

Ref:	NR/L3/ELP/27406/MOD J
Issue:	1
Date:	3 December 2011
Compliance date:	3 March 2012

Engineering Deliverable Requirements for Electrical Power Asset Design

Module J: DC Networks (DC & 3 phase)

1 Typical DC Networks (DC & 3 phase) Requirements

Only the appropriate items described in clauses 2 to 4 should be specified in the PRS along with requirements identified in Module A. Additional requirements may be specified in the PRS for complex or unusual schemes.

2 DC Networks (DC & 3 phase) Form A

The required items may be incorporated into the associated GRIP 3 option selection report instead of providing standalone deliverables. The level of detail for each item should only be sufficient to satisfy the approval in principle of single option selection.

a) Major Feeding Diagram.

Required for schemes introducing a new electrification system or amending existing feeding arrangements. Details are required of the route covered by the scheme including interfaces with any existing electrification systems and measures to mitigate potential effects on adjacent or abutting infrastructure.

A major feeding diagram produced at GRIP 3 in order to obtain approval in principle of single option selection may require updating at a later GRIP stage to reflect any scheme alterations.

A major feeding diagram commentary will be required to identify any new or modified feeding arrangements shown on the diagram and the rationale for those arrangements.

b) Single Line Diagram.

A substation single line diagram showing all controlled elements (HV and DC) and which may include manually operated disconnectors, isolators and switches, current and voltage transformers, rectifier transformers, rectifiers and converters. It should also show the interface with the TNO/DNO where applicable.

c) Site Layout Drawings.

Outline site layout drawings are required for a new site or where significant changes to an existing site layout are required. The site layout drawing may detail new equipment locations, cable routes and containment in the context of the site and its interface to the railway. The cable routes and containment requirements should be supported by cable route notes.

d) Equipment Layout Drawings.

Outline equipment layout drawings are required where significant changes to existing enclosures/buildings are required.

e) DNO Requirements.

DNO requirements for both high voltage and low voltage interfaces as applicable.

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- f) Earthing and Bonding Strategy.
 - Details of earthing and bonding strategy applied to the site/sites.
- g) Primary Equipment.
 - Identification of the type, ratings and configuration of key items of distribution equipment.
- h) Ancillary Services.
 - Type and configuration of substation buildings, building services requirements (e.g. heating, lighting and ventilation) and ancillary equipment requirements (e.g. batteries and chargers and low voltage distribution equipment).

3 DC Networks (DC & 3 phase) Form B

- a) Site Location Drawing.
 - To be produced for sites that have new or modified infrastructure.
- b) Site Layout Drawing.
 - A detailed drawing showing the site layout of equipment including cable routes within the site and accompanying cable route notes. Where cable routes extend beyond the limits of the site additional cable route drawings and accompanying cable route notes will be required.
- c) General Arrangement Drawings.
 - Detailed drawings showing the substation building and all substation equipment general arrangement details.
- d) Equipment Layout Drawings.
 - A detailed drawing showing the layout of equipment within a substation building.
- e) Schematic & Wiring Diagrams.
 - Detailed equipment diagrams including circuit diagrams, wiring diagrams, termination diagrams and interlocking diagrams.
- f) Substation Operations Diagrams.
 - Substation operational diagrams showing all controlled elements (HV and DC) and manually operated disconnectors, isolators and switches, current and voltage transformers, rectifier transformers, rectifiers and converters. It should also show the interface with the incoming HV supply from the DNO where applicable.
- g) Earthing and Bonding Strategy.
 - Detailed earthing and bonding system design drawings and calculations for the substation site.
- h) Terminal Marshalling Diagrams.
- i) HV/LV Cable Schedules.