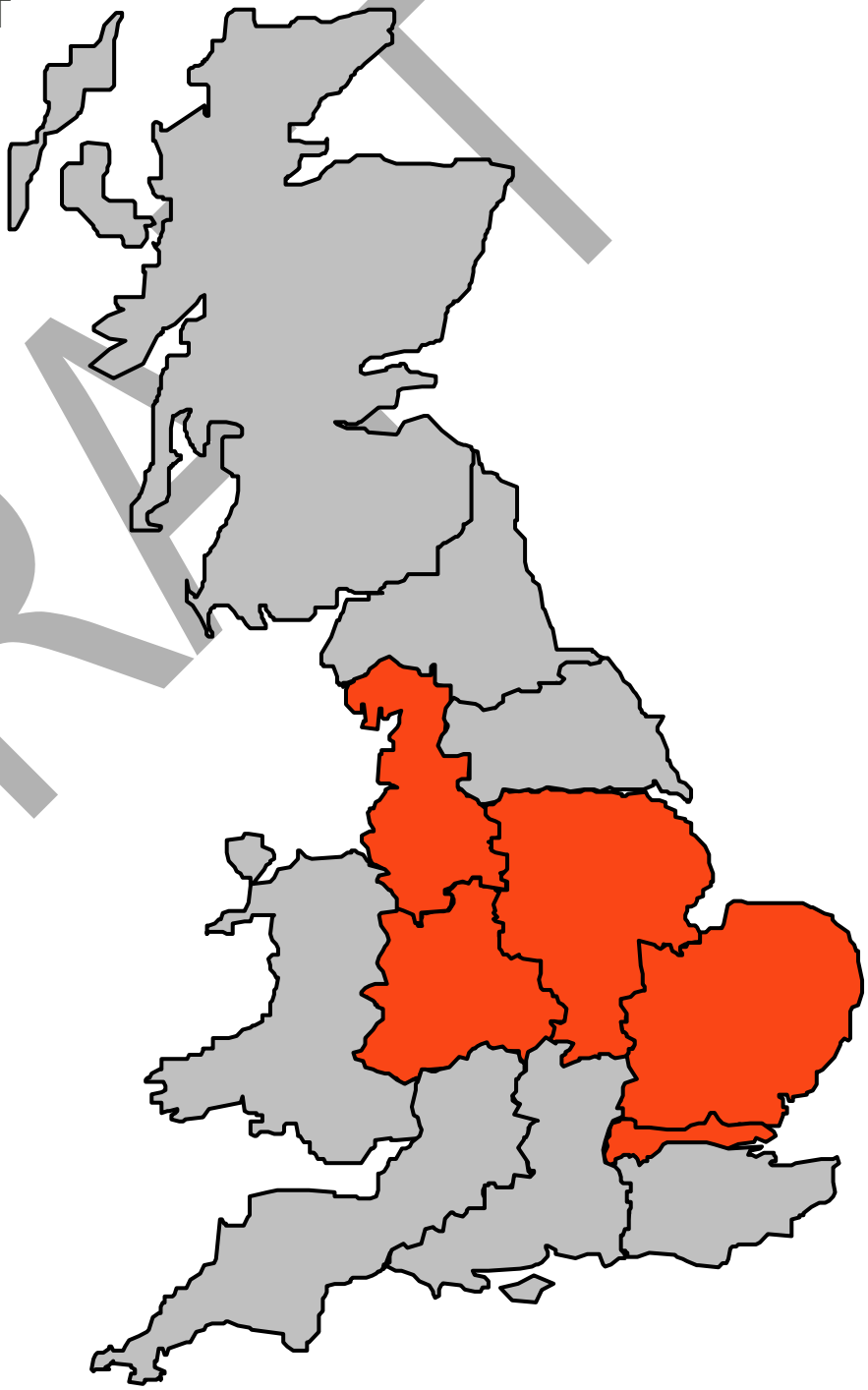
Exit Capacity Planning Methodology Statement

As required by Standard Special Condition A57: Exit Capacity Planning

December 2026 DRAFT



DRAFT

Contents

Executive Summary 3
Objectives to Meet 1-20 Winters Demand 3
Methodology 4
Collection and Processing of Actual Demand Data 4
Pre-Forecast Data 4
Customer Engagement and Data Collection 5
DS8 Demands 5
Engagement 5
Load and Demand Forecasting 6
Demand Forecast 6
Offtake Parameter Statements, (OPS) 7
DN Interruption 7
Gemini Input 7
Final Review 8
Lessons Learnt session 8
Population of Network Analysis and Other Models 8
Strategy & Models 8
Network Specifics 9
Model Data 10
Consus Modelling 10
National Gas Transmission Assured Pressure Requests 10
Provision of the GDN Network Structure 10
Network Topologies 11
Publication of 1-in-20 and Other Forecasts 11
Forecasts 11
Methodology Publications 11
Methodology Statement 11
Appendices 12
Appendix A 12
Appendix B 13

DRAFT

Executive Summary

Overview

The aim of this document is to satisfy the obligations comprised within the Exit Capacity Planning Guidance (ECPG) document, namely:

- Publication of a methodology statement, setting out the process used to assess the requirements for National Gas Transmission (NGT) exit capacity, as set out in paragraphs 3.2 to 3.6

Cadent considers that the publication of this Methodology Statement, together with the detailed information that follows, meets the obligations as set out in the ECPG, which itself forms part of **Standard Special Condition A57: Exit Capacity Planning**.

Objectives to Meet 1-20 Winters Demand

To meet our licence obligations, DN's book sufficient capacity to ensure that we are able to meet demand on the peak day in a 1:20 winter. Every Gas Year (1st October to 30th September), we are required to book exit capacity from the National Transmission System for each of our offtakes.

Every 3 years, Cadent receives four demand pathways from NESO (National Energy System Operator): Holistic Transition, Electric Engagement, Hydrogen Evolution and Falling Behind. We engage with them to develop our forecast based on our views of these pathways.

Cadent also works with NESO to develop a ten-year outlook each year, which generally closely aligns with the Falling Behind pathway and is considered the most representative forecast of demand on Cadent's networks. This is used within Demand Statement 1 to produce Load Duration Curves showing ranked daily demand from the 1-in-20 peak day to the annual minimum for each LDZ. Cadent also receives Demand Statement 6, which provides weather-corrected actual and forecast annual demand by LDZ, load band and supply type, and Demand Statement 35, which reconciles LDZ demand with wider regional and GB demand across the FES pathways. Cadent reviews these outputs and investigates material differences before using the approved forecast to support network modelling and determine its 1-in-20 requirements.

Our approach meets the 1:20 peak day obligation with a combination of Enduring and Annual capacity products and addresses the risk that daily capacity products may not be available in the event of an NGT constraint being called.

Cadent also considers SSC A11 when developing its NTS Exit Capacity strategy. Procuring sufficient capacity supports the economic and efficient operation of the

DRAFT

combined pipeline system in accordance with UNC Relevant Objectives A and B and helps secure the availability of sufficient gas to meet domestic consumers' peak demand in accordance with Relevant Objective E.

Methodology

How we run the process

Collection and Processing of Actual Demand Data

Pre-Forecast Data

Cadent shall provide the following for each LDZ under its control, all data provided by Xoserve:

1. Actual consumption and shrinkage during previous calendar year corrected to the Seasonal Normal CWV conditions (using the NDM algorithms) with throughput broken down into the following categories:

- NDM 0 to 73.2MWh per annum
- NDM 73.2 to 732MWh per annum
- NDM >732MWh per annum
- DM
- Shrinkage
- Peaking Power Plant data
- Total LDZ

These volumes should take account of adjustments made in respect of individual site and aggregate NDM reconciliation, including (if appropriate) the re-phasing of such adjustments into earlier years.

2. Confirmation of the total number of new loads connected in each LDZ in the previous calendar year, and the number of loads in aggregate at the end of the year, split between domestic (0 to 73.2MWh p.a.) and non-domestic (>73.2MWh p.a.) categories. By early January the team will carry out a review of all the new large loads that have been accepted over the previous year.

3. Details of any load consuming/expected to consume >58.6GWh per annum provided by Xoserve, that:

- Has been connected in the previous calendar year; or
- Is expected to be connected to LDZ networks in the ten-year forecast period
- Information concerning any known or expected changes to any existing loads consuming >58.6GWh per annum

Each year we take the monthly flow data for the largest / most impactful sites in each network and compare it with the historic data to look for trends. Specifically, we look at:

- Annual demand
- Max daily
- Avg. daily

DRAFT

These figures are compared with the results from the previous years to determine if the demand is largely the same as previously or if it is trending in a particular direction, and if the actual demand is in line with the AQ and SOQ. These forecasts are then applied to these sites for the modelling for the coming year.

The sites chosen are not necessarily the largest in each network but are those that would have the most impact if their demand underwent a significant change, for example because they are at an extremity of the network.

A draft of the DS8 Large Load Data is then created. This report is needed for a) us to add these loads to our models with the appropriate demand levels and b) for NESO to use in their demand forecasting. The data is checked to ensure that the correct data has been used and that any judgement-based decisions are appropriate to that demand.

The information provided in relation to such demands includes, as appropriate, expected 1-in-20 peak day demand, annual demand, supply type, category/nature of load, date of first gas flow and any associated phasing or build-up of demand over time.

Xoserve will send through more info for the pre-forecast to the DN. Again, this is needed for the NESO forecasting team. This data incorporates the weather corrected demand by Load Band, processed and unprocessed reconciliation and the numbers of new domestic and non-domestic connections. Also included is the supply point count at the end of the year. All this data is split by LDZ.

All of the required information from the business and Xoserve are sent through to the NESO Demand Forecasting team for them to assess during the forecasting process. The files sent across will be The DS8 spreadsheet, the LTS Quoted UIP and Non-Standard report from the Connections report and the Pre-Forecast information from Xoserve.

This year we will supply additional data to support the creation of the forecast. This includes details of biomethane connections, power generation data and data centre information.

Customer Engagement and Data Collection

DS8 Demands

If a customer is significant enough to have a substantial impact on the network, then we will endeavour to talk to them with regards to their demand and usage patterns across the day / year. This engagement can take the form of questionnaires to the user and ‘face to face’, virtual discussion as required. These loads are known as DS8 demands.

Engagement

This is a vital part of the process to ensure that we have all the data that we need to carry out our demand forecasting, modelling and offtake bookings as efficiently as possible. If we don’t have accurate information on specific large loads for example,

DRAFT

the distribution of demand on the models may be inaccurate and capacity could be booked inaccurately.

Each year in the middle of March we have bilateral meetings to discuss the pre forecast data and receive an overview from NESO of the draft forecast. This is always subject to change as we do not receive the final version of the demand forecast until May.

Meetings are held with NGT at several stages of the process and 3rd parties are invited to attend as observers to all these as per the new ECPG requirements. These meetings cover the expectations of the Demand Forecast, the expectations of our booking requests, the likely response to the Assured Pressure Requests, the response to the bookings requests and changes to accommodate rejections of the requests where needed.

Load and Demand Forecasting

Demand Forecast

We receive our demand forecast from NESO within May each year. The forecasts are produced by NESO in line with the FES process. Details on how this is done can be found in NG's Gas Demand Forecasting Methodology document, under the heading 'Gas operations documents (1)', and the FES Modelling Methods document.

These files will be emailed by NESO. Between the months January – March information is exchanged, and bilateral meetings are held to determine data requirements and information exchange. External observers are invited to these bilateral meetings.

Every year DNs receive from NESO four different demand pathways and a central forecast and engage with them to either develop the forecast or develop their own based on an in-house demand forecasting process.

All DN demand forecasting methodologies are subject to a governance process and when approved is modelled and determines our peak day 1:20 requirement.

In accordance with Standard Special Condition A9, Cadent plans its network and NTS Exit Capacity requirements to meet aggregate daily demand under 1-in-20 peak conditions, including within-day gas flow variations. Forecast demand, network modelling and Consus analysis are used to assess the interaction between NTS offtakes, linepack and storage, ensuring that sufficient capacity and operational flexibility are available to meet an in-day peak.

Governance

In 2015 National Grid Distribution commissioned an independent study of the National Grid Demand Forecasting Methodology to gain assurance that the methodology would produce credible demand scenarios.

DRAFT

The Smith Institute was asked by National Grid to conduct an independent review of the technical basis of the 1 in 20 peak demand forecasting and so underpin the confidence of the Engineering team in the use of such forecasts for booking year-ahead gas capacity.

The conclusion drawn by The Smith Institute was that the methodology used to generate the 1 in 20 peak demand forecast is fit for purpose. There were recommended improvements to enhance the model performance which were accepted by National Grid.

A full governance exists for this process, and checks are carried out at each step of the way to ensure the correct steps are taken and that the correct data is used.

Annual business sign off occurs following internal challenge and review sessions.

Cadent manages the risks identified in the ECPG through data assurance, stakeholder engagement and comparison with historic information to support forecast accuracy; submission of future requirements through the SSC A57 Exit Capacity Planning process to protect required baseline capacity from substitution; and annual review of NTS Exit Flex and Assured Offtake Pressure requirements. If Flex or AOP products were no longer available, Cadent would assess alternative operational, commercial and investment solutions to maintain its ability to meet 1-in-20 demand.

Offtake Parameter Statements, (OPS)

This tells the corresponding DN how much gas we are expecting to use through the transfers to / from their LDZ. The amounts are based on the modelled data. Assurance checks are completed.

DN Interruption

This is a commercial tool administered annually by Xoserve or driven ad-hoc by the DNs. It is used to alleviate network constraints and as an alternative to network reinforcement. Xoserve will provide the information on the eligible sites within a DN, these are those sites that have an AQ greater than 200k therms or 58.6 GWh per annum. Eligible sites within the DN interruption zone can bid in for interruptible contracts as per UNC and process outlined on the joint office here: https://www.gasgovernance.co.uk/int

DN Interruption is Cadent's principal commercial solution and is considered alongside network investment and changes to NTS Exit Capacity bookings. Cadent also considers other available UNC arrangements where appropriate, including Seasonal Large Supply Point arrangements under UNC Modification 0458 and Daily Metered designation under UNC Modification 0665, where these could help manage the effect of a site's demand on the network under 1-in-20 conditions.

Gemini Input

Following approval of the peak demand forecast, Cadent uses network modelling to determine the short- and long-term requirements for NTS Exit Flat, NTS Exit Flex and Assured Offtake Pressure. Existing baseline capacity is assessed first and, where it is insufficient to meet forecast demand, Cadent considers network reconfiguration,

DRAFT

LDZ/LDZ transfers, commercial solutions, additional capacity and network investment using the assessment criteria described in this methodology.

When the Peak Day models have been finalised, the offtake Flat, Flex & Pressure figures are put into Gemini for the next 6 years. There are 3 parts to the Gemini input; reductions to current flat enduring bookings, increases to flat bookings and an input of flex and pressure data as per the UNC process, which can be found here: UNC TPD B3.

If needed, after engagement with NGT, changes can be made to the data in Gemini to reflect the position agreed. If the requests are affected by Substitution, then NGT need to get acceptance of this from Ofgem. In this case the values will not be confirmed in Gemini until November or December. Assurance checks are completed at each step of the booking request process

Final Review

A check is made that all previous steps have been carried out fully and correctly and that all strategies are in place for the winter period. Any network settings that are different for the summer and winter periods are also checked to ensure that the required changes have been made or are scheduled to be made at the appropriate time.

At this time a check of the ECPG will be made to ensure that we have been fully compliant with every requirement.

Lessons Learnt session

This ensures that all process documents used are up to date and are still fit for purpose and that any lessons learnt are documented for future years.

Population of Network Analysis and Other Models

Strategy & Models

A strategy is agreed within the Energy Control Centre (ECC). This will determine where we book gas into the Local Transmission System (LTS), pressures differentials across the network at start of day, where flex will be taken, and if there are any pressure restrictions that need to be considered.

A spreadsheet is created to store the data from the network analysis models, to calculate any additional storage needed to meet the Consus, (see below for explanation of this tool), requirement that is not needed on the model, and to verify that no offtake goes above its physical capacity or baseline amount.

The base model in network analysis is scaled to the agreed demand level and balanced as per the strategy. The results are stored in the spreadsheet mentioned above.

DRAFT

Where network modelling identifies a potential constraint, Cadent assesses network investment alongside network reconfiguration, LDZ/LDZ transfers, commercial solutions and changes to NTS Exit Capacity holdings. Options are assessed against technical feasibility, cost, complexity, delivery timescales and probability of success, with network investment generally progressed where other options do not provide a suitable economic and efficient solution and subject to Cadent's internal governance.

Network safety, compliance with Cadent's Safety Case and applicable legal and licence obligations take precedence when options are assessed. Where the available options meet these requirements, Cadent compares commercial solutions, changes to NTS Exit Capacity holdings and network investment based on factors including cost, the duration of the requirement and delivery timescales, recognising that the higher cost and longer delivery period of reinforcement may make it more appropriate for enduring constraints that cannot be resolved through other measures.

Models are also created for D13, D46, D150 & D300. This is done by scaling down the peak model to the D13 demand level, then scaling the D13 model to D46, etc. These are needed for the Section H spreadsheets which are sent to NGT.

The network analysis model uses the following flow equations; Smooth Pipe Law, Panhandle A and Redlich–Kwong. These shall be used with the appropriate efficiency and roughness factors relevant to the network being evaluated

All the results are saved in the spreadsheets, and a check is carried out to ensure that the models have been built and balanced correctly and in line with the agreed strategy. Assurance checks are carried out.

Network Specifics

EA – This is a very rural network with small pockets of demand rather than large population centres. Several parts of it are fed from isolated sources under pressure control, the rest is volumetric control. There are relatively few large loads on this network and even less customers directly connected to the LTS. There are a large number of sustainable entry connections, but these are not considered in our peak day bookings.

EM – This network has areas of higher demand and industry as well as customers connected directly to the LTS. Most of the network is controlled volumetrically with some pockets of pressure control. There are a large number of sustainable entry connections, but these are not considered in our peak day bookings.

NL – This is a densely populated area, but it has minimal customers directly connected to the LTS and minimal sustainable entry connections

NW – This network is highly industrialised in parts and very rural in others. It is volumetrically controlled with only 1 small section of pressure control. It has many directly connected customers and several sustainable entry connections which are not considered in our peak day bookings.

WM – This is similar to the NW in that it has areas which are highly populated and industrialised and others which are very rural. There are some directly connected

DRAFT

customers and several sustainable entry connections which are not considered in our peak day bookings. It is mainly controlled volumetrically.

Model Data

Data for the network analysis models comes from different sources; the Pipeline Safety Regulations (PSR) records, uplift of demand from the <7bar network analysis models, the Interruption Eligibility data from Xoserve and the DS8 data.

Physical pipe and Offtake/PRI data parameters contained within the model is reviewed and updated on an annual or ad-hoc basis throughout the year. The team will request the relevant information from appropriate departments in the business or be informed of a change as part of the project closure process. This is to ensure that the network analysis models are as accurate as possible. A full physical validation of the model can be carried out if required using PSR and other Data.

Flow data from all the sources on the <7bar network analysis models supplied by an LTS feed is added to the LTS network analysis models. This data provides the basis for the demand distribution on the network analysis models. Assurance Checks are completed.

The DS8 data is used for demands that can have a significant effect on the network on their own. This could be due to size, location, or both. Files are created for all demands that are to be added to the network analysis models, whether from network analysis, the Interruption data or DS8 data.

Consus Modelling

Consus is a storage simulation tool that is used to determine the amount of storage required at a given demand level. Two data files are needed for each LDZ from the control room SCADA system. These are Hourly Demands and FE Data (Forecast Error). The remaining data comes from the demand forecast supplied by NESO, (LDEM & Peak Day Forecast), and a file downloaded from the National Gas Data Item Explorer on their website (historic CWV) or via Xoserve's data files.

The files are loaded into the Consus application supplied by DNV and the tool is run. The report produced by the tool is saved for audit purposes and the results used to determine the storage level required for the coming winter. Assurance checks are completed.

National Gas Transmission Assured Pressure Requests

NGT send a formal request for reductions in the assured pressures at various offtakes. This is to help them run their network more efficiently. These are assessed against the capacity of the site and the need for linepack / storage and a formal reply is sent.

Provision of the GDN Network Structure

DRAFT

Network Topologies

This information was provided to Ofgem and NGT and published on Cadent's website in line with the timescales within the ECPG. They can be found here.

Publication of 1-in-20 and Other Forecasts

Forecasts

The forecast is published on Cadent's website and can be found here in the Long Term Development Plan, (LTDP), which gives details of longer range forecasts and historic demands.

Approved topology forecasts are provided to NGT and Ofgem but not published externally due to CNI considerations.

Methodology Publications

Methodology Statement

This ECP Methodology Statement document is intended to fulfil the requirements set out in sections 3.22 and 3.23 of the ECPG.

DRAFT

Appendices

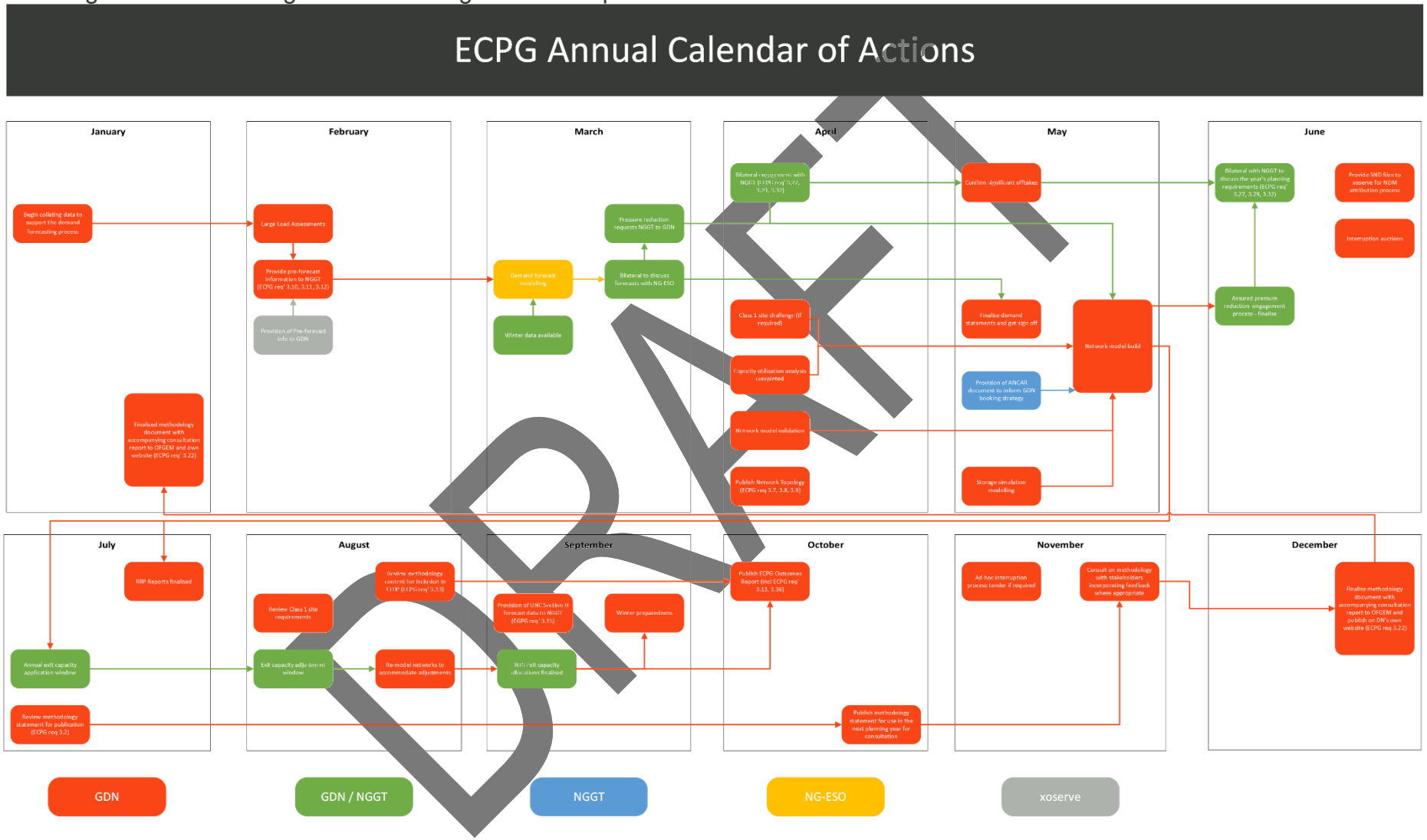
Appendix A

The full Exit Capacity Planning Guidance Document can be found here on Ofgem's website.

DRAFT

Appendix B

The diagram below is a high-level flow diagram for this process.



DRAFT

For all feedback or queries, please contact:

Chris Jones
Head of Engineering ECC
Cadent
Pilot Way
Ansty Park
Coventry
CV7 9JU

Email: LTSPlanning.AnalysisRequests@cadentgas.com