Hawton BSP

Network Development Report – East Midlands

May 2024

Electricity Distribution

nationalgrid

Contents

Hawton 33 kV

1. Network Overview

Hawton Bulk Supply Point (BSP) is fed from Staythorpe Grid Supply Point (GSP) in National Grid Electricity Distribution's (NGED's) East Midlands licence area. Hawton BSP is fed directly from Staythorpe via a dual 132 kV circuit.

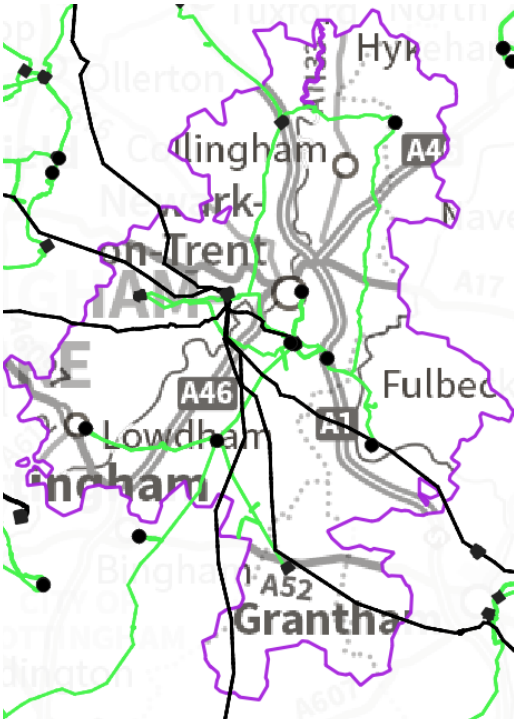

Figure 1.1 Hawton geographic network coverage

This report discusses all existing and future network constraints over a 0-10 year horizon identified on the 33 kV network fed from Hawton BSP. This uses the methodology outlined in the Network Development Plan Methodology Report with Network Operability Modelling applied as outlined below.

For the purposes of this analysis the NGED Best View Distribution Future Energy Scenario (DFES) has been used to study the years 2022 (baseline), 2028 and 2034, with consideration given to how proposals could change under the other scenarios. Five representative days have been studied across the four seasons: Winter Peak Demand, Intermediate Warm Peak Demand, Intermediate Cool Peak Demand, Summer Peak Demand and Summer Peak Generation.

1.1 Network Topology

Hawton BSP has two 33 kV busbars fed by two 132/33 kV Grid Transformers (GTs), both rated at 45/90/117 MVA. Hawton BSP feeds eleven primary substations: Bingham T2, Bottesford, Carlton-on-Trent T1, Caythorpe, Fernwood, Hawton, Newark Junction, Sibthorpe, Southwell, Swinderby and Westborough. Hawton primary is located at the same site as Hawton BSP. Three of the primaries fed from Hawton are single transformer primaries (Bottesford, Westborough and Sibthorpe). The remaining primaries all have two 33/11 kV transformers each. Bingham T2, Bottesford and Caythorpe are all fed via a 33 kV dual tower circuit to Sibthorpe primary. Swinderby T2 and Westborough are fed via Fernwood primary, and Swinderby T1 is fed via Carlton-on-Trent primary.

Hawton is interconnected with two other BSPs: Checkerhouse and Willoughby. The interconnection with Checkerhouse is via Carlton-on-Trent primary, and the interconnection with Willoughby is via Bingham primary. The 11 kV bus sections at both primaries are run open under normal running arrangements, so Hawton is not loosely coupled with any other BSP.

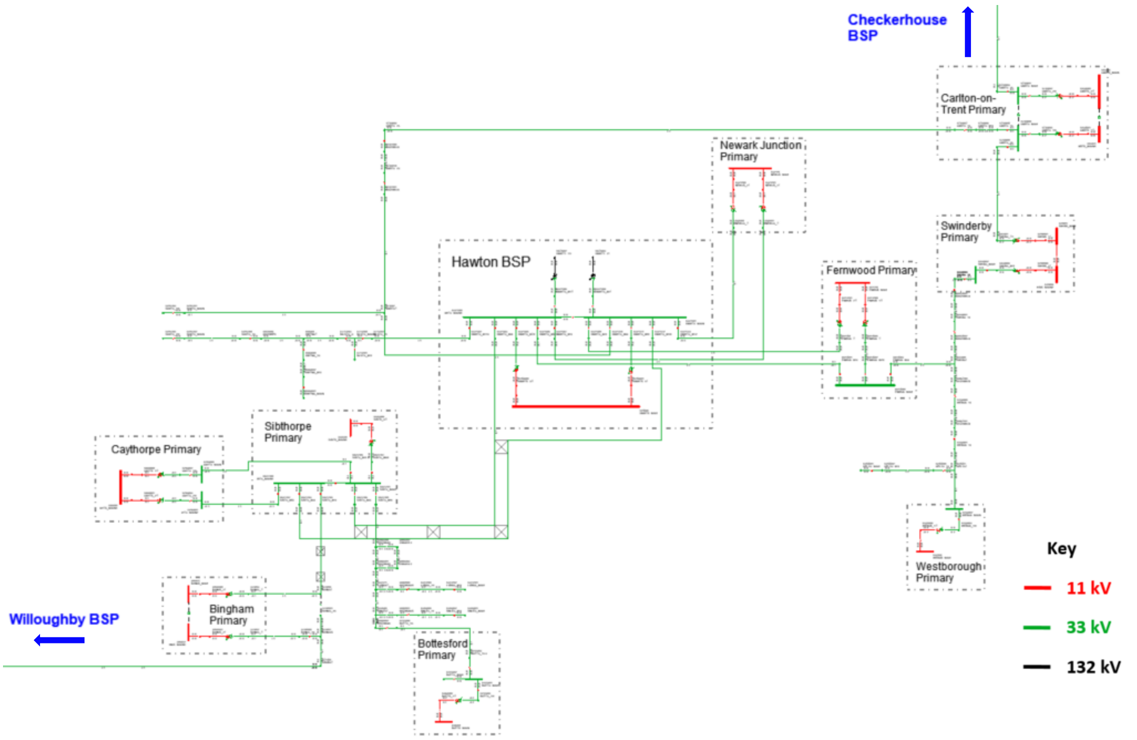

Figure 1.1.1 Hawton 33 kV network single line diagram

1.2 Network Operability Modelling

The following network automation and manual switching schemes have been modelled in the analysis of this area, aligning to how the network is currently operated.

- For the loss of an infeed to a transformer at any of the primaries fed from Hawton BSP under arranged outages, the lower voltage side circuit breaker is opened to prevent back-energisation.
- The 33 kV network downstream of Hawton BSP is split for arranged outages on its 33 kV bus section breaker to prevent loose couples. This involves splitting Hawton, Southwell, Fernwood, Swinderby, Sibthorpe, Caythorpe and Newark Junction at 11 kV.
- During arranged outages on the 33 kV bus section breaker at Sibthorpe primary, Caythorpe primary is split at 11 kV.
- For an outage on the 33 kV infeed to or the 33/11 kV transformer at Bottesford primary, the load is backfed on the 11 kV network to Grantham North primary.
- For an outage on the 33 kV infeed to or the 33/11 kV transformer at Sibthorpe primary, the load is backfed on the 11 kV network to Caythorpe primary.
- For an outage on the 33 kV infeed to or the 33/11 kV transformer at Westborough primary, the load is backfed on the 11 kV network to Grantham North primary.
- For an outage on the infeed from Hawton or Checkerhouse BSP, Carlton-on-Trent primary is paralleled at 11 kV and fed fully from the other BSP (i.e. for an outage on the circuit from Hawton BSP the site is fed fully from Checkerhouse BSP and vice versa).
- For an outage on the infeed from Hawton or Willoughby BSP, Bingham primary is paralleled at 11 kV and fed fully from the other BSP (i.e. for an outage on the circuit from Hawton BSP the site is fed fully from Willoughby BSP and vice versa).

2. Network Constraints and Solution Options

2.1 Summary of Network Constraints

The following constraints were identified for the Best View Scenario, for which mitigation options will be discussed:

- Overloads are seen by 2028 on the transformers at Hawton primary, for arranged or fault outages on the other transformer (or either 33 kV busbar at Hawton BSP).
- By 2028, overloads are projected to occur on the primary transformers at Newark Junction, and by 2034 overloads are also projected for the 33 kV circuits from Hawton BSP to Newark Junction primary (in both cases for N-1 outages on the other busbar, circuit or transformer).
- The two transformers at Fernwood primary, and the 33 kV circuit feeding T1 from Hawton BSP are all projected to overload for N-1 outages on the other transformer/infeed in 2034.
- A generation constraint is seen on the transformer at Sibthorpe primary under normal running conditions.
- Both demand and generation constraints are seen on the transformer at Westborough primary under normal running conditions, and a generation constraint is seen on the 33 kV circuit from Fernwood.

2.2 Hawton primary transformer overloads

Constraint Overview

Generation | **Demand**

The table below outlines the nature of the network constraints identified in the network analysis.

Table 2.2.1 constraint(s) and conditions under which constraint(s) occur

Constraint	N-1 Condition	Subsequent N-2 Condition	First studied year constraint is observed in each season under Best View			
			Winter	Int Cool	Int Warm	Summer
Hawton primary transformer overloads	Arranged or fault outage on the other transformer or 33 kV busbar at Hawton BSP	None	2028	2028	2028	2028

Uncertainty under other Distribution Future Energy Scenarios: Similar load growth is forecast under Consumer Transformation as under Best View, with slightly higher growth seen under Leading the Way. As under Best View overloads are seen for every season in 2028 for these two scenarios. The lowest load growth is forecast under Falling Short, for which reinforcement may not be triggered before 2034.

Solution Options

A list of each of the options considered for this constraint is given below.

Table 2.2.2 solution options to solve constraint(s)

Option	Description
Reinforcement	
1	Uprate both transformers at Hawton primary.
2	Install additional transformers at Hawton primary.
3	Install two 132/11 kV GTs at Hawton BSP.
Flexibility Services	
4	Procure flexibility under Hawton primary.

Solution Development

These options have been assessed on their technical viability and their likely cost-effectiveness pending a full CBA. This CBA will be subsequently carried out by the DNO to determine the optimal reinforcement solution, which will then be tested against market provided flexibility by the DSO as part of the Distribution Network Options Assessment (DNOA) process.

Option 1 – Uprate both transformers at Hawton primary

Viable

Capacity released for constraint(s) considered: 16 MVA

New limiting factor for constraint(s) considered: New transformer ratings

Detailed description: Uprating both of the transformers at Hawton primary would resolve this constraint and provide significant headroom to accommodate future load growth in the area. The transformers would be uprated to 20/40 MVA units (the highest rating used by NGED as standard on the network). As the primary transformers at Hawton are over 60 years old, this replacement would also confer an asset condition benefit. Minimal 33 kV circuit works will be required to free up this capacity, as Hawton primary is located at the same site as Hawton BSP.

Option 2 – Install additional transformers at Hawton primary

Discounted

Capacity released for constraint(s) considered: Minimal

New limiting factor for constraint(s) considered: Transformer ratings for a busbar fault

Detailed description: In the short term, a third primary transformer at Hawton would not free up any additional capacity, as there are only two 33 kV busbars at Hawton BSP (so two transformers could be lost for a busbar outage). If a third GT were installed at Hawton BSP (as discussed in the Staythorpe 132 kV report), along with additional 33 kV busbars this could provide an opportunity to feed a third primary transformer. This option has been discounted as the reinforcement of Hawton BSP may not be carried out in time to resolve this constraint, and regardless, adding a third primary transformer would create a loose couple across the two halves of Hawton BSP once they are established. The existing primary transformers would also likely need replacing in the near future regardless based on their condition, making this option significantly more expensive overall than option 1.

In the long term, additional capacity could be required at Hawton primary. This is due to the fact that there is significant demand growth forecast for the area which is likely to eventually take the site over the firm capacity of the site even with two 20/40 MVA transformers. This could be accomplished by adding two more primary transformers (creating a second Hawton primary fed from the other side of Hawton BSP).

Option 3 – Install two 132/11 kV GTs at Hawton BSP

Discounted

Capacity released for constraint(s) considered: 16 MVA

New limiting factor for constraint(s) considered: 11 kV LV circuit breakers for the new GTs

Detailed description: Replacing the two primary transformers at Hawton with 132/11 kV GTs would resolve this constraint, as well as reducing loading on the 132/33 kV GTs at Hawton BSP. 15/30/39 MVA units would provide similar capacity to 20/40 MVA primary transformers, or alternatively 132/11/11 kV transformers could be installed to further increase the 11 kV capacity. This option has been discounted, as it would not provide the headroom required for future growth at the other primaries supplied from Hawton BSP (most notably Newark Junction as discussed in Section 2.3 of this report).

Option 4 – Procure flexibility under Hawton primary

Viable

Flexibility service type: Generation turn up/demand turn down.

Detailed description: Flexibility services could be procured to alleviate the projected overloads seen on the transformers at Hawton primary. This would not however provide any benefit for the condition of the existing transformers. The viability of utilising flexibility will be further investigated as part of the DNOA process.

Solution Recommendation

Uprating the 33/11 kV transformers at Hawton primary to 20/40 MVA units would alleviate this constraint and provide significant capacity for future growth in the area. The potential option to add additional primary transformers at Hawton could be explored in the longer term to support the high demand growth forecast for the area.

2.3 Newark Junction transformer and circuit overloads

Constraint Overview

Generation | **Demand**

The table below outlines the nature of the network constraints identified in the network analysis.

Table 2.3.1 constraint(s) and conditions under which constraint(s) occur

Constraint	N-1 Condition	Subsequent N-2 Condition	First studied year constraint is observed in each season under Best View			
			Winter	Int Cool	Int Warm	Summer
Newark Junction primary transformer overloads	Arranged or fault outage on the other transformer or infeed	None	2028	2028	2028	2034
Hawton to Newark Junction 33 kV circuit overloads	Arranged or fault outage on the other transformer or infeed	None	2034	2034	2034	2034

Uncertainty under other Distribution Future Energy Scenarios: Slightly higher growth is forecast under the Leading the Way and Consumer Transformation scenarios. High enough growth is projected under every scenario to trigger significant overloads at Newark Junction and necessitate reinforcement.

Solution Options

A list of each of the options considered for this constraint is given below.

Table 2.3.2 solution options to solve constraint(s)

Option	Description
Reinforcement	
1	Reinforce Newark Junction primary.
2	Build a new primary substation.
Flexibility Services	
3	Procure flexibility under Newark Junction primary.

Solution Development

These options have been assessed on their technical viability and their likely cost-effectiveness pending a full CBA. This CBA will be subsequently carried out by the DNO to determine the optimal reinforcement solution, which will then be tested against market provided flexibility by the DSO as part of the DNOA process.

Option 1 – Reinforce Newark Junction primary

Discounted

Capacity released for constraint(s) considered: None

New limiting factor for constraint(s) considered: As before

Detailed description: There are three main options for reinforcing Newark Junction primary itself which have been considered to alleviate this constraint (all of which have been discounted):

- Uprating the existing primary transformers is not possible, as the existing units are rated to 20/40 MVA (which is already the highest rated units utilised by NGED as standard on the network).
- Installing a third primary transformer and 33 kV infeed would not free up capacity in the short term, as there are only two 33 kV busbars at Hawton BSP at present to feed from. Even after the reinforcement of Hawton BSP (which is discussed in the Staythorpe 132 kV report) is carried out, a third transformer would create a loose couple across the two halves of Hawton BSP. Creating a three transformer primary would also introduce additional network complexity.

- Installing two more 20/40 MVA transformers at and 33 kV circuits to Newark Junction primary (creating a second primary at the same site) has been discounted as the site would then be limited by the ability to get new 11 kV circuits out of the substation. This would also not be creating capacity where the load centre is expected to develop (unlike building a separate primary as discussed in option 2 below), leading to significant additional expenditure in developing the 11 kV network.

Option 2 – Build a new primary substation

Viable

Capacity released for constraint(s) considered: Up to 38 MVA

New limiting factor for constraint(s) considered: Total capacity of Newark Junction and the new primary

Detailed description: Building a new primary substation fed from Hawton BSP with two 20/40 MVA transformers would allow Newark Junction to be deloaded, alleviating this constraint. This would create significant capacity for demand growth in the area (which is projected to be high). A potential location for a new substation has been identified to the north of Newark Junction primary which is closer to the centre of the projected load growth in the area. This will reduce costs significantly on the 11 kV network, in comparison to upgrading Newark Junction itself or building a primary substation elsewhere. 20/40 MVA transformers are the optimal choice for the new primary, as they are the largest utilised by NGED as standard on the network (smaller units such as 12/24 MVA transformers would be unsuitable to accommodate the high demand growth forecast for the area).

Two new 33 kV circuits would need to be built from Hawton BSP to the new primary site to feed the new 20/40 MVA transformers. Two 33 kV construction circuits, which are currently run at 11 kV, already exist. These run from Newark Junction to near the proposed new primary site. 33 kV circuits would therefore only need to be built to Newark Junction primary, requiring around 4 km of 33 kV circuit works for each of the two new feeders (subject to detailed route investigation and land rights).

Option 3 – Procure flexibility under Newark Junction primary

Viable

Flexibility service type: Generation turn up/demand turn down.

Detailed description: Flexibility services could be procured to alleviate the projected overloads seen on the transformers at and 33 kV circuits to Newark Junction primary. Flexibility may not be suitable to defer reinforcement in the long term due to both the high demand growth projected and the fact that it would not help with getting more 11 kV capacity out of Newark Junction primary. The viability of utilising flexibility will be further investigated as part of the DNOA process.

Solution Recommendation

Building a new primary substation to deload Newark Junction has been identified as the optimal reinforcement solution. 20/40 MVA transformers at this new primary (and new 33 kV circuits from Hawton to match) will provide the most headroom for the high demand growth forecast in the area.

2.4 Fernwood transformer and circuit overloads

Constraint Overview

Generation | **Demand**

The table below outlines the nature of the network constraints identified in the network analysis.

Table 2.4.1 constraint(s) and conditions under which constraint(s) occur

Constraint	N-1 Condition	Subsequent N-2 Condition	First studied year constraint is observed in each season under Best View			
			Winter	Int Cool	Int Warm	Summer
Fernwood primary transformer overloads	Arranged or fault outage on the other transformer or infeed	None	2034	2034	2034	2034
Hawton to Fernwood T1 33 kV circuit overloads	Arranged or fault outage on the 33 kV infeed to Fernwood T2	None	-	2034	-	-

Uncertainty under other Distribution Future Energy Scenarios: High growth is forecast under all four base scenarios, triggering overloads on the transformers at Fernwood even under the lowest growth scenario (Falling Short).

Solution Options

A list of each of the options considered for this constraint is given below.

Table 2.4.2 solution options to solve constraint(s)

Option	Description
Reinforcement	
1	Uprate the transformers at Fernwood primary and install a new 33 kV circuit.
2	Install a third primary transformer at Fernwood.
Flexibility Services	
3	Procure flexibility under Fernwood primary.

Solution Development

These options have been assessed on their technical viability and their likely cost-effectiveness pending a full CBA. This CBA will be subsequently carried out by the DNO to determine the optimal reinforcement solution, which will then be tested against market provided flexibility by the DSO as part of the DNOA process.

Option 1 – Uprate the transformers at Fernwood primary and install a new 33 kV circuit

Viable

Capacity released for constraint(s) considered: 15 MVA

New limiting factor for constraint(s) considered: New transformer ratings

Detailed description: Uprating the two transformers at Fernwood primary from 12/24 MVA units to 20/40 MVA would resolve the projected overloads. To alleviate the constraint projected to occur on the 33 kV circuit from Hawton BSP to Fernwood T1, and free up the capacity created by uprating the transformers, 33 kV circuit works will be required.

While the 33 kV circuit to Fernwood T1 is already rated higher than 20/40 MVA transformers, it also supplies Westborough and T2 at Swinderby. If a new 33 kV circuit were built from Hawton to Fernwood, these primaries could be unstitched, with a circuit feeding Westborough and Swinderby T2, and Fernwood having two dedicated 33 kV infeeds. This would free up circuit capacity for all three primaries, reduce network complexity and improve operability.

Reinforcing both the primary transformers at and the 33 kV infeeds to Fernwood would create enough capacity to accommodate the demand growth forecast for the area in 2050 for every scenario. It could also help facilitate creating a second 33 kV infeed to Westborough primary which may be required as discussed in Section 2.6 of this report (especially if the opportunity were taken to oversize the new 33 kV circuit to Fernwood).

Option 2 – Install a third primary transformer at Fernwood

Discounted

Capacity released for constraint(s) considered: Up to 23 MVA

New limiting factor for constraint(s) considered: Existing transformer ratings

Detailed description: The installation of a third primary transformer at Fernwood (with a new 33 kV circuit from Hawton BSP) would free up significant capacity at the primary and resolve this constraint. This capacity would only be freed up if carried out after reinforcement of Hawton BSP (which is discussed in the Staythorpe 132 kV report and will allow three circuits to be fed from separate 33 kV busbars). This option has been discounted for a number of reasons:

- It would create additional network complexity by creating a three transformer primary which would need to be split at 11 kV for arranged outages on any infeed or transformer.
- It would underutilise the existing 33 kV circuits which are rated high enough for the full capacity of 20/40 MVA transformers.
- It would not create the benefits associated with being able to unstitch Fernwood from Westwood and Swinderby primaries unless two new 33 kV circuits were installed (one to feed the new transformer and one to feed Westwood and Swinderby T2).

Option 3 – Procure flexibility under Fernwood primary

Viable

Flexibility service type: Generation turn up/demand turn down.

Detailed description: Flexibility services could be procured to alleviate the projected overloads seen on the transformers at Fernwood primary and the 33 kV circuit feeding T1. The viability of utilising flexibility will be further investigated as part of the DNOA process.

Solution Recommendation

The optimal reinforcement solution identified is to uprate both primary transformers at Fernwood to 20/40 MVA units, and to install a new 33 kV circuit from Hawton BSP to Fernwood primary to allow it to be unstitched from Westwood and Swinderby primaries (freeing up the required circuit capacity and reducing network complexity).

2.5 Sibthorpe primary transformer overloads

Constraint Overview

Generation Demand

The table below outlines the nature of the network constraints identified in the network analysis.

Table 2.5.1 constraint(s) and conditions under which constraint(s) occur

Constraint	N-1 Condition	Subsequent N-2 Condition	First year constraint is observed under Best View
			Summer (generation)
Sibthorpe primary transformer reverse power flow overload	None	None	2034

Uncertainty under other Distribution Future Energy Scenarios: This constraint occurs under every scenario, except Falling Short by 2034. The highest generation growth is seen under Consumer Transformation for Sibthorpe. Demand growth is forecast to be relatively low for all scenarios.

Solution Options

A list of each of the options considered for this constraint is given below.

Table 2.5.2 solution options to solve constraint(s)

Option	Description
Reinforcement	
1	Uprate the transformer at Sibthorpe primary.
Operational Mitigation	
2	Active Network Management.
Flexibility Services	
3	Procure flexibility under Sibthorpe primary.

Solution Development

These options have been assessed on their technical viability and their likely cost-effectiveness pending a full CBA. This CBA will be subsequently carried out by the DNO to determine the optimal reinforcement solution.

Option 1 – Uprate the transformer at Sibthorpe primary

Viable

Capacity released for constraint(s) considered: 7 MVA

New limiting factor for constraint(s) considered: New transformer rating and/or 33 kV circuit ratings (depending on generation growth on the Caythorpe / Bottesford / Bingham network)

Detailed description: Uprating the primary transformer at Sibthorpe to a 12/24 MVA unit would alleviate this constraint and increase both the demand and generation capacity for the site. While a second transformer and 33 kV circuit works may be required at some point in the future to accommodate further generation growth, the site will be underutilised from a demand perspective based on current demand forecasts. The 11 kV backfeed capacity of the site would become the new limiting factor for demand headroom.

Option 2 – Active Network Management

Viable

Capacity released for constraint(s) considered: Dependent on curtailment

New limiting factor for constraint(s) considered: As before

Detailed description: Any additional connections at Sibthorpe 11 kV could be included in an Active Network Management (ANM) scheme. ANM schemes are used to manage constraints on over-committed networks.

Option 3 – Procure flexibility under Sibthorpe primary

Discounted

Flexibility service type: Generation turn down/demand turn up.

Detailed description: Flexibility is not suitable to manage this constraint as it is generation driven. Managing generation constraints using flexibility procurement is technically feasible, but NGED's internal tools and processes for calculating flexibility requirements for generation constraints are still in development.

Solution Recommendation

Uprating the transformer at Sibthorpe primary to a 12/24 MVA unit would alleviate this constraint and increase the site's capacity for both demand and generation. This reinforcement may be deferrable by utilising ANM as discussed above.

2.6 Westborough transformer and circuit overloads

Constraint Overview

Generation | Demand

The table below outlines the nature of the network constraints identified in the network analysis. A full 11 kV study is required to determine if the 11 kV backfeeds to Westborough do not limit the capacity of the site (in which case intervention could be triggered sooner).

Table 2.6.1 constraint(s) and conditions under which constraint(s) occur

Constraint	N-1 Condition	Subsequent N-2 Condition	First year constraint is observed in each season under Best View			
Demand			**Winter**	**Int Cool**	**Int Warm**	**Summer**
Westborough transformer overload	None	None	2034	2034	-	-
Generation			**Summer**			
Westborough primary transformer reverse power flow overload	None	None	2034			

Uncertainty under other Distribution Future Energy Scenarios: Higher demand growth is forecast under Leading the Way and Consumer Transformation, triggering overloads for intermediate warm as well. No demand overloads are triggered under System Transformation or Falling Short. Generation overloads are seen for every scenario except Falling Short.

Solution Options

A list of each of the options considered for this constraint is given below.

Table 2.6.2 solution options to solve constraint(s)

Option	Description
Reinforcement	
1	Install a second transformer and 33 kV circuit to Westborough primary.
Operational Mitigation	
2	Active Network Management.
Flexibility Services	
3	Procure flexibility under Westborough primary.

Solution Development

These options have been assessed on their technical viability and their likely cost-effectiveness pending a full Cost Benefit Analysis (CBA). This CBA will be subsequently carried out by the DNO to determine the optimal reinforcement solution, which will then be tested against market provided flexibility by the DSO as part of the DNOA process.

Option 1 – Install a second transformer and 33 kV circuit to Westborough primary

Viable

Capacity released for constraint(s) considered: 14 MVA

New limiting factor for constraint(s) considered: New transformer ratings

Detailed description: Uprating the existing transformer at Westborough to 12/24 MVA and installing a second transformer rated to match would alleviate both the demand and generation constraints forecast to occur. A second 33 kV circuit from Hawton BSP to the primary would be required to feed this new transformer. If a new 33 kV circuit to Fernwood primary were built, as discussed in Section 2.4 of this report, the new infeed would not require a circuit all the way back to Hawton BSP.

A new 33 kV circuit from Fernwood to Westborough would require around 7 km of circuit works (subject to detailed route investigation and land rights). This reinforcement solution would comfortably provide the demand capacity required for growth up to 2050 based on current forecasts. 20/40 MVA transformers would not be justified, and would not free up significant capacity regardless, without the existing 33 kV circuit to the primary being uprated. Generation growth on the other hand may trigger further investment at the primary and the surrounding 33 kV network (with a new 33 kV circuit generation overloads may still be an issue under N-1 outage conditions) unless ANM is suitable to manage the area as discussed in option 2 below.

A second transformer at the site would also remove the reliance on 11 kV backfeeds to maintain security of supply (a full study is required to determine the full capabilities of these backfeeds).

Option 2 – Active Network Management

Viable

Capacity released for constraint(s) considered: Dependent on curtailment

New limiting factor for constraint(s) considered: As before

Detailed description: Any additional connections at Westborough 11 kV could be included in an ANM scheme. ANM schemes are used to manage constraints on over-committed networks. This option could help manage the projected generation constraint at Westborough, but not the projected demand constraint.

Option 3 – Procure flexibility under Westborough primary

Viable

Flexibility service type: Generation turn down/demand turn up.

Detailed description: Flexibility services could be procured on the network supplied from Westborough primary to alleviate the projected demand overloads seen on the transformer. Flexibility would not be suitable for managing the reverse power flow constraint projected at Westborough. The viability of utilising flexibility will be further investigated as part of the DNOA process.

Solution Recommendation

The optimal long term reinforcement solution to cater for demand growth at Westborough is to install two 12/24 MVA transformers at the site and a new 33 kV infeed from Hawton BSP via Fernwood primary. The high generation growth forecast for the area may necessitate enhancing this reinforcement proposal, the justification for which would be assessed as load develops in the area. Reinforcement may be deferred in the first instance by a combination of ANM and flexibility procurement to manage the projected generation and demand constraints respectively.

Registered Office: Avonbank, Feeder Road, Bristol BS2 0TB
nationalgrid.co.uk