CLEVE HILL SOLAR PARK

ENVIRONMENTAL STATEMENT

VOLUME 1 - CHAPTERS

CHAPTER 17 - MISCELLANEOUS ISSUES

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CLEVE HILL
SOLAR PARK

17 MISCELLANEOUS ISSUES

17.1 Introduction

1. This chapter of the Environmental Statement (ES) describes and assesses the potential effects of the Development in terms of:

    - Glint and Glare (section 17.2);
    - Human Health (section 17.3);
    - Electric, magnetic and electromagnetic fields (section 17.4);
    - Telecommunications, Television Reception and Utilities (section 17.5);
    - Waste (section 17.6); and
    - Major Accidents and Disasters (section 17.7).

2. Relevant legislation and guidance that has been consulted with respect to this chapter is listed in each of the following sections, as appropriate.

3. Baseline conditions have been established through desk-based assessment and consultation in relation to the topics covered by this chapter, where appropriate. The assessment methods used within this chapter are described in greater detail in the relevant subsections below.

4. This chapter is supported by the following technical appendix provided in Volume 4 (DCO Document Reference 6.4.17):

    - Technical Appendix A17.1 Glint and Glare Assessment Report;
    - Technical Appendix A17.2 National Grid Consultation; and
    - Technical Appendix A17.3 United Kingdom Power Networks (UKPN) Consultation.

17.1.1 Development Parameters Assessed

5. The Rochdale Envelope parameters for the Development have been considered with respect to the potential effects considered in this chapter, and typically worst-case values/scenarios for this are captured by the candidate design, as set out in Chapter 5: Development Description.

17.2 Glint and Glare

17.2.1 Introduction

6. The definition of glint and glare can vary, however, the definition used by Pager Power, the consultants who have undertaken the assessment reported in Technical Appendix A17.1, is as follows:

    - Glint – a momentary flash of bright light typically received by moving receptors or from moving reflectors; and
    - Glare – a continuous source of bright light typically received by static receptors or from large reflective surfaces.

7. The term 'solar reflection' is used to refer to both reflection types *i.e.*, glint and glare.

8. A glint and glare assessment has been undertaken to assess the likely effect of solar reflection on receptors within the Development's surrounding environment. This is provided in Technical Appendix A17.1.

9. Effects could theoretically occur only when solar panels are in place. This is principally during the operational phase, but will be the case across the site to varying extents during the construction and decommissioning phases, as panels are erected and decommissioned, respectively. The assessment therefore applies during the operational phase, and potentially partially during the construction and decommissioning phases.

17.2.2 Relevant Legislation, Guidelines and Policy

10. There are limited formal guidelines in the UK for examining reflections from solar panels with respect to residential amenity or road safety. Guidelines have been produced (by the Civil Aviation Authority) with respect to solar developments and aviation activity. Independent studies regarding the relative reflectivity of solar panels and other materials have been undertaken (see Appendices A and B of Technical Appendix A17.1).

11. Glint and Glare Assessments are sometimes required to accompany planning applications for solar developments, depending on the determining authority's judgement of their need. There are no guidelines setting out a particular methodological approach, but the receptors of interest are specified in guidance issued by the Department for Communities and Local Government (DCLG).

12. *'Particular factors a local planning authority will need to consider include… the effect on landscape of glint and glare and on neighbouring uses and aircraft safety.'* (Paragraph 274).

13. The need for glint and glare to be assessed is again set down in the National Planning Policy Framework (NPPF), which requires local authorities to consider;

> *'the proposal's visual impact, the effect on landscape of glint and glare … and on neighbouring uses and aircraft safety'.*

14. Accordingly, sensitive receptors are considered to be aviation receptors, such as control towers and aircraft, residential receptors and ground based transport receptors, such as drivers and passengers in cars and trains[1].

17.2.3 Consultation Responses

15. Through the EIA Scoping Opinion the Planning Inspectorate made the following comments with respect to glint and glare and a response is provided as to how this has been addressed:

- "*The Applicant is advised to use the ZTV developed for the LVIA to identify sensitive receptors with potential views of the site, which may therefore be affected by glint and glare.*"
  Receptor identification is detailed in section 4 of Technical Appendix A17.1; and
- "*The study area for the glint and glare assessment should be set out and justified in the ES.*"
  This is set out in section 4 of Technical Appendix A17.1.

16. Under Section 42 of the Planning Act, consultation with the relevant bodies on the PEIR was undertaken. The following consultees made comments with respect to glint and glare. The comments and the responses as to how these have been addressed are set out in Table 17.1.

[1] Hirsch, A. (2014) Impacts and Mitigation Strategies from Solar Array Systems within Colorado Department of Transportation's Highway Right of Way Areas. ICSI 2014: pp. 880-891.

Table 17.1 Key Section 42 Consultation Responses about Glint and Glare

Consultee	Response	Applicant Response
Kent County Council	Public rights of way (PRoW) users have not been included in the 'Glint and Glare' study. Considering the proximity of Public Footpaths ZR484 and ZR485 to the solar panels, KCC requests that the 'Glint and Glare' study is extended to assess the impact on PRoW users.	The 'Glint and Glare' study in this Chapter has been updated to include ZR484 (the Saxon Shore Way and proposed England Coast Path) and ZR485.
Swale Borough Council	There is less concern about light nuisance transmission from the solar panels, as this is much less of a problem than it used to be – modern farms have much less reflection from panels than used to be the case. Nevertheless, there is still the potential for glint and glare to occur and this needs to be recognised and quantified. A light nuisance assessment should be submitted with predicted light levels, glint and glare measurements/predictions and mitigation, if any.	This is provided in this Chapter and accompanying Technical Appendix A17.1.
Graveney with Goodnestone Parish Council	We note some glint and glare impacts on residents are assessed as moderate. Can you confirm whether there any means of mitigation?	Section 9 of the Glint and Glare Assessment (ES Technical Appendix A17.1) stated: "*No mitigation requirement has been identified*". However, section 8 of the assessment does provide an overview of potential mitigation measures.
Graveney Rural Environment Action Team (GREAT)	How did the developers assess the impact of the glint and glare on the health and well-being of the residents of Graveney? Did they use a recognised well-being scale and standard? What factors were taken into account? What measures would the developers take to reduce the effects?	The Glint and Glare Assessment (Technical Appendix A17.1), section 3 and various Appendices, details the methodology used.

17.2.4 Assessment Methodology

17. The Glint and Glare Assessment methodology is set out in section 3 and Appendices A-E of Technical Appendix A17.1.

18. A geometric assessment was undertaken to identify the potential for solar reflections to impact on potentially sensitive receptors. The assessment was limited to ground based receptors. This excluded aviation receptors because the nearest active airfield is Maypole Airfield, approximately 13.5 km to the east, and at this distance significant glint and glare effects are extremely unlikely.

19. The proposed assessment methodology has adhered to the following sequence:

- Identify the receptors of concern;
- Choose appropriate receptor locations based on the above;
- Define the proposed solar farm area and choose an appropriate assessment resolution;
- Undertake geometric calculations to determine whether a solar reflection may occur, and if so, when it will occur;
- If a reflection can occur, determine whether the reflecting panels will be visible from the identified receptor locations. If the panels are not visible from the receptor then no reflection can occur;
- If it is calculated that a reflection will occur, consider the location of the solar reflection with respect to the location of the sun in the sky, its angle above the horizontal and the time of day at which a reflection could occur;
- Consider both the solar reflection from the proposed solar farm and the location of the direct sun light with respect to the receptor's position;
- Consider the solar reflection with respect to the published studies; and
- Determine whether the solar reflection is likely to be a significant nuisance or a hazard to safety.

20. Effects are classed as major, moderate, low or no effect. A major effect which may present a significant nuisance or a hazard to safety is recommended to be mitigated to reduce the magnitude of the effect to acceptable levels. This accords with the scale and description used in Technical Appendix A17.1, Appendix D, but does not match the scale used elsewhere in this ES. Technical Appendix A17.1 methodology sets out that only Major effects require mitigation, so the conclusion that only these are significant in terms of the EIA Regulations is consistent with the approach taken elsewhere in this ES.

17.2.5 Baseline Conditions

21. The reflectivity of solar panels is relatively low, comparable to still water and less than glass and steel. The surrounding environment contains reflective materials and surfaces already, some of these are highlighted in Figure 12 in Technical Appendix A17.1, including:

- Another solar farm at Abbey Fields Road, to the south;
- Relatively still water in the Swale, Faversham Creek and Oare Creek; and
- Plastic covers (including polytunnels) within agricultural fields.

22. Of particular note, users of the Saxon Shore Way receive reflections of sunlight from the Swale and Faversham Creek at certain times of the day.

17.2.6 Assessment of Potential Effects

17.2.6.1 Road Users

23. Potential for glint and glare effects on users of Seasalter Road has been predicted at two short stretches, each approximately 150 m in length, one just to the northwest of the junction with the existing Cleve Hill Substation access road, and one on the south side of Graveney Hill, as shown in Figure 8 of Technical Appendix A17.1. Effects have been modelled and predicted to last for up to approximately 20 minutes per day but in practice they would be fleeting for a moving receptor. The intensity of any reflection would be comparable to the intensity of a reflection from still water.

24. Traffic volumes on Seasalter Road are unlikely to be high, as set out in Chapter 14: Access and Traffic. There is also a relatively large separation (approximately 500 m or more) between the panels and a vehicular receptor.

25. Seasalter Road runs approximately north-south to the east of the site. Any reflections would occur from the west or northwest, while drivers will be facing south or southwest, or north or northeast.

26. The reflecting area is likely to be partially or fully obscured by undulating terrain and vegetation.

27. Overall, the effect is considered low and no mitigation is required.

17.2.6.2 Residential Receptors

28. The assessment considered residential receptors within 1 km of the Development with the potential to be impacted by glint and glare. There is no formal guidance on distance within which glint and glare should be assessed. From a technical perspective, there is no maximum distance at which potential reflections could be experienced. The significance of a reflection decreases with distance. This is because the proportion of an observer's field of vision that is taken up by the reflecting area diminishes as the separation distance increases. The intensity of the reflection also reduces with distance. Terrain and shielding by vegetation are also more likely to obstruct an observer's view at longer distances. The above parameters and industry experience shows that a 1 km buffer is generally appropriate for glint and glare effects on ground-based receptors.

29. In total effects were assessed on 82 properties as detailed in Technical Appendix A17.1. Calculations suggest that up to 36 properties could receive reflections from the panels. Reflections at residential receptors would generally coincide with direct sunlight, such that an observer looking towards a reflecting panel would also be looking towards the sun. Direct sunlight is significantly more intense than a solar reflection from a panel.

30. Effects have been modelled and predicted to last for up to 40 minutes per day under worst-case conditions (full visibility of all reflecting panels on a sunny day).

31. The reflecting area is likely to be partially or fully obscured due to the separation distance and existing features of the environment (trees, the sea defence structures and other buildings).

32. Overall the potential effect is considered moderate, and not significant, and no mitigation requirement has been identified.

17.2.6.3 Footpath Users

33. The assessment considered users of public footpaths ZR484 and ZR485. Reflections would generally coincide with direct sunlight, such that an observer looking towards a reflecting panel would also be looking towards the sun. Direct sunlight is significantly more intense than a solar reflection from a panel.

34. Effects on users of ZR484 and ZR485 have been modelled and predicted to last for up to approximately 40 minutes per day for a static observer, in the absence of intervening structures that would block the light. For ZR485, which passes through the site and below the height of the solar PV modules, much of the light reflected towards users of the path would be blocked by other solar PV modules – only those modules whose upper surface can be seen, in practice, from the path have the potential to cause reflection. In practice effects would likely be perceptible for a few minutes for a moving receptor.

35. Public footpaths are not continually occupied and, in many cases, potential reflections would not be observed at all.

36. Reflections towards a footpath user do not have an associated safety hazard. The worse-case scenario would be discomfort when looking towards a reflecting panel and a potential temporary after-image.

37. For users of the Saxon Shore Way (ZR484), reflections from the solar PV modules would be similar to reflections that may already occur from the Swale or Faversham Creek, on the other side of the path. Reflections could only occur from one of these at any time, as they are in different directions from any point on the path.

38. There are other public rights of way within 1 km of the Development site, as set out in Chapter 13: Socio-economics, Tourism, Recreation and Land-Use, including ZR488 to the southeast of the development. Effects for observers on this footpath and others within 1 km of the Development site are likely to be similar in nature to, but lesser in magnitude than, those for observers on the assessed footpaths within Technical Appendix A17.1. Further detail is provided in in Appendix I of Technical Appendix A17.1.

17.2.7 Mitigation Measures

39. Overall, the effect is considered low and no mitigation is required.

17.2.8 Cumulative Effects

40. The cumulative developments set out in Chapter 2: Environmental Impact Assessment have been reviewed against the findings of the assessment reported in Technical Appendix A17.1. No other sources of glint and glare are proposed, that may have a

cumulative effect on the receptors assessed in this chapter. The cumulative developments do include potential new receptors for glint and glare effects, however the nearest of these is at a distance of 1 km southwest of the western end of the Development site at its nearest point, and not particularly elevated. The properties are further from the nearest proposed solar PV modules than others assessed in A17.1, and would have more intervening screening by vegetation and buildings. Other cumulative residential developments are substantially further away, and would not receive effects.

41. Cumulative effects are therefore assessed as negligible and not significant.

17.3 Human Health

17.3.1 Introduction

42. A Human Health Impact Assessment (HHIA) has been undertaken to consider key determinants to protect human health. HHIAs are designed to determine whether a proposal might improve health inequalities or negatively affect people's health and wellbeing in its widest sense.

43. Based on the experience of the project team, the EIA Scoping Opinion (DCO Document Reference 6.4.3.2) and subsequent consultation with the public and other organisations, this section draws together and considers the findings from the following assessments:

- Air Quality and Climate;
- Traffic and Transport;
- Noise;
- Residential amenity (from the LVIA);
- Security;
- Health and safety at work; and
- Electric, magnetic and electromagnetic fields (EMF; assessed in section 17.4).

44. The people who might be affected are different depending on the nature and magnitude of the potential effect; where effects are predicted, the affected population is described.

45. Properly designed and maintained solar parks and energy storage facilities are safe technologies. This is evidenced by both technologies being widely deployed in residential settings in very close proximity to human receptors. The site design and inbuilt buffers from sensitive receptors will minimise any risk to human health resulting from the operation of the Development. Risks associated with electrical infrastructure such as from lightning strikes are removed or reduced through inbuilt control systems and can be scoped out at this stage.

46. Potential health impacts are therefore related primarily to construction related impacts, and operational impacts on residential amenity.

47. Significance is assessed as in the assessments drawn from.

48. Cumulative effects are considered in the assessments drawn from, and where relevant these are included in this section.

17.3.1.1 Consultation

49. Full consultation responses received are collated and provided, along with the Applicant's response, in the Consultation Report (DCO Document Reference 5.1). A summary is provided in Table 17.2.

Table 17.2 Consultation Response Summary for Human Health

Consultee	Response	Applicant Response
GREAT Graveney	How did the developers assess the impact of the working hours and working days during construction on the health and well-being of villagers of Graveney? Did they use a recognised well-being scale and standard? What factors were taken into account? What measures would the developers take to reduce the effects?	A Health Impact Assessment is presented in the ES in section 17.3. This considered the potential health impacts of the construction of the development on local residents. The potentially significant effects are identified and assessed in technical chapters of the ES for the types of impact that could affect health (air quality, noise, traffic/transport).
Health and Safety Executive	No comment from a planning perspective	No response required.

17.3.2 Air Quality and Climate

50. The potential air quality effect of the Development is assessed in Chapter 16: Air Quality.

17.3.2.1 Baseline Conditions

51. The effects of existing air quality conditions in the area of the Development demonstrated that there were no recorded exceedances of NO_2 air quality objective in 2017. Exceedances of the Air Quality Standard objectives for NO_2 and PM_{10} were not predicted as concentrations were below the respective air quality objectives within the proposed years of construction.

17.3.2.2 Assessment of Effects

Construction Phase

52. Construction traffic emissions have been assessed in terms of the potential changes in the ambient levels of NO_2 and PM_{10} that a construction project may bring about. The baseline traffic data used in the air quality assessment is detailed in Chapter 14: Access and Traffic.

53. The effects of air quality from construction traffic emissions have been predicted to be negligible and no mitigation is considered necessary.

54. Construction activities have the potential to create a dust nuisance in dry, windy conditions. Dust emissions are not anticipated to relate to trackout, where dust is carried by construction vehicles on and off site, because of the extended length of metalled road that will be implemented from Seasalter Road in to the electrical compound.

55. During the earthwork phase when constructing the wider site, low risk effect on human receptors has been predicted.

56. Mitigation measures are embedded within the Outline Construction Environmental Management Plan (Outline CEMP), provided as Technical Appendix A5.4, and following implementation of this mitigation, negligible construction dust effects are predicted on human receptors.

Operational Phase

57. Operational phase effects were scoped out of the assessment in Chapter 16: Air Quality.

Decommissioning Phase

58. Decommissioning effects are assessed as the same as construction effects, however in practice they're likely to be lesser in magnitude.

17.3.3 Traffic and Transport

59. The potential effect that traffic and transport associated with the Development has been considered in Chapter 14: Access and Traffic.

17.3.3.1 Baseline Conditions

60. Traffic considerations have the potential to affect people in the local area and along the transport route leading to the Development along the A299, Head Hill Road and Seasalter Road; receptors exist along the proposed access route between the M2 and the Development, most notably Graveney and Goodnestone.

61. The highest number of vehicles resulting from the Development will be during the construction phase, consisting of construction workers, cranes, construction vehicles and construction material deliveries using HGVs.

17.3.3.2 Assessment of Effects

Construction Phase

62. A number of potential traffic effects are assessed in Chapter 14: Access and Traffic. Mitigation measures are both embedded in the design of the Development, and put forward in addition, namely the Outline Construction Traffic Management Plan (Technical Appendix A14.1), in order to reduce the traffic effects arising from the Development, particularly along the construction route and public rights of way. The following are the key potential effects associated with access and traffic:

- Severance;
- Driver, pedestrian and cyclist delay and amenity; and
- Fear and intimidation.

63. Safety effects on users of the roads has been scoped out, as no effects are anticipated above the baseline. Severance is the effect of splitting communities that exist on both sides of an access route, caused by increases in traffic levels. Driver delays usually occur at junctions and occur when junctions are operating close to or at capacity. The increase in traffic as a result of construction of the Development does not warrant the need for any junction capacity assessments and there are no existing capacity issues at any junction within the vicinity of the Development. Given the infrequent nature of potential delays and the avoidance of sensitive time-periods, congested junctions are considered to be moderate sensitivity. However, the level of effect in terms of percentage increase of vehicles is classed as very low and therefore, the effect is expected to be slight. Any delays will be infrequent and of short duration, and hence not significant.

64. Pedestrian and cycle delay and amenity has been considered. There is no existing pedestrian infrastructure present on Seasalter Road, from which access is taken, and therefore the pedestrian amenity is currently limited. Therefore, it is envisaged that pedestrians will utilise the parallel PROW which runs next to the carriageway. The nearest bus stop is Murton Place, located on Seasalter Road and the nearest railway station is in Faversham, away from the access route for the Development. Effects on pedestrian and cycle amenity, and on delay to public transport, are assessed as slight or negligible, and not significant.

65. With regards to fear and intimidation, the strategic highway network to the site is relatively straight with good visibility along its extent. The one section which has poorer visibility is the narrow bridge over the railway line. It is anticipated that any abnormal loads travelling over the bridge will be guided by banksman to avoid any conflict. Furthermore, signage will be used to educate drivers of potential on coming HGVs. Furthermore, a pedestrian footbridge is located over the bridge, avoiding any conflict

between road users. Fear and intimidation effects are assessed as slight or negligible, and not significant.

Operational Phase

66. Traffic during the operation phase will consist of movements by staff that will supervise the operation of the Development and visit the Development to conduct routine maintenance. This is unlikely to involve HGVs and considered to be of negligible magnitude, and hence any related effects will not be significant.

Decommissioning Phase

67. Effects during decommissioning are likely to be less adverse than those during the construction phases as less plant and material will be required and will therefore be of the same, or lesser significance than construction effects. An Outline Decommissioning and Restoration plan has been produced to accompany the ES. It is expected that a Decommissioning Traffic Management Plan would be produced and agreed with the Local Highways Authority prior to decommissioning commencing

17.3.4 Noise

68. A full assessment of the potential effects of noise and vibration is provided in Chapter 12: Noise and Vibration.

17.3.4.1 Baseline

69. Potential noise-sensitive receptors are identified as houses in the vicinity of the Development. Potential noise effects are limited to residential amenity in the localised area which reduces as the distance from the Development increases. Houses which are closest to the Development were selected for assessment, in order to represent the worse-case effects and those most likely to be affected by any potential effects.

17.3.4.2 Assessment of Effects

Construction Phase

70. The effects of construction noise on the Development design have been assessed on the basis of the change in traffic noise levels due to the addition of traffic associated with construction of the Development, and construction noise itself. Baseline traffic flows at each noise-sensitive receptor have been sourced from Chapter 14: Access and Traffic. The percentage increases in all traffic and for HGVs have then been used together with the number of vehicles, proportion of HGVs and likely speed (based on the type of road) to calculate the likely change in traffic noise level due to construction traffic for the peak of the construction programme in terms of vehicle movements, using the method described in Calculation of Road Traffic Noise (CRTN)[2]. For construction activities, mitigation may be required, depending on the proposed methods and plant to be used. Example mitigation measures are provided, however specifics will be agreed with the local planning authority via the CEMP, to be secured under a requirement of the DCO, prior to commencement of construction to ensure the mitigation corresponds to requirements.

71. Following mitigation, noise effects during the construction phase have been found to be not significant at the identified sensitive receptors in terms of the EIA Regulations.

Operational Phase

72. The effects of noise from operation of the Development have been assessed using the standard methodology for assessing noise. The existing levels of background noise have been measured at a selection of representative properties situated in the vicinity of the Development. Mitigation may be required, depending on the proposed plant and

[2] Calculation of Road Traffic Noise, Department of the Environment, 1988

specific locations of it within the site. Example mitigation measures are provided, however specifics will be agreed with the local planning authority prior to commencement of construction to ensure the mitigation corresponds to requirements. Noise levels during operation of the Development have been predicted using a recognised calculation technique, compared to the noise limits and found to be acceptable under the EIA Regulations with mitigation measures.

Decommissioning Phase

73. Predicted noise effects arising from decommissioning are likely to be of a similar nature to those predicted for the construction phase and have been found to be not significant. Decommissioning effects will be managed through best practice measures.

17.3.5 Residential Amenity

74. An assessment of residential visual amenity has been undertaken in Technical Appendix A7.4.

75. Residents are considered to be of high sensitivity to the Development as they are static 'receptors' whose enjoyment of the property is likely to be affected by the quality of visual amenity experienced there. Eighteen residential properties and groups have been assessed within 1 km of the Development. Beyond this distance, the Development is likely to form such a small feature as to be a negligible part of any view and not reasonably likely to be affected by the Development.

76. The Residential Visual Amenity Assessment identified that, out of the 18 properties/ groups, significant visual change will occur on:

- 13 properties/groups during the construction phase;
- 13 properties/groups during the operational phase, immediately following construction of the Development;
- 10 properties/groups during the operational phase, after year 10, with the growth of vegetation planted to screen or soften views of the Development infrastructure; and
- 8 properties/groups during the decommissioning phase.

77. Significant visual change does not mean a significant effect on amenity. Application of the standard test, of whether the visual change would be such as to render a property an unattractive place to live, found that no properties would be described as this, during any phase of the Development.

17.3.6 Security

78. The Development is located within a rural and isolated area and houses infrastructure considered to be vulnerable to illegal interference including theft. The Development will include security measures to regularly monitor access to the Development. This section therefore assesses the effect of security measures of the Development upon the health and well-being of neighbouring residents and future occupiers.

79. The Development will be enclosed by a 2 m 'deer fence'. Pole mounted internal facing closed circuit television (CCTV) systems are also proposed to be deployed around the perimeter of the operational areas of the Development. CCTV will act as a visible deterrent to vandalism and other anti-social behaviour.

80. It is likely that lighting on sensors for security purposes will be deployed around the electrical compound and potentially at any other pieces of critical infrastructure. No areas of the Development are proposed to be continuously lit. Lighting is assessed in Chapter 7: Landscape and Visual, as being of negligible magnitude and not significant during all phases of the Development.

81. Vehicular access will be restricted to authorised personnel only and will be monitored, therefore reducing the likelihood of transport being used for the removal of equipment.

82. Effects from theft and vandalism are not predicted to cause any negative health effects on the people in the vicinity of the Development. This will be further minimised by the implementation of security measures.

17.3.7 Public Access

83. Access to the general public will be limited to public rights of way and a new permissive path through the site, as detailed in Chapter 13: Socio-economics, Tourism, Recreation and Land Use.

84. Public footpaths ZR484, ZR488, ZR486, CW901, CW55 and ZR692, which include the Saxon Shore Way and the proposed England Coast Path, are adjacent or close to the Development site and will not have any significant direct effects.

85. Public footpaths ZR485 and ZR488 cross the Development in different locations and therefore during the construction phase of the Development, temporary obstructions may arise that will directly affect the footpath users, though the paths will be kept open throughout the construction phase. Where paths cross routes used by construction vehicles, these points will be either gated allowing pedestrian access and preventing vehicular access, or staffed so that pedestrians can be allowed through safely. Paths will be separated from solar PV modules and other Development equipment by a 2 m high 'deer fence'. The Development includes a proposed new permissive path, which will cross the site, opening up additional potential circular routes.

86. Given these measures, the risk to human health through public access to the Development site is assessed as low and not significant during all phases of the Development.

17.3.8 Health and Safety at Work

87. There are various health and safety considerations particularly for workers during construction and decommissioning of the Development. Workers are in the closest proximity to the Development and as a result are considered to be the most at risk group.

88. Comprehensive health and safety assessments are an essential part of the construction process and would be carried out prior to construction by the contractor in accordance with legislation. A Construction, Design and Management (CDM) co-ordinator will be appointed and be responsible for the provision of a pre-construction information pack, as required under the Construction (Design and Management) Regulations 2015. The appointed contractor will be required to provide a construction phase plan.

89. The construction of the Development would be managed in accordance with the Health and Safety at Work Act 1974 and would comply with all other relevant Health and Safety Regulations, including:

- The Construction (Health, Safety and Welfare) Regulations 1996;
- Construction (Design and Management) Regulations 2015; and
- Electricity Safety, Quality and Continuity Regulations 2002.

90. The Development would operate to the Health and Safety Executive 'Health and safety in the new energy economy: Meeting the challenge of major change' published in August 2010[3].

[3]Health and Safety Executive (2010) Health and safety in the new energy economy: Meeting the challenge of major change. Available online: http://www.hse.gov.uk/eet/assets/pdf/new-energy-economy.pdf (Accessed on 23/10/2018)

17.3.8.1 Unexploded Ordnance (UXO)

91. A preliminary online desk-based search of the potential for unexploded ordnance (UXO) present within the Development site was undertaken in May 2018[4]. The results identified the Development site as a 'low risk' area, relative to other locations within the UK generally. However, there is evidence of military use of the area, particularly during World War II as set out in ES Chapter 11: Cultural Heritage and Archaeology and it is known that World War II shells were recovered during the construction of the existing Cleve Hill Substation. Therefore UXO will continue to be addressed as a potential health and safety risk to construction workers throughout the pre-construction planning and the construction phase of the Development to ensure the health and safety of site workers. Risks generally are higher in the proposed electrical compound, where all soil will be moved down to a depth of 1 m or more, compared to where the solar PV module mounting structures will be installed, as these will involve a pole in the ground every few metres only.

92. Following adoption of these measures, the risk to human health of construction workers is considered to be low and not significant during the construction phase.

17.3.9 Conclusion

93. Key determinants to the protection of human health, including mental health aspects associated with changes to amenity as a result of the Development[5], have been considered as part of this HHIA. The outcome of the HHIA indicates that the Development is unlikely to negatively affect people's health and wellbeing in its widest sense. There are no effects that:

- Cause potentially severe or irreversible negative effects;
- Affect a large number of people; or
- Specifically may affect people who already suffer poor health or are socially excluded.

94. As a result, no negative significant effects are predicted for any phase of the Development.

95. Potential positive effects on health include effects the Development will have on climate, by way of reducing emissions of carbon dioxide, and the increases in access to open spaces the Development will lead to, during its operation phase.

17.4 Electric, Magnetic and Electromagnetic Fields (EMFs)

17.4.1 Introduction

96. This section assesses the potential effects of electric, magnetic and electromagnetic fields (EMFs) produced by the Development.

97. Power frequency EMFs arise from generation, transmission, distribution and use of electricity and occur around power lines and electric cables and around domestic, office or industrial equipment that uses electricity. Electric fields are the result of voltages applied to electrical conductors and equipment. Fences, shrubs and buildings can block electric fields. Magnetic fields are produced by the flow of electric current; however most materials do not readily block magnetic fields. The intensity of both electric fields and magnetic fields diminishes with increasing distance from the source.

[4] Zetica UXO Website (2018). Risk Maps. Available online: https://zeticauxo.com/downloads-and-resources/risk-maps/ (accessed on 23/10/2018)
[5] The ES assesses the likely significant effects of the Development during construction, operation and decommissioning. Effects as a result of the development process itself including consultation, environmental assessment and consent applications are a separate consideration outside of the scope of this ES.

98. Electric fields depend on the operating voltage of the equipment. Magnetic fields depend on the electrical currents flowing and are not significantly limited by most common materials. Typically, ground-level magnetic fields from underground cables fall much more rapidly with distance than those from a corresponding overhead line, but can be higher at small distances from the cable.

17.4.1.1 Consultation

99. Section 42 Consultation responses received following publication of the PEIR in June 2018 are collated and provided, along with the Applicant's response, in the Consultation Report (DCO Document Reference 5.1). There were no responses relevant to EMFs.

17.4.2 Relevant Legislation, Guidelines and Policy

100. There is no direct statutory provision in the planning system relating to protection from EMFs. Guidance from the Department for Energy and Climate Change (DECC)[6] suggests that guidelines for both public and occupational exposure published by the International Commission on Non–Ionizing Radiation Protection (ICNIRP)[7] should be taken into account. The DECC guidance also references Health Protection Agency (HPA) guidelines[8] on the application of ICNIRP exposure guidelines.

101. The DECC guidance states that 'overhead power lines at voltages up to and including 132 kV, underground cables at voltages up to and including 132 kV and substations at and beyond the publicly accessible perimeter' are not capable of exceeding the ICNIRP exposure guidelines and therefore no assessment is required for these and other types of infrastructure listed on the Energy Networks Association website.

102. National Grid[9] states that:

> *"Underground cables, whether directly buried or in a tunnel, produce no external electric field."*

103. Therefore electric fields are not considered further in this assessment.

17.4.3 Baseline Conditions

104. The HPA guidelines refer to the following ICNIRP reference levels:

> *"For occupational exposure to 50 Hz fields, the reference level for electric fields is an electric field strength of 10 kV m -1 and for magnetic fields a magnetic flux density of 500 µT.*
>
> *The equivalent levels for public exposure are 5 kV m -1 and 100 µT."*

105. The underground 400 kV cable system will be located on private land that is not publicly accessible, however the public exposure reference levels have been used in this assessment to ensure that there are no adverse effects on the closest publicly accessible areas.

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[6] DECC (2012). DECC Power Lines: Demonstrating compliance with EMF public exposure guidelines, A Voluntary Code of Practice 2012. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/37447/1256-code-practice-emf-public-exp-guidelines.pdf [Accessed 22/10/2018]

[7] ICNIRP (1998) ICNIRP Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic and Electromagnetic Fields (up to 300 GHz). Available at: https://www.icnirp.org/cms/upload/publications/ICNIRPemfgdl.pdf [Accessed 22/10/2018]

[8] HPA (2009) Application of ICNIRP Exposure Guidelines for 50 Hz Power Frequency Fields http://webarchive.nationalarchives.gov.uk/20140714113841/http://www.hpa.org.uk/Topics/Radiation/UnderstandingRadiation/InformationSheets/info_IcnirpExpGuidelines/ [Archived, accessed 22/10/2018]

[9] National Grid Website (EMFs.info) (2018), Underground Power Cables. Available online: http://www.emfs.info/sources/underground/ [Accessed 22/10/2018]

106. The underground 400 kV cable system will be located adjacent to the existing Cleve Hill Substation which connects to the existing 400 kV overhead transmission network. This infrastructure also has the potential to generate EMFs as it includes equipment of greater than 132 kV.

107. Magnetic fields are not simply added together where they may be generated by separate sources and are typically dominated by the biggest source[10], therefore it is appropriate to consider the magnetic field generated by the 400 kV cable system in isolation even in areas where a magnetic field may be present from multiple sources. This is the approach taken in this assessment.

17.4.4 Assessment of Potential Effects

108. The scope of the assessment of EMFs is limited to consideration of any cables associated with the Development which exceed 132 kV. The only part of the Development to exceed this voltage is the underground export cable between the Development Substation and the existing Cleve Hill Substation which will be an underground 400 kV cable system.

109. The HPA guidelines outlines an assessment methodology as a structured approach.

- Stage 1 – comparison of external fields to ICNIRP reference levels;
- Stage 2 – if stage 1 identifies that an exceedance is above the reference levels, the results of the evaluation should be compared with the values of external fields required to produce the basic restrictions in the body; and
- Stage 3 - to demonstrate compliance with basic restrictions, a detailed assessment should be carried out taking into account factors that represent the actual exposure conditions.

110. Following each stage of evaluation, if the results of the assessments are at or below the reference values, then compliance with the basic restrictions can be assumed.

17.4.4.1 Construction and Decommissioning Effects

111. Effects during the construction and decommissioning phases of the Development are scoped out of the assessment as the cables will not produce any significant EMFs until the Development is generating electricity when it is operational.

17.4.4.2 Operational Effects

112. An underground high voltage 400 kV cable system, buried underground, will be installed to connect the Development substation with the existing Cleve Hill substation. The 400 kV cable system is described in section 5.4.3 of Chapter 5: Development Description of the ES.

113. The highest EMFs produced by underground cables are located directly above the buried cables, and field strength decreases with distance from the source.

114. National Grid gives examples of magnetic fields for underground cables calculated at 1 m above ground level[11], as seen in Table 17.3.

[10] National Grid Website (EMFs.info) (2018), Adding fields together. Available online: http://www.emfs.info/what/adding/ [Accessed 22/10/2018]
[11] National Grid Website (EMFs.info) (2018), A guide to the debate on electric and magnetic fields and health. Available online: http://www.emfs.info/sources/overhead/specific/400-kv/ [Accessed 22/10/2018]

Table 17.3 Magnetic Fields for direct buried underground cables at 1 m above ground level

Voltage	Specifics	Location	Load	Magnetic Field in µT at Distance from Centreline			
				0 m	5 m	10 m	20 m
400 kV	Direct Buried	0.5 m spacing, 0.9 m depth	Maximum	96.17	13.05	3.58	0.92
			Typical	24.06	3.26	0.90	0.23

115. The HPA guidelines for occupational exposure are 500 µT and for public exposure 100 µT. Table 17.3 demonstrates that even directly above the cable under maximum load, neither the occupational or public limits will be breached.

116. The exact cable route is not known but the nearest residential receptor is located more than 100 m from the likely route of the underground cable. Due to the magnitude of effect upon the receptors, in accordance with ICNIRP exposure limit values, EMFs will have no effect on local residents therefore the effect is not significant in terms of the EIA Regulations.

17.4.5 Cumulative Assessment

117. As set out in section 17.4.3, magnetic fields are not added together where they may be present from multiple sources, therefore there will be no cumulative effects with other developments.

17.5 Telecommunications, Television Reception and Utilities

17.5.1 Introduction

118. This section evaluates the effects of the Development on telecommunication infrastructure, television reception and existing utilities.

119. Effects relating to existing infrastructure are not environmental effects, and there is no requirement to include an assessment of these effects under the EIA Regulations[12]. However, given the nature of solar park developments, they have the potential to affect existing utility infrastructure above and below ground.

17.5.2 Consultation

120. To identify any existing infrastructure constraints, both consultation and a desk-based study has been undertaken. Consultation with relevant telecommunication and utilities providers is a routine part of solar development and consultees include water, gas and electricity utilities providers and telecommunications providers as appropriate. Telecommunications and television providers are unlikely to be affected by Electromagnetic Interference (EMI) unless transmitters are in close proximity to electrical infrastructure associated with the solar PV array, in particular inverters[13].

121. A summary of the consultation findings is provided in section 17.5.3.

122. Consultation responses received following issue of the PEIR in June 2018 are collated and provided, along with the Applicant's response, in the Consultation Report (DCO Document Reference 5.1). None of these added information relevant to the baseline conditions for this section.

[12] HMSO. The Town and Country Planning (Environmental Impact Assessment) Regulations 2017
[13] Pager Power (2014) News: Electrical Compatibility: solar farms and wireless transmissions, Available online: https://www.pagerpower.com/news/solar-farms-electromagnetic-interference-emi/ [Accessed 23/05/2018]

17.5.3 Baseline Conditions

17.5.3.1 Telecommunications

123. There are understood to be no buried telecommunication infrastructure beneath the Development.

124. A search was undertaken of mobile phone mast locations using http://www.mastdata.com/ which confirmed there were no masts in the vicinity of the Development and services would be unaffected by the Development.

125. Openreach were consulted and provided mapping of infrastructure on or in close proximity to the Development. The presence of this infrastructure has been considered in the design of the Development.

126. Consultation was undertaken with the following organisations who have confirmed that the Development would have no effect on their infrastructure:

- Sky;
- Virgin Media;
- Vodaphone
- C.A. Telecom UK Ltd;
- City Fibre (Digital Infrastructure Provider);
- EU Networks Fiber UK Ltd;
- Instalcom Ltd; and
- Verizon (formally MCI Worldcom, MFS).

17.5.3.2 Television Reception

127. The area surrounding the Development receives television signals that were made exclusively digital, after the digital switchover was completed in the Meridian region, and hence no analogue TV signals are broadcast in the area[14].

128. The area around the Development is predominantly served by the Blue Bell Hill transmitter in Kent, approximately 27 km west of the Development.

129. Additional searches were undertaken for the presence of analogue radio, digital radio and freeview transmitter masts in the vicinity of the Development. The Faversham freeview transmitter is located approximately 3.5 km to the southwest of the Development site boundary[15]. A Television Relay Station is identified on Ordnance Survey basemapping approximately 1.8 km south of the Development site.

130. No other such masts were identified within 5 km of the Development. Given the low-lying nature of the Development, this is a sufficient distance to ensure any potentially relevant baseline factors are recorded to inform the assessment.

17.5.3.3 Utilities

131. On-site utilities could include water, sewers, gas or oil pipelines and electrical cables. Knowledge of the utilities during design and construction allows any effects to be negated by avoiding them or by use of suitable structures, such as pipe bridges.

132. From a desk-based search of existing datasets and consultation the following utilities and infrastructure has been identified which have the potential to be affected by the Development:

- National Grid – 400 kV transmission network overhead line (OHL; reference ZV);
- UK Power Networks – 11 kV distribution network OHL; and

[14] Further information on the digital switchover can be found at: http://www.digitalswitchover.co.uk/tvregion/meridian/ [accessed 20/03/2018]
[15] Available online: https://ukfree.tv/transmitters/tv/Faversham [accessed 29/10/2018]

- Blue Transmission London Array Limited (BTLAL) and London Array Ltd (LAL) – offshore wind farm export cables between London Array Offshore Wind Farm and the existing Cleve Hill Substation.

133. In addition, there is a UKPN building at NGR TR 04888 63976 adjacent to the anticipated route of the 400 kV cable system which will connect the Development to the existing Cleve Hill Substation. This building will be taken into account during the detailed design of the route for the 400 kV cable system for the Development.

134. Through further consultation, the organisations listed above provided further detail regarding the location of their infrastructure and the necessary clearances required.

135. The following organisations were consulted and confirmed that the Development would have no effect on their infrastructure:

- Scottish and Southern Electricity Networks;
- Southern Gas Networks;
- South East Water;
- Southern Water;
- GTC (independent utility provider);
- Teliasonera;
- Network Rail; and
- HS1.

17.5.4 Development Design Mitigation

136. During the design process for the Development, the infrastructure with the potential to be affected by the Development has been taken into account.

17.5.4.1 National Grid

137. National Grid provided 'pillar of support' data for the ZV 400 kV OHL towers and OHL clearance data for all of the ZV OHL which is within the Development site boundary.

138. The data used to demonstrate that the candidate Development design will not breach any of these protected zones is include in Technical Appendix A17.2 with confirmation from National Grid of no objection in principle to the candidate Development design.

17.5.4.2 UKPN

139. UKPN undertook a site visit and provided drawings and clearance distances for the 11 kV OHL. During the site visit, the potential for moving and undergrounding the line was discussed and following further consultation, UKPN provided a quotation for the works and confirmed to objection in principle to the moving and undergrounding of the 11 kV OHL. This consultation is presented in Technical Appendix A17.3.

140. The undergrounding of the UKPN 11 kV forms part of the Development design and has enabled additional generating capacity to be added to the route of the OHL.

17.5.4.3 BTLAL & LAL

141. The export cables from London Array offshore Wind Farm cross the Development site from north to south to the east of the electrical compound. All infrastructure other than the northern site access option avoids this area.

142. The northern site access option would cross over the export cables requiring construction works to be undertaken in the area above the cables then all construction traffic to access the site across this route. It is anticipated that a cable crossing design will be agreed between the parties and implemented over the location of the cables to ensure that the existing cables are protected. The existing farm track in this location is currently utilised by HGVS associated with the agricultural use. BTLAL and LAL not

raised any objection to the Development and agreement is expected to be reached in relation to the design of the interface between infrastructure assets.

17.5.5 Assessment of Potential Effects

17.5.5.1 Telecommunications

143. There is a telecommunications mast associated with the existing Cleve Hill Substation at NGR TR 04779 64024. The mast is not expected to be affected by the Development given the low-lying nature of the site, and the lack of potential for it to form a barrier between the mast and any receiving station.

144. No other telecommunication infrastructure has been identified beneath or close to the Development.

145. The Development is unlikely to interfere with telecommunication infrastructure and therefore no effects are anticipated.

17.5.5.2 Television Reception

146. The Development has no moving parts and is therefore unlikely to interfere with digital television signals and therefore no effects are anticipated.

17.5.5.3 Utilities

147. The potential exists for utilities to be affected during the construction of the Development through damage caused as a result of excavation and engineering operations. In the absence of precautionary measures to avoid damage to utilities, this could lead to a short-term adverse effect. However this risk has been mitigated by mapping infrastructure that crosses the Development and avoiding it through the design of the Development.

148. No effects on utilities are predicted as a result of the operational or decommissioning phases of the Development.

149. Cumulative effects will not occur in combination with other proposed developments, as the Development is predicted to have no effect on telecommunication, television or utilities.

17.6 Waste

17.6.1 Introduction

150. Given the nature of the Development and the construction process no significant quantities of waste are anticipated. The majority of construction equipment will be delivered to site for assembly and installation (mounting structures) and connection (solar panels).

151. Exact quantities and types of waste likely to be generated during the construction phase are unknown, however it is expected that waste streams could include:

- Welfare facility waste;
- Waste chemicals, fuels and oils;
- Waste metals;
- Waste water from dewatering of excavations;
- Waste water from cleaning activities (*e.g.*, wheelwash);
- Packaging; and
- General construction waste (paper, cardboard, wood, *etc.*).

152. During the operational phase of the Development the site would be unmanned, although given the scale of the Development maintenance personal would be expected

to be present on site most days. Waste arising are expected to be substantially less that during the construction phase, and could include:

- Welfare facility waste;
- Waste metals; and
- General waste (paper, cardboard, wood, *etc*.).

153. A Site Waste Management Plan (SWMP) will be agreed as part of the Outline CEMP prior to the commencement of construction.

17.6.2 Consultation

154. Section 42 consultation responses are collated and provided, along with the Applicant's response, in the Consultation Report (DCO Document Reference 5.1). A summary is provided in Table 17.4.

Table 17.4 Consultation Response Summary for Waste

Consultee	Response	Applicant Response
Graveney with Goodnestone Parish Council	(c) Waste: What material will be used for the proposed flood bunding around the battery storage facility? Where will it be sourced?	The bund is expected to be formed predominantly of site won material, in particular clays to form the core of the bund, and topsoil to provide a planting medium into which landscaping planting will be planted.

17.6.3 Assessment of Effects

17.6.3.1 Decommissioning and Construction

155. The number of vehicles associated with the removal of waste material associated with decommissioning and construction is considered within Chapter 14: Access and Traffic.

156. All waste transported offsite will be delivered to the appropriately licenced receivers of such materials. Given that operators receiving any waste materials resulting from the Development will be subject to their own consenting procedures, there is no requirement for further consideration of waste to be undertaken, beyond the volume of any traffic generated during the construction phase resulting from its transportation.

17.6.3.2 Operational Phase

157. During the operational phase of the Development waste arising are expected to be substantially less that during the construction phase, and so effects are not assessed.

17.7 Major Accidents or Disasters

17.7.1 Consultation

158. Section 42 consultation responses received are collated and provided, along with the Applicant's response, in the Consultation Report (DCO Document Reference 5.1). A summary is provided in Table 17.5.

Table 17.5 Consultation Response Summary for Major Accidents or Disasters

Consultee	Response	Applicant Response
Graveney with Goodnestone Parish Council	(d) Major accidents and disasters: Have KCC and Swale BC emergency planning officers been consulted on the proposals and, if so, what have they said about potential risks and any management and mitigation measures?	Both Kent County Council and Swale Borough Council have been consulted on the proposals, and no comments in relation to major accidents and disasters have been raised by KCC or Swale BC.
GREAT Graveney	Who has been involved in emergency planning? Can you supply a complete risk assessment to the villagers of Graveney for major accidents and disasters and also for all other risks associated with the scheme?	No significant effects are identified in this chapter, nor have been raised by consultees.
The Faversham Society	What are the risks of a major incident on the site in the during construction? During operation? During decommissioning? What is the particular risk of explosion on the site? What would be the consequences? Have those risks been mitigated in the proposal? If so how?	No significant effects are identified in this chapter, nor have been raised by consultees, for any phase of the Development. No risk of explosion is identified in any phase of the Development.

17.7.2 Vulnerability of the Development

159. It is considered that the Development is only potentially vulnerable to one type of major accident or disaster; inundation from the sea. This has been assessed in Chapter 10: Hydrology, Hydrogeology, Flood Risk and Ground Conditions and the associated Flood Risk Assessment in Technical Appendix A10.1.

160. The Development has incorporated flood resilience and resistance measures into the design to ensure that the Development would be safe and able to return to operation in the event of a flood defence breach or overtopping event, including accounting for sea level rise as a result of climate change.

17.7.3 Potential for the Development to Cause Major Accidents or Disasters

161. The Development is not considered likely to cause a significant accident or disaster risk during either the construction or operational phases.

17.7.3.1 Construction and Decommissioning Phase

162. Health and Safety during construction is addressed in section 17.3.8. In summary, the risk both to construction workers and the general public is low and not significant during the construction and decommissioning phases.

17.7.3.2 Operational Phase

Solar PV Arrays

163. When operational the majority of the Development comprises solar PV modules which are inert. Electrical infrastructure will be located across the Development, in the form of inverters, transformers and cabling, all of which will be subject to routine maintenance such that it is not considered to pose a significant risk to creating an accident or disaster.

Electrical Compound

164. There will be a concentration of electrical infrastructure at the bunded substation compound which will include the substation and transformers all of which will be subject to routine maintenance such that it is not considered to pose a significant risk of creating an accident or disaster.

165. Also an approximately 700 MWh battery array is proposed within the electrical compound, which will be designed using an energy storage system which includes batteries, inverters and system controllers.

166. There is a potential fire risk associated with certain types of batteries such as lithium ion, although the facility includes cooling systems which are designed to regulate temperatures to within safe conditions to minimise the risk of fire.

167. The battery technologies on which the design is based details the following with regards to fire protection:

- The manufacturer undertakes extensive testing and analysis to assess fire risk;
- Based on the fire risk assessment the following recommendations are made:
  - Do not install batteries where temperatures routinely approach or exceed 80°C – this is not the case with the Development;
  - Do not install batteries near heating equipment or heat sources – this is not the case with the Development;
  - Protect the installation area from flooding – this has been done with the introduction of the bund around the substation compound which houses the battery array; and
  - Ensure that installation areas comply with appropriate local fire, electrical and building code requirements – this would be the case with the Development.

168. Fire detection and suppression features could be installed to detect (*e.g.*, multi-spectrum infrared flame detectors) and suppress fire (*e.g.* water base suppression systems) to minimise the effect of any fire. The Development design will include adequate separation between battery banks to ensure that an isolated fire would not become widespread and lead to a major incident.

169. The Development is therefore not likely to lead to any major accidents or disasters.

170. No potential has been identified for the Development to lead to increased risk of a major accident or disaster in combination with cumulative developments.