

Transmission Standard Design

PART 1- POLICY REQUIREMENTS AND DESIGN GUIDELINES



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Document Control

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Documents Referenced In This Document

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DMS and other document reference in this document are indicated in blue underlined text.	

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1 Introduction

This Policy contains the suite of standard design documents comprising the functional specifications, concept design, catalogue of standard equipment and construction level design drawings.

The Policy is divided into the following parts:

- **Part 1** : Policies
- **Part 2** : Functional Specifications:
 - 132/22 kV Terminal Substation - DM# [3619979](#);
 - 132/22 kV Zone Substation - DM# [3470476](#);
 - 132 kV Wood Pole Lines - DM# [3543622](#); and
 - 132 kV Cables - DM# [4075708](#).
- **Part 3** : Concept Design:
 - 132/22 kV Terminal Substation - DM# [7442120](#);
 - 132/22 kV Zone Substation - DM# [3493930](#);
 - 132 kV Wood Pole Lines - DM# [3762886](#); and
 - 132 kV Cables - DM# [4127041](#).
- **Part 4** : Catalogue of Standard Plant and Equipment – DM# [3014709](#) / DM# [2196893](#)
- **Part 5** : Construction Level Design Drawings and Specifications – DM# [4000316](#) / DM# [3488105](#)

2 Scope

Develop standard designs at construction detail level for transmission assets. Based on the development of standard modules for:

- 132/22 kV Zone substation;
- 330/132 kV Terminals; and
- 132 kV Transmission lines and cables.

These modules will consist of the following series of drawings and construction specifications:

- Civil and structural;
- Primary assemblies;
- Materials lists;

- Secondary seed drawings;
- Design database; and
- Project description of each module.

3 **Purpose**

This strategic initiative has been recognised within the works engine as one of the key enablers to ensure safety, reliability and efficiency is achieved through standardisation of how we plan design, purchase and construct Western Power Transmission assets.

4 **Policies**

The standard designs contained in this Manual have been developed in accordance with the Western Power Transmission Assets policies contained in [Appendix A](#).

4.1 **Environmental Policy**

All assets shall comply with Western Power's Environmental Policy (DMS# [5403605](#)).

The Policy is structured to ensure business activities are planned and conducted to minimize and where possible avoid adverse effects on the natural environment and social surroundings for the benefit of current and future generations.

The environmental objectives are to:

- integrate environmental considerations into all parts of our business planning and decision-making processes;
- sustainable development and working cooperatively with our community and stakeholders to deliver innovative solutions for the future;
- protect the natural environment, our heritage and local visual amenity; preserve biodiversity, and prevent pollution;
- comply with applicable environmental laws and aspire to higher standards within the business, resulting in a shift from compliance to innovation;
- provide our employees with the necessary education and ongoing training to achieve a culture of responsible environmental management;
- reduce the environmental footprint of our business;
- establish and maintain standards, objectives and targets to ensure continual improvement in our environmental performance; and
- engage in enduring and collaborative environmental partnerships that align with our business values.

4.2 Safety and Health Policy

Western Power's Safety and Health Policy (DMS# [3223381](#)) is based on a commitment to provide a work environment and organizational activities, which ensures the safety and health of employees, contractors and members of the general public.

The primary objectives of Western Power's safety and health policy are:

- To identify, assess and manage risks that the workforce, customers and the public face due to our activity;
- To meet, and where appropriate, exceed legal and industry safety and health standards;
- To require the same standards of compliance from all contractors, partners and suppliers.
- To develop and support Western Power employees, and provide resources to meet our safety and health vision;
- To communicate with and engage all interested people on safety and health matters in an open, transparent and timely manner;
- To systematically address deficiencies and deliver opportunities for improvement, through the application of our Safety and Health Management System.

4.3 Public Safety Policy

Western Power's Public Safety Management Strategy (DMS# [3197392](#)) aims to identify and eliminate or control all reasonable foreseeable public safety risks in relation to hazards within the control of Western Power.

The Western Power's Public Safety Management Strategy is underpinned by:

- Compliance with all applicable legislative and statutory requirements;
- A consistent risk management framework, with appropriate governance, across the business;
- Appropriate procedures for all routine business activities, including planning, design, construction, maintenance and operation;
- Appropriate procedures for dealing with network emergencies to enable rapid response to hazardous situations;
- Thorough investigation of all incidents and accidents and evaluation of data on network faults to drive continuous improvement;
- A comprehensive plan to promote public awareness of potential electrical safety risks;
- Clear linkages between public safety outcomes and investment decisions/funding requirements;
- Maintaining effective and productive relationships with all stakeholders that have an interest in public safety; and
- Developing, implementing, monitoring and reporting on Western Power's improvement initiatives and programs specifically intended to reduce, control or eliminate public safety risks.

4.4 Risk Management Policy

Risk Management is integral to the successful achievement of Western Power's goals and a key requirement of effective corporate governance.

The primary objectives of Western Power's risk management policy (DMS# [3842495](#)) are:

- To achieve a structured and systematic approach to the process of managing risk;
- To give assurance to the Board and Executive that material risks are being effectively identified, assessed and managed across the business;
- The establishment of a "risk aware" culture in which the taking of calculated risks in pursuit of opportunities to benefit the organization is encouraged;
- To ensure leadership for risk management is embedded at all levels of the organisation;
- Improved business performance through informed decision-making;
- Improved stakeholder confidence in Western Power's ability to achieve its goals;
- Effective compliance with laws and legislation; and
- Risk management is integrated into the organisation's policies, practices and plans.

4.5 Hazard and Risk Management Policy

Western Power's Hazard and Risk Management Policy deals with the implementation of, and compliance with, endorsed hazard and risk management processes and practices to ensure appropriate hazard identification and management.

The primary objectives of Western Power's risk management policy (DMS# [2803053](#)) are:

- To give guidance to all employees as to what constitutes endorsed hazard and risk management processes and practices;
- Increased compliance with endorsed hazard and risk management processes and practices;
- Increased compliance with legal obligations surrounding hazard and risk management; and
- Provide assurance that significant exposures to breaches of legal obligations surrounding hazard and risk management have been mitigated by appropriate controls.

4.6 Crisis Management Policy

In the event of an adverse incident or series of incidents, Western Power management shall act in accordance with prescribed Crisis Management and Recovery procedures to preserve life and ensure personal safety, maintain and/or enhance reputation, minimise the loss of commercial position and meet statutory obligations.

The principles of the policy (DMS# [3006518](#)) are intended to ensure the effective management of an incident or series of events which may damage Western Power's employees, customers, third parties, operations, environment, long term prospects, corporate brand or corporate reputation. In such a situation the objectives are to:

- Save life and prevent major personal injury;
- Minimise damage to the environment;
- Protect assets and information from further damage;
- Minimise business interruptions;
- Minimise financial and legal liability;
- Protect reputation; and
- Seise business opportunities.

The end state of the application of Crisis and/or Business Continuity Management is to:

- Preserve life and ensure personal safety;
- Maintain and/or enhance reputation;
- Minimise loss of commercial position;
- Meet statutory obligations; and
- Communicate with key stakeholders.

4.7 Document Management Policy

The principles of the Document Management Policy (DMS# [2802440](#)) are intended to encourage use of endorsed document management practices by all staff, thus ensuring Western Power leverages its corporate information asset. The policy applies to all of Western Power's business activities and operations.

The primary objectives of document management in Western Power are:

- To ensure accountability and compliance with regulations regarding document management practices and retention;
- To ensure the information stored in documents is managed in a way commensurate with its value to Western Power;
- To ensure that critical documents are up to date and instantly accessible.
- To minimise the cost of managing documents;
- To improve the productivity of document users; and
- To foster a more dynamic organisation by enabling information to be more easily shared across organisational and process boundaries and over time.

4.8 Minimisation of Life Cycle Costs

Standard designs shall aim to minimising the net present value of the lifecycle costs of the asset recognising future risks and their tangible and intangible costs, as far as they can be foreseen.

Life cycle costs will be based on a sustainability costs beginning at the project's approval phase. Any costs incurred before this are not controllable and will not be accounted for in the sustainability assessment.

A trade-off between the initial capital investment and future operational, maintenance, refurbishment, disposal and compliance costs shall be made for an optimum design.

4.9 Compliance with Regulatory Requirements

Western Power standard designs shall fulfill requirements set by the Electricity Industry Act (DMS# [5352284](#)) and the [Western Power transmission license](#) agreement.

Western Power shall comply with all regulatory and statutory requirements and the technical codes. Cooperatively with the statutory compliance Western Power will endeavour to achieve best practices.

4.10 Planning Criteria

The standard designs presented in this manual shall comply with Western Power's Transmission Planning Criteria (DMS# [1195855](#)). This Planning Criteria has the following aspects that drive the decisions:

- System performance requirements;
- Safety;
- Environmental; and
- Financial.

The System performance criteria are further broken down to determination of:

- Contingency;
- Reliability;
- Quality of supply;
- Steady state; and
- Stability.

4.11 Innovation and Excellence

The standard design shall support Western Power's commitment to upholding excellence through innovation in engineering which represents Western Power's drive for technical leadership in the industry and forms the basis for delivering satisfactory service.

4.12 Future Technology

Technological and economic changes and changes in stakeholders' needs will force modifications to the standard designs in the long term. Standard designs shall enable the adoption of future technologies but will be assessed through the change management policy (DMS# [5347040](#)).

4.13 Procurement and Inventory

The design of the asset shall be in line with Western Power's purchasing and procurement policy (DMS# [4096273](#)). It shall be based on standard products from reputable suppliers with due consideration to the long-term supply sustainability.

Efficient inventory management through long-term supply contracts and management of spares are key aspects of Western Power's procurement policy. The standard design of assets shall consider these policies including already established period contracts for the supply of major equipment.

4.14 Change Management

The standard designs presented in this manual have been developed in compliance with current Western Power's corporate policies and drivers. These policies and drivers may change in time in response to the changes within the business-operating environment including but not limited to the regulatory frameworks, climate changes, customer expectations and behavior.

The standard designs shall be regularly reviewed, updated and communicated to wider Western Power community by the Transmission Primary Engineering Services Section through an agreed change control process to maintain continued compliance – DMS# [5347040](#). Where possible the review period will synchronise with the plant period contracts.

4.15 Transmission Line and Cable Design Guidelines

The standard designs presented in this manual have been developed in compliance with current Western Power's corporate policies and drivers. These policies and drivers may change in time in response to the changes within the business-operating environment including but not limited to the regulatory frameworks, climate changes, customer expectations and behavior.

All design requirements for transmission lines to comply with the latest revision of C(b)1.

Appendix A

Manual Ref No.	Policy Title	Associated Document Type	Associated Document Description	DMS#
4.1	Environmental			5403605
	Standards and Guidelines		ISO 14000 Series of Environmental Management Standards	
	Related Policies and other documents		Western Power Environmental Policy	2713795
			Environmental Management Framework	3036248
			Western Power Environmental Strategy	2718320
			Environmental Management Overview	2529272
			Environmental Management System (EMS), EMISWeb (electronic EMS tool) http://perda01.90/env/net/emis.nsf	
	Legal reference		Environmental Protection Act 1986	2773619 , 2701242 , 2701251
			Environmental Protection and Biodiversity Conservation Act 1999	3018946 , 3018951
			Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (Cth)	2674306
			Aboriginal Heritage Act 1972 (WA)	2674316
			Agriculture and Related Resources Protection Act 1976 (WA)	3125679 , 2684969 , 2684966
			Bush Fires Act 1954 (WA)	3156753
			Conservation and Land Management Act 1984 (WA)	3156924
			Contaminated Sites Act 2003 (WA)	3181951 , 3397087
			Country Areas Water Supply Act 1947 (WA)	3130362 , 2783920
			Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (WA)	3135117
			Environmental Protection (Controlled Waste) Regulations 2004 (WA)	2760296
			Environmental Protection (Noise) Regulations 1997 (WA)	2760349 , 3096012
			Environmental Protection (Peel Inlet-Harvey Estuary) Policy 1992 (WA)	2674671
			Environmental Protection (South West Agricultural Zone Wetlands) Policy 1998 (WA)	2674675
			Environmental Protection (Swan and Canning Rivers) Policy 1998 (WA)	2711519
			Explosives and Dangerous Goods Act 1961 (WA)	2714950
			Native Title Act 1993 (Cth)	3016143
			Soil and Land Conservation Act 1945 (WA)	3127177
			Wildlife Conservation Act 1950 (WA)	3156924 , 3112161

Appendix A (Continue)

Manual Ref No.	Policy Title	Associated Document Type	Associated Document Description	DMS#
		Standards and Guidelines	ISO 14000 Series of Environmental Management Standards	
		Related Policies and other documents	Western Power Environmental Policy	2713795
			Environmental Management Framework	3036248
			Western Power Environmental Strategy	2718320
			Environmental Management Overview	2529272
			Environmental Management Systems (EMS), EMIS Web (electronic EMS Tool) http://perda01:90/env/net/emis.nsf	
			Assessment of Environmental and Social Issues in Line Route Selection and Design Process (Policy)	1374758
			Environmental Impact Assessment and implementing Environmental Conditions (Policy)	1374972
			Entry to Land Subject to Native Title (Policy)	1369500
			Management of Native title for New works (Procedure)	1384496
			Management of Phytophthora dieback during maintenance and construction activities	1382172
			Power Frequency Electromagnetic Fields (Policy)	1294640
			Developing and Implementing Environmental Management Systems (Procedure)	1407950
			Development of Environmental Management Systems (Policy)	1407951
			Procurement, Storage, Handling, Transport and Disposal of SF6	1374973
4.2	Safety and Health			3223381
		Legal references	Section 24(1) Electricity Corporations Act 2005	
			WA Occupation safety and health Act 1984 and regulations 1996	
		Standards and Guidelines	http://powernet.westernpower.com.au/gateway/br_business_services/safety_and_health/	
		Related Policies and other documents	5.2.1 <Workplace Fatalities Policy	2802960
			Safety and Health Guideline: Emergency Response	2802465
			Safety and Health Guideline: Hazard Identification and Risk Assessment	2802470
			Safety and Health Policy Statement	2802460
			Pre-Employment Medical Examinations	2802479
			Physical Capacity Screening	2802480 and 2802482
			Health Information Sessions	2802488
			Executive Health Assessment Program	2802488
			Safety Recognition Guidelines	2802551
			Safety Performance Recognition	2802518
4.3	Public Safety			1265922 & 3197392

Appendix A (Continue)

4.4	Risk Management			3842495
		Legal references	Electricity Corporations Act 2005 (WA)	
		Standards and Guidelines	AS4360:2004 Risk Management	
			AS8000-2003 Corporate Governance – Good governance principles	
			ASX Principles of Good Corporate Governance – Principle 7 Recognise and manage risk	
			COSO Enterprise Risk Management Framework	
		Related Policies and other documents	Risk Management Framework	3006518
			1.6.1 Crisis Management	3006518
4.5	Hazard and Risk Management			2803053
		Legal references	Electricity Corporations Act 2005 (WA)	
			Corporations Act (2001)	
			Occupational Safety and Health Act 1984 (WA)	
			Occupational Safety and Health Regulations 1996 (WA)	
		Standards and Guidelines	AS/NZS 4360: Risk Management	
			AS/NZS 4804:1997 Occupation Health and Safety Management System	
			Leadership and Behavior	
		Related Policies and other documents	Hazard Identification and Risk Management	2802470
			5.3.1 Hazard and Risk Management	2803053
			5.1.2 Management of Contractors	2803046
			Monitoring and Review	
4.6	Crisis management			3006518
		Legal references	Electricity Corporations Act 2005-section 63. Interruption etc of supply.	
			Energy Operators (Powers) Act 1979-Sections 48, 57 and 58	
		Standards and Guidelines	AS8000-2003 Corporate Governance-Good governance principles	
			AS4360:2004. Risk Management	
			HB221:2004 Business Continuity Management	
			ANAO Business Continuity Management	
		Related Policies and other documents	Western Power Crisis Management and Recovery Manual	3022037
			1.5.1 Risk Management Policy	3006290
			Risk Management Framework	3017083
			Safety and Health Guidelines Emergency Response	2802465

Appendix A (Continue)

Manual Ref No.	Policy Title	Associated Document Type	Associated Document Description	DMS#
4.7	Document Management			3004344
		Legal references	Electricity Corporations Act 1994 (WA)	
			State Records Act 2000 (WA)	
		Standards and Guidelines	Document Management Policy and Procedures Manual	2802440
		Related Policies and other documents	Document Management Policy, detailed version	2802443
			DMS Training Manual	2802547
			Corporate Thesaurus	2802441
			IKMS Provision of Archiving Service	2802477
			Retention Disposal Schedule – Use restricted to IKMS Officers	2802456
		Related Policies and other documents	Recordkeeping in Western Australia – State Records Office (SRO) Advice Sheet	2802619
			Disaster Recovery Plan – Use restricted to IKMS Officers	2802494
			1.5.1 – Risk Management Policy	3006290
			1.3.1 – Integrity and Ethics Policy	3004466