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Tasmanian Government Radio Network (TasGRN) Project

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1. Introduction

The purpose of this submission is to seek approval from the Parliamentary Standing Committee on Public Works (PSCPW) for the planned Government radio network in Tasmania. This submission will inform the Committee of the need for a Whole of Government radio network and detail the manner in which the Tasmanian Government Radio Network (TasGRN) Project has addressed this need.

The Tasmanian Government's formal response to the **Report of the Auditor-General No. 10 of 2013-2014 (Government Radio Communication – Appendix One (1))'** recommended that a whole-of-Government radio network (Tasmanian Government Radio Network - TasGRN) be completed by 2020. The TasGRN aims to deliver a reliable, functional and usable state-wide public safety grade radio communications network fit for purpose in supporting emergency response, public order during major events and the day to day operations of Tasmania's Emergency Services Organisations (ESOs), land managers and the electricity supply industry.

The Auditor-General's report made eleven recommendations supporting progress and development of a whole-of-government radio network, including:

- Agencies should work together to resolve congestion issues.
- Agencies should investigate ways to provide secure and confidential communications.
- Any whole-of-government network should consider a level of duplication with regard to infrastructure and cost.

2015 Parliamentary Standing Committee of Public Accounts Review of Auditor-General's Report No 10 of 2013-14 Government Radio Communications

This review was undertaken in response to *Report of the Auditor-General No 10 of 2013-14 Government radio communications.* The review recommends that:

- The Whole of Government radio network project be completed by 2020, and
- A new entity be established to manage the network into the future.

The existing networks supporting these agencies and Tasmanian Government businesses are reaching end of operational life and represent ageing technology with limited availability of technical support and spare parts. It will be increasingly difficult for ESOs to meet the expected growth in demand for their services, with the limitations imposed by these ageing legacy radio networks. Additionally, the State's third-party contract for the management and operation of the Trunked Mobile Radio Network (TMRN) which supports Tasmania Police, TasNetworks and Hydro, will expire in 2021 (with an option to extend to 2023). The supplier has further indicated that the TMRN will be technically obsolete and difficult to maintain beyond 2021.

The timeframe to procure and commission a new network means the Government needs to act now to deliver the TasGRN by 2022/23. If the TasGRN is not completed within this timeframe ESOs will be exposed to significant risk due to the escalating likelihood of network failure.

The lack of reliable, functional and usable state-wide public safety grade radio communications places the safety of the community and staff at risk.

2. TasGRN Project 'Phase Two' Background

A secure, reliable and effective radio network is essential to the success of Tasmania's ESOs, and therefore to the protection of lives and property in Tasmania. This project follows several earlier steps toward achieving a shared radio network for User Organisations, dating back to at least 2005. Progress to date has been slower than anticipated, resulting in several reviews and recommendations:

- In 2013/14, the Tasmanian Budget Committee approved an ongoing allocation of funds in forward estimates for the TasGRN Project. This was a catalyst to establish a new Steering Committee, and recognition that a new approach was required.
- The 2013 Tasmanian Bushfires Inquiry Report made multiple recommendations, two of which relate directly to this project:
 - All agencies and the government support moving to an integrated communications technology for police and emergency services. (Recommendation 10)
 - Police and other emergency services examine options for achieving radio interoperability between them in the absence of an integrated radio system. (Recommendation 11)

The inquiry concluded that resources need to be committed to improving the emergency management arrangements, and that many of the problems are the result of not making these commitments in the past.

- In May 2014, the Tasmanian Audit Office completed an audit of the State's publicly managed radio communications networks, to assess the effectiveness and efficiency of the current radio communications networks used by seven government users in Tasmania. This report also explored whether the whole-of-government radio network project (as it was known at the time), was progressing towards delivering a more efficient and effective network. The Auditor-General's report made eleven recommendations supporting progress and development of a whole-of-government radio network, including:
 - Agencies should work together to resolve congestion issues.
 - Agencies should investigate ways to provide secure and confidential communications.
 - Any whole-of-government network should consider a level of duplication with regard to infrastructure and cost.
- Between September 2014 and August 2015, the Parliamentary Standing Committee of Public Accounts reviewed the implementation of recommendations from the Auditor-General's report. Based on their findings, the Committee recommended the following:
 - A new governance structure and project resourcing separate from the 'business as usual' operations of the Project Unit in Department of Police, Fire and Emergency Management (DPFEM). This included finalising the appointment of an independent Project Manager to the TasGRN Project.
 - Completion of the project by 2020.

- Establishment of a new entity to manage the network into the future.
- Risk Management Plans should be clearly documented for each of the entities.
- In 2015, the 'Interim Interoperability Gateway' was established, enabling emergency services to talk directly with each other by a connection between the TMRN and the networks used by the Tasmania Fire Service (TFS) and Ambulance Tasmania (AT).
- Also, in 2015, CUBE Group Management Consulting was engaged to review aspects of the TasGRN Interoperability Project. The review resulted in several recommendations to the Steering Committee of the time, about the business case, governance and project resourcing. Further to this, CUBE facilitated a strategic planning session with the Steering Committee, resulting in an agreed scope and objectives for the project, together with a high-level plan for the next stages of work.
- Later in 2015, addressing a recommendation of the Bushfires Inquiry, the Department of Justice reported on their Independent Review of Tasmania's Emergency Management Arrangements. All fifty-two recommendations of the review were endorsed by Cabinet; recommendation 47 stated:
 - The recommendations of the CUBE Consulting Report and the Auditor-General's report into the development of a shared mobile radio network be implemented.
 - In 2016, a revised Steering Committee was established to ensure representation from all stakeholders 'in scope' for the project. A new Project team was also established with separate and dedicated resourcing, reporting directly to the Steering Committee. Additional external resources were engaged to support this phase of the project.

The TasGRN Business Case was developed across 2017, with significant input from User Organisations, in identifying the business requirements for a new shared radio network that is interoperable, contemporary and sustainable. This approach was a fundamental recommendation from various reports including the Auditor-General's report into the 2013 Tasmanian Bushfires. The project has been supported by Technical Advisors - Mingara Australasia Pty Ltd, Commercial Advisors - Deloitte, Probity Advisors - Wise Lord and Ferguson and Legal Advisors MinterEllison in addition to dedicated resources from the Office of the Crown Solicitor.

The TasGRN Project engaged extensively with the Market with a comprehensive Market Sounding / Request for Information (RFI) process in order to be able to establish an indication of the total cost of a Managed Service to the State.

The Business Case was endorsed in 2018 with Government reserving an allocation of \$25 million per annum. The Business case identified a P25 standards-based radio network, delivered as a managed service, as the preferred radio communications model.

Facilitated by the DPFEM the State has conducted a tender process for the design, construction and operation of the TasGRN as a Managed Service. The Request for Tender (RFT) application period opened 24 November 2018 and closed on 31 May 2019.

The Tender was advertised as being subject to approval from the Parliamentary Standing Committee on Public Works (PSCPW). It was not possible to present the TasGRN project to the PSCPW prior to receiving tender responses due to the unknown quantum of the solution that may be offered to the State from the market place, and a requirement to ensure the market was not influenced by public information surrounding the anticipated value of the project.

As a result of evaluation of the tenders received the Steering Committee has endorsed a preferred tenderer.

Subject to endorsement by the Parliamentary Standing Committee for Public Works the State will seek to commence the delivery of the TasGRN.

3. Current state of the Radio Networks

A significant portion of existing radio networks have been in use for twenty plus years, are past expiration date and the technology supporting the main emergency services network is outdated.

The existing networks supporting these agencies and Tasmanian Government businesses are reaching end of operational life and represent ageing technology with limited availability of technical support and spare parts. It will be increasingly difficult for ESOs to meet the expected growth in demand for their services with the limitations imposed by these ageing legacy radio networks.

The State has negotiated an extension to the contract with the service provider for TMRN which will expire in 2021, with two (2) possible one year extensions through to the end of 2023, and the vendor has stated it will have limited ability to support the network after this date. In 2020 the TMRN will be twenty-five years old.

Multiple facets of the networks are operating with a high risk of failure which will not be able to be readily rectified due to obsolescence of key network elements and software.

User Organisations will be forced to transition to unsupported radio communications systems, significantly increasing the chance of system failure. This situation will be untenable for mission-critical operations.

If there is no action, ESOs may develop their own networks in isolation of other User Organisations, and as a result the benefits of a whole-of-government network would not be fully realised.

The eight (8) User Organisations operate five (5) independent radio networks, resulting in duplication of site infrastructure, operations and maintenance programs, contractual arrangements and management resources, leading to delivery and cost inefficiencies.

Multiple networks that do not 'talk' to each other limit the ability for inter-agency communication, which has significant operational implications during multi-agency

'events' such as natural disaster, in particular bush fires, major accidents or violent offender incidents.

Independent radio systems have resulted in inconsistent coverage, security and capacity between User Organisations and across the State.

The functionality of radio communications is not consistent across all User Organisations, particularly for access to duress and emergency call functionality which is critical to safety of frontline staff.

Encrypted communications is not available at the network level on any of the existing networks. Tasmania Police is able to access encrypted communications on the TMRN but this requires encryption of individual handsets which is only available for specific high risk business units, exposing services to unauthorised interference and placing frontline staff and members of the public at risk.

Multiple independent networks reduce the opportunity for economies of scale and leveraging purchasing power, resulting in less capacity to drive cost efficiencies.

The consistency of radio network governance and management arrangements in Tasmania is impacting the transparency of cost, performance and decision making. It has been indicated that the reported operating costs for User Organisations' networks are unclear due to 'informal arrangements' and 'inter-agency agreements'¹. This extends to variation in monitoring and reporting procedures, and incomplete asset datasets.

The end of life assessments, undertaken by Mingara, highlighted a number of common governance issues across existing radio networks in operation, including:

- accuracy, completeness and currency of documentation varied greatly
- a high reliance on key individuals for system knowledge, and
- in-house development of new network functionality due to technology obsolescence.

In addition to limiting network performance management, meaningful operational and financial benchmarking at a whole-of-government level is not currently possible. These isolated management and investment arrangements constrain holistic, whole-of-government investment planning.

Some users operating their mission-critical communication on shared networks currently have little operational control, which limits their service performance.

¹ Tasmanian Audit Office, Report of the Auditor-General No. 10 of 2013-14, p. 34

4. TasGRN Capability

The TasGRN will be a multi-agency Tasmanian-wide radio network that enables interagency interoperable communications and more consistent coverage across geographic regions. The introduction of the TasGRN will be a seminal moment for Tasmanian ESO's, government departments and government business enterprises. It will launch an era of flexible, integrated, reliable and highly available wide area communications across the State, leading to more effective collaboration and interoperability between the User Organisations delivering services to the Tasmanian community.

The implementation of a 'P25 based shared network' has been identified as the recommended option for a mission-critical voice communication technology for Tasmania. P25 or Project 25 is a suite of standards for digital mobile radio designed for use by public safety organisations. P25 radios are a direct replacement for analogue UHF (Ultra High Frequency) (typically frequency modulation (FM)) radios, but add the ability to transfer data as well as voice, allowing for more natural implementations of encryption and text messaging.

This approach would transition User Organisations onto a single, purpose built, dedicated digital radio communications network. The radio network would be designed, built and operated to be public safety grade, underpinned by a technology platform based on the P25 suite of open standards.

In arriving at the recommended option, the following alternate communication technologies and approaches to the recommended 'P25 based shared network' were considered:

- Continuing with existing arrangements, which only defers capital investment to beyond 2020 and is likely to result in User Organisations pursuing projects in isolation of the TasGRN Project. Additionally, continuation of existing arrangements will subject User Organisations and the community to significant risk of network failure and technology obsolescence in the interim period.
- Early adoption of a state-wide Long-Term Evolution (LTE) network (also referred to as Public Safety Mobile Broadband), however this did not represent value for money given the considerable cost, while the immaturity of the technology in a public safety environment heightened technology risk and concerns regarding deliverability.

The recommended 'P25 based shared network' will provide all users with core mission-critical voice and narrowband data capability, including:

- wide-area group voice calls, pending radio equipment selected (e.g. calls may be made network-wide)
- interoperability of communications between regions, User Organisations and other networks
- emergency/duress functionality
- end-to-end secure voice communications via encryption (where required), and
- GPS location tracking for radio terminals.

The recommended P25 option outperformed other P25 options considered due to its expanded UHF coverage footprints. This provides User Organisations significantly more in-building and outdoor portable coverage, essential for ESOs that are required to serve and protect the community in all populated areas across the State. Further, the recommended option provides the technical base to transition to a LTE network capability in the future, without making a major investment now. The recommended P25 option is therefore an incremental ('building block') approach to investing in a mission-critical communication capability.

The key functionality of the recommended option is summarised in Figure 4, separating capabilities that are inherent in a P25 solution and additional capabilities that will be delivered by the recommended option.

The P25 technology pursued through the business case aligns with recently completed or current projects in other Australian jurisdictions, including New South Wales, Queensland and South Australia. Tasmania is the last Australian state/territory to transition to a P25 network, with Hobart the only capital city not to have P25 coverage.

It is anticipated the TasGRN Project would be delivered over three years (target completion date of the end of 2023). Following delivery, it is envisaged that the TasGRN will be operated as a Managed Service (MS) through until 2035. Existing radio networks will be decommissioned in 2023/24 following the full transition of User Organisations to the TasGRN.

Key benefits to the State include:

- **Risk minimisation:** Continuity of mission-critical radio network services ensures the User Organisations, particularly ESOs, can confidently support the safety of frontline staff, as well as protect the public, beyond 2020.
- Enhanced outcomes: The network's design will deliver a contemporary mission-critical grade communication capability. By designing a shared network based on User Organisations' business requirements, additional network capability will enable improved service delivery and, hence, drive enhanced outcomes for the State.
- Strategic direction: This investment will provide the base for a range of future strategic decisions regarding technology evolution, alignment with other states and Tasmania's Information Technology (IT) strategic direction (e.g. Emergency Services Computer Aided Dispatch ESCAD). The recommended approach allows for the later adoption and integration of new technologies and solutions as they become available to the market.

Currently, radio networks are used as a communications medium for a range of key agencies and Tasmanian Government businesses. The User Organisations in scope for this business case are:

- Tasmania Police: The primary law enforcement agency for Tasmania.
- **Tasmania Fire Service (TFS)*:** Responsible for fire control and suppression in Tasmania. TFS has a significant volunteer base.
- **Ambulance Tasmania (AT):** The statutory provider for ambulance services and pre-hospital care in Tasmania.

- **Tasmania State Emergency Service (SES)**: A Tasmanian agency that provides emergency services in Tasmania, particularly for storm, flood, road crash, search and rescue services. This is a predominantly volunteer based agency.
- **Sustainable Timber Tasmania (STT)*:** A Tasmanian Government Business Enterprise responsible for managing 800,000 hectares of Permanent Timber Production Zone land.
- **Parks and Wildlife Service (PWS)*:** A Tasmanian Government agency within the Department of Primary Industries, Parks, Water and Environment (DPIPWE), responsible for wildlife and protected areas in Tasmania, such as national parks and reserves.
- Two electricity supply industry organisations:
 - **TasNetworks:** Tasmanian Government-owned corporation responsible for electricity transmission and distribution in Tasmania.
 - **Hydro Tasmania:** Tasmanian Government Business Enterprises responsible for electricity generation.

* These agencies are signature to the Inter-agency Bushfire Management Protocol (2017-18) which is the operating agreement between the three (3) organisations most closely involved with the management of bushfires in Tasmania .

These organisations will drive the new radio communications capability. The TasGRN Project has engaged Agency Project Leads from each of the in-scope User Organisations. This position will assist the agency with implementation of the TasGRN Project being managed by the Department of Police, Fire and Emergency Management (DPFEM). The Agency Project Lead is the centralised point of contact of the organisation for the TasGRN Project. The role works across all streams of the project: including Procurement & Contracts, Infrastructure & Technical, Change & Communications and Project Management.

They are responsible for maintaining trust between the organisation and the project, and for maintaining engagement levels of impacted stakeholders. The role works to ensure clarity for services and roles in the post go-live environment for staff, volunteers and the community

4.1. Alternative Technologies

The 'Full LTE' approach has been designed to deliver radio communications services based on the emerging future generation standards for Mission-Critical Push-to-talk over LTE (MCPTT). The MCPTT standards are being developed to replicate all mandatory P25 standard functionality, however the approach was considered to be of significant risk given the emerging nature of the technology.

The mission-critical specifications for LTE are being developed through a staged release schedule and there are limited examples of MCPTT being used in an operational public safety environment. In addition, the 'Full LTE' approach was considered unlikely to be deliverable by 2020 and presents a significant investment in both capital expenditure and operating expenditure over and above either of the other potential approaches. This is primarily due to the cost of a major upgrade in network sites to ensure it can meet the same level of coverage, resilience and redundancy as the P25 network design.

Although not strictly a commercial observation, there is a divergence within the market regarding views on how "ready" Long-Term Evolution (LTE) technology (also referred to as Public Safety Mobile Broadband), is to form part of a mission critical communications network. This will need to be explored further in the future to determine the right level of "proven" technology whilst also providing a roadmap to take advantage the LTE broadband capability and functionality that is just over the horizon. Building the right risk allocation and flexibility in the contractual arrangements will be of critical importance.

The market itself is quite thin. This will be particularly the case if a hybrid P25/LTE solution is the preferred way forward.

Market sounding revealed the market expects P25 LMR (Land Mobile Radio) networks to be in use by Public Safety until *at least 2030* due to:

- Immaturity of LTE standards for Public Safety;
- LTE networks coverage and resilience shortfalls; and
- The likelihood of a progressive transition of voice and data services from LMR to LTE over an extended period (e.g. 10+ years).

LTE will likely play an important complementary role into the future as an overlay network that will:

- Support improved coverage options (e.g. enhancing in-building coverage)
- Deliver required broadband voice/data requirements
- Enable progressive transition to a full LTE solution as the technology matures

Furthermore, LTE is cost prohibitive. Early adoption of a state-wide LTE network did not represent value for money given the considerable cost, while the immaturity of the technology in a public safety environment heightened technology risk and concerns regarding deliverability by 2020.

Under the 'Full LTE' approach, an estimated 370 LTE sites would be needed to deliver against User Organisation coverage requirements, comprising approximately:

- 200 existing mobile carrier network LTE sites (requiring augmentation for public safety as required)
- 100 new LTE sites to be built, and
- 70 existing State-owned sites to be developed into LTE sites.

4.2. **Potential Future Users**

Other entities/organisations have been identified as possible future users and could benefit from the TasGRN but are not presently included in scope.

The TasGRN Project recognises that there are other stakeholder groups including government agencies, government affiliated businesses, and local government entities that may either have existing radio-based systems or, in the longer term, could potentially become users of the TasGRN.

While seeking to maintain an awareness of these potential secondary and tertiary stakeholders, the TasGRN Project is however specifically excluding these groups, including those listed below, from the scope of current project activities:

- Metro Tasmania
- Tas Ports
- Tas Water
- Local Government (29 Councils)
- Tas Rail
- TT-Line
- Surf Lifesaving Tasmania
- Marine and Safety Tasmania
- Hobart Airport,
- Department of State Growth (Transport), and
- Department of Justice (Prisons and Corrections Services)
- Potentially the Australian Federal Police and the Australian Defence Force.

Once the TasGRN is established some of these agencies, Tasmanian Government businesses, and local government entities may show interest in becoming future users of the TasGRN.

5. Reference Design

On 6th October 2017, a selection of TasGRN Project Representatives, including representatives from Agencies, the DPFEM TasGRN Project team, Deloitte and Mingara, attended a Multi-Criteria Assessment (MCA) workshop to assess potential TasGRN solution approaches. Attendees at the MCA workshop assessed three (3) potential solution approaches:

- Do Minimum
- Shared P25 Network
- Full LTE

Against the following seven (7) criteria:

- Aligns with Project Strategic Statements;
- Aligns with Government policy, recommendations and legislative objectives;
- Meets mandatory business requirements;
- Minimises operational Risk;
- Minimises technology risk;
- Maximise value for money; and
- Commerciality of approach.

The outcomes of the MCA workshop identified that the Shared P25 Network solution approach was preferred over the Do Minimum and Full LTE approaches. Based on these outcomes, the TasGRN project team received Steering Committee endorsement to proceed with establishing three (3) Reference Design technical solution options for a Shared P25 Network solution approach.

The development of the TasGRN Reference Design was underpinned by the outcomes of following five (5) key project activities:

- TasGRN Strategic Statements definition;
- TasGRN agency business requirements development;
- TasGRN Market Sounding;
- Development of the TasGRN Strategic Options; and
- Development of each agency's TasGRN Concept of Operations (ConOps)

5.1. TasGRN Strategic Statement

The TasGRN Strategic Statement document provided high-level direction on the scope for the Reference Design solution options, helping to ensure that the modelled solution is capable of delivering the required TasGRN project outcomes.

The Strategic Statements were developed in consultation with DPFEM and the stakeholder agencies as a set of principles, which included consideration of the following key areas applicable to a TasGRN:

- Public Safety Grade Communications;
- Radio Systems;
- Radio Spectrum;
- Coverage;
- Site Capacity;
- Communication Centres;
- Radio Terminals; and
- Enhanced Coverage Systems.

Where available, the TasGRN Strategic Statements also took into consideration key stakeholder and user required operational outcomes, and any common operating principles and practices they desired to be applied across the State.

5.2. TasGRN Agency Business Requirements

The operational business requirements of the key stakeholder Agencies were developed and approved in consultation with each Agency. Agency business requirements were developed and refined over a series of interactive workshops through consultation with key agency personnel. Each of the operational business requirement were categorised into one of the following key focus areas (as well as being identified as either mandatory, desirable or optional) to support the development of the Reference Design technical solution options:

- General capability;
- Coverage;
- Centralised Communications;
- Logging;
- Radio terminal equipment;
- Support Services;
- Training;
- Operational reporting;
- Interoperability; and
- External systems integration.

The Agency TasGRN Operational Business Requirements Development Process identified 321 requirements, of which 291 were classified as mandatory.

Importantly as an outcome of this process each User Organisation was provided a copy of their own Business Requirements as well as a consolidated set of Business Requirements for the network as a whole. The sign-off on the consolidated set of requirements by all User Organisations represented a significant milestone for the project as this had often been a barrier to further progress under earlier iterations of the project.

5.3. TasGRN Strategic Options

Based on the information gathered through the TasGRN Business Requirements process three (3) TasGRN Strategic Options were established. Outcomes of the TasGRN Market Sounding and TasGRN Steering Committee endorsed Strategic Options Principles also influenced development of the TasGRN Strategic Options.

A cornerstone principle applied to the development of the TasGRN Strategic Options was that all three (3) options provided agencies with operationally viable TasGRN alternatives, whilst also providing the project with cost alternatives based on network element inclusions and exclusions. To achieve this the first Strategic Option - Option 1 formed the baseline for the subsequent Strategic Options - Option 2 and Option 3 whereby:

- Option 2 included all network elements available in Option 1, plus additional network elements.
- Option 3 included all network elements available in Option 2, plus additional network elements.

The implementation of a 'P25 based shared network' has been identified as the recommended option for a mission-critical voice communication technology for Tasmania. This approach would transition User Organisations onto a single, purpose built, dedicated digital radio communications network. The radio network would be designed, built and operated to be public safety grade, underpinned by a technology platform based on the P25 suite of open standards.

The recommended 'P25 based shared network' will provide all users with core mission-critical voice and narrowband data capability, including:

- wide-area group voice calls (e.g. calls may be made network-wide)
- interoperability of communications between regions, User Organisations and other networks
- emergency/duress functionality
- end-to-end secure voice communications via encryption (where required), and
- GPS location tracking for radio terminals.

While each of the Strategic Options meet the majority of the User Organisations' operational business requirements, Strategic Option 2 meets more requirements than Strategic Option 1, while Strategic Option 3 meets more requirements that Strategic Option 2. It should be noted that some operational business requirements were not able to be practically achieved within the project either due to delivery or cost constraints.

The recommended P25 option (figure 1), referred to as Strategic Option 2 in the business case, outperformed other P25 options considered due to its expanded UHF coverage footprints. This provides User Organisations significantly more in-building and outdoor portable coverage, essential for ESOs that are required to serve and protect the community in all populated areas across the State. Further, the recommended option provides the technical base to transition to an LTE network capability in the future, without making a major investment now. The recommended P25 option is therefore an incremental 'building block' approach to investing in a mission-critical communication capability.



Figure 1: Recommended P25 Option

5.4. Network Coverage and Capacity

The Reference Design technical solution is based on the provision of new digital public safety grade radio communications network, providing stakeholders with secure and reliable communications capacity across the State of Tasmania.

Network coverage and capacity were designed utilising the outcomes delivered by the project activities with Strategic Options and the Agency Concept of Operations providing the primary design inputs.

The reference design provides network coverage and capacity services to TasGRN users primarily via P25 Phase 2 trunked radio site infrastructure at selected locations across the state.

Use of P25 Phase 2 operation for trunking, as opposed to Phase 1, has several advantages, most notably:

- more efficient use of available radio frequency spectrum (one Phase 2 voice channel requires 6.25 kHz (Kilohertz) of spectrum vs 12.5 kHz when operating in Phase 1 mode);
- increased voice channel efficiency per base station (two voice channels per base station when operating in Phase 2 mode, one voice channel per base station when operating in Phase 1 mode); and
- an improvement in radio terminal battery usage efficiency due to less frequent transmission of signalling information (e.g. longer lasting battery).

Detailed desktop analysis was undertaken by Mingara to identify the level of network service, and primarily coverage, that User Organisations receive now, and the level of service expected under Strategic Option 1 and Strategic Option 2. Note that analysis was not undertaken for Strategic Option 3, however it is assumed that the network performance of Strategic Option 3 will closely align with Strategic Option 2².

Analysis was undertaken on three types of coverage, including:

- **In-vehicle (mobile) coverage:** Coverage that enables User Organisations to communicate from radios installed in vehicles.
- **Outdoor portable coverage:** Coverage that enables User Organisations to communicate from hand-held radio.
- Enhanced outdoor portable coverage: Radio coverage that is designed to provide an increased likelihood of enabling User Organisations to communicate from within buildings using hand-held radios.

Strategic Option 1 would see significant uplift from the current state under all coverage types. Only outdoor portable and enhanced outdoor portable coverage is expected to increase between Strategic Options. Therefore, in-vehicle (mobile) coverage has been used to demonstrate the uplift in service coverage improvements from the current-state to the P25, and the remaining coverage types have been used to differentiate the service level improvements between the Strategic Options.

In addition to the three types of coverage analysed, Mingara has used a number of coverage metrics to specifically demonstrate the extent of the priority benefits, including:

- **Percentage coverage of CAD events or incidents:** A measure of the number of historical computer aided dispatch (CAD) events that fall within the reference design coverage. The assessments are on the following data sets:
 - Tasmania Police CAD data for the period 2012-2015

² The only coverage difference between Strategic Option 2 and Strategic Option 3 is access to LTE for mission-critical communications.

- TESI outages data for the period 2012-2016
- Percentage coverage of State: A measure of coverage across Tasmania.
- **Percentage coverage of built-up (populated) areas:** A measure of populated areas defined by an analysis of gazetted census boundaries, 2016 census data, satellite imagery and address data for all households in Tasmania.
- **Percentage coverage of flood-prone areas:** A measure of coverage in flood-prone areas based on a State-provided dataset.
- Percentage coverage of plantation / world heritage areas: A measure of coverage in natural land expanses across Tasmania based on a State-provided dataset.

6. National Strategic Context of the TasGRN

The TasGRN has been informed by strategies, recommendations and/or guidelines at both a State and National level:

- The Tasmanian Government has a long-term strategy to deliver improved radio communications capability for key government services.
- The National Framework to Improve Government Radio Communications Interoperability 2010-2020 as endorsed by Council of Australian Government (COAG) articulate principles to assist jurisdictions and agencies to achieve radio communications interoperability by 2020.
- A review of the 400 MHz frequency band by the Australian Communications & Media Authority (ACMA). Under the ACMA plan, regional areas including Tasmania were intended to migrate to the exclusive government band by 2018. Tasmania has been advised existing licenses will be supported beyond 2020 to enable transition to a new network.
- Along with a move to utilise the 400MHz band, adoption of a P25 open technology standard has been recommended and will require a replacement of some frequency dependent equipment currently used in the TMRN, as well as proprietary technology equipment which cannot operate using the P25 standard. The move to an open standard technology will provide greater flexibility for Government Agencies and businesses to select and purchase equipment such as radio terminals and consoles that are best suited to their operational needs while remaining part of a single network.
- Due to Tasmania's topography it is likely that there will be a requirement to operate in frequencies other than 400MHz (Megahertz) in regional areas. Current technology provides seamless roaming of frequencies. The ability to operate on multiple frequencies was seen as an inhibitor to progress of this project in the past.
- Aligns Tasmania with other states given the majority of other states have already implemented similar radio solutions over the past twenty years (to align with COAG 2010 commitments). The new network will enable interoperability with interstate networks and devices, which is critical during major events, such

as fires, where Tasmania leverages interstate resources (people and equipment) to support response, and in meeting the National Counter Terrorism Arrangements.

• A reliable, interoperable state-wide radio communications network would assist in the coordination of critical infrastructure resilience as outlined by the COAG Counter-terrorism meeting on October 2017.

Currently Tasmania is the only State in Australia that does not have a contemporary P25 Radio Network.

6.1. Australian National Security Alignment

The public's expectations are also evolving with the threat of terrorism. The current terrorism threat to Australia and Australian interests is *Probable* – an unprecedented level in our history. Australia's National Counter-Terrorism Plan outlines the arrangements, governance and operational responsibilities of Australian governments and agencies engaged in countering terrorism.

Emergency services provide consequence management in the event of a terrorist incident, consistent with state and territory plans and structures.

- The 2017 Triennial Review of Australia's National Counter-Terrorism Arrangements highlighted the need to respond to the rapidly evolving and more complex terrorist threat environment.
- On 5 October 2017 a special meeting of the Council of Australian Governments on counterterrorism (CT COAG) agreed a package of legislative and practical measures to strengthen a nationally consistent approach to countering terrorism. This included arrangements to enable nationally consistent approaches to countering terrorism, with an emphasis on **interoperability**, across the prepare, prevent, respond and recover spectrum.
- The National Framework to Improve Government Radiocommunications Interoperability;
- The wider Australian direction for shared government radio networks, 'open standard' technology and the Australian Communications and Media Authority's (ACMA) dedicated spectrum for security, law enforcement and emergency services.
- It is the responsibility of states and territories to:
 - maintain counter-terrorism related policies, legislation and plans within their jurisdictions with a view to national consistency and interoperability, and
 - support and coordinate critical infrastructure resilience in their jurisdiction.

6.2. Technical Standards and Legislative Requirements

The Project will adhere to multiple Acts and standards during the design, implementation and execution, including:

• The Radiocommunications Act 1992 (Commonwealth)

- State Policies and Projects Act 1993 (Tasmania)
- Emergency Management Act 2006 (Tasmania)
- Major Infrastructure Development and Approvals Act 1999 (Tasmania)
- A Guide to the Tasmanian Radiocommunications Plan 1985 (Tasmania)
- Agency specific legislation, including the Fire Services Act 1979 (Tasmania).

In addition to the above, a number of Tasmanian land and environmental heritage protection laws will impact construction works and ongoing site activities:

- Environmental Management and Pollution Control Act 1994
- Public Land (Administration and Forests) Act 1991
- National Parks and Reserves Management Act 2002.

To address the requirements of the above legislation, the TasGRN Project is including project management systems mechanisms to ensure that environmental and heritage protection issues are addressed early and monitored. State planning laws will also be considered. Whilst there are planning activities required to ensure compliance, these are not expected to have a significant impact on the Project.

From a Technical Standards perspective, the proposed solution is based on open standards, using proven technology available from multiple vendors. It should be noted that the preferred P25 technology is a tested technology that is used in multiple jurisdictions across Australia. It is not expected that the Project will alter its technology path during project delivery.

6.3. Impacts from National regulatory changes

The existing primary Government radio network is the TMRN which operates in the 800MHz frequency band and uses proprietary Enhanced Digital Access Communications System (EDACS) technology. It is used by Tasmania Police, the Tasmanian electricity supply industry Network (TasNetworks and Hydro Tasmania), and to a lesser extent the SES. There are also a number of smaller analogue radio networks operated by the TFS, AT, STT, and DPIPWE.

- There are a number of strategic drivers for the project including a review of the 400 MHz frequency band by the Australian Communications & Media Authority (ACMA). Under the ACMA plan, regional areas including Tasmania were intended to migrate to the exclusive government band by 2018. Due to the long lead times required to build a new network, the ACMA has been advised that Tasmania will migrate to the 400MHz band by 2024.
- The move to an open standard technology will provide greater flexibility for Government Agencies and businesses to select and purchase equipment such as radio terminals and consoles that are best suited to their operational needs while remaining part of a single network.
- Due to Tasmania's topography it is likely that there will be a requirement to operate in frequencies other than 400MHz in regional areas. Current technology provides seamless roaming of frequencies. The ability to operate on multiple frequencies was seen as an inhibitor to progress of this project in the past.

7. National Comparisons and Interoperability

Similar projects amalgamating government owned radio networks to a single government radio network (GRN) have occurred in most states and territories of Australia (excluding Western Australia and the Northern Territory). In some states, whole-of-government radio networks have existed since the 1990s, NSW established the NSWGRN in 1993 and South Australia established the SAGRN in 1999. These states benefit from centralised coordination and maintenance of radio networks and equipment, consistency between agencies in terms of technologies used, and enhanced efficiency and effectiveness of operations.

As illustrated in figure two (2) and three (3) all Australian states and territories have at least one government owned radio network that uses P25 digital technology. Many states are currently undergoing P25 upgrades or are developing business cases to do so. Examples include:

- Queensland established the Government Wireless Network in southeast Queensland in 2014 (P25 Phase II technology).
- South Australia's current network wide upgrade to P25 Phase 1.
- New South Wales' *Critical Communications Enhancement Program* to amalgamate all users to one network, upgrade P25 core infrastructure, and improve state-wide coverage.
- Emergency Management Victoria's 2015 Operational Communications *Program* to transition existing radio networks to a single emergency response network by 2020, and to upgrade the P25 Metropolitan Mobile Radio and Regional Mobile Radio networks.
- Queensland's 'Public Safety Regional Radio Communications Network' business case for a regional upgrade to P25.

Tasmania is the last Australian state/territory to transition to a P25 network, with Hobart the only capital city not to have P25 coverage.

Whilst a significant investment the TasGRN leaves the State of Tasmania well placed to deal with modern communication channels for emergency services and other users, together with providing a platform for use of emerging technologies.

Costing of the TasGRN is consistent with those faced by other jurisdictions however unfortunately Tasmania's challenging terrain, together with relatively low population base, puts this State at a disadvantage in funding from an economies of scale perspective.

The TasGRN project is consistent with a number of other radio network projects being undertaken around the world, including those in the US following on from outcomes of 9/11 (for example see <u>www.la-rics.org</u>)



Figure 2: Government Radio Networks in Australia - Technology



Figure 3: Government Radio Networks in Australia - Coverage

8. Public Expectation

The public expects that ESOs are at the forefront of responding to the needs of the Tasmanian community. The emergency management environment is rapidly changing, with:

- an ageing Tasmanian community and the metropolitan population spread increasing the pressure on emergency services;
- an increasing national security threat and the incidence and severity of natural disasters;
- increasing demand for emergency services under the government's plan to grow Tasmania's population to 650,000 by 2050 and annual visitors to 1.5 million by 2020.
- Greater levels of scrutiny by public and governments during and following emergency events
- Increasing legislative/regulatory demands e.g., WHS liabilities, etc

It is the public's expectation that emergency services and their operational staff have a reliable, sustainable and value for money communications system that allows interoperability between User Organisations, therefore enabling providers to respond to emergencies in a coordinated and timely manner. With technology becoming increasingly sophisticated and available, the community's expectation of responsiveness has increased accordingly.

Frontline staff need to be able to communicate with confidence with their own organisations and also with other agencies to ensure that they can safely perform their duties.

Subsequent to this is the expectation that response times will shorten, and interagency coordination will continue to improve. This was endorsed through the *2013 Tasmanian Bushfires Inquiry*, which concluded:

'The emergency management arrangements can, and should, be improved to provide an appropriate level of protection and reassurance for the community.... resources need to be committed to improving the emergency management arrangements. Many of the problems are the result of not making these commitments in the past. To some extent as well, it may be a reaction of not having many significant emergencies in Tasmania, so that arrangements have either not been sufficiently tested or the management of emergencies has not been rigorously scrutinised. Nonetheless, resources should now be committed to undertaking the improvements needed.'

Expectations of ESOs and essential service providers will continue to grow in parallel with increased demand for their services. To meet these expectations, resources will need to be accessible in more locations across the State and users will need to coordinate emergency responses efficiently. In an urban context, crowd safety is an increasing operational challenge with the rise in the number of major events and the potential threat of terrorism.

The safety of frontline staff must not be compromised due to limitations in communications

Summary of the operational, economic and financial benefits expected to be realised from delivering the TasGRN Project. The benefits are categorised by stakeholder recipient group to demonstrate that the beneficiaries of the TasGRN Project extend to government users, community and business, frontline staff and government.

Benefit recipient "who"	Community and Business	User Agencies	Government
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Benefit "how"	Improved community health outcomes due to more timely and coordinated dispatch of ESO's	Reduction in the severity of workplace injuries resulting from an improved ability to identify, locate and respond to injured operational staff	Improved asset investments and management through better understanding of each asset type and their operational location over time
	Reduction of damage and loss during floods and bushfires due to ESOs' ability to inform and prepare communities for emergency events in a more timely and coordinated manner across Tasmania	Increased operational efficiency, and less reliance on operational workarounds, enabled by contiguous coverage to operational response areas	Improved operational monitoring and reporting due to improved tools and systems for tracking network performance, including near-real-time operational reporting capabilities for network management
	Greater ability to minimise structure fire damage through inherent indoor radio coverage capability, reducing the financial cost of fires for households and business.	Increased efficiency enabled by inter-agency interoperability and coordination during multi-agency events	Potential for other Tasmanian Government Agencies to avoid making significant investment in radio communications by on- boarding them to the TasGRN incrementally and removing infrastructure duplication.
	Improved operational effectiveness of Police responses to crime through the provision of State wide, reliable, fully encrypted, end to end communications	Avoided asset failure of existing networks ageing or life-expired infrastructure	Improved Safety of citizens and employees of the State
	Improved search and rescue outcomes in remote areas through the provision of new radio transmission infrastructure	Reduction in training costs and duration due to standardised terminals and ease of use with personal devices	Potential for improved training and operational effectiveness through the ability to standardise radio terminal equipment within and between agencies (subject to individual agency policy)
	Avoided privacy breaches due to enhanced network security	Improved public confidence in emergency service delivery	Improved quality and objectivity of evidence for investigations, including coronial inquiries, through improved quality of voice recordings and associated meta-data from incidents
	Ability to meet growing incident demand resulting from population and tourism growth, through enhanced radio capacity and scalability	Future proofs mission-critical communications in Tasmania, enabling innovation through next generation voice and data technology	

Figure 4: Expected benefits by stakeholder recipient group

9. Social and Environmental Impacts

The TasGRN will have far-reaching social and environmental impacts, many of which will apply to the Tasmanian community as a whole. The social and environmental impacts of the TasGRN cannot be fully assessed until the design of the TasGRN is finalised, as a proportion of the impacts will relate specifically to the building and decommissioning of radio towers.

The economic and social cost of failing radio networks on the Tasmanian population cannot be reliably quantified due to the random nature of both network failures and emergency events in the future. It is reasonable to assume however, based on history that would come at significant cost.

In broad terms, the social impacts of the TasGRN include:

- Increased access and ease of use to mission-critical radio communications for the State's large volunteer base;
- Geographical equity for regional and remote citizens to have access to, and receive, more responsive and coordinated emergency services;
- Geographical equity due to new government-funded site infrastructure having the potential to be leveraged by commercial providers, to deliver more telecommunication services in regional and remote Tasmania;
- Improved health, public safety and natural disaster response outcomes for all citizens of Tasmania, including improved WHS for User Organisations;
- Avoided privacy breaches due to enhanced network security;
- Potential for economic and social benefits for rural towns through the provision of TasGRN site access to commercial mobile service providers, enabling greater commercial and social connectivity.
- Improved public confidence in ESO operations due to improved security and response times.

The environmental impacts of the TasGRN include:

- Increased ability to protect the environment due to ESOs' more timely and coordinated response to extreme events (e.g. bushfires, floods);
- Increased ability to protect World Heritage zones due to enhanced coverage in rural and forested areas enabling greater mobility of resources; and
- The addition of new sites will intrude on natural environment.

10. Cost and funding

The cost for the TasGRN has been based on a costed reference design aimed at delivering the Business Requirements as produced by technical advisors Mingara Australasia Pty Ltd.

The Capital Works component of the Reference Design includes: -

- Master Sites (centralised call processing and information management infrastructure located at secure State operated datacentres)
- Remote Sites (radio broadcast sites delivering operational coverage and capacity)
- Backhaul (all inter-site links that interconnect all TasGRN infrastructure elements together)
- User Organisation Communications Centre (all TasGRN infrastructure located at a User Organisation communications/control centre)
- Dedicated in-building Coverage Solutions (dedicated TasGRN infrastructure to deliver coverage and capacity to in-door locations where large people gathering occurs)
- Deployable Coverage Solutions (Mobile radio transmission sites that can be rapidly deployed to areas where coverage and/or capacity may be needed for shared agency use and integrates into the fabric of fixed TasGRN radio broadcast sites. In addition, smaller mobile radio transceivers provide standalone coverage solutions for individual agency use)
- Radio Terminal equipment (vehicle radios, handheld radios and fixed location radios)
- Terminal Equipment Accessories (accessories that ensure the radio terminal equipment and any associated accessories ensures the equipment is fit for intended purpose in the various agency operational environments)
- Implementation and Project Management
- Applications and Systems Interfaces (provision of interfaces to permit TasGRN integration with other existing systems e.g. ESCAD and DPIPWE GIS, that addresses both like for like integration and business improvement benefits)
- Risk adjustment Factors (identifiable areas of risk and mitigation each assigned a capital dollar figure)
- Contingency Factors (a gross arbitrary dollar figure with no associated identifiable areas of risk)

As a result of this a "cost" estimate of \$200 - \$250 Million was assigned to the capital component of the network.

Under a Managed Service arrangement, it is noted that the capital "costs" will be "price adjusted" into managed services payments to enable the spread of such costs over the duration of the agreement and bundled with operational services payments.

The exact price of the managed service, including capital costs, will not be determined until the conclusion of the procurement process.

The Business Case identified that the average annual cost for a Managed Service meeting the agency requirements contained in the reference design, and subsequently included as part of - the Request For Tender (RFT) - would be in the vicinity of \$40M per annum on the basis of a two year build period and 10 year operational services period.

This estimate will however be impacted by: -

- The total capital cost (including such variables as number of sites / terminal numbers / console numbers / backhaul requirements);
- The total cost of services (including variables such as the number of vehicles and the associated rate of vehicle churn to be supported);
- The total duration of the contract;
- The exchange rate used for imported content of the reference design capital;
- The international and domestic labour rates capitalised in the reference design;
- The date from which all existing radio systems are no longer in use;
- The timeframe for transition; and
- The total payback time of capital.

In order to fund the project, User Organisations will redirect funding currently utilised to support existing networks to the new TasGRN once transitioned across. In addition, Government has provided recurrent funding of \$25 million per annum with the final contributions from Government and user organisations to be determined based on negotiated outcome.

11. TasGRN Delivery Model

11.1. Managed Service Contract

The TasGRN will be procured as a Managed Services Contract (MS). Under the MS, the Service Provider will provide an end-to-end solution in which they will finance, develop, maintain, operate and retain ownership of all assets (except State assets, which would be provided under lease or license), including network infrastructure and terminals, over the term of the contract. The Service Provider will provide use of the radio network and terminals as a service to the User Organisations.

The MS will require the Service Provider to transfer all of the TasGRN equipment and other TasGRN assets to the State (or its nominees) on expiry or termination of the agreement.

The MS model was recommended in the TasGRN Business Case for multiple reasons, including:

- Greater risk transfer over the life of the assets;
- Reduced interface risks between radio terminals and network infrastructure due to a single provider managing and delivering both; and
- Greater flexibility compared with a PPP contract to accommodate possible technology changes.

The intent of the MS is to appoint a single Service Provider who will be responsible for all risks over the life of the assets, including the design, build, commissioning and operations of all infrastructure and services

The preferred packaging approach for the TasGRN is to procure the network infrastructure and terminal equipment and operating applications as one package, rather than separating them into two separate packages. This will see Package 1 and Package 2 combined through the procurement process as shown in the diagram below.



The preferred packaging approach has been developed in consultation with the TasGRN Project stakeholders and the technical advisors who provided key learnings from other radio network procurements across Australia and internationally. The project's commercial advisors have also provided input into the preferred approach, leveraging their experiences in other jurisdictions and procuring other strategic and complex government assets.

11.2. Shared P25 Network Solution Approach

The radio network will be designed, built and operated to be public safety grade, underpinned by a P25 standards compliant technology platform.

All of the user organisations' radio terminal equipment would be replaced with P25compliant equipment, while communications centre radio communications and logging infrastructure would be replaced with a common, virtualised technology platform. New communications centre infrastructure would also be implemented where required.

P25-compliant technology platform provides all user organisations with key public safety mission-critical voice and narrowband data capability, including:

- Wide-area group voice calls (e.g. calls may be made network-wide);
- Emergency/duress functionality;
- End-to-end secure voice communications (via encryption); and
- GPS location tracking for radio terminals.

In addition to the core P25 voice and data radio communications services provided, the P25 shared network possess the following key characteristics:

- Fit-for-purpose, public safety grade radio terminal equipment;
- Fault tolerant system architecture (where feasible);
- Integrated virtualised communications centre environments (e.g. allowing for consistent capability and user experience across any radio console position);
- Recording and logging of voice communications and associated metadata;
- Legacy radio systems integration;
- Intra-state and inter-state interoperability capability.

Shared P25 network coverage and capacity services would be provided by dedicated radio site infrastructure, implemented in locations required to meet business requirements.

Under the 'P25 shared network' approach, it is estimated approximately 130 plus radio sites may be required to deliver against User Organisations' requirements, with sites comprised of a combination of existing user organisation/State locations and new commercial access arrangements or construction of new sites as required.

11.3. Coverage Design

The TasGRN User Organisations have undertaken an extensive coverage prediction and site selection process. This process generated a design that will economically leverage existing sites, minimising green-field builds to meet the State's coverage requirements. The trunked radio site design utilises the best mix of available site infrastructure, using a combination of State, Preferred Tenderer and other sites assets. The preliminary coverage design utilises a mix of VHF and UHF frequencies.

Selection of UHF and VHF site location is primarily based on UHF coverage requirements and may require multiple sites in close proximity to maximise channel availability.

11.4. Capital Works

Under the proposed delivery model, the Service Provider is responsible for the Design, Build, Operation and Maintenance of the network. Under this model the Service provider will be required to undertake predominantly all capital works and maintenance necessary to deliver the State's requirements. Whilst the Service Provider will have ultimate responsibility for the design of the network, that design will require approval by the State.

The States Requirements were detailed in the Technical Specifications released with the Request for Tender on 24 November 2018. The technical specifications were signed off by the project Steering Committee containing representation from all user organisations, Department of Premier and cabinet and the department of Treasury and Finance.

For security reasons it is not appropriate to release the Technical Specifications publicly given the TasGRN will provide part of the State's critical Infrastructure.

The Technical Specifications detail the TasGRN Facility as "all the accommodation, integrated hardware, software, firmware, systems, services, licenses and sites used

to deliver the functional infrastructure upon which the Service Provider delivers the TasGRN Operational Services during the Services Term."

The TasGRN Facility is comprised of: -

- Land Mobile Radio Element;
- Broadband PTT Element;
- Satellite PTT Element;
- Central Communications Element;
- Network Management Elopement;
- Individual User Support Element;
- Performance and Operational Reporting Element.

The Service Provider will be responsible for the 'design, build, testing, operation and maintenance of the TasGRN, such that it complies with the Specification."

A large component of the capital works will be in the construction and maintenance of radio transmission sites.

It is estimated at this time that the typical site will have a physical land area footprint of approximately 20 metres × 40 metres (less than one hectare). However, there will be sites that vary from this approximation.

Some TasGRN infrastructure sites will likely comprise of vacant Crown Land, commercial land and potentially agricultural land. Given the long-term tenure requirements (i.e. freehold, long-term lease or exclusive licence), commercial arrangements will need to be undertaken in respect of these sites. To ensure State Security, it is not prudent to document the exact location and nature of these sites at this time.

To obtain the level of coverage required by User Organisations it is envisaged the TasGRN comprise approximately 130 individual sites spread throughout the State. It is anticipated that there will only be one (1) to three (3) greenfield sites, in total, required to be built across the State, the remaining quantity of sites will utilise existing site components.

The Preferred Tenderer will setup a Program Management Team which has end-toend accountability for all assigned Projects, sub-Projects and Program-wide costs, schedules, interdependencies, issues, risks, changes, quality, procedures, governance and reporting.

It includes the following components:

- End to End Project Management
- Health Safety & Environmental management and compliances
- Planning and design of the core network transmission and new base station backhaul transmission network
- Development of design, site acquisition and construction of the Land Mobile Radio base stations. Including:
 - Civils, Buildings & Power;
 - Network and Access Transmission;
 - Structures;
 - \circ Land Mobile Radio equipment installation, optimisation and testing; and
 - The Program approach will be implemented in the following phases (draft):

The TasGRN Reference Design includes two geographically diverse master sites, located at Hobart and Launceston. The master site locations were chosen for the following attributes:

- Proximity to local qualified support personnel and services;
- Proximity to mainland-accessible airports;
- Proximity to reliable geographically and media diverse backhaul links;
- Availability of reliable, permanent and temporary mains power;
- Availability of fit-for-purpose ICT system accommodation; and
- Proximity to agency communications centre environments.

Each master site is provisioned with equipment to provide continuous core P25 radio communications services (i.e. voice and narrowband data) to users in the event the other site is rendered inoperable. In addition to providing master site redundancy, each core call processing server has been provisioned in a redundant architecture, allowing for call processing operations to continue with minimal disruption in the event of a core call processing server failure.

The master sites include a range of infrastructure and services as required to meet agency needs, including:

- Core voice and data logging capability (e.g. recording and storing talk group calls, data transmission directly from the system);
- Interfaces to radio transmission sites;
- Interfaces to agency communications centre environments (e.g. for console connection);
- Telephone interconnect interface (e.g. providing connection to PSTN);
- Operational reporting capability; and
- Network management capability.

Communication centres are a strategic component of a land mobile radio (LMR) network with dispatchers utilising them for the purpose of managing radio communications with frontline staff. The TasGRN Reference Design includes the following to be proposed locations for communications centres:

- Radio Dispatch Services Tasmania Police
- FireComm Tasmania Fire Service
- TFS Cambridge
- TFS Burnie
- TFS Launceston
- State Operations Centre Ambulance Tasmania
- TasNetworks Maria Street Communication Centre Facility
- TasNetworks Albion Street Communication Centre Facility
- Other Consoles at the following locations:
 - FireComm Tasmania Fire Service

- TFS Cambridge
- STT Operations Centre Sustainable Timber Tasmania
- PWS Operations Centre Tasmania Parks and Wildlife Service

Communications centres are designed to be physically separate sites with inherent potential for interoperability if and when required. All communications resources connected to the TasGRN can be accessed from any TasGRN console. This supports load sharing during periods of high demand upon ESOs and/or regions and allows for inherent Business Continuity Planning (BCP) capability if a communications centre is unable to be staffed.

Individual WAN links are provisioned to each Master Site, allowing for continuation of services in the incidence of single link failure. If both WAN links are lost at a location, dispatch services can continue at another connected communications centre.

The communications centres will be provisioned with the following major solution elements:

- Radio dispatch console positions (with audio management functionality where required);
- Remote radio console interfaces that allow remote radio consoles to connect from locations outside the communications centres;
- On-site voice logging equipment for the recording of radio and telephone activity relevant to the location;
- Voice logging replay and analysis positions;
- Gateway interfaces to connect legacy radio systems to the new network; and
- Telephone gateway equipment that allows connection of existing telephone lines/extensions to the console system.

It is anticipated the build phase of the project will be between 18 - 30 months with users progressively transferred from existing networks to the new network.

12. Governance

12.1. Governance

The TasGRN governance model is based on implementing arrangements that appropriately reflect the user agencies' requirements across the two major phases of the project. Importantly whilst DPFEM is the lead Agency, unlike earlier iterations of this project, the Steering Committee now comprises representation from all user organisations together with representatives from DoTAF and DPAC. The governance comprises:

- **Delivery phase:** DPFEM has administrative responsibility with the Steering Committee to drive the project and oversee the TasGRN Project team responsible for overseeing the delivery of the project on behalf of, and within, government; and
- **Ongoing operations:** DPFEM to be the employing Agency with responsibility for performance management against ongoing contractual arrangements for managed services. A Board to be established to oversee operational performance of the network.

The governance structure at each major phase of the project can be seen in Figure 6 and Figure 7. Figure 7 sets out the governing bodies and their roles/responsibilities in ensuring the delivery of the TasGRN Network.

TASGRN Project: Project Team Resourcing Diagram



Figure 6: Governance Structure – Delivery Phase

Tasmanian Government Radio Network (TasGRN) Project – Connected, Informed, Confident, Safe

TASGRN Project: Project Team Resourcing Diagram Operations Phase



Figure 7: Governance Structure – Ongoing Operations

Tasmanian Government Radio Network (TasGRN) Project – Connected, Informed, Confident, Safe

13. Considerations and Strategies for Community Engagement

The scale of the TasGRN means that many different stakeholder groups from multiple agencies and organisations will be impacted by its delivery. The TasGRN Project team has undertaken broad stakeholder analysis to date. This is an ongoing process, as the exact number of stakeholders will not be known until the network design is finalised. Even after the network has been built, the list of stakeholders is likely to change over time. The Project and DPFEM will continue to manage stakeholders during the "Delivery" phase.

The Project is working within the parameters of the Tasmanian Government Framework for Community Engagement (http://www.dpac.tas.gov.au/ data/assets/pdf file/0006/273633/Tas_Governme nt_Framework_Community_Engagement_Revised_2014.pdf) with engagement currently aligning with the Inform and Consult segments of the framework.

The TasGRN Project has sought to establish a public presence with the delivery of a website, incorporating avenues for contact to be made with the TasGRN Project Team (<u>www.tasgrn.tas.gov.au</u>). In addition to maintaining the website, the Project Team prepare a quarterly newsletter which is available by subscription with issues subsequently published on the website for public access (<u>https://www.tasgrn.tas.gov.au/newsletters</u>).

The following scenarios have been identified which will require community engagement following appointment of a Service Provider:

- creation of greenfield radio sites,
- decommissioning of existing infrastructure,
- alterations or modifications at existing sites, and
- where there is no change to be made to an existing site.

These scenarios and related engagement considerations are outlined below.

13.1. Scenario 1 – Greenfield Site

Where the requirement for a greenfield radio site may be identified by the Service Provider, the following considerations will be incorporated for community engagement. A greenfield site is defined as a site which will require the construction of a new tower (plus associated buildings to house equipment for power backup etc.), which may also have a requirement to clear the space to remove existing trees, as well as the creation of a roadway to enable access to the site once built.

The proximity of any greenfield site to residential areas will be considered and has been assessed by the Project to sit within the Inform/Consult categories for engagement based on the Tasmanian Government Framework. It is intended that, in conjunction with the service provider, provision of information and consultation will take place with local communities to answer questions and address concerns. It is anticipated that this engagement will involve liaison with municipal councils to assist in the facilitation of information sessions for residents, along with distribution of information within the area.

Where a site may be visible from any nearby townships it is intended to provide information regarding the installation and the benefits for the community, particularly around emergency responses.

There is a likelihood of new leasing arrangements for land to be made between the Crown and the Landowner/or with DPIPWE as the land management authority. Any leasing arrangements will be determined dependent upon the engagement of a Service Provider and the identification of site requirements.

13.2. Scenario 2 – Decommissioning of Existing Infrastructure

Where a site has been identified as no longer being useful in the provision of radio services to the user organisations of the TasGRN, it is assumed that the State, through the TasGRN Project, will undertake decommissioning of sites.

The community engagement focus for decommissioning of sites will be on providing an awareness of ongoing coverage for services within these areas. There may be concerns around a lack of coverage with removal of a site, where previously the community had an awareness or perception of coverage due to proximity to a site. The avenues for engagement and communication identified for greenfield sites apply to this scenario also.

Further to potential community concerns around site removal, the TasGRN Project have an active stakeholder register to capture affected parties, being those with equipment currently co-located on a site. Contact has been made with these affected parties to provide information regarding the progression of the Project. Further specific advice will be provided to each of the affected parties as further information is known regarding specific impacts. With the transition of five separate radio networks onto one network, there will be instances where multiple towers on the one site can be rationalised.

13.3. Scenario 3 – Alterations/Modifications at Existing Site

Where a site will remain but with alterations or modifications, the following considerations will be incorporated for community engagement. It is intended that, in conjunction with the service provider, provision of information and consultation will take place with local communities to answer questions and address concerns. It is anticipated that this engagement will involve liaison with municipal councils to assist in the facilitation of information sessions for residents, along with distribution of information within the area.

Where a site may be visible from any nearby townships it is intended to provide information regarding the installation and the benefits for the community, particularly around emergency responses.

Where there are no substantial changes anticipated to infrastructure, information will be provided in consultation with municipal council channels. As above, any parties with equipment co-located on the site will be contacted directly prior to works being undertaken.

13.4. Scenario 4 – No Change to Site

Where a site will remain and will form part of the TasGRN, the following considerations will be incorporated for community engagement. Information regarding sites which will not be impacted will be provided for information to both parties with equipment colocated on the site along with the local community, in consultation with municipal councils.

14. Environmental Management

The chosen service provider will operate within a contractual, legislative and regulatory framework that will mandate optimal environmental management practices. The legal agreement between the State and the service provider (subject to negotiation) has been drafted with environmental considerations at the forefront.

Prior to commencing performance of the Services at any site the Service Provider must prepare and submit a plan for the management of the environment to the State for review and comment.

14.1. Environmental Management Plans

The TasGRN agreement will require the chosen tenderer to prepare an environmental management plan prior to the commencement of services at any site. As at the time of writing, Section 33.3 of the Tasmanian Government Radio Network agreement (the TasGRN Agreement) includes the following requirements:

- (a) Prior to commencing performance of the Services at any Site, the Service Provider must prepare and submit to the State a draft environmental management plan in respect of that Site for review and comment by the State.
- (b) If any Government Agency requires any changes or alterations to the Environmental Management Plan, the Service Provider must notify the State and provide the updated draft Environmental Management Plan to the State for review.
- (c) Under clause 33.3 of the TasGRN Agreement each draft environmental management plan submitted by the Service Provider under paragraph (a) or paragraph (b) must be reviewed by the State and finalised under Clause 31.4.
- (d) The Service Provider must comply, at all applicable times, with each Environmental Management Plan.

It should be noted that minor changes to the extract above are a likely outcome of contract negotiations between the State and the successful tenderer. However, the basic requirement for the chosen service provider to prepare and submit environmental management plans prior to the commencement of work at any field site is non-negotiable.

In addition to meeting its contractual obligations in relation to environmental management, the chosen service provider will be required to adhere to all relevant local, State and Commonwealth approval protocols.

A number of Tasmanian land and environmental heritage protection laws will impact construction works and ongoing site activities, including:

- Environmental Management and Pollution Control Act 1994;
- Public Land (Administration and Forests) Act 1991;
- National Parks and Reserves Management Act 2002.

It should also be noted that the draft TasGRN agreement specifies any breach by the service provider of the 'World Heritage Laws' as a major default on the contract.

14.2. Site Access Arrangements

Section 33.4 of the TasGRN Agreement states that the Service Provider must not enter into, vary, amend or agree to the lessor or licensor assigning, transferring or novating any lease, sub-lease licence or other tenure or access arrangement relating to the access of a TasGRN site without the permission of the State. If the Service Provider wishes to deviate from the terms set out in Section 33.4 of the Agreement, they must receive permission from the State and provide evidence to ratify why this is required.

Any Site Access Arrangements must comply with the Land Titles Act 1980 (Tas).

14.3. Development Approvals

Development approvals will be required where a significant upgrade or new Greenfield is required. These will need to comply with current legislative requirements.

15. Project Schedule

15.1. Project Schedule

Due to the impending expiry of the TMRN contract (and associated vendor support), there is pressure on the timeframe for the implementation of the TasGRN. It is estimated that it will take 30 months construct the new TasGRN. Therefore, it is imperative that the new network is procured as soon as practicable, to enable construction to be completed by 2022.

Figure 8 summarises the main activities that are required to fully implement the TasGRN. It should be noted that the existing radio networks will remain fully operational until User Organisations have been fully transitioned to the new TasGRN network. It is currently estimated that User Organisations will require twelve months to fully transition to the TasGRN following network commissioning.

15.2. TasGRN Project Road Map as at 17/07/20

2021 2020 2022 2023 2024 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q2 Q3 Q4 Q1 Q2 Q1 Contract Negotiation Period Complete (31/12/2020) Final Network Design Complete ACMA 800mhz deadline Project Plan Complete Pilot Build Complete Phase 1 Complete Core and Consoles TMRN Ericsson Contract extension (30/12/22) Phase 2 Build TMRN Coverage Phase 5 Build North-West Region Phase 3 Build Southern Region Phase 4 Build Northern Region ACMA 800mhz hard deadline (30/06/2024) TMRN Ericsson (Exp. (25/12/21) Network Build Complete -Pilot Residual Operations and Decommission Build and Operate (Demonstration) Testing Planning Testing **Operational Readiness Operational Rollout** Heightened Support Service Desk Establishment Service Desk Operational Transition In Planning Transition Embedding Training User Training Planning and Development Organisational Change Management (OCM): Stage 2 Pre-implementation

TasGRN Project Roadmap - Updated

Figure 8: TasGRN Project Roadmap

16. Major Tasmanian Multi-Agency Response Events Timeline



Figure 9: Major Tasmanian Multi-Agency Response Events

17. Conclusion

The TasGRN Project is the culmination of work towards achieving a shared radio network dating as far back as 2005. The aim of the Project has been to reduce the exposure of ESOs to significant risk due to the escalating likelihood of network failure as a result of ageing technology.

The development of a plan for the commissioning of a new network has been thorough, with extensive consultation with stakeholders, User Organisations and specialist advisors. The functional benefits delivered by the TasGRN will translate to operational improvements, which will minimise risk, enhance outcomes and provide the basis for future strategic decisions regarding technology evolution.

The implementation of the scope of works detailed in this submission will greatly improve the provision of services delivered by ESOs and other User Organisations and enable Tasmania to remain future-focused in the provision of public-safety grade interoperable radio communications.

The Department of Police, Fire and Emergency Management recommends the Tasmanian Government Radio Network Project to the Parliamentary Standing Committee on Public Works for support and approval.

Glossary

Term	Explanation
3GPP	3rd Generation Partnership Project - The 3rd Generation Partnership Project (3GPP) unites [Seven] telecommunications standard development organizations (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC), known as 'Organizational Partners' and provides their members with a stable environment to produce the Reports and Specifications that define 3GPP technologies. The project covers cellular telecommunications network technologies, including radio access, the core transport network, and service capabilities - including work on codecs, security, and quality of service - and thus provides complete system specifications. The specifications also provide hooks for non- radio access to the core network, and for interworking with Wi-Fi networks.
4G	The fourth generation of mobile telephone communications. The speed and standards of this technology of wireless needs to be at least 100 Megabits per second and up to 1 Gigabit per second to pass as 4G. It also needs to share the network resources to support more simultaneous connections on the cell. Coverage of true 4G was limited to large metropolitan areas. Outside of the covered areas, 4G phones regressed to the 3G standards.
ACMA	Australian Communications and Media Authority
АТ	Ambulance Tasmania
Base Station / Radio Base	A radio receiver and transmitter that is located in a specific place (at a site) that enables a two-way radio to communicate with a dispatcher or over a larger range with other two-way radios.
ВСР	Business Continuity Planning
CAD	Computer Aided Dispatch
COAG	Coalition of Australian Governments – a peak intergovernmental forum in Australia chaired by the Prime Minister, attended by Premiers of each state and Chief Minister of territories and the President of the Australian Local Government Association. Members manage matters of national significance that require coordinated action by all Australian governments, e.g. ACMA's arrangement to designate 403-470MHz exclusively for the use of government radio.
ComCen	Command/Communication Centre – Generally refers to the location where command and control operations interface with the communication systems.
ConOps	Concept of Operations
Conventional Radio	A non-trunked mode of operation. Instead of Talkgroups, the radio system defines channels or talk pathways (talkpath/s) because there is no central point of control for radio frequency allocation like there is in a trunked system. The technological impact of this is that there is no dedicated trunk control channel. The system then functions in a similar manner as the existing LMR systems.

Term	Explanation	
СОР	Common Operating Platform – A system that provides a mapped view of shared information for use in critical emergency incident planning and response activities.	
DAQ	Delivered Audio Quality – A measure of audio quality that is based on the Mean Opinion Score system. The score is represented by a number ranging from 1 to 5 and is often used in field and LAB testing within the radio industry.	
	 DAQ 1: Unusable. Speech present but not understandable. 	
	 DAQ 2: Speech understandable with considerable effort. Requires frequent repetition due to noise or distortion. 	
	 DAQ 3: Speech understandable with slight effort. Requires occasional repetition due to noise or distortion. 	
	 DAQ 3.4: Speech understandable without repetition. Some noise or distortion present. 	
	 DAQ 4: Speech easily understandable. Little noise or distortion. 	
	DAQ 5: Perfect. No distortion or noise discernible.	
DC	Design and construct - referring to the model by which a vendor may supply a system.	
DCOM	Design, Construct, Operate and Maintain – This refers to a business model whereby a prime vendor would be responsible.	
DMR	Digital Mobile Radio (ETSI Standard, considered a digital replacement for MPT1327 trunking, 2xTDMA talk channels per 12.5 KHz RF channel).	
DoTaF	Department of Treasury and Finance	
DPAC	Department of Premier and Cabinet	
DPFEM	Department of Police, Fire and Emergency Management	
DPIPWE	Department of Primary Industries, Parks, Water and Environment	
EDACS	Enhanced Digital Access Communication System - An early digital radio protocol with mixed analogue/digital capability used by the state-wide Tasmania Police/Transend network.	
ESO	Emergency Service Organisation	
ESCAD	Emergency Services Computer Aided Dispatch – a project run through the DPFEM that integrates Tasmania Police, AT, TFS and SES computer aided dispatches. The system will record information about emergency incidents (e.g. brief details, taskings, attending officers, comments) for the reference of emergency services personnel when on a call.	
Encryption	The coding of voice (or data) into unintelligible forms for secure transmission.	
FM	Frequency Modulation	

Term	Explanation
GBE	Government Business Enterprise
GPS	Global Positioning System – This technology refers to the digital global positioning services available through the Navstar satellites.
GRN	Government Radio Network
HGS	Harmonised Government Spectrum
ІСТ	Information and Communications Technologies
ILM	Investment Logic Mapping
IRP	Infrastructure Rationalisation Programme
IT	Information and Technology
ІМТ	Incident Management Team
kHz	KiloHertz
LMR	Land mobile radio
LTE	Long-Term Evolution – is a standard for high-speed wireless communication for mobile phones and data terminals. It is based on the GSM/EDGE and UMTS/HSPA network technologies, increasing the capacity and speed using a different radio interface together with core network improvements
MCA	Multi-Criteria Assessment
MCPTT	Mission-Critical Push-to-talk over LTE (MCPTT)
MHz	Megahertz
Mission-critical	Referring to a grade of service that is fit for use within the public safety environment.
MPT1327	British Post Office developed analogue trunked radio standard (NB has 1200 bps data capability).
MS	Managed Service - referring to the business model by which a vendor may supply a system.
NCCGR	National Coordinating Committee for Government Radio- communications – established in 2003 to address multi-agency and cross-jurisdictional issues relating to the coordination of government and public safety radio-communications.
NPV	Net Present Value – the difference between the present value of cash inflows and the present value of cash outflows.
NSW GRN	New South Wales Government Radio Network, administered by the NSW Telco Authority
NT or NetTas	Networking Tasmania
NT-PMRN & CSN	Northern Territory Police Mobile Radio Network & Community Safety Network

Term	Explanation	
ОМ	Operation and Maintenance – refers to the costs, resources and activities that surround the functions of ongoing operation and maintenance of a system.	
ΟΤΑΡ	Over the Air Programming – a feature provided by some radio systems that allows administrative changes to be pushed out to radio terminals without having to physically retrieve them. This method usually uses narrow band data to push configuration files to terminals.	
OTAR	Over the Air Rekeying – a feature provided by some radio systems that allows remote administration of security secrets (keys) on radio terminals in the field. This allows for dynamic, in operation changes of the encryption system.	
P25	Digital trunked radio standard instigated by APCO (USA), considered 'emergency service grade' with respect to performance and encryption.	
Project 25 Phase I	The APCO defined technology capability standard that specifies trunked radio usage in an FDMA (Frequency Division Multiple Access) digital or analogue voice communication scheme.	
Project 25 Phase II	The APCO defined technology capability standard that specifies trunked radio usage in a TDMA (Time Division Multiple Access) digital voice communication scheme.	
PSCPW	Parliamentary Standing Committee on Public Works	
PSMB	Public Safety Mobile Broadband	
РТТ	Push To Talk – Refers to the 'push button to transmit' style of communication delivered by half duplex LMR systems.	
PWS	Parks and Wildlife Service	
RF	Radio Frequency	
RFI	Request for Information	
RFT	Request for Tender	
SAGRN	South Australia Government Radio Network	
SES	State Emergency Services	
SIIRP	Structured Infrastructure Investment Review Process	
SME	Subject Matter Expert	
Spectrum	The frequencies of electromagnetic waves used for the transmission of radio signals.	
SOC	State Operations Centre	
STT	Sustainable Timber Tasmania	
Talkgroup	A term used in the trunked mobile radio industry that is defined as a logical grouping of radio endpoints that can communicate between	

Term	Explanation
	each-other. Generally, this is done in a half-duplex manner (PTT style) where only one party can speak at any one time.
TasGRN	Tasmanian Government Radio Network
TDMA	Time Division Multiple Access (multiple talk channels on one RF channel by virtue of dividing the digital data stream into time slots).
TETRA	Terrestrial Trunked Radio: An open digital trunked radio standard defined by the European Telecommunications Standards Institute.
TFS	Tasmania Fire Service
TMRN	Trunked Mobile Radio Network – a digital (and analogue) capable radio network used by Tasmania Police, TasNetworks and Hydro Tasmania that operates on 800MHz frequency.
Triple Zero / 000	The emergency service's hotline frontend system.
Trunked radio	A mode of radio operation that allows a larger Talkgroup range to exist and operate with a smaller number of radio channels. Bearer radio channels are generally allocated to talkgroups on an "as needed" basis. The total number of simultaneous Talkpaths supported is fixed to the number of channels available.
UHF	Ultra-High Frequency (300 MHz to 1000 MHz)
VHF	Very High Frequency (30 - 300 MHz)
WAN	Wide Area Network

Appendix 1 - Recommendations from the Auditor-General Report - No. 10 of 2013-14 Government Radio Communications (May 2014)

Rec	Section	We recommend that	
1	1.2	Tasmania Police, Tasmania Fire Service (TFS), Ambulance Tasmania and State Emergency Services (SES) investigate ways of providing secure and confidential radio communications.	
2	1.3.1	TFS and Ambulance Tasmania work together to resolve problems around congestion, particularly during the fire season.	
3	1.3.1	 TFS, Ambulance Tasmania, Forestry/Parks and SES set reliability standards and monitor against them. TFS, Ambulance Tasmania, Forestry/Parks and SES establish a register to record service outages and complaints regarding their networks. All service and complaint issues are resolved within pre-set targets. 	
4	1.5	until the outcome of the WoG project is complete (and interoperability is achieved), emergency services should investigate and implement methods for further improving interoperability.	
5	1.6	duplication of infrastructure be costed and taken into account when considering whether to proceed with the WoG network.	
6	2.2.2	network managers develop and document strategic plans for the management of their radio networks.	
7	2.3	network managers produce business cases for all major upgrades.	
8	3.2.3	stakeholders involved with the WoG radio project re-engage positively to ensure a solution to the current impasse is achieved in the best interests of the stakeholders and the State as a whole.	
9	3.3.1	the WoG project's objectives should include a meeting entity requirements and the consultant be asked to re-evaluate the revised set of objectives.	