

**DCP 162A Legal Text****Non-Secure Connections in the Common Connections Charging Methodology****Amend Paragraph 1.24 of Schedule 22 (CCCM)**

Delete the current definitions of New Network Capacity and Relevant Section of Network (RSN), and replace them with:

<b>New Network Capacity</b>	<p>is either the secure or non-secure capacity of the Relevant Section of Network (RSN) following Reinforcement. Whether secure or non-secure capacity is applicable depends upon the type of capacity that can be provided from the RSN. For example, if the capacity provided to the Customer by the RSN is secure, but the capacity requested by the Customer at the point of connection is non-secure, the secure capacity will be used. See Example 12.</p> <p>The capacity to be used will be based on our assessment of the thermal ratings, voltage drop and upstream restrictions and compliance with our relevant design, planning and security of supply policies. The equipment ratings to be used are the appropriate operational rating at the time of the most onerous operational conditions taking account of seasonal ratings and demand.</p>
<b>Relevant Section of Network (RSN)</b>	<p>is that part or parts of the Distribution System which require(s) Reinforcement. Normally this will comprise:</p> <ul style="list-style-type: none"> <li>· the existing assets, at the voltage level that is being reinforced, that would have been used to supply you (so far as they have not been replaced) had sufficient capacity been available to connect you without Reinforcement; and/or</li> <li>· the new assets, at the same voltage level, that are to be provided by way of Reinforcement.</li> </ul> <p>Where it is unclear what assets would have supplied the Customer in the event that sufficient capacity had been available, the existing individual assets with the closest rating to the new assets will be used. See Example 13.</p> <p>There may be more than one RSN (e.g. at different voltage levels).</p>

**Amend 2<sup>nd</sup> Paragraph of Example 4 in Schedule 22 (CCCM)**

As the Customer's existing LV connection is unable to deliver the Required Capacity a new connection will be required from the local HV network. This will be a non-secure connection to a secure network. The Minimum Scheme is to overlay part of the nearest HV circuit (Feeder 2) which only has spare capacity of 200kVA. The Reinforcement to make the capacity available requires 1200m of existing HV cable to be overlaid with a larger capacity cable.

**Amend 2<sup>nd</sup> and 3<sup>rd</sup> Paragraph of Example 5 in Schedule 22 (CCCM)**

The POC is to the existing HV network at point B and it is proposed to install 500m of HV underground cable from the POC to the Customer's installation. This is a non-secure connection that requires reinforcement of a non-secure network.

The connection requires the Reinforcement of 500m of HV overhead line between points A and B for a thermal capacity requirement and replacement of the existing 11 panel HV switchboard at the primary substation in order to increase its fault level rating from 150MVA to 350MVA. However, the new fault level will be limited by the fault level rating of the local network of 250MVA.

**Amend 5<sup>th</sup> Paragraph of Example 5 in Schedule 22 (CCCM)**

The RSN is the 11kV switchboard at the primary substation.

Fault Level CAF calculation: The numerator in the CAF calculation is based upon the Fault Level contribution from the Customer's new generator connection, in this Example 10MVA. The denominator is based upon the New Fault Level Capacity, which is the lower of the Fault Level capacity of the new HV switchboard, 350MVA or of the local system, 250MVA in this Example.

**Amend 2<sup>nd</sup> Paragraph of Example 6 in Schedule 22 (CCCM)**

The RSN for the Reinforcement is the transformers at the existing 132/33kV substation

Security CAF calculation: the numerator in the CAF calculation is based upon the Required Capacity of the Customer, i.e. 18MVA. The denominator is based on the secure New Network Capacity following Reinforcement, i.e. 90MVA.

**Amend 1<sup>st</sup> Paragraph of Example 8A in Schedule 22 (CCCM)**

A new housing development has a Required Capacity of 2MVA to serve 900 plots. The local 11kV feeder has a network capacity of 7.7MVA based upon the limitation of the existing 400 Amp circuit breakers at Primary Substation A. The existing load on the circuit is 7.6MVA. It is therefore not possible to connect the new load to this circuit without Reinforcement works. To reinforce the circuit it is proposed to install a new circuit breaker at Primary Substation B and install a new 11kV feeder (also rated at 7.7MVA) to the local 11kV circuit. The new 11kV feeder is used to split the existing circuit from a secure two to a secure three feeder network. The newly installed cable between point A and B is 1300m long. The newly installed cable to connect the development from the POC is 1200m.

**Amend 4<sup>th</sup> Paragraph of Example 8A in Schedule 22 (CCCM)****The RSN for the Reinforcement**

For the Reinforcement CAF the RSN is considered to be the secure three feeder 11kV network comprising the two feeders from Primary Substation A and the new feeder from Primary Substation B as this new feeder is capable of feeding either of the existing circuits. The numerator in the CAF calculation is based upon the Required Capacity of the new development, i.e. 2MVA. In this case, the New Network Capacity (under secure N -1 conditions) following the Reinforcement works is equal to  $(3 - 1) \times 7.7\text{MVA} = 15.4\text{MVA}$

**Amend 2<sup>nd</sup> Paragraph of Example 8B in Schedule 22 (CCCM)**

In this variation of the previous Example the site is closer to Primary Substation B and the Minimum Scheme is to connect the new load to the new 11kV feeder from Primary Substation B and provide interconnection to an existing secure 11kV feeder from Primary Substation A. In this Example 600m of 11kV cable on site (between Points C and D) is required to provide connectivity within the development and is considered to be Extension Assets.

**Amend 6<sup>th</sup> Paragraph of Example 8B in Schedule 22 (CCCM)****The RSN for the Reinforcement**

The RSN is considered to be the secure three feeder 11kV network comprising the two feeders from Primary Substation A and the new feeder from Primary Substation B ~~as any of these can be used to supply the Customer in normal and outage conditions~~. As in the above example the numerator in the CAF calculation is based upon the Required Capacity of the new development, i.e. 2MVA. In this case, however the work to provide the connection will increase the capacity of the existing shared use Distribution System from 7.7MVA to 15.4MVA. The New Network Capacity (under secure N -1 conditions) following the Reinforcement works is equal to  $(3 - 1) \times 7.7\text{MVA} = 15.4\text{MVA}$

**Amend 6<sup>th</sup> Paragraph of Example 10 in Schedule 22 (CCCM)**

The RSN for the Reinforcement comprising the 11kV Cable Works:

For the 11kV cable assets the RSN is considered to be the secure three feeder 11kV network from Primary A (Feeder 2), Primary C (Feeder 2) and Primary E (Feeder 1). In this case the New Network Capacity (under secure N -1 conditions) following the Reinforcement works is equal to  $(3 - 1) \times 7.7\text{MVA} = 15.4\text{MVA}$

**Amend 9<sup>th</sup> Paragraph of Example 10 in Schedule 22 (CCCM)**

The RSN for the Reinforcement comprising the Primary substation assets:

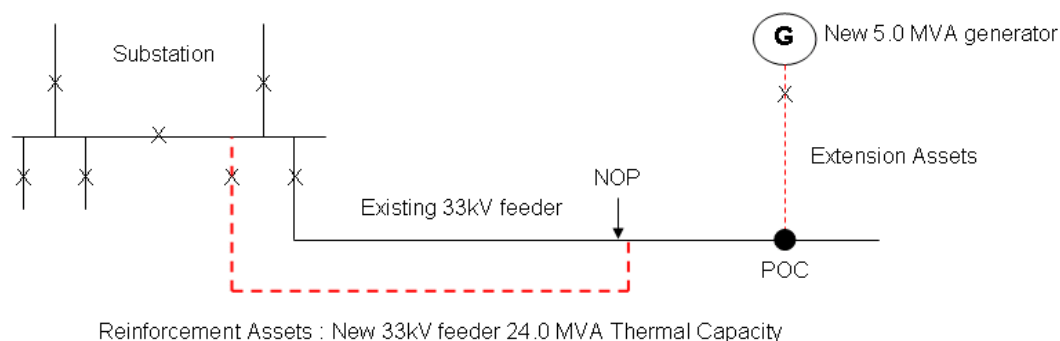
In this instance the RSN ~~comprises the three primary transformers~~ (Primary A, C and E) within the group that can be used to supply the customer ~~in normal and abnormal conditions~~. The New Network Capacity of this RSN (under secure N -1 conditions) following the Reinforcement works is equal to 17.7MVA. (10MVA from either Primary A or Primary C and 7.7MVA from Primary E which is limited by the single 11kV cable connected to it.

**Add new Examples 11, 12 and 13 (to follow Example 10) in Schedule 22 (CCCM)**

**Example 11: Non-Secure Connection With Non-Secure Reinforcement**

A Customer wishes to connect a new generator with a Required Capacity for export purposes of 5 MVA. The connection of the generator requires the installation of 1,000m of 33kV cable and a 33kV metering circuit breaker, these being Extension Assets. An existing spare circuit breaker at the substation is utilised which, in this case, is not chargeable to the Customer.

As there is insufficient capacity in the existing 24.0 MVA thermal capacity rated 33kV feeder for the new generation due to the presence of existing generation, the connection also requires the installation of a new 33kV feeder, which also has a thermal capacity of 24.0 MVA, as Reinforcement. This is the Minimum Scheme as it is cheaper to do this, to the extent as shown in the diagram below, rather than upgrade the existing 33kV feeder to the same point along it.



### Reinforcement:

The numerator in the CAF calculation is the Required Capacity of the new generator, which is 5.0 MVA.

The Relevant Section of Network in this case is the existing 33kV feeder and the new 33kV feeder. The New Network Capacity is calculated using the non-secure capacity and is therefore the sum of the thermal capacities of the two feeders, which is 48.0 MVA. This is the denominator in the CAF calculation.

The Connection Charge for this Scheme is calculated as follows:

### Reinforcement:

	Cost	Apportionment	Customer Contribution
<b>Contestable Work</b>			
Installation of new 33kV feeder	£ 500,000	$5.0 / 48.0 \times 100\% = 10.4\%$	£ 52,000
<b>Total Reinforcement Cost</b>	£ 500,000		<b>£ 52,000</b>

### Extension Assets:

	Cost	Apportionment	Customer Contribution
<b>Contestable Work</b>			
Installation of 1,000m 33kV cable	£ 200,000	n/a	£ 200,000
Installation of 33kV metering circuit breaker	£ 70,000	n/a	£ 70,000
<b>Non-Contestable Work</b>			
Joints to 33kV network	£ 10,000	n/a	£ 10,000

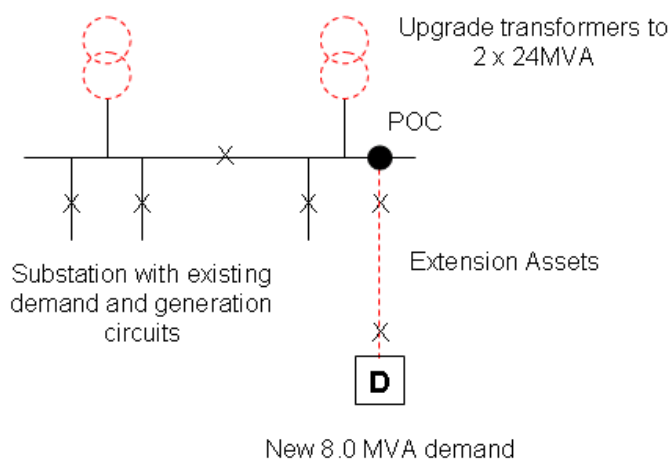
<b>Total Extension Asset Cost</b>	<b>£ 280,000</b>		<b>£ 280,000</b>
CIC Charges			£ 3,500

**Total Connection Charge = £ 52,000 + £ 280,000 = £ 332,000**

### Example 12: Non-Secure Connection With Secure Reinforcement

A Customer requests a new connection to industrial premises requiring an 8 MVA metered demand connection. In this case, the Customer has exercised their option to request non-secure Extension Assets in the provision of the connection.

The existing network comprises a substation which has 2 x 15 MVA transformers. The Minimum Scheme to provide the connection is to install 750m of 11 kV cable from the substation to the industrial premises, as Extension Assets. As there is insufficient capacity available from the existing 2 x 15 MVA transformers to provide the new connection, it will be necessary to upgrade the transformers to 2 x 24 MVA units. Both transformers at the substation must be upgraded to ensure the 11kV network load can be maintained during planned or unplanned outages of one of the transformers. Although the Customer wishes to accept a non-secure connection, the substation must provide secure capacity to its Group Demand (which includes the Customer) to comply with the requirements of Engineering Recommendation P2/6. As the Extension Assets will be provided solely for the Customer, these can be provided on the basis of a single circuit to provide a non-secure connection, at the Customer's request.



**Reinforcement:**

The numerator in the CAF calculation is the Required Capacity of the new demand, which is 8.0 MVA.

The Relevant Section of Network in this case is the transformers at the substation. The New Network Capacity is the secure capacity of the transformers, which is 24 MVA. This is the denominator in the CAF calculation.

The Connection Charge for this Scheme is calculated as follows:

**Reinforcement:**

	<b>Cost</b>	<b>Apportionment</b>	<b>Customer Contribution</b>
<b>Non-Contestable Work</b>			
Installation of 2 x 24 MVA 33/11 kV transformers	£ 1,500,000	$8.0 / 24.0 \times 100\% = 33.3\%$	£ 500,000
<b>Total Reinforcement Cost</b>	<b>£ 1,500,000</b>		<b>£ 500,000</b>

**Extension Assets:**

	<b>Cost</b>	<b>Apportionment</b>	<b>Customer Contribution</b>
<b>Contestable Work</b>			
Installation of 750m 11kV cable	£ 75,000	n/a	£ 75,000
Installation of 11kV metering circuit breaker	£ 50,000	n/a	£ 50,000
<b>Non-Contestable Work</b>			
Joints to 11kV network	£ 5,000	n/a	£ 5,000
<b>Total Extension Asset Cost</b>	<b>£ 130,000</b>		<b>£ 130,000</b>
CIC Charges			£ 1,100

**Total Connection Charge = £ 500,000 + £ 130,000 = £ 630,000**

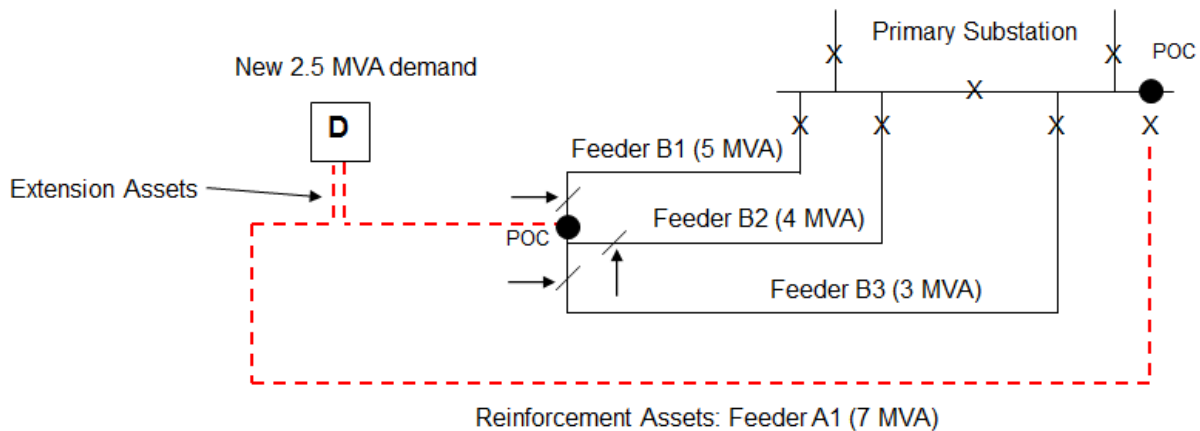
**Example 13: Secure Connection With Secure Reinforcement**

A Customer requests a new connection to commercial premises which has a Required Capacity of 2.5 MVA. The connection is to be provided on a secure basis and the Minimum Scheme is as shown.

To comply with demand security requirements, it is necessary to install a new feeder (Feeder A1) with a thermal capacity of 7 MVA, as a reinforcement of the network which comprises of circuits B1, B2 and B3. The ratings of the circuits are as detailed and the loadings are in line with design standards.

The Extension Assets in this case are two 11 kV cable circuits of 25m each.

For technical reasons the maximum number of feeders (within any group) for consideration will be four.



### Reinforcement:

If sufficient capacity had been available in the existing network, only two of the existing feeders would have been required to provide the required security.

The original network is a 3 circuit configuration with a theoretical total capacity of 12MVA (5+4+3 MVA). Under n-1 conditions (and with the largest capacity circuit unavailable) the thermal capacity of the network would be reduced to 7MVA which would be accomplished through network reconfiguration and the moving of 'normal open points'.

On the revised/new network with 4 circuits the total theoretical capacity would be 19MVA. Under n-1 conditions (and with the largest capacity circuit unavailable) the thermal capacity of the network would be reduced to 12MVA.

Hence, the New Network Capacity is determined by applying  $(N - 1)$  security to the 4 feeder RSN. This gives a secure NNC of 12 MVA. This recognises the possible loss of feeder A1 and supplies fully restored via the remaining circuits B1, B2 and B3.

Therefore, the numerator in the CAF calculation is the Required Capacity of 2.5 MVA and the denominator is the New Network Capacity of 12.0 MVA.

The Connection Charge for this Scheme is calculated as follows:



**Reinforcement:**

	Cost	Apportionment	Customer Contribution
<b>Contestable Work</b>			
Installation of new 11kV feeder	£ 250,000	$2.5 / 12 \times 100\% = 20.8\%$	<b>£52,000</b>
<b>Total Reinforcement Cost</b>	£ 250,000		<b>£52,000</b>

**Extension Assets:**

Contestable Work	Cost	Apportionment	Customer Contribution
Installation of 2 x 25m 11kV cable	£ 10,000	n/a	£ 10,000
Installation of 2 x 11kV metering circuit breakers	£ 100,000	n/a	£ 100,000
<b>Non-Contestable Work</b>			
Joints to 11kV network	£ 5,000	n/a	£ 5,000
<b>Total Extension Asset</b>	£115,000		<b>£115,000</b>
CIC Charges			£ 1,100

**Total Connection Charge = £ 52,000 + £ 115,000 = £ 163,000**

W&Co: 8 May 2014

**Wragge & Co LLP**  
**8 May 2014**