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POWERLINK QUEENSLAND REVENUE PROPOSAL

APPENDIX 5.09 - PUBLIC

Powerlink Queensland Asset Management Plan (Volume 1 - Overview)

Delivering better value

ASSET MANAGEMENT PLAN 2015

Volume 1 – Overview

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ABBREVIATIONS

AEMO	Australian Energy Market Operator
AMP	Asset Management Plan
CQ-SQ	Central Queensland to South Queensland
DNSP	Distribution Network Service Provider
IOP	Investment Options Paper
kV	Kilovolt
LNG	Liquefied Natural Gas
NER	National Electricity Rules
NNESR	Non-network Engagement Stakeholder Register
OR	Operational Refurbishment
RIT-T	Regulatory Investment Test for Transmission
TAPR	Transmission Annual Planning Report
TNSP	Transmission Network Service Provider

REFERENCES

The following references are relevant in relation to this volume of the Asset Management Plan.

- AM-POL-1035: Asset Management Policy
- AM–STR–1037: Asset Management Strategy
- ASM-I&P-FRA-A2300019: Asset Management Framework
- ASM-I&P-FRA-A2417558: Asset Risk Management Framework.

1. INTRODUCTION

The 2015 Asset Management Plan (AMP) forms an integral part of Powerlink's overall asset management framework, providing a clear line of sight between business strategy, asset management policy and strategy and integrated network investment plans over a 10-year outlook period.

The purpose of the Asset Management Plan is to:

- apply the principles set out in Powerlink's Asset Management Policy, Framework, Strategy and related processes to guide the development of investment plans for the network, including such factors as expected service levels and risk management;
- provide an overview and analysis of the factors impacting network development, including energy and demand forecast, generation development, network performance and the condition and performance of the existing asset base;
- provide a view of asset condition, health, life cycle plans and emerging risks related to factors such as safety, network reliability and obsolescence; and
- outline a plan for network investment and provide an integrated annual snapshot of the forward plan of investments required to manage identified network risks and limitations.

2. ASSET MANAGEMENT SYSTEM

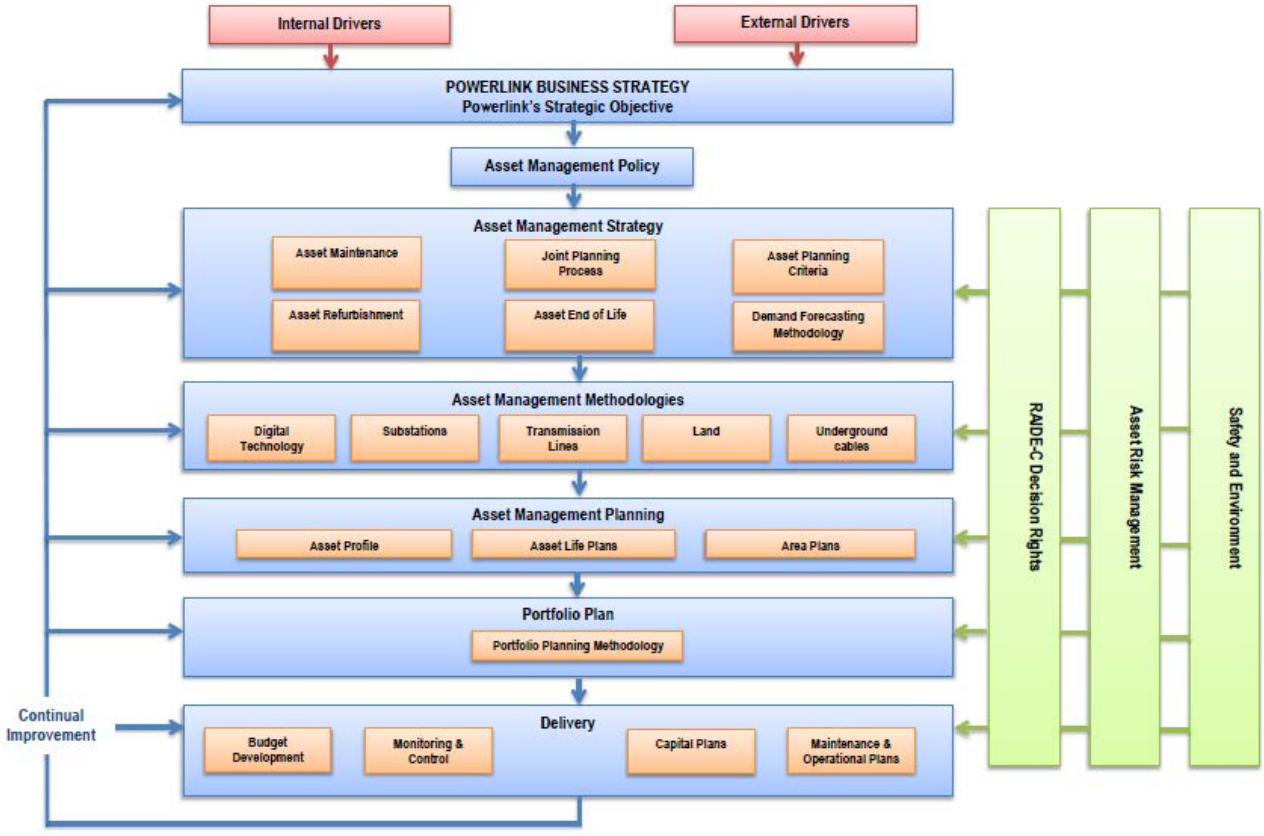
Powerlink's Business Strategy, Asset Management Strategy and overall asset management planning objectives and process are founded on our Mission and Vision.

Powerlink's Business Strategy captures the significant external and internal drivers on our business and sets out key strategic themes and initiatives to be adopted by the business over a three year outlook period. The Business Strategy, when considered in conjunction with the Asset Management Policy, forms the foundation of the Asset Management Strategy.

The Asset Management Strategy is a core document that sets out Powerlink's asset life cycle, asset management cycle, key internal and external business drivers, asset management strategies, and the required levels of service for Powerlink's assets. These inputs in combination set the strategic framework for Powerlink's Asset Management Plan and future network investment.

The components forming part of the Powerlink's Asset Management Framework are illustrated within Figure 2.1. This Asset Management Plan is a key document in Powerlink's Asset Management framework.

Figure 2.1 - Asset Management Framework



The Asset Management Policy is approved by Powerlink's Board and sets out principles that are applied to the management of all of Powerlink's network, telecommunications and business infrastructure assets. The policy sets out a commitment to sustainable asset management practices that ensure Powerlink provides a valued transmission service to current and future generations by managing risk, optimising performance and managing expenditure on assets through the whole of asset life cycle.

Powerlink's Asset Management Strategy is based on two parallel aspects, asset life cycle and asset management cycle. The asset life cycle considers assets on a "whole of life" basis. The asset management cycle considers the broader business environment with continuous improvement from the review of evolving factors. This is to ensure other elements, such as safety and environment, are considered.

In terms of managing the development and ongoing operation of the high voltage transmission network, Powerlink has a number of service levels derived from our strategic drivers, statutory authorities, transmission licence and relevant operating obligations. These are also set out in the Asset Management Strategy.

The Asset Management Strategy is supported by a range of documents governing how Powerlink plans, develops and manages transmission network assets, including the Demand Forecasting Methodology, Joint Planning Process, Asset Planning Criteria, and Asset Reinvestment Policy.

Powerlink's Risk Management Policy requires the adoption of a structured approach to risk management, applying consistent and transparent methods for the assessment and treatment of risk against a number of categories. Powerlink appraises and manages asset risks in accordance with Powerlink's corporate risk management standard and procedures, and the Asset Risk Framework.

Powerlink has been progressively enhancing methodologies and techniques to assess and evaluate strategic asset risks in accordance with a roadmap that is focused on achieving the following key objectives:

- at a corporate level, build knowledge of Powerlink's corporate risk management framework, risk assessment philosophy and techniques;
- develop and where necessary expand the corporate risk matrix so that parameters applied to determine likelihood, consequence and overall risk levels are aligned with asset management decision making;
- develop a detailed first principles model for key asset risks that drive a significant component of Powerlink's expenditure, focused on failure modes, probabilities, exposure factors and consequences;
- develop risk metrics and scoring methodologies calibrated across the different classes of network assets so that investment proposals and associated timings can be more effectively ranked and prioritised; and
- develop supporting information technology systems for greater transparency and to support the systematic assessment of strategic asset risk linking to the prioritisation of work portfolios based on typical constraints.

The Asset Management Plan incorporates a number of enhancements derived from this improvement program.

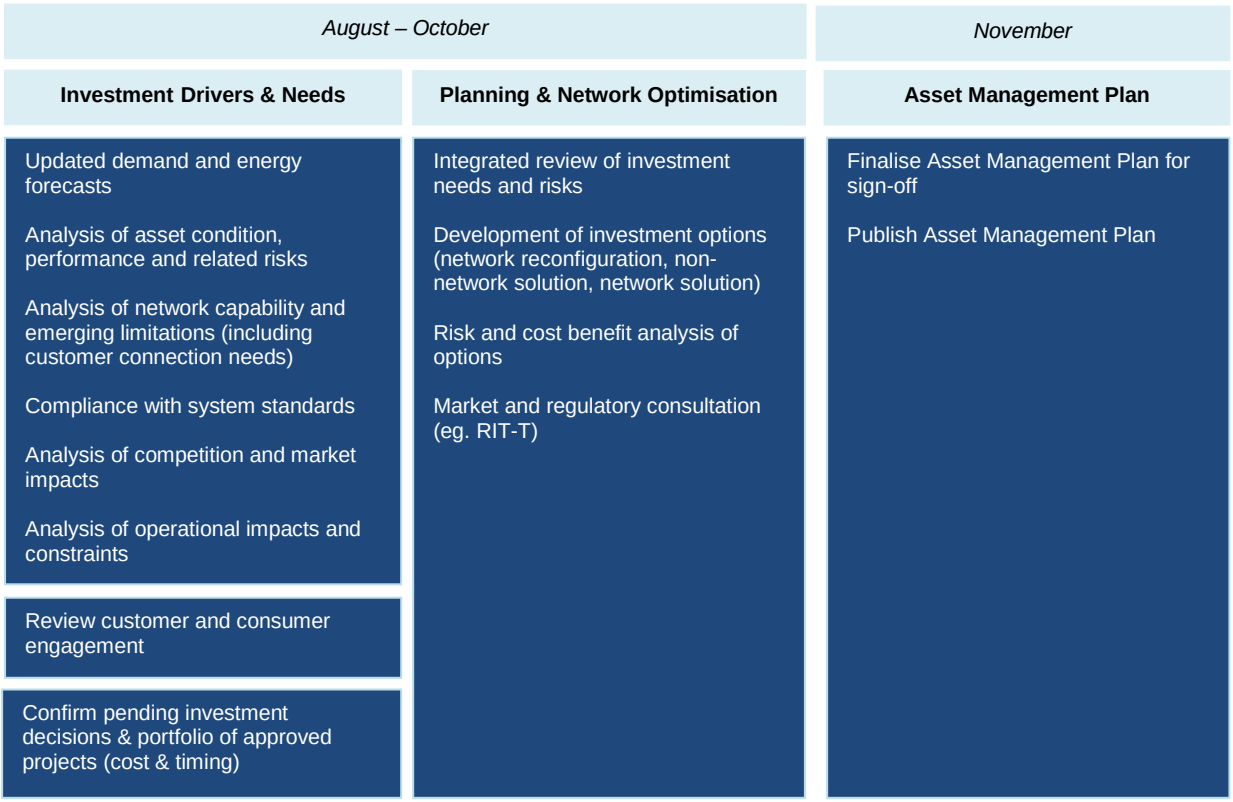
3. ASSET MANAGEMENT PLAN DEVELOPMENT

The development of the Asset Management Plan is conducted on an annual basis commencing in the second half of the calendar year. The development of the plan involves inputs from a number of disciplines including asset strategy, network planning, network customer management, portfolio management and network regulation.

Inputs from other parts of the organisation are sought and considered in the development of the asset management plan process where relevant and applicable.

The timeline and process for development of the Asset Management Plan is shown in Figure 3.1.

Figure 3.1 - Asset Management Plan Development Process



The Asset Management Plan is part of an annual cycle of network assessment and investment review. Following publication of the plan, the investment works and projects identified through the Asset Management Plan are used as inputs to the related capital budget review and corporate planning processes.

The annual review process is outlined below in Figure 3.2.

Figure 3.2 - Annual Investment Planning Process

The program of works is reviewed monthly for strategic tracking and alignment. Updates from the review are provided in the monthly Project Approval Milestone reporting and monitoring process to communicate and align the latest overview of the program of works.

4. ASSET MANAGEMENT DRIVERS

4.1 Asset Condition and Risks

The Queensland transmission network experienced considerable growth in the period from 1960 to 1980. Many transmission network assets constructed over this period are approaching the end of their technical or economic life. Reinvestment in these assets in some form is required within the outlook period of the Asset Management Plan in order to manage emerging risks related to safety, reliability, obsolescence and other factors. Under the current demand growth outlook, reinvestment in the transmission network to manage identified risks associated with these end of life assets will form the majority of Powerlink's capital expenditure program of work moving forward.

Powerlink's asset management methodologies are therefore fundamental in supporting the appraisal of future investment needs, particularly: the monitoring and analysis of asset health, condition and performance; risk assessment methodology; and whole of life cycle planning. For some classes of assets, the systematic appraisal of strategic value and business utility is also required to support investment decisions.

Powerlink is also focused on ensuring asset reinvestment needs are not just considered on a "like for like" basis, with substantial focus on integrated analysis of asset condition and network capability in order to bring about optimised solutions that may involve network reconfiguration, retirement and/or non-network solutions. The outcomes of this integrated approach are strongly reflected in Powerlink's investment outlook discussed in Volume 2.

4.2 Demand and Energy Growth

Demand and energy forecasting is a fundamental part of Powerlink's business and can significantly influence future investment needs. In the current environment, Powerlink is focused on enhancing our demand and energy forecasting methodologies to ensure that we adequately capture the impact of emerging technologies. Powerlink has also taken measures to broaden industry engagement on our demand and energy forecasting models to ensure we capture the most credible assumptions about the timing and rate of technology uptake impacting electricity demand.

Powerlink also seeks advice from industry experts in the modelling of potential market development scenarios that may impact the transmission network and trigger potential investment needs.

Powerlink's 2015 TAPR forecasts indicate relatively flat growth for energy, summer maximum demand and winter maximum demand after growth due to the LNG industry is removed. While there has been significant investment in the resources sector, further developments in the short term are unlikely due to low global coal and gas prices.

4.3 Understanding Stakeholder Value Proposition

Working with stakeholders to understand what they value about Powerlink's transmission service is a fundamental component of Powerlink's mission and business strategy. Powerlink has established a number of channels for stakeholder engagement in order to seek input on our asset management planning and future investment decisions.

Powerlink recognises that electricity price is a major focus of both electricity consumers and directly connected customers. Powerlink is committed to ensuring that its asset management planning and investment strategies create valued outcomes and deliver both a cost effective and reliable electricity supply.

5. OPTIMISED NETWORK SOLUTIONS

5.1 Overview

Powerlink is responsible for planning the shared transmission network within Queensland. The NER sets out the planning process which requires consultation with AEMO, Registered Participants and interested parties, including customers, generators and DNSPs. Significant inputs to the network planning process are:

- the forecast of customer electricity demand (including demand side management) and its location;
- location, capacity and arrangement of new and existing generation (including embedded generation);
- condition and performance of assets and an assessment of the risks associated in allowing assets to remain in-service; and
- the assessment of future network capacity to meet the required planning criteria.

The 2015 TAPR 10-year forecasts of electrical demand and energy across Queensland are used, together with forecast generation patterns, to determine potential flows on transmission network elements. Powerlink examines the capability of its existing network and the future capability following any changes resulting from committed augmentations. This involves consultation with the relevant DNSP in situations where the performance of the transmission network may be affected by the distribution network, for example where the two networks operate in parallel.

Where potential flows could exceed network capability, Powerlink notifies market participants of these forecast emerging network limitations. If the capability violation exceeds the required reliability standard, joint planning investigations are carried out with DNSPs (or other TNSPs if relevant) in order to identify the most cost effective solution, regardless of asset boundaries, including potential non-network solutions.

In addition to meeting the forecast demand, Powerlink must maintain its current network so that the risks associated with the condition and performance of existing assets are appropriately managed. Powerlink routinely undertakes an assessment of the condition of assets and identifies potential emerging risks related to factors such as safety, reliability and obsolescence.

Planning of the network then focuses on optimising the network topology as assets reach the end of their technical or economic life so that the network is best configured to meet current and future capacity needs. Individual asset investment decisions are not determined in isolation. Powerlink's integrated planning process takes account of both future changes in demand and the condition based risks of related assets in the network.

5.2 Area Plans

Powerlink develops Area Plans for collective groupings of assets to co-optimise future network capability requirements with end of life and condition related issues. For example, an integrated approach is considered where there are opportunities for optimising or consolidating the network where changing load consumption and/or generation patterns, coupled with how the network has developed over time, have changed the forecast network capability requirements.

Where reinvestment drivers are identified, strategies including extended maintenance, asset decommissioning, replacement with lower rated plant, or consolidation of existing assets to improve utilisation are considered (depending on the circumstances).

At present there are a number of Area Plans under investigation within the outlook of the Asset Management Plan, including:

- Cairns – 132kV development between Woree and Kamerunga, including reinvestment in Kamerunga substation, [redacted]
- North Queensland – progressive reinvestment in the 275kV and 132kV transmission lines from Strathmore to Clare and up to Ross/Townsville South.
- Mackay – reinvestment in 132kV transmission line between Nebo and Pioneer Valley substations.
- Central West – progressive reinvestment in the 132kV network assets between and including Gladstone South, Callide, Moura and Baralaba substations.
- Gladstone – progressive reinvestment in the 275kV and 132kV transmission lines around the Gladstone area.
- CQ-SQ – progressive reinvestment in 275kV transmission assets on the eastern corridor between Calliope River and South Pine.
- Tarong – Chinchilla secondary systems replacement, fault level limitations on the Tarong 275/132/66kV transformers and longer term development plans for overhead transmission lines between Tarong and Chinchilla.
- Metropolitan Brisbane – 110kV transmission lines from Belmont to West Darra substations and between Rocklea, West Darra and South Pine substations and 275kV transmission lines between Belmont and Blackstone.
- Gold Coast – progressive reinvestment in the Mudgeeraba 275/110kV substation and approaching end of life of Greenbank-Mudgeeraba 275kV transmission line.

Area Plans are further detailed within Volume 3 of this Asset Management Plan.

5.3 Investment Options Papers

As the timing of a significant future investment need identified in the Asset Management Plan approaches, Powerlink undertakes further detailed analysis of investment need and options, culminating in the development of an Investment Options Paper (IOP). In broad terms an IOP addresses the following matters in detail:

- The investment need, incorporating current and future network capability, asset condition and performance and other factors.
- Risk assessment of both the investment need, the potential to continue to carry the identified risks over time and the effect of implementing various options to mitigate the risk. Powerlink is focused on considering a broad range of feasible options including carrying the identified risk, maintenance activities, refurbishment, capital reinvestment, network reconfiguration, asset retirement and non-network solutions.
- The alignment of the investment need and options with Powerlink's overall business strategy, asset management strategy and longer term Area Plans.
- Qualitative and economic analysis of the feasible options identified to address the need. Qualitative factors related to decision making may include customer impacts, operational impacts, land and easement tenure, stakeholder and landholder relations, legal and regulatory matters and delivery risks or constraints.

6. NON-NETWORK SOLUTIONS

Powerlink has established processes for engaging with customers for the provision of non-network services in accordance with the requirements of the NER. The current engagement process centres around publishing relevant information on the need and scope of viable non-network solutions to emerging network limitations.

For over a decade, Powerlink has implemented a range of non-network solutions in various areas to assist or augment the power transfer capability of the high voltage transmission grid. In 2002, Powerlink commenced a regulatory consultation to address emerging network limitations within the transmission network between central and north Queensland. As part of the suite of recommended works, Powerlink entered into contractual arrangements with several power stations located within the north Queensland area to provide network support services to economically defer significant transmission network expenditure.

More recently, as part of the solution to address forecast emerging limitations in the Northern Bowen Basin area, Powerlink entered into a two year network support agreement with a proponent who is able to provide grid support.

Powerlink is currently looking to enhance its customer engagement and expand the use of non-network solutions to address limitations within the transmission network where economic and technically feasible to do so. Current initiatives and measures being undertaken by Powerlink to further develop processes for the consideration of non-network solutions include:

- Enhanced engagement with non-network providers in line with Powerlink's Stakeholder Engagement Framework principles and processes. In particular, via new channels, focussing on the provision of advance information to stakeholders prior to the commencement of formal public consultation or with respect to network investments which may have the potential to use non-network solutions.
- Focus on enhanced collaboration with primary stakeholders to assist in realising demand management outcomes – DNSP, directly connected customers & major non-network providers.
- Cultivate a stronger working relationship with DNSPs associated with the provision of non-network solutions, placing demand management planning on equal footing with network joint planning.
- Enhance business accountability and process, key stakeholder relationships and information systems to ensure a high state of readiness to acquire demand response when needed.

7. CUSTOMER AND CONSUMER ENGAGEMENT

Powerlink is implementing plans to proactively engage with stakeholders and seek their input to Powerlink's business processes and objectives. All engagement activities are undertaken in line with our Stakeholder Engagement Framework that sets out the principles, objectives and outcomes Powerlink is seeking to achieve in our interactions with stakeholders. The framework aims to achieve greater stakeholder trust and social licence to operate, better business decision making and improved management of corporate risks and reputation.

A number of customer and consumer engagement activities specifically influence Powerlink's asset management planning process.

Demand and Energy Forecasting Forum

Powerlink held a Demand and Energy Forecasting Forum with a wide range of attendees from across the industry. The forum examined demand and energy forecasting on the Queensland transmission network with a particular focus on how advances in future technology are playing an ever increasing role in future demand and energy needs. The information provided as a result of this forum supports the refinement of our demand and energy forecasting methodologies and assumptions into the future.

Customer and Consumer Panel

Powerlink has established a customer and consumer panel in order to provide a face to face forum for our stakeholders to give input and feedback to Powerlink regarding our decision making, processes and methodologies. It will also provide Powerlink with another avenue to keep our stakeholders better informed about operational and strategic topics of relevance.

Joint Planning Forums

Powerlink routinely convenes joint planning forums in collaboration with distribution network service providers to ensure effective coordination of the joint response to network needs and solution development. These forums have seen a general shift in focus to joint optimisation of network reinvestment decisions.

Area Plan Forums

Powerlink has established plans to engage with customers and consumers specifically impacted by the longer term development of transmission network infrastructure addressed under Area Plans. Area Plan forums are conducted in order to seek feedback from stakeholders as an input to decision making, and as such are focused on longer term network developments and the economic and qualitative factors influencing Powerlink's decisions.

Non-network Engagement Stakeholder Register (NNESR)

Powerlink has established processes for engaging with customers for the provision of non-network services in accordance with the requirements of the NER. The current engagement processes centres around publishing relevant information on the need and scope of viable non-network solutions to emerging network limitations. In late 2014, Powerlink initiated consultation for the purposes of enhancing engagement with non-network providers in line with its Stakeholder Engagement Framework principles and processes, and to further enhance the processes for consideration of non-network solutions. This has resulted in the establishment of the Non-Network Engagement Stakeholder Register.