WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

Company Directive

STANDARD TECHNIQUE: SD5F

Relating to connecting multiple small low voltage connections with limited network analysis

Policy Summary

This document specifies the procedure for connecting multiple street furniture connections (metered or unmetered) with a demand of up to 5kVA with minimal design analysis and minimal input services from Western Power Distribution.

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Implementation Date: October 2017

Approved by

Policy Manager

Date: 26 October 2017

IMPLEMENTATION PLAN

Introduction

This document specifies the procedures that shall be followed by Western Power Distribution (WPD) and Independent Connection Provider (ICP) staff where the ICP wishes to determine the point of connection onto WPDs distribution network and / or approve their own design, in accordance with the ENA Competition in Connections Code of Practice (COP).

Main Changes

This is a new document

Impact of Changes

The new connection / augmentation of multiple street furniture installations will be able to follow this procedure for the determination of the point of connection and for the subsequent information exchanges between WPD and ICP's.

Implementation Actions

Team Managers responsible for street furniture connection designs shall ensure that all staff involved in the design of the relevant connections are made aware of the requirements of this standard technique.

Implementation Timetable

This document can be implemented with immediate effect.

REVISION HISTORY

Document Revision & Review Table		
Date	**Comments**	**Author**
October 2017	• This is a new document	Seth Treasure

1.0 Introduction

1.1 This document specifies the procedure for connecting multiple street furniture connections (metered or unmetered) with a demand of up to 5kVA with minimal design analysis and minimal input services from Western Power Distribution (WPD). Installations will be permitted to connect if they comply with the set network and demand criteria detailed within this document.

1.2 This document has been written in coordination with the Energy Network Association 'Competition in Connections Code of Practice' (COP) which has been created to facilitate competition in the market of new electricity connections through minimising the input services from host DNOs and to ensure that the input services are provided on an equivalent basis to internal data systems.

1.3 The COP can be viewed by clicking on the following link: - Code of Practice

1.4 Where all the criteria specified in this document cannot be satisfied further detailed analysis shall be carried out to determine the point of connection before any load can be connected and will be undertaken in all cases for loads in excess of those identified in the scope of this document.

1.5 Where further detailed analysis is required, the appropriate Low Voltage design software (i.e. WinDebut), transformer and customer load data and profiles must be considered / consulted.

2.0 Scope

2.1 The principle of this document is to enable the quick determination of multiple new or augmented (disconnection and reconnection) street furniture connections (demand) onto the existing WPD owned and operated low voltage networks without the requirement for in depth network analysis with computer based software.

2.2 Multiple installations of up to 5kVA (total load) of street furniture connections are permitted where each individual connection is connected to a separate low voltage circuit.

2.3 The installation of more than one street furniture connection on a single low voltage circuit is outside of the scope of this document.

2.4 The 'determination of the point of connection' shall be compliant with the requirements of Standard Technique: SD5B which relates to connections with minimal design analysis. Alternatively more detailed analysis is required in compliance with Standard Technique: SD5K and SD1F.

2.5 ICP's wishing to undertake a connection in accordance with this Standard Technique shall be signatory to the WPD 'Framework Agreement relating to Network Access and Adoption of Electricity Connection and Distribution Equipment' (FNA&AA). ICP's will also have to sign the 'Extension of Contestability' (EOC) Agreement for the determination of the 'Point of Connection' (POC).

3.0 Low Voltage Circuit requirements

3.1 The low voltage circuit shall comply with the following criteria.

- The supplying transformer (ground or pole mounted) shall be rated ≥ 100kVA.
- The low voltage circuit 'mains' at the point of connection shall have a cross sectional area ≥ 35 mm².
- The low voltage circuit and transformer are not overloaded
- The low voltage circuit is not subject to interactivity, Potential Refund or Apportionment of costs.

4.0 Connection requirements

4.1 Overhead connections shall be supplied via a 25 mm² copper concentric conductor.

4.2 Underground connections shall be supplied via a 25 mm² aluminium hybrid conductor.

4.3 The maximum length of service cable from the 'mains' cable (service joint) to the metered street furniture connection is 30m. Any service length greater than 30m will require more technical analysis for the consideration of voltage drop and impedance and therefore is outside the scope of this document. ST:SD5K details further guidance on the analysis of low voltage circuits.

4.4 Metered connections shall not form part of a loop. Only connections fully comprising of unmetered connections may be 'looped' from either cutouts or service cables.

4.5 All new unmetered connections installed within a 20m distance from a suitable low voltage main (see above), shall be connected with a sole use service cable.

4.6 The point of supply shall have a Phase to Neutral and Phase to Earth impedance equal or lower than the values specified within Table 1.

4.7 The connection shall be connected via a 'street light' cutout compliant with EE Spec 116 with a minimum rating of 25 amps.

4.8 The fuse shall be compliant with BS88 – 1 2007 / IEC 60269 – 1 and be suitably sized for the demand of the installation.

4.9 For the determination of the earthing availability, where the circuit is predominately combined neutral and earth construction – it may be assumed that the circuit is suitable for PME. For all other construction types, the earthing availability shall be agreed with the responsible WPD team.

4.10 Where the installation utilises a Protective Multiple Earth (PME) connection, the construction of the termination housing shall be categorised as 'Class 1' insulated i.e. it is metal and not GRP.

4.11 Where the installation requires a PME connection, the consumer shall install an earthing electrode compliant with the requirements detailed within Table 2 and provide a bonded installation compliant with the wiring regulations (BS 7671).

4.12 The connection materials shall comply with ENA Engineering Recommendation G81 and the associated WPD framework appendices as amended. These documents are available from WPDs Technical Information website, www.westernpowertechninfo.co.uk.

4.13 Underground jointing techniques shall comply with the jointing practices detailed within the WPD jointing procedures / policies.

4.14 Overhead connection techniques shall comply with the connection practices detailed within the WPD connection procedures / policies.

Cut-out Fuse Rating	Maximum Phase to Neutral Loop Impedance (PNLI)	Maximum Earth Fault Loop Impedance (EFLI)		
		PME / PNB Connection	SNE[3] Connection	Directly Earthed (TT) Connection
Street lighting type cut-out (i.e. 25A cut-out)				
6A	1.50 Ω[1]	As per PNLI requirement	13.50 Ω	N/A
10A	1.38 Ω[1]		7.10 Ω	N/A
16A	0.86 Ω[1]		3.80 Ω	N/A
20A	0.69 Ω[1]		2.70 Ω	N/A
25A	0.55 Ω[1]		2.10 Ω	N/A

Notes

Note 1 The phase to Neutral impedance to metered connections shall be ≤ 0.47 Ω.

Table 1 Maximum impedance for Metered and unmetered connections

Connection	Maximum single phase load or overall unbalance on split or three phase connection	Maximum consumer earth electrode resistance bonded to main earth terminal
single phase, unbalanced split or three phase	500 w	100 Ω
	1kW	60 Ω
	2kW	20 Ω
	3kW	14 Ω
	4kW	11 Ω
	5kW	9 Ω

Table 2 Customer installation earthing requirements

Note, If the earth electrode resistance as specified above cannot be satisfied, the installation should form part of a TT system by installing a separate earth electrode and fitting a suitable protection device in accordance with BS 7671 (e.g. an RCD).

If the earth electrode resistance as specified above is unachievable and the installation of a RCD protection device is undesirable due to maintenance and nuisance tripping, the street furniture may have neither a mains derived earth terminal or residual current device (RCD) if the fixture is categorised as 'Class 2' (double insulated).

5.0 Power Quality

5.1 The connected system shall comply with BS EN 61000-3-2 which relates to Harmonics for items rated up to 16A per phase.

5.2 The connected system shall comply with BS EN 61000-3-3 which relates to Flicker for items rated up to 16A per phase.

6.0 Connection Procedure

6.1 The electrical designer will assess the proposed electrical installation for compliance with sections 4 and 5 of this document. Only installations that comply with sections 4 and 5 may be processed via the 'Street furniture matrix'.

6.2 The competent electrical designer will assess the WPD record maps to evaluate the point/s of connection to ensure that no more than a total of 5kVA will be connected to each low voltage circuit.

Access to WPD's linear asset records will be made available via our online map view package

6.3 Circuits that are identified with a warning 'hand' symbol which detail 'AOC' (Apportionment of costs) are outside of the scope of this document and the determination of the point of connection shall be undertaken by WPD.

6.4 The competent electrical designer will determine the low voltage circuit compliance with the requirements of section 3 via the WPD mapping system (conductor sizes) and the online CROWN Internet Routing and Tracking system known as CIRT (transformer sizes). Any installations on circuits that do not conform to the requirements of section 3 will require technical analysis in accordance with Standard Technique: SD5K.

6.5 Once the electrical designer has established compliance with the above clauses, they shall raise an enquiry '**CIC Demand LV – ICP Multiple Design and POC**' (one enquiry) via CIRT or EMAIL to the WPD Records Team (providing the minimum information) for installations sited within a single Distribution region. Distribution regions can be found via the WPD Network Info maps which are available from the WPD Website, Connections > Network Plans and Information.

The ICP shall raise an individual enquiry per installation type / demand requirement.

6.6 When making an application to connect multiple street furniture installations the ICP shall provide the following;

- An overview map detailing the location/s of the connections
- A suitably scaled location map detailing the 'Point of Connection' (POC) and 'Point of Supply' (POS).
- The demand of the installation and fusing requirements
- The earthing arrangement of the installation e.g. PME / SNE & Customer earth electrode (resistance value and design)

- Information regarding the connection materials
- Information regarding the declaration of conformity with the Power Quality standards BSEN 61000-3-2 and BSEN 61000-3-3
- Proposed timescale of works
- Completed and signed application form (Appendix B)

6.5 WPD (Network Services) will assess the initial connection enquiry from the ICP per installation type / setup with the requirements of this document (this may include multiple locations). If the installation is acceptable with the requirements of this document, WPD shall issue an acceptance notice per single installation type (Appendix B).

6.6 Following a design submission to WPD, if the installation or low voltage system is deemed to be non-compliant with the requirements of this Standard Technique. The design submission will be rejected by WPD and a traditional CIC enquiry shall be raised by the ICP.

6.7 Following a design submission to WPD, if a circuit is subject to the ECC Regulations (Potential Refund) the applicable installation will be rejected by WPD and the ICP will be required to raise a traditional CIC enquiry so that the appropriate costs can be refunded to the initial party.
The ICP may resubmit a new design not including the affected connections to the circuits with the applicable Potential Refund.

6.8 If the ICP wish to connect installations with different model specifications / demand requirements, the installer shall raise an enquiry per model specification / demand requirement per Distribution region. WPD will provide multiple acceptance forms per model specification / demand requirement.

6.9 Once WPD has issued an acceptance confirmation notice for the connection and installation materials, the ICP shall follow the Live Jointing Notification procedure (as detailed within Standard technique: NC2L).

6.10 The ICP shall provide the WPD Records team with a schedule of works as detailed within ST:NC2L

6.11 The responsible WPD Network Services team will provide any required MPAN's.

7.0 Inspections and Design assessment

7.1 The ICP physical works and POC assessment will be reviewed in accordance with the 'Inspection & Monitoring regime'.

8.0 Information on request

8.1 ICP's can obtain the following information by using the online CROWN Internet Routing and Tracking (CIRT) package.

- Substation Name
- Substation Number

- HV Feeder Reference
- Primary Substation Name & Number
- Total number of Customers
- Total Agreed Supply Capacity (must be reserved)
- Day MD*
- Night MD*
- Transformer Size & Voltage
- LV Cabinet / Pillar size
- HV Switch Type
- Automation assets

Per LV Feeder:

- Feeder Number
- Number of Customers by Profile Class
- Number of Half Hourly Customers
- Number of IDNO Customers per substation
- Agreed Supply capacities per feeder (These capacities must be reserved)
- Inaccurate figures may appear where MPAN numbers are incorrectly profiled or the meter supplier has provided inaccurate data. In the event of spurious or suspicious data, WPD's local responsible team must be contacted for interpretation.

8.2 Any information not available within CIRT and required for the design of the connection can be obtained by requesting it within the application of the enquiry or by contacting the local Network Services team. The contact details of the responsible team will be provided in the confirmation email during the notification process. This requested information shall be provided within five working days where the information is available on the WPD systems or up to six weeks where monitoring equipment needs to be fitted on site to collect data.

8.3 Information obtained via responsible WPD team –

- Earthing arrangements (PME, PNB, SNE or TT)
- IDNO Agreed Supply Capacities

8.4 Information to be obtained via the central Primary System Design Planning team (PSD) –

- Earthing Arrangements within close proximity to Primary Substations

To obtain information from PSD, the ICP shall make a request by emailing wpdpsdicpdata@westernpower.co.uk

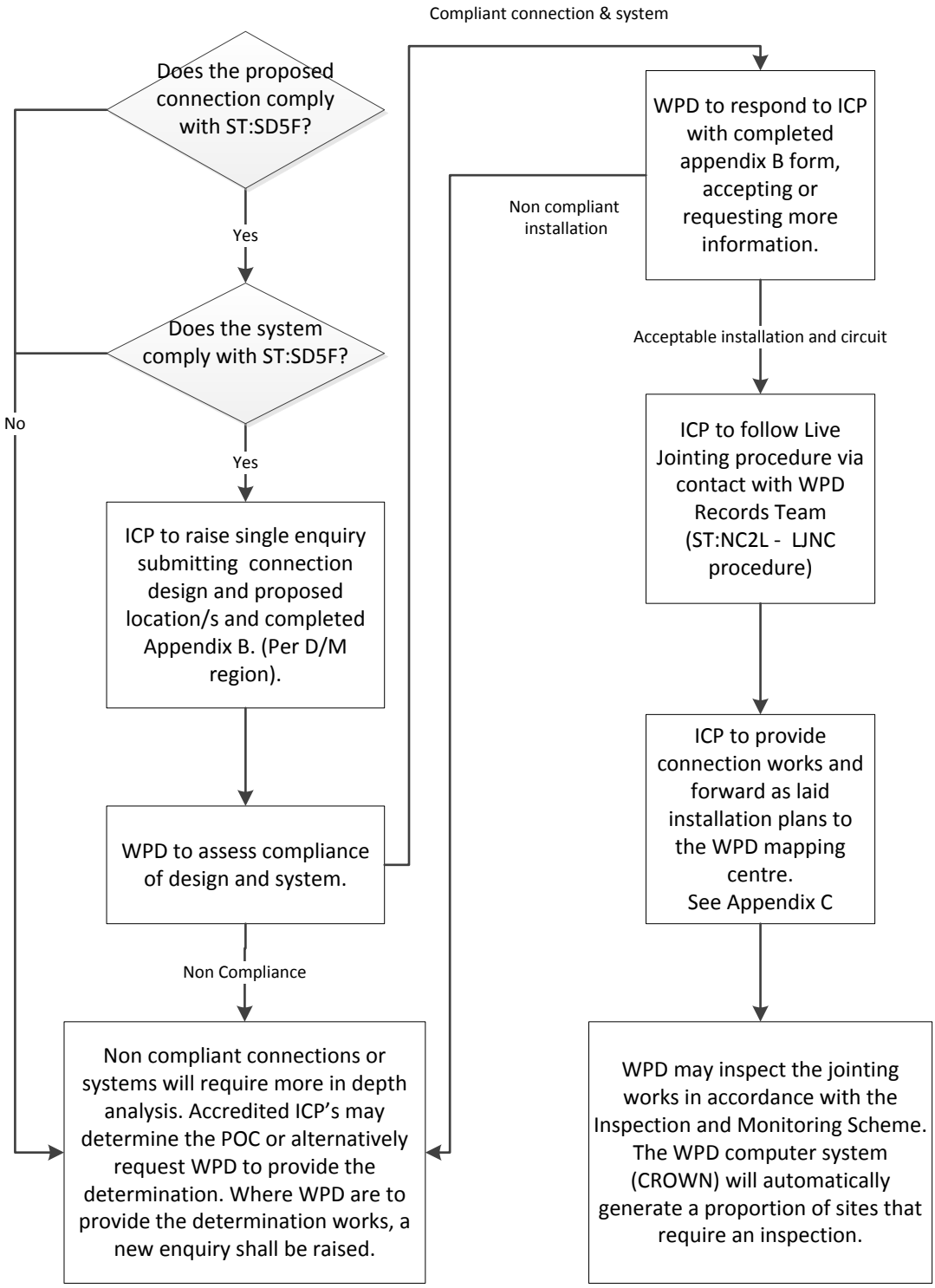
9.0 Land Rights

9.1 ICPs must ensure that all statutory consents and land rights are negotiated in accordance with WPD's Estates and Wayleaves Policy documents.

9.2 Land rights should be negotiated so as to be in accordance with the terms of WPD's standard legal document templates.

9.3 WPD Estates and Wayleaves documents and standard legal document templates will be made available on the WPD Technical information website.

APPENDIX A



Multiple Matrix Connections flow chart

Reference ST:NC2L with particular reference with Appendix C.

APPENDIX B

Enquiry Number / Ref	
Location/s plans attached	_____ _____ _____

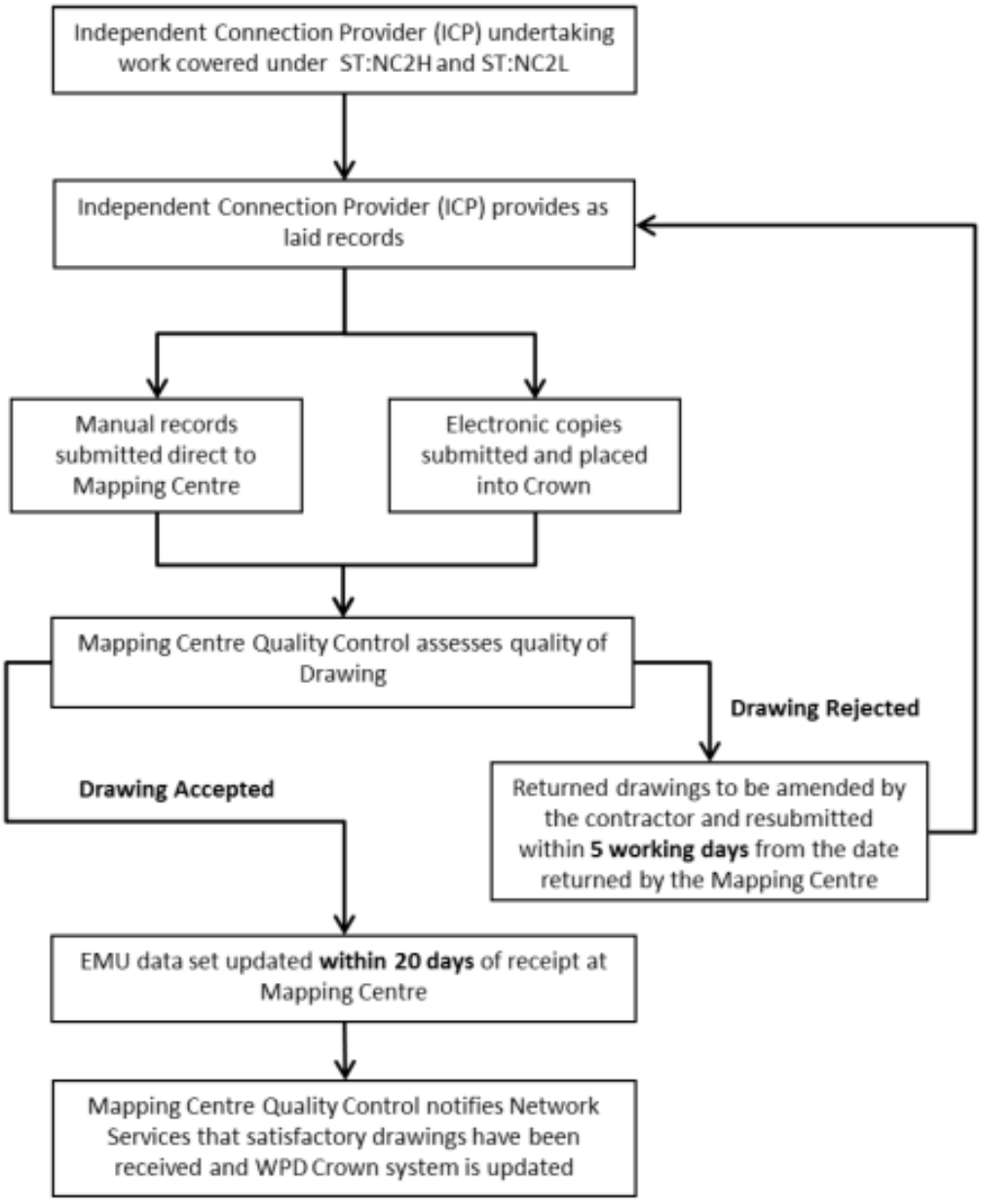
Does the connection conform to the following requirements?	**Y/N**
The requested load is individually ≤ 5kVA and on individual feeder	
The Distribution transformer is rated ≥ 100kVA	
The mains conductor has a cross sectional area of ≥ 35mm²	
The cross sectional area of the installed service cable to be 25mm², copper for overhead circuits and aluminium for underground circuits	
The connection complies with clause 4.5 – 4.7 regarding looped supplies	
The supplies are fed via a street light cutout with a minimum rating of 25 amps	
The earthing arrangements comply with Table 1 if a PME earthing arrangement is to be utilised	
The installation complies with BSEN 61000 – 3 – 2 and 61000 – 3 – 3 for harmonics and flicker	
The installation earthing system complies with Table 2 for the requested load	
There are no applicable Apportionment of Cost hand symbols applicable to the circuit	

Designation	
Accepted / Rejected Comments.	
Signed	
PRINT name	

For internal use only – WPD Acceptance

Signed	
PRINT name	

APPENDIX C



Mapping Response flow chart

APPENDIX D

SUPERSEDED DOCUMENTATION

None. This is a new Document.

APPENDIX E

ASSOCIATED DOCUMENTATION

- Electricity Act 1989
- Electricity, Safety, Quantity and Continuity Regulations 2002
- ST:SD1F – Relating to the Code of Practice
- ST:SD5A - Design of Low Voltage Domestic Connections
- ST:SD5B – Relating to the determination of the Point of Connection with minimal analysis
- ST:SD5C - Design of Low Voltage connections to Multiple Occupancy buildings
- ST:SD5D - Arrangement of Low Voltage Cut outs
- ST:SD5K - Relating to the use of Windebut computer software
- ST:SD5P - Design of Unmetered Connections
- ST:SD5R - Earth Fault loop Impedances and Phase to Neutral Loop Impedances at LV installations
- ST:SD6J - Connection Design – Potentially disturbing Electrical Equipment rated up to 75A
- ST:SD8B - Relating to Cable Ratings
- ST:TP21D - 11kV, 6.6kV and LV earthing
- ST:TP21E - Provision of WPD earth terminals to customer LV installation
- ENA ER G81 (all parts)
- WPD G81 Appendices (all parts)
- ENA Competition in Connections Code of Practice
- ENA ER G12 – Earthing requirements

APPENDIX F

KEY WORDS

Point of Connection, ICP Design, Code of Practice Agreement, street furniture, street lights