



OAKLANDS FARM SOLAR PARK

Applicant: Oaklands Farm Solar Ltd

Sequential Assessment – Flood Risk

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1 INTRODUCTION

1.1 OVERVIEW

- 1.1.1 This Sequential Study has been prepared by Oaklands Farm Solar Ltd (the Applicant) to accompany the application for a Development Consent Order (DCO) for the proposed Oaklands Farm (the Proposed Development), located to the south-east of Walton-on-Trent, South Derbyshire (the Site).
- 1.1.2 The Sequential Study seeks to determine whether there are any sequentially preferable sites to the Site in areas of lower flood risk. Irradiation levels and topography are key factors in the determination of appropriate locations for solar development. The Applicant has identified South Derbyshire as an optimal region within the UK to site large scale solar development due to its high levels of irradiation and large areas of flat open land, as well as its proximity to high demand centres for electricity. Renewable energy developments require a point of connection to the National Grid electrical network to enable the electricity generated to be distributed to consumers and this is a key constraint in the selection of the Site. As such, this Sequential Study focuses on a 10km radius of the proposed grid connection point at Drakelow Substation.
- 1.1.3 As set out in Section 2.5 of the Flood Risk Assessment [APP-141], there is an unnamed tributary (an Ordinary Watercourse) shown on Ordnance Survey (OS) mapping which runs through part of the Site. A small tributary to the Ordinary Watercourse crosses the west of the Site from Oaklands Farm buildings to its confluence with the Ordinary Watercourse. The Ordinary Watercourse and its tributary are shown in Figure 2-2 of the FRA [APP-141].
- 1.1.4 Based on flood zone mapping from the Environment Agency (EA), 8.3 hectares (ha) of the Site is outside Flood Zone 1, the lowest risk flood zone. The Site (as per the Order Limits) is 191 hectares in area, which comprises the solar panel array areas and the cable connection route between the solar arrays and the Drakelow Power Station. The 8.3ha of the Site therefore equates to 4% of the Site being outside Flood Zone 1.
- 1.1.5 The aspects of the Proposed Development which would be located outside Flood Zone 1 is limited to underground cables and is therefore not vulnerable to surface water flooding. Part of the temporary construction track is located outside Flood Zone 1 however; this will be removed following construction.
- 1.1.6 Although the sequential test for flood risk is based on the publicly available EA data, the updated Flood Risk Assessment (Section 4.5 and Appendix H) submitted at Deadline 5 [REP5-017] details the additional hydraulic modelling undertaken by the Applicant during the course of the Examination, in agreement with the EA. That modelling demonstrates that the area of the Site outside Flood Zone 1 is less (approximately 7.3 ha) however, a small area of solar panels will be located within Flood Zone 2. Solar panels will be elevated (minimum 0.8 m above ground level) and significantly above the modelled flood depth of 0.15m, therefore this minor potential flood issue has been fully mitigated.

- 1.1.7 The results of the study will be used to assess whether the location of the Proposed Development, which includes areas outside Flood Zone 1, accords with planning policy requirement to preferably use land in areas of less flood risk.
- 1.1.8 The Sequential Study has been undertaken to satisfy the requirements of both National Policy Statement (NPS) EN-1 and the National Planning Policy Framework (NPPF) . Paragraph 5.8.21 of NPS EN-1 states a sequential, risk-based approach should be followed to steer new development to areas with the lowest risk of flooding, taking all sources of flood risk and climate change into account. Similarly, within the NPPF (Paragraphs 165 – 175), the overall aim of the Sequential Test is to steer new development to the lowest flood zone (i.e., Flood Zone 1). Where there are no reasonably available sites within Flood Zone 1, Flood Zones 2 and 3 may be considered, subject to passing the Exception Test, depending on the type of development proposed. Both the NPS EN-1 and the NPPF therefore, require the application of both the Sequential Test and the Exception Test. Chapter 2 of this document provides further detail on the relevant planning policy.
- 1.1.9 It should be noted that there are limitations to the depth of analysis which can reasonably be undertaken in a Sequential Study. The assessment of potential solar development areas is therefore considered to be high level, using data from readily available published sources. No site visits have been undertaken to further validate this information. This approach is compliant with National Policy Statement (NPS) EN-1 , Paragraph 4.3.2 which state “the consideration of alternatives in order to comply with policy requirements should be carried out in a proportionate manner” and “only alternatives that can meet the objectives of the proposed development need to be considered”.
- 1.1.10 The assessment methodology which has been followed is a logical and transparent approach, which is set out at Chapter 3.

2 POLICY CONTEXT

2.1 CONTEXT TO THE SEQUENTIAL TEST

- 2.1.1 Paragraph 5.8.6 provides the overarching context for addressing flood risk in respect of Energy Nationally Significant Infrastructure Projects, stating that the aim is to ensure that flood risk from all sources is taken into account at all stages of the planning process to avoid inappropriate development in areas at risk of flooding and to steer new development to areas with the lowest risk of flooding. Paragraph 5.8.36 confirms that in determining an application for development consent, the Secretary of State should be satisfied that where relevant that the Sequential Test has been applied and satisfied as part of site selection and that a sequential approach has been applied at the site level to minimise risk by directing the most vulnerable uses to areas of lowest flood risk.
- 2.1.2 Paragraphs 5.8.7 then references the role of the Sequential Test with Paragraph 5.8.7, introducing the concept of reasonably available alternative sites by noting that “Where new energy infrastructure is, exceptionally, necessary in flood risk areas (for example where there are no reasonably available sites in areas at lower risk), policy aims to make it safe for its lifetime without increasing flood risk elsewhere and, where possible, by reducing flood risk overall. It should also be designed and constructed to remain operational in times of flood.”
- 2.1.3 Paragraph 5.8.10 addresses the Exception Test, but in doing so clarifies the approach to be taken to the Sequential Test, stating “The Exception Test is only appropriate for use where the Sequential Test alone cannot deliver an acceptable site. It would only be appropriate to move onto the Exception Test when the Sequential Test has identified reasonably available, lower risk sites appropriate for the proposed development where, accounting for wider sustainable development objectives, application of relevant policies would provide a clear reason for refusing development in any alternative locations identified. Examples could include alternative site(s) that are subject to national designations such as landscape, heritage and nature conservation designations, for example Areas of Outstanding Natural Beauty (AONBs), SSSIs and World Heritage Sites (WHS) which would not usually be considered appropriate”.
- 2.1.4 Paragraph 5.8.21 further explains “The Sequential Test ensures that a sequential, risk-based approach is followed to steer new development to areas with the lowest risk of flooding, taking all sources of flood risk and climate change into account. Where it is not possible to locate development in low-risk areas, the Sequential Test should go on to compare reasonably available sites with medium risk areas and then, only where there are no reasonably available sites in low and medium risk areas, within high-risk areas.”

2.2 DEFINING REASONABLY AVAILABLE SITES

- 2.2.1 National Planning Policy Guidance defines a ‘Reasonably Available Site’ as one which is “in a suitable location for the type of development with a reasonable prospect that the site is available to be developed at the point in time envisaged

for the development” (paragraph: 028 Reference ID: 7-028-20220825, Revision date: 25 08 2022) .

- 2.2.2 Paragraph 5.8.23 of EN -1 confirms that any consideration of alternative sites through a Sequential Test should take account of the more general policy set out at Section 4.3 of EN-1 on alternatives.
- 2.2.3 Paragraph 4.3.15 of EN-1 states that “Applicants are obliged to include in their ES, information about the reasonable alternatives they have studied. This should include an indication of the main reasons for the applicant’s choice, taking into account the environmental, social and economic effects and including, where relevant, technical and commercial feasibility.”
- 2.2.4 Paragraph 4.3.22 then confirms that given the level and urgency of need for new energy infrastructure, the Secretary of State only needs to consider alternatives that can „meet the objectives of the proposed development“. In this case the Sequential Test has therefore been applied on the basis that any alternative site would need to be able to achieve the same or similar level of electricity generation as the Proposed Development.
- 2.2.5 Paragraph 4.3.23 states that “The Secretary of State should be guided in considering alternative proposals by whether there is a realistic prospect of the alternative delivering the same infrastructure capacity (including energy security, climate change, and other environmental benefits) in the same timescale as the proposed development.” This Sequential Assessment has been produced during the Examination of the Application which seeks development consent for the Proposed Development. It is therefore very unlikely that an alternative site within the Sequential Test Study Area would deliver the same infrastructure capacity in the same timescale as the Proposed Development, if it were not already moving through the process of achieving development consent, and there are no such projects within the defined Sequential Study Area. This aspect of EN-1 has therefore not been used in this case to discount any site, in order to ensure that a robust and meaningful assessment is undertaken.
- 2.2.6 Paragraph 4.3.24 then provides a wider context to the consideration of alternative sites, explaining that “The Secretary of State should not refuse an application for development on one site simply because fewer adverse impacts would result from developing similar infrastructure on another suitable site, and should have regard as appropriate to the possibility that all suitable sites for energy infrastructure of the type proposed may be needed for future proposals.”
- 2.2.7 Paragraph 4.3.27 provides further guidance on the definition of alternative sites, noting that “Alternative proposals which mean the necessary development could not proceed, for example because the alternative proposals are not commercially viable or alternative proposals for sites would not be physically suitable, can be excluded on the grounds that they are not important and relevant to the Secretary of State’s decision.” Further Paragraph 4.3.28 states that “Alternative proposals which are vague or immature can be excluded on the grounds that they are not important and relevant to the Secretary of State’s decision.”

2.3 SITE LEVEL APPLICATION OF THE SEQUENTIAL TEST

- 2.3.1 Paragraph 5.8.9 states that “If, following application of the Sequential Test, it is not possible, (taking into account wider sustainable development objectives), for the project to be located in areas of lower flood risk the Exception Test can be applied as defined in <https://www.gov.uk/guidance/flood-risk-and-coastal-change#table2>. The test provides a method of allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available.”
- 2.3.2 Paragraph 5.8.29 then sets out that “The sequential approach should be applied to the layout and design of the project. Vulnerable aspects of the development should be located on parts of the site at lower risk and residual risk of flooding. Applicants should seek opportunities to use open space for multiple purposes such as amenity, wildlife habitat and flood storage uses. Opportunities should be taken to lower flood risk by reducing the built footprint of previously developed sites and using SuDS.”
- 2.3.3 The Application is accompanied by a Flood Risk Assessment [REP5-017] which demonstrates how the sequential approach has been applied to the layout and design of the Proposed Development and which discusses the Exception Test.

2.4 NATIONAL PLANNING POLICY FRAMEWORK (NPPF) (2023)

- 2.4.1 Paragraph 165 states that “Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.”
- 2.4.2 Paragraph 168 explains that “The aim of the sequential test is to steer new development to areas with the lowest risk of flooding from any source. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The strategic flood risk assessment will provide the basis for applying this test. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding.”
- 2.4.3 Paragraph 169 sets out that “If it is not possible for development to be located in areas with a lower risk of flooding (taking into account wider sustainable development objectives), the exception test may have to be applied. The need for the exception test will depend on the potential vulnerability of the site and of the development proposed, in line with the Flood Risk Vulnerability Classification set out in Annex 3.”

2.5 SOUTH DERBYSHIRE LOCAL PLAN - POLICY SD2 – FLOOD RISK

- 2.5.1 At the local level Policy SD2 states that when considering development proposals in South Derbyshire, the Council will follow a sequential approach to flood risk management, giving priority to the development of sites with the lowest risk of

flooding. The development of sites with a higher risk of flooding will only be considered where essential for regeneration or where development provides wider sustainability benefits to the community that outweigh flood risk.

3 SEQUENTIAL TEST METHODOLOGY

3.1 OVERVIEW

- 3.1.1 There is no national or local policy or guidance which is prescriptive as to how applicants should approach the selection of sites. However, the methodology used in this assessment has been informed by relevant planning policy which is set out in Chapter 2.
- 3.1.2 In this case, renewable energy developments require a point of connection to the National Grid electrical network to enable electricity generated to be distributed to consumers and this is a key constraint in the selection of the Site. Stage 1 of this assessment is to define an appropriate study area, which reflects that key constraint.
- 3.1.3 Stage 2 is to map the flood risk present across that study area, in order to identify areas which are outside Flood Zone 1 and which can therefore be excluded from further consideration as they are not sequentially preferable to the Site in flood risk terms.
- 3.1.4 Stage 3 then maps 'hard constraints', which are a combination of the flood risk zones and other physical features (such as urban areas) which would prevent a large scale solar farm from being delivered, and which can therefore also be excluded from further consideration.
- 3.1.5 Stage 4 then adds 'further hard constraints'. Those have been identified in accordance with the criteria set out at Paragraph 5.8.10 of EN-1, to take account of wider sustainable development objectives, where the application of relevant policies would provide a clear reason for refusing development, as well as the policy at Paragraph 4.3.27 of EN-1 which requires alternatives to be commercially viable and physically suitable for the type of development proposed. In this case the further hard constraints which are applied comprise sloping sites over a specific grade, the River Mease Special Area of Conservation, a designated Park and Garden and Grade 2 agricultural land, for the reasons set out in the discussion in this document at Stage 4.
- 3.1.6 Following Stage 4 four Potential Development Areas (PDA's) are identified as being capable of providing alternative sites which could be sequentially preferable to the Proposed Development in flood risk terms and which would be of a similar size to the Proposed Development and therefore capable of producing a similar generating capacity. Stage 5 provides a discussion of each of those PDAs.

4 STAGE 1 – IDENTIFICATION OF SEARCH AREA

- 4.1.1 Irradiation levels and topography are key factors when determining the location of solar development. Solar developments are currently found across the UK; however, their efficiency is determined by the levels of irradiation at their location. In addition, topography is an important factor for locating solar development, with flat land being optimal for construction and less visually intrusive in the wider landscape. It also limits the shading between arrays and allows for better screening for development compared to sloping land; and enables panels to be optimally configured for best production levels.
- 4.1.2 Given these characteristics, the Applicant considers South Derbyshire to be an optimal region within the UK to locate a large-scale solar farm given its high levels of irradiation compared to other parts of the UK and the topography which is predominantly made up of and characterised by large flat open land. South Derbyshire is also located near high demand centres for electricity (e.g., Birmingham, Nottingham, Leicester) and therefore, large scale solar development in this region will place generation close to areas of high demand.
- 4.1.3 Following the identification of South Derbyshire, a search for a Point of Connection (PoC) was undertaken within this region. Drakelow Substation has been identified by the Applicant as the PoC for the Proposed Development. There is no prescribed guidance or standard on what constitutes a reasonable search area for renewable energy development. Since renewable energy schemes require a viable connection to the existing grid network, it is essential that there is a PoC with sufficient capacity. The PoC must be able to offer sufficient capacity and must remain viable for the lifetime of the solar farm (i.e. 40 years).
- 4.1.4 A longer cable route from the Proposed Development to the PoC will result in more cable trenching, joint bays and associated environmental impact. This will also result in greater electrical losses and a more complex cable route that will likely need to cross more existing utility assets, watercourses, and roads etc. With an increased length of cable route, there will also be a greater footprint requiring negotiations with more landowners, and ultimately more risk and a greater cost to deliver the Proposed Development.
- 4.1.5 NPS EN-1 Paragraph 4.3.27 states that when considering alternative proposals, they should be commercially viable and physically suitable. Therefore, in the case of the Proposed Development, it also is a functional requirement for it to be in a location where the National Grid has the capacity to accommodate energy generation. In identifying a PoC, the Applicant also took account of the proximity of existing National Grid substations to areas of lower flood risk as planning policy seeks to direct development into these areas.
- 4.1.6 As with the Agricultural Land Alternative Site Search presented in Chapter 3 of the Environmental Statement (ES) [APP-084], a 10 km Search Area, centered on Drakelow Substation, is utilised for this Study. The Study Area is shown in Figure 1 below.
- 4.1.7 The Study Area is provided as **Figure 1** within this Assessment.

5 STAGE 2 – FLOOD ZONES

- 5.1.1 Stage 2 of the Sequential Study has been to map constraints within the area of search using GIS. Figure 2 shows areas within Flood Zones 2 and 3, with the extent of those flood zones based on Environment Agency mapping.
- 5.1.2 The Flood Zones within the Study Area are shown on **Figure 2**.

Flood Risk of the Proposed Development

- 5.1.3 Figure 3 is taken from the Flood Risk Assessment which forms part of the application for the Proposed Development and shows the mapped extent of fluvial flood risk at the Site based on Environment Agency mapping. The Flood Risk Assessment goes on to then model the extent of surface water flooding, using hydraulic modelling. That level of comparable information is not available across the Sequential Study area and therefore for the purposes of this Study the EA's mapped Flood Zones 2 and 3 have been used.
- 5.1.4 As Figure 3 demonstrates, an ordinary watercourse passes through the northern extent of the panel array area of the Proposed Development and runs through that part of the Order Limits for the Proposed Development which relates to the cable connection which runs north from the panel array area to the Drakelow substation. As a result in area terms some 4% of the Proposed Development Site lies within Flood Zone 2, which equates to an actual area of 8.3 hectares.

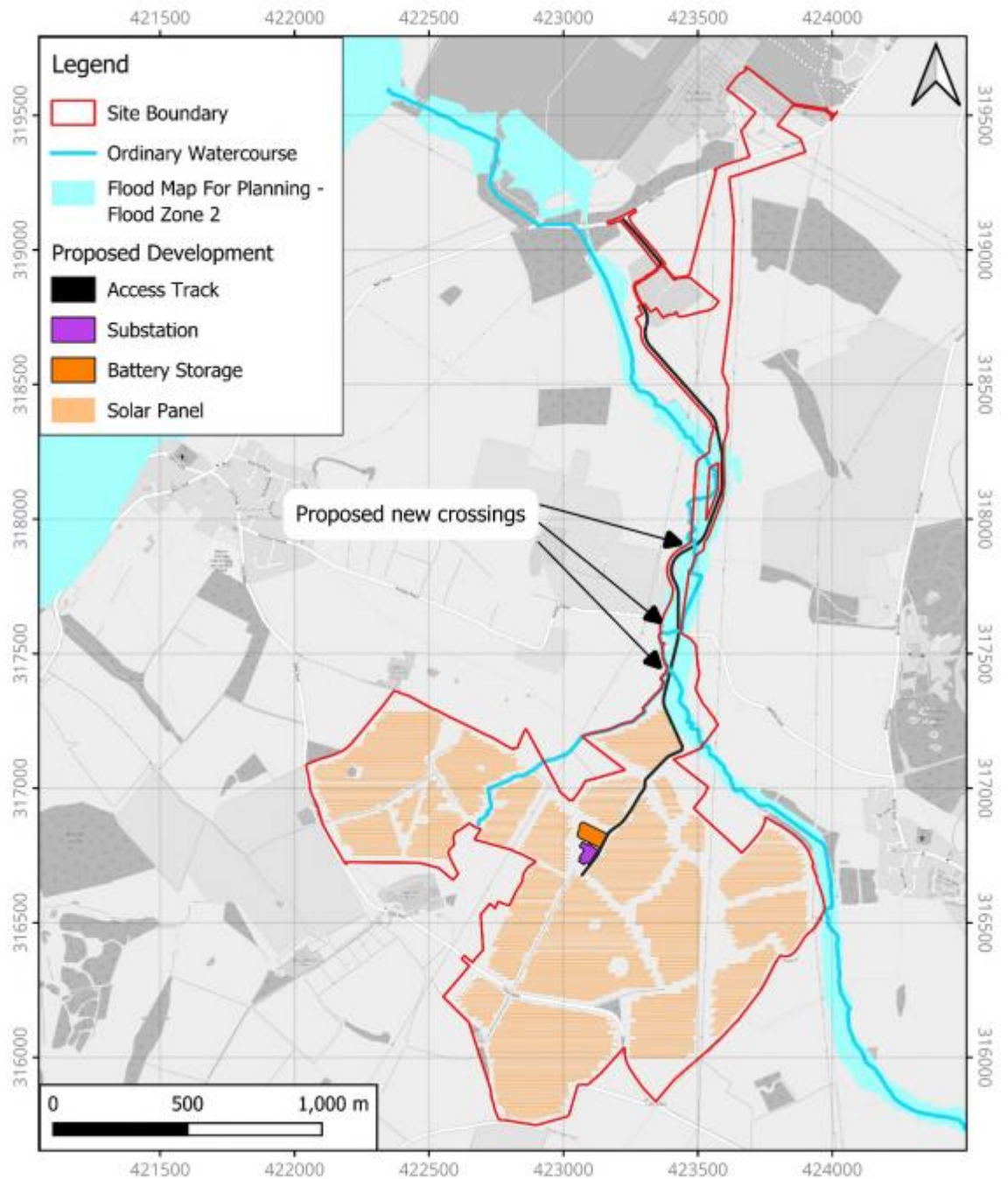


FIGURE 3 – FLOOD RISK ASSOCIATED WITH THE PROPOSED DEVELOPMENT

5.1.5 An alternative site must therefore have a lesser area within Flood Zone 2 or 3 in order to be sequentially preferable to the Proposed Development Site. An alternative site with 8.3 hectares or more of its area located outside Flood Zone 1 is not considered to be sequentially preferable to the Proposed Development and can be excluded. Alternative sites have been assessed on the basis of the area in hectares which is outside Flood Zone 1, on the basis that due to other constraints the area of land required for an alternative to provide a similar generation capacity

to the Proposed Development would vary. Using the area in hectares ensures that a direct comparison can be made between an alternative but larger site of the same generating capacity and its respective flood risk position compared to the Proposed Development.

5.2 CONCLUSION FROM STAGE 2

- 5.2.1 As demonstrated by Figure 2, in broad terms the comparatively low area of the Proposed Development which lies outside Flood Zone 1 means that it is reasonable to take the approach that any alternative sites of a similar size to the Proposed Development which are located in the very north and south and the central part of the Study Area would have an area of over 8.3 hectares which would sit within Flood Zones 2 and 3, due to the extent of those areas which fall within those Flood Zones associated with the Trent, Tame and Dove Rivers. Those parts of the study area can therefore be excluded from further consideration as they would not be sequentially preferable to the Site.

6 STAGE 3 – HARD CONSTRAINTS

6.1 HARD CONSTRAINTS

- 6.1.1 EN-1 is clear that alternative sites must be reasonably available and Paragraph 4.3.27 states that “Alternative proposals which mean the necessary development could not proceed, for example because the alternative proposals are not commercially viable or alternative proposals for sites would not be physically suitable, can be excluded on the grounds that they are not important and relevant to the Secretary of State’s decision.”
- 6.1.2 Stage 3 of the Sequential Study has therefore been to map further hard constraints within the area of search using GIS.
- 6.1.3 Physical obstacles to development (e.g., built-up urban areas, major infrastructure such as railways, roads etc.) have been identified within the study area. Those physical obstacles to development would in principle prevent a ground mounted solar scheme from being delivered in those areas and it is therefore reasonable to exclude those from the outset in any consideration of alternative sites.
- 6.1.4 The location of the River Trent, approximately 1 km to the west of Drakelow Substation, is considered a ‘hard constraint’ for the possible alternative sites. To reach the PoC, an alternative site to the west of the River Trent would need to cross through an area of flood risk associated with the River Trent, as well as likely also needing to cross one of the smaller watercourses which run from the River Trent to the north and south of Drakelow. The width of the area of flood risk associated with the River Trent varies in the vicinity of the site, from circa 0.6km at Barton Turn to some 3km through the southern part of Burton upon Trent.
- 6.1.5 The Proposed Development assumes a cable construction corridor of 50 metres in width. Applying that to the 8.3 hectares of the Site which is outside Flood Zone 1 means that if an alternative site was located entirely within Flood Zone 1 and its cable corridor of 50 metres were to pass through Flood Zones 2 and 3 for a distance of more than 1.6km then that alternative site would have more than 8.3 hectares outside of Flood Zone 1 and would not be sequentially preferable. That would in itself mean that it would not be possible in sequential terms for an alternative site to have a cable corridor of 50m running through those parts of the River Trent where the flood risk zone is more than 1.6km wide.
- 6.1.6 However as noted above EN-1 is also clear that alternative sites must be commercially viable and physically suitable. In order to reach Drakelow the cable connection corridor of any alternative site located to the west of the River Trent would be significantly longer than the cable corridor associated with the Proposed Development, and would need to cross the A38, a railway line, the River Trent itself and various elements of built form and urban areas which sit along the A38. For a development of a similar scale to the Proposed Development the combination of the longer cable connection and the need to cross those features would not be expected to be commercially viable, and potentially in some instances not physically possible.

6.1.7 On the basis of the above it is considered reasonable in the context of this sequential assessment to exclude from consideration the area to the west of the River Trent.

6.1.8 **Figure 4** maps the hard constraints.

6.2 CONCLUSIONS OF STAGE 3

6.2.1 The result of Stage 3 is that, as shown on Figure 4 there are two broad areas of search remaining; one to the north east of Burton upon Trent and Swadlincote and one to the south of those two settlements.

7 STAGE 4 – FURTHER ‘HARD’ CONSTRAINTS

7.1 FURTHER HARD CONSTRAINTS

- 7.1.1 EN-1 Paragraph 5.8.10 relates to the application of the Exception Test, noting that is only for use where the Sequential Test alone cannot deliver an acceptable site. However that Paragraph notes that in applying the Sequential Test it is appropriate to take account of wider sustainable development objectives, where the application of relevant policies would provide a clear reason for refusing development in any alternative locations identified, and specifically identifies national designations, such as landscape, heritage and nature conservation designations.
- 7.1.2 With reference to the study area there is the Bretby Hall designated Historic Park and Garden to the north of Swadlincote and areas of Ancient Woodland. It is considered reasonable to exclude those areas from the study area, on the basis that the loss of those features would provide a clear reason for refusing development in those locations.
- 7.1.3 The River Mease catchment, which is a Special Area of Conservation, covers a large part of the southern part of the study area and is a national designation under the Habitats Directive. Natural England (NE) has a Site Improvement Plan for the River Mease which outlines priority issues that are currently impacting or threatening the conditions of the SAC and actions to address them. These include water pollution and drainage issues which are applicable to development within the catchment. A small part of the Proposed Development site falls within the River Mease catchment, which has therefore been a focus of statutory bodies such as Natural England and the Environment Agency. The Applicant’s position is that the impacts of the Proposed Development on the River Mease have been fully addressed through the mitigation secured through the dDCO, which includes the use of attenuation measures to reduce surface water run off and nutrient enrichment and where the land in the Mease catchment would be sown at the earliest opportunity to establish grassland, as detailed at 2.6.9 of the OCEMP [REP5-011].
- 7.1.4 However in terms of this Sequential Assessment, it is considered reasonable to exclude from consideration any alternatives which would sit entirely or largely within the designated River Mease Catchment Area, as there would not be certainty that a development which would deliver a similar generating capacity as the Proposed Development and which was located entirely within the River Mease Catchment Area would be entirely able to mitigate its impacts on the SAC.
- 7.1.5 The South Derbyshire Green Belt sits between Burton-upon-Trent and Swadlincote. EN-1 sets out that energy infrastructure projects may comprise ‘inappropriate development’ which are by definition harmful to the Green Belt and which therefore need to be justified by Very Special Circumstances. EN-1 makes clear that substantial weight should be given to any harm to the Green Belt. It would not be appropriate in every case to exclude Green Belt land by definition from the consideration of alternative sites, as there are examples where large scale solar farm developments have taken place in the Green Belt. However in this case the Green Belt in question is limited in scale and serves to prevent

coalescence between Burton upon Trent and Swadlincote. A development of a similar generating capacity as the Proposed Development would need to cover a significant proportion of the South Derbyshire Green Belt, and on that basis, and when the majority of the study area in this case sits outside the Green Belt, it is considered appropriate and reasonable in this case to exclude that area from further consideration.

- 7.1.6 There are areas within the remaining study area which are identified as being Grade 2 agricultural land. Government policy remains that Best and Most Versatile agricultural land should be protected and that large solar projects should avoid the use of that higher quality agricultural land where possible. In the context of this Sequential Assessment there is considered to be a balance to be taken in that respect, in terms of undertaking a reasonable assessment as to whether there are sequentially preferable alternative sites to the Proposed Development site in flood risk terms which, in accordance with EN-1, take account of wider sustainable development objectives. The Proposed Development site includes some limited areas of Grade 2 agricultural land, so it would not be reasonable to exclude all Grade 2 agricultural land from the Sequential Assessment. However there are two areas, immediately to the north east and south-west of Burton upon Trent, where any alternative site to deliver generating capacity similar to the Proposed Development would result in that alternative site being entirely or substantially within identified Grade 2 agricultural land. It is therefore considered to be a reasonable approach to exclude those two areas from further assessment. Given the low risk of flooding within the Proposed Development site, even if an alternative site within those two areas was considered to be sequentially preferable in flood risk terms, there would only be a limited difference in flood risk between those alternatives and the Proposed Development. Given the policy position on agricultural land the position taken in this assessment is that, taking account of wider sustainability objectives, it would not be reasonable to seek to provide the generating capacity proposed on an alternative site at a lower risk of flooding, but entirely or substantially on Grade 2 agricultural land.
- 7.1.7 Areas where the slope of the land is above 15 degrees have been excluded, as it would not be feasible to install solar panels on land which slopes that steeply.
- 7.1.8 **Figure 5** maps the Further Hard Constraints, in the context of the mapping provided at Stages 2 and 3.

7.2 CONCLUSIONS OF STAGE 4

- 7.2.1 The outcome of Stage 4 is that four remaining areas remain within the wider study area. Those four areas have each been identified as Potential Development Areas (PDA's) and appraised in Stage 5 of this Assessment.

8 STAGE 5 – POTENTIAL ALTERNATIVE SITES

8.1 CONTEXT

- 8.1.1 Stage 5 of the Sequential Study has been to refine the unconstrained area and identify PDAs for solar development, which are shown on **Figure 6**.
- 8.1.2 Paragraph 4.3.23 of EN-1 states that ,The Secretary of State should be guided in considering alternative proposals by whether there is a realistic prospect of the alternative delivering the same infrastructure capacity (including energy security, climate change, and other environmental benefits) in the same timescale as the proposed development.’ EN-1 Paragraph 4.3.27 states that “Alternative proposals which mean the necessary development could not proceed, for example because the alternative proposals are not commercially viable or alternative proposals for sites would not be physically suitable, can be excluded on the grounds that they are not important and relevant to the Secretary of State’s decision.”
- 8.1.3 EN-1 therefore provides a clear direction that an alternative site must be able to demonstrate that there is a reasonable prospect of that alternative delivering the same infrastructure capacity as the proposed development.
- 8.1.4 As with the agricultural land alternative site search presented in Chapter 3 of the Environmental Statement (ES) [APP-084], a threshold of 90% of the Site has been set as the minimum available land area. This equates to an area of 155 hectares (ha). Areas that are irregularly shaped or divided by numerous constraints were not considered further as these likely to be less efficient solar panel layouts and greater lengths of cabling. Sites smaller than 155 ha would not meet the objectives of the Proposed Development (i.e., unlikely to have sufficient generation capacity) and therefore, in line with NPS EN-1 Paragraph 4.3.2 3, do not need to be considered. It should be noted that this is a conservative approach as a larger area would typically be required to allow flexibility for detailed design and to ensure there is sufficient area to deliver the same capacity. However it is considered a robust approach as in the case of the Proposed Development an element of that 191 hectares comprises the cable corridor between the panel arrays and Drakelow. It is therefore reasonable to search for development areas of a smaller size, as those could in theory provide a similar generating capacity if unconstrained.
- 8.1.5 In accordance with a recent appeal decision¹, it is not considered necessary to assess multiple smaller areas of unconstrained land which could be combined to result in a sufficient sized site (155 ha). Multiple smaller sites would not meet the objectives of the Proposed Development (i.e., unlikely to have sufficient generation capacity) and therefore, in line with NPS EN-1 Paragraph 4.3.2 3, do not need to be considered.
- 8.1.6 Previously developed land using the brownfield registers provided by local planning authorities² has been a consideration within the Study Area. No brownfield land that meets the minimum individual site size threshold of 155 ha

¹ <https://www.rushcliffe.gov.uk/media/0mqhksm1/cd-710-b.pdf>

² South Derbyshire District Council; East Staffordshire Borough Council; Litchfield District Council; and North West Leicestershire District Council were all accessed.

was identified. Paragraph 5.11.3 of NPS EN-1 acknowledges that “although the re-use of previously developed land for new development can make a major contribution to sustainable development by reducing the amount of countryside and undeveloped greenfield land that needs to be used, it may not be possible for many forms of energy infrastructure”. Therefore, brownfield land was not considered further. Likewise, the Sequential Study has not included the potential for solar PV within built up urban areas or on rooftops as they are not considered a practical alternative to a ground-based solar scheme of the size proposed.

8.2 OVERVIEW

8.2.1 As shown in Figure 6, four PDA’s have been identified within the 10 km search area from Drakelow Substation. PDA’s have been labelled 1-4 and drawn up against aerial imagery (Figures 6 – 9) to follow obvious field boundaries and other physical constraints, such as amenity areas for housing and other obstructive land uses.

PDA Reference	Total Site Area (ha)	Distance to PoC (km) ³
PDA 1	460 ha	~ 7.1 km
PDA 2	517 ha	~ 6.5 km
PDA 3	648 ha	~ 0.9 km
PDA 4	705 ha	~7.9 km
The Proposed Development		
Oaklands Farm Solar Park	191 ha	~2.8km

8.2.2 The PDAs are identified on the basis that they each cover an area of land which is capable of accommodating a development site of the size of the Site, and therefore capable of achieving the same generating capacity as the Proposed Development. In reality each of the identified PDAs would contain constraints which would limit the developable areas within each of the wider identified areas.

8.2.3 Each PDA is assessed as to whether it could accommodate a large scale solar development which would be sequentially more favourable than the Site. Each PDA has first been assessed on the basis of flood risk before then being evaluated against planning, environmental and other operational assessment constraints which were derived from national and local planning and environmental policy objectives and the operational requirements of the Proposed Development. These have included biodiversity, landscape and visual amenity, cultural heritage, flood risk, land use, access for construction, as well as operational factors related to deliverability such as grid connection feasibility, topography and shading to consider the suitability of these areas for large scale solar development.

³ It is worth noting this distance is based on a straight line to the nearest point of the PDA. It does not consider cable route design (e.g., does not avoid constrained land, whether the cable route follows the public road, landowners willing to enter negotiations etc). Following initial design, any cable route is likely to be considerably longer.

8.3 PDA – FLOOD RISK POSITION

8.3.1 Figure 7 overlays the PDAs with Flood Zones 2 and 3.

- PDA1 and PDA2 – there is an area of flood risk associated with a water course which runs through PDA1 and PDA2. Depending on the configuration of an alternative site within that area, it is possible that the watercourse alone would create a level of flood risk which exceeds that present on the Proposed Development site, and which therefore makes that alternative site not sequentially preferable. If a site configuration could be found within PDA1 or PDA2 which is able to avoid that flood risk area, then the cable connection route between those areas of search and Drakelow would realistically be expected to need to cross a watercourse either to the east or west of Swadlincote, and potentially also the watercourse running through PDA1 and PDA2 themselves. Neither PDA1 or PDA2 could be delivered without some area of a proposed development site and cable corridor being outside Flood Zone 1.
- PDA3 – sits adjacent to the Proposed Development Site but includes elements of the Proposed Development Site within it. The level of flood risk for any proposed development site within PDA3 is created by the unnamed watercourse which runs south from Drakelow, which any cable connection from PDA3 would be required to cross. The extent of that flood risk arising from PDA3 is therefore dependent on the configuration of a site within that area and the point of the cable connection.
- PDA4 – sits to the south of the River Mease, which any cable connection would therefore be required to cross. It would potentially be necessary for that cable corridor to also then have to cross a further watercourse before arriving at Drakelow.

FIGURE 7 - POTENTIAL DEVELOPMENT AREAS WITHIN FLOOD ZONES 2 AND 3

8.4 SUMMARY OF STAGE 5

- 8.4.1 It is reasonable to take the position that none of the PDAs would be able to be delivered without some element of the development site and cable corridor being outside Flood Zone 1. The extent of the area outside Flood Zone 1 would in each case depend on the configuration of the development site itself and the routing of the cable corridor, so it is not possible at this stage of the assessment to state with certainty that those PDAs would only be able to deliver a development of a similar generating capacity to the Proposed Development in a way which would be less sequentially preferable than the Site. The flood risk constraints and other constraints are therefore assessed below in respect of each PDA in turn, against the context that Paragraph 5.8.10 of EN-1 makes clear that it is appropriate to take account of wider sustainable development objectives when undertaking the sequential test.
- 8.4.2 EN-1 Paragraph 5.8.10 relates to the application of the Exception Test, noting that is only for use where the Sequential Test alone cannot deliver an acceptable site. However that Paragraph notes that in applying the Sequential Test it is appropriate to take account of wider sustainable development objectives, where the application of relevant policies would provide a clear reason for refusing development in any alternative locations identified, and specifically identifies national designations, such as landscape, heritage and nature conservation designations.

9 PDA1

- 9.1.1 PDA 1 is located approximately 7.1 km to the north-east of Drakelow Substation, noting this is based on a straight line to the nearest point of the PDA. The PDA is approximately 460 ha in size and is shown on **Figure 8**.
- 9.1.2 At 460 hectares in size, PDA1 would in theory be sufficiently sized to accommodate a site capable of providing a similar generating capacity to the Proposed Development (at 191 hectares).
- 9.1.3 A large proportion of the site is classified as Grade 2 agricultural land, which is a significantly higher proportion than the Oaklands Farm site. The site has several residential properties within the land itself, which would in reality be expected to reduce the extent of panel areas in order to appropriately mitigate any adverse impacts on the residents of those properties, with the extent to which panel array areas would need to be reduced not known at this stage, as that would depend on the extent of any impacts and the consideration of those in a wider planning balance. PDA1 then sits in close proximity to six listed buildings (as shown separately on **Figure 13**) and immediately adjacent to a designated historic Park and Garden, and the distribution of the listed properties is such that any proposed solar development would still be in proximity to at least one of those.
- 9.1.4 The distance between PDA1 and the connection point at Drakelow is significantly greater than the corresponding distance in the case of the Oaklands Farm site.
- 9.1.5 On the basis of the above PDA 1 is therefore not considered to be a reasonable alternative to the Oaklands Farm site. There is no certainty, given the constraints present, that PDA1 would be able to deliver a solar scheme of the scale capable of achieving a similar level of generation as the Proposed Development in a manner which has regard to wider sustainable development objectives. Furthermore, if a scheme could be achieved of a similar generating capacity then the greater distance of the cable route means that it is not certain that a scheme within PDA1 would be commercially viable to achieve. If a scheme of a similar generating capacity which was commercially viable could be achieved, then by definition aspects of the cable corridor route would be outside Flood Zone 1, and potentially elements of the solar array development area would also be outside that flood zone. The extent of the area of any alternative site outside of Flood Zone 1 would therefore be dependent on the route of the cable corridor and the configuration of the site itself.
- 9.1.6 In the context of the above and the relevant planning policy it is therefore reasonable to take the position that PDA1 would not realistically be able to deliver a scheme of the same infrastructure capacity, having regard to wider sustainable development objectives, in a commercially viable manner. Even if that were the case there would be aspects of that development which would be outside Flood Zone 1 and it is reasonable to take the position that PDA1 is not able to deliver the proposed generating capacity through a scheme which is sequentially preferable in flood risk terms to the Proposed Development.

10 PDA2

- 10.1.1 PDA 2 is located approximately 6.5 km to the east of Drakelow Substation, noting this is based on a straight line to the nearest point of the PDA. The PDA is approximately 517 ha in size and is shown on **Figure 9**.
- 10.1.2 PDA2 comprises a series of fields located to the north west of Swadlincote, around the village of Hartshorne.
- 10.1.3 The Potential Development Area is of a scale which would be capable of containing a development site of a similar area to the Proposed Development. However, the PDA is located in close proximity to residential areas of Swadlincote or Hartshorne, with some other individual dwellings located through the PDA. Furthermore, there are a number of listed buildings located through Hartshorne (as shown on **Figure 13**) and the designated historic Park and Garden immediately to the west. In reality the presence of those land uses and constraints would serve to reduce the area in which any solar farm development would be likely to take place, having regard to the need to appropriately manage impacts on those receptors.
- 10.1.4 There are then also areas of land which have slopes of between 7 and 15 degrees, which would allow solar arrays to be installed but which would be expected to limit the effectiveness of those panels. That, coupled with the distance of the cable route required to connect to Drakelow, means that for the generation capacity proposed there cannot be certainty that a scheme could be viably delivered within PDA2.
- 10.1.5 In flood risk terms, there is a watercourse running through the centre of PDA2. Given the constraints identified above it would be reasonable to expect that elements of any solar arrays in PDA2 would need to be in proximity to that watercourse and that the Order Limits of a scheme in PDA2 would be likely to include some areas which would be outside Flood Zone 1.
- 10.1.6 Any connection cable route between PDA2 and Drakelow would need to run for a distance considerably greater than that required at Oaklands Farm, and to reach Drakelow would need to navigate either the residential area of Swadlincote or circumvent the designated Park and Garden to the west of PD2. Any connection cable would need to cross a railway and a watercourse, thereby being more complex and still requiring a level of works within a flood zone.
- 10.1.7 In the context of the above and the relevant planning policy it is therefore reasonable to take the position that a development scheme of the same infrastructure capacity within PDA2 which has regard to wider sustainable development objectives would involve some elements of flood risk within the development site itself, in addition to the watercourses being crossed by the cable corridor. It is therefore considered to be a reasonable position that a scheme within PDA2 would have a similar or greater amount of land at risk of flooding as the Proposed Development and would not then be sequentially preferable. The length of the cable connection and the unsuitability of areas of PDA2 then also mean it is a reasonable position that a scheme within PDA2 would in any event potentially not be commercially viable for the level of generation capacity proposed.

11 PDA3

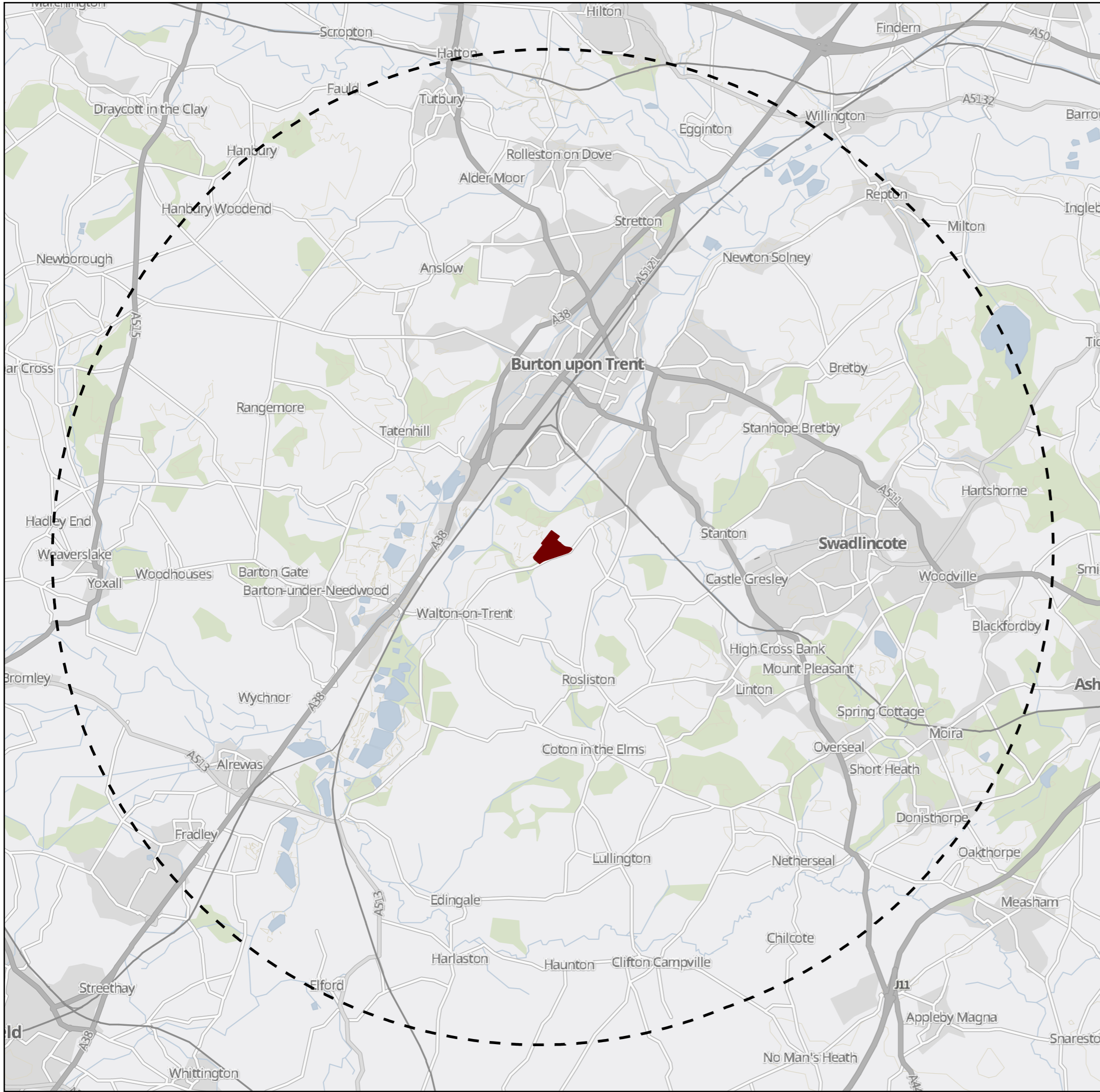
- 11.1.1 PDA 3 is located approximately 0.9 km to the south of Drakelow Substation, noting this is based on a straight line to the nearest point of the PDA. The PDA is approximately 648 ha in size, as shown on **Figure 10**, and incorporates areas of land which are in the Site which contains the Proposed Development as shown on **Figure 11**.
- 11.1.2 PDA3 is located immediately to the west of the proposed Oaklands Farm Solar Park, but as noted incorporates land at Oaklands Farm.
- 11.1.3 However, the wider PDA3 area would incorporate an area of Grade 2 Agricultural Land which is higher than seen on the Oaklands Farm site. It would also be in proximity to the village of Walton-on-Trent and the cluster of Listed buildings which sit within that village area (as shown on **Figure 13**). There are a number of residential properties within the PDA itself, so as with PDA1 the presence of those properties would in reality be expected to reduce the extent of panel areas in order to appropriately mitigate any adverse impacts on the residents of those properties, with the extent to which panel array areas would need to be reduced not known at this stage, as that would depend on the extent of any impacts and the consideration of those in a wider planning balance.
- 11.1.4 PDA3, like the Oaklands Farm site, also lies partly within the River Mease Catchment Area. The connection to Drakelow would require any cable to pass through the same unnamed tributary as the cable connection for the Oaklands Farm Solar Park connection, so it would not be possible for a scheme in a different part of the PDA3 to the Proposed Development to achieve a connection to Drakelow without some aspect of that cable connection corridor being outside of Flood Zone 1.
- 11.1.5 The position taken is that the Site of the Proposed Development represents the most area within PDA3 where it is possible to deliver the generation capacity proposed, having regard to other sustainable development objectives. On that basis, the consideration of flood risk in respect of PDA3 moves onto the site level sequential test and the Exceptions Test, which assess whether the Proposed Development has been designed to address any areas of flood risk, and then that the Proposed Development has been designed to be safe from and resilient to flooding for its lifetime, both of which are addressed in the Flood Risk Assessment.

12 PDA4

- 12.1.1 PDA 4 is located approximately 7.9 km to the south of Drakelow Substation, noting this is based on a straight line to the nearest point of the PDA. The PDA is approximately 705 ha in size and is shown on Figure 12.
- 12.1.2 PDA4 sits at the southern extent of the search area. To achieve a similar scale of development site, and therefore generation capacity, would require the use of a larger proportion of Grade 2 agricultural land than is present at the Oaklands Farm Solar Park site, and would also bring any development into the proximity of a number of listed buildings (as shown on **Figure 13**), both interspersed through the development area and located in the village of Harlaston. The PDA4 development site would be expected to need to sit close to or enter into the River Mease Catchment Area, to an extent greater than in the case of the Oaklands Farm Solar Park site. The cable connection between PDA4 and Drakelow substation would be significantly longer than required by Oaklands Farm, and would need to pass through both the River Mease, the associated River Mease Catchment Area and then the same unnamed tributary which is being crossed by the Oaklands cable connection and so it can be reasonably assumed that a development in PDA4 would affect a similar or greater area of land in Flood Zone 2/3 and therefore not be sequentially preferable to the Proposed Development.

13 CONCLUSION

- 13.1.1 This Sequential Study has followed a five-stage approach to evaluate the location of the Proposed Development, against other potential areas for solar development identified in order to establish whether the Site is in a suitably sequential preferable location for a proposed solar development requiring a land area of 155 ha.
- 13.1.2 Based on the PoC at Drakelow Substation, the assessment has considered potential solar development areas in a 10 km Search Area, which was defined to have regard to the need for any alternatives to be commercially viable.
- 13.1.3 Stages 2, 3 and 4 have involved GIS mapping to exclude environmental and planning constraints and to apply operational considerations. The Hard Constraints applied at Deadline 2 resulted in the area to the west of the River Trent being excluded from the study area. The Further Hard Constraints applied at Deadline 3 resulted in four Potential Development Areas being identified.
- 13.1.4 The conclusions of this evaluation indicate that PDA 1, 2 and 4 have a number of potential land use, operational and environmental constraints which would mean it would be difficult to viably develop solar of the scale required for the Proposed Development at these locations. None of these areas could be developed without some element of the Proposed Development and cable connection corridors being located in areas which are outside Flood Zone 1 and therefore be in Flood Zones 2 and 3, where there is a risk of flooding.
- 13.1.5 As shown in **Figure 11**, the Proposed Development is located within PDA 3. Those parts of PDA3 outside the Proposed Development site have greater constraints on developing solar at the scale required and do not offer any likelihood of development involving less use of Flood Zone 2/3. In the case of PDA3 the Proposed Development is considered to be the most appropriate opportunity to deliver the generating capacity proposed, having regard to wider sustainability objectives. It is therefore considered appropriate in the case of PDA3 to progress to the site based sequential assessment and the Exception Test which are presented within the Flood Risk Assessment. In summary, the layout of the Proposed Development has also followed a sequential approach in accordance with Paragraph 5.7.9 of NPS EN-1 and the NPPF. Flood risk within the Site is very low but has informed the design of the Proposed Development, with components sensitive to flooding being placed outside the limited areas of Flood Zone 2 found within the site. The only permanent above ground components located within Flood Zone 2 are solar panels which sit at least 800mm above ground and significantly above the modelled flood depth of 150mm, therefore this minor potential flood issue has been fully mitigated.
- 13.1.6 This Sequential Study concludes that there are no deliverable and sequentially preferable sites which could accommodate the Proposed Development within the defined area of search and therefore demonstrates the Sequential Test has been applied and is met.



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- Drakelow Substation
- Drakelow Substation - 10km Buffer

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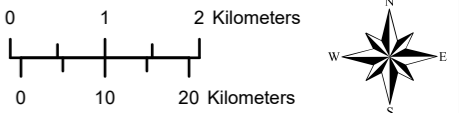


FIGURE:
Figure 1 - Study Area



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- Drakelow Substation
- Drakelow Substation - 10km Buffer
- Flood Zone 2 and 3
- A Road
- Motorway
- Railway

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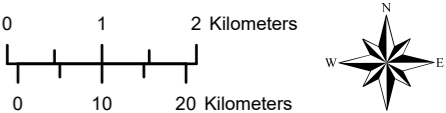


FIGURE:
Figure 2 - Flood Zones

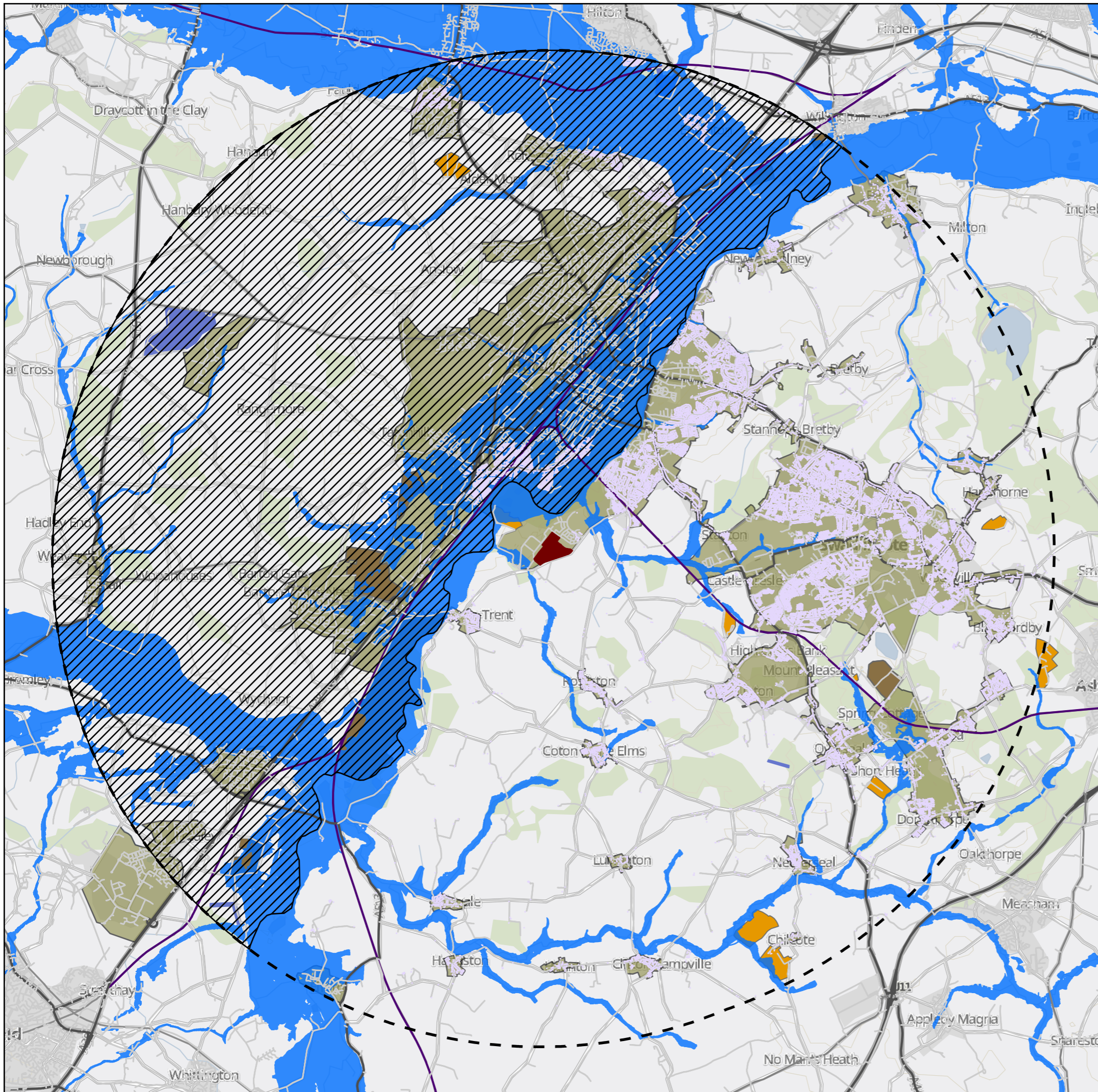


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	Drakelow Substation
	Drakelow Substation - 10km Buffer
	Flood Zone 2 and 3
	West of the River Trent - Exclusion Area
	10m Housing Buffer
	10m A Road Buffer
	5m B Road Buffer
	2m Other Roads Buffer
	7.5m Railway Buffer
	Airfield
	Built Up Areas
	Existing Renewable Project
	Quarry

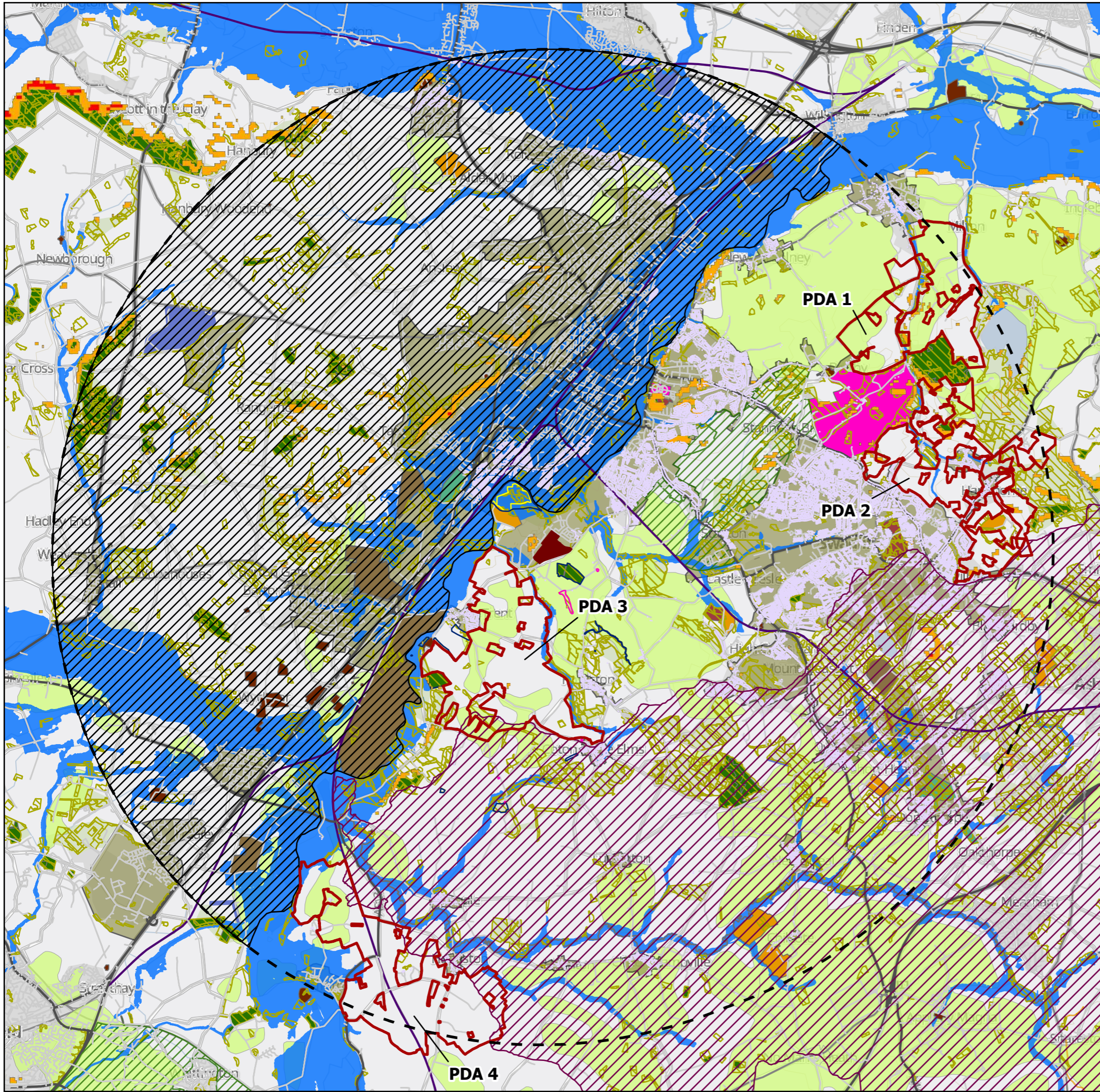
NOTES:	FIGURE REF: OAK31c.v2	
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FIGURE:
Figure 4 - Hard Constraints



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Drakelow Substation	Local Wildlife Site
Drakelow Substation - 10km Buffer	Potential Local Wildlife Site
Potential Development Area	Ancient Woodland
Flood Zone 2 and 3	Country Park
West of the River Trent - Exclusion Area	Green Belt
10m Housing Buffer	Local Nature Reserve
10m A Road Buffer	National Forestry Inventory
5m B Road Buffer	Park and Garden
2m Other Roads Buffer	Scheduled Monument
7.5m Railway Buffer	Site of Special Scientific Interest (SSSI)
Airfield	Special Area of Conservation (SAC)
Built Up Areas	Agricultural Land Classification
Existing Renewable Project	Grade 2
Quarry	Slope (Degrees)
Mease River Catchment	≤7
Derbyshire Wildlife Trust Reserve	7 < degrees ≤15
	>15

NOTES:	FIGURE REF: OAK31d.v2	
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FIGURE:
Figure 5 - Further Hard Constraints



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- Drakelow Substation
- Drakelow Substation - 10km Buffer
- Potential Development Area
- Oaklands Solar Farm Site Boundary

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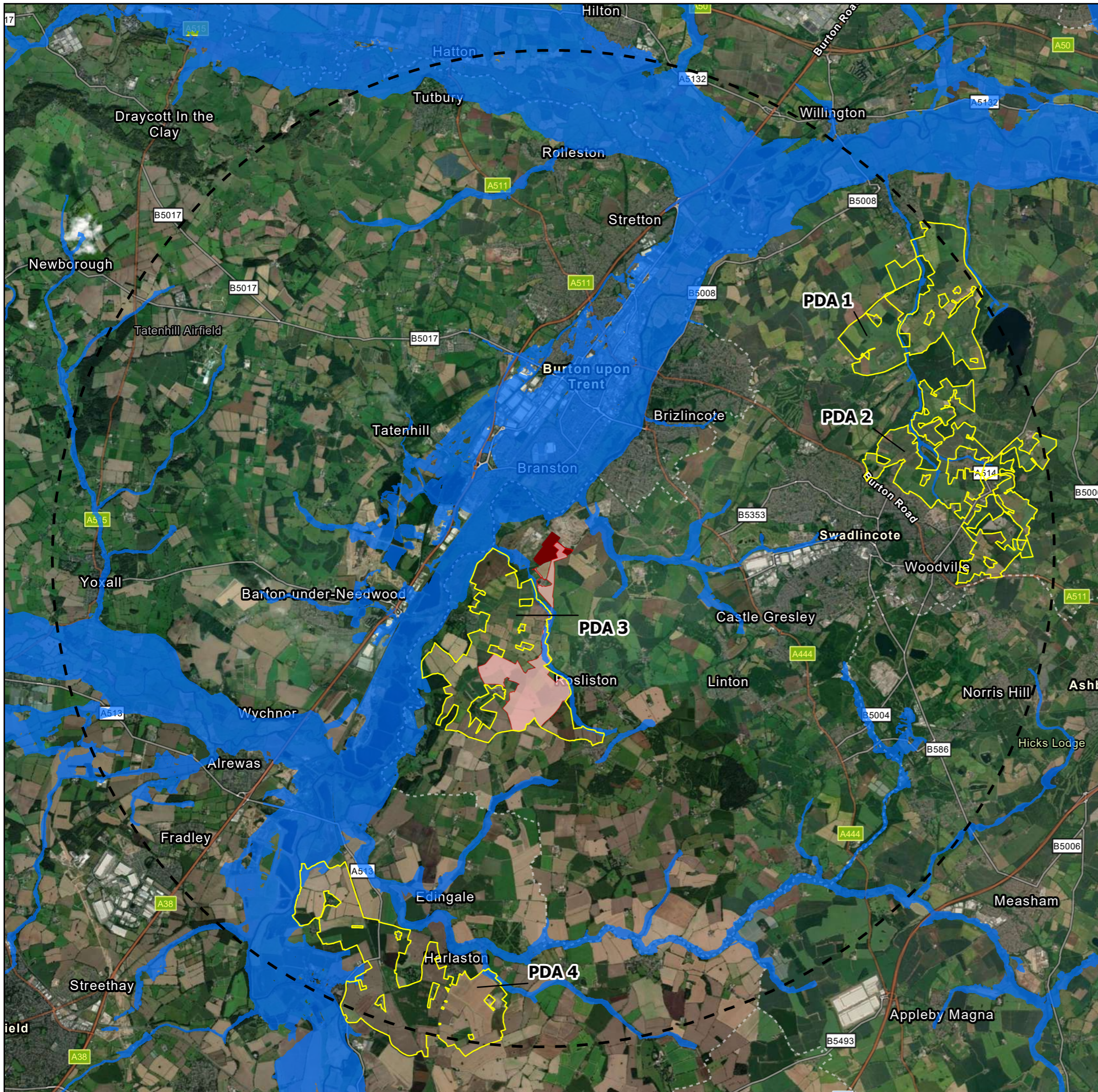


FIGURE:
Figure 6 - Potential Development Areas



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- Drakelow Substation
- Drakelow Substation - 10km Buffer
- Potential Development Area
- Oaklands Solar Farm Site Boundary
- Flood Zone 2 and 3

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FIGURE:
Figure 7 - Potential Development Areas with Flood Zone 2 and 3



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 Potential Development Area

NOTES:

FIGURE REF: OAK31g.v2

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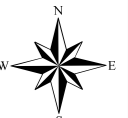


FIGURE:
Figure 8 - Potential Development Area 1



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 Potential Development Area

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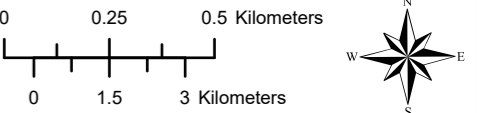


FIGURE:
Figure 9 - Potential Development Area 2



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 Potential Development Area

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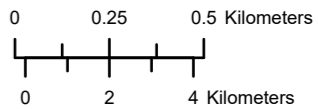


FIGURE:
Figure 10 - Potential Development Area 3

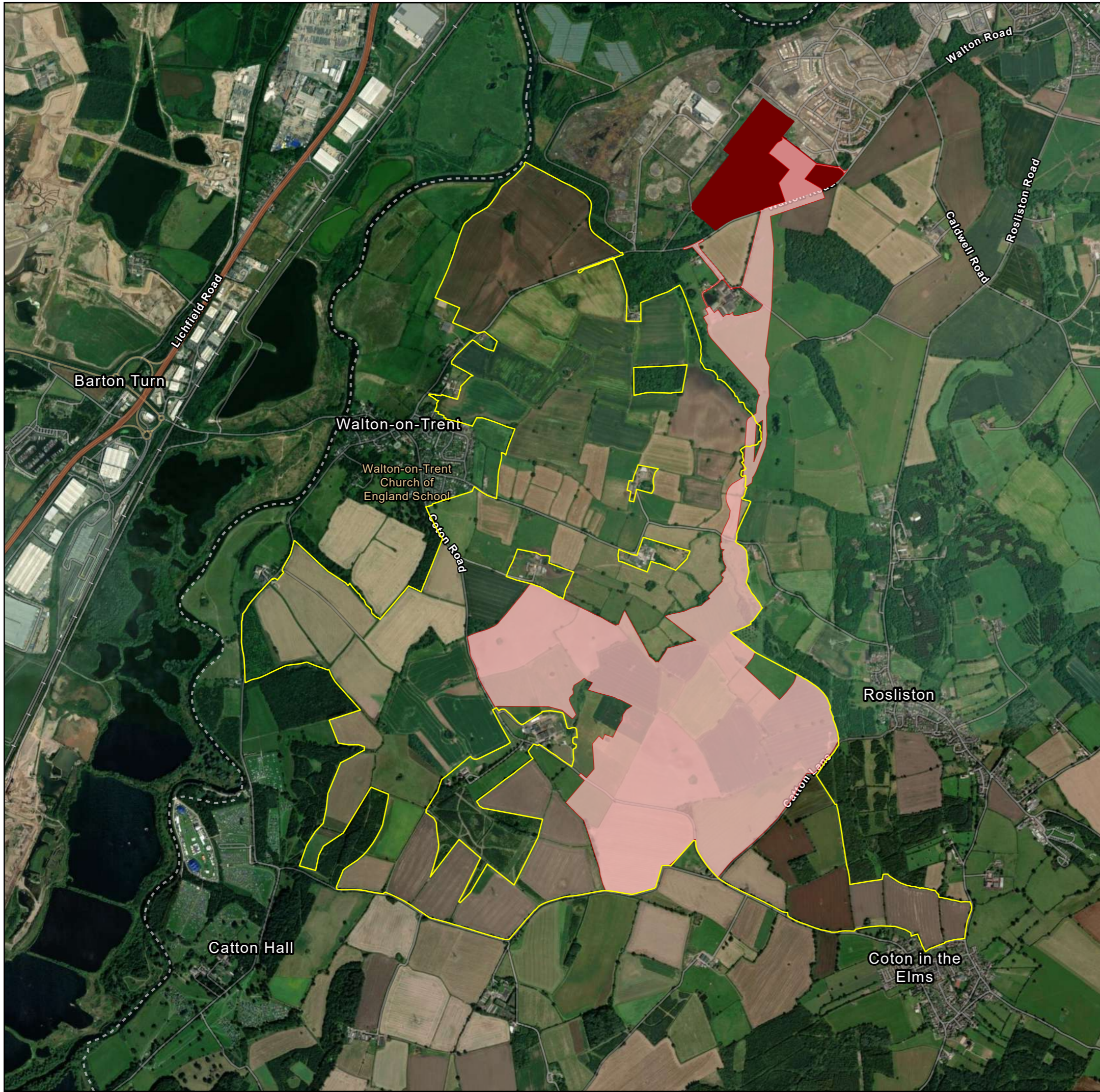


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- Drakelow Substation
- Potential Development Area
- Oaklands Solar Farm Site Boundary

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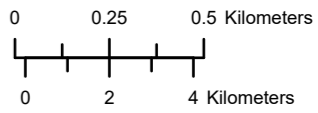


FIGURE:
Figure 11 - Potential Development Area 3 with Oaklands Development



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 Potential Development Area

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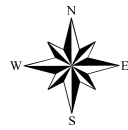
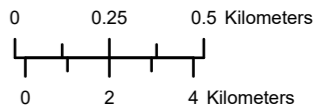


FIGURE:
Figure 12 - Potential Development Area 4



PROJECT:
Oaklands

Spatial Reference:
Name: British National Grid
PCS: British National Grid
GCS: GCS OSGB 1936
Projection: Transverse Mercator



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- Drakelow Substation
- Drakelow Substation - 10km Buffer
- Potential Development Area
- Oaklands Solar Farm Site Boundary
- Listed Building

NOTES:	FIGURE REF: OAK31I.v1
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FIGURE:
 Figure 13 - Impact of Listed Buildings on Potential Development Areas



PROJECT:
Oaklands

Spatial Reference:
 Name: British National Grid
 PCS: British National Grid
 GCS: GCS OSGB 1936
 Projection: Transverse Mercator

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