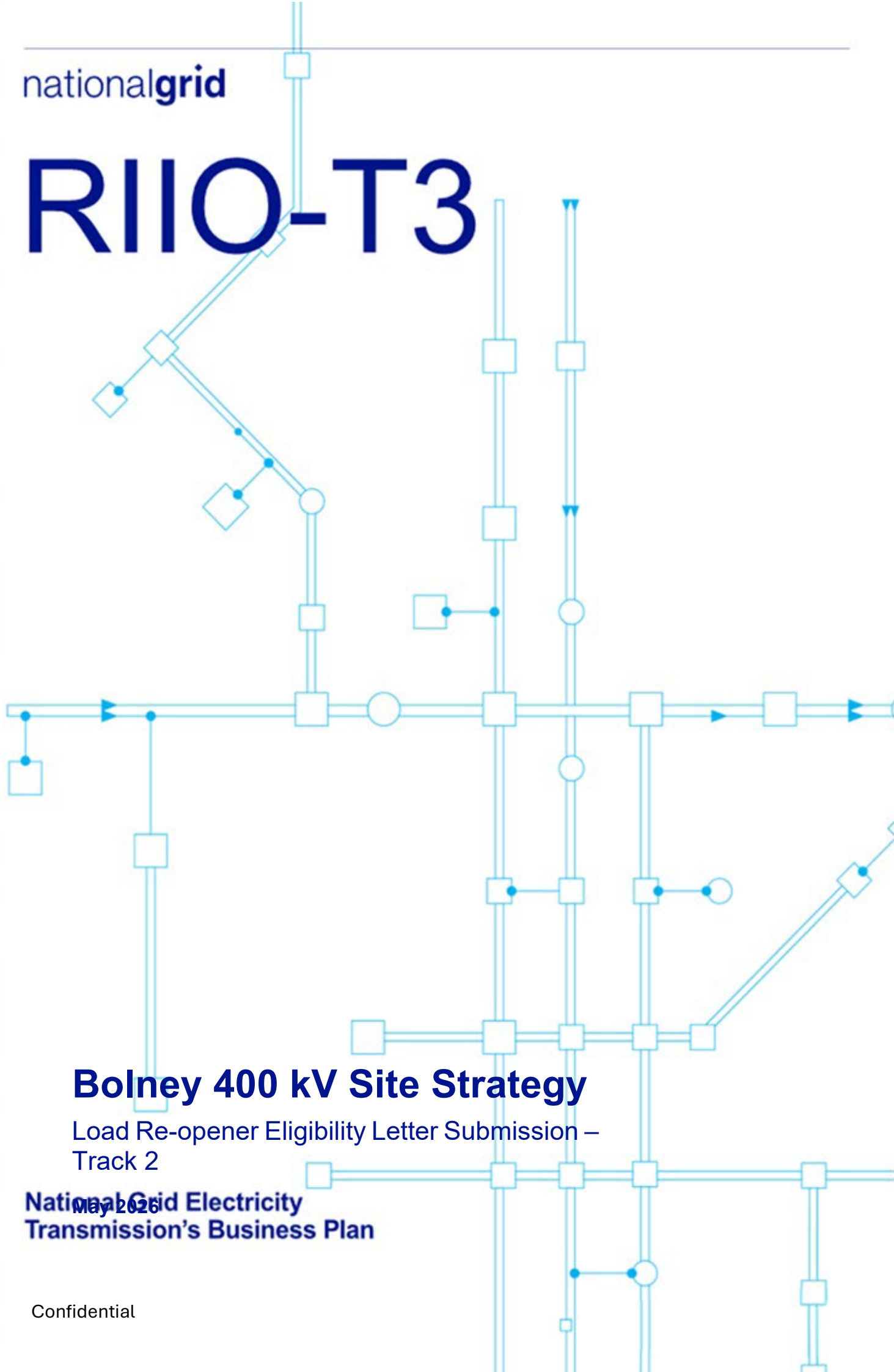


# R110-T3



## Bolney 400 kV Site Strategy

Load Re-opener Eligibility Letter Submission –  
Track 2





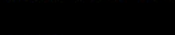

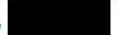

National Grid Electricity  
Transmission's Business Plan

## Table of Contents

|  |           |
|--|-----------|
| Reference and summary table  | 3         |
| <b>1. Executive Summary</b>  | <b>5</b>  |
| 1.1 Project Summary  | 5         |
| 1.2 Submission Purpose   | 5         |
| 1.3 Need   | 5         |
| 1.4 Optioneering   | 5         |
| 1.5 Cost Estimates   | 6         |
| 1.6 Indicative Delivery Program  | 7         |
| <b>2. Introduction</b>   | <b>8</b>  |
| 2.1 Bolney 400 kV Site Strategy  | 8         |
| 2.1.1. Eligibility, Project Track Statement & PASE   | 8         |
| 2.1.2 Pre-Construction Funding Request   | 8         |
| 2.2 Background   | 9         |
| 2.2.1 Chronology to the investment   | 9         |
| 2.2.2 Regional & Network Context   | 10        |
| 2.2.3 Site Background  | 11        |
| 2.2.4 Historical Funding   | 13        |
| <b>3. Drivers &amp; Needs Case</b>   | <b>14</b> |
| 3.1 Customers  | 15        |
| 3.2 Asset Health   | 16        |
| <b>4. Optioneering</b>   | <b>17</b> |
| 4.1 Strategic Options  | 17        |
| 4.2 Siting   | 17        |
| 4.3 Longlist of options considered   | 18        |
| 4.3.1 Influence of stakeholders on shortlisting  | 21        |
| 4.4 Shortlisted Options  | 22        |
| 4.4.1 Option D-1: AIS extension of existing 400 kV busbar with SGT6 Bay, Feeder Bays and tertiary connection                           | 22        |
| 4.4.2 Option D-2: AIS extension of existing 400 kV busbar with a new Bus Coupler 1 Bay and Grid Park Connection                        | 24        |
| 4.4.3 Option D-3: AIS extension of existing 400 kV busbar with new SGT6 Bay and Grid Park Connection                                   | 25        |
| 4.4.4 Option D-4: Extension of 400 kV Substation towards eastern side by AIS busbar connection with new GIS Substation (Hybrid Option) | 27        |
| 4.5 Detailed qualitative analysis of shortlisted options   | 29        |
| 4.5.1 PASE   | 32        |
| 4.6 Detailed quantitative analysis of shortlisted options  | 32        |
| 4.6.1 Cost estimates of shortlisted options  | 32        |
| 4.6.2 Cost-Benefit Analysis  | 33        |
| <b>National Grid   May 2026   Bolney 400 kV Site Strategy</b>  | <b>1</b>  |

|           |   |           |
|-----------|---|-----------|
| 4.7       | Preferred solution                                      | 35        |
| 4.7.1     | Project benefits, outputs & deliverables                | 36        |
| 4.7.2     | Futureproofing  | 37        |
| <b>5.</b> | <b>Project Delivery</b>                                 | <b>38</b> |
| 5.1       | Proposed deliverability programme                       | 38        |
| 5.2       | Procurement & contracting strategy                      | 38        |
| 5.3       | Risk & risk management                                  | 39        |
|           | Following are the associated risks                      | 39        |
| <b>6.</b> | <b>Proposed working arrangements</b>                    | <b>40</b> |
| 6.1       | Details of proposed working arrangements between TOs    | 40        |
| 6.2       | Details of proposed working arrangements between DNOs   | 40        |
| <b>7.</b> | <b>Conclusion</b>                                       | <b>41</b> |
|           | <b>Appendices</b>                                       | <b>42</b> |
|           | <b>Appendix A – System Design Table</b>                 | <b>42</b> |
|           | <b>Appendix B – Summary of further rejected options</b> | <b>46</b> |
|           | <b>Appendix C – Glossary</b>                            | <b>48</b> |

## Reference and summary table

| Field                                      | Description  |
|--|--|
| Name of Project                            | Bolney 400 kV Site Strategy  |
| TO's preferred re-opener track             | Track 2 Eligibility Letter (EL)  |
| RRP References                             | No OSR created to date. Will be included in RRP26 submission.  |
| BPDT / Project Reference Number            | Not Applicable   |
| Load Board Reference                       | Not Applicable   |
| Investment Driver                          | Customer connections: Demand, Generation and BESS.   |
|  |  <p>This investment enables CP2030-critical generation capacity by enabling  of offshore wind and  of BESS demand for  CP2030 medium-large scale offshore/BESS customers. As such, this investment supports the delivery of key UK government energy policy objectives and the regulatory framework set through RII0-3 and the CP2030 pathway, by enabling a secure, affordable and resilient electricity system capable of accommodating sustained growth in demand and generation.</p> |
| PASE Alignment                             | The preferred option is a PASE Variant. The Volume Driver allowance calculation for this scheme is  and therefore cost variances exceed £14.85m or 25% of total project cost <sup>1</sup> .   |
| Outputs                                    | Extending the 400kV and providing a tertiary connection to enable  of generation and embedded demand,  of BESS demand, and  of PV Array (Solar) demand. This will extend the existing substation to its practical maximum capacity within the current site configuration - further extension to the east or west is constrained by environmental considerations and the proximity of residential properties.  |
| Short list of strategic options considered | <p>Four main options were shortlisted for detailed analysis:</p> <ul style="list-style-type: none"> <li>• <b>Option D-1:</b> AIS extension of existing 400 kV busbar with tertiary connection.</li> <li>• <b>Option D-2:</b> AIS extension of existing 400 kV busbar with a new Bus Coupler 1 Bay and Grid Park Connection.</li> </ul>   |

<sup>1</sup> In Ofgem's Load Re-Opener Guidance, atypical extensions to Double Busbar AIS are listed as a Variant Option in Appendix 1 – PASE Framework. Atypical costs are defined as cost variances exceeding £14.85m or more than 25% of total project cost, whichever is higher.

| Field   | Description  |                          |                        |                          |            |            |            |
|---|--|--------------------------|------------------------|--------------------------|------------|------------|------------|
|   | <ul style="list-style-type: none"> <li>• <b>Option D-3:</b> AIS extension of existing 400 kV busbar with new SGT6 Bay and Grid Park Connection.</li> <li>• <b>Option D-4:</b> Extension of 400 kV Substation by AIS busbar connection with new GIS Substation.</li> </ul>                                      |                          |                        |                          |            |            |            |
| Preferred solution and explanatory narrative on the rationale | Option D-1 is preferred because it can be partially constructed offline on the available National Grid land, which reduces the required outage, and provides convenient access for both maintenance and operation. The tertiary connection is more cost-effective, quicker to deploy, and technically simpler. |                          |                        |                          |            |            |            |
| Costs   | [REDACTED]   |                          |                        |                          |            |            |            |
| Delivery Year   | [REDACTED]   |                          |                        |                          |            |            |            |
| Applicable Reporting Tables                                   | No OSR created to date. Will be included in RRP26 submission.  |                          |                        |                          |            |            |            |
| Historic Funding interactions                                 | We have not had any historical funding for this investment need.<br>EAWO: There are no Early Asset Write Offs for this investment.   |                          |                        |                          |            |            |            |
| Interactive Projects  | Bolney 400 kV Site Strategy interacts with following project in the area: <ul style="list-style-type: none"> <li>• UKPN 132 kV substation rebuild</li> </ul>   |                          |                        |                          |            |            |            |
| Spend Apportionment   | <table border="1"> <thead> <tr> <th>T2 (FY 2022-2026):</th> <th>T3 (FY 2027 – FY 2031)</th> <th>T4+ (FY 2032 – FY 2037+)</th> </tr> </thead> <tbody> <tr> <td>[REDACTED]</td> <td>[REDACTED]</td> <td>[REDACTED]</td> </tr> </tbody> </table>  | T2 (FY 2022-2026):       | T3 (FY 2027 – FY 2031) | T4+ (FY 2032 – FY 2037+) | [REDACTED] | [REDACTED] | [REDACTED] |
| T2 (FY 2022-2026):  | T3 (FY 2027 – FY 2031)   | T4+ (FY 2032 – FY 2037+) |                        |                          |            |            |            |
| [REDACTED]  | [REDACTED]   | [REDACTED]               |                        |                          |            |            |            |

# 1. Executive Summary

## 1.1 Project Summary

Bolney is an existing 400 kV transmission node in Sussex. This proposed investment extends the Bolney 400 kV AIS substation (including new bays and a tertiary connection) to enable the timely connection of c.1.37 GW of low-carbon generation and embedded demand, [REDACTED] of battery energy storage (BESS) and [REDACTED] of solar PV in the South-East. The scheme increases capacity and operability at a strategically important node to meet contracted connection dates.

[REDACTED]

## 1.2 Submission Purpose

We are seeking Ofgem's confirmation that the Bolney 400 kV Site Strategy is eligible for assessment under the Load Re-opener. We are also seeking confirmation that Track 2 EL is the appropriate route for this project, approval of Pre-Construction Funding (PCF), approval of the eligibility of the project and approval of our preferred option.

## 1.3 Need

This investment is load-driven and extends the existing Bolney 400 kV substation to provide new bays and a tertiary connection required to connect [REDACTED] contracted customers between [REDACTED] [REDACTED] MW of generation and embedded demand, [REDACTED] of BESS demand, and [REDACTED] of PV Array (Photo Voltaic / Solar) demand.

The existing 400 kV substation configuration cannot accommodate the required additional bays, transformer arrangements and customer interfaces without reinforcement. Without this investment, we would be unable to meet our contractual and licence obligations to connect customers and maintain an efficient, coordinated and economical transmission system. This investment enables [REDACTED] MW of CP2030-critical generation capacity, directly supporting the UK Government's Clean Power 2030 strategy by enabling medium-large-scale BESS/Offshore connections.

## 1.4 Optioneering

We have undertaken a structured, multi-factor optioneering process to identify a deliverable and proportionate solution in the interests of consumers. We conducted a high-level assessment of strategic options, including do-nothing, market-based, whole-system, reuse or extension of existing assets, and new-build options, to develop a longlist of eight potential options for the site.

In identifying a shortlist of options for Bolney, we have balanced:

- the ability to meet the contracted customer requirements and connection dates;
- the extent to which the solution can be delivered within the existing operational boundary;
- construction complexity, outage requirements and interaction with existing assets; and
- consumer value, including comparative cost and delivery risk.

**Table 1: Summary of optioneering longlist**

| Option     | Details   | Drivers met? | New site? | AIS/ GIS? | PASE        | Short List? | Preferred Option |
|------------|---|--------------|-----------|-----------|-------------|-------------|------------------|
| Option A   | Do nothing counterfactual option  | No           | No        | NA        | N/A         | X           | X                |
| Option B   | Market-based solution   | No           | No        | NA        | N/A         | X           | X                |
| Option C   | Non-transmission, whole systems solutions (Distribution Network Operator (DNO))                               | No           | No        | NA        | N/A         | X           | X                |
| Option D-1 | AIS extension of existing 400 kV busbar with tertiary connection.   | All          | No        | Yes       | Var         | ✓           | ✓                |
| Option D-2 | AIS extension of existing 400 kV busbar with a new Bus Coupler 1 Bay and Grid Park Connection.                | All          | No        | Yes       | Var         | ✓           | X                |
| Option D-3 | AIS extension of existing 400 kV busbar with new Super Grid Transformer (SGT) 6 Bay and Grid Park Connection. | All          | No        | Yes       | Var         | ✓           | X                |
| Option D-4 | Extension of 400 kV Substation by AIS busbar connection with new GIS Substation.                              | All          | Yes       | Hybrid    | Non-aligned | ✓           | X                |
| Option E-1 | Complete New AIS/GIS Substation.  | All          | Yes       | AIS GIS   | Yes No      | X           | X                |

Four design options, all focused on extending the existing 400 kV substation, were shortlisted for detailed analysis. Each shortlisted option can meet the contracted customer requirements, but they involve material trade-offs across cost, constructability, outage requirements, interface complexity and future expandability.

Of these, Option D-1 is our preferred solution because it is the most cost-effective and deliverable solution. This will extend the existing substation to its practical maximum capacity within the current site configuration - further extension to the east or west is constrained by environmental considerations and the proximity of residential properties. Supportive evidence and detailed analysis of our preferred option is set out in Section 4.

## 1.5 Cost Estimates

Option D-1 is the least expensive option on comparison of the short-listed options. The other shortlisted options reflect different trade-offs between using a tertiary connection or grid park configuration, the extent of AIS extension works within the existing site, the use of a hybrid GIS solution, and the level of interface works with existing assets and [REDACTED]'s adjacent rebuild.

Indicative cost estimates, based on the cost book using 2023/24 prices, provide an indicative range from [REDACTED] for Option D-1 through to [REDACTED] for Option D-4, reflecting differences in:

- the choice between a tertiary connection, grid park arrangement or hybrid GIS solution;
- the scale of additional substation equipment and associated interface works;
- the extent of civil works, footprint expansion and associated cable / Gas Insulated Busbar (GIB) requirements; and
- differences in delivery complexity, outage requirements.

## 1.6 Indicative Delivery Program

The project is currently planned for staged delivery between [REDACTED], with key outputs aligned to customer connection dates, as set out in Section 6. Project delivery is dependent in part on coordination with [REDACTED] related substation works.

## 2. Introduction

### 2.1 Bolney 400 kV Site Strategy

This paper presents an Eligibility Letter application under the 'Load Re-opener and Price Control Deliverable' Special Condition (3.18 of the RIIO-ET3 Licence) for an investment to extend the Bolney 400 kV substation. It seeks the following approvals from Ofgem<sup>2</sup>:

- a. Eligibility for submission under the Load Re-opener and Price Control Deliverable under Special Condition 3.18;
- b. Confirmation the project follows Track 2 EL of the re-opener process as it is compliant with Ofgem's Pre-Approved Standards of Engineering (PASE);
- c. Pre-Construction Funding (PCF) under Special Condition 3.15 (Pre-Construction Funding Re-opener, Price Control Deliverable); and
- d. Approval of the investment need and our preferred option.

The investment is load-driven, with customer details explained in Section 3.

#### 2.1.1. Eligibility, Project Track Statement & PASE

Bolney is driven by contracted customer connections that require additional capacity and new substation interfaces. The existing 400 kV site configuration cannot accommodate the required additional bays and transformer arrangements without reinforcement. The investment is therefore load-driven and triggered by contracted customer requirements and completion dates. We are submitting this project under Assessment Track 2 EL because the preferred solution is PASE-compliant (PASE Variant: Atypical Extensions to Double Bus AIS).

#### 2.1.2 Pre-Construction Funding Request

Under Special Condition 3.15 of the Electricity Transmission licence, this investment qualifies for allowances equal to 8.2% of its total forecasted cost [REDACTED]

Based on our current forecast we have provided below breakdown of costs amounting [REDACTED] as part of this submission. This equates to [REDACTED] of the latest total forecast costs project costs.

Table 2 below summarises the activities covered by the application of these PCF allowances based on our current progress of PCF and EEW spend. This position will be updated as we continue to mature this investment and ultimately reconciled at Project Assessment stage of the re-opener.

We confirm that no PCF activity included in this submission has been funded through baseline allowances, other re openers, or alternative licence mechanisms.

---

<sup>2</sup> As per section 1.20 of the Load Re-opener Guidance and Submission Document (16 Dec 2025).

## 2.2 Background

### 2.2.1 Chronology to the investment

Bolney is an existing 400 kV AIS substation in Sussex. From 2018, it received multiple Battery Energy Storage System (BESS) connection requests including [REDACTED]

We submitted the funding request titled 'NESO EJP Bolney 400 kV' to Ofgem, in December 2024 as part of our RIIO-T3 Business Plan, to request the approval for the delivery of the full scope of the investment and associated funding of [REDACTED] as part of the RIIO-ET3 baseline.

There were other drivers at the site including a [REDACTED] Offshore Wind Farm connection [REDACTED] connection of BESS for [REDACTED], increasing [REDACTED] for [REDACTED] and enabling fault level intervention for [REDACTED] however, they were not within the scope of 2024 EJP submission, because of low customer confidence at that time.

In Draft Determinations (DD) 2025, Ofgem disagreed with the proposed Grid Park solution for the BESS customers and rejected the optioneering. Around the same time, we were informed that [REDACTED] was no longer pursuing a connection at Bolney, having opted to explore alternative locations due to unsuccessful land acquisition efforts.

Similarly, [REDACTED] also informed that they were unable to secure the necessary land and would also not be proceeding with a connection at Bolney. As a result, we took the decision to re-enter the optioneering stage and cancelled the December 2024 submission request from our side, as confirmed by Ofgem in Final Determinations.

Our December 2024 EJP covered a narrower scope than this reopener. Following changes in the customer landscape and Ofgem's feedback on the grid park solution, we re-ran optioneering in 2025 and identified a revised preferred option based on the current [REDACTED] contracted customers. Of these, all customers have Gate 2 offers under Connections Reform.

We have also addressed Ofgem's DD feedback regarding DNO-based whole systems solution in Section 4.3.

Figure 1 provides the summary of chronology to the investment, while Table 3 provides a breakdown of the contracted customers' detail.

**Figure 1: Summary of chronology**



**2.2.2 Regional & Network Context**

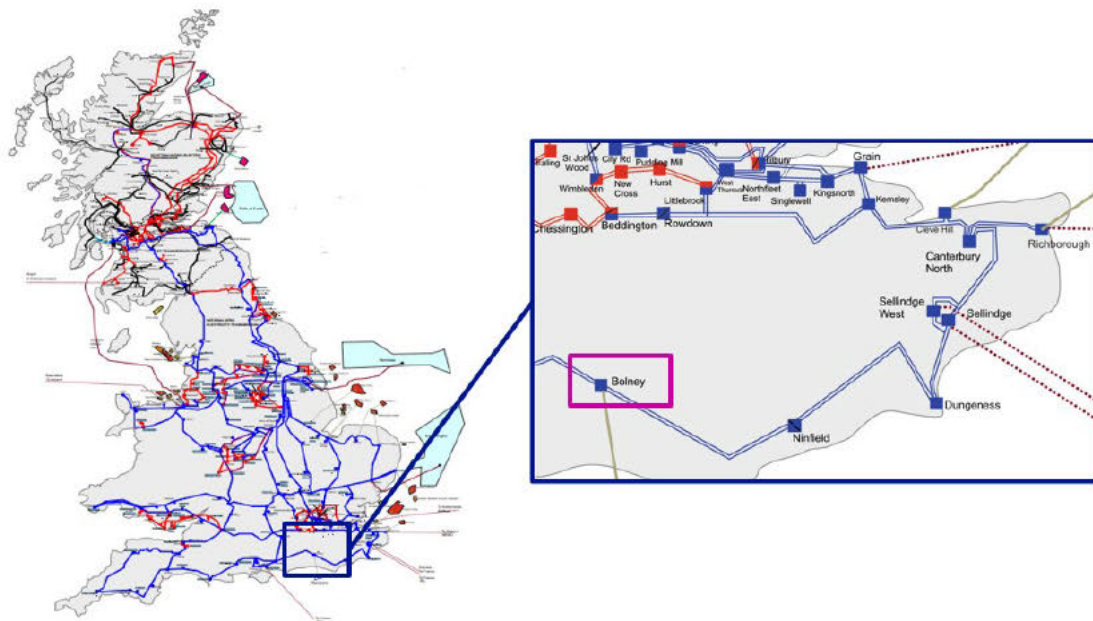
Our South-East Coast zone consists of substations at Bolney, Ninfield, Dungeness, Sellindge, Canterbury, Richborough, Cleve Hill and Kemsley. It is generally an exporting zone owing to the existing 3 GW connection to Europe including from generation from London Array at Cleve Hill 400 kV substation, Rampion offshore windfarms at Bolney 400 kV substation and embedded generation connected to UKPN’s Shoreham substation (Shoreham power station) and Richborough substation (Thanet offshore windfarm).

Our electricity transmission strategy in the Southeast focuses on upgrading and extending a number of substations in the region to accommodate new interconnectors from continental Europe and other sizeable generation and demand connections. This includes new substations in Kent, at Wallend and Minster. A strategic offshore HVDC link between Suffolk and Kent; Sealink project, will act as a relief valve for high power flows between the transmission networks of East Anglia and the Southeast.

Along the Hampshire and Sussex coasts, in addition to our investment in Bolney, we are expanding Little Horsted, rebuilding Fawley and developing cable replacements to strengthen network resilience and increase capacity in the Solent area.

The 400 kV substation serves as the connection point for major demand centres including Brighton, Worthing, Gatwick Airport and Network Rail, making it essential for the regional security of supply. With significant new connections, such as the [REDACTED], large BESS projects, and increased embedded generation from UKPN, the existing substation cannot accommodate contracted customer connections without additional investment. This investment enables timely delivery of these customer connections, helping the UK meet decarbonisation and net-zero targets by integrating substantial renewable and storage capacity. In addition, Bolney 400 kV Site Strategy supports CP2030 by enabling large-scale BESS connections, aligning with connections reform principles, relieving capacity constraints at a critical Southeast node, and appropriately sequencing delivery with wider network reinforcements.

**Figure 2: Location of Bolney site on our network**



Key: **Red** = 275kV assets, **Blue** = 400 kV assets. Investment location shown in the **purple** area

2.2.2.1 Interactive Projects

[REDACTED]

2.2.3 Site Background

Bolney is a site in Sussex near Haywards Heath. There are two substations at Bolney; Bolney 400kV Air Insulated Switchgear (AIS) and Bolney 132 kV GIS (owned by UKPN).

Bolney 400 kV substation was built in the 1960s and comprises double-busbar configuration with [REDACTED]

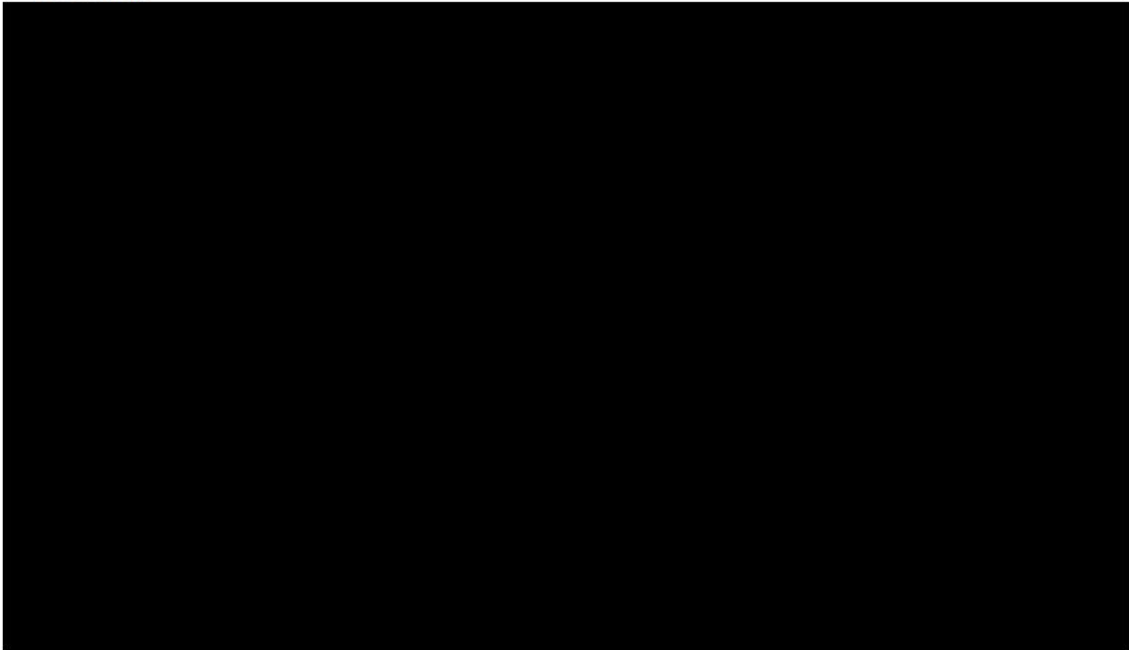
[REDACTED]

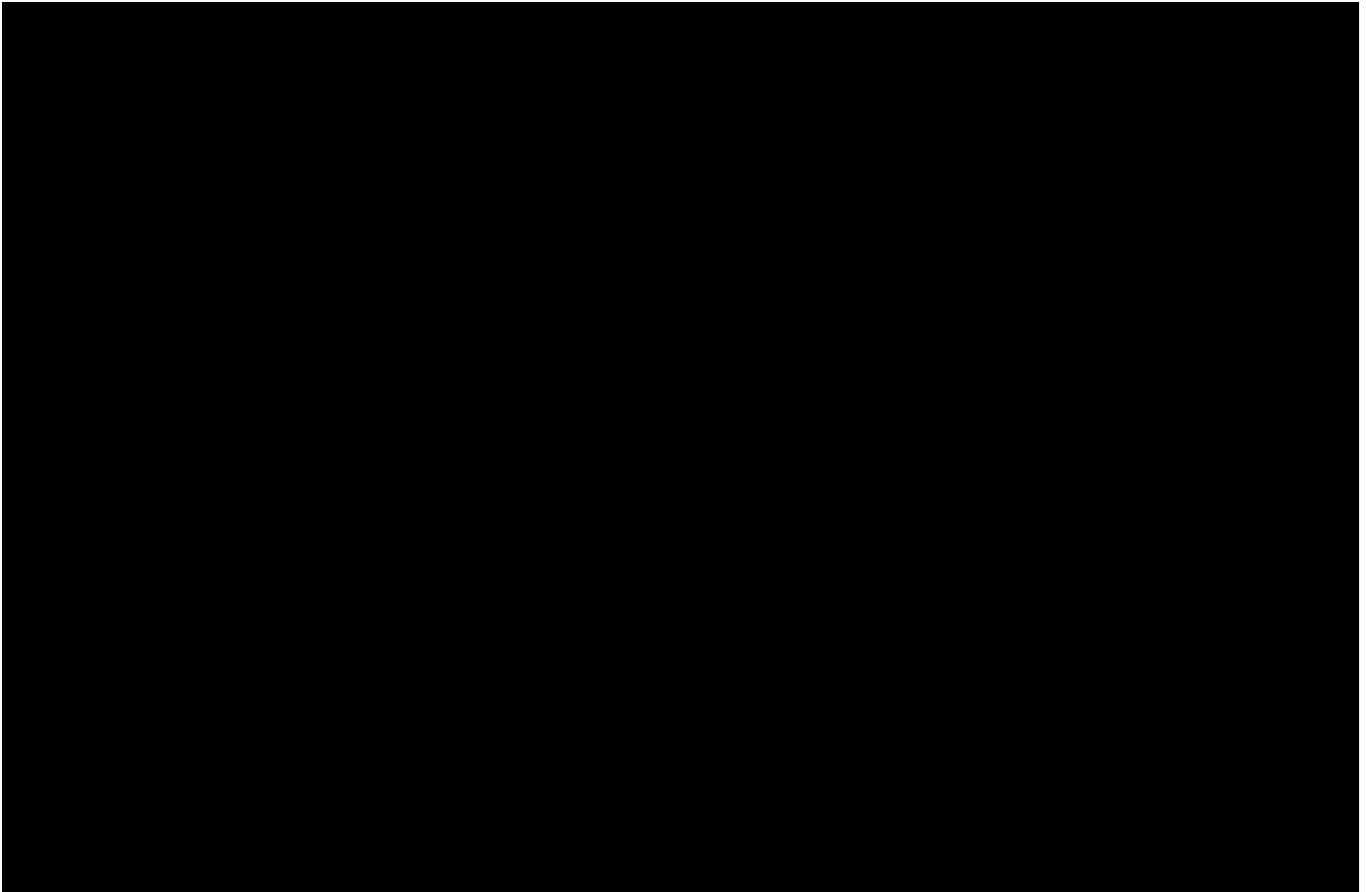
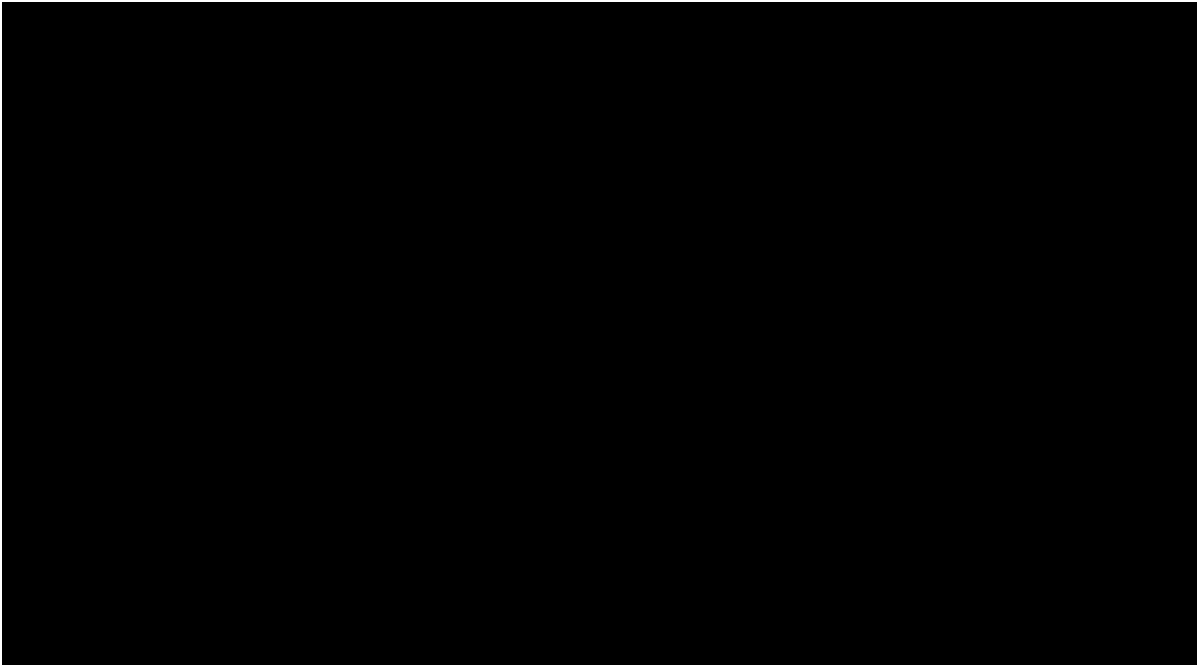
[REDACTED]

[REDACTED]

The primary function of Bolney 400 kV substation is to provide a transmission connection for [REDACTED]. Bolney supplies demand in the Bolney/Ninfield group (loosely coupled via Lewes and Southern Cross). The Bolney 400 kV demand includes [REDACTED] as such the site is considered sensitive from a demand perspective. [REDACTED] on is embedded within the Bolney group (connected at [REDACTED] substation). Throughout this time, we have maintained the substation and its assets through various non-load interventions. Further detail on asset health is explained in Section 3.2.

Figures 3 and 4 show the Single Line Diagram (SLD) of the existing 400 kV and 132 kV substations at Bolney.





Key: **Teal** = UKPN proposed 132 kV rebuild, **Orange** = Bolney 400 kV extension, **Yellow** = Bolney 132 kV substation (UKPN owned), **Green** = Location of tertiary solution, **Blue** = Dynamic Reactive Compensation Assets for Rampion.

#### 2.2.4 Historical Funding

For this proposed investment, we have not previously received any funding from Ofgem.

#### 2.2.4.1 Early Asset Write Offs (EAWO)

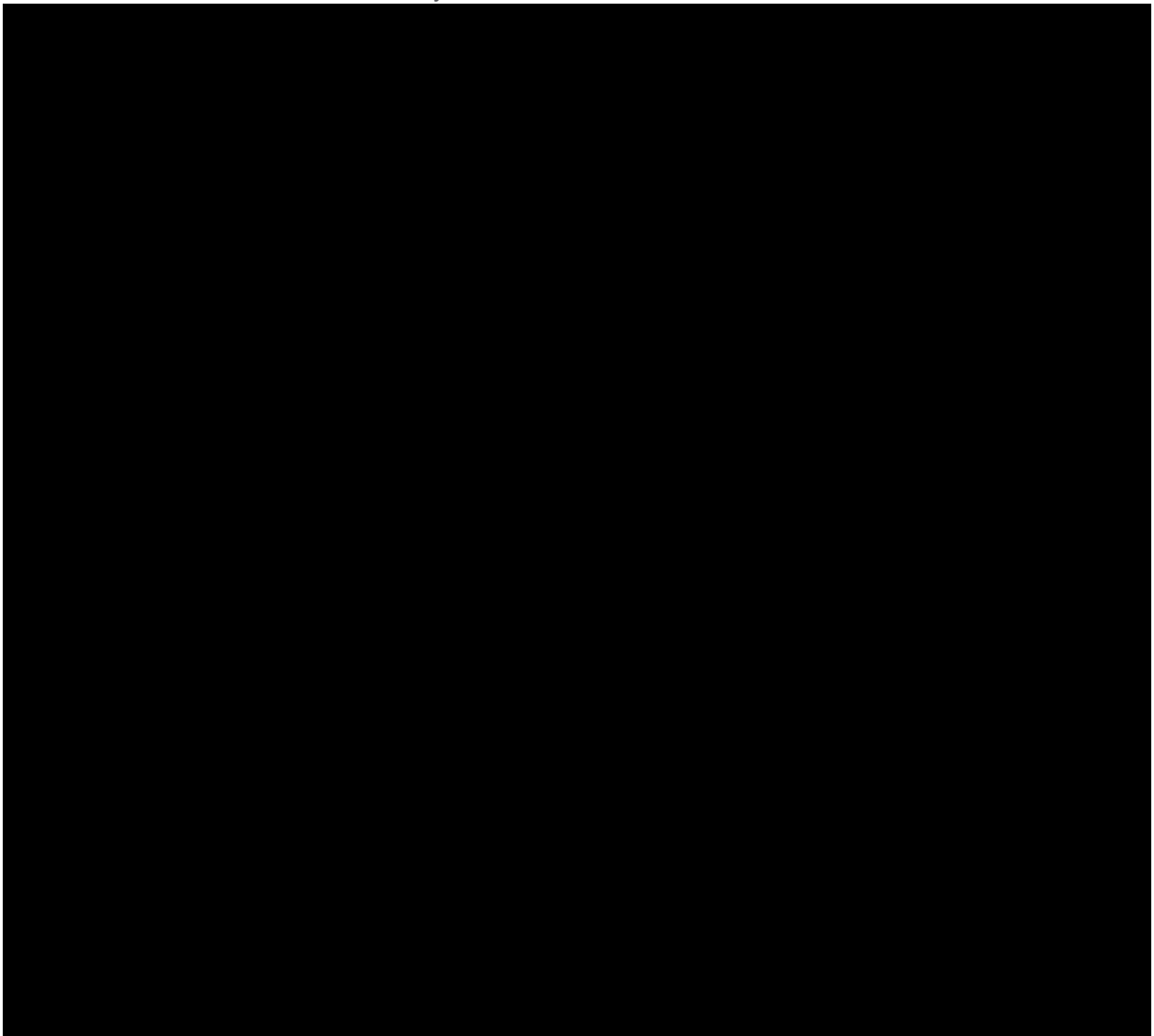
There are no Early Asset Write Offs for this investment.

## 3. Drivers & Needs Case

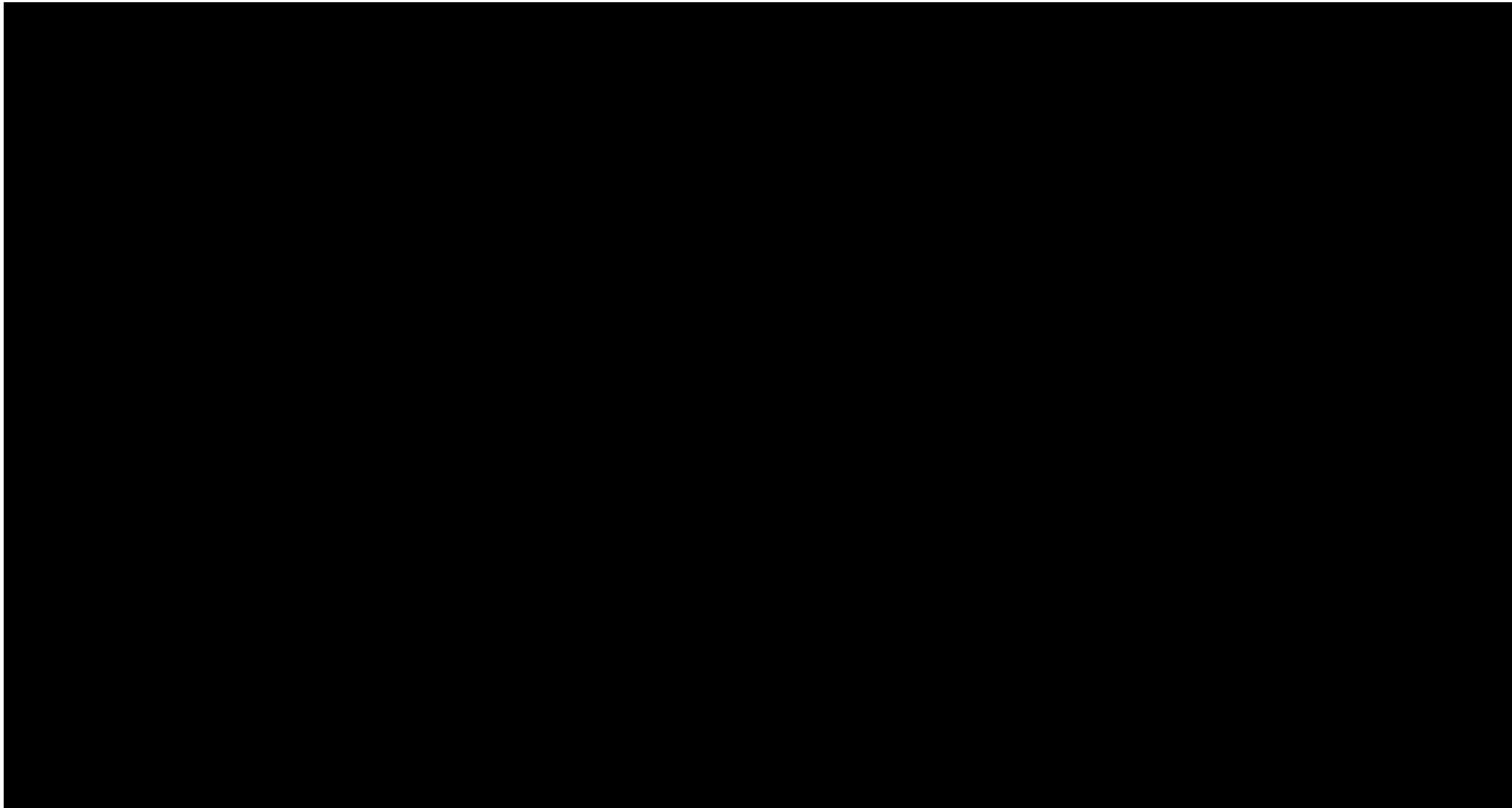
This investment is primarily driven by customer need, but it has also been developed to support efficient whole-life network development. All contracted customers at Bolney 400 kV, except DNO demand, have Gate 2 offers which gives us certainty that the works planned at Bolney are required within the timescales outlined.

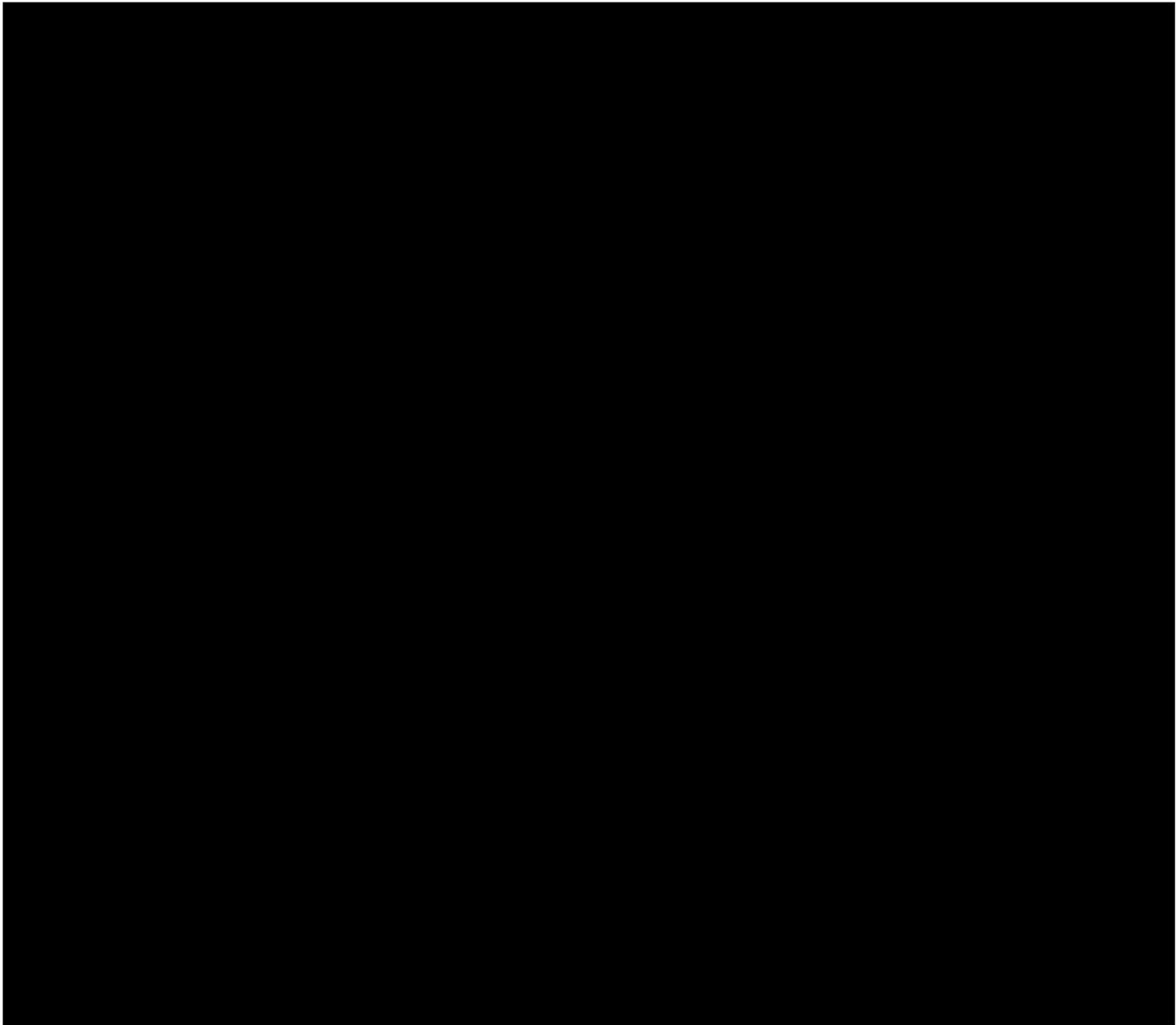
The customer ACL dates presented in this submission reflect the existing P6 programme. The testing and setting of ACL dates for customer contracts within scope of connections reform is ongoing throughout [REDACTED]. Confirmation of agreed ACL dates will therefore be presented in the next stage of submission which is Project Assessment.

Table 3 lists down all drivers at Bolney 400 kV substation.



<sup>3</sup> [Strategic Energy Need – NESO 9 Feb 2025](#)





### 3.2 Asset Health



# 4. Optioneering

We follow a structured, multi-factor optioneering process to select the most economic and efficient solution, in the interest of consumers. In line with the Electricity Transmission Design Principles, our optioneering process takes into account engineering, environmental, deliverability, economic and stakeholder factors. We start by assessing the most suitable strategic options.

## 4.1 Strategic Options

In line with our standard optioneering process, we considered the following broad strategic options:

**Table 5: Strategic Options Summary Table**

| Option Number | Option Name                 | Option Description   |
|---------------|-----------------------------|--|
| A             | Do nothing                  | The network is kept in its current state, and no new connections are facilitated.                      |
| B             | Market based solution       | Increased customer demand is accommodated through the procurement and use of ancillary services only.  |
| C             | Whole systems solution      | The required customer connection is accommodated by a DNO.   |
| D             | Make use of existing assets | Facilitating the requested connection by utilising the existing substation (extension, uprating, etc.) |
| E             | New build                   | Facilitating the requested connection by building a new substation.                                    |

We discounted Options A, B and C early in our optioneering process due to licence and contractual obligations and the inability to facilitate connection requests. As detailed below, our initial high-level assessment concluded that the drivers could be effectively met by making use of existing assets. A descriptive rationale is explained in Section 4.3, Table 6.

## 4.2 Siting

There was no siting study conducted as the proposed works are within our existing operational boundary.

### 4.3 Longlist of options considered

Table 6: Longlist table

| Options  | Technical Description   | Relevant Diagrams or Layout References | Consenting Risks & Environmental Impact               | Rationale for taking/ or not taking forward the option to shortlisted assessment.   |
|--|---|--|---|---|
| <b>Option A:</b> Do nothing<br><b>Not progressed</b>                               | The network is kept in its current state, and no new connections are facilitated.                     | N/A                                    | <ul style="list-style-type: none"> <li>N/A</li> </ul> | <ul style="list-style-type: none"> <li><b>Contractual and Licence compliance:</b> Compliant customer connection not delivered, and it would be against our contractual and license obligations.</li> </ul>  |
| <b>Option B:</b> Market-based solution<br><b>Not progressed</b>                    | Increased customer demand is accommodated through the procurement and use of ancillary services only. | N/A                                    | <ul style="list-style-type: none"> <li>N/A</li> </ul> | <ul style="list-style-type: none"> <li><b>Contractual and Licence compliance:</b> Compliant customer connection not delivered, and the option does not comply with our licence obligations to provide connections.</li> </ul>   |
| <b>Option C:</b> Non-transmission, whole systems solution<br><b>Not progressed</b> | The required customer connection is accommodated by a DNO.  | N/A                                    | <ul style="list-style-type: none"> <li>N/A</li> </ul> | <p>This option was specifically reassessed during the 2025 re-optioneering exercise in response to Ofgem's Draft Determinations feedback on the December 2024 EJP.</p> <ul style="list-style-type: none"> <li><b>Contractual and Licence compliance:</b> Compliant customer connection not delivered.</li> <li><b>Deliverability:</b> <ul style="list-style-type: none"> <li>We discounted the whole-system / non-transmission option because it would not provide a viable route to deliver the required contracted outputs. The local DNO network cannot accommodate the scale and configuration of the contracted requirements at Bolney, particularly the [REDACTED] and the wider combination of demand, storage and interface changes required at the site as there is currently no spare bay available. In practice, this means the connections must be delivered through reinforcement of the transmission interface at Bolney rather than through an alternative lower-voltage solution.</li> <li>Whilst UKPN is progressing with an extension of their 132 kV substation, the delivery date is anticipated to be [REDACTED], which is not in-line with [REDACTED] contracted date of [REDACTED] – making this option unviable.</li> </ul> </li> </ul> |

| Options  | Technical Description   | Relevant Diagrams or Layout References           | Consenting Risks & Environmental Impact  | Rationale for taking/ or not taking forward the option to shortlisted assessment.  |
|--|---|--|--|--|
|  |   |  |  | <ul style="list-style-type: none"> <li>○ Furthermore, there is no established industry mechanism to transfer customers from transmission network to the DNO. Implementing such a change mid-process would have required customers to re-enter the connection queue from the beginning, with no certainty of outcome, which the customers did not support.</li> <li>○ This option and conclusion were discussed and agreed through routine monthly meetings with UKPN representatives.</li> </ul> |
| <p><b>Option D-1:</b> AIS extension of existing 400 kV busbar with tertiary connection.</p> <p><b>Shortlisted</b></p>                              | <p>Extension of 400 kV Busbar towards East side for new Line Bay, Extension of 400 kV Busbar towards west side for SGT6 Bay, SGT3B Banked with SGT3 and Tertiary connection with SGT5</p> | <p>SLD and layout is included in Section 4.4</p> | <ul style="list-style-type: none"> <li>• The proposed works are within existing operational boundary. Where the works fall within our permitted development rights, there is no obligation to obtain permitted development (PD) confirmation from the Local Planning Authority.</li> <li>• Lower environmental impact as compared to other options.</li> </ul> | <ul style="list-style-type: none"> <li>• <b>Land, planning and consents:</b> NG-owned land and known technology.</li> <li>• <b>Deliverability:</b> Delivers required capacity with operational flexibility, and there is a lower delivery risk due to tertiary connection (simpler technical requirements).</li> </ul>   |
| <p><b>Option D-2:</b> AIS extension of existing 400 kV busbar with a new Bus Coupler 1 Bay and Grid Park Connection.</p> <p><b>Shortlisted</b></p> | <p>Extension of 400 kV Busbar towards East side for new Line Bay, Extension of 400 kV Busbar towards west side for SGT6 Bay, SGT3B Banked with SGT3 and Grid Park Connection</p>          | <p>SLD and layout is included in Section 4.4</p> | <ul style="list-style-type: none"> <li>• Relocation of MSC equipment requires permission from Local DNO.</li> <li>• No major environmental impact.</li> </ul>  | <ul style="list-style-type: none"> <li>• <b>Land, planning and consents:</b> NG-owned land.</li> <li>• <b>Deliverability:</b> Most construction can occur offline.</li> </ul>  |
| <p><b>Option D-3:</b> AIS extension of existing 400 kV busbar with new SGT6 Bay and</p>  | <p>Extension of the substation on both the eastern and western sides to provide space for two new feeder bays in the east and a new Bus Coupler 1 bay in the west</p>                     | <p>SLD and layout is included in Section 4.4</p> | <ul style="list-style-type: none"> <li>• No major consenting risks as all proposed works are within existing operational boundary.</li> <li>• Lower environmental impact as compared to other options.</li> </ul>  | <ul style="list-style-type: none"> <li>• <b>Land, planning and consents:</b> NG-owned land.</li> <li>• <b>Engineering:</b> This configuration reduces the amount of western site extension work and shortens the 132 kV cable route required from the new SGT6 bay to the 132 kV substation. It also avoids significant overhead line modifications.</li> </ul>  |

| Options   | Technical Description  | Relevant Diagrams or Layout References    | Consenting Risks & Environmental Impact  | Rationale for taking/ or not taking forward the option to shortlisted assessment.  |
|---|--|---|--|--|
| Grid Park Connection.<br><br><b>Shortlisted</b>   |  |   |  |  |
| <b>Option D-4:</b><br>Extension of 400 kV Substation by AIS busbar connection with new GIS Substation (Hybrid Option)<br><br><b>Shortlisted</b> | Extension of 400 kV Substation towards eastern side by AIS busbar connection with new GIS Substation (Hybrid Option) | SLD and layout is included in Section 4.4 | <ul style="list-style-type: none"> <li>No major consenting risks.</li> <li>This option also requires vegetation clearance and potential tree felling.</li> </ul>   | <ul style="list-style-type: none"> <li><b>Land, planning and consents:</b> NG-owned land.</li> <li><b>Engineering:</b> Most construction can be completed offline, reducing the number and duration of outages.</li> <li><b>Deliverability:</b> It maintains access to both new and existing infrastructure and preserves the potential for future northern expansion.</li> </ul>  |
| <b>Option E-1:</b><br>Complete New AIS/GIS Substation<br><br><b>Not progressed</b>  | Complete New AIS/GIS Substation on North Side of the existing substation   | Not applicable                            | <ul style="list-style-type: none"> <li>Requires planning permission, as the works would be located outside the operational area.</li> <li>This option also requires vegetation clearance felling.</li> <li>Increased Biodiversity Net Gain (BNG) requirements compared with brownfield substation extensions.</li> </ul> | <ul style="list-style-type: none"> <li><b>Land, planning and consents:</b> Larger footprint requiring additional land – outside of existing operational boundary.</li> <li><b>Engineering:</b> Major overhead line works and short-term OHL outages would be required during construction; Longer cable routes would be needed to connect the new substation to the existing transformers and the 132 kV network, increasing both cost and complexity.</li> <li><b>Consumer value:</b> This option would be significantly more costly than other options as it is a new build. Furthermore, in view of the customer applications and wider regional need, there is no requirement to build a new substation at Bolney. Furthermore, there is space at the north of the existing substation for future rebuild. Based on these factors, building a new substation is not in the best interests of consumers.</li> </ul> |




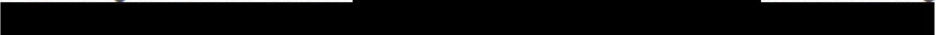



## 4.4 Shortlisted Options

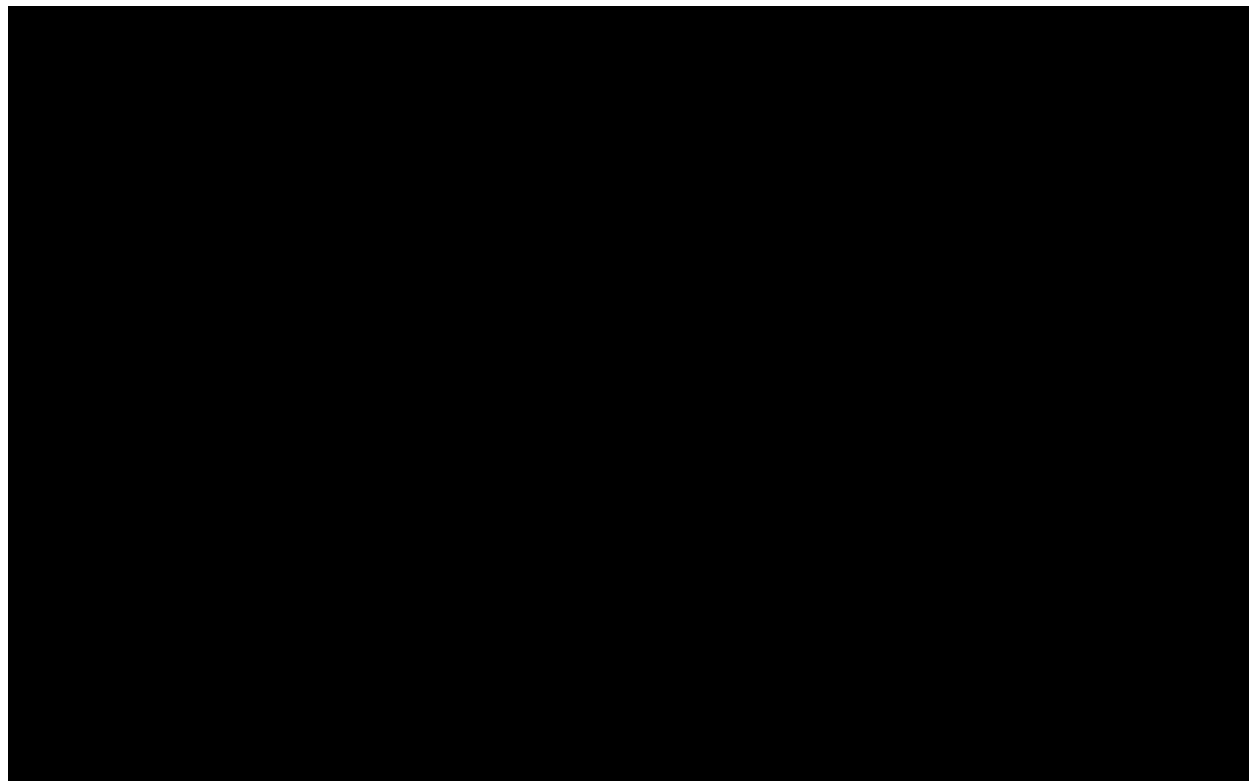
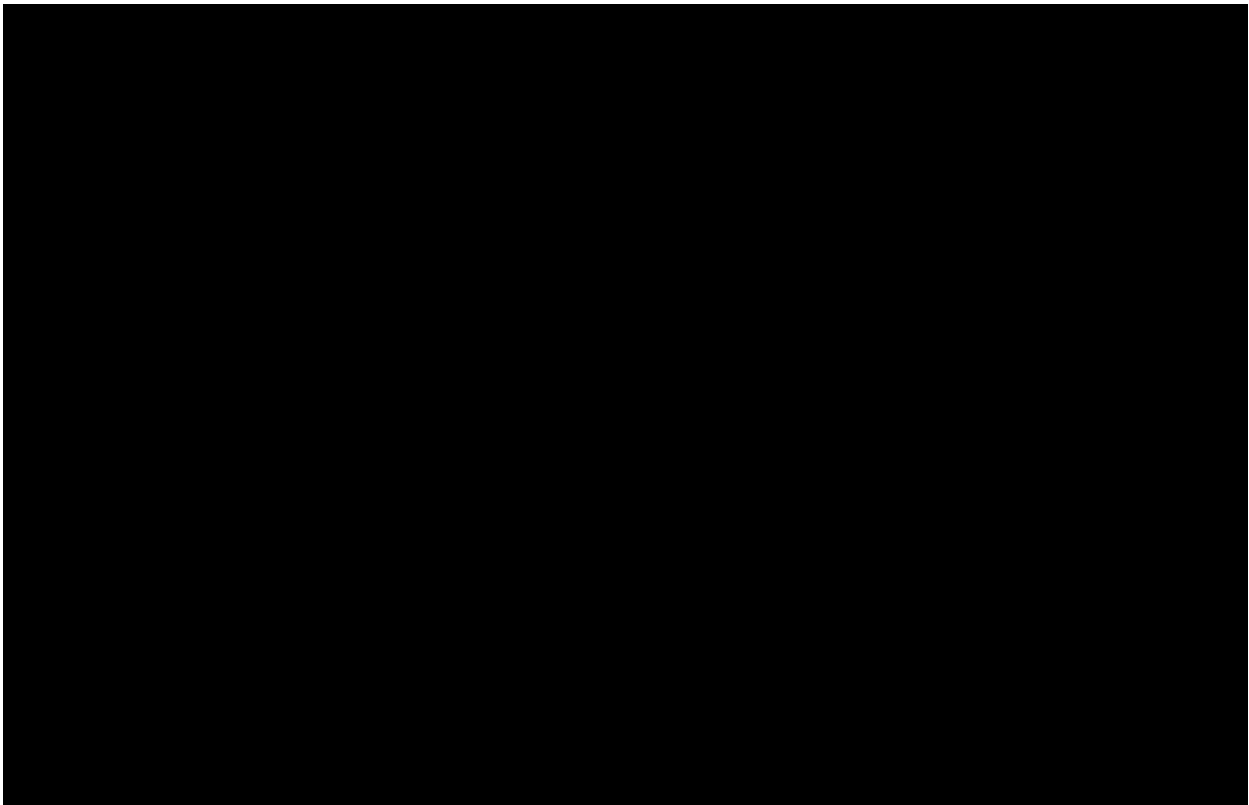
The shortlisted options for this investment are:

- Option D-1: AIS extension of existing 400 kV busbar with new SGT6 Bay, Feeder Bays and tertiary connection;
- Option D-2: AIS extension of existing 400 kV busbar with a new Bus Coupler 1 Bay and Grid Park Connection;
- Option D-3: AIS extension of existing 400 kV busbar with new SGT6 Bay and Grid Park Connection; and
- Option D-4: Extension of 400 kV Substation towards eastern side by AIS busbar connection with new GIS Substation (Hybrid Option).

### 4.4.1 Option D-1: AIS extension of existing 400 kV busbar with SGT6 Bay, Feeder Bays and tertiary connection

This option involves extending the 400 kV busbar  and extending the 400 kV busbar . By using targeted busbar extensions rather than undertaking wider system reconfiguration, this approach reduces construction complexity and minimises operational disruption while maintaining system reliability.

 also maximises the use of existing assets and simplifies the overall arrangement. This option can largely be delivered offline and avoids the additional complexity and footprint of the alternatives.

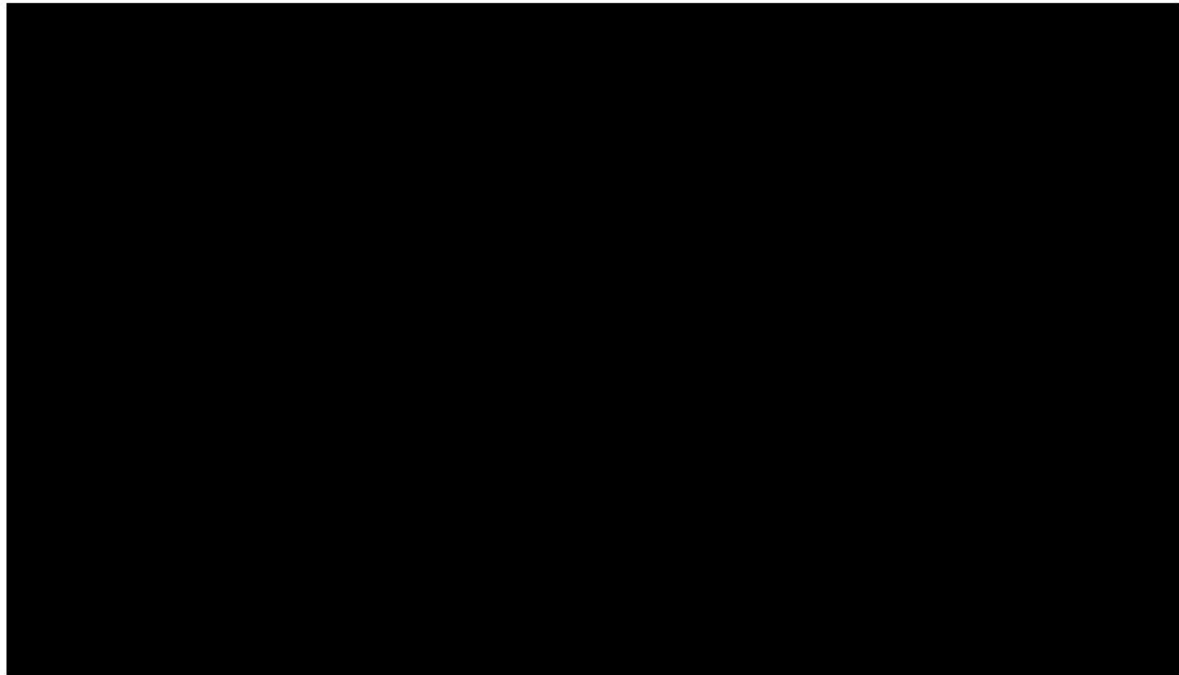


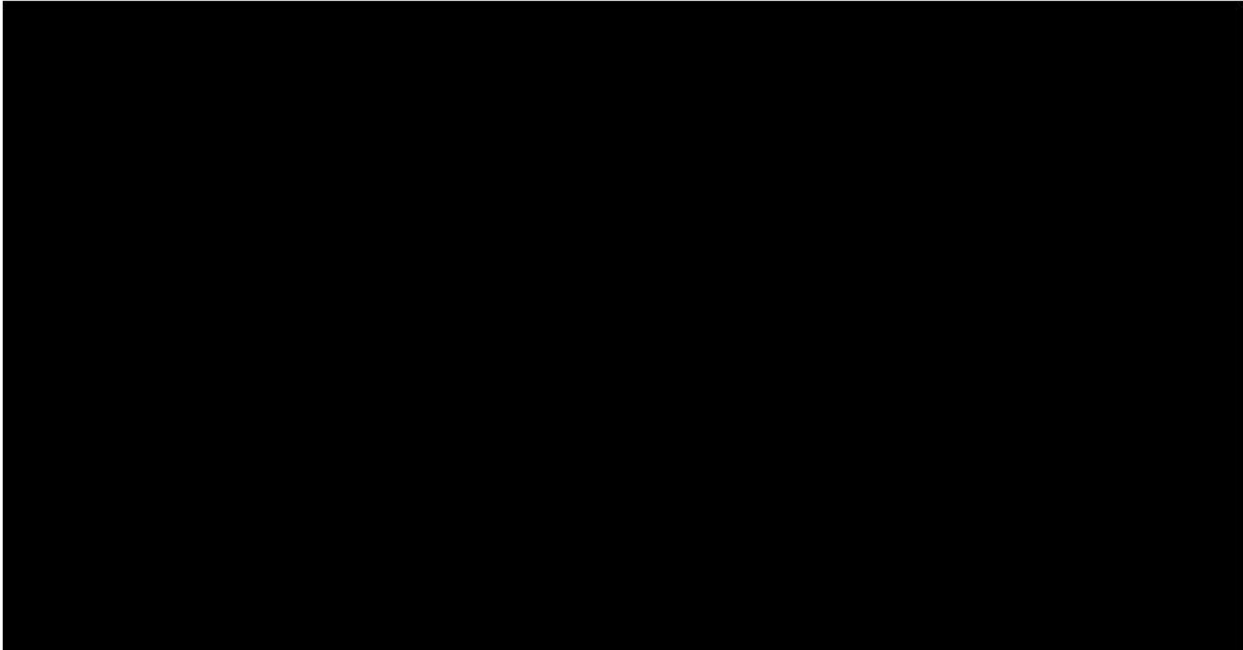
#### 4.4.2 Option D-2: AIS extension of existing 400 kV busbar with a new Bus Coupler 1 Bay and Grid Park Connection

This option requires extending the substation on both its eastern and western sides to create space for [REDACTED]

A proposed 400/33 kV grid-park transformer [REDACTED] will also tee off from the [REDACTED]. As part of these works, several assets, including [REDACTED]

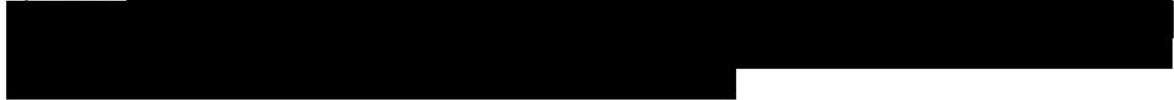
A key benefit of this option is that most construction can occur offline, significantly reducing outage requirements and improving access in an already congested substation. However, it requires modification of the existing northwest outfall, demands a larger western footprint, and necessitates longer 132 kV cable routing from SGT6.



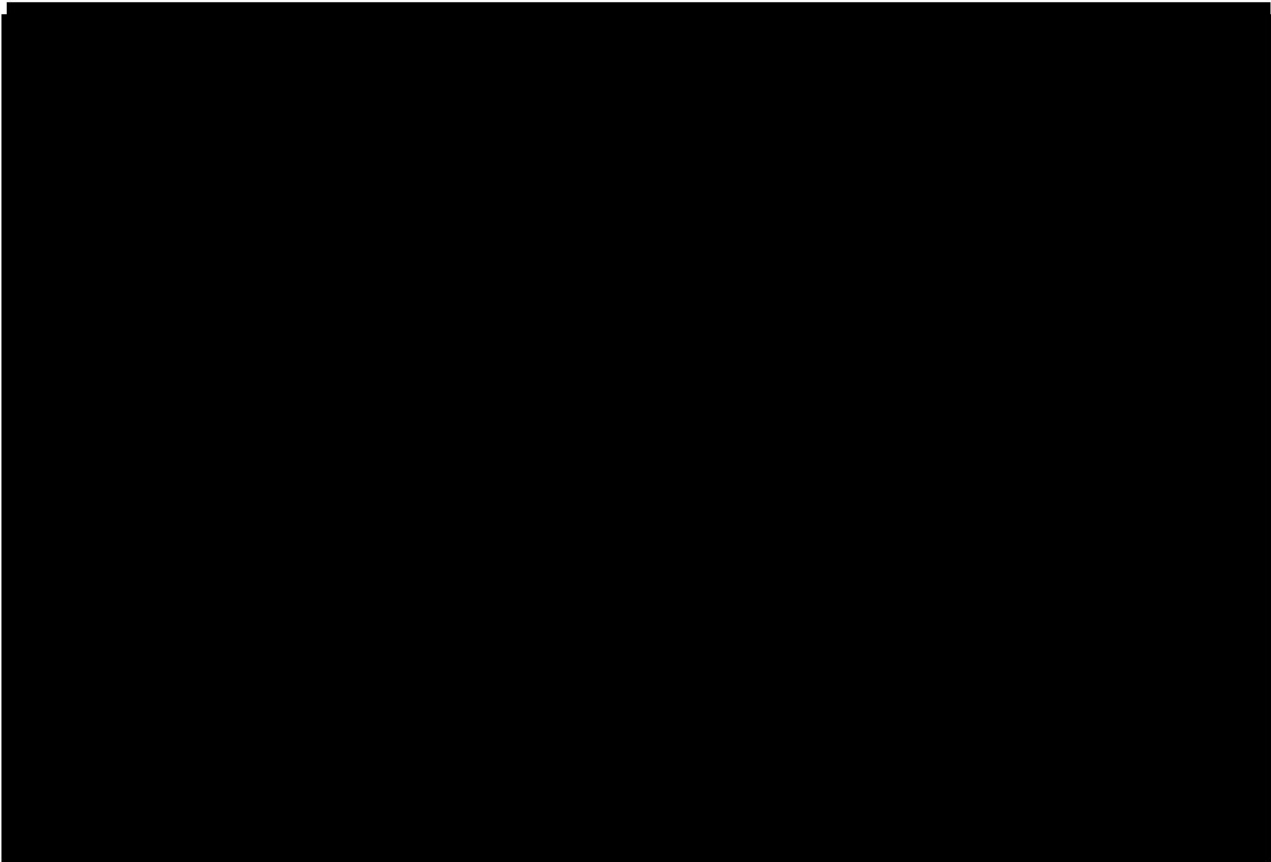
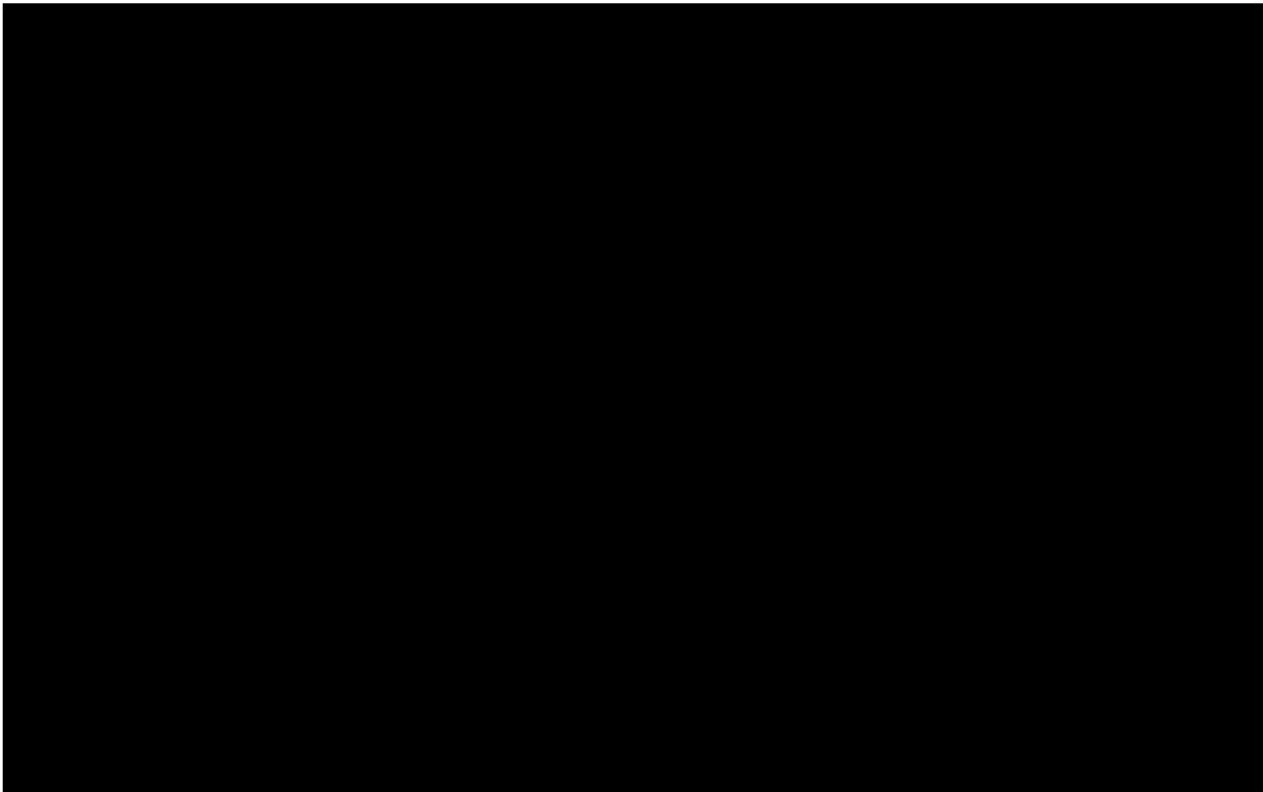


#### 4.4.3 Option D-3: AIS extension of existing 400 kV busbar with new SGT6 Bay and Grid Park Connection

This option proposes extending the substation on both the eastern and western sides to provide space for [REDACTED]



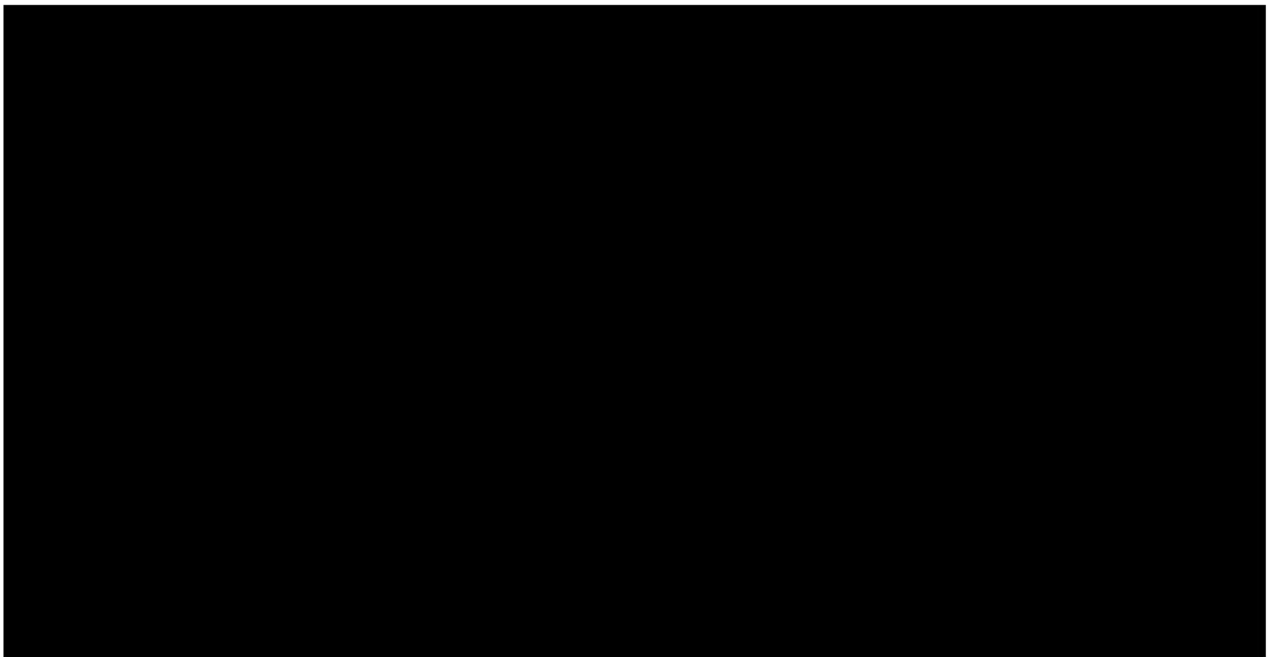
Compared with Option D-1, this configuration reduces the amount of western site extension work and shortens the 132 kV cable route required from the new [REDACTED]. It also avoids significant overhead line modifications. However, the option introduces several disadvantages. Relocating and constructing the existing [REDACTED] will require outages. The western extension could conflict with existing HV cables and installing down-droppers on the [REDACTED] bay increases working-at-height risks. Transformer delivery access to the [REDACTED] may be restricted, and the diesel generator and fuel tank will need relocating to accommodate [REDACTED]. Substantial civil works are still required for the [REDACTED] and new fire barrier walls will be necessary for [REDACTED] unless a technical deviation is approved.

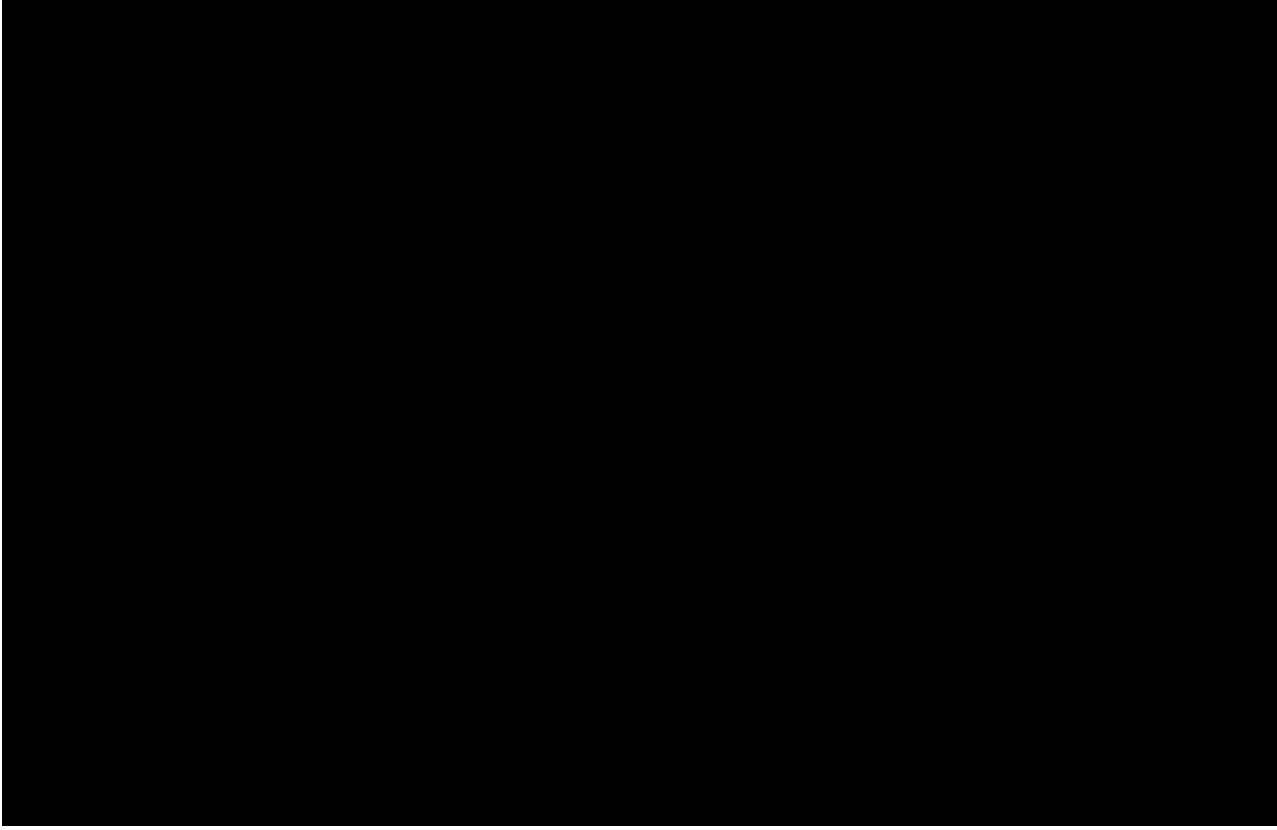


#### 4.4.4 Option D-4: Extension of 400 kV Substation towards eastern side by AIS busbar connection with new GIS Substation (Hybrid Option)

This option proposes extending the substation eastward using GIS, arranged either horizontally or vertically, with one tertiary connection provided from [REDACTED]. A key benefit of this approach is that most construction could be completed offline, reducing the number and duration of outages. It also maintains good access to both new and existing infrastructure and preserves the potential for future northern expansion. No significant OHL works would be required, and the [REDACTED] [REDACTED] has already been completed.

However, the option requires a larger footprint on the eastern side of the site, increasing civil construction requirements. GIS equipment, particularly SF<sub>6</sub>-free switchgear, often comes at a higher cost compared to AIS. The design also requires longer GIB runs to connect the new SGTs. The proposed development area overlaps with the [REDACTED] rebuild zone, creating potential interface issues. [REDACTED]





Please see the System Design Table for the shortlisted options in Appendix A.

## 4.5 Detailed qualitative analysis of shortlisted options

Table 7: Detailed Qualitative Assessment Table

| Optioneering Categories  |  |  |  |  |   |
|--|--|--|--|--|---|
| Option   | Engineering  | Environmental  | Deliverability   | Economic/Consumer Value  | Consenting /Stakeholder   |
| <b>Option D-1:</b><br>AIS extension of existing 400 kV busbar with SGT6 Bay, Feeder Bays and tertiary connection | <ul style="list-style-type: none"> <li>✓ This is a known technology i.e., existing one being used on site, so operational procedures are well known.</li> <li>✓ <b>Construction would be simpler</b> than alternatives as it avoids the additional Grid Park and associated interface infrastructure required by Options D-2 and D-3, and avoids the new GIS hall / GIB scope required by Option D-4.</li> <li>✓ <b>Uses the existing SGT5 tertiary infrastructure</b> for [REDACTED] requirement and therefore avoids introducing a separate Grid Park or 132 kV hybrid connection for that customer connection. SGT6 bay and line bay can be partially constructed offline.</li> <li>✓ <b>PASE Variant option</b> as it's an AIS extension.</li> </ul> | <ul style="list-style-type: none"> <li>✓ Option D-1 <b>requires the least land take</b> compared to the other options, so it is expected to have a lower environmental impact, including reduced ecological disturbance and reduced Biodiversity Net Gain (BNG) mitigation requirements.</li> <li>✓ <b>Lower carbon footprint</b> than other designs.</li> </ul> | <ul style="list-style-type: none"> <li>✓ This option <b>enables timely connection for Stage 1 ACL</b> of [REDACTED] as compared to Option D-4 due to reduced design and construction complexity.</li> <li>✓ The <b>known technology lowers the risk of design faults</b>, helping to achieve the required delivery timeline with less risk.</li> </ul> | <ul style="list-style-type: none"> <li>✓ Being extended to <b>its practical maximum capacity within the current site configuration</b>.</li> <li>✓ Saves space in the north of the substation for future rebuild, if needed.</li> <li>✓ <b>Avoids the need for more extensive new infrastructure</b> by using the tertiary approach that is quicker to deploy.</li> <li>✓ <b>In alignment with our wider regional strategy for Southeast</b> (Solent area) as explained in Section 2.2.2.</li> </ul> | <ul style="list-style-type: none"> <li>✓ <b>The proposed works will be within the existing National Grid operational land.</b> We will exercise our permitted development rights in constructing this extension.</li> </ul> |
|  | <b>Strong Benefit</b>  | <b>Benefit</b>   | <b>Benefit</b>   | <b>Strong Benefit</b>  | <b>Benefit</b>  |
| <b>Option D-2:</b><br>AIS extension of existing 400 kV busbar with a new Bus Coupler                             | <ul style="list-style-type: none"> <li>✓ <b>Enables the bulk of new equipment installation and civil works to be completed within the extension area</b> prior to final connection into the existing substation, thereby reducing outage requirements.</li> </ul>  | <ul style="list-style-type: none"> <li>✓ Compared with Options D-3 and D-4, Option D-2 requires a smaller extension area and less associated ground remediation, resulting in lower BNG mitigation requirements.</li> <li>× <b>Intervention footprint remains greater than</b></li> </ul>  | <ul style="list-style-type: none"> <li>✓ Option D-2 can be <b>delivered within the same timescale as Options D-1 and D-3.</b></li> </ul>   | <ul style="list-style-type: none"> <li>× Option D-2 would be more expensive than Option D-1 due to construction of the Grid Park.</li> <li>✓ Saves space in the north of the</li> </ul>  | <ul style="list-style-type: none"> <li>✓ <b>The proposed works will be within the existing National Grid operational land.</b> We will exercise our permitted</li> </ul>  |

| Optioneering Categories  |   |  |   |  |  |
|--|---|--|---|--|--|
| Option   | Engineering   | Environmental  | Deliverability  | Economic/Consumer Value  | Consenting /Stakeholder  |
| 1 Bay and Grid Park Connection   | <ul style="list-style-type: none"> <li>* There is additional infrastructure, footprint and greater complexity involved than Option D-1.</li> </ul> <p>[REDACTED]</p> <ul style="list-style-type: none"> <li>✓ PASE Variant option as it's an AIS extension.</li> </ul>  | Option D-1 because of the additional Grid Park-related infrastructure.   |   | substation for future rebuild, if needed.  | <ul style="list-style-type: none"> <li>development rights in constructing this extension.</li> <li>* The relocation of MSC equipment requires permission from the local DNO.</li> </ul>                              |
|  | Benefit   | Neutral  | Benefit   | Detractor  | Neutral  |
| Option D-3: AIS extension of existing 400 kV busbar with new SGT6 Bay and Grid Park Connection | <ul style="list-style-type: none"> <li>✓ Option D-3's configuration reduces the amount of western site extension work, shortens the 132 kV cable route from SGT6 to the 132 kV substation, and avoids major OHL modifications.</li> <li>* [REDACTED] which would drive outages; there is also a potential clash with existing HV cables.</li> <li>* Substantial civil works are required for the [REDACTED] and new fire barrier walls will be necessary for [REDACTED] unless a technical deviation is approved.</li> <li>✓ PASE Variant option as it's an AIS extension.</li> </ul> | <ul style="list-style-type: none"> <li>* Due to additional civil works, the environmental / construction footprint is less favourable than Options D-1 and D-2.</li> <li>✓ Lower environmental issues to address than Option D-4 e.g., vegetation clearance and potential tree felling.</li> </ul> | <ul style="list-style-type: none"> <li>* Option D-3 could face delays if there is a delay in the approval for [REDACTED]</li> </ul> | <ul style="list-style-type: none"> <li>* Option D-3 would be more expensive than Option D-1. It is more costly for both parties to install Mobile Passes and a higher rating 132/33kV transformer.</li> <li>✓ Saves space in the north of the substation for future rebuild, if needed.</li> </ul> | <ul style="list-style-type: none"> <li>✓ The proposed works will be within the existing National Grid operational land. We will exercise our permitted development rights in constructing this extension.</li> </ul> |
|  | Detractor   | Neutral  | Neutral   | Detractor  | Benefit  |
| Option D-4: Extension of   | <ul style="list-style-type: none"> <li>✓ The new GIS hall, eastern extension works and most associated plant installation</li> </ul>  | <ul style="list-style-type: none"> <li>* It requires vegetation clearance and potentially tree felling.</li> </ul>   | <ul style="list-style-type: none"> <li>* The hybrid GIS solution requires a larger</li> </ul>                                       | <ul style="list-style-type: none"> <li>* Option D-4 would be the highest-cost shortlisted option.</li> </ul>   | <ul style="list-style-type: none"> <li>✓ The proposed works will be within the</li> </ul>  |

| Optioneering Categories   |  |  |  |  |   |
|---|--|--|--|--|---|
| Option  | Engineering  | Environmental  | Deliverability   | Economic/Consumer Value  | Consenting /Stakeholder   |
| 400 kV Substation towards eastern side by AIS busbar connection with new GIS Substation (Hybrid Option) | <p>can be completed ahead of final integration with the existing substation.</p> <p>* There are [REDACTED]</p> | <p>* Compared with other options, this option has a <b>higher environmental and construction sensitivity</b> due to a relatively larger footprint.</p> | <p>footprint, increasing civil construction needs.</p> | <p>The additional cost is driven by the hybrid GIS solution; longer GIB runs are required to connect the SGTs and there is broader construction scope than other options.</p> <p>✓ Saves space in the north of the substation for future rebuild, if needed.</p> | <p>existing <b>National Grid operational land</b>. We will exercise our permitted development rights in constructing this extension.</p> <p>* This option also overlaps with [REDACTED] rebuild area, which could cause interface issues.</p> |
|   | Neutral  | Detractor  | Detractor  | Strong detractor   | Detractor   |

Based on the qualitative assessment above, our preferred design is Option D-1 because it provides the best overall balance of deliverability, environmental performance and consumer value. It is the most proportionate option to meet the contracted requirements because it can largely be delivered offline, is located within existing operational land, minimises additional footprint and interfaces, and avoids the higher complexity associated with the other shortlisted options.

#### 4.5.1 PASE

Atypical extensions to double busbar AIS substations are listed as a PASE Variant Option in Ofgem's Load Re-opener guidance published on 01 April 2026<sup>4</sup>. Therefore, we treat this investment (AIS extension) as PASE-compliant and therefore eligible for Track 2 EL consideration.

## 4.6 Detailed quantitative analysis of shortlisted options

### 4.6.1 Cost estimates of shortlisted options

To assess the shortlisted options, cost estimates have been created for quantitative economic comparison. All capex costs are derived from NGET's latest Cost Book (23/24 prices). Estimating Units Lines (EULs) have been used to generate cost estimates based on the scope of work and the new assets to be acquired for each option. For each EUL, we have applied a [REDACTED] contingency, based on historic project analysis, to account for unforeseen circumstances and mitigate risks during implementation.

---

<sup>4</sup> <https://www.ofgem.gov.uk/sites/default/files/2026-03/load-re-opener-guidance-and-submission-requirements-document.pdf>

Option D-1 is lower cost than Options D-2 and D-3 because it avoids the additional grid park equipment and associated interface works. It is lower cost than Option D-4 because it avoids a new GIS substation, longer GIB runs and the larger civil footprint required by the hybrid option.

#### 4.6.1.1 Cost drivers

The project's cost estimates are based on current market conditions, with ongoing work to refine requirements. The baseline funding request is supported by high-cost confidence and robust EUL (Estimating Units Lines) assessments.

Using the cost book, the main factors driving the costs for the shortlisted options are:

- Unit costs of SGTs;
- Operational cut and fill works for substation area.

#### 4.6.2 Cost-Benefit Analysis

##### 4.6.2.1 Purpose and Approach

Our Cost Benefit Analysis (CBA) evaluates the economic efficiency and consumer value of the proposed transmission investments. This analysis aligns with Ofgem's Load Re-opener Guidance and Submission Requirements.

The CBA process integrates monetised benefits such as constraint cost savings, system efficiency improvements, and consumer bill impacts, alongside a comprehensive Whole-Life Cost Analysis (WLCA) that captures capital expenditure, operational and maintenance costs, replacement cycles, carbon impacts, and future extendibility. This dual approach ensures a balanced assessment of both short-term economic benefits and long-term cost efficiency, avoiding the risk of asset stranding or future inefficiencies.

Our CBA considers:

- **Robust optioneering and sensitivity testing:** We have evaluated credible alternatives, including 'do nothing' and 'do minimum' scenarios, to confirm that the preferred solution delivers the optimal balance of technical performance, environmental impact, and economic benefit.
- **Quantification of constraint cost reductions:** Using system operator modelling outputs and historical data, we quantify expected savings from reduced system constraints, which translate into direct consumer bill benefits.
- **Assessment of delay impacts:** The financial consequences of potential project delays on constraint costs and consumer bills are modelled through risk-adjusted scenarios, providing a clear understanding of the value of timely delivery.
- **Inclusion of socio-economic benefits:** Where quantification is challenging, qualitative evidence supported by stakeholder engagement and regional development plans highlights the wider economic benefits, including job creation and inward investment.
- **Consideration of non-monetised benefits:** We explicitly identify benefits that are qualitative or not readily monetisable, such as enhanced system operability, resilience, and environmental improvements, ensuring full transparency of the value proposition.
- **Alignment with policy and government targets including Net Zero and AI Growth Zones:** The CBA reflects the influence of national and local policies, including Clean Power 2030, net zero commitments, and economic growth plans demonstrating how the investment supports the broader energy transition.

We have assessed consumer value by comparing the whole-life costs and benefits of five shortlisted connection and substation delivery options using Ofgem's RIIO-ET3 CBA template. The assessment is completed relative to a counterfactual and on a discounted basis over a 50-year appraisal period (2027–2076), consistent with the CBA methodology.

For each option considered, we have quantified:

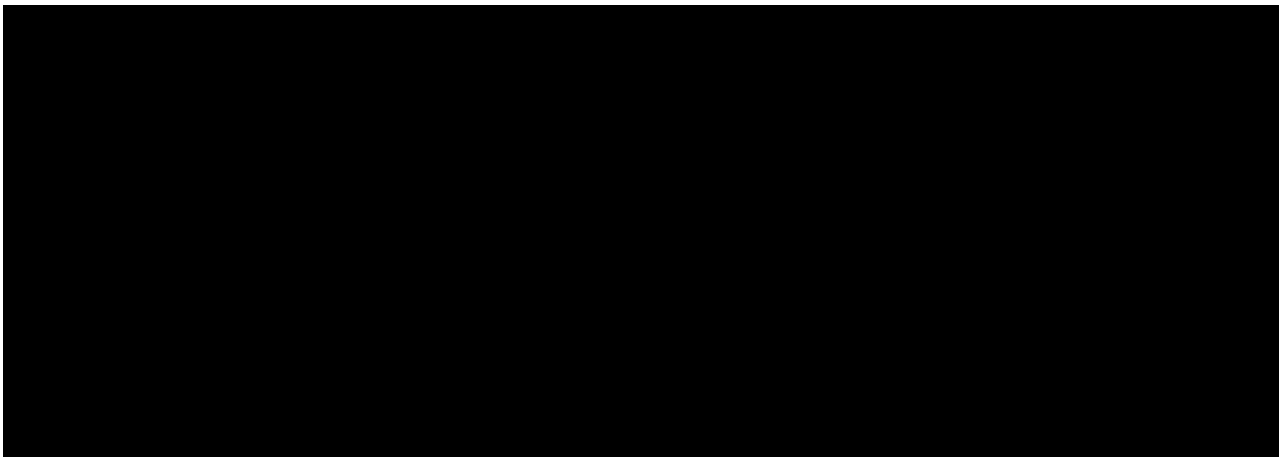
- Initial CAPEX investment required; and
- Future end of life replacement costs

The supporting CBA model quantifies the costs and benefits for this project. Using the Ofgem RIIO-ET3 CBA template spreadsheet, the CBA compares the discounted cost and benefits for consumers for the following four shortlisted options:

- Option D-1: AIS extension of existing 400 kV busbar with new SGT6 Bay, Feeder Bays and tertiary connection;
- Option D-2: AIS extension of existing 400 kV busbar with a new Bus Coupler 1 Bay and Grid Park Connection;
- Option D-3: AIS extension of existing 400 kV busbar with new SGT6 Bay and Grid Park Connection; and
- Option D-4: Extension of 400 kV Substation towards eastern side by AIS busbar connection with new GIS Substation (Hybrid Option).

#### 4.6.2.2 CBA Outcome

Lifetime Cost-Benefit Analysis: The lifetime costs and benefits refer to a 50-year period starting from 2027 until 2076.



On the basis of the discounted lifetime CBA results (Table 9), **Option D-1** delivers the highest NPV (- [REDACTED]) and therefore represents the preferred option on consumer value grounds. Options D-2 and D-3 deliver less preferable NPVs, as they are lower than D-1 [REDACTED]. Option D4 ranks lowest on NPV [REDACTED]. This analysis is subject to confirmation through deliverability, consents/land, outage and risk considerations, and any CBA sensitivities set out in the assumptions below.

#### 4.6.2.3 Assumptions of the CBA analysis

The CBA results are based on the following high-level assumptions (with sensitivities used to test robustness where appropriate):

- Appraisal period of 50 years (2027–2076), with costs and benefits discounted and presented relative to the counterfactual.
- Cost base: 2023/2024 prices, aligned to the Ofgem RIIO-ET3 CBA template inputs (including treatment of replacement CAPEX and maintenance).
- Carbon: central base case carbon price applied for monetising construction carbon, SF6/alternative gas leakage and losses, with scenario testing for alternative carbon price trajectories.
- Benefits scope applied consistently across options; where option-specific benefits exist (e.g. constraints), the basis and evidence are documented and applied consistently.
- Key sensitivities considered (as applicable): timing/phasing, CAPEX uncertainty ranges, delivery/outage risk, and benefit parameter uncertainty (including losses and leakage assumptions).



#### 4.6.2.5 Benefits

The following benefits have been included within the CBA:

- SF6 / Alternative gas leakage reduction
- Carbon cost of construction reduction
- Transmission loss reduction
- Constraint cost reduction
- Summary of all Benefits

Table 11 presents the summary of all (undiscounted) benefits, including environmental and non-environmental benefits, considering the central base case carbon price.



## 4.7 Preferred solution

Based on both qualitative and quantitative analysis of our shortlisted options, the preferred option is Option D-1: extension of the existing 400 kV busbar with a tertiary connection. We prefer this option

because it meets the contracted requirement by minimising cost to consumers, outage dependency, land take, environmental impact and delivery complexity. Option D-1 also has the largest NPV.

The preferred solution enables the efficient connection of all identified customers while utilising existing National Grid-owned land surrounding the Bolney 400 kV substation for required extensions. This approach minimises land acquisition and consenting risk while supporting timely delivery.



#### 4.7.1 Project benefits, outputs & deliverables

The preferred investment at Bolney will deliver key outputs for consumers and the wider network. It will provide the physical capacity and interfaces required to connect contracted customers, improve operability at a strategically important node, and preserve flexibility for future development at the site. Table 12 summarises the principal outputs and benefits of the preferred option.

**Table 12: Summary of outputs and benefits**

|                                  |   |
|----------------------------------|---|
| <b>Output &amp; Proposed PCD</b> | Deliver multiple new connections at Bolney 400 kV, including [REDACTED], offshore wind [REDACTED] and battery storage, by extending the 400 kV Busbar on the west and east side, and providing a tertiary connection.   |
|                                  | <ul style="list-style-type: none"> <li>• <b>Increase connection capacity and operability:</b> Provides multiple new connection at Bolney 400 kV through the required extension of busbars and new SGTs, raising the substation’s capacity to accept and dispatch new power flows and demand, and directly supporting transfer capability through the node.</li> <li>• <b>Strengthen operational resilience:</b> Increases switching options [REDACTED] enhancing resilience to equipment outages. Reduces the risk of faults, outages, and constraints, especially as demand patterns change and more low carbon technologies are connected to the system.</li> <li>• <b>Enable decarbonisation outcomes:</b> Facilitates timely connection of renewables and storage, supporting lower curtailment and balancing the system locally, reducing system carbon intensity and enabling efficient use of low-carbon generation</li> <li>• <b>Potential environmental risk reduction:</b> Option to use synthetic ester oil for new transformers and explore lower GWP gases longer-term reduces environmental risk vs. mineral oil/SF<sub>6</sub> legacy configurations.</li> <li>• <b>Minimise local impacts:</b> Minimise visual and local environmental impact by combining the scope into a single, small site extension.</li> <li>• <b>Support net zero and local opportunity:</b> Facilitate future customer connections in the Southeast, enabling progress to net zero and local economic opportunities.</li> <li>• <b>Generates ongoing jobs</b> post-construction through customer assets such as solar farms, battery sites etc.</li> <li>• <b>Reduce land and programme risk:</b> Use National Grid owned land for east/west extensions, reducing land acquisition risk.</li> <li>• <b>Mitigate constructability risk:</b> Relocate only selected site services [REDACTED] rather than wholesale rearrangements.</li> </ul> |

#### 4.7.2 Futureproofing

The existing Bolney 400 kV substation is being extended to its practical maximum capacity within the current site configuration. Further extension to the east or west is constrained by environmental considerations and the proximity of residential properties.

While land remains to the north of the existing site, this is not currently intended for a further extension of the current substation layout. However, it maintains optionality for a potential future rebuild, should this be required as part of a wider site strategy.

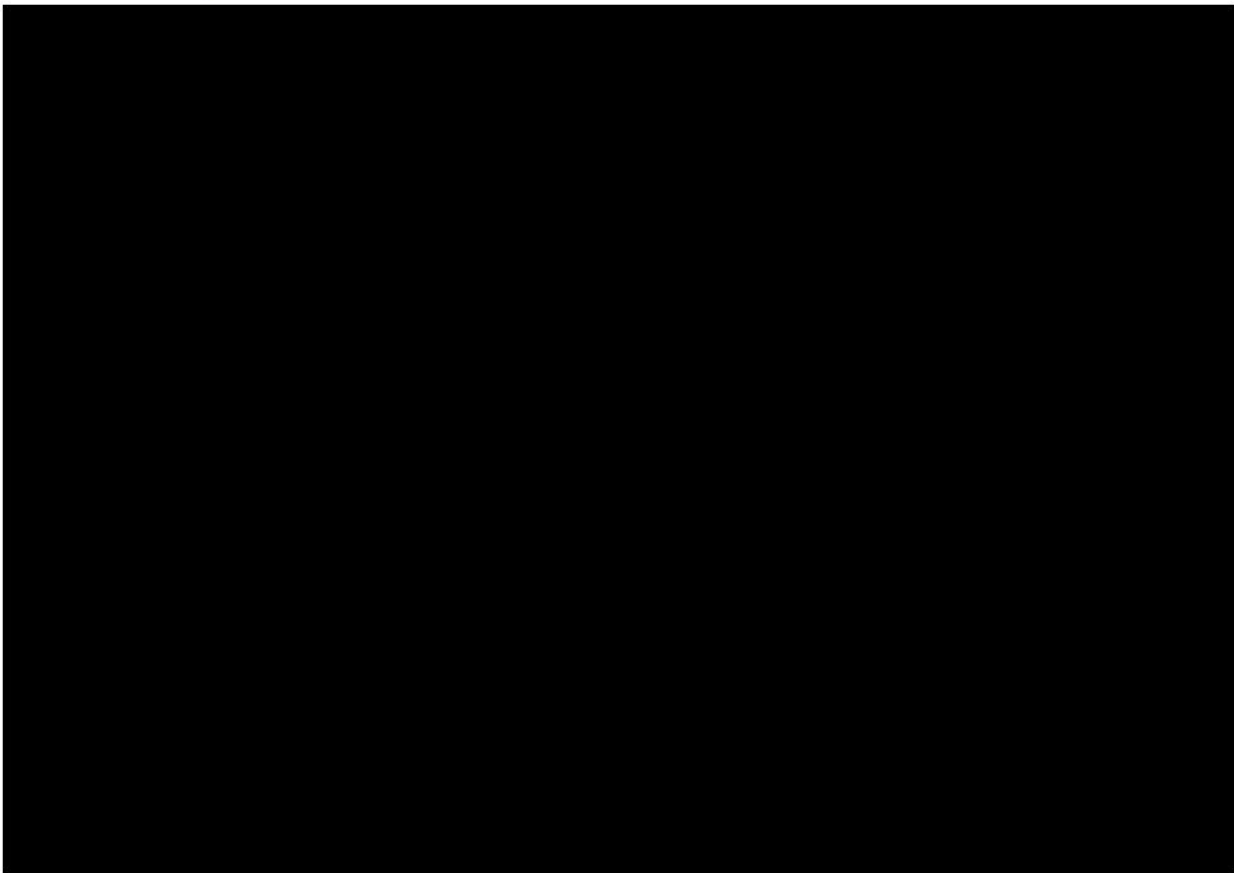
As stated in Section 2.2.2, the investment at Bolney is part of our wider Southeast strategy to address regional demand that includes our plans to expand Little Horsted, rebuild Fawley and develop cable replacements to strengthen network resilience and increase capacity in the Solent area.

# 5. Project Delivery

## 5.1 Proposed deliverability programme

The proposed programme of works is outlined in the following table.

ACL dates vary from [redacted] to [redacted] for each customer, as stated in Section 3.1. Table 13 below shows the key milestones and associated dates

A large rectangular area of the page is completely redacted with a solid black fill, obscuring the content of Table 13 mentioned in the text above.

## 5.2 Procurement & contracting strategy

A table area under section 5.2 is redacted with a solid black fill, obscuring the procurement and contracting strategy details.

### 5.3 Risk & risk management

Following are the associated risks involved with this investment:

**Table 14: Risk Summary Table**

| Risk   | Mitigation Measure  |
|--|---|
| <b>Design development &amp; programme:</b><br>Potential delays in completing detailed design work, which may impact procurement and construction sequencing.                   | Early design freeze, prioritisation of critical-path packages, and strong design coordination and change control.                                   |
| <b>Planning consents:</b> Risk of the Local Authority refusing Permitted Development rights, potentially requiring a full planning process and extending timescales.           | Early engagement with the Local Planning Authority, maximising use of permitted development within existing boundaries.                             |
| <b>Procurement &amp; supply chain:</b> Long manufacturing lead times for SGTs and wider supply-chain constraints may delay transformer delivery.                               | Advance procurement or slot reservation for long-lead items.  |
| <b>System access &amp; outages:</b> Limited access to required outages on the existing network may prevent works from being delivered to the planned schedule.                 | Early coordination with System Operations, maximising offline construction, and sequencing works to minimise outage dependency.                     |
| <b>Third party dependency:</b><br>- Delays in Rampion or BEGA achieving their FID milestones could disrupt coordination and interface activities.                              | Maintaining close interface management.   |
| <b>Third party dependency:</b> Possible delays in the design and procurement of the 132 kV GIS bay for the new UKPN substation, affecting integration and programme alignment. | Early technical and programme alignment with UKPN, clear interface ownership, and inclusion of dependencies within the integrated master programme. |

## 6. Proposed working arrangements

### 6.1 Details of proposed working arrangements between TOs

There are no current working arrangements with TO's as there have been no drivers from TO's for additional capacity.

### 6.2 Details of proposed working arrangements between DNOs

As described in Section 4.3.1, we have engaged with [REDACTED] throughout the optioneering process and further engagement is required as part of the enabling works for the 400 kV Bolney Substation development. The primary interaction involves coordinating the diversion and relocation of the 132 kV assets situated within the footprint of the extended 400 kV busbar on the west side of the site. Close collaboration with [REDACTED] will ensure these assets are safely relocated, enabling construction to progress without impacting local distribution customers. In addition, there is a requirement to replace the existing 132 kV OHL section [REDACTED] to [REDACTED] substation with [REDACTED]  
[REDACTED]

## 7. Conclusion

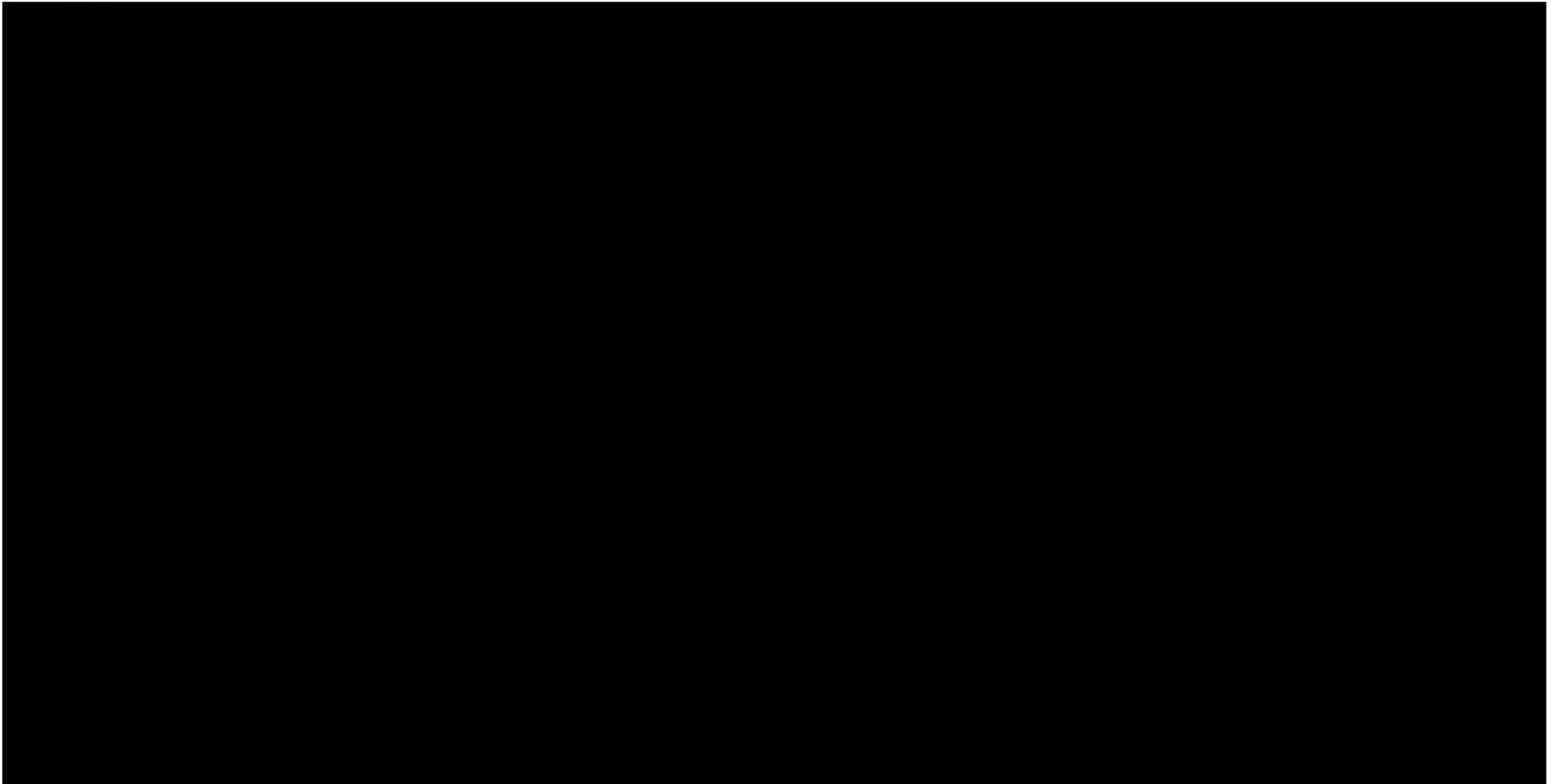
This submission outlines a preferred solution to satisfy the investment drivers. It seeks confirmation of eligibility under Special Condition 3.18, confirmation of eligibility for PCF under Special Condition 3.15, confirmation of re-opener Track 2 EL and formal approval of the preferred option .

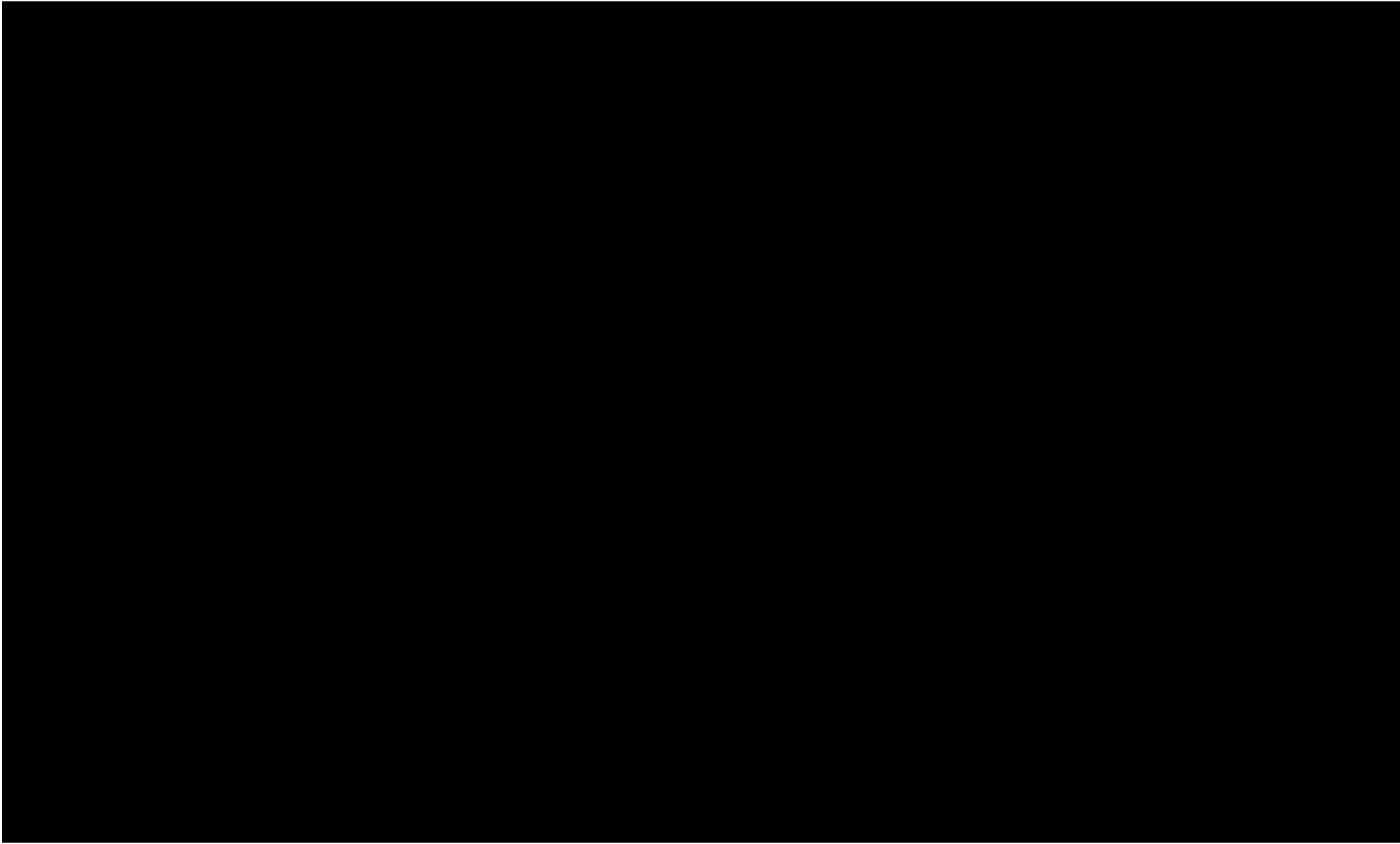
The preferred option D-1 involves extending the 400 kV busbar eastwards to create a new line bay and extending the 400 kV busbar westwards [REDACTED]

**Table 15: Investment Summary**

|                                    |  |
|------------------------------------|--|
| <b>Main Drivers</b>                | Load – Connection of multiple contracted CP-2030 aligned generation and BESS customers.  |
| <b>Preferred Options</b>           | <b>Option D-1</b> – AIS extension of the existing 400 kV busbar with new SGT6 bay, feeder bays and tertiary connection.  |
| <b>Estimated Cost &amp; Timing</b> | <p><b>Total forecasted expenditure:</b> [REDACTED]</p> <p><b>Indicative delivery timeline:</b></p> <ul style="list-style-type: none"> <li>• Early enabling works: from [REDACTED]</li> <li>• Forecast completion: [REDACTED]</li> </ul>  |
| <b>Outputs</b>                     | <p>Delivery of multiple new connections at Bolney 400 kV, including [REDACTED], offshore wind ([REDACTED]), and battery storage, by extending the 400 kV Busbar on the west and east side, and providing a tertiary connection.</p> <p>Improved system operability, resilience, and flexibility.</p> <p>Facilitating future customer connections in the Southeast, enabling progress to net zero and local economic opportunities.</p> |

# Appendices









## Appendix B – Summary of further rejected options

Other than the five main options (Options D-1 to D-4 and E-1), several sub-options were evaluated for their ability to meet the investment drivers. In summary, these options were as follows:

- Option D-3A: Line Bay to east, Bus coupler 1 to west, 1 SGT bay in place of BC1, 1 SGT bay Tee with SGT3, 1 Grid Park SGT Tee with SGT1, relocating MSC 4 in 132 kV Yard adjacent to Grid T2A
  - This option was rejected because it required outages for the relocation and construction of existing bus coupler bay with proposed [REDACTED]. There would also be potential clash with HV cable at west of the substation due to extension of proposed bus coupler bay, and the option also required removal and installation of down droppers on [REDACTED]. In addition, there was restricted transformer delivery access to [REDACTED].
- Option D-3B: Line Bay to east, Bus coupler 1 to west, 1 SGT bay in place of BC1, 1 SGT bay Tee with SGT3, 1 Grid Park SGT Tee with SGT1, relocating MSC 4 in 132 kV yard in place of 132 kV auxiliary plant building
  - This option was rejected for the same reasons as Option D-3A. [REDACTED]
- Option D-3C: Line Bay to east, Bus coupler 1 to west, 1 SGT bay in place of BC1, 1 SGT bay Tee with SGT3, 1 Grid Park SGT Tee with SGT1, relocating MSC 4 at area in front of car park and main office
  - This option was rejected for the same reasons as Option D-3A and 3B. [REDACTED]
- Option D-3D: Line Bay to east, Bus coupler 1 to west, 1 SGT bay in place of BC1, 1 SGT bay Tee with SGT3, 1 Tertiary connection with SGT 3 and 1 Tertiary connection with SGT5
  - This option was rejected for similar reasons as Options 3A, 3B and 3C. [REDACTED]
- Option D-3E: Line Bay to east, Bus coupler 1 to west, 1 SGT bay in place of BC1, 1 SGT bay Tee with SGT3, 1 Tertiary connection with SGT 5 and 1 Tertiary connection with SGT 4 placed near 132 kV Auxiliary building
  - This option was rejected to similar reasons as mentioned for Option D-3A.
- Option D-3F: Line Bay to east, Bus coupler 1 to west, 1 SGT bay in place of BC1, 1 SGT bay Tee with SGT3, 1 Tertiary connection with SGT 5 and 1 Tertiary connection with SGT 4 placed at area in front of Car park and Main Office
  - This option was rejected to similar reasons as mentioned for Option D-3A.

- Option D-3G: Line Bay to east, Bus coupler 1 to west, 1 SGT bay in place of BC1, 1 SGT bay Tee with SGT3, 1 Tertiary connection with SGT 5 and 1 Tertiary connection with SGT 4 placed at north side of substation
  - This option was rejected to similar reasons as mentioned for Option D-3A.
- Option D-4A: GIS Substation extension at east side of Substation (Horizontally), 1 Tertiary connection with SGT 3 and 1 Tertiary connection with SGT 5
  - This option was rejected because it required a larger footprint for the site extension, infringement of the proposed area with rebuild area allocated for UKPN. In addition, the cost of SF<sub>6</sub> free switchgear would be higher as compared to AIS equipment [REDACTED]
- Option D-4B: GIS Substation extension at east side of Substation (Vertically), 1 Tertiary connection with SGT 3 and 1 Tertiary connection with SGT 5
  - This option was rejected because it required a larger footprint for site extension to the east of the substation. In addition, the positioning of 400 kV GIS would make future expansion for GIS unfeasible. Like Option D-4A, this option would also face higher costs due to SF<sub>6</sub> free switchgear, infringement challenges [REDACTED]
- Option E-1A: New Offline GIS Substation to north of the substation
  - This option was rejected because the cost of a new GIS substation would be high and the existing 400 kV transmission line towers would require relocation, resulting in major OHL works. This option would also necessitate relocating the existing 400 kV transmission line towers, leading to major overhead line works and requiring short-term OHL outages during construction. Longer cable routes would be needed to connect the new substation to the existing transformers and the 132 kV network, increasing both cost and complexity. Temporary structures may be required to minimise outages, introducing additional risks associated with working near live conductors. [REDACTED]
- Option E-2B: New Offline AIS Substation to north of the substation
  - This option was rejected because the cost of a new AIS substation would be high as compared to other options and the larger footprint of new AIS means that it would not fit into available land. In addition to this, like Option E-1A, this option would also necessitate relocating the existing 400 kV transmission line towers, leading to major overhead line works and requiring short-term OHL outages during construction. Longer cable routes would be needed to connect the new substation to the existing transformers and the 132 kV network, increasing both cost and complexity. Temporary structures may be required to minimise outages, introducing additional risks associated with working near live conductors. Although the current AIS could be fully dismantled and the land repurposed, adequate line clearance would still need to be maintained around the new GIS facility.

## Appendix C – Glossary

Table 17: Glossary

| Abbreviation | Description                                 |
|--------------|---|
| ACL          | Available For Commercial Load               |
| ACSR         | Aluminium Core Steel Reinforced             |
| AIS          | Air Insulated Switchgear                    |
| APM          | Advanced Procurement Mechanism              |
| BESS         | Battery Energy Storage System               |
| BP           | Business Plan                               |
| BPDT         | Business Plan Data Template                 |
| CAI          | Closely Associated Indirect                 |
| CBA          | Cost Benefit Analysis                       |
| CPO          | Compulsory Purchase Order                   |
| CSNP         | Centralised Strategic Network Plan          |
| DC           | Direct Current                              |
| DCO          | Development Consent Order                   |
| DC TC        | Direct Current Time Constraint              |
| DESNZ        | Department for Energy Security and Net Zero |
| DISC         | Disconnecter                                |
| DLR          | Docklands Light Railway                     |
| DNO          | Distribution Network Operator               |
| ECC          | Estimated Cost of Construction              |
| EEW          | Early Enabling Works                        |
| EJP          | Engineering Justification Paper             |
| EoL          | End-Of-Life                                 |
| ESO          | Energy System Operator                      |
| ET           | Electricity Transmission                    |
| EU           | European Union                              |
| EUL          | Estimating Units Lines                      |
| ESW          | Earth Switch                                |
| FEED         | Front End Engineering Design                |
| FES          | Future Energy Scenarios                     |
| FY           | Financial Year                              |
| G3           | Green Gas for Grid                          |

| Abbreviation | Description                               |
|--------------|---|
| GEC          | General Electric Company                  |
| GIB          | Gas Insulated Busbar                      |
| GIS          | Gas Insulated Switchgear                  |
| GLA          | Greater London Authority                  |
| GW           | Giga Watt                                 |
| HDD          | Horizontal Directional Drilling           |
| HV           | High Voltage                              |
| HWUP         | Hackney Waltham Cross Upgrading           |
| IEC          | International Electrotechnical Commission |
| kW           | Kilo Watt                                 |
| LLTI         | Long Lead Time Items                      |
| LTDS         | Long-Term Development Statement           |
| LV           | Low Voltage                               |
| LVAC         | Low Voltage Ac                            |
| M&E          | Mechanical And Electrical                 |
| MIT          | Main Interconnected Transmission Systems  |
| MSIP         | Medium Sized Investment Project           |
| MVA          | Megavolt-Amperes                          |
| MW           | Mega Watt                                 |
| NESO         | National Energy System Operator           |
| NETS         | National Electricity Transmission System  |
| NG           | National Grid                             |
| NGED         | National Grid Electricity Distribution    |
| NGET         | National Grid Electricity Transmission    |
| NOA          | Network Options Assessment                |
| NOMs         | Network Output Measures                   |
| NPV          | Net Present Value                         |
| OHL          | Overhead Line                             |
| ORPS         | Obligatory Reactive Power Service         |
| PCD          | Price Control Deliverables                |
| PCF          | Pre-Construction Funding                  |
| SF6          | Sulfur Hexafluoride                       |
| SGT          | Super Grid Transformer                    |

| <b>Abbreviation</b>     | <b>Description</b>                              |
|-------------------------|---|
| <b>SLD</b>              | Single Line Diagram                             |
| <b>SPV</b>              | Special Purpose Vehicle                         |
| <b>SSMD</b>             | Sector Specific Methodology Document            |
| <b>SSSI</b>             | Site of Special Scientific Interest             |
| <b>STC</b>              | System Operator Transmission Owner Code         |
| <b>SuDS</b>             | Sustainable Drainage Solutions                  |
| <b>TBC</b>              | To Be Confirmed                                 |
| <b>tCO<sub>2</sub>e</b> | Tonnes of Carbon Dioxide Equivalent             |
| <b>TCPA</b>             | Town And Country Planning Association           |
| <b>TCSNP</b>            | Transitional Centralised Strategic Network Plan |
| <b>TWB</b>              | Through-Wall Bushing                            |
| <b>UK</b>               | United Kingdom                                  |
| <b>UKPN</b>             | UK Power Networks                               |
| <b>UKPN EPN</b>         | Eastern Power Networks                          |
| <b>UKPN LPN</b>         | London Power Networks                           |
| <b>UKPNS</b>            | UK Power Networks Services                      |
| <b>UXO</b>              | Unexploded Ordnance                             |
| <b>VCA</b>              | Voltage Compliance Assessment                   |
| <b>XPLE</b>             | Cross-Linked Polythene                          |

National Grid plc  
National Grid House,  
Warwick Technology Park,  
Gallows Hill, Warwick.  
CV34 6DA United Kingdom

Registered in England and Wales  
No. 4031152  
[nationalgrid.com](http://nationalgrid.com)