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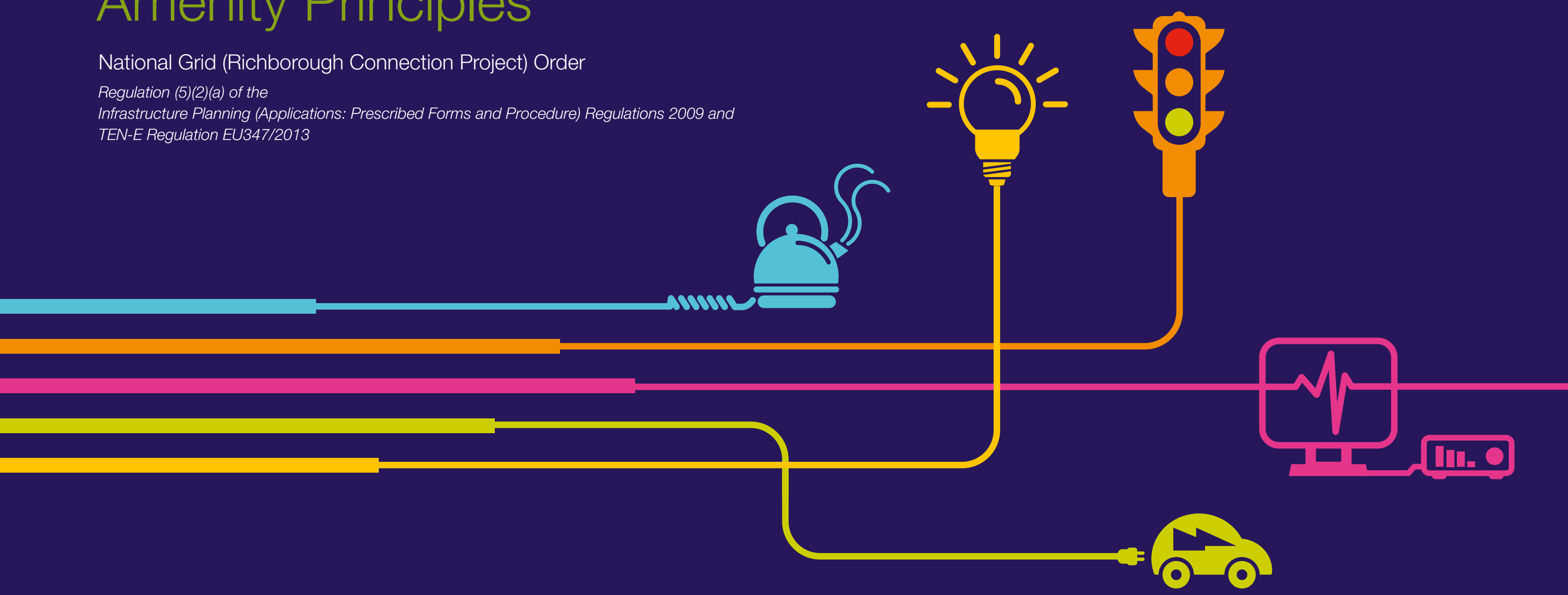
7B Holford Rules and Visual Amenity Principles

National Grid (Richborough Connection Project) Order

Regulation (5)(2)(a) of the
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 and
TEN-E Regulation EU347/2013



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Richborough Connection Project

Volume 5

5.4 Environmental Statement Appendices

5.4.7B Holford Rules and Visual Amenity Principles

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7 HOLFORD RULES AND VISUAL AMENITY PRINCIPLES

7.1 Holford Rules

7.1.1 In 1959, Lord Holford, then advisor to the Central Electricity Generating Board (CEGB), developed a series of planning guidelines in relation to amenity issues, which have subsequently become known as the "Holford Rules". The National Grid Company (NGC) subsequently revised these rules in the 1990's, and although never formally published as official guidance, they are often referred to in planning publications such as "Planning Overhead Routes (RJB Carruthers, 1987)" and "Visual Amenity Aspects of High Voltage Transmission (GA Goulty, 1989)". The Holford Rules form the basis upon which the decision making process of siting overhead transmission lines, and minimising the potential landscape impact of such infrastructure. They are particularly helpful in a route Optioning process, as most Landscape Visual Impact Assessment guidelines relate to other forms of infrastructure such as highways, wind farms or hydroelectric generating structures. In contrast, the Holford Rules relate specifically to transmission lines, and although slightly amended in the 1990's, the core premise of each rule remains intact since originally proposed in 1959.

Rule 1: Avoid altogether, if possible, the major areas of highest amenity value, by so planning the general route of the first line in the first place, even if the total mileage is somewhat increased in consequence.

7.1.2 This is the basic guidance that multiple routes should be considered as an integral part of environmental statements. Rule 1 also implies an obligation to protect areas designated for, or otherwise recognised as being of the highest amenity value. This rule also obliges consideration of alternative routes that avoid such protected sites, even if the proposal is direct replacement of existing structures and transmission lines that presently run through protected areas. Areas to be avoided include;

- Schedule of Ancient Monuments
- Protected Coastal Zone Designations
- Special Area of Conservation
- Special Protection Area
- Ramsar Site
- National Scenic Areas
- National Parks
- National Nature Reserves
- Sites of Special Scientific Interest (SSSI)
- Listed Buildings
- Conservation Areas
- World Heritage Sites (non-statutory designation)

- Historic Gardens and Designed Landscapes (non-stat designation)

Rule 2: **Avoid smaller areas of high amenity value, or scientific interests by deviation; provided that this can be done without using too many angle towers, i.e. the more massive structures which are used when lines change direction.**

7.1.3 Whilst smaller areas of amenity value may not be encompasses in designated sites as listed above, they should also be avoided where possible. Effects on the settings of historic buildings and other cultural heritage features should be minimised.

Rule 3: Other things being equal, choose the most direct line, with no sharp changes of direction and thus with fewer angle towers.

7.1.4 The fewer more massive structures used to support the transmission lines, the less impact upon the amenity of the area. However, it is also suggested that in flat or open landscapes, support poles or towers should not be erected in a straight line, as this increases the visual intrusion due to an artificially linear feature being introduced into the landscape.

7.1.5 **Rule 4**: **Choose tree and hill backgrounds in preference to sky backgrounds wherever possible; and when the line has to cross a ridge, secure this opaque background as long as possible and cross obliquely when a dip in the ridge provides an opportunity. Where it does not, cross directly, preferably between belts of trees.**

Rule 5: **Prefer moderately open valleys with woods where the apparent height of towers will be reduced, and views of the line will be broken by trees.**

7.1.6 Rules 4 and 5 suggest that both background and foreground features be utilised to mask or minimise the appearance and impact of the infrastructure, where the existing ground features afford opportunity. The exposure of lines and pylons on ridges should be minimised. Where possible, follow areas of open space, running alongside (but not though) existing wooded areas, including skirting edges of copses and small plantations. Where there is no reasonable alternative, to cutting through woodland, the Forestry Authority Guidelines should be followed; “Forest Landscape Design Guidelines, 2nd Ed. (the Forestry Commission, 1994)”, and “Forest Design Planning – A Guide to Good Practice (S. Bell / The Forestry Authority, 1998)”.

Rule 6: In country which is flat and sparsely planted, keep the high voltage lines as far as possible independent of smaller lines, converging routes, distribution poles and other masts, wires and cables, so as to avoid a concentration or ‘wirescape’.

7.1.7 In all locations, minimise confusion by mixing cable and support types. Avoid concentrations where possible, in order to avoid the cable runs dominating the landscape character. Wherever possible and practicable, parallel or closely related routes should be arranged to provide a coherent appearance. Where diverging

routes allow, sufficient separation should be planned to limit the effects on properties and features within the cable lines.

Rule 7: **Approach urban area through industrial zones, where they exist; and when pleasant residential and recreational land intervenes between the approach line and the substation, go carefully into the comparative costs of the undergrounding, for lines other than those of the highest voltage.**

7.1.8 Should lines be required to pass through development areas, the course should be carefully selected to minimise the effects on the development as far as is practicably possible. Undergrounding should be considered as a realistic alternative in order to minimise impact where there is little alternative. Alignments should be chosen after consideration of the effects of the infrastructure on proposals for new development. When siting sub-stations, the effects of terminal towers should be considered in order to take advantage of screening opportunities such as ground form and vegetation.

Supplementary Notes

7.1.9 *Residential Areas* - Avoid routeing close to residential areas as far as possible on grounds of general amenity.

7.1.10 *Designations of County, District and Local Value* - Where possible choose routes which minimise the effect on Special Landscape Areas, areas of Great Landscape Value and other similar designations of County, District or Local value.

7.1.11 *Alternative Tower Designs* - In addition to adopting appropriate routeing, evaluate where appropriate the use of alternative tower designs now available where these would be advantageous visually, and where the extra cost can be justified.

7.1.12 There are steel lattice tower and timber pole designs alternative to the conventionally prescribed designs. These should be investigated where additional costs and voltages allow, in order to minimise visual intrusion. SHETL have reviewed these alternatives for use in Scotland, and summarised the findings in “Overhead Transmission Line Tower Study (SHETL, 2004)”.

7.1.13 The Holford Rules focus upon landscape amenity issues, and how these issues are perceived by receptors; so as to minimise any adverse impact upon the local amenity. SP Transmission Ltd.’s guidelines “Overhead Transmission Lines, Routeing and Environmental Assessment (SPTL, Draft), and other guideline documents focus both on the recommendations set out in the Holford Rules, and the importance of people, residential areas etc., rather than simply the amenity value.

7.1.14 Since the Holford Rules were first proposed, progressively greater importance has been given to users of highways and rights of way. This is especially important with respect to developments such as overhead grid connections near to regional and national parks, whose users are walking rights of way largely for an appreciation of the aesthetic quality of the landscape within the park, but also in outlying areas.

7.2 Pylon Design – Landscape and Visual Amenity Principles

7.2.1 This note sets out some principles relevant to considering the potential effects of the different transmission pylon designs that may be used for the Richborough Connection Project; the standard steel lattice pylon and the low height steel lattice pylon. These principles consider the effects on landscape and visual amenity that may arise if each pylon type is used in different landscape types and where there are different receptors along the route of the proposed 400kV overhead line.

Description of pylons

7.2.2 The standard and low-height steel lattice pylons are constructed from steel members bolted together in a 'lattice' design.

Materials and colour

7.2.3 The standard and low-height steel lattice pylons are painted light grey.

Suspension pylons

7.2.4 Suspension pylons are used when an overhead line is running in a straight line. Table 1 below compares the main dimensions and characteristics of each pylon type.

Table 1.1

Suspension Pylon Type	Average Height	Base at Widest Point	Number of Cross Arms	Width of Widest Cross Arm	Number of Earth Wires
Standard steel lattice pylon	46.5m	7.1m	3	18.2m	1
Low height steel lattice pylon	42.1m	7.06m	2	29.2m	1

7.2.5 The standard steel lattice pylons are constructed of steel members forming a vertical pylon with three cross arms at heights of approximately 22m, 30m and 40m above the ground. The maximum width of the cross arms is approximately 18m.

7.2.6 The low height lattice pylons have four arms, the lowest arm having a width of approximately 29.2m. This design is constructed using steel members with a greater number of reinforcing members than the standard steel lattice pylon. This pylon is not designed to be used for angle deviations greater than 30 degrees.

7.2.7 Between two and three sets of conductors (wires) would be suspended from each of the six side arms of each pylon, with a single earth wire strung from the peak of each pylon.

7.2.8 The typical span distance between suspension pylons for each of the designs is approximately 360m.

Tension pylons

7.2.9 Where an overhead line changes direction, tension pylons (or angle pylons) are used. Tension pylons may also be needed at intervals in a straight section of lattice steel pylon overhead line. Standard steel lattice tension pylons and low-height steel lattice tension pylons are similar in design to suspension pylons but are wider at the base and are constructed of thicker gauge steel than those used in a suspension pylon. The size of the pylon, particularly its width, increases as the angle of the overhead line deviation increases to a maximum of approximately 60 degrees.

7.2.10 The sections below consider the pylon designs in the context of the Richborough Connection Project assessment topics of landscape and visual amenity, but first considers the Holford Rules relevant to landscape and views.

The Holford Rules

7.2.11 The Holford Rules as set out in National Grid's 'Approach to the design and routeing of new electricity lines' provide guidance on selecting and assessing potential route corridor options and alignments. The seven rules seek to minimise landscape and visual amenity effects in routeing overhead lines and are applicable whatever pylon type is used. Rules 4, 5 and 6 are particularly relevant to considering the possible landscape and visual effects that may arise from using the standard steel lattice or low height lattice. Rules 4 and 5 consider working with the characteristics of the landscape to minimise landscape and visual amenity effects. Rule 6 considers the approach to planning new routes near to existing overhead line infrastructure. The relevance of these rules is detailed under each section below. The other rules consider more strategic issues regarding route corridor planning.

Principles

7.2.12 A taller object is more visible than a shorter object. The effect of the earth's curvature in a completely flat and open landscape would mean that a taller object would be visible over a greater distance than a shorter object. Vast, flat and completely open landscapes are very rare and shorter objects are more effectively screened or obscured completely or partly (filtered) by intervening vegetation, built form and other structures. It is this effect which tends to limit the visibility of vertical objects in the landscape.

7.2.13 The bulking or 'mass' of an object also affects the extent to which it is visible with wider and solid objects being more visible than those which are narrower or of a more open construction.

7.2.14 These matters influence the extent to which different pylon designs 'fit' or are accommodated in a landscape and how they affect views. Other factors related to the character of landscape, features present, topography and the relationship of the viewer are also influences.

7.2.15 The principles below consider these matters in regard to the proposed route alignment for the Richborough Connection Project.

7.2.16 The principles are intended to assist in forming and explaining judgements regarding how different pylon designs may affect landscape and views.

7.2.17 Principles for considering the potential effects of different solutions and informing the choice between the standard lattice pylon and low-height lattice pylon have been based on five criteria. These include:

- Landscape type;
- Filtering and screening of views;
- Backgrounding;
- Visibility of other overhead lines; and
- Distance from visual receptor.

7.2.18 Each of these criteria is discussed below.

Landscape type

7.2.19 When considering the potential effects of different pylon designs in the landscape the characteristics of the landscape type should be considered. This includes the scale of the landscape, particularly in relation to vertical features; degree of openness or enclosure; nature of the skyline; and the level, nature and pattern of tree, hedge and woodland cover.

Flat landscape

7.2.20 In a large-scale flat landscape, such as the Ash Level, it is anticipated that the low height lattice would tend to be visible for a shorter distance than the standard steel lattice pylon due to the lower height combined with screening by intervening hedgerow and trees.

Ridge/hill landscape (looking up to)

7.2.21 On and near the top of a ridge, the low-height steel lattice pylon would tend to be less visible than the steel lattice pylon due to their lower height.

Ridge/hill landscape (looking down from)

7.2.22 Looking down from a ridge landscape towards an overhead line it is anticipated that in near distance views the standard steel lattice pylons would potentially benefit more from backgrounding by, for example, the Blean Woods, when looking down from a ridge landscape such as within Section A of the Stour Valley.

7.2.23 In distant views, the low-height steel lattice pylon would tend to be less visible and for a shorter distance than the standard steel lattice pylon due to their lower height and the effect of intervening hedgerow and tree screening.

Filtering and screening

7.2.24 Rule 5 of the Holford Rules advises that when routeing an overhead line moderately open valleys with woods are preferred where the apparent height of towers will be reduced and views of the line will be broken by trees. Background and foreground features should be utilised to reduce the apparent height and domination of towers in views and to minimise the exposure of numbers of towers on prominent ridges and skylines. The opportunities for topography and trees to reduce the apparent height of an overhead line need to be considered along with how each pylon appears in the landscape and views.

No filtering or screening

7.2.25 Where no filtering or screening is available, preference between pylon types is largely dependent on other factors such as topography and distances from receptors, however the standard steel lattice pylon would tend to be visible for a greater distance due to greater height, compared to the low height lattice.

Partially filtered or screened

7.2.26 Where there is partial screening or filtering in views by for example hedgerow and trees, landform or built form, visibility of the low-height steel lattice pylon would be less compared to the standard steel lattice pylon, due to their lower heights.

Filtered or screened

7.2.27 Generally the low-height steel lattice pylon will be more readily screened entirely than the taller standard steel lattice pylon where the same amount of cover would lead to only partial screening of the standard steel lattice pylon.

Backgrounding

7.2.28 Rules 4 and 5 of The Holford Rules are particularly relevant regarding 'backgrounding', meaning the effect of landform or other features behind a pylon giving rise to none or only part of it appearing against the sky. Steel lattice pylons benefit from backgrounding because the thin steel members in an open structure make background features visible beyond.

7.2.29 Rule 4 considers using tree and hill backgrounds as a means of reducing the visual effects of pylons in the landscape, in preference to sky backgrounds. The opportunities for backgrounding need to be considered when planning the route of an overhead line and selecting the type of pylon to be used in the landscape. In particular when the line has to cross a ridge, backgrounding should be secured as long as possible through utilising landform and trees.

7.2.30 As outlined above Rule 5 highlights the importance of utilising background and foreground features to reduce the apparent height and domination of towers in views and to minimise the exposure of numbers of towers on prominent ridges and skylines.

No backgrounding

7.2.31 In general pylons are more prominent where there is no backgrounding and they are viewed against sky backgrounds. The low height steel lattice pylon would tend to be more prominent than the standard steel lattice pylon where there is no backgrounding. This is a result of the greater number of steel members providing a denser appearance and making them more visible against the sky.

Partial backgrounding

7.2.32 Effects of partial backgrounding depend on the extent of backgrounding and the extent of pylon visible above and against the sky. The lower the height of the lattice pylon the smaller the extent visible against the sky.

Full backgrounding

7.2.33 Full backgrounding reduces visibility of lattice pylons.

Other overhead lines visible

7.2.34 Other steel lattice overhead lines are visible within the route corridor including 132kV, 275kV and 400kV overhead lines.

7.2.35 Rule 6 of the Holford Rules considers that where land is flat and sparsely planted, a new high voltage line should be kept as far independent as possible from other smaller lines to avoid the clutter of 'wirescape'. The Supplementary Note to Rule 6 refers to planning wherever practicable parallel or closely related routes with tower types, spans and conductors forming a coherent appearance. Introducing a different pylon structure near an existing steel lattice pylon would be a greater change than introducing a series of similar structures and may produce an incoherent appearance. However each overhead line shares similar characteristics of being a linear development comprising conductors suspended from arms on supports, notwithstanding any discrepancy between types of support.

7.2.36 The presence of existing overhead lines with lattice pylons generally would reduce the significance of effect resulting from a new overhead line using lattice pylons because although the magnitude of effect is similar, the landscape is likely to have lower sensitivity to a new lattice pylon overhead line, compared to the effect experienced if there was no existing infrastructure. Where existing lattice overhead lines are in a view a new lattice pylon overhead line is likely to result in an overall lower scale of change.

Distance from receptor (person(s) having a view)

7.2.37 When considering the potential visual effects of different pylon solutions the distance in a receptor view should be considered. The proximity of an object to a receptor influences the extent to which an object will be visible. In a completely flat and open

landscape the closer a receptor is to an object the more visually prominent an object will be and the greater visual effect it will have on a receptor's view. However vast, flat and completely open landscapes are very rare. A solid structure would be more prominent than a lattice structure of the same size and constructed of the same material when viewed from the same distance.

7.2.38 The following distances outline typical effects a new overhead line would have on receptors. These typical distances should be used to help determine visual effects of different pylon types. When making a judgement on visual effects a pylon design would have on receptor views distance should be considered alongside landscape type, filtering and screening of views, and backgrounding.

Near distance views

7.2.39 In near distance views of an overhead line (typically less than 250m) the low height lattice pylon is anticipated to be more prominent than the standard lattice pylon. This is due to the greater number of steel members creating a denser looking structure, compared to the standard lattice.

Middle Distance Views

7.2.40 Overhead line routeing seeks to maximise separation from sensitive receptors such as dwellings on the grounds of amenity. Many visual receptors have views of an overhead line from beyond 250m. In middle distance views (typically between approximately 250m and 1km), the low height lattice is anticipated to become less visible than the standard lattice pylon due to the lower height of the pylon and the effects of filtering, screening and backgrounding.

Distant Views

7.2.41 In more distant views (typically over approximately 1km) the low height lattice pylon would tend to be visible for a shorter distance and benefit more readily from complete screening and backgrounding due to its lower height.

7.3 Conclusion

7.3.1 There are principles which can be considered when assessing and describing the comparative effects of different pylon designs on landscape character and on views. National Grid's eventual expression of preference for one type of overhead line support over another in each circumstance generally will be influenced by the results of engagement and consultation with interested parties including local planning authorities where a line is proposed. The considerations above can be used as the basis for judgements to express reasons for preferring one pylon type over another (in each section of the proposed connection) with regard to effects on landscape and on views and visual amenity. Other factors, including those arising from engagement and consultation also will be relevant and used as part of a comprehensive assessment process in line with EIA and National Grid's Options Appraisal process, in reaching a conclusion.

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