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Bramford to Twinstead Reinforcement

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Assessment

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1. Introduction

1.1 Overview

- 1.1.1 National Grid Electricity Transmission plc (here on referred to as National Grid) is making an application for development consent to reinforce the transmission network between Bramford Substation in Suffolk, and Twinstead Tee in Essex. The Bramford to Twinstead Reinforcement ('the project') would be achieved by the construction and operation of a new electricity transmission line over a distance of approximately 29km (18 miles), the majority of which would follow the general alignment of the existing overhead line network.
- 1.1.2 This Minerals Resource Assessment (MRA) has been produced to support the application for development consent and the accompanying Environmental Statement (ES) under the Planning Act 2008. It has been prepared to examine the potential effects of the project on Mineral Safeguarding Areas with the purpose of establishing the potential impact on mineral resources of economic importance and to consider whether further consideration and mitigation is required in accordance with planning policy. This MRA has been written with regard to Minerals Safeguarding Practice Guidance (Minerals Products Association, 2019) which provides guidance on the scope and format of the MRA.

1.2 Background to the Project

- 1.2.1 The reinforcement would comprise approximately 18km of overhead line (consisting of approximately 50 new pylons, and conductors) and 11km of underground cable system (with associated joint bays and above ground link pillars).
- 1.2.2 Four cable sealing end (CSE) compounds would be required to facilitate the transition between the overhead and underground cable technology. The CSE would be within a fenced compound, and contain electrical equipment, support structures, control building and a permanent access track.
- 1.2.3 Approximately 27km of existing overhead line and associated pylons would be removed as part of the proposals (25km of existing 132kV overhead line between Burstall Bridge and Twinstead Tee, and 2km of the existing 400kV overhead line to the south of Twinstead Tee). To facilitate the overhead line removal, a new grid supply point (GSP) substation is required at Butler's Wood, east of Wickham St Paul, in Essex. The GSP substation would include associated works, including replacement pylons, a single circuit sealing end compound and underground cables to tie the substation into the existing 400kV and 132kV networks.
- 1.2.4 Some aspects of the project, such as the underground cable sections and the GSP substation, constitute 'associated development' under the Planning Act 2008.
- 1.2.5 Other ancillary activities would be required to facilitate construction and operation of the project, including (but not limited to):
- Modifications to, and realignment of sections of existing overhead lines, including pylons;
 - Temporary land to facilitate construction activities including temporary amendments to the public highway, public rights of way, working areas for construction equipment and machinery, site offices, welfare, storage and access;

- Temporary infrastructure to facilitate construction activities such as amendments to the highway, pylons and overhead line diversions, scaffolding to safeguard existing crossings and watercourse crossings;
- Diversion of third-party assets and land drainage from the construction and operational footprint; and
- Land required for mitigation, compensation and enhancement of the environment as a result of the environmental assessment process, and National Grid's commitments to Biodiversity Net Gain.

1.2.6 For a full description of the project reference should be made to ES Chapter 4: Project Description (**application document 6.2.4**). The Proposed Alignment can be found on the Figure 4.1: The Project (**application document 6.4**). The need for the project is described in the Need Case (**application document 7.2.1**).

1.2.7 The Order Limits cross the administrative boundaries of Suffolk and Essex, and therefore pass through various mineral safeguarded and mineral consultation areas within both Minerals Planning Authorities. This report references the following project sections:

- Section AB: Bramford Substation/Hintlesham;
- Section C: Brett Valley;
- Section D: Polstead;
- Section E: Dedham Vale Area of Outstanding Natural Beauty (AONB);
- Section F: Leavenheath/Assington;
- Section G: Stour Valley; and
- Section H: GSP Substation.

1.2.8 Section AB, C, D, E, F and the eastern part of G (up to the River Stour) are located within the administration of Suffolk County Council, while the western part of Section G (from the River Stour) and Section H are located within the administration of Essex County Council. The sections and the administrative boundary between Suffolk and Essex County Council are shown on the Location Plan (**application document 2.2**).

2. Minerals Policy and Planning

2.1 National Policy Statement

- 2.1.1 As described in ES Chapter 2: Regulatory and Planning Policy Context (**application document 6.2.2**), when determining an application for development consent, the Planning Inspectorate is required to have regard for the relevant National Policy Statements (NPS). The two relevant NPS for the project are the Overarching NPS for Energy (EN-1) (Department of Energy and Climate Change (DECC), 2011a) and the NPS for Electricity Networks Infrastructure (EN-5) (DECC, 2011b).
- 2.1.2 Paragraph 5.10.9 of EN-1 states, '*Applicants should safeguard any mineral resources on the proposed site as far as possible, taking into account the long-term potential of the land use after any future decommissioning has taken place*'.
- 2.1.3 Paragraph 5.10.22 of EN-1 states '*Where a proposed development has an impact upon a Mineral Safeguarding Area (MSA), the IPC [Infrastructure Planning Commission] should ensure that appropriate mitigation measures have been put in place to safeguard mineral resources*'.
- 2.1.4 There is no reference to minerals within EN-5.
- 2.1.5 Although the relevant NPS provide the primary policy against which the project should be decided, regional and local policy documents may also be considered important and relevant to decision-making. Therefore, the relevant minerals plans have been considered when developing this MRA. Further details on planning policy can be found in the Planning Statement (**application document 7.1**).

2.2 National Planning Policy Framework

- 2.2.1 The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2021) paragraphs 209 to 214 describe how planning policies should facilitate the sustainable use of minerals.
- 2.2.2 Paragraph 210 states that '*Planning policies should:...*
- c) Safeguard mineral resources by defining Mineral Safeguarding Areas and Mineral Consultation Areas; and adopt appropriate policies so that known locations of specific mineral resources of local and national importance are not sterilised by non-mineral development where this should be avoided (whilst not creating a presumption that the resource defined will be worked); and*
- d) set out policies to encourage the prior extraction of minerals, where practical and environmentally feasible, if it is necessary for non-mineral development to take place*'.
- 2.2.3 The NPPF also states in paragraph 213 that '*Minerals planning authorities should plan for a steady and adequate supply of aggregates by: ...*
- f) maintaining landbanks of at least 7 years for sand and gravel ... whilst ensuring that the capacity of operations to supply a wide range of materials is not compromised*'.

2.3 Suffolk County Council

Minerals and Waste Local Plan

- 2.3.1 The Suffolk Minerals and Waste Local Plan was adopted in July 2020 (Suffolk County Council, 2020). This indicates that large parts of the Order Limits are located within the Suffolk County Council Minerals Consultation Area (MCA).
- 2.3.2 Policy MP10 advises that these areas will be safeguarded from proposed development in excess of 5ha. As the Order Limits exceed 5ha within a MCA, a MRA has been produced to demonstrate that *'the sand and gravel present is not of economic value, or not practically or environmentally feasible to extract, or that the mineral will be worked before the development takes place or used within the development'*.
- 2.3.3 The Suffolk Minerals and Waste Local Plan (MWLP) also shows that the project is located within the following site allocated for sand and gravel extraction:
- Layham Quarry operated by Brett Aggregates – site allocation M5 and IL4/NHL3 as shown on Map B3 in the MWLP. Allocation M5 is for an extension to the existing sand and gravel operations at Rands Hall Pit in Layham. It is known that a planning application to extend the timescales for extraction and restoration at Layham Quarry to April 2032 and October 2033, respectively, was approved in October 2019 (Planning Ref: SCC/0018/19B/VOC).
- 2.3.4 The Order Limits include parts of Layham Quarry. Policy MP10 advises that the County Council will safeguard *'areas falling within 250m of an existing, planned or potential site allocated in the Plan for sand and gravel extraction. The MPA [Minerals Planning Authority] will advise the Local Planning Authority whether any proposed development might prejudice the future extraction of minerals and should be refused, or whether such development itself might be prejudiced by proposed mineral working.'*
- 2.3.5 Policy MS5: Layham applies to Layham Quarry, which is crossed by the project. Layham Quarry is allocated for mineral extraction in the Suffolk Minerals and Waste Local Plan, having an estimated mineral resource of 829,000 tonnes. The policy states that the Council will grant planning permission at this site for future sand and gravel extraction. Further discussion regarding Layham Quarry is provided in Section 3.3.
- 2.3.6 Figure 10.3 (**application document 6.4**) shows the Order Limits of the project, the extent of the MCA crossed by the project and the location of Layham Quarry.

Suffolk County Council Local Aggregate Assessment

- 2.3.7 The current landbank for various aggregates for any given MPA is usually documented in a Local Aggregate Assessment (LAA), which reports annually on aggregate supply and demand within the relevant planning area. The most recent LAA for Suffolk reflects the position at the end of 2018 (Suffolk County Council, 2019). This contains the following relevant information:
- **Sand and Gravel Sales:** The 10-year average sales have decreased slightly since the previous LAA and currently stands at 1.094 million tonnes (Mt) as of December 2018, however the 3-year average was slightly higher at 1.234Mt; and
 - **Sand and Gravel Landbank:** The landbank of permitted reserves as of December 2018, based on the 10-year sales average, was 9.7 years. This is in excess of the

seven-year requirement set out in the NPPF. With the adoption of the 2020 Minerals Local Plan, there has been a further provision of 11.180Mt of sand and gravel which included a 20% safety margin. This is considered sufficient to reach the end of the 2020 Minerals Local Plan period (2036).

- 2.3.8 The evidence from the LAA indicates there is no current or foreseeable shortage of sand and gravel reserves in Suffolk, and that the current landbank of material is adequate to reach the end of the current plan period in 2036.

2.4 Essex County Council

Minerals Local Plan

- 2.4.1 The current Essex Minerals Local Plan was adopted in July 2014 (Essex County Council, 2014). This is currently under review and consultation on the Minerals Local Plan Review ended on 29 April 2021. A new Local Development Scheme was expected to be adopted imminently after the consultation ended, which would set out a new timetable for adoption of the Minerals Local Plan Review. However, this has been delayed and the timetable for adoption is currently unknown at this stage. Therefore, the review considers both the policies in the adopted and emerging Essex Minerals Local Plan in the application for development consent, with limited weight afforded to the latter.
- 2.4.2 The policies map within the adopted Minerals Local Plan (Essex County Council, 2014) and the emerging Minerals Local Plan (Essex County Council, 2021c) confirm that parts of the project are located within a MSA for sand and gravel. The project does not cross through any MCA. Policy S8 of the emerging Minerals Local Plan requires that the Minerals Planning Authority be consulted, and its views taken into account on *'all planning applications for development on a site located within an MSA and/or MCA that would have the potential to sterilise 5ha or more for sand and gravel, 3ha or more for chalk and greater than 1 dwelling for brickearth or brick clay'*. Where development exceeds these thresholds, a MRA is required. The wording of these requirements in the emerging Minerals Local Plan (Essex County Council, 2021c) differ slightly from those outlined in Policy S8 of the adopted Minerals Local Plan, introducing *'would have the potential to sterilise'*.
- 2.4.3 Policy MP10 of the adopted Minerals Local Plan (Essex County Council, 2014) advises that the MSA will be safeguarded from proposed development in excess of 5ha. If a project sterilises 5ha of mineral within the MCA, the developer needs to demonstrate that *'the sand and gravel present is not of economic value, or not practically or environmentally feasible to extract, or that the mineral will be worked before the development takes place or used within the development'*.
- 2.4.4 The Essex Minerals Local Plan (Essex County Council, 2014) defines MSA as being all areas of glacial, glaciofluvial and river terrace deposits of sand and gravel identified on the British Geological Survey (BGS) mapping (and other supplementary sources of evidence).
- 2.4.5 The policies map within the adopted Minerals Local Plan identifies that *'extensive areas of northern and central Essex are protected by MSA for sand and gravel'*. This includes parts of the Order Limits, as shown on Figure 10.3 (**application document 6.4**). However, no allocated sites or MCA have been identified in close proximity or within the Order Limits.

2.4.6 Essex County Council is currently in the process of reviewing Policy S6 of the Minerals Local Plan, and this is likely to include the use of the average of the last 10 years of rolling sales, plus a buffer of 20%, to calculate the aggregate provisions and to allow sufficient flexibility to accommodate any increases in sand and gravel sales. This means that additional sites will be needed to meet this requirement and therefore Essex County Council has recently undertaken a Call for Sites exercise for sand and gravel extraction, which ended in March 2022, to *'ensure a steady and adequate supply of this minerals to the end of the Essex Minerals Local Plan period in 2029'* as well as carrying out public engagement on the direction of Policy S6 of the Minerals Local Plan.

Essex County Council Local Aggregate Assessment

2.4.7 The latest available LAA for Essex was published in December 2021 (Essex County Council, 2021) and reflects the position at the end of 2020. The LAA contains the following relevant information:

- **Mineral Extraction Facilities:** In December 2020 there were *'37 sand and gravel quarries in Greater Essex, 24 of which are active. Of the 13 inactive sand and gravel quarries, four are considered as long term 'dormant' and nine are permitted but not actively extracting'*. The project does not cross through any of these sites. At the time of writing the LAA, there was considered to be at least 3.6 million tonnes (Mt) per annum potential sand and gravel production capacity *'however, there is assumed to be significantly more capacity within Greater Essex'* as only 65.2% of the sites provided the potential sand and gravel production capacity. It was also identified in the LAA that there was the potential for extraction at a further four sites pending determination. A review of these applications has determined that two are still awaiting determination, one has been resolved to be granted consent subject to conditions and legal agreement, and one has been granted consent on 1 March 2022;
- **Sand and Gravel Sales:** The 10-year annual average sales (2011 to 2020) figure was 3.26Mt and the three-years sales annual average was 3.23Mt, which are below the predicted tonnage of 4.45Mt per annum which was used to determine the required provisions in the current adopted Minerals Plan. Sales of sand and gravel increased from 2.80Mt to 2.96Mt in the period between 2011 and 2020, however in the last three years the sales show a decrease from 3.56Mt in 2018 to 2.96Mt in 2020 (it is noted that this could have been affected by COVID-19). There have been no years where the actual sales have exceeded the annualised provision within the Minerals Plan; and
- **Sand and Gravel Landbank:** The current landbank is calculated using the 10-year sales average, which currently stands at 10.30 years which is in excess of the seven-year requirement set out in the NPPF.

2.4.8 The evidence from the LAA suggests that the demand for sand and gravels in Essex has been decreasing and is below the figure which was used to determine the required annual provision of material within the adopted Minerals Local Plan (Essex County Council, 2014) and the emerging Minerals Local Plan (Essex County Council, 2021c). It is therefore considered that there is no current or foreseeable shortage of sand and gravel in Essex and that the existing landbank is adequate.

3. Existing Baseline

3.1 General Overview

3.1.1 Figure 10.1 and 10.2 (**application document 6.4**) show the 1:50,000 series mapping comprising the superficial and solid geology for the Order Limits respectively. Further information in relation to the geology relevant to the project is described in ES Appendix 10.1: Geology Baseline Information and Preliminary Risk Assessment (**application document 6.3.10.1**).

3.2 Mineral Composition and Thickness

Minerals Assessment Reports

3.2.1 There are two relevant Minerals Assessment Reports (MAR) which cover parts of the Order Limits. The MAR are a series of reports that describe the mineral resources across areas of the United Kingdom. The reports were produced using data gathered from borehole surveys and contain qualitative and quantitative data on lithology, composition, particle size analysis and other information of commercial value.

Minerals Assessment Report 85

3.2.2 MAR 85 (IGS, 1981a) covers the western edge of Section D: Polstead through to the eastern part of Section G: Stour Valley. Large parts of the Order Limits pass through areas described as having deposits that are '*continuous or almost continuous spreads of mineral beneath overburden*'. The Order Limits also cross smaller sections which are described as being '*exposed mineral*'. The Order Limits crosses through resource blocks A, B, C and D. Table 3.1 shows the expected mineral and overburden thickness across the resource blocks within the Order Limits.

Table 3.1 – Expected Mineral and Overburden Thickness within Resource Blocks A, B, C and D

Resource Block	Mean Thickness of Mineral (m)	Range of Mineral Thickness (m)	Mean Thickness of Overburden (m)	Range of Overburden Thickness (m)
A	9.7	2.0 to 14.5	6.2	0.3 to 10.7
B	10.2	2.7 to 14.2	5.1	0.1 to 11.5
C	13.4	1.8 to 29.5	2.0	0.1 to 11.5
D	5.7	1.2 to 15.3	2.2	0 to 6.3

Minerals Assessment Report 68

3.2.3 MAR 68 (IGS, 1981b) covers the western part of Section G: Stour Valley and Section H: GSP Substation. The MAR subdivides the area covered into resource blocks where the mineral is, then sub divided into areas where it is exposed and areas where it is present beneath overburden.

3.2.4 The western part of Section G: Stour Valley is located within resource blocks E and H and shows that sand and gravel is absent from parts of the Order Limits, or it is not

potentially workable. However, much of the southern area of Section G falls into an area of '*exposed mineral*' with very limited thicknesses of overburden. The mean grading percentages from resource block E suggests the mineral in this area has limited fines content (6%) and a high mean fine to coarse sand content (76%).

- 3.2.5 In Section H: GSP Substation, the area is indicated to be close to the boundary between blocks B and C.
- 3.2.6 The MAR indicates that in this area, the base of the Boulder Clay is likely to be at approximately 75m above ordnance datum (AOD) and that the surface of the bedrock is likely to be at approximately 50m AOD. This suggests approximately 25m thickness of potential mineral deposit in the area of the site. However, the overburden is anticipated to be up to 10m thick overlying the potential mineral.
- 3.2.7 In the MAR it is described that borehole records from resource blocks B and C indicate the Kesgrave Sand and Gravel in these blocks to be particularly clayey in places and including the presence of seams of laminated clay to the exclusion of sand. It is also described that in blocks B and C the Kesgrave Sand and Gravel typically grades as a Sand, and that the quality of the mineral within block B is comparatively low, whilst in block C the mineral is typically concealed by thick overburden. Minerals have also been proven to be discontinuous in some parts of the blocks.

3.3 Layham Quarry

- 3.3.1 The Order Limits cross Layham Quarry (site allocation IL4/NHL3) including Site Allocation M5 (which represents an extension to Layham Quarry), which are within a MSA for sand and gravel. These are shown on Figure 10.3 (**application document 6.4**).
- 3.3.2 Layham Quarry is operated by Brett Aggregates and has not been operational since before 2013. Based on a review of historical aerial imagery (Google Earth, 2000-2021), it appears that the part of the quarry the Order Limits cross (allocation IL4/NHL3) has previously been worked and at least partly restored. This was confirmed during a meeting between Brett Aggregates and National Grid on 23 September 2021.
- 3.3.3 An extension to Layham Quarry was previously put forward for consideration following a call for sites, included within the Suffolk Minerals and Waste Local Plan (2020), and a site selection report was undertaken by Suffolk County Council to support the extension. This identified that the average sand and gravel deposit thickness is 2.4m and that the average depth of the overburden is 1.8m. The report also indicates the extractable resource is made up of '*23% coarse aggregates and 77% fine aggregate*'.
- 3.3.4 A planning application to extend the timescales for extraction and restoration at Layham Quarry to April 2032 and October 2033, respectively, was approved in October 2019 (Planning Ref: SCC/0018/19B/VOC).
- 3.3.5 Allocation M5, to the south of and outside of the Order Limits, (for the extension to the existing sand and gravel operations at Layham Quarry), is greater than 250m from the Order Limits and therefore not considered further in this assessment.

4. Assessment

4.1 Safeguarded Extents

Suffolk County

- 4.1.1 The Safeguarding and Proposals Map accompanying the Suffolk Minerals and Waste Local Plan (2020) indicates that approximately 61% of the Order Limits, within Suffolk County Council, are located within an MCA. This is shown on Figure 10.3 (**application document 6.4**).
- 4.1.2 The county of Suffolk is approximately 3,800km² in area, and approximately 52% of the county is located within an MCA. The Order Limits that cross through Suffolk, comprise approximately 0.15% of the Suffolk MCA.

Essex County

- 4.1.3 The policies map accompanying the Essex Minerals and Waste Local Plan (2014) indicates that approximately 84% of the Order Limits, within Essex County Council, are located within a MSA for sand and gravel. This is shown on Figure 10.3 (**application document 6.4**).
- 4.1.4 The county of Essex is approximately 3,600km² in area, and approximately 36% of the county is currently safeguarded for sand and gravel deposits. The Order Limits that cross through Essex, comprise approximately 0.1% of the Essex MSA for sand and gravel.

4.2 Effects of the Project on Safeguarded Extents

- 4.2.1 The approximate areas and calculations provided in Section 4.1 indicate that the Order Limits affect very small areas of the total MCA/MSA for both Counties. The calculations undertaken are also precautionary as they consider the Order Limits, whereas the physical footprint of the operational project components (pylons, underground cables, CSE compound and GSP substation) is a relatively small proportion of the Order Limits.
- 4.2.2 The works proposed within Essex and Suffolk includes the removal of approximately 25km of the current 132kV line and approximately 2km of the 400kV overhead line. This means that either previously more difficult to extract mineral may become accessible for potential future extraction, for example where the alignment diverges from the existing 132kV overhead line which is to be removed, or that there would be no net change to the overall potential sterilisation of the mineral.
- 4.2.3 The areas within the Order Limits (located within an MSA/MCA) where the physical footprint of the operational project components would effectively sterilise any potentially valuable mineral are significantly smaller still (i.e. <0.2% of the total MSA/MCA).
- 4.2.4 Therefore, the actual total extent of areas where mineral could be sterilised is considered to be insignificant in the context of the total safeguarded areas, and the requirements and LAA discussed in Chapter 2.

4.3 Engineering and Construction Considerations

- 4.3.1 Prior extraction refers to the removal of a mineral resource, to prevent sterilisation, prior to the commencement of construction works on a project. Incidental extraction refers to

the removal of a mineral resource during the construction of the project. In this case, incidental extraction is not considered feasible due to the likely engineering requirements needed following mineral extraction, to create an appropriate development platform for the project (see below sections).

- 4.3.2 The assessment presented below is based on the Proposed Alignment, which is the design that is shown on Figure 4.1: The Project (**application document 6.4**). However, it should be noted that the permanent aspects of the project, including pylon locations, are not fixed and could be located anywhere within the Limits of Deviation, as defined on the Work Plans (**application document 2.5**).

Overhead Sections (Sections AB, C, D and F)

- 4.3.3 The overhead line comprises pylons spaced typically 360m apart, and the conductors (line part). The conductors would not result in sterilisation of minerals, as minerals could be extracted from beneath the overhead line, as evidenced at Layham Quarry, which is crossed by both the existing 400kV overhead line and the existing 132kV overhead line. Therefore, this section relates to the pylon bases and the four CSE compounds only (the GSP substation and underground cables are discussed separately below).
- 4.3.4 There are approximately 50 pylons and there are four CSE compounds, as shown on Figure 4.1: The Project (**application document 6.4**). Of the 50 new pylons, currently 31 are located within the Suffolk MCA, along with two of the three CSE compounds located within Suffolk MCA based on the Proposed Alignment on Figure 4.1: The Project (**application document 6.4**). No new permanent pylons are currently proposed within the Essex MSA, however there is one CSE compound.
- 4.3.5 At the pylon bases (which have an operational footprint of approximately 10m by 10m) and CSE compounds, any prior extraction would need to include an area bigger than the operational footprint to facilitate construction of the bases (for reasons of practicality and stability). The mineral would then have to be replaced by appropriate material which would need to be engineered to meet any specific geotechnical design requirements for the pylon bases. This is not considered to be a feasible option for pylon construction and operation. This would require additional cost to over excavate, replace with imported material, engineer the material and to provide the suitable stability assessments and specifications required to demonstrate/facilitate short and long term stability of the excavations and the pylons.
- 4.3.6 Replacing the excavated mineral with inert waste as a recovery operation (to reduce the potential costs associated with prior/incidental extraction), is not considered a feasible option as the infrastructure needs suitable ground conditions for construction and long-term stability. The use of inert waste would also require separate additional applications to be made to the Environment Agency for environmental permits (for a waste recovery activity) including supporting risk assessments such as hydrogeological risk assessments and stability risk assessments. This is likely to result in both additional cost and delay to the programme affecting National Grid's duty to be economic and efficient. The potential environmental impacts of using inert waste could also be significant and are likely to require environmental assessment and planning permission in their own right.
- 4.3.7 In addition to not being considered a feasible engineering option due to long-term stability, it is considered that the long relatively narrow corridor that comprises the Order Limits would limit the potential for either prior or incidental extraction in the context of the relatively low volume of mineral likely to be extracted. This is before consideration of the

quality and value of the mineral (which may further reduce the volume). The cumulative costs of extraction of the mineral, the transport of the mineral to an off-site facility for processing and the subsequent infilling of the void (either with inert waste or engineered fill), together with the geotechnical engineering enhancement to provide an appropriate material on which to construct the project is considered to significantly outweigh the economic value of the extracted mineral.

Underground Cable Sections

- 4.3.8 The mineral (sand and gravel) is generally present below a thickness of overburden material. The thickness of overburden is up to about 10m in places within the Order Limits but is generally between 1-4m thick.
- 4.3.9 If prior/incidental extraction were to take place within the underground cable sections, the proposed trench for underground cables would likely lie in many places within the overburden material. The excavation required to extract the mineral would therefore need to be enlarged (in terms of depth and lateral extent) beyond the current proposed footprint (c. 80m wide) in order to reach the mineral below.
- 4.3.10 The resultant over-enlarged void would need to be backfilled with appropriate material, and this requirement for additional materials suitable to surround the cables would add additional cost to the project including the additional construction work required to extract the minerals and back fill the void.

GSP Substation

- 4.3.11 The proposed GSP substation is located off the A131 between Butler's Wood and Waldegrave Wood. The site is located within a MSA for Sand and Gravel, as shown on the policies map within the Essex County Council adopted Minerals Local Plan (2014).
- 4.3.12 Incidental extraction is not considered feasible at the GSP substation due to the likely engineering requirements (and associated timescales for completion) needed following mineral extraction, to create an appropriate development platform for the GSP substation as discussed in the Overhead Sections (Sections AB, C, D and F) section above.
- 4.3.13 Prior extraction of the potential mineral at the GSP substation would leave a void that would then have to be replaced/filled by appropriate material which may need to be engineered to meet any specific geotechnical design requirements for the proposed GSP substation. In practical terms, the whole site would need to be worked to prevent sterilisation (by default) of mineral in between the built elements. This would require additional cost to over excavate, replace with imported material, engineer the material and to provide the suitable stability assessments and specifications required to demonstrate/facilitate short and long term stability of the excavations and the subsequent structures.
- 4.3.14 There is currently an existing 400kV overhead line passing through the proposed GSP substation site, which is owned and operated by National Grid. This includes two pylons within the boundary of the GSP substation. Any prior extraction would need to provide appropriate stand off to the existing pylon bases which reduces the amount of mineral available within this relatively small area.

- 4.3.15 The mineral at the site is present below the overburden (up to 10m) that would require excavation and storage during the excavation of the mineral. This would require additional land outside of the site.
- 4.3.16 The use of inert waste to replace the excavated material is not considered feasible and this is unlikely to be practical in the context of the relatively small area and would require additional designs and engineering to fully understand the design implications. The use of inert waste would also require separate additional applications to be made to the Environment Agency for environmental permits (for a waste recovery activity) including supporting risk assessments such as hydrogeological risk assessments and stability risk assessments. This would result in both additional cost and delay to the programme affecting National Grid's duty to be economic and efficient. The potential environmental impacts could also be significant and are likely to require environmental assessment and planning permission in their own right.
- 4.3.17 The proposed GSP substation is critical to the overall delivery of the wider project and needs to be in place prior to the removal of the 132kV overhead line and subsequent project components. The potential delays and cost increase resulting from any extraction could significantly impact the delivery of the wider reinforcement project within the required timescales.

Overall Summary of the Engineering Considerations

- 4.3.18 As outlined within this section, prior extraction of the minerals is not considered feasible and would result in significant enlargement of the Order Limits due to the void required to extract the minerals. There would be additional cost to dig the void and also to backfill the extracted void to return ground levels to pre-works levels. This would significantly increase the cost of the project and would go against National Grid's duty to be economic and efficient.
- 4.3.19 The cumulative costs of extraction of the mineral, the transport of the mineral to an offsite facility for processing and the subsequent infilling of the void with a suitable backfill material (either with inert waste or engineered fill), together with the geotechnical engineering enhancement to provide an appropriate material on which to construct the project is considered to significantly outweigh the economic value of the extracted mineral. This is before consideration of the quality and value of the mineral (which may further reduce the volume/economic value).
- 4.3.20 In addition, the prior extraction would need to take place in advance of work required to construction the new overhead line and underground cables. The extraction would extend the construction programme. This would mean that National Grid would miss the project's intended delivery date of 2028, which could also risk delivering the UK Government's net zero ambitions and delivering up to 50GW of offshore wind connected by 2030. Therefore, it is considered that in the context of the additional cost and time required, prior/incidental extraction is not viable.

4.4 Environmental Considerations of Extraction

Overhead Line Sections

- 4.4.1 The specific environmental implications of extraction of the material from each pylon base would need to be considered and assessed in the context of the potential impacts related

to noise, dust, traffic, landscape and visual impact (which may vary at each location). In the context of the relatively small discrete areas of the pylon bases, and therefore the small volume of mineral realised, the environmental impacts are likely to outweigh the economic value of the mineral.

Underground Cable Sections

- 4.4.2 The cable route within Section E: Dedham Vale AONB and Section G: Stour Valley was selected for undergrounding during the development of the Connection Options Report (**application document 7.2.4**) and has been verified through further studies since. Undergrounding was chosen within Sections E and G mainly due to their high landscape value. This view was supported in the responses received during the 2021 non-statutory consultation and the 2022 statutory consultation. Further details can be found in the Consultation Report (**application document 5.1**).
- 4.4.3 Prior extraction of the minerals along the underground cable route in Section E: Dedham Vale AONB would lead to a larger footprint and a longer construction duration within the nationally designated AONB. Mineral extraction would likely to lead to significant effects on this nationally important designation, which would outweigh the benefit associated with the mineral extracted. Extending the Order Limits to accommodate the additional width required to safely extract the minerals, would also increase the magnitude of impact on other sensitive features such as ancient woodland.
- 4.4.4 With regards to Section G: Stour Valley, the project is proposing three trenchless crossings, as described in the ES Chapter 4: Project Description (**application document 6.2.4**). These have been designed to avoid overlying sensitive features (River Stour, the Sudbury Branch Railway Line and woodland areas) and likely significant effects. National Grid has identified these features as warranting the use of trenchless methods. Prior extraction of minerals would likely lead to significant effects on these sensitive features, which would outweigh the benefit associated with the mineral extracted.
- 4.4.5 Where the underground cables cross surface water features, the trenches are likely to be either within the cohesive layers overlying the granular mineral or relatively shallow within the granular mineral. Prior/incidental extraction in these areas would likely require over excavation either through the cohesive overburden or deeper than needed by the project to reach the full extent of mineral and the resulting void would need to be filled with appropriate material, either through importation of clean fill material or using inert waste as a recovery activity.
- 4.4.6 The potential impacts of extracting minerals would include increased noise and dust levels across the project. There could also be a significant increase in traffic movements associated with the heavy goods vehicles (dump trucks) required to remove the minerals from site to any processing or sales yards. The extraction could increase the landscape and visual effects across the wider area and could also increase the loss of habitats and disturbance to protected species during construction.

GSP Substation

- 4.4.7 The proposed GSP substation is situated between two areas of designated ancient woodland, which are also Local Wildlife Sites. As outlined in Section 4.3, prior extraction would require an excavation area greater than the current site. The proposed GSP substation has been designed to lie between the two areas of ancient woodland and

outside of the root protection areas of the trees. The woodland would provide visual screening of the proposed GSP substation from nearby receptors.

4.4.8 If the minerals were to be extracted from the site in advance of construction of the proposed GSP substation, the working area would need to extend beyond the current site boundary. This could require working within the rootzone of the ancient woodland and potentially require the removal of ancient woodland habitat, while the minerals were extracted and the void infilled. This would impact on the woodland habitats and protected species. The environmental impact of extracting the minerals is considered to outweigh the benefit that would be gained from extracting the sand and gravel.

4.4.9 The specific environmental implications of extraction of the mineral from the site would need to be considered and assessed in the context of the potential impacts related to noise, dust, traffic, landscape and visual impact. In the context of the relatively small area of the site, and therefore the small volume of mineral realised, the environmental impacts are likely to outweigh the economic value of the mineral.

Overall Summary of the Environmental Considerations

4.4.10 The overall impact of extracting minerals prior to construction of the project could mean the Order Limits and construction work would need to extend or further extend into sensitive areas, such as Dedham Vale AONB. Extracting the minerals would increase the magnitude of impacts on the environment, and would likely generate additional effects around noise, dust and traffic. The duration of construction would also need to extend, which would increase the level of disruption caused during construction. Therefore, the environmental impact associated with extracting the minerals is considered to be disproportionate to the value gained from extracting the minerals.

5. Conclusion

- 5.1.1 Parts of the Order Limits are located within either a MSA or a MCA for sand and gravel. The MSA and MCA both extend beyond the Order Limits, across substantial areas of Essex and Suffolk. Even if the full extent of the Order Limits within a MSA/MCA were to sterilise mineral of sufficient quality and extent to be economically valuable, the extent of the sterilised area is very small in comparison to the extent of the MSA/MCA. The actual areas where built operational development would effectively sterilise any valuable mineral are significantly smaller still (<0.2% of the total MSA/MCA). Therefore, the quantity of mineral sterilised by the project is considered to be insignificant in the context of the extensive occurrence of sand and gravel within both counties and the national need/significance of the project.
- 5.1.2 In addition, whilst there are sand and gravel deposits safeguarded within the Order Limits, the existence, extent and quality of such is not proven and is anticipated to be highly variable. Therefore, not all of the safeguarded areas may contain mineral, or mineral of sufficient quality or economically valuable.
- 5.1.3 Consideration has also been given to prior extraction of minerals as part of the project construction programme. This has shown that the increase in cost associated with the extraction would increase the overall cost of the entire project and would conflict with National Grid's duty to be economic and efficient. In addition, the additional time that would need to be added to the construction schedule would mean that National Grid would miss the project's intended delivery date of 2028, which would also risk delivering the UK Government's net zero ambitions and delivering up to 50GW of offshore wind connected by 2030. Therefore, it is considered that in the context of the additional cost and time required, prior/incidental extraction in these areas is not viable.
- 5.1.4 The project includes removal of some existing 132kV line, and modification or realignment of existing overhead line which reduces the total area that would potentially sterilise any minerals of economic value and importance.
- 5.1.5 Finally, the project has sought to avoid and reduce effects on sensitive environmental features through its design process. The prior extraction of minerals would significantly increase the magnitude of environmental effects created by the project and would lengthen the duration of construction works in sensitive areas such as Dedham Vale AONB. The environmental impact associated with extracting the minerals is considered to be disproportionate to the value gained from extracting the minerals.
- 5.1.6 The NPPF encourage prior extraction of minerals '*where practical and feasible*', and this MRA indicates that this requirement is not met at on the project.
- 5.1.7 Based on the national significance of the project and that both Suffolk and Essex have more than the seven-year land bank of sand and gravel, as required by the NPPF, and sufficient additional safeguarded areas, it is considered that the potential impact of sterilising the small volume associated with the project is acceptable without further consideration or mitigation.

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