RIIO-T3

Lower Frankton 400kV AIS Substation

Track 3 Needs Case Submission

October 2026

Needs Case Summary

Electricity Transmission

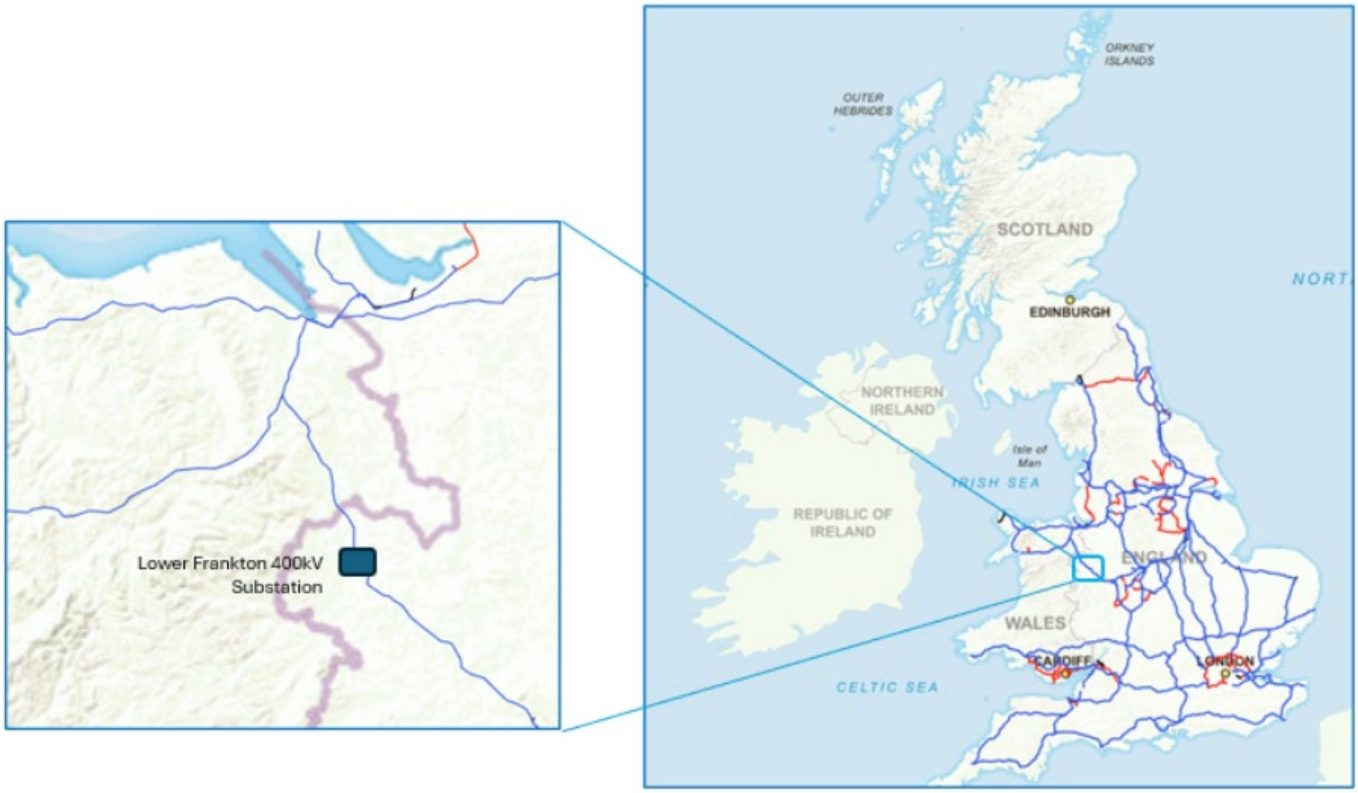
nationalgrid

1. Background

Lower Frankton is a new 400/132kV substation project in Shropshire. It will deliver an Air-Insulated Switchgear substation. The connected independent distribution network operator (IDNO) will construct and own the 132kV substation.

The site is positioned on the existing transmission corridor between Legacy, Ironbridge and Shrewsbury. It will provide a new connection point for the contracted IDNO and support potential future North–South Wales reinforcement and power-flow control requirements. The coordinated design reduces the likelihood of piecemeal reinforcement and repeated construction.

Figure 1: Proposed location of investment on our network



This Needs Case is submitted under the RIIO-ET3 Load Re-opener mechanism in Special Condition 3.18. It seeks Ofgem approval of the investment need, the optioneering undertaken and the preferred solution. If approved, National Grid Electricity Transmission will continue development and submit a Project Assessment.

2. Investment Drivers

The primary driver is the connection of the 132kV IDNO substation and associated Gate 2 Phase 2 onshore wind projects, with a combined Transmission Entry Capacity of 693MW. Lower Frankton is also driven by wider strategic network drivers including the NESO-signaled strategic North-South Wales reinforcement works and power flow management.

There is no asset-health driver. The project only modifies a limited number of existing overhead-line towers to facilitate the turn-in.

3. Options

We undertook a structured, multi-factor optioneering process to identify a proportionate and deliverable solution in the interests of consumers. We assessed do-nothing, market-based, non-transmission, existing substation and new-build options. Options that could not provide a compliant physical connection, lacked sufficient space or would require substantial reinforcement were discounted. Option E-1 was also discounted because it would meet the contracted customer connection only and would require later expansion to accommodate identified strategic requirements.

From the longlist, Options E-2 and E-3 were therefore shortlisted for detailed qualitative and quantitative assessment.

Table 1: Summary of longlist options assessment

Option	Details	Shortlist?	Preferred?
A	Do nothing counterfactual	No – does not deliver the required connections	
B	Market-based solution	No – does not provide the required physical infrastructure	
C	Non-transmission, whole-system solution	No – does not provide a transmission connection	
D-1	Extend Legacy substation	No – insufficient space and significant reinforcement required	
D-2	Extend Ironbridge substation	No – insufficient space and significant reinforcement required	
D-3	Extend Shrewsbury substation	No – would require substantial new transmission infrastructure	
E-1	New 400kV AIS substation	No – limited to the immediate customer connection and later expansion	
E-2	New 400kV AIS substation	✓	
E-3	New 400kV AIS substation	✓	✓

4. Qualitative Trade-offs Between the Shortlisted Options

The table below sets out how the two shortlisted options compare against the balanced scorecard criteria used in our qualitative assessment.

Table 2: Qualitative trade-offs between the shortlisted options

Criteria	Option E-2	Option E-3
Engineering	**Neutral**. Meets current contracted customers and identified strategic requirements, but only two spare bays for future generation customers remain after allowing for the anticipated North-South Wales reinforcement connections.	**Benefit**. Meets the same requirements and retains further bays for future generation, reducing the likelihood of later extension.
Environmental	**Neutral**. Smaller initial footprint, but any later extension would create additional consenting, construction and environmental impacts.	**Benefit**. Slightly larger initial land take, but mainly on lower-value agricultural land and reduces whole-life impacts by avoiding repeat site clearance, mobilisation and construction.
Deliverability	**Neutral**. Slightly smaller initial scope, but future expansion would depend on later funding, contractors, equipment and suitable outages.	**Benefit**. Larger upfront scope, but delivers capacity in one programme and reduces future delivery, mobilisation and outage risk.
Economic / consumer value	**Neutral**. Lower initial cost and more favourable base-case economic scenario, but a later extension would increase whole-life cost.	**Benefit**. Costs more initially, but avoids potential future extension and provides the stronger long-term consumer outcome if future strategic network requirements materialise.
Consenting / stakeholder	**Neutral**. Smaller initial footprint, but later expansion could repeat planning activity and local construction disruption.	**Neutral**. Larger initial footprint may attract more concern, but avoids repeat construction and associated future community disruption.

5. Quantitative Trade-offs Between the Shortlisted Options

The table below expresses the shortlisted options relative to Option E-3, which is set to 1.00. The estimates reflect our view at the time of optioneering and allow a like-for-like comparison. To protect the competitive tender process and consumer value, only cost ratios are presented.

The base case does not assume an extension to Option E-2. An illustrative future scenario shows the position if three additional bays are later required.

Table 3: Quantitative trade-offs between the shortlisted options

Measure	E-2	E-3	Illustrative E-2a: E-2 + extension
Initial capital cost, including risk and contingency	0.99	1	1.03
Present value of lifetime costs	0.99	1	1.02
Net present value (NPV), cost*	0.98	1	1.02
Undiscounted construction carbon, gas leakage and transformer losses costs	0.96	1	0.98
Assumed asset life	40 years	40 years	40 years

**Lower is better*

Option E-2 has the lowest initial cost and the most favourable base-case NPV, at around 1% and 2% below Option E-3 respectively. However, if future strategic network requirements materialise, E-2 would require a later extension. The illustrative extended option is around 3% more expensive upfront and 2% more expensive on a whole-life and NPV basis than Option E-3. Option E-3 therefore avoids later construction, outage, consenting and mobilisation activity for a relatively small increase over E-2's initial cost.

6. Preferred Solution

Based on the qualitative and quantitative assessment, Option E-3 is the preferred option because:

- **Consumer value.** It provides the lower whole-life cost if future strategic network reinforcement drivers materialise, as it provides sufficient upfront capacity within the initial build and avoids the costs associated with repeat mobilisation.
- **Deliverability.** It delivers the required capacity in one construction programme and reduces reliance on future funding, contractor availability, equipment procurement and transmission outages.
- **Future flexibility.** It accommodates the contracted customer connections and the anticipated wider strategic network drivers within the initial build.
- **Environmental & stakeholder considerations.** Although the initial footprint is slightly larger than E-2, the additional land is expected to be lower-value agricultural land and the option avoids the environmental and community impacts associated with a later site expansion.
- **Strategic benefits.** It establishes Lower Frankton as a coordinated connection node for contracted generation, future North–South Wales reinforcement and regional power-flow management.

Option E-3 therefore represents the least-regret, build-once solution. It meets the confirmed customer-driven need while providing proportionate flexibility for credible future network requirements and aligns with the principles of adaptable, enduring network design.