

YG-DCO-031

# Yorkshire Green Energy Enablement (GREEN) Project

**Volume 5**

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**nationalgrid**



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# Contents

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<b>2.</b>	<b>Project Need and Alternatives</b>	<b>1</b>
2.1	Introduction	1
2.2	Legislative and policy background	1
	The EIA Regulations	1
	National Policy	2
	Holford Rules	3
	National Grids Statutory Obligations	3
2.3	Project development process	4
	Strategic proposal	4
	Options identification and selection	5
	Defined proposal and statutory consultation	5
	Assessment and land rights	6
	Application, examination and decision	6
	Construction	6
2.4	Need for the Project	6
	Do nothing scenario	8
	Main Alternatives	8
2.5	Strategic proposal	8
	Identification of longlist of Strategic Options	9
	Identification of shortlist of Strategic Options	9
	Appraisal and Selection of the 2019 Strategic Proposal	10
	Strategic Proposal Back Check and Review (2020)	13
2.6	Options identification and selection	16
	Introduction	16
	Overview of approach	17
	York North Options Appraisal	18
	Tadcaster Area options appraisal	20
	Monk Fryston Area	22
	Non statutory consultation	24
2.7	Defined proposal and statutory consultation	24
	Design development: Change control process	24
	Overview of non statutory consultation feedback	25
	Design changes in response to non statutory consultation feedback	26
	Assessment of identified design refinements	28
	Statutory consultation	30
2.8	Assessment and land rights	30
	Overview of statutory consultation feedback	30
	Design changes in responses to statutory consultation feedback	31
	Design refinement and development	37

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Figure 2.1 - 2019 Strategic Options connecting to Poppleton Substation or the Poppleton to Monk Fryston overhead line	11
Figure 2.2 - 2019 Strategic Proposal	13

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# 2. Project Need and Alternatives

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## 2. Project Need and Alternatives

### 2.1 Introduction

- 2.1.1 This chapter describes the need for and design evolution of the Yorkshire Green Energy Enablement (GREEN) Project (referred to as Yorkshire GREEN or the Project throughout this ES), documenting the main alternatives considered, their assessment and how consultation has shaped the Project.
- 2.1.2 The information presented in this chapter summarises a number of earlier supporting studies that reported on the need for new infrastructure, strategic options that could feasibly meet the Project need, different route corridors that have been considered, and the preferred route for connection. This chapter provides details of the work undertaken during the development of the Project. However, it does not seek to provide a full chronological summary of the various assessments and work that has been undertaken over a number of years.
- 2.1.3 Further detailed information relating to the development of the Project and its alternatives can be found in the following documents, which are submitted as part of the Development Consent Order (DCO) application (within **Volume 7**):
- National Grid Electricity Transmission plc (National Grid), (2022), Project Need Case, **Volume 7, Document 7.4**;
  - National Grid (2019). Yorkshire GREEN project: Strategic Proposal 2019, **Volume 7, Document 7.5**;
  - National Grid (2020). Yorkshire GREEN Project: Strategic Proposal Back Check and Review 2020, **Volume 7, Document 7.6**;
  - National Grid (2021). Yorkshire GREEN Project: Strategic Proposal Addendum 2021, **Volume 7, Document 7.7**; and
  - National Grid (2021). Corridor and Preliminary Routing and Siting Study, **Volume 7, Document 7.8**.

### 2.2 Legislative and policy background

- 2.2.1 There is both a legal and policy need to report the main alternatives considered during the development of a Nationally Significant Infrastructure Project (NSIP).

#### The EIA Regulations

- 2.2.2 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) (EIA Regulations) set out a procedure for assessing, consulting and informing decision-making for projects that are likely to have significant environmental effects.

- 2.2.3 Regulation 14(2)(d) of the EIA Regulations requires<sup>1</sup> that an Environmental Statement (ES) should include at least, “a description of the reasonable alternatives studied by the applicant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment”. Part 2 of Schedule 4 also requires that an ES includes “A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.”

## National Policy

- 2.2.4 Paragraph 4.4.2 of the National Policy Statement (NPS) for Energy (EN-1)<sup>2</sup> states that “applicants are obliged to include in their ES, as a matter of fact, information about the main alternatives they have studied. This should include an indication of the main reasons for the applicant’s choice, taking into account the environmental, social and economic effects and including, where relevant, technical and commercial feasibility”.
- 2.2.5 The NPS for Electricity Networks Infrastructure (EN-5)<sup>3</sup> confirms the principle of overhead lines is acceptable and their effects can often be mitigated. Where there is potential for adverse landscape and visual effects, the Planning Inspectorate “will have to balance these against other relevant factors, including the need for the proposed infrastructure, the availability and cost of alternative sites and routes and methods of installation (including undergrounding)” (paragraph 2.8.8). Consent for overhead lines should only be refused in favour of an underground or sub-sea line if the Planning Inspectorate is “satisfied that the benefits from the non-overhead line alternative will clearly outweigh any extra economic, social and environmental impacts and the technical difficulties are surmountable” (paragraph 2.8.9).

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<sup>1</sup> The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, SI 2017:572. (Online) Available at:

<https://www.legislation.gov.uk/ukxi/2017/572/regulation/31/made> (Accessed 14 October 2021)

<sup>2</sup> Department of Energy and Climate Change (2011). Overarching National Policy Statement for Energy (EN-1). (Online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/47854/1938-overarching-nps-for-energy-en1.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf) (Accessed 17 August 2022)

<sup>3</sup> Department of Energy and Climate Change (2011). National Policy Statement for Electricity Networks Infrastructure (EN-5). (Online) Available at:

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/47858/1942-national-policy-statement-electricity-networks.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47858/1942-national-policy-statement-electricity-networks.pdf) (Accessed 17 August 2022)

- 2.2.6 In September 2021, the Department of Business, Energy and Industrial Strategy (BEIS) consulted upon a review of the energy NPSs with consultation closing on 29 November 2021. The energy NPS were reviewed to reflect the policies and broader strategic approach set out in the Energy White Paper, and ensure a planning framework was in place to support the infrastructure requirement for the transition to net zero. There are limited substantive changes with regards to the consideration of alternatives within those draft energy NPSs which are considered to be relevant to the Project<sup>4</sup>. However Paragraph 2.14.2 of draft NPS EN-5 outlines that applicants should avoid the use of Sulphur hexafluoride (SF<sub>6</sub>) in new developments and, under paragraph 2.14.4, where this is not feasible evidence must be provided as to why, such as “*an explanation of the alternatives considered, and a case why these alternatives are technically infeasible or require bespoke components that are grossly disproportionate in terms of cost. In particular, an accounting of the cost differential between the SF<sub>6</sub>-reliant asset and the appropriate SF<sub>6</sub>-free alternative should be provided.*”
- 2.2.7 Notwithstanding the draft NPS EN-5 policy on SF<sub>6</sub> and National Grid’s commitment to not introduce new SF<sub>6</sub> equipment onto the system by 2024-25, Yorkshire GREEN does include SF<sub>6</sub> equipment within its design within the nine 275kV / 400kV circuit breakers. Currently there are no alternative non- SF<sub>6</sub> circuit breakers under development by manufacturers which would be ready for installation in time to meet the Yorkshire GREEN programme requirements.
- 2.2.8 Therefore, the Yorkshire GREEN technical design shall continue to incorporate pre-existing SF<sub>6</sub> equipment. However, it is prudent to note that if National Grid’s supply chain can provide a feasible non-SF<sub>6</sub> alternative within their tender proposals, which could be designed, tested and installed in sufficient time to meet the 2027 in service date, this technology would be the preferred technical solution in line with National Grid’s corporate commitment and this could be accommodated within the design of the substations proposed as part of this Application.

## Holford Rules

- 2.2.9 Paragraph 2.8.7 of EN-5 outlines that the Planning Inspectorate should take into account the Holford Rules in the consideration of any alternatives. **Section 6** of the Planning Statement (**Volume 7, Document 7.1**) sets out how the Holford Rules have been applied by National Grid to the design development of the Project. Holford Rules 1, 2, 3 and 7 have been particularly relevant in the selection of route corridor and connection options for the Project. Holford Rules 4, 5 and 6 have been relevant in the consideration of possible landscape and visual effects that may arise from using particular pylon types.

## National Grids Statutory Obligations

- 2.2.10 National Grid’s statutory obligations are set out in the Electricity Act 1989 (the Electricity Act) and in the terms of its Transmission Licence (regulated by Ofgem). Under the Electricity Act, National Grid Electricity System Operator (NGESO) and National Grid

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<sup>4</sup> Refer to paragraph 4.2.12 of Draft NPS EN-1: September 2021, Department for Business, Energy & Industrial Strategy, Draft Overarching National Policy Statement for Energy (EN-1) (access 17/08/22) and paragraph 2.11.14 of Draft MPS EN-5; September 2021, Department for Business, Energy & Industrial Strategy, (2021) Draft National Policy Statement for Electricity Networks Infrastructure (EN5) (Online) Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1015238/en-5-draft-for-consultation.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015238/en-5-draft-for-consultation.pdf) (Accessed: 17 August 2022)

must develop transmission network proposals in an efficient, coordinated and economical way, whilst having regard to the desirability of preserving amenity. This means that, when National Grid considers options to deliver additional network capability, it must balance the need to develop the network in a way that is efficient, coordinated and economical and minimises impact on people and places.

- 2.2.11 National Grid is also required, under Section 38 of the Electricity Act, to comply with the provisions of Schedule 9 of the Act. Schedule 9 requires licence holders, in the formulation of proposals to transmit electricity, to preserve amenity by Schedule 9(1)(a) ‘...have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest;’ and by Schedule 9(1)(b) ‘...do what [it] reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects’.
- 2.2.12 This is discussed further in **Chapter 5 - Legislative and Policy Overview, Volume 5, Document 5.2.5.**

### *National Grid Approach*

- 2.2.13 National Grid propose to build new transmission infrastructure where existing infrastructure cannot accommodate the customer or capacity needs economically and efficiently. Where there is no viable existing upgrade option, National Grid identify solutions and options that seek to achieve the most appropriate integration of its statutory, licence duties and obligations.
- 2.2.14 National Grid’s Our Approach to Consenting (**Appendix 5.3.2A, Volume 5, Document 5.3.2A,**) sets out how, in principle, National Grid identifies the most appropriate location and technology for any new transmission infrastructure. It provides a framework to identify and balance technical, socio-economic, environmental and cost considerations in selecting project options while taking into account feedback received, ensuring that the decision-making process is documented in a transparent way.
- 2.2.15 National Grid has developed ‘Our Approach to Options Appraisal’ (**Appendix 5.3.2B, Volume 5, Document 5.3.2B**), as best practice to inform clear, robust and transparent decision-making. The guidance aims to ensure that decisions regarding the technology choice and/or location of infrastructure is based upon a full understanding of the implications of each alternative option, using a wide range of criteria, covering environment, socio-economics, technology and cost.

## **2.3 Project development process**

- 2.3.1 The approach to the design and routing of new electricity transmission lines including the consideration of alternatives to the Project, such as alternative routes, has followed National Grid’s ‘Our Approach to Consenting’ guidance (**Appendix 5.3.2A, Volume 5, Document 5.3.2A**). An overview of the key steps in the development process for new proposals from this guidance is outlined below with a brief explanation on the work to be undertaken at each step.

### **Strategic proposal**

- 2.3.2 This first step is to check if the existing network can accommodate the customer or capacity needs economically and efficiently before National Grid considers building any

new infrastructure. Once the need for new infrastructure has been established, the ways in which the proposal could be delivered are reviewed. National Grid considers several different strategic options, which might include the consideration of different technologies (this could include underground cables, overhead lines or sub-sea cables); different areas for connection points; or a combination of the two. National Grid considers, at a regional scale, where the required infrastructure could be accommodated, along with the most appropriate technology that could be used. An options appraisal methodology is then used to compare options and differentiate between their relative costs and benefits to best meet commercial, statutory and policy requirements, as well as the needs of National Grid's customers and consumers.

2.3.3 The key outputs from this step are the:

- Project Need Case (See **Section 2.4** of this chapter as well as **Volume 7, Document 7.4**); and
- Strategic Proposal Report (SPR) (See **Section 2.5** of this chapter as well as **Volume 7, Document 7.5**).

2.3.4 The identification of a strategic proposal establishes the scope of the proposal which leads to options identification and selection.

### Options identification and selection

2.3.5 At the second step in the proposed development a broad Study Area is identified within which a range of potential route corridor (and site) options are considered. These are identified by considering environmental and other constraints using the findings from the Strategic Proposal stage.

2.3.6 Once corridor (or site) options have been identified an options appraisal is carried out to determine a preferred option to be consulted on. Within the route corridor taken forward a preliminary route swathe, which indicates the location where development is more likely to take place, is identified. The darker the swathe the less constrained (and thus more preferred) it is for the location of development.

2.3.7 For non-linear infrastructure, such as electricity substations, a similar process is followed, with 'siting studies' used to identify suitable locations for that infrastructure (known as 'Siting Areas'), again based upon a combination of design requirements and the preference to avoid major constraints. These non-linear elements are also included within the corridor options, where appropriate.

2.3.8 The preferred corridor options and preliminary route swathes, as well as any potential Siting Areas for non-linear infrastructure are then subject to non-statutory consultation with a range of stakeholders and members of the public. The swathes and Siting Areas allow flexibility such that feedback can be considered and the design developed accordingly. The key outputs from this stage are:

- Corridor and Preliminary Routeing and Siting Study (See **Section 2.6** of this chapter as well as **Volume 7, Document 7.8**); and
- Non-statutory consultation report (**Appendix 5, Consultation Report, Volume 6, Document 6.1**).

### Defined proposal and statutory consultation

2.3.9 The preferred corridor option, preliminary route swathe and Siting Areas for non-linear infrastructure design are developed further using the feedback from the non-statutory



consultation as well as additional technical and environmental baseline information gathered following the identification of the preliminary route swathe. Preliminary environmental information is prepared for a single defined proposal, including a preliminary route for any proposed overhead lines, summarising the key routing, design, socio-economic and environmental issues associated with the proposal and alternatives considered. The defined proposal is then subject to statutory consultation in accordance with Sections 42, 47 and 48 of the Planning Act 2008 and Regulation 12 of the EIA Regulations.

2.3.10 The key outputs from this stage are a Preliminary Environmental Information Report (PEIR) (**Section 2.6**) which supports the statutory consultation.

### **Assessment and land rights**

2.3.11 Feedback from statutory consultation informs further refinement of the proposal design. The preliminary route is developed further to form the detailed route alignment and/or site proposal (**Chapter 3: Description of the Project, Volume 5, Document 5.2.3**) for which National Grid will submit an application for development consent, including a draft DCO, and on which the EIA is based and reported on in the ES in support of the DCO application. Agreements to acquire land and rights over land through voluntary negotiation are also sought with affected landowners.

2.3.12 The key outputs from this stage are:

- Consultation Report (**Volume 6, Document 6.1**) submitted in support of the DCO application which sets out details of the feedback received and how National Grid has responded to this in finalising the proposal for which development consent is being sought.
- The DCO application and accompanying ES.

### **Application, examination and decision**

2.3.13 National Grid will then submit its application for development consent, including a draft DCO, having considered and, where appropriate responded to, the consultation feedback. The application is submitted to the Planning Inspectorate, using the prescribed form and procedures for DCO applications in England and Wales.

### **Construction**

2.3.14 Following a positive decision on its application, National Grid will then progress the consented proposal through construction, ensuring that all DCO requirements are discharged and complied with.

2.3.15 Most relevant to the design evolution of the Project and consideration of alternatives are the first four steps in the proposal development process, prior to the submission of an application for development consent. **Sections 2.4 to 2.8** provide a summary of the work undertaken to develop the Yorkshire GREEN design and alternatives considered.

## **2.4 Need for the Project**

2.4.1 In line with the UK government's legal commitment to reduce greenhouse gas emissions by at least 100% of 1990 levels (net zero) by 2050, growth in offshore wind generation and interconnectors to Europe has seen a significant number of connections planned in Scotland and coastal areas of the North of England.



- 2.4.2 The existing electricity transmission network was not designed to transfer the current and increasing volume of generation capacity from the North to major centres of electricity demand which continue to exist in central and southern England. The network will require significant reinforcement in the Yorkshire area to provide capacity for these connections and customers to ensure that power can be transferred securely to onshore demand centres in the south to meet the needs of Great Britain electricity consumers.
- 2.4.3 National Grid has obligations under its Transmission Licence<sup>5</sup> to provide an efficient, economic and co-ordinated transmission system in England and Wales. National Grid is required at all times to plan and develop the transmission system in accordance with the National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS) and to offer connections to and/or use of the transmission system via the National Grid Electricity System Operator (ESO).
- 2.4.4 The growth in generation and interconnectors to Europe and rising transfers of onshore and offshore wind from Scotland, alongside connections in the northern regions of England, means that by 2027, boundaries<sup>6</sup> B7, B7a and B8 of the transmission system will exceed their current capacity.
- 2.4.5 This assessment is supported by both the Network Options Assessment (NOA) and the Future Energy Scenarios (FES) which are undertaken by the Electricity System Operator, independently of National Grid as the transmission owner. The FES identified that from 10,000 MW to between 20,000 MW to 30,000 MW is required in increased capacity by 2040 driven by generation to achieve NET ZERO targets.
- 2.4.6 The National Grid (ESO) manages shortfalls in boundary capacity by reducing power flows and constraining generation. This is achieved by paying generators to reduce their outputs, known as 'constraint costs'. Ultimately, constraint costs are passed on to consumers and businesses through electricity bills. When constraint costs become higher than the cost of investment required to reinforce the network (and remove the need for constraint costs) it is considered right to proceed with investment for reinforcement. Without reinforcement by 2027 there can be no further unconstrained connections above boundary B8.
- 2.4.7 In addition, the following three contracted customers have connection offers which are reliant on reinforcement of the network:
- Continental Link – A 1.8GW Interconnector between England and Norway to connect in the Creyke Beck Substation, close to Hull, by 2027;
  - The Atlantic Superconnection - A 1GW Interconnector from Iceland expected to connect in the Creyke Beck Substation, close to Hull, by 2027; and
  - Hornsea Offshore P4 - 2 phased connection application for 2.6GW (1.5GW in 2027 and 1.1GW in 2028) of offshore wind generation with an offer to connect in the North East in April 2027 and October 2028 for each phase respectively.
- 2.4.8 Establishing the need for reinforcement, as summarised above, is the first step in National Grid's project development process. For the Project, this is detailed in the **Updated Need Case Document (Volume 7, Document 7.4)**. On the basis of the need case established, National Grid review how the required reinforcement could be

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<sup>5</sup> Transmission of electricity in Great Britain requires permission by a licence granted under Section 6(1)(b) of the Electricity Act 1989 (as amended) (the Electricity Act).

<sup>6</sup> Boundaries are made up of circuits which flow from one area of the network to another and define the capability to transport power between areas of the electricity transmission system.

delivered, considering different strategic options, and assessing the options identified. This takes into account environmental, socio-economic, cost and technical considerations. The strategic proposal is then considered further through options identification and selection, taking into account feedback received. The design and assessment of the Project in environmental terms is the subject of statutory consultation, with feedback considered, before the Project taken forward is finalised and submitted in the DCO application.

- 2.4.9 As detailed above there is an urgent need to deliver reinforcement in the Yorkshire area, which will be achieved through Yorkshire GREEN, to ensure increased boundary capability in the future to the centres of demand where it is required and mitigate high constraint costs associated with managing the boundary capacity shortfall.

### **Do nothing scenario**

- 2.4.10 As identified by above, due to growth in electricity generation and interconnectors, rising transfers of onshore and offshore wind from Scotland, alongside connections in the northern regions of England there is a strong and urgent need case to deliver a reinforcement of the electricity system boundaries in the area where Yorkshire GREEN would be located to increase boundary capabilities by 2027 and three contracted customers are reliant on this need being resolved. Therefore, the 'do nothing' scenario is not a viable alternative and has not been considered any further in this ES.

### **Main Alternatives**

- 2.4.11 For the purposes of this chapter, the main alternatives considered include:
- strategic route options (**Section 2.5**);
  - route corridor alternatives, preferred route corridor and preliminary route swathe and Siting Areas (**Section 2.6**); and
  - the evolution of the Project design and design alternatives considered following non-statutory consultation (**Section 2.7**) and then statutory consultation (**Section 2.8**).

## **2.5 Strategic proposal**

- 2.5.1 Once the need for the Project had been established, National Grid then considered the different ways in which the need could be met in order to establish a Strategic Proposal.
- 2.5.2 A two-step process was followed in order to identify strategic options which were then subject to a detailed appraisal:
- 1: The identification of a longlist of strategic options by selecting different geographical 'start' and 'end' points which would provide opportunities to meet the Project Need Case; and
  - 2: The identification of a shortlist of strategic options, by applying technical and benefit filters to the longlist in accordance with National Grid's Options Appraisal Guidance (**Volume 5, Document 5.3.2B**).
- 2.5.3 The longlist was filtered down to a shortlist by undertaking a high-level review whereby each strategic option was subject to the following filters:

- Technical filter: Strategic options which do not meet the need case or otherwise would not meet the standards set out in the Security and Quality of Supply Standards (SQSS) should be discounted.
- Benefit filter: Strategic options for which there are no distinct or material benefits over other strategic options which would do the same thing should be discounted.

## Identification of longlist of Strategic Options

- 2.5.4 The first stage was the identification of a longlist of strategic options by selecting ‘start’ and ‘end’ points for reinforcements to meet the Project Need Case, taking into account the boundaries required to be reinforced. These start and end points were identified from existing substations, as well as intermediate ‘tee off’ points from existing overhead lines either side of the existing Thornton – Drax overhead line.
- 2.5.5 Three separate technologies were considered for each option identified. These comprised:
- overhead line and underground cable technologies which are established technologies already well used in the electricity transmission system; and
  - gas insulated line, which was (at this time) a developing technology using gas insulation.
- 2.5.6 It was assumed the use of Direct Current (DC) technology would be neither economical nor efficient due to the requirement for AC/DC conversion, which would be prohibitively costly at the distances involved. A marine DC solution was also not considered viable, as the need for the Project is to relieve/bypass the Thornton - Drax circuits, which are not close to the coast, so any potential marine option would be significantly longer and more expensive than any onshore solution. Therefore, DC technology was not considered any further.
- 2.5.7 The outcome of the first stage was the identification of a longlist of 379 strategic options.

## Identification of shortlist of Strategic Options

- 2.5.8 A limited number of options were discounted using the Technical Filter. It was noted that a number of options would require substantially more works to ensure they would comply with SQSS. However, these were taken forward for more complete appraisal.
- 2.5.9 A number of strategic options were discounted using the Benefit Filter. These were typically options which would require longer routes than shorter length alternatives which would achieve the same Project objectives. Selecting options of a shorter length ensured that National Grid met its statutory duties under the Electricity Act 1989 (section 9 and Schedule 9) as well as the Holford Rules on the routing of overhead transmission lines, compliance with which is required by NPS EN-5.
- 2.5.10 The outcome of this stage was the identification of a shortlist of 90 strategic options (30 options each using three separate technologies (overhead line, underground cable and gas insulated line)<sup>7</sup>. The substations which formed potential connection points in the short-listed options were reviewed to identify if any major land, planning or engineering constraints were present that would discount them, but none were discounted on this basis.

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<sup>7</sup> Refer to Table 3.1 in the SPR 2019, **Volume 7, Document 7.5**

2.5.11 Further optioneering was undertaken to consider viable technical options that would connect to either Poppleton 275kV substation or the existing Poppleton - Monk Fryston 275kV overhead line (the XC route). This produced an additional 15 options which were included as part of the Strategic Option appraisal which took into account the additional works that would be required on the XC route to meet the Project Need Case (**Volume 7, Document 7.4**) and deliver the optimal benefits from these strategic options. These sub-options were considered as part of the appraisal of shortlisted strategic options, increasing the overall number of options subject to more detailed appraisal from 90 to 105.

## **Appraisal and Selection of the 2019 Strategic Proposal**

2.5.12 Each of the 105 shortlisted strategic options were appraised in accordance with National Grid's Approach to Options Appraisal (**Appendix 5.3.2B, Volume 5, Document 5.3.2**) across a range of technical, environmental, socio-economic, programme and cost criteria with the objective of identifying a Strategic Proposal which met the Project need case as well as National Grid's statutory and licence obligations.

2.5.13 The main differences between the strategic options related to their size or length of connection, costs and whether the option made use of existing infrastructure. Entirely new build options typically had longer route lengths, whilst those options which include upgrading existing infrastructure typically had shorter route lengths for the new-build elements. In general terms this resulted in significant differences and sensitivities in engineering complexity, capital costs, environmental and socio-economic impacts and programme. Longer new build projects are typically more expensive, have a greater environmental impact and would take longer to build compared to shorter alternatives.

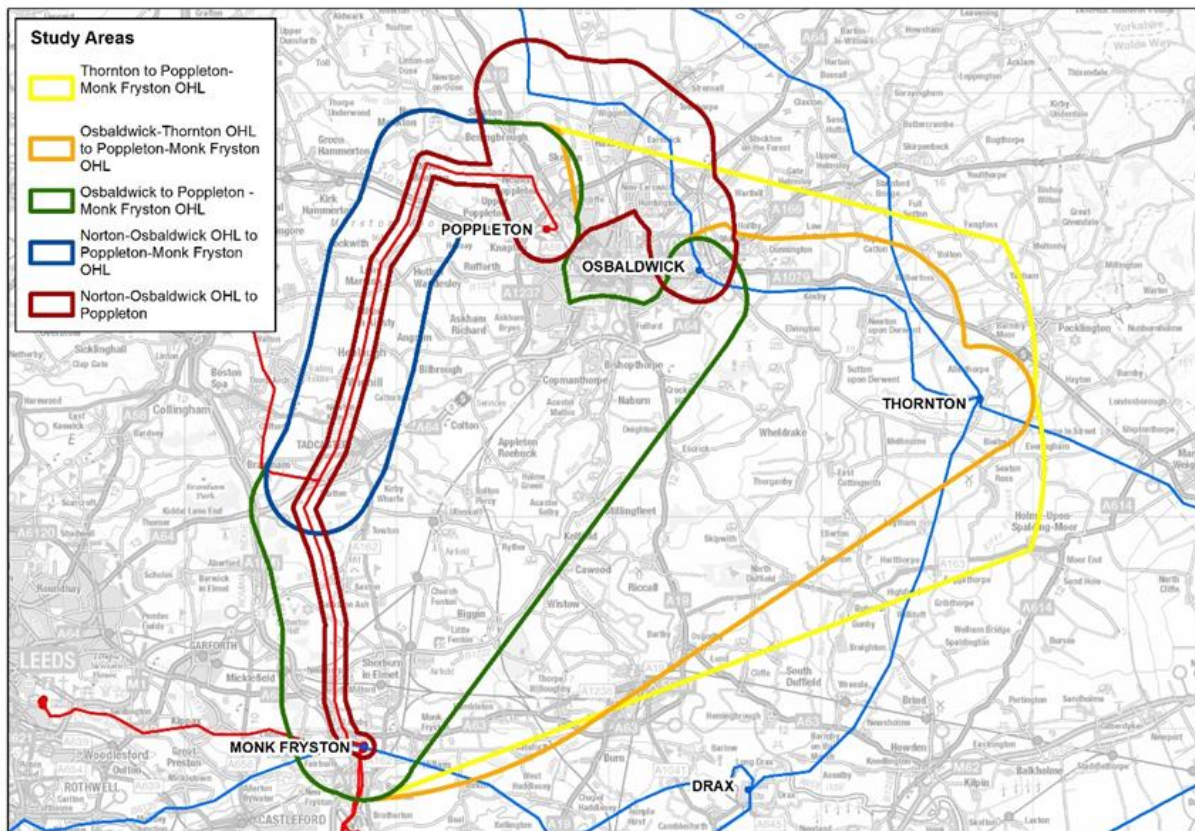
2.5.14 In terms of technology, options which used overhead line connections were considered to be preferable (over underground cable) from a cost perspective. Gas insulated line technology was considered much less preferable due to its potentially greater climate change impact from the use of sulphur hexafluoride than alternative technologies.

2.5.15 National Grid considers the construction of wholly new infrastructure where existing infrastructure cannot be technically or economically upgraded to meet system security standards and regulatory obligations. In identifying the Strategic Proposal, the strategic options which allowed the use of existing infrastructure in order to minimise environmental effects and cost and take account of National Grid's statutory duty to have regard to amenity under section 38 of the Electricity Act 1989 were therefore preferred. A number of the strategic shortlist options requiring entirely new infrastructure and longer routes were discounted on this basis.

2.5.16 Five main strategic options (set out in **Table 2.1**) were identified which met the requirements of the Project Need Case taking into account the Options Appraisal. These included a combination of new infrastructure and upgrades to existing infrastructure and all options would require works to the existing overhead line between Poppleton and Monk Fryston. **Figure 2.1** below illustrates the Study Areas for these potential strategic options.



**Figure 2.1 - 2019 Strategic Options connecting to Poppleton Substation or the Poppleton to Monk Fryston overhead line**



**Table 2.1 - Strategic Options identified from the Appraisal**

<b>‘Start’ Point</b>	<b>‘End’ Point</b>	<b>New Works Required</b>
Norton - Osbaldwick OHL	Poppleton Substation	New Approximate 6 km route
Thornton Substation	Poppleton - Monk Fryston OHL	New Approximate 32 km route
Osbaldwick Substation	Poppleton - Monk Fryston OHL	New Approximate 19 km route
Norton - Osbaldwick OHL	Poppleton - Monk Fryston OHL	New Approximate 31 km route
Osbaldwick - Thornton OHL	Poppleton - Monk Fryston OHL	New Approximate 24 km route

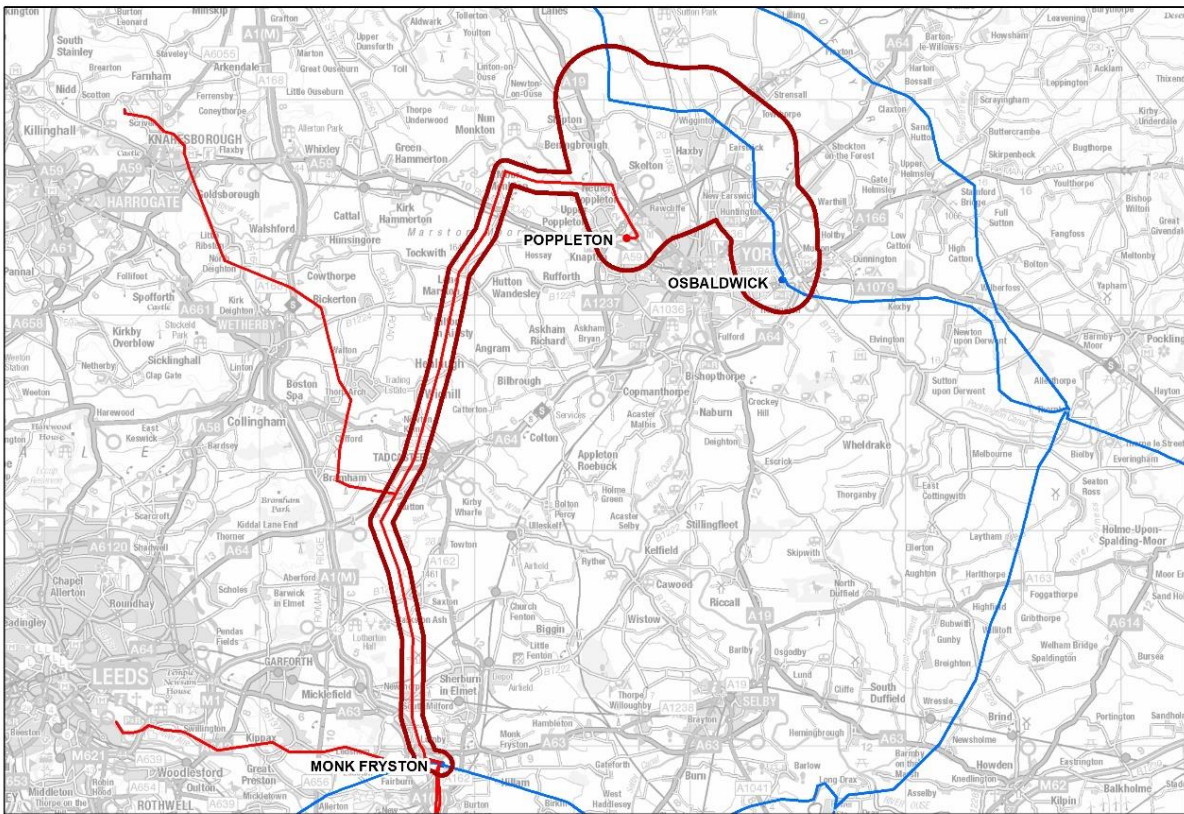
2.5.17 A number of the strategic options had ‘start’ points located to the east of Poppleton and York which would have required longer new build routes around the south of York resulting in the potential for greater environmental effects, in particular landscape and

visual impacts, as well as increased cost. Therefore, to minimise such effects options with 'start' points to the north or west of York were preferred.

- 2.5.18 Of the two strategic options which would connect from the existing Norton–Osbalwick overhead line, an option that would connect directly into Poppleton Substation was considered preferable. Whilst this option would require an extension to Poppleton Substation and increase the length of the Poppleton - Monk Fyston XC/XCP overhead line which would need reconductoring, it would reduce the amount of new build infrastructure required.
- 2.5.19 Therefore, it was identified that a new 6km (direct point-to-point) route from the Norton–Osbalwick overhead line to the existing Poppleton Substation was the preferred option across cost, technical and environmental/socio-economic criteria relative to longer alternatives. In environmental and socio-economic terms, this solution had comparatively less impact than other new build alternative options which would be approximately 19km to 32km long.
- 2.5.20 The 2019 strategic options appraisal identified a Strategic Proposal (**Figure 2.2**) comprising two key elements:
- construction of a new 400kV double circuit overhead line approximately 6km in length connecting from a point on the existing Norton-Osbalwick overhead line (2TW/YR 400kV) to Poppleton Substation.; and
  - reconductoring the existing 275kV overhead line from Poppleton to Monk Fyston (XC/XCP route) to increase the capacity of the existing overhead line. An alternative sub-option to increase the voltage on this overhead line to 400kV was discounted on cost grounds and because it did not meet the Project Needs Case.



**Figure 2.2 - 2019 Strategic Proposal**



2.5.21 Further details of this process and the options which were discounted is provided in the SPR 2019, (**Volume 7, Document 7.5**).

**Strategic Proposal Back Check and Review (2020)**

2.5.22 Following the preparation of the SPR (2019), two further developments occurred in relation to the Project need. These comprised the:

- publication of the 2021 Network Options Appraisal (NOA), and
- announcement of the UK Government’s intention to increase the offshore wind energy target from 30GW to 40GW and the identification of additional customers<sup>8</sup> not included in the 2019 Future Energy Scenarios<sup>9</sup>.

2.5.23 As a result, National Grid undertook a ‘back check and review’ of the 2019 SPR (**Volume 7, Document 7.6**).

2.5.24 A back check and review exercise found that the 2019 Strategic Proposal would not be able to accommodate the more ambitious FES and the new additional signed customer connection agreements, as the equipment at Poppleton and Monk Fryston Substations was not rated high enough for the additional capacity the customer connections required. The result of which produced a revised technical requirement and

<sup>8</sup> Continental Link and Atlantic Super Connection

<sup>9</sup> Future Energy Scenarios are produced annually by National Grid ESO in consultation with industry stakeholders to identify what ‘credible futures’ might exist, when considering the rate at which the UK may decarbonise, the impact of de-carbonisation of supply and how consumer behaviour will impact demand. National Grid (2019). Future Energy Scenarios.

respective boundary flow requirement of 1500MVA. This meant that the pre-existing 500MVA rating of OPN2 selected in the NOA 5 assessment would now be inadequate.

2.5.25 As part of the 'back check and review' process, the 105 shortlisted strategic options identified in the 2019 strategic options appraisal were reconsidered and this identified:

- 49 options were no longer viable as they used gas insulated technology (discounted due to climate change effects) or involved upgrading existing overhead lines to 400kV (it had been identified that 275kV overhead lines would be sufficient to meet the Project needs and would be a more cost effective option)<sup>10</sup>;
- 28 options were reviewed against cost, programme and length of connection and discounted because they would have greater costs than the preferred 2019 strategic option; would not achieve the programme required or would require a longer connection length (of between 19.5km and 39.5km); and
- 28 options (all overhead line) were reviewed with further studies undertaken to provide a greater understanding of the works required to ensure these options could meet the revised Project need case. This identified that:
  - 21 of these 28 options became more costly as following further studies it was identified that they would result in additional works and were discounted; and
  - 7 options did not meet the programme requirements and/or had longer connection lengths than the preferred option (between 24km and 31km), and therefore involved a greater impact on environmental designations and other receptors. The Study Areas for these options would also include several areas of ancient woodland and many Grade I Listed Buildings, Registered Parks and Gardens and Scheduled Monuments and also passed in closer proximity to a number of settlements which would also potentially increase costs due to a greater need for measures to mitigate effects.

2.5.26 Following the back check and review exercise, the preferred 2019 strategic proposal was revised into six new variant strategic options based on the original strategic proposal each requiring a new 400kV connection of approximately 7.5km. For each new variant strategic option both connection via overhead line and underground cable was considered. Each of the six variant strategic options were appraised in accordance with National Grid's Approach to Options Appraisal (**Volume 5, Document 5.3.2B**) against a range of technical, environmental, socio-economic, cost and programme criteria and comprised the following.

- Variant strategic option 1A: New 275kV or 400kV substation north of York, and a new 275kV substation at Monk Fryston.
- Variant strategic option 1B: New 275kV or 400kV substation north of York, and a new 400kV substation at Monk Fryston.
- Variant strategic option 2A: New 275kV or 400kV substation at 'Poppleton South', and a new 275kV substation at Monk Fryston.
- Variant strategic option 2B: New 275kV or 400kV substation at 'Poppleton South', and a new 400kV substation at Monk Fryston.

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<sup>10</sup> It should be noted that the 400kV overhead line proposed as part of the Project is only required to tie into and utilise existing overhead lines between the 2TW/YR overhead line and the new Overton Substation.

- Variant strategic option 3A: New 275kV or 400kV substation at ‘Poppleton South’, the partial realignment of the existing XC/XCP overhead line, and a new 275kV substation at Monk Fryston.
- Variant strategic option 3B: New 275kV or 400kV substation at ‘Poppleton South’, the partial realignment of the existing XC/XCP overhead line, and a new 400kV substation at Monk Fryston.

2.5.27 For all new variant strategic options the appraisal determined that overhead line options were preferred from a cost perspective. In addition, no nationally designated landscapes were present. All the options identified would result in new and/or upgrading of infrastructure in the Green Belts around York and Leeds (**Planning Statement, Volume 7, Document 7.1**).

2.5.28 Of the six new variant strategic options, Options 1A and 1B were preferred from an environmental perspective for the following reasons.

- Option 1A and 1B would result in the construction of a new substation on previously undeveloped land whilst Options 2A, 2B, 3A, and 3B had the potential for the new substation to be constructed on previously developed land. However, local plan allocations and planning applications for new housing on land immediately south of the existing Poppleton 275kV substation would also constrain Options 2A, 2B, 3A and 3B.
- Options 1A, 1B, 2A and 2B were preferred over options 3A and 3B as for options 3A and 3B the realignment of the existing 275kV XCP overhead line between Moor Monkton Grange and Poppleton 275kV substation (to allow the alignment to be used for the new 400kV connection to Poppleton) would result in new infrastructure in an area where there is currently none. This would have the potential to lead to greater environmental and socio-economic effects.
- Whilst Options 1A and 1B would lead to some localised landscape and visual effects at the new ‘substation site north of York’, the need for a new substation at ‘Poppleton South’ would also lead to additional environmental effects (including landscape and visual impacts, and potential ecological effects on the nearby Clifton Ings and Rawcliffe Meadows Site of Special Scientific Interest).
- The 400kV connection route for Option 1A and 1B had a greater potential to be shorter in length by up to 2km and therefore minimise environmental effects and land take (depending on the location of the substation north of York) compared to Options 2A, 2B, 3A, and 3B which would require a 400kV connection further south to Poppleton.

2.5.29 Overall, the sensitivities associated with a new build substation on greenfield land for Options 1A and 1B were considered to be outweighed by the potential for a shorter 400kV connection (compared to Options 2A, 2B, 3A, and 3B), the significantly greater certainty that a 400kV connection could be physically and technically achieved to the new substation (compared to Option 2A/2B) and the environmental effects associated with constructing new 400kV overhead line infrastructure in an area where there is currently none (Option 3A/3B).

2.5.30 Taking into account technical requirements, a new Strategic Proposal (Option 1B) was identified which would construct a new 400kV double circuit overhead line from a point on the Norton–Osbalwick overhead line, but would also include the following elements:



- construction of a new substation to the north of York which the new 400kV overhead line would connect into from the north;
- construction of a new substation at Monk Fryston to connect into the existing 275kV substation at this location; and
- reconducting and changes to the existing pylons and 275kV XC/XCP overhead line between Monk Fryston and Poppleton substations so that this overhead line would also connect to the new substation to the north of York.

- 2.5.31 Further details of the back check and review process and the options which were discounted are provided in the Yorkshire GREEN Strategic Proposal Back Check and Review (2020), **Volume 7, Document 7.6**.
- 2.5.32 In 2021 a Back Check and Review Addendum (**Volume 7, Document 7.7**) was undertaken as a result of the publication of the 2021 Network Options Appraisal (NOA), and the announcement of the UK Government's intention to increase the offshore wind energy target from 30GW to 40GW and further expectation for this to increase beyond 40GW (since the back check and review process has been carried out a further increase to 50GW has been identified). The two further developments were considered relevant to the consideration of options and the extent of new generation to be connected to the network in coming years.
- 2.5.33 The back check and review key criteria (ability to meet the earliest in-service date of 2027, ability to minimise the length of the new 400kV connection, and ability to minimise the cost) were again applied along with associated updated constraint costs. It concluded that the 2019 strategic options (SPR 2019, **Volume 7, Document 7.5**) considered unsuitable to be taken forward for the 2020 Back and Check Review, remained unsuitable to be taken forward. In particular, a key finding was that the seven lower cost strategic options were now subject to significantly greater annual constraint costs, meaning that the economic case for progressing OPN2 (the selected Strategic proposal)] relative to these options had strengthened. This was in addition to the other disadvantages of these options already identified. It was also considered appropriate to discount three variant sub-options (Option 1A, 2A and 3A) as they had an earliest in-service date (EISD) of 2028 and, accordingly, the cost of these options would increase significantly due to additional delay costs. Given that there were alternative overhead line options that meet the need case for reinforcement with substantially lower costs, these options were not considered further.
- 2.5.34 The 2021 Back Check and Review Addendum Report concluded that of the remaining three options (1B, 2B, 3B) that the originally selected option (Option 1B) remained valid on the basis it met the EISD, was shorter and would cost less.
- 2.5.35 The Strategic Proposal (Option 1B) was then taken forward to the Options Identification and Selection stage.

## 2.6 Options identification and selection

### Introduction

- 2.6.1 A Corridor and Preliminary Routeing and Siting Study ('the CPRS Study'), **Volume 7, Document 7.8**, was undertaken to further define the location of the proposed Project infrastructure within a defined Study Area based on the strategic proposal identified at the strategic options stage (described in **Section 2.5**). An Options Appraisal was

undertaken for proposed new infrastructure comprising substations, Cable Sealing End Compounds (CSECs) and overhead lines.

2.6.2 The CPRS Study focused on the routing of new overhead lines and siting of the new infrastructure at three locations: north of York ('York North'), Tadcaster and Monk Fryston. The key drivers for the location of new infrastructure within these three areas were as follows:

- York North:
  - The proposed York North Substation should be within proximity of the 'East to West' (Skelton to Moor Monkton) section of the existing 275kV XCP overhead line to minimise the length of double circuit 275kV overhead line connections required between the proposed York North Substation and the existing XCP overhead line.
  - Two proposed CSECs on the 2TW/YR overhead line should be in close proximity to the existing 2TW/YR overhead line to minimise the amount of underground cabling required to connect the proposed CSECs.
- Tadcaster: Two proposed CSECs, one on the existing XD 275kV overhead line and the other on the existing XC 275kV overhead line should be in close proximity to the existing junction and close to existing pylons to limit the extent of underground cabling to connect the two proposed CSECs and to minimise the length of the downloads connecting each proposed CSEC to the pylon.
- Monk Fryston: The proposed Monk Fryston Substation and associated infrastructure should be in close proximity to the existing Monk Fryston Substation to enable connections to be made efficiently between the two substations to minimise environmental impact and cost.

## Overview of approach

2.6.3 A staged approach, undertaken in line with National Grid's Approach to Option Appraisal (**Volume 5, Document 5.3.2B**), comprised:

- Stage 1-Identify and Define Corridor and Siting Area Options: This involved the development of Corridors (a broad area within which a new overhead line could be routed) within which the proposed 400kV overhead line could be routed from the existing 2TW/YR 400kV overhead line to a proposed substation to the north of York, and the two proposed 275kV overhead lines from the existing XCP 275kV overhead line to the proposed substation north of York. The development of the corridors and the Siting Areas (an area of land within which a new CSEC or substation could be sited) took into consideration several high-level embedded mitigation measures in alignment with the Holford<sup>11</sup> and Horlock Rules<sup>12</sup>, where applicable. Following consideration of the application of the initial mitigation measures<sup>13</sup> the Corridors and Siting Areas were subject to analysis and review and further refinement with the application of additional or more defined mitigation measures aligned with Section 5

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<sup>11</sup> National Grid (2021). The Holford Rules. National Grid; London.

<sup>12</sup> National Grid (2021). The Horlock Rules. National Grid; London.

<sup>13</sup> These are outlined in Table 2.2 of the CPRS Study, **Volume 7, Document 7.8** and included measures such as avoiding routing and siting near residential areas, Grade I, II\* listed buildings, ancient woodland and areas of woodland greater than 350m wide as well as avoiding siting Substations and CSECs in higher risk flood zones 2, 3 and incorporating, where feasible, buffers between infrastructure and the environmentally sensitive receptors.

of the NPS for Energy (EN-1) and Section 2 of the NPS for Electricity Network Infrastructure (EN-5), including Section 5.3 of EN-1 and Section 2.7 of EN-5 (Biodiversity and Geological Conservation), Section 5.7 of EN-1 (Flood Risk) and Section 5.8 of EN1 (Historic Environment).. All Corridors and Siting Areas were reviewed by National Grid's engineering and design team to confirm technical feasibility prior to being finalised.

- Stage 2-Undertake Options Appraisal and Selection of Preferred Options: Following agreement of the Corridors and Siting Areas, all options were appraised with input from a range of technical disciplines including environmental (biodiversity, heritage, landscape and visual, socio-economic, flood risk, traffic and access), planning and engineering. The appraisal took into account local, regional and national planning policy, including the presence of green belt, where applicable. The outcome of this stage was the agreement of a Preferred Corridor for the overhead lines and Preferred Siting Areas for the proposed substations and CSECs.
- Stage 3-Development of Graduated Swathes for the Preferred Corridor and Graduated Siting Areas: Following agreement of the Preferred Siting Areas and the Preferred Corridor, a preliminary route alignment was developed for the proposed overhead lines and locations within Preferred Siting Areas for the proposed substations and CSECs, which took into consideration the environmental and socio-economic constraints identified, where present. These took into consideration the Holford Rules and in particular rules 1, 2 and 3 to avoid areas of amenity value and, while taking this into consideration, selecting a direct route. The preliminary route swathes (paragraph 2.3.8), referred to as graduated swathes in this ES and the CPRS (**Volume 7, Document 7.8**), in the York North area indicated the broad areas where the preliminary overhead line route, were likely to be located. The darker areas of the graduated swathe indicated a greater preference for the location of the required infrastructure. Similar areas, referred to as Graduated Siting Areas were also prepared for the proposed CSECs and substation infrastructure at Tadcaster and Monk Fryston.

## York North Options Appraisal

- 2.6.4 At York North, four Corridors (A, B, C, and D) were identified for the proposed 400kV and 275kV overhead lines. Corridor option (A1) was also identified to provide options to connect with the far western extent of the existing XCP overhead line. Four Siting Areas were identified for the proposed CSEC at the existing 2TW/YR overhead line, which correspond with the four principal Corridors. A total of 12 Siting Areas were identified for the proposed York North Substation. Given that the proposed components of York North were intrinsically linked, the options appraisal process considered 21 different combinations of the corridors and Siting Areas (see Table 4.1 of the CPRS Study, **Volume 7, Document 7.8**).
- 2.6.5 Following the identification of these 21 options, a screening exercise was undertaken to identify the least preferred options. As a result, four options in Corridor A and 5 options in Corridor B were screened out. In general, this was due to factors such as longer lengths of overhead line required, limited highways access to Substation Siting Areas, potential landscape and visual effects on residential areas and landscape character impacts on the River Ouse Corridor. The remaining 12 options were then considered further.
- 2.6.6 York North Substation was renamed and is referred to as Overton Substation for the remainder of this chapter. **Figure 2.3, Volume 5, Document 5.4.2** illustrates the



locations of the four route corridors. Further information on how these were identified can be found in Section 1.1 of the CPRS Study.

### *Holford Rules and Horlock Rules appraisal*

2.6.7 In considering the route corridor options against the Holford Rules, all route corridors accorded with Rule 1 as they avoided major areas of highest amenity value. It was assumed that a route could be identified within each corridor to avoid smaller areas of high amenity value to meet the requirements of Rule 2. Corridor B was the shortest and most direct of the options and therefore considered most closely to accord with Holford Rule 3. With regard to Rule 4, the northern part of Corridor A was larger in landscape scale and more open and therefore more pylons may be visible against a sky background. The skyline of this landscape is however not particularly distinctive or prominent and is already influenced by vertical infrastructure. Due to the flat landscape context, Holford Rule 6 would not differentiate between the options. Holford Rule 7 was not considered to be applicable to this study as this relates to routing overhead lines in urban areas. Overall Corridor B was considered to best align with the Holford Rules.

2.6.8 With regard to the Horlock Rules, none of the CSEC or substation Siting Areas appraised would impact on any nationally valued landscapes. Within each of the Siting Areas it was considered possible for infrastructure to be sited to avoid areas of local amenity value. The greatest opportunity to take advantage of existing screening in the surrounding area was provided by alternative substation locations to the south of Hurns Gutter and north of Skelton located east and west of the A19<sup>14</sup>. However, neither of these sites were considered to align closely with the supplementary note of the Holford Rules to “*avoid routeing close to residential areas as far as possible on grounds of general amenity*” as they would require large terminal structures near to residential areas. The Siting Areas which had the least number of opportunities to take advantage of existing screening were options located north of the River Ouse<sup>15</sup>. These Siting Areas were located close to the River Ouse Corridor and were slightly elevated in relation to the river, with little intervening vegetation cover. Furthermore, whilst other Siting Areas, including the preferred Overton Substation Siting Area<sup>16</sup>, had fewer opportunities to take advantage of existing screening the study found that additional mitigation in the form of earth mounding/ planting could be implemented to help mitigate effects.

### *York North preferred option*

2.6.9 Following the appraisal, it was concluded that the preferred option for York North<sup>17</sup> comprised:

- Corridor B (**Figure 2.3, Volume 5, Document 5.4.2**) as the preferred route corridor to connect the new 400kV and 275kV overhead lines;
- A substation Siting Area (Overton Substation) located south of Shipton by Beningbrough, adjacent to the East Coast Mainline railway (ECML) and west of the A19; and

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<sup>14</sup> Refer to Substation Siting Areas YN5b and YN5a in the CPRS Study, **Volume 7, Document 7.8.**

<sup>15</sup> Refer to Substation Siting Areas YN4a and YN4b in the CPRS Study, **Volume 7, Document 7.8.**

<sup>16</sup> Refer to Substation Siting Area YN3b in the CPRS Study, **Volume 7, Document 7.8.**

<sup>17</sup> Refer to Option B.YN3b in the CPRS Study, **Volume 7, Document 7.8.**

- A CSEC Siting Area located approximately 1km north east of Shipton by Beningbrough.
- 2.6.10 The preferred option was identified as the option with the fewest constraints and, where there was the potential for environmental effects, it was considered that these could be feasibly mitigated through the introduction of appropriate measures.
- 2.6.11 The preferred substation Siting Area was selected as it is located at least 800m from the nearest residential properties (Overton Grange Farm 800m south), is close to the A19, minimising the need for traffic to route along minor roads and could be sited to avoid higher risk flood zones 2 and 3. The site itself comprises open arable fields and few valued landscape elements (such as mature trees) would need to be removed. Ponds are present within the Siting Area however it was considered that any effects from the loss of these ponds and any species, such as great crested newt that they may support could be mitigated.
- 2.6.12 Overall, the combination of the preferred Siting Area and Corridor B was considered to provide the preferred option with respect to both the Horlock and Holford Rules as well as technical feasibility. Corridor B was best aligned with the Holford Rules as it would offer the potential for one of the shortest and most direct routes from the 2TW 400kV overhead line to the proposed substation. Measures, such as planting would be needed to mitigate the visual effects of the substation but compared with other Siting Areas this location lies furthest away from the River Ouse and the Ouse Valley Landscape Character Type which has high landscape sensitivity.
- 2.6.13 Following the selection of the preferred Corridor, two graduated swathes were developed, based on a preliminary route for the proposed 400kV overhead line to the preferred substation Siting Area and two routeing options developed for the two 275kV overhead lines connecting to the existing XCP 275kV overhead line. For the proposed 275kV connections south from Overton substation to the existing 275kV XC/XCP overhead line between Monk Fryston and Poppleton, two options were identified as further assessment of the potential ecological effects of the crossing of the River Ouse was required:
- Option 1 (**Figure 2.4, Volume 5, Document 5.4.2**): This option would comprise a new section of 275kV overhead line running south-west from the proposed Overton Substation, east of Overton Wood and across the River Ouse with a second new section running approximately parallel to the eastern side of the ECML. This option would enable the dismantling of up to 2.5km of the existing XCP 275kV overhead line.
  - Option 2 (**Figure 2.5, Volume 5, Document 5.4.2**): This option would comprise two new sections of 275kV overhead lines broadly parallel with the ECML; one would be located to the eastern side of the ECML and the other to the west. This would enable the dismantling of up to 700m of the existing XCP 275kV overhead line.

Both options were taken forward for further consultation (paragraph 2.6.37).

### **Tadcaster Area options appraisal**

- 2.6.14 During Stage 1 ten Siting Areas for two new CSECs (one on the XD overhead line and one on the XC overhead line) at Tadcaster were identified. Three options were located

along the alignment of the existing XC overhead line and seven options along the alignment of the existing XD overhead line<sup>18</sup>.

### *Horlock Rules appraisal*

- 2.6.15 All Siting Areas avoided “*altogether internationally and nationally designated areas of the highest amenity...*” and were considered to comply with Rule 2 of the Horlock Rules. All Siting Areas were considered to comply broadly with Rule 3 of the Horlock Rules to protect areas of local amenity value.
- 2.6.16 The two northernmost Siting Areas on the XC overhead line<sup>19</sup> were not considered to fully meet the objective of Rule 4 of the Horlock Rules, which requires the Siting Area to take advantage of the screening provided by the landform and to limit intrusion into the surrounding area. These Siting Areas had open views from Tadcaster and slightly elevated level in relation to surrounding landscape. As such, the southernmost option<sup>20</sup> was the preferred siting area on the XC line from a Horlock Rules perspective
- 2.6.17 All Siting Areas on the XD overhead line were considered acceptable under landscape and visual criteria relating to the Horlock Rules.
- 2.6.18 In terms of other environmental and technical perspectives, there was little to distinguish between the options. However, three of the most western Siting Areas on the XD overhead line<sup>21</sup> located east and west of Braham Substation were considered least preferable from a biodiversity perspective due to the presence of existing woodland that would be subject to either potential removal or impact.
- 2.6.19 On the XC overhead line, two northernmost Siting Areas<sup>19</sup> were least preferable from a landscape and visual perspective.
- 2.6.20 A combination of options that would result in the shortest cabling route was preferred from a biodiversity, archaeology and engineering perspective. Of all the potential combinations, the preferred Siting Areas on the XC and XD overhead lines would result in the shortest cabling route.
- 2.6.21 From an engineering perspective the preferred Siting Area on the XC overhead line was preferred as the existing pylon could be reused and there would be no need for a replacement pylon. As above, a connection between the preferred Siting Areas on the XC and XD overhead lines would ensure the shortest underground cable section, thus XD Siting Area was the preferred option on the XD line from an engineering perspective.

### *Preferred options*

- 2.6.22 The preferred Siting Areas selected are located in the land between the A64 and A659, with the XD preferred Siting Area east of the A659 and the XC preferred Siting Area at the junction of the XC and XD overhead lines (**Figure 2.6, Volume 5, Document 5.4.2**).
- 2.6.23 Overall, the Siting Areas were selected as the preferred option due to their close proximity to each other and limited environmental and technical constraints and good access, which would mean the potential impacts on the environment and local community could be limited, where possible. These options were also preferable from

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<sup>18</sup> Refer Figure 5.1 of the CPRS Study, **Volume 7, Document 7.8** for all identified Siting Areas

<sup>19</sup> XC2 and XC3, **Volume 7, Document 7.8**.

<sup>20</sup> XC1, **Volume 7, Document 7.8**.

<sup>21</sup> Refer XD4, XD6 and XD7, **Volume 7, Document 7.8**.

an engineering perspective. These Siting Areas were taken forward to consultation (paragraph 2.6.37).

## **Monk Fryston Area**

2.6.24 Three Siting Areas for a new substation at Monk Fryston were identified during Stage 1. These comprised locations to the east and north of the existing substation and west (on the opposite side of Rawfields Lane to the existing substation).

### *Horlock Rules appraisal*

2.6.25 With regard to the Horlock Rules, none of the three Substation Siting Areas appraised would impact on any nationally valued landscapes (Horlock Rule 2). Within each of the Substation Siting Areas it was considered possible for infrastructure to be sited to avoid areas of local amenity value (Horlock Rule 4). All Siting Areas were considered to align broadly with the requirements of Rules 1 to 4 of the Horlock Rules.

### *Monk Fryston preferred option*

2.6.26 A location to the east of the existing Monk Fryston Substation was selected as the preferred Siting Area for the new substation (**Figure 2.7, Volume 5, Document 5.4.2**).

2.6.27 Potential impacts associated with physical environment, tourism and recreation, settlement and population and land use were considered to be indiscernible across all three Siting Areas.

2.6.28 All three Siting Areas were located within the Fairburn and Newton Ings SSSI Impact Risk Zone. There are two ponds in the area, one adjacent to the pylon located at Beterras Hill which has the potential to be impacted by all options. An additional pond located to the south east of the existing substation may be indirectly impacted by Siting Areas to the east (preferred option) and west of the existing substation.

2.6.29 For landscape and visual all three Substation Siting Areas were considered broadly within the same degree of impact with the potential for locally significant visual effects. All three Siting Areas were considered to be low to moderately constrained in landscape and visual terms. However, it was identified that there were opportunities for mitigation through more detailed assessment, siting and construction, which would reduce the potential for significant landscape effects. For the Siting Areas to the north and west it was acknowledged that underground cables and overhead lines around the proposed 400kV substation may constrain what is possible in terms of mounding and planting for landscape mitigation and visual screening purposes. Whereas for the preferred Siting Area the proximity to Monk Fyston Lodge and underground cables around the substation would greatly constrain what is possible in terms of screen mounding and/ or planting to the north east of the new substation.

2.6.30 For the Siting Areas to the north and west the potential for adverse visual effects was identified, but the lower parts of the substation could, over time, be screened by a combination of appropriate mounding/ false cuttings and mitigation planting, noting that for the Siting Area to the west mounding/ false cuttings may require comparable greater extent of earthworks due to the sloping nature of the field. For the preferred Siting Area it was acknowledged that this option would maximise the filtering/ screening benefit of existing vegetation to the south of the siting zone which would screen the lower parts of the development from some views.

- 2.6.31 For all three Siting Areas it was concluded that the upper parts of the substation would continue to be visible from properties and settlements in the surrounding local area. For the Siting Area to the north, views from most properties of the upper parts of the substation would be in combination with the existing substation and as such these would appear as one, particularly in longer distance views. For the Siting Area to the west the upper parts of the substation would continue to be visible from properties and settlements in the surrounding local area. In short distance views the substation may appear slightly disjointed from the existing substation however, in longer distance views the existing substation and new substation may appear as one.. For the Siting Area to the east (preferred), views of the upper parts of the substation would be in combination with the existing substation and as such these would appear as one, particularly in longer distance views. Therefore for landscape and visual all three Siting Areas were considered broadly within the same degree of impact with the potential for locally significant visual effects.
- 2.6.32 With regards to historic environment effects, the preferred Siting Area was not preferred in relation to impacts on the historic environment due to its proximity to, and potential effects on the setting of Monk Fryston Lodge, a Grade II listed building located to the east. However, it was considered with appropriate planting and landscaping these effects could be mitigated.
- 2.6.33 In relation to traffic and access, all the Siting Areas considered could be accessed from Rawfield Lane.
- 2.6.34 From an engineering perspective, the preferred Siting Area was selected as it provided a location where a less complex and cost-effective solution to connect with existing infrastructure could be provided. This included shorter and fewer cable routes as a Substation at the preferred Siting Area could be connected to the existing Monk Fryston 275kV/400kV substation via busbars; shorter lengths of new overhead line would be required compared to the other Siting Areas and existing access roads could be used to access the site.
- 2.6.35 The preferred Siting Area was then taken forward to consultation (paragraph 2.6.35).
- 2.6.36 Further information on the selection of these preferred locations is provided in the CPRS Study (**Volume 7, Document 7.8**). In summary the following options were selected and taken forward for non-statutory consultation.
- York North: Out of the four Corridors (and one Corridor Section), four CESC Siting Areas and 12 substation Siting Areas identified, which equated to 21 feasible combination options, it was concluded that the preferred route corridor was Corridor B which would provide a direct and short route for the overhead line from the 2TW/YR overhead line to the preferred substation Siting Area located south of Shipton by Beningbrough, adjacent to the ECML and west of the A19. While there are a number of constraints associated with the option (i.e. potential loss of ponds within Siting Area) it was considered, to present the most suitable solution. Two graduated swathes were identified to connect the two new 275kV overhead lines from the substation Siting Area with the existing XCP 275kV overhead line.
  - Tadcaster: Ten Siting Areas were identified for two CSECs to be located on the existing XD and XC 275kV overhead lines. When taking into account Horlock rules, environmental, technical and engineering considerations, two preferred Siting Areas, located in the land between the A64 and A659 were identified as the preferred options. This combination of Siting Areas resulted in the shortest cable length, and



limited impacts on biodiversity and landscape and visual receptors, compared to other options. It also allows the reuse of an existing pylon on the XC overhead line.

- Monk Fryston: Three substation Siting Areas were identified at Monk Fryston to locate a substation. Proximity and orientation to the existing substation was a key engineering driver for this option. It was concluded that the Siting Area east of the existing substation was the preferred Siting Area, but it was acknowledged that mitigation would be required to limit the impacts to Monk Fryston Lodge and the properties within its grounds.

## **Non statutory consultation**

2.6.37 Non-statutory consultation for the Project took place between 11 March and 15 April 2021, with an extension to 4 May 2021 agreed for Skelton and Wigginton Parish Council. The non-statutory consultation formed the first stage of consultation for the Project and provided consultees an opportunity to provide their views on the emerging Project design. Each consultation response received was analysed by National Grid, and, where relevant, requests for change were considered in order to further develop the design of the Project during the next stage of the Project (Section 2.7: Defined proposal and statutory consultation) (**Appendix 5, Volume 6, Document 6.1**).

## **2.7 Defined proposal and statutory consultation**

2.7.1 The 'Defined Proposal and Statutory Consultation' stage involves design development in response to feedback from the non-statutory consultation to support the production of Preliminary Environmental Information and statutory consultation on the modified Route Corridor and Preliminary Route and sites. As part of consultation feedback analysis a Design Change Control (DCC) process is used by National Grid to review and process requests for design changes raised by consultees and refine the Project design.

### **Design development: Change control process**

2.7.2 Potential design refinements are identified through stakeholder feedback, the results of non-statutory and statutory consultation, on-going discussions with landowners and reviews by the engineering and environmental team as additional baseline information is collated. The process has been developed to ensure that each identified design refinement is considered and assessed by National Grid's specialist teams covering environment, design and construction and land rights.

2.7.3 The process is applied to relevant design refinements associated with the Project and broadly comprises the following stages:

- Preliminary assessment: Each design refinement is initially reviewed by National Grid to identify if there are valid reasons to consider the request. In order to be considered each request needs to be specific and locatable. If so, the design refinement is passed on to the next stage of the process. Some identified refinements are rejected at this stage if for example they are a duplication of another request already being considered under the change control process or have been considered at a previous stage and there is no new information that could change the decision previously made (i.e. at the CPRSS or Strategic option stage).
- Engineering study: This examines the technical feasibility of the proposed change and if feasible an engineering design which would accommodate the refinement is developed for consideration in the next stage of the process.



- Full assessment: The technical specialists (environmental, engineering and construction and land rights) assess all the relevant information, including the engineering design and independently come to a view as to whether the refinement should be made. For some changes, additional information is provided to inform the decision. For example, in some cases a more detailed assessment is undertaken by environmental specialists where concerns are raised about the potential environmental implications of the change.

## Overview of non statutory consultation feedback

2.7.4 There were 42 non-statutory consultation responses received, from which a number of themes emerged. A brief summary regarding the responses received is set out below and the full detail is provided in **Appendix 5, Volume 6, Document 6.1**.

- In general, respondents indicated that the preferred Substation Siting Area for York North (Overton Substation) was the preferred site for the substation but respondents stressed the importance of positioning the substation sympathetically to protect the landscape and countryside features and concerns were raised by several respondents in terms of the potential landscape and visual amenity impacts of the proposed Overton Substation. Concerns around access were also raised, in particular the potential use of Overton Lane and Stripe Lane by heavy goods vehicles during construction and how this may impact local residents accessing Overton village.
- A number of respondents commented on the corridor options identified in the CPRSS and generally, responses from the respondents supported corridor B for the alignment of the 400kV overhead lines. Skelton Parish Council commented that infrastructure should be kept away from Skelton village.
- Several respondents queried why the 400kV lines could not be placed underground.
- Some respondents expressed concern around the impact the lines would have on the Green Belt, arguing that running the cables underground would maintain the openness of the landscape and the rural character of local villages.
- Concerns were raised in relation to the proposed substation at Monk Fryston including why it could not be built in another location further away as well as to the west of Rawfield Lane, the impact of construction works on local traffic levels and about the development of the substation in the Green Belt and effects on local villages and the local wildlife.
- Comments about the environmental impact of the Project were received including that there should not be permanent noise or light pollution to Overton village and that adverse effects on water quality and pollution during construction should be prevented.
- Respondents noted that new infrastructure would be sited in locations sensitive to local wildlife and habitat sites. Several respondents also stated that impacts on Overton Wood (an Ancient Woodland) and Moorland Nature Reserve should be avoided as part of the Project. Respondents felt that construction works should be carried out at appropriate times to avoid negative impacts on wildlife, such as nesting birds and bats.
- In relation to the alignment of the two options put forward for the alignment of the 275kV overhead lines more respondents supported Option 1 than Option 2, although

both options faced some objections. This is discussed in more detail in paragraphs 2.7.5 to 2.7.9.

- A landowner offered an alternative site for the proposed Overton Substation on a plot of land within their ownership. This proposal was supported by Overton Parish Council in their response and is discussed further under paragraphs 2.7.16 to 2.7.17.

## **Design changes in response to non statutory consultation feedback**

### *Feedback on options 1 and 2 and development of preferred overhead line route alignment*

- 2.7.5 Feedback from the non-statutory consultation was considered in the further development of the proposed overhead line routes for Option 1 (**Figure 2.4**) and 2 (**Figure 2.5**).
- 2.7.6 Respondents supported Option 1 as it would allow the decommissioning of infrastructure close to Overton. Residents of Overton commented that Option 2 would increase the total number of pylons and wires in the area, blighting the view to the north of the village. They also commented that increasing the number of wires in a concentrated area, as is suggested in Option 2, would increase the risk of bird collision. The Canal and River Trust stressed that if Option 2 were taken forward, the impact of the overhead lines on users of the River Ouse must be fully considered, including boaters, towpath users, anglers and wildlife.
- 2.7.7 A potentially affected landowner expressed concern with regard to Option 1. They stated that keeping both sets of pylons and lines parallel with the railway lines would limit the intrusiveness of the Project as there are new pylons and wires being sited to the east of the railway in either option. In addition to this, they stated that this route protects the SINC of Overton Wood, keeping new lines and Pylons away from the habitat. They also stated that the lines in Option 1 would adversely impact the landholding including the solar panels that are placed between the farmstead and Overton Wood and the three dwellings at Overton Grange.
- 2.7.8 Taking into account the non-statutory consultation feedback, options were developed within the graduated swathes for the new overhead lines (**Figure 2.4** and **2.5**, **Document 5.4.2**). Two overhead line options for the 400kV and 275kV overhead lines located within graduated swathes for preferred corridor options 1 and 2 were identified as follows:
- 400kV overhead line option 1: A 2.6km route running south from the 400kV Norton to Osbaldwick (2TW/YR) overhead line, including indicative CSEC locations, comprising nine new pylons and connecting to Overton Substation. This overhead line route would connect to the existing 2TW/YR overhead line from an existing pylon approximately 240m south of Coldstream Gorse woodland.
  - 400kV overhead line option 2: A 2.6km route with nine new pylons connecting the 400kV Norton to Osbaldwick (2TW/YR) overhead line, including indicative CSEC locations, with Overton Substation. One of the new pylons would replace an existing pylon and connect to the existing 2TW/YR overhead line from an existing pylon 210m south-west of Newlands Farm.
  - 275kV overhead lines option 1 (within Option 2 graduated swathe, **Figure 2.5**): Two separate routes connecting from Overton Substation in the north and running parallel east and west of the ECML. The western route (1.5km) would comprise six

new pylons connecting into the existing 275kV XC/XCP overhead line between Monk Fryston and Poppleton Substations approximately 300m north of Overton village. The eastern route (1.3km) would comprise four new pylons connecting at an existing pylon 90m north of Stripe Lane and east of the ECML. Two pylons (and associated overhead conductors) on the existing XC/XCP route north and north-east of Overton would be removed.

- 275kV overhead lines option 2 (within Option 1 graduated swathe, **Figure 2.4**): Two separate routes would connect from Overton Substation in the north. The western route (2km) would comprise seven new pylons and connect into the existing 275kV XC/XCP overhead line between Monk Fryston and Poppleton Substations at an existing pylon approximately 370m north of Woodhouse Farm. The eastern route (1.3km) would comprise four new pylons and connect to the existing overhead line at an existing pylon 90m north of Stripe Lane and east of the ECML. Under this option a section of the existing 275kV Poppleton to Monk Fryston (XCP) overhead line, including seven pylons, would be removed from east of the ECML to north of Woodhouse Farm.

2.7.9 An Options Appraisal of the above was undertaken in accordance with National Grid's Option Appraisal Guidance (**Volume 5, Document 5.3.2B**) to identify a preferred alignment.

#### *New 400kV overhead line*

2.7.10 For the 400kV overhead line, the Options Appraisal identified that option 2 was the preferred overhead line alignment. Compared to option 1, it minimised landscape and visual effects on Woodstock Lodge (a wedding venue and considered as both a visual and socio-economic receptor) and was more compliant with the NPS EN-5, which make it clear that overhead line routing should be undertaken in accordance with the Holford Rules (paragraph 2.8.5). Option 2 was considered more compliant with the Holford Rules due to it being straighter and more direct (Holford Rule 3), and maximising distance to residential properties (Supplementary Note 3 of the Holford Rules). Whilst this option would have greater landtake and require more construction work and was therefore considered less favourable from an engineering perspective, these differences were not considered to be material or to preclude the development of the option within the required timescales.

#### *New 275kV overhead line*

2.7.11 Of the two options for the 275kV connections, the Options Appraisal identified option 2 as the preferred overhead line alignment.

2.7.12 Option 2, would be likely to have fewer landscape effects and fewer visual effects on properties in Overton compared with Option 1, as it would result in the removal of a greater length of existing overhead line infrastructure to the north of Overton. In addition, it would minimise effects on the National Cycle Network (NCN) Route 65 (on Overton Road) compared to 1 by avoiding a concentration of 'wirescape' (i.e. the presence of several overhead wires or lines in views and across the landscape) parallel to the railway. Option 1 would also result in the creation of 'wirescape' as a result of the two new overhead lines running parallel and either side the ECML.

2.7.13 Option 2 has the potential for slightly greater effects on biodiversity compared to Option 1 as it would cross the River Ouse (which is a candidate Site of Interest for Nature Conservation (SINC)). Effects could also result from the presence of Tansy Beetle,

increased risk of bird collision during construction (when two overhead lines crossing the River Ouse would be present) and increased risk of hydrological and pollution impact. However, these effects were not considered to be significant and could be minimised by locating pylons away from the River Ouse to minimise effects on any habitat along the river which may support aquatic species such as the Tansy Beetle. Pollution best practice management measures would also minimise the risk of pollution and contamination effects on the river during construction.

- 2.7.14 Effects on the historic environment would be very similar for both options with effects from Option 2 being slightly greater because of increased risk of impacting buried archaeological remains south of the River Ouse. Such effects could be minimised through further investigation of baseline conditions, using existing access tracks and roads to access the works and micro-siting of intrusive works.
- 2.7.15 Option 2 was also the preferred option from a technical and engineering perspective as it would enable the removal of a greater number of pylons that would have required upgrading or replacement if option 1 had been taken forward.

#### *Alternative location for Overton Substation*

- 2.7.16 A proposal for an alternative site located north of the village of Shipton for the Overton Substation was suggested in consultation feedback. The alternative site was suggested by a local landowner and supported by Overton Parish Council and was located to the north of the village of Shipton. Consultees suggested using this alternative site would reduce the environmental impact of the substation on the surrounding villages in terms of noise and light pollution and visual impact.
- 2.7.17 The suggested alternative location would not be large enough for the substation to be constructed, taking into account the land needed for the construction works and therefore this change was not made. Furthermore, siting the substation at the alternative location would require changes to the routing of the overhead lines which would pass close to surrounding villages, including Skelton. This was considered less compliant with the Holford and Horlock Rules than the current Project proposals.

#### **Assessment of identified design refinements**

- 2.7.18 Following the identification of the initial preferred design (400kV option 2 and 275kV Option 2) and consideration of feedback from the non-statutory consultation a number of design refinements were made to develop the design to support the statutory consultation on the Project (paragraph 2.7.27). The Project design was developed in more detail to ensure the Project could be constructed and operated safely, to minimise the area of temporary and/or permanent land take and to avoid environmental effects wherever feasible which could then be used for the basis of optioneering to develop the design. Such refinements included:
- inclusion of construction compounds, construction working areas and permanent and temporary access routes;
  - ensuring the Project boundary included sufficient land to construct the Project but that this was minimised where feasible, for example, ensuring property boundaries were followed wherever possible;
  - ensuring safe access, for example avoiding the routing of access beneath scaffolding where access routes join the public highway;

- minimising or re-orientating construction working areas to avoid effects on potential receptors where feasible, for example ensuring a minimum clearance of 9m to watercourses as required by the Internal Drainage Boards where possible, moving working areas around pylons to avoid the need to divert or close a public right of way (PRoW), or remove ponds;
- movement of the proposed construction compounds and access routes adjacent to Overton Substation to minimise loss of hedgerow; and
- siting pylons to ensure safe clearances between features such as the ECML, River Ouse and the proposed overhead line.

2.7.19 For some aspects of the Project design, alternative options were developed and appraised as part of the design review process. These are summarised as follows. For information on pylon locations see the figures provided to accompany **Chapter 3: Description of the Project (Figures 3.1 to 3.6, Volume 5, Document 5.2.3)**.

*Pylon locations (connection of the YN overhead line with the existing Norton to Osbaldwick (2TW/YR) overhead line)*

2.7.20 Further assessment identified the potential to improve the initial engineering design where the proposed 400kV YN overhead line connects to the existing 400kV Norton to Osbaldwick (2TW/YR) overhead line to allow the conductors to align correctly. Three options were identified:

- Option 1: Move YR040 east 15m and YN002 30m north;
- Option 2: Move YN001 west by 15m and YN002 slightly further north; and
- Option 3: Move YR040 east 15m, YN001 east by 8m and YN002 north by 100m.

2.7.21 Option 2 was selected as the preferred option. Although landscape and visual effects were similar for all three options, Option 2 would result in no increase in pylon height compared with Options 1 and 3 which would increase pylon height by 3m. Option 2 would also be more compliant with the Holford Rules due it being a straighter route compared with the other options.

*Realignment of the 275kV Monk Fryston to Poppleton (XC/XCP) overhead line, east of Moor Monkton*

2.7.22 Analysis of the pylons along this section of overhead line to the east of Moor Monkton identified that several pylons would need replacing due to the pylons being overloaded from the additional conductors required to achieve the Project rating. Two options were identified. Both options involved moving the section of existing overhead line closest to Moor Monkton further to the south, with option 2 moving this section of overhead line further from the village than option 1. Option 2 would allow the pylon closest to Moor Monkton (existing pylon XC428T) to be removed completely.

2.7.23 Option 2 was selected, primarily as it allowed for the removal of existing pylon XC428T. This option would also benefit views for some residents of Moor Monkton with pylons noticeably further from the village.,

*Access to pylon XC472 near Newton Kyme*

2.7.24 Alternative options for access to this pylon, which is located south of the River Wharfe, 1.4km north-west of Tadcaster, were considered as the existing access is in close



proximity to Newton Kyme village which includes several listed buildings (including scheduled Kyme Castle, Grade II\* listed Newton Kyme Hall and Grade I listed St Andrew's church) and historic environment receptors (Newton Kyme conservation area, medieval ridge and furrow). There was the potential for direct effects on the Grade II\* listed Newton Kyme Hall as the proposed access route could result in direct effects on gates and other features which are likely to form part of the curtilage of this listed building as a result of the need to implement the access and potentially widen gates.

- 2.7.25 Four options were put forward; Option 1 was an amendment to the existing access route; Option 2 left the public highway to the south of Newton Kyme using an existing double width gate and Options 3 and 4 provided direct access from the A659 south of the pylon.
- 2.7.26 Option 1 was discounted due to effects on the historic environment receptors at Newton Kyme and a PRoW (Ebor Way long distance footpath route); the need to route construction traffic through Newton Kyme along a minor road; potential effects on flood defences; greater engineering cost (due to a longer section of route); and inability to accommodate construction traffic due to the width of the gate (also assumed to be part of Newton Kyme Hall) for the access point. Option 4 was discounted as it would not be possible for larger construction machinery to gain access to the pylon via this route and the route could impact flood defences. Options 2 and 3 were taken forward into the design as one allows a shorter access route, but would require installation of a bridge whereas the longer access route (at this time) would not require installation of new of upgrades to existing culverts and bridges. Both options would need measures to minimise effects on crossing of watercourses and to protect ground conditions (use of panels rather than stone access roads) to minimise historic environment effects.

## Statutory consultation

- 2.7.27 The above changes were incorporated into the preliminary design of the Project. This and supporting environmental information (PEIR) were consulted on as part of statutory consultation under Sections 42 and 47 of the Planning Act 2008 between 28 October and 9 December 2021. Each consultation response received was analysed by National Grid, and, where relevant, requests for change were considered in order to further develop the design of the Project during the next stage of the Project (**Section 2.8: Assessment and Land Rights**).

## 2.8 Assessment and land rights

- 2.8.1 The Assessment and Land Rights stage involves iteratively progressing the preliminary design of the Project in response to statutory consultation feedback and detailed environmental assessment so a detailed Project design can be formed. The required land rights and associated mitigation are also considered at this stage. The Design Change Review process outlined under paragraphs 2.7.2 to 2.7.3 was used to appraise the design changes.

### Overview of statutory consultation feedback

- 2.8.2 The detail of consultation feedback is provided in the Sections 7.4 and 7.5 of the **Consultation Report (Volume 6, Document 6.1)**. Ninety seven consultation responses were received in total.
- 2.8.3 Following statutory consultation, National Grid continued to progress the design of the Project. In light of feedback received, and further design and environmental

investigation and assessment work completed by National Grid, elements of the Project were altered and refined following statutory consultation. Some of these changes presented new or different impacts for identified consultees and/or amendments to the draft Order Limits at the time, compared to those presented during the statutory consultation. As a result of this, three additional targeted consultations were conducted by National Grid. As the impacts of these changes would be mostly localised, tending to only impact those stakeholders who would be directly affected, this consultation only notified consultees about changes that could specifically impact them. Further detail can be found in Section 8 of the Consultation Report (**Volume 6, Document 6.1**).

### **Design changes in responses to statutory consultation feedback**

- 2.8.4 Consultation representations received as part of the statutory consultation, were considered and used to review and further refine the design of the Project, where appropriate. The design changes considered as result of stakeholder feedback are summarised below. This chapter includes those representations that are relevant to the EIA assessment. In accordance with the EIA Regulations, the information presented relates to the reasonable alternatives considered. The reader should refer to the **Consultation Report (Volume 6, Document 6.1)** for further information on the consultation responses.
- 2.8.5 Details of the main design changes to the Project that were made at this stage of the Project and have been accommodated, in comparison with the proposed draft Proposals consulted on as part of the statutory consultation, are provided below.
- 2.8.6 A number of changes were made to the Project as a result of consultee feedback from the statutory consultation which are summarised as follows.

### *Shipton CSECs*

- 2.8.7 Stakeholder feedback from targeted consultation was received to move the location of the Shipton North CSEC and the temporary overhead line diversion in this area to minimise impacts on a landowner and operation of a farm holding as it was considered that the location of the CSEC could impact upon land owner plans to expand farm operations in this area (including development by the land owner already taking place). Following consideration of this change the CSEC was moved slightly southwards and changed to an anchor block solution which required less space with the temporary diversion moved from the north to the south of the existing 400kV Norton to Osbaldwick (2TW/YR) overhead line to accommodate this request and avoid effects on the operation of the land holding.

### *YN 400kV Overhead Line*

- 2.8.8 During the design process veteran trees were identified in close proximity to and under the proposed route of the new 400kV YN overhead line. To avoid the loss of these features, initially, the angle pylon (YN004) was moved further south and the YN overhead line south of this pylon was moved eastwards. Further targeted consultation was undertaken on this change with key stakeholders, and following feedback pylon YN004 was moved west and north and positioned behind an existing tree line to minimise landscape and visual effects on visual receptors to the east of the proposed overhead line.
- 2.8.9 Stakeholder feedback suggested that the two southernmost pylons (YN007 and YN008) on the proposed 400kV YN overhead line be moved to minimise effects on farm

operations. The change to YN007 was accommodated within the design but YN008 was rejected due to the presence of a watermain pipeline and because this alternative design would locate pylon YN008 in the area to install scaffolding needed to protect the crossing of the A19 with the potential to increase impacts on the A19.

- 2.8.10 Stakeholder feedback was also received which put forward changes to the location of pylon YN006 to move this slightly westwards and closer to a field boundary. Making this change would have moved the pylon slightly closer to receptors in Shipton. The associated change in the alignment of the YN overhead line could result in increased visual effects on receptors west of the overhead lines as well as the potential loss of veteran trees. For these reasons this change was not made to the design.

#### *Overton Substation: Location, layout and access*

- 2.8.11 A number of alternatives were considered for the location of Overton Substation as well as in relation to the access to the substation. Two stakeholder responses were received specifically in relation to the location of Overton Substation. In considering these, consideration was also given to the alignment of the overhead lines which would need to connect into the substation.
- 2.8.12 Stakeholder feedback was received to re-orientate Overton Substation at its location south of the A19 so that the substation would be aligned parallel with the ECML. This was considered to minimise the loss of agricultural land and potential impacts on farm operations. Movement of the substation further north towards Overton Road also formed part of the request to reduce visual effects from the 275kV XC overhead line and pylons on receptors to the south. Making these changes to the substation would also require movement of the 400kV YN overhead line further to the east. This change was not incorporated into the Project design for the following reasons:
- the presence of a water main pipeline below the substation site prevented some of the changes being implemented;
  - the re-orientation of the substation would have moved it into flood zones which would not meet policy tests as alternatives sites are available outside of flood;
  - the changes required to the YN overhead line would have increased negative landscape and visual effects on receptors to the east of the overhead line (Hall Moor Farm cottages and Hall Moor Farm South); and
  - the construction works would have increased in complexity due to works taking place in closer proximity to the ECML. The space needed to construct the substation between the ECML and substation would have reduced.
- 2.8.13 Stakeholder feedback was received to move Overton Substation to the north of the A19 due to stakeholder concerns regarding potential visual effects and the suggestion that the alternative site would be better screened by existing vegetation around its boundary. Moving the substation further north would require realignment of all three overhead lines connecting into the substation from the north and south. This would require additional pylons on the 275kV SP and XC overhead lines and one less pylon on the 400kV YN overhead line, with an overall net increase in the number of pylons. This change was not incorporated into the Project design for the following reasons.
- Flood modelling indicated that there was a greater risk of flooding at the alternative site, with part of the site falling within flood zone 2 which would not meet policy tests as alternatives sites are available outside of flood zone 2.

- Although the alternative substation would have been better screened by existing vegetation, measures would still be needed within the substation site to mitigate landscape and visual effects, in particular landscape planting and bunding around the northern half of the site. Initial flood modelling indicated that the boundary along which these measures were required was at greater risk of flooding and therefore it may not be possible to implement such measures (landscape bunds) without increasing flood risk further.
- The alternative design increased the overall number of pylons with the introduction of a new angle Pylon south of the substation increasing landscape and visual effects, reducing compliance with Holford Rule 3. Furthermore, a concentration of wirescape (Holford Rule 6) would have likely resulted from the alternative option and potentially increased visual effects with an increase in pylon visibility and complexity of wirescape perceived from the south-east edge of Shipton and the A19.
- The alternative site could result in greater effects on biodiversity with the potential loss of priority habitat and the loss of a veteran tree and effects on protected species which may use habitats along the watercourses bordering the site.
- The alternative design could increase effects on land holdings due to the increased number of pylons and would result in increased costs.

- 2.8.14 Although the alternative designs for Overton Substation were not implemented, changes were made to the substation to reduce its overall footprint. The initial design allowed for a worst-case footprint to allow for all potential equipment needed in the substation layout. Following further review of the engineering design it was determined this was not required and the substation footprint was reduced and the distance between the substation and watermain pipeline increased.
- 2.8.15 Overton Road is part of the Sustrans National Cycle Network (NCN 65), and concerns were raised for the safety of users of this route having to travel along Overton Road alongside construction vehicles accessing the construction compounds either side of the road near Overton Substation. Therefore, changes were made to the design in order to provide an alternative cycle route and a surfaced off-road alternative route was incorporated into the Project design allowing users to bypass Overton Road between its junction with the A19 and where this Sustrans route crosses the ECML. In addition, as part of a subsequent design change the access into the Overton Substation site was revised in order to minimise construction traffic travelling along the single-track Overton Road as a result of stakeholder feedback.
- 2.8.16 Stakeholder feedback was also received to move the pylons closest to the substation (YN008, XC416 and SP003) as close to existing field boundaries as possible to minimise effects on farm operation. YN008 could not be moved due to the presence of the watermain pipeline and the need to locate scaffolding over the A19. Pylons XC416 and SP003 could not be moved due to the technical constraints on the angle of the downloads from these pylons as they would connect into the substation as well as needing to achieve clearances to the ECML railway.
- 2.8.17 Stakeholder feedback from North Yorkshire County Council highways queried why access into Overton Substation could not be taken directly from the A19. An access to the A19 on the frontage of the Overton Substation was not considered appropriate due to the nature of the A19 in the area. The A19 is a 60mph two lane single carriageway. The frontage of the Overton Substation would be along a section of carriageway that is just prior to a bend on the A19 near the junction with Overton Road. It was considered that a new access in this location would introduce further highways safety issues on the



road when compared to using an established wide access at Overton Road. The Overton Road access has been in place for a long time and existing road users are aware of the junction, it has warning and direction signs well in advance on the A19 and the speed of vehicles at this junction is naturally slower due to it being on the apex of a shallow bend on the A19.

### *275kV overhead lines connecting into Overton Substation*

- 2.8.18 Stakeholder feedback suggested that pylons SP005 and SP006 east of the ECML, south-east of Overton Substation and west of Skelton be moved closer to field boundaries to avoid effects on farm operations. SP005 was moved to address this. SP006 was not moved as the clearances required between the different components of the overhead line could not be achieved.
- 2.8.19 Stakeholder feedback was also received which outlined a number of changes to the XC overhead line south of Overton Substation. These changes were put forward to minimise landscape and visual effects and minimise effects on farming operations. Two options were considered; option 1 moved the overhead line much closer to Overton Wood and option 2 made amendments to the statutory consultation overhead line alignment moving pylon XC419 south-west and moving the overhead line south of this pylon slightly westwards and closer to Overton Wood. Pylons XC420 and XC421 would also have moved slightly west, as would the temporary diversion south of the River Ouse.
- 2.8.20 Option 1 would have resulted in increased potential effects on Overton Wood ancient woodland and veteran trees, compared with the statutory consultation design and would have also resulted in one additional pylon. This option was also considered less compliant with the Holford Rules as it would increase effects on “smaller areas of higher amenity value” (Rule 2) and be less direct with one additional angle Pylon, a greater change of direction at XC419 and one additional pylon (Rule 3). However it would allow some backgrounding from the woodland (Rule 4). Option 2 had fewer environmental effects than option 1 but was not considered to meet the changes put forward by the stakeholder and therefore neither option was incorporated into the design.
- 2.8.21 Stakeholder feedback was also received which put forward changes to the location of SP006 and SP007, to move these west and closer to the ECML. Making this change would have increased ecological effects compared with the statutory consultation design as a result of increased habitat loss, increased effects on Overton Borrowpits Site of Importance for Nature Conservation (SINC) and increased effects on Hurns Gutter. From an engineering perspective this change would have moved the pylon working areas closer to Hurns Gutter and would also have meant that the safety clearances between the ECML and the cranes needed to install the overhead line would not have been met. Clearances are needed for safety reasons in the event the crane falls. Therefore this change was not incorporated into the design.

### *Realignment of existing XC overhead line south of Moor Monkton*

- 2.8.22 Stakeholder feedback was received which put forward changes to move the existing XC overhead line further north from stakeholders as part of the realignment. Three options were considered however an option could not be found that allowed the realigned XCP overhead line to be moved further north from the stakeholders. Furthermore, some of the options resulted in fewer pylons being built offline and therefore temporary diversions having to remain in place for a longer period. For one option more temporary pylons would be required increasing the number of temporary pylons in the landscape.



In terms of environmental effects all options were likely to have similar effects to the statutory consultation design. Option 2 would have slightly improved visual effects compared to the statutory consultation design but would result in increased loss of trees and habitat along the River Foss Corridor, including veteran trees.

### *Existing XC overhead line works*

2.8.23 Changes were made to the scaffolding design to avoid impacts on Huddleston Old Wood, an area of ancient woodland, in response to stakeholder feedback as well as other areas of mature woodland and veteran trees. These changes comprised reducing the footprint and size of the scaffolding and rotating the scaffolding to avoid these ecological receptors. At Huddleston Old Wood a vertical steel tube from the scaffold would extend into the wood to prevent the conductors dropping onto trees during the reconductoring works in response to this feedback.

### *Tadcaster Area*

2.8.24 Stakeholder feedback put forward a change in the Tadcaster Area to move the replacement pylon XD001 into the adjacent field to the west or further east towards the field boundary to minimise effects on farm operations. Three options were considered:

- 1) move the pylon to the adjacent field to the west;
- 2) move the pylon further east to the field boundary; or
- 3) move the pylon slightly further east.

2.8.25 In terms of landscape and visual effects, compared with the statutory consultation design, Option 1 was the most preferred as the pylon would be reduced in height and would move further away from the nearest visual receptor. Option 2 was the least preferred as the taller pylon proposed under this option would have the potential to increase visual effects on the nearest visual receptor. Effects from Option 3 would be similar to the statutory consultation design.

2.8.26 However, in terms of impacts on agricultural operations, Option 2 was most aligned with the stakeholder request with Option 3 the next preferred option as this would bring the pylon closer to the field boundary and minimise land take and sterilisation of land further to the south. Option 1 was least preferred as it would move the CSEC further into the middle of the field increasing impacts on farm operations south of the field boundary with a greater length of underground cable and therefore soil disturbance. Overall, Option 3 was most preferred and was selected because it would have the least impact on the adjacent pylons along the existing overhead line, would minimise construction works, contribute towards meeting the stakeholder request and would not increase visual effects compared to those reported in the PEIR at statutory consultation.

2.8.27 Stakeholder feedback put forward a proposed change to remove the northern construction compound at Tadcaster and increase the size of the southern compound in order to avoid effects on farm operations at the proposed northern compound location. Following further design work in the surrounding area, National Grid has removed one of the compounds proposed at Tadcaster, leaving a single construction compound, in line with a landowner's request. The single construction compound is to be located in the southern field, as this avoids the need for construction traffic to track underneath existing and temporary overhead lines, as well as being in close proximity to the cable sealing end compound and cable run.

- 2.8.28 Stakeholder feedback put forward a proposed change to re-route the underground cable between the CSECs in order to minimise effects on farm operations. This change could not be accommodated within the Project design due to the presence of a medium pressure gas main pipeline which will need to be diverted in order to construct the Project. A high pressure gas pipeline is also present in this area and therefore limited space is available to avoid the high pressure gas pipeline, divert other third party utilities and install the underground cable. For these reasons this change was not implemented as part of the design.
- 2.8.29 Stakeholder feedback was received in relation to the location of the Tadcaster West CSEC suggesting that it should be rotated so that the longest side runs adjacent to the boundary of the field; another suggestion was that the Tadcaster West CSEC could be positioned half on the land proposed and half in the adjoining field; the feedback also proposed the retention of existing pylon XD001 to avoid the need for a new pylon.
- 2.8.30 The retention of existing pylon XD001 is not possible as it is a suspension pylon which means that the pylon is not designed to handle the loads required to accommodate the connection between the pylon and the Tadcaster West CSEC.
- 2.8.31 The suggestion provided to rotate the CSEC so the longest side could be positioned half on the land proposed and half in the adjoining field, is not possible in the existing location and this would be required to be further south-east from the proposed position to enable the downloads required between the pylon and the CSEC. This option would result in the need for the span length of the downloads from the replacement XD001 pylon to be increased in length and taken at a different angle to the proposed solution. The optimal electrical solution is for the downloads to be taken at 90 degrees from the pylon to the CSEC. Whilst positioning of the CSEC further south-east would be technically possible, this does not present an optimal engineering solution, and would result in permanent effects on two landholdings rather than one landholding as is proposed. This would also result in an increased permanent land take across two landholdings due to the extended length of access road. Therefore, this option has not been taken forward.
- 2.8.32 The suggestion provided to rotate the CSEC so that the longest side would be adjacent to the field boundary, is not possible in the existing location and this would be required to be further south-east from the proposed position to enable the downloads required between the pylon and the CSEC. This would result in the need for the span length of the downloads from the replacement XD001 pylon to be increased in length and taken at a different angle to the proposed solution. This would be required to ensure the appropriate separation clearances are observed for safety, construction, maintenance and operation. Increased download span lengths could also result in the need to strengthen the gantry design and increase the size of the foundations. Furthermore, additional post insulator equipment would be required in the CSEC for this option due to the need to rotate the gantry to accommodate this solution to achieve electrical clearance.
- 2.8.33 The option proposed by the respondent which would be required to be further south-east in the field, whilst technically possible, does not present an optimal engineering solution and also would require increased permanent land take. For these reasons set out above, this option has not been taken forward.

### *Monk Fryston Substation Area*

- 2.8.34 Stakeholder feedback suggested that the boundaries of the proposed construction compound on the west side of Rawfield Lane at the Monk Fryston Substation area be

moved to allow for agricultural machinery to pass around the construction compound. Three options were considered to slightly amend the location and layout of the compound within the field in which it would be located, and the compound boundaries amended accordingly to allow access for agricultural machinery.

## **Design refinement and development**

- 2.8.35 It is National Grid's approach to use design assumptions and parameters in earlier phases of the Project design to allow for flexibility and enable the Project design to be modified in response to consultation feedback. Therefore in addition to the feedback from statutory consultation, a number of design refinements were made to the Project design to ensure optimal operation of the Project, meet design and safety standards and to mitigate environmental effects identified as part of ongoing survey and assessment work that had taken place since the start of the Project. These have been themed as follows:
- additional refinements to the Project design to allow for its construction;
  - amendments to the highways and access design in order to ensure the design complies with highways design standards, allows for safe access and can accommodate the type and number of construction vehicles needed to construct the Project;
  - reduction in the area of land within the Order Limits needed to construct and operate the Project where feasible in order to minimise effects on land holdings and avoid or minimise habitat loss; and
  - changes made to minimise or avoid environmental effects, in particular in relation to tree loss and impacts on biodiversity, identified as a result of baseline surveys.
- 2.8.36 In each case all proposed design changes were reviewed in line with National Grid's change control process and against policy compliance and baseline environmental conditions to ensure negative environmental effects were minimised and measures implemented to mitigate effects.
- 2.8.37 In addition to the feedback from statutory consultation, a number of refinements were made to the Project design to ensure optimal operation of the Project, meet design and safety standards and to mitigate environmental effects identified as part of ongoing survey and assessment work.
- 2.8.38 Further refinements were made to the Project design to allow for its construction. This included more detailed design of construction drainage, scaffolding to ensure access for farm operations and residents can be maintained, third party utility diversions and temporary watercourse crossings.
- 2.8.39 Changes made to the highway and access design have comprised the following:
- The junction of Overton Road and the A19 near Overton Substation was widened in order to allow larger construction HGVs needed to construct the substation to safely pass in both directions.
  - Initially the visibility splays within the Project design had been designed to accommodate vehicle speed limits of 60mph, prior to any survey work taking place, in line with national speed limits. Further review, including speed surveys, identified lower speeds as well as speed limitations on some roads and therefore visibility splays were either reduced or removed completely. In some locations this also allowed the retention of trees and woodland which would otherwise have been lost.

- West of Skelton and east of the ECML a temporary bridge across Hurns Gutter and temporary access between pylons SP005 and SP006 were included in the Project design as further assessment identified that Stripe Lane may not be suitable to accommodate larger construction vehicles and substantial widening and upgrades would be needed for passing places. This change would allow construction traffic to access these pylons whilst reducing the construction traffic along Stripe Lane to smaller vehicles, such as cars, 4 by 4 vehicles and low loaders, only. Implementing this change avoided the need to widen or construct passing places along Stripe Lane which would have resulted in associated effects such as loss of mature trees and hedgerow.

2.8.40 Changes made to minimise the area of land needed within the Order Limits to construct and operate the Project have included the following:

- Removing and reducing the number of temporary overhead line diversions (and associated working areas and access). In reviewing the Project design, it was found that in some locations the Project could be safely constructed without the need for the proposed temporary diversions, such as the southern temporary diversion along the XCP line (existing pylons XCP006 to XCP008). Removing these temporary diversions would reduce landscape, visual and heritage setting effects during construction as well as potential habitat loss.
- Reducing the number of construction accesses and/or minimising the length of access tracks where feasible. This has included amending access routes to avoid vegetation loss, minimise effects on property and use existing field gates to avoid hedgerow removal. Access was amended to route along the alignment of the overhead line to minimise the number of access routes traversing fields and minimise effects on farm operations. For example, between pylons XD004 and XD008 on the existing 275kV Tadcaster Tee to Knaresborough (XD/PHG) overhead line in the Tadcaster Area. An access route was also included between pylons XCP007 and XCP008 to allow the removal of a long access route from Cinder Lane near Nether Poppleton.
- Removing areas of the land within the Order Limits which were not needed to construct or access the Project. An area of Order Limits east and west of Sutton Lane along the existing 400kV Norton to Osbaldwick (2TW/YR) overhead line was removed as further engineering review identified that potential works east of pylon YR035 were not required.
- Removal of bellmouths where access tracks met the public highway which were not required in order to meet highways design standards. At a number of locations bellmouths were not required as the volume and type of vehicles needed to construct the Project were such that existing field access gates or bellmouths already in place were suitable to accommodate the proposed construction traffic.

2.8.41 A number of changes made to minimise or avoid environmental effects including the following design refinements:

- The Order Limits were amended to ensure that a 15m buffer would be in place between Overton ancient woodland and the Order Limits.
- As arboricultural baseline surveys were undertaken, a number of veteran and high-quality trees were identified within the Order Limits. Several changes were made to ensure that impacts on such trees were avoided. Design refinements have included altering the alignment of proposed access routes, reducing the extent of working

areas, or stringing areas or amending the Order Limits or Limits of Deviation to exclude high quality or veteran trees.

- The design has been refined to avoid effects on other biodiversity identified as a result of baseline ecological surveys. Typically, such changes included altering working areas to avoid locally designated nature conservation sites such as Overton Borrowpits Site of Importance for Nature Conservation, areas of priority habitat and to ensure a buffer between the proposed areas of construction and identified receptors such as badger setts and otter holts
- The footprint of scaffolding, needed to protect assets such as railways where the overhead line crosses over such features, or the layout and design of the scaffolding was reduced or redesigned to avoid impacts on woodland and high-quality trees.
- The Tadcaster Tee East 275kV CSEC was moved further west and away from the A64 highway corridor to minimise retaining structures required for this element of the design and therefore minimise landscape character effects, in particular on the Locally Important Landscape Area within which this part of the Project lies.
- The height of one the temporary diversion pylons to the west of Pollums House Farm, west of the existing Monk Fryston Substation, was increased to minimise the loss of existing woodland south of this property. Although the pylon height has increased, this change would ensure that existing woodland would remain in place and would help screen both the temporary and permanent elements of the Project at this receptor, reducing visual effects
- The Order Limits south of Monk Fryston Substation were extended southwards to include land within existing National Grid ownership. This would allow access to the proposed biodiversity and landscape planting and earthbunds around the proposed Monk Fryston Substation. In addition, by not making this change the land in the corner of the field south of the existing Monk Fryston Substation would become sterilised as it cannot be accessed other than through the Project site. The existing tree belts and woodland long the field boundary would be retained as part of the Project.

2.8.42 The Project design for which development consent is being sought is described in further detail in **Chapter 3: Description of the Project, Volume 5, Document 5.2.3.**



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