.

29. `Environmental management procedures will be implemented via the requirement for Contractors to receive a Defence Environmental Compliance Certificate prior to construction works starting. This is subsequently managed through periodic auditing through the construction period by Defence's Environment and Heritage Officers.

30. **Flora and Fauna**. There are no significant risks identified to flora and fauna as a result of the project.

31. **Air Quality and Noise.** There are no significant risks identified to air quality and noise as a result of the project.

32. **Water Quality Issues.** There are no significant risks associated with water quality as a result of this project.

33. **Ground Conditions**. The project includes about 23.8 kilometres of underground trenching across the PMA, as well as construction of two ISSs. To mitigate the risk that soil contamination poses to the project, detailed geotechnical and contaminated soil testing has occurred along the internal to PMA and external to PMA line route, as well as the key locations for the ISSs. Where possible, areas of contamination have been avoided. However, there is potential to discover contamination during construction. A plan for managing the contaminated spoil will be established and maintained and will form part of the Construction Environmental Management Plan. Defence is conducting further investigations which will inform the plan and include:

a. additional testing to further assess the contamination and assist with managing the risk associated with the potentially contaminated spoil material during construction;

b. further sampling of potentially contaminated spoil prior to construction to characterise the material for landfill disposal; and,

c. balancing cut and fill across the sites by re-using material that is below the Defence's screening guidelines for residential use.

34. **Unexploded Ordnance (UXO)**. Caution will be exercised during all excavation work to identify any risks to construction personnel from the presence of unexploded ordnance. The majority of works is to be completed within the PMA 'Cantonment' Area which is assessed as having a low likelihood of UXO. As a result, an on-site survey was not required.

35. **Flood Events.** The siting of key infrastructure has been done in a manner which avoids areas where the risk of flood events poses a risk to the functionality of the infrastructure.

KEY LEGISLATION

36. The following key legislation, codes and regulations are relevant to this project:

a. Environment Protection and Biodiversity Conservation Act 1999;

b. Building and Construction Industry Improvement Amendment (Transition to Fair Work) Act 2012;

c. Work Health and Safety Act 2011;

d. Disability Discrimination Act 1992;

e. Fair Work Act 2009;

f. Fair Work (Building Industry) Act 2012;

g. Electricity Safety (Bushfire Mitigation) Regulations 2013;

h. Electrical Safety (Installations) Regulations 2009;

i. Electricity Distribution Code Version 7; and

j. Victorian Service and Installation Rules (2014).

37. The design of the proposed facilities will comply with all relevant Australian Standards, Codes and Guidelines including the National Construction Code, inclusive of the Building Code of Australia. The design will be compliant in accordance with the correct revision of the Building Code of Australia (BCA) / National Construction Code (NCC) at the time of the Building Certifier's approval of the design.

CONSULTATION WITH KEY STAKEHOLDERS

38. Extensive consultation was undertaken throughout the project development phase, with representatives of Defence Estate and Infrastructure Group (EIG), PMA Base Command, Defence internal technical directorates, Defence environmental representatives and the local DNSP, AusNet Services. Consultation has occurred with key Defence stakeholders as follows:

a. Army Headquarters - Advice on project scope and operational requirements;

b. Puckapunyal Military Area / Combined Arms Training Centre - Advice on operational requirements;

c. Estate and Infrastructure Group, Infrastructure Division – Advice on Zone and Precinct Planning requirements, site selection, and environment, heritage and engineering policy / compliance requirements;

d. Defence Support Victoria – Consideration of regional issues and concerns;

e. Defence Security Agency - Advice on physical security policy;

f. Chief Information Officer Group – Advice on Information Communications Technology policy and costing; and

g. Defence's Estate Maintenance and Operating Services – Consideration of design from a base services perspective.

39. Defence has consulted with AusNet Services, DNSP on upgrade to HV power supply and proposed PMA internal network design compliance requirements. Defence has also developed a community consultation plan and communication strategy that recognises the importance of providing local residents, statutory authorities and other interested stakeholders an opportunity to provide input into, or raise concerns relating to the proposal. Community consultation is planned to be conducted in March / April 2016.

40. The people and groups currently identified for consultation are listed below.

a. Federal Member for McEwen, Mr Rob Mitchell MP;

b. Victorian Member for Euroa, Ms Steph Ryan MP;

c. Mitchell Shire Council;

d. Country Fire Authority; and

e. The general public.

PURPOSE OF THE WORKS

Project Objectives

41. The purpose of this project is to provide purpose built facilities that are fit for purpose, compliant and provide value for money, in order to support the HV power requirements for the PMA. The PMA HV upgrade project will deliver an upgrade of the existing site HV reticulation system, as well as the incoming utility (AusNet Services) supply. This will provide required supply capacity and redundancy with an allowance to meet projected load growth to 2028. To achieve this, the HV reticulation on the Base will be upgraded to a ring main system, with aged assets deemed inappropriate for reuse to be decommissioned and replaced.

DETAILS AND REASONS FOR SITE SELECTION

42. The site selection for each of the relevant elements has been undertaken in accordance with Infrastructure Division's planning policy requirements. The siting locations of the two new intake switching station buildings, ISS1 and ISS2 were considered in detail and the outcomes of the SSB approved by the Defence delegate were as follows :

a. New switching station 1 (ISS1), to be located adjacent to the existing ISS1; and

b. New switching station 2 (ISS2) to be located at the North East corner of Morobe Road North and Malaya Road junction (adjacent to the existing sports oval).

43. These locations were selected in order to minimise disturbance to greenfield sites, optimise the electrical configuration, avoid any known areas of in ground contamination, avoid any known sites of cultural heritage significance, as well as any locations which would interfere with the Base operational continuity either during construction or afterwards.

DETAILED DESCRIPTION OF THE PROPOSED SCOPE OF WORKS

44. This project proposes three scope elements. Details of each scope element are described in the following sections.

Upgrade External HV Power Supply

45. The proposed solution is to upgrade SMR1 and connect it to a rebuilt ISS1, as the existing 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.

Provide Redundancy in External HV Power Supply

46. The proposed solution 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 following Ford Road and the Seymour-Tooborac Road – a length of some 8.1km (see Attachment 4). It will terminate at a new intake switching station ISS2, which is a pre-cast and steel building located at the corner of Malaya and Morobe Roads within the PMA.

Upgrade Internal HV Power Reticulation with PMA

47. The proposed existing network shall be reconfigured to an underground ring main arrangement, connecting the intake substation to distribution substations located throughout the base (see Attachment 3).

48. While low voltage (LV) network augmentation did not fall within the original scope of the project; after detailed engineering inspections and due to poor existing asset condition and safety and reliability risks, some existing LV pillars with LV switchboards inside new kiosk substations[6] will be replaced, with the old pillars decommissioned and removed.

49. To meet the power factor requirements for the ultimate maximum demand (7.1MVA), provision for a Power Factor Correction system is incorporated into the design.

PUBLIC TRANSPORT, LOCAL ROAD AND TRAFFIC CONCERNS

50. There will be no increase in the working population at PMA as a result of this project.

51. There will be some increased traffic during construction as materials and equipment are delivered and workers travel to and from the PMA. However, in comparison with the

[6] The radial mains supplies 44 distribution substations ranging in size from 10 kilovolt Amps (kVA) to 1,000kVA that consist of a mixture of pole top transformers, Ring Main Units and pad-mount substations. The distribution substations range in both age and condition, with most having reached end of life. Most transformers are pole mounted, however some more recently constructed kiosk type substations exist generally within grassed nature strips close to roadways. Where possible, these newer kiosk installations are to be retained.

existing traffic in the area, traffic increases resulting from the project's delivery will be minimal.

52. During construction there will be an increase to the number of large vehicles that enter the Base to deliver material to the construction sites. Construction management controls will be implemented to mitigate the effects of this increased traffic through liaison with the Base operations staff.

53. The AusNet Services work includes upgrade and extension to existing HV assets. Some of these areas are located in proximity to public roads and traffic management systems will be implemented to ensure safety of road users and construction workers.

ZONING AND LOCAL APPROVALS

54. The delivery of the preferred option does not involve the acquisition or disposal of any land or property by Defence.

55. Four additional 2m wide property easements are required to be created to suit the installation of the new 22kV underground feeder cable (SMR4). These easements will be negotiated between AusNet Services and property holders in AusNet's capacity as the DNSP. Approvals for PMA external HV works and any connections to the HV network are managed by the DNSP.

56. In order to ensure compliance with all of AusNet's requirements, and to confirm seamless works delivery and coordination between the internal to PMA and external to PMA works, AusNet Services will have responsibility for the design and delivery of the works external to Commonwealth land (from the SMR ZSS to each of the two points of connection at the base). There are no required or proposed changes to zoning, either on Base or off Base as a result of this project.

CHILDCARE PROVISIONS

57. There are no requirements for additional childcare facilities as a result of this project, with the existing facilities meeting the current and known future needs of the Base.

IMPACT ON LOCAL COMMUNITY

58. The PMA has a long standing and good relationship with the local Seymour community. This project is not expected to have any adverse impacts on the community.

59. Access roads and parking are well established within PMA in a permanently constructed grid pattern. Heavy machinery used during construction is also expected to have minimal impact on the local road network other than temporary part road closures.

60. Delivery of the upgrade to SMR1 and extension of SMR4 to PMA, will likely involve limited and short-lived disruption to local road works, and the extension will also involve the establishment of easements along some property boundaries to facilitate future inspection of the lines by the DNSP. The upgrade to the existing feeder and the construction of the second feeder will improve power reliability for the PMA.

61. The upgrade will also result in a demonstrable reduction in bushfire risk, associated with the underground of the HV overhead lines.

PLANNING AND DESIGN CONCEPTS

62. Planning and design concepts have been developed to satisfy the functional requirements to support the HV Power Supply Upgrade. The general philosophies adopted for the design of the proposed facilities incorporates the following considerations:

d. provision of cost effective and functional facilities of energy efficient design suitable for the climate of the site and style compatible with existing base aesthetics;

e. adoption where possible of conventional techniques and materials, in particular those commonly used by the construction industry and consistent with those already utilised on the site;

f. utilisation of ready available and durable materials that combine long-life while minimising maintenance;

g. recognition of site constraints, security requirements, the established zone plans, functional relationship to existing facilities and operational determinants; and

h. planning services and structure design to accommodate flexibility.

63. In addition to technical reviews conducted within Defence, consultation has been undertaken with AusNet Services to ensure that the proposed works comply with AusNet Services requirements and relevant standards. Defence will seek formal approval from AusNet Services for all design and works associated with the connection to the external HV feeders.

64. A schematic design for the proposed supply and distribution system within PMA has been prepared by a professional engineering Design Services Consultant (DSC). The design will be finalised by the DSC prior to tendering for a specialist contractor to complete the works subject to Parliamentary approval. Internal network upgrades, such as the ring mains will be trenched (underground), improving reliability and removing both bushfire risk as well as visual intrusion associated with overhead wiring.

65. The DNSP, AusNet Services, as the party responsible for external works (upgrade SMR1 extension to SMR4) has prepared a schematic design for the new, duplicate feeder and is responsible for completing the design and delivering that segment of the project.

66. The new and upgraded intake switching stations (ISS1 and ISS2) will be designed in accordance with the requirements of the MIEE, Manual of Fire Protection Engineering (MFPE), the NCC[7] and other Victorian codes and standards.

Structural Design

67. The structural design philosophy is based on providing an efficient and cost effective structural system for each building element.

68. The key considerations taken into account in the structural design are:

[7] The Building Code of Australia (BCA) is Volumes One and Two of the National Construction Code (NCC) and these two terms are often used interchangeably.

a. ensuring the design for each building is fit for purpose;

b. cost-effectiveness over the whole of life of the buildings through appropriate use of materials;

c. minimisation of in-service maintenance requirements;

d. minimisation of risks inherent in the design (both safety and economic risks); and

e. maintaining flexibility of the use of internal spaces where appropriate.

Mechanical Design

69. Mechanical services are limited to split-cycle air conditioning units in all switch rooms and communications rooms. Equipment has been selected based on the following criteria:

a. safety and reliability;

b. maintainability and supportability; and

c. site / facility / user specific performance requirements.

70. The air conditioning units are provided to protect the electrical and communications equipment from extremes of temperature and to provide optimum operating conditions. Selection of equipment and design of equipment space and associated distribution services have considered equipment appropriate noise and vibration levels.

Hydraulic Services

71. The selected hydraulic equipment will be readily available and adequately serviced in Australia with spare parts and technical support. The proposed facilities do not require water supplies. Any rainwater collected by the building roofs and gutters will be drained and disbursed to the surrounding ground using conventional detailing to avoid local erosion.

Electrical Services

72. The electrical supply to the proposed facilities will be from the existing AusNet Services SMR1 connection to the PMA. The second SMR4 feeder line will provide a redundant HV power source to the PMA in the event of an outage in order to maintain on-base power supply.

73. The HV equipment and cables have been selected based on the proposed upgrade of the external feeders SMR1 and SMR4, with a nominal voltage of 22 kilovolts. The electrical design has been undertaken in accordance with all relevant Australian Standards, all applicable Legislation, Regulations, Codes of Practice, Victorian Services and MIEE.

Communications

74. To meet the requirements for automatic, remote control and monitoring functions required for the HV upgrade, a Power Control and Monitoring System (PCMS) will be implemented. All 22 kilovolt circuit breakers will be motorised and remotely controlled and monitored with power meters installed on the incomer and all ring main feeders. The PCMS will control and monitor all HV switchgear and auxiliary equipment.

Fire Protection

75. The proposed works will bring the additional advantage of mitigating the bushfire risk associated with the current extensive unprotected 22kV overhead internal spur line, which will be replaced with a ring main, situated underground wherever practical.

76. Where HV lines are not installed underground, they are to be constructed using HV aerial bundled cable, which although not as effective as underground installation, can also reduce bushfire ignition risk.

Acoustics

77. There are no acoustic impacts associated with the implementation of the recommended option, and hence no acoustic treatments are required.

Security

78. There is no public access to the proposed facilities and entry to the proposed facilities will be through the controlled access points at PMA. The proposed buildings have been designed for the appropriate security classification as stipulated by Defence requirements.

ENVIRONMENTAL SUSTAINABILITY OF THE PROJECT

79. The Commonwealth is committed to ecologically sustainable development and the reduction of greenhouse gas emissions. Defence reports annually to Parliament on its energy management performance and on its progress in meeting the energy efficiency targets established by the Government as part of its commitment to improve ecologically sustainable development. Defence also implements policies and strategies in energy, water and waste to improve natural resource efficiency and to support its commitment to the reduction of energy consumption, potable water consumption and waste diversion to landfill.

80. This proposal addresses Commonwealth policy by adopting cost-effective and ecologically sustainable development practices as a key objective in the design of the new facilities. To achieve this objective, the proposed buildings will comply with:

a. Section J of Volume One of the Building Code of Australia, National Construction Code 2015 Energy Efficiency.

b. Part 3.12 of Volume Two of the Building Code of Australia, National Construction Code 2015; Energy Efficiency.

c. Energy Efficiency in Government Operations policy;

d. Smart Infrastructure Manual: Design and Construction v1.0 (April 2015), Department of Defence; and

e. Smart Infrastructure Manual: Design and Construction.

81. The ecologically sustainable measures proposed for the project will be balanced with other requirements for Defence buildings, including security and work health and safety

considerations, to ensure that Defence's operational capability is not compromised. The goal of these measures will be to maximise return on capital investment, while also aiming to minimise the ongoing maintenance and operational requirements. To that end, the design team will conduct an ecologically sustainable development workshop with Defence stakeholders to determine what opportunities are available to the project. Whole of life costing will be considered and incorporated into the designs as part of this process.

82. All energy sources supplying the PMA will be individually metered and linked to a control and monitoring system allowing Defence to better manage and monitor environmental performance. Sub-metering will be provided in accordance with the Defence Energy Management Strategy, and the requirements of the Commonwealth Energy Policy.

Landscaping

83. Landscaping works will be conducted on areas which are disturbed by works and will be reinstated on completion. Disturbances by trenching will be treated to match the surrounding area where applicable.

84. As the majority of the completed works will be underground electrical cabling and along the alignment of the current overhead HV supply runs, once the ground has been reinstated, there will be minimal visual impact. The current overhead supply and poles will be removed. Precautions will be taken to avoid compromising environmental sensitivities by adopting landscaping practices in accordance with local environmental conditions, advice from the Base Senior Environment Officer, and the Construction Environmental Management Plan.

Energy Targets

85. There are no general energy performance based requirements for non-office facility types as defined in Defence's SMART Infrastructure Manual.

WORK HEALTH AND SAFETY MEASURES

86. The proposed facilities to be provided under this project will comply with Department of Defence's Work Health and Safety Policy, the Work Health and Safety Act 2011, Work Health and Safety (Commonwealth Employment - National Standards) Regulations and the Defence Work Health and Safety Manual.

87. In accordance with Section 35(4) of the Building and Construction Industry Improvement Act 2005, contractors will also be required to hold full work health and safety accreditation from the Office of the Federal Safety Commissioner under the Australian Government Building and Construction Work Health and Safety Accreditation Scheme.

88. Safety aspects of this proposal have been addressed during the design process and have been documented in a Safety in Design Report completed by the contractor. No special or unusual public safety risks have been identified in this process. The contractor will also be required to submit a Safety Plan for the construction phase and prior to the start of any construction activities.

COST EFFECTIVENESS AND PUBLIC VALUE

Outline of Project Costs

89. The estimated out-turned cost of this project is $32.7 million, excluding Goods and Services Tax. This cost estimate includes management and design fees, construction, equipment, contingencies and an allowance for escalation.

90. The Net Personnel Operating Costs of $0.5 million per year have been estimated for the proposed works. This cost estimate provides the basis for funding the ongoing operation and support services required by this proposal.

Details of Project Delivery System

91. A Project Manager / Contract Administrator (PM/CA) has been appointed by the Commonwealth to manage the development phase of the project. Subject to satisfactory performance, value for money assessment and Parliamentary approval of the propose project, it is intended that the current PM/CA will be furthered engaged for the delivery phase of the project. The PM/CA will have responsibility to manage delivery and certification of the works by DSC and Head Contractor and administrator those contracts.

92. A DSC has been appointed to fully design and document the proposed facilities. Subject to satisfactory performance, a value for money assessment and Parliamentary approval for the proposed project, it is intended that the DSC will further engaged for the delivery phase of the project. The DSC has the responsibility to approve any changes to the design proposed by the Head Contractor and certify that the works have been constructed and perform in accordance with the “for construction” designs.

93. Subject to Parliamentary approval of the proposed project, the full scope of works for this project will be delivered through two contracts as follows:

a. Head Contractor (HC) (Construct Only) for internal works to deliver the HV ring mains, HV kiosks, new replacement ISS1 and new ISS2. The electrical design will be based on that specific brand of equipment which already exists within the base[8]. This approach is in line with MIEE and procurement plans prepared for this project.

b. A contract between Defence and AusNet Services for external HV power works to upgrade SMR1 and extend SMR4 to the point of connection at PMA using the standard AusNet Services Contract.

Construction Program

94. Subject to Parliamentary approval of the project, construction is expected to commence in late 2016 and reach completion approximately 12 months later in late 2017

[8] This option complies with the MIEE (Clause 26.7.1), which states that, “It is Defence policy that HV switchgear is standardised for each Defence establishment to ensure a common operator interface. Therefore at each establishment there is a single make/type of switchgear normally used in accordance with Chapter 8 – Construction Requirements and Project Controls.” The documentation has been based on this brand of switchgear but this does not preclude adjustments to the design should an alternate brand of supplier be engaged subject to the Head Contractor procurement process.

Public Value

95. The proposed facilities will rectify existing electrical problems and failures and ensuring effective and reliable power supply to facilities within the PMA, the proposed works will contribute to Defence capability and effectiveness, which has an inherent public value.

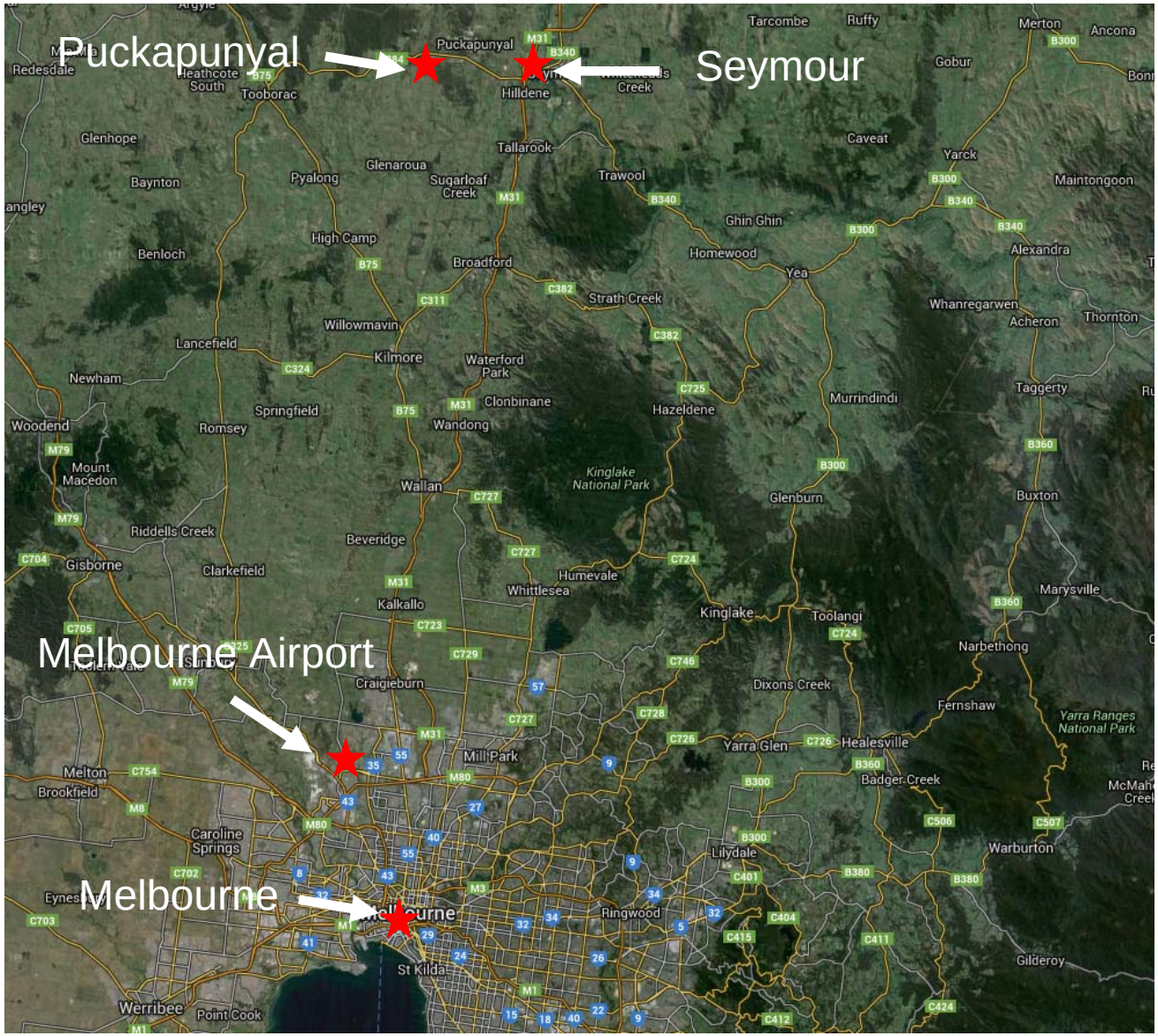
96. Public value is also achieved by designing HV upgrade works for current and future growth. The cost of investment, both in capital and operating terms, has been optimised through taking a long term view of a major infrastructure upgrade at the PMA.

Revenue

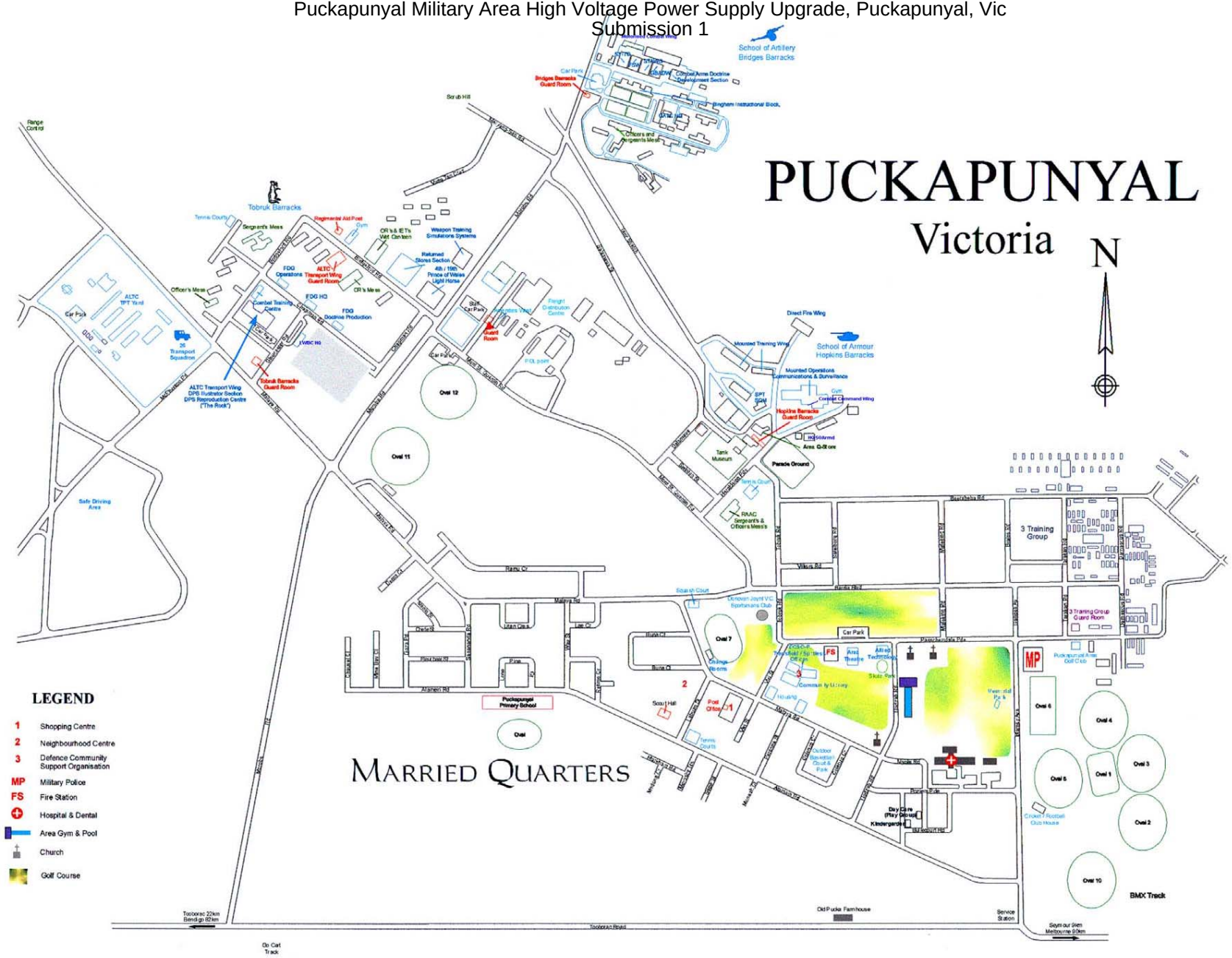
99. No revenue will be derived from this Project.

ATTACHMENTS

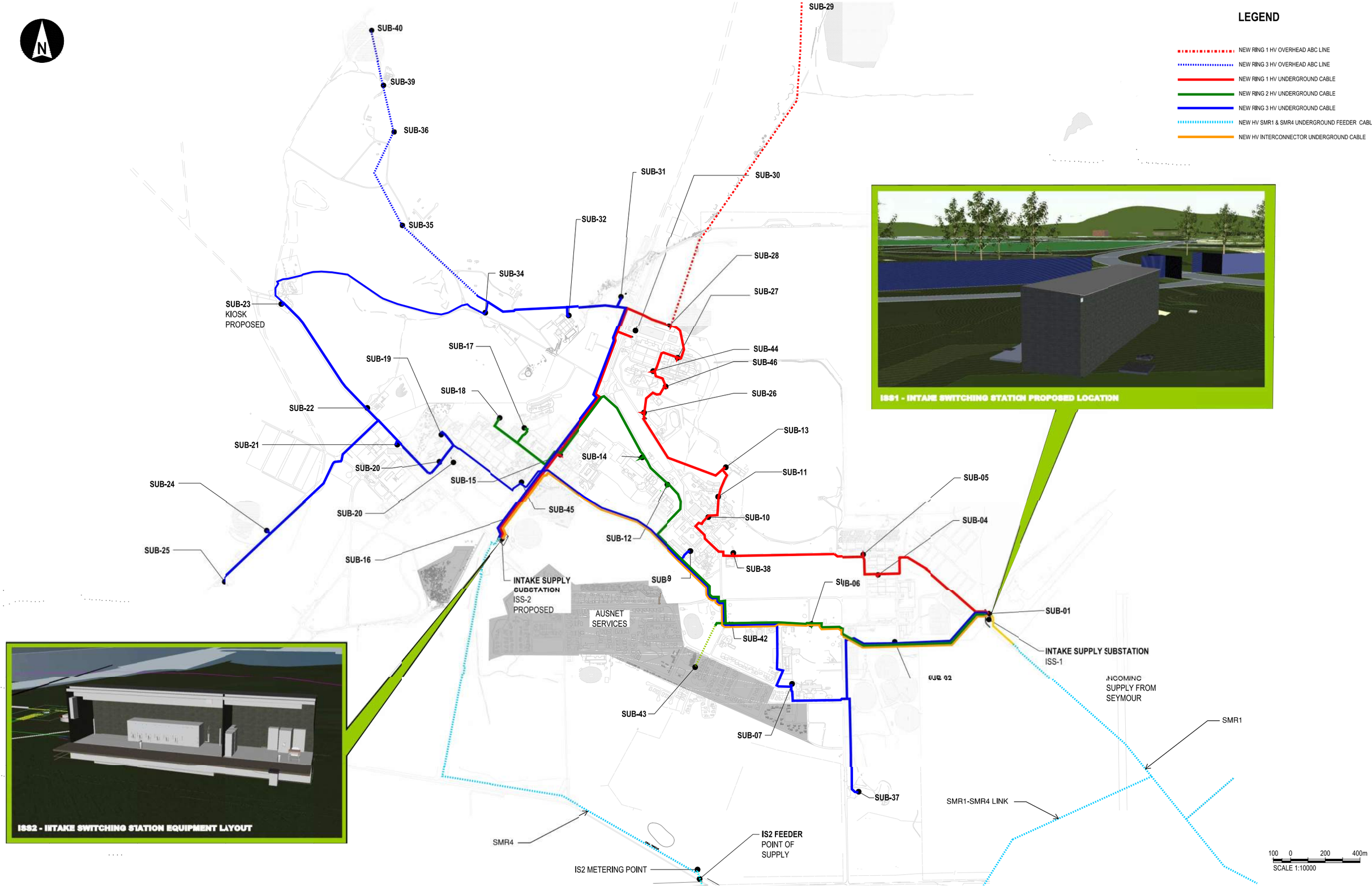
1. Locality Plan
2. Puckapunyal Site Plan
3. Site plan – Internal works
4. Site Plan – External works
5. Intake Service Station



ATTACHMENT 01 - LOCALITY PLAN

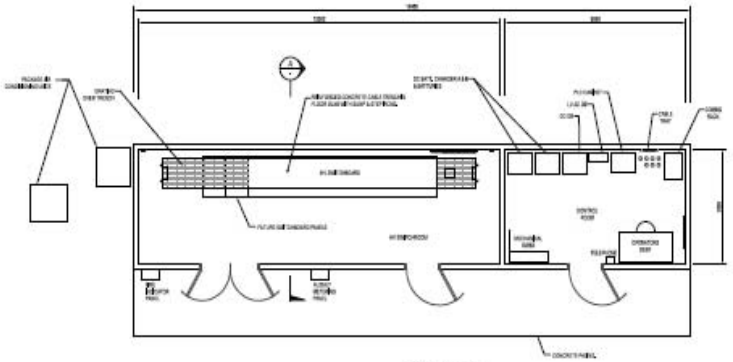


ATTACHMENT 02 SITE PLAN – PUCKAPUNYAL MILITARY AREA

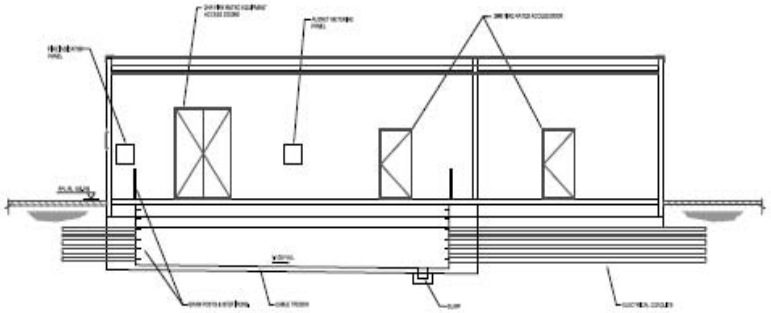


ATTACHMENT 03 | INTERNAL TO PMA - SITE PLAN

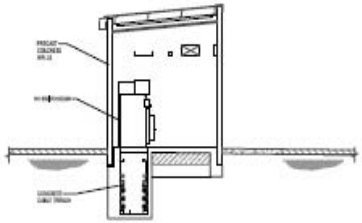
ATTACHMENT 04 | EXTERNAL TO PMA - SITE PLAN



ISS1 FLOOR PLAN



SOUTH WEST ELEVATION



SECTION A

ATTACHMENT 05 – INTAKE SUBSTATION LAYOUT