# East Pye Solar

## Environmental Statement

## Volume 3: Appendix 9.1 – Flood Risk Assessment & Outline Surface Water Drainage Strategy

**Revision 2**

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# Schedule of Changes

| Reference | Page | Description of Changes | Reason for Revision |
|---|---|---|---|
| ES Appendix 9.1 Flood Risk Assessment & Outline Surface Water Drainage<br>Revision 2 | Pages 66 and 169 | Figure 9.8 added to Appendix A.<br>Removal of Figure 3a and Figure 3b titles from the Appendix A cover page.<br>Removal of sheet references for Figure 9.6, Figure 9.7, and Figure 9.8 from the Appendix A cover page.<br>Reduction in document MB size. | Response to Section 51 advice. |

# Table of Contents

**Executive Summary** ..... **1**
**1 Introduction** ..... **4**
1.1 Background ..... 4
1.2 Objectives ..... 4
1.3 Order Limits ..... 5
1.4 Scheme Description ..... 5
1.5 Planning Policy and Sources of Information ..... 6
1.6 Consultation/Engagement ..... 7
1.7 Caveats and Exclusions ..... 8
**2 Planning Policy Context** ..... **9**
2.2 National Policy and Guidance ..... 9
2.3 Local Policy and Guidance ..... 12
**3 Site Setting** ..... **13**
3.1 Hydrological Setting ..... 13
3.2 Topography ..... 13
3.3 Geology & Hydrogeology ..... 15
3.4 Existing Drainage Arrangements ..... 16
**4 Impact of Climate Change** ..... **18**
4.1 Climate Change Allowances Guidance ..... 18
4.2 Peak River Flow ..... 18
4.3 Peak Rainfall Intensity ..... 19
**5 Assessment of Flood Risk** ..... **20**
5.1 Overview ..... 20
5.2 Historic Flooding Records ..... 20
5.3 Tidal Flood Risk ..... 21
5.4 Flood Risk from Reservoirs & Artificial Sources ..... 21
5.5 Sewer Flooding ..... 21
5.6 Groundwater Flood Risk ..... 22
5.7 Fluvial (River) Flood Risk ..... 23
5.8 Pluvial (Surface Water) Flood Risk ..... 30
5.9 Summary ..... 31
**6 Hydrological Connectivity** ..... **32**
**7 Flood Vulnerability and Sequential Test** ..... **33**
7.1 Flood Risk Vulnerability ..... 33
7.2 NPPF Sequential Test and Sequential Approach ..... 33
**8 Embedded Flood Risk Mitigation** ..... **36**
8.1 Scheme Design and Freeboard ..... 36
8.2 Watercourse Buffers ..... 38
8.3 Watercourse Crossings for Cables & Access ..... 38

**9 Outline Surface Water Drainage Strategy ..... 40**
9.1 Overview ..... 40
9.2 Planning Policy and Guidance ..... 40
9.3 Solar Farms and Surface Water Runoff Dynamics ..... 40
9.4 Drainage Hierarchy ..... 42
9.5 Design Approach ..... 43
9.6 Solar PV Arrays ..... 44
9.7 Access Tracks ..... 45
9.8 Inverter/Conversion Units ..... 46
9.9 Battery Energy Storage System (BESS) ..... 46
9.10 Substations ..... 48
9.11 Pollution Control ..... 51
9.12 Construction & Decommissioning Mitigation ..... 52
9.13 Adoption and Maintenance ..... 54
9.14 Wastewater Disposal ..... 55
**10 Conclusions ..... 56**

## Figures

Figure 1.1: Order Limits ..... 5
Figure 5.1: EA Yare-Tas Modelled Flood Extents Present-Day - Sub-Sites 8A & 8B ..... 24
Figure 5.2: EA Yare-Tas Modelled Flood Extents Climate Change - Sub-Sites 8A & 8B ..... 25
Figure 5.3: Comparison of EA Flood Zone Map March 2025 (Left) & Previous (Right) ..... 25
Figure 5.4: Comparison of Masterplan with EA Flood Zones 2 and 3 for Sub-Site 8A ..... 26
Figure 5.5: EA Modelled Flood Extents Present-Day - Sub-Site 7B & CRC6-7 ..... 27
Figure 5.6: EA Modelled Flood Extents Climate Change - Sub-Site 7B & CRC7 ..... 28
Figure 5.7: EA Flood Zones 2/3 of Starston Brook & LiDAR Topography Overlay ..... 29

## Tables

Table 3.1: Site Topography ..... 14
Table 4.1: Climate Change – Peak Rainfall Intensity Allowances ..... 19
Table 6.1: Designated Sites and Hydrological Connectivity to Site ..... 32
Table 9.1: Greenfield Runoff Rates ..... 47
Table 9.2: BESS Attenuation Indicative Requirements ..... 47
Table 9.3: National Grid Substation Indicative Attenuation Requirements ..... 49
Table 9.4: 132kV Project Substation & 400kV Project Substation within Sub-Site 5A Attenuation Requirements ..... 50
Table 9.5: Pollution Hazard Indices (Table 26.2 of CIRIA SuDS Manual) ..... 51
Table 9.6: SuDS Mitigation Indices (Extract of Table 26.3 of CIRIA SuDS Manual) ..... 51

## Appendices

Appendix A EA Opendata Maps
Appendix B Stakeholder Correspondence
Appendix C Anglian Water Sewer Records
Appendix D Proposed Drainage Information

# Executive Summary

This 'Flood Risk Assessment and Outline Surface Water Drainage Strategy' (FRA and DS) report has been prepared on behalf of East Pye Solar Limited (the Applicant) to accompany a Development Consent Order (DCO) application for a solar photovoltaic (PV) electricity generating station and associated development.

This report forms **ES: Appendix 9.1 Flood Risk Assessment and Outline Surface Water Strategy [EN0110014/APP/6.3.9.1]** of the Environmental Impact Assessment (EIA).

The flood risk within the Order Limits is overall considered to be low from fluvial, reservoir, groundwater and sewer sources.

The majority of the Order Limits is located within Flood Zone 1 'Low Probability' of river/sea flooding, with localised areas of Sub-Sites (where areas within the Order Limits include more than one parcel of land) and the Cable Route Corridor (CRC) located within Flood Zones 2 'Medium Probability' and 3 'High Probability' associated with the floodplains of the Hempnall Beck and the River Tas, and their tributaries.

The majority of the land within the Order Limits has a 'very low' surface water flood risk. However, surface water overland flow routes at increased risk are present across the area, mostly associated with ordinary watercourse tributaries, notably within/along the boundary of CRC4, CRC6, CRC8, CRC9 and CRC13, Site 9, and Sub-Sites 4B, 7A, 7E, 7F, 7K, 8A, and 10A-10D.

A sequential approach has been applied to the Scheme, locating infrastructure within areas of Flood Zone 1 and the lowest flood risk from other sources as far as possible. Localised areas of surface water flood risk are present within the National Grid/Project Substations and Battery Energy Storage System (BESS); however, this will be managed within the proposed surface water drainage systems for these elements of the Scheme.

The Sequential and Exceptions Tests have been undertaken for the Scheme and are included in Appendix A of the **Planning Statement [EN0110014/APP/7.14]**.

Solar PV Arrays are located within Flood Zone 1 and in areas of 'very low' surface water flood risk as far as practicable, but some Solar PV Arrays extend into areas of higher surface water flood risk. However, the Solar PV Arrays are raised above the ground on thin stilts/supports (or in limited areas concrete footings where sensitive archaeology has been identified) and will therefore not impede flow routes/floodplain storage and are designed to remain operational in times of flood.

The raised design of the Solar PV Arrays also means that they represent a negligible increase in impermeable area as the natural ground cover is retained beneath. The incorporation of grassland within the Order Limits will effectively manage the risk of runoff concentration/rill formation, provide greater soil stability and improve soil quality through the cessation of chemical/fertiliser applications associated with more intensive agricultural practices.

The CRC represents a narrow area for cable installation and associated works. There is a commitment to Avoidance Areas of certain environmental receptors, including watercourses (as specified in Table 2.1 of the Outline CEMP), whereby open cut trenches and launch and reception pits associated with trenchless techniques, such as HDD will be located outside of the Avoidance Areas to minimise impacts. Avoidance Areas are locations where trenchless technologies rather than open cut trenches will be used to avoid certain environmental receptors within the CRC. The Avoidance Areas are set out and secured in the **Outline CEMP [EN0110014/APP/7.1]**. The management of the cable works in the area in relation to pollution will be managed through the measures outlined in the **Outline CEMP [EN0110014/APP/7.1]**.

As secured through the **Outline CEMP [EN0110014/APP/7.1]**, where practicable, temporary internal haul routes within the CRC will be designed to avoid impacts on watercourses. Where this is not practicable, temporary construction access ramps will be used for these crossings. The type of crossing selected for the temporary construction access ramps will be determined at detailed design in consultation with the relevant planning authority.

Sensitive water receptors (private drinking water supplies and ecological designated sites (Special Areas of Conservation (SAC) and Sites of Specific Scientific Interest (SSSI)) are located within the Study Area (as defined in the **ES: Chapter 9 Water Environment [EN0110014/APP/6.1.9]**) and have the potential to be impacted by the Scheme through the mobilisation of contaminants to surface water and groundwater receptors. Therefore, a mitigation strategy has been developed to address such risks during all phases of the Scheme.

Surface water runoff from access tracks, inverter/converter units are considered to be a low pollution risk and will be managed through the use of permeable surfaces, filter drains and/or gravel aggregate sub-bases to promote natural infiltration to ground.

Outline surface water drainage arrangements for the National Grid Substation, Project Substation in the BESS Site, Project Substation in Sub-Site 1B, and BESS areas have been provided in this report, with detailed design to be secured as part of the DCO. The drainage strategies for the National Grid Substation and Project Substations and BESS will incorporate appropriate treatment stages before runoff is discharged at a controlled rate to a receptor (likely ordinary watercourses) and provide appropriate management for the containment of firewater runoff in the unlikely event of a fire from these facilities. Following testing, the runoff be tankered off-Site, if required.

Further details in relation to drainage in the event of a fire are provided within the **Outline BSMP [EN0110014/APP/7.5]**. The detailed BSMP will be secured by a DCO Requirement.

The potential for impacts from the mobilisation of contaminated sediment and surface water runoff arising from the construction and decommissioning phases will be managed through the incorporation of measures outlined in the **Outline CEMP**

**[EN0110014/APP/7.1]** and **Outline DEMP [EN0110014/APP/7.3]**, with detailed versions secured by a DCO Requirement.

In summary, this FRA demonstrates that the Scheme is safe and will not detrimentally impact on flood risk within the Order Limits or elsewhere, in accordance with the requirements of national and local planning policy.

# 1 Introduction

## 1.1 Background

1.1.1 This 'Flood Risk Assessment and Outline Surface Water Drainage Strategy' (referred to as the FRA and DS) report has been prepared on behalf of East Pye Solar Limited (the Applicant) to accompany a Development Consent Order (DCO) application for a solar photovoltaic (PV) electricity generating station and associated development (the Scheme).

1.1.2 The Order Limits is grouped into Sites 1-10 and the BESS Site. Sites 3-10 are concentrated to the east of Long Stratton. Land parcels including Sites 1 and 2 and the BESS Site are located south of Great Moulton (see **Figure 1.1**).

1.1.3 The Order Limits falls within the administrative areas of Norfolk County Council (NCC) (which also serves as the Lead Local Flood Authority (LLFA) for the area) and South Norfolk Council (SNC).

1.1.4 This assessment has been prepared in accordance with planning policy and sources of information outlined in **Section 1.5**. The FRA takes into account the requirements of the EA, SNC and NCC policy and guidance (as LLFA), together with comments provide by relevant consultees to the **ES: Appendix 2.2 EIA Scoping Opinion [EN0110014/APP/6.3.2.2]** and Preliminary Environmental Impact Report (PEIR). A review has also been undertaken of relevant flood risk documents for the area including the Greater Norwich Strategic Flood Risk Assessment (SFRA).

1.1.5 Mitigation measures are proposed within this FRA to eliminate or limit risk of flooding from surface water runoff in an extreme rainfall event.

## 1.2 Objectives

1.2.1 The FRA includes:

- A review of readily available information on flooding using data provided by the EA and other stakeholders including, where available, the SFRA;
- Evaluation of background hydrology;
- Assessment of the risks from all sources of flooding;
- Assessment of the impacts of climate change on all forms of flooding; and
- Consideration of the surface water drainage requirements and set out the proposed DS.

## 1.3 Order Limits

1.3.1 The Order Limits are shown on **Figure 1.1** below and **Figure 9.1 (Sheets 1-19)** in **Appendix A**.

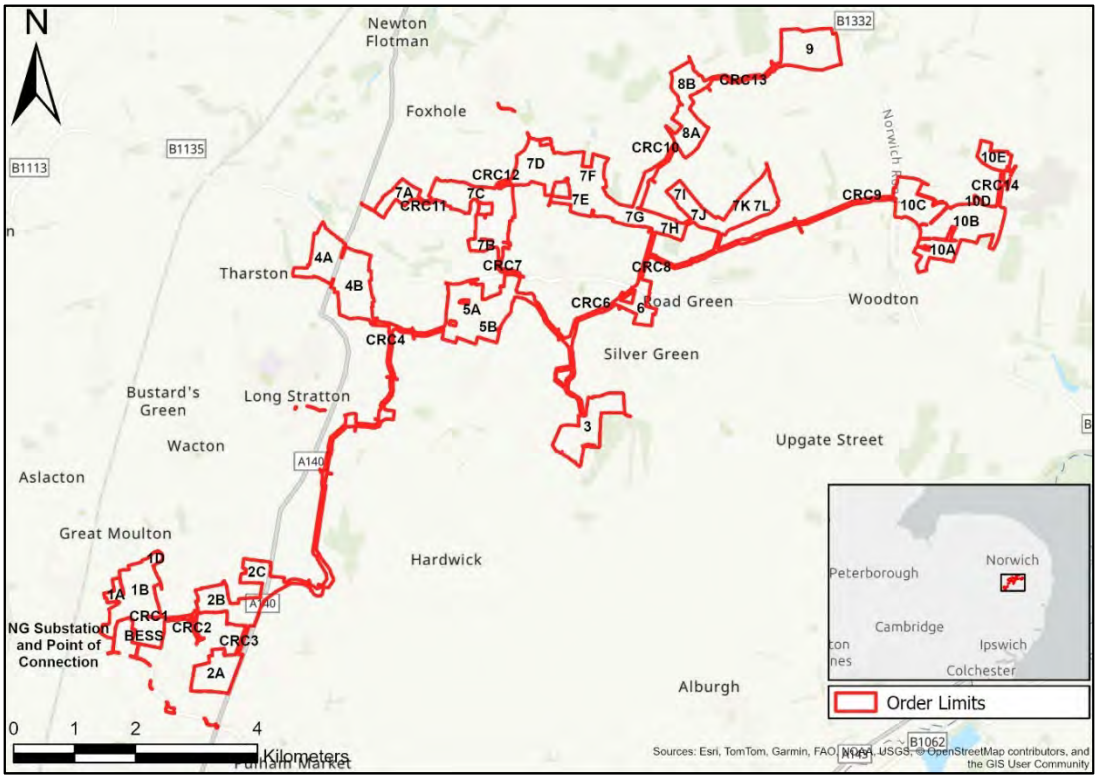



Figure 1.1: Order Limits

1.3.2 Small areas in **Figure 1.1** are detached from the main Order Limits which pertain to locations where works will be undertaken to facilitate the Scheme. These works include tree removal/hedge trimming and verge improvements (Land at Station Road (LSR)1-4, Land at Church Hill (LCH), Land at Ipswich Road (LIR) and Land at Hall Lane (LHL)).

1.3.3 These works are not considered to significantly impact on or be relevant to flood risk and are therefore not considered further as part of this assessment.

## 1.4 Scheme Description

1.4.1 The Scheme comprises the construction, operation and maintenance, and decommissioning of a solar PV electricity generating station and associated development as follows:

- Solar PV Arrays with mounting structures (as either single-axis tracker and/or fixed);
- Conversion Units (comprising: Inverters, Transformers and Switchgear);

- Project Substations (132kV, 400kV) comprising electrical infrastructure such as Conversion Units, busbars (a bar or strip of metal used to transport electric current from one location to another with minimal energy loss) and control rooms;
- 33kV Sub-distribution Switch Rooms;
- A National Grid Substation;
- BESS;
- CRC;
- Grid Connection Infrastructure, including underground and/or overhead lines which could include new pylons between the National Grid Substation and the Point of Connection;
- Ancillary infrastructure including enclosure, security, fencing, drainage, and earthworks, as required;
- Access tracks and access points;
- Highway works;
- Green infrastructure;
- Mitigation and enhancement areas; and
- Temporary construction compounds.

1.4.2 Further detail on each element of the Scheme is set out in **ES: Chapter 4 The Scheme [EN0110014/APP/6.1.4]**).

## 1.5 Planning Policy and Sources of Information

1.5.1 This FRA has been prepared based on the following sources of information and guidance:

- EA published 'Open Data (Ref 1) datasets (see **Appendix A**);
- Stakeholder correspondence, including the EA, Water Management Alliance (WMA) for Norfolk Rivers and NCC (see **Appendix B**);
- Anglian Water Services (AWS) sewer records dated August 2023 (see **Appendix C**);
- Modelled outputs from the Yare 2014 Study, provided as a link via correspondence ref. EAN/2024/374313 dated September 2024;
- Topographic Survey by Survey Solutions dated May 2024;

- The Works Plans (**[EN0110014/APP/2.3]**);
- Phase 1 Ground Conditions Assessment (see **ES: Appendix 16.1 [EN0110014/APP/6.3.16.1]**);
- Cook and McCuen (2013) 'Hydrological response of solar farms', Journal of Hydrologic Engineering, volume 18, issue 5 (Ref 2);
- UK Centre for Ecology & Hydrology (CEH), Flood Estimation Handbook (FEH) Web service dated 2023 (Ref 3);
- British Geological Survey (BGS), Geology Viewer and Borehole data, dated 2025 (Ref 4);
- Construction Industry Research and Information Association (CIRIA), 'The SuDS Manual V.6', C753, dated 2015 (Ref 5)
- Department for Energy Security & Net Zero, Overarching National Policy Statement for Energy (EN-1) and National Policy Statement for Renewable Energy Infrastructure (EN-3) dated December 2025, and draft National Policy Statement for Electricity Networks Infrastructure (EN-5) dated November 2025 (Ref 6)
- EA 'Flood Risk Assessments: Climate Change Allowances' guidance, updated May 2022 (Ref 7)
- **ES: Appendix 2.1 EIA Scoping Report [EN0110014/APP/6.3.2.1]** and **ES: Appendix 2.2 Scoping Opinion [EN0110014/APP/6.3.2.2]**;
- Greater Norwich Area SFRA Final Report: Level 1, dated November 2017 (Ref 8);
- NCC 'Lead Local Flood Authority Statutory Consultee for Planning Guidance Document', Version 7.3, dated April 2025 (Ref 9);
- Department for Environment, Food and Rural Affairs (DEFRA) 'National Standards for sustainable drainage systems', last updated July 2025 (Ref 10);
- NCC Flood Investigations Report (Ref 11).

## 1.6 Consultation/Engagement

1.6.1 Initial enquiries were undertaken in 2024 with the EA to obtain modelled extents/flood levels for the watercourses in the area and NCC as the LLFA for the area to obtain flood history information in relation to the Order Limits. The Water Management Alliance (WMA) for Norfolk Rivers; and Waveney, Lower Yare and Lothingland Internal Drainage Boards (IDB) were also contacted in 2024 with regards to easement requirements from their watercourses.

1.6.2 Consultation was undertaken on the EIA Scoping Report and the PEIR. A copy of the EIA Scoping Opinion is provided in **ES: Appendix 2.2 Scoping Opinion [EN0110014/APP/6.3.2.2]** and responses from authorities on the PEIR is provided in the **Consultation Report [EN0110014/APP/5.1]**. A summary of the responses in relation to flood risk and drainage for the EIA Scoping is provided in **ES: Chapter 9 Water Environment [EN0110014/APP/6.1.9]**. Responses to the PEIR in relation to flood risk and drainage are provided in the **Consultation Report [EN0110014/APP/5.1]**.

1.6.3 Further engagement has been undertaken with the EA and NCC (LLFA) in December 2025 to discuss and address the PEIR consultation responses. The outcome from this engagement is has been provided in **ES: Chapter 9 Water Environment [EN0110014/APP/6.1.9]** and **Consultation Report [EN0110014/APP/5]** and addressed within this FRA.

## 1.7 Caveats and Exclusions

1.7.1 This FRA has been produced based on information in relation to flood risk and for the Scheme that is available at the time of writing.

1.7.2 The Approach for the FRA and proposals for the surface water management strategy is based on the requirements of the EA and NCC in its role as the LLFA, as well as the relevant British Standards (BS8533) (Ref 12). The conclusions are based on the data available at the time of the study and on the subsequent assessment that has been undertaken in relation to the Scheme as outlined in below.

1.7.3 The Construction (Design and Management) Regulations 2015 (CDM Regulations) (Ref 13) will apply to any future development of the Order Limits which involves ‘construction’ work, as defined by the CDM Regulations. As such it is the responsibility of the Applicant to fulfil its duties under the CDM Regulations.

# 2 Planning Policy Context

2.1.1 This FRA has been prepared in accordance with the relevant national and local planning policy and statutory authority guidance as detailed below.

## 2.2 National Policy and Guidance

### National Policy Statements

2.2.1 The relevant National Policy Statements (NPS) provide the primary basis for decisions by the Secretary of State on development consent applications for Nationally Significant Infrastructure Projects.

2.2.2 The Overarching NPS for Energy (NPS EN-1) (Ref 6) dated December 2025 came into force in January 2026 which identifies both water quality and resources and flood risk as topics requiring consideration and assessment for energy related projects.

2.2.3 The NPS requires that where a proposed development is likely to have effects on the water environment:

- The Applicant should undertake an assessment of the existing status of, and impacts of the Scheme on, water quality, water resources and physical characteristics of the water environment (paragraph 5.16.3);
- Flood risk from all sources should be considered to avoid in appropriate development in areas at risk of flooding, and to steer new development to areas with the lowest risk of flooding (paragraph 5.8.6);
- Where new energy infrastructure is exceptionally required in flood risk areas, it must be designed and constructed to be safe/operational for its lifetime without increasing flood risk elsewhere and where possible reduce flood risk overall (paragraph 5.8.7);
- An application should be accompanied by an FRA for energy projects of 1ha or greater in Flood Zone 1 and all energy projects in Flood Zones 2 and 3 (paragraph 5.8.13);
- Where a project may be affected by or may increase flood risk, pre-application discussions should be undertaken with the EA and other bodies (paragraph 5.818);
- Any requirements for sequential testing are satisfied (paragraphs 5.8.21-5.8.23); and
- Priority is given to the use of Sustainable Urban Drainage Systems (SuDS) (paragraph 5.8.32).

2.2.4 EN-1 refers to the National Planning Policy Framework (NPPF) and the associated Flood Risk and Coastal Change Planning Practice Guidance (PPG) for further details regarding the minimum requirements for FRA.

2.2.5 NPS for Renewable Energy Infrastructure (NPS EN-3) (Ref 6) dated December 2025 came into force January 2026 addresses climate change adaptation and requires that Applicants set out how proposals would be resilient to rising sea levels and increased risk of flooding. In respect of water quality and resources and safe design/resilience to climate change, EN-3 refers to the assessment requirements and considerations set out in EN-1.

2.2.6 Paragraph 2.4.11 of EN-3 notes that solar projects may be proposed in low lying, exposed sites and that Applicants should consider how plant will be resilient to the increased risk of flooding. Paragraph 2.10.85 notes that the FRA will need to consider the impact upon drainage and that localised SuDS, such as swales and infiltration trenches, should be used to control runoff.

2.2.7 NPS for Electricity Networks Infrastructure (NPS EN-5) (Ref 6) dated December 2025 came into force in January 2026 and provides the primary basis of applications received for electricity networks infrastructure and sets out the factors influencing route selection and the impacts that may arise from such development. However, EN-5 refers to EN-1 regarding the assessment of flood risk and consideration of resilience to climate change and does not therefore set out additional policy in respect of flood risk.

## National Planning Policy Framework

2.2.8 The NPPF was last updated in December 2024 (Ref 18). The accompanying PPG was released in March 2014 (with reference to the 'Flood Risk and Coastal Change' section) and last updated in September 2025 (Ref 19).

2.2.9 The NPPF sets out the requirement for the Sequential Test in paragraphs 171-177 see below:

*'173. A sequential risk-based Approach should also be taken to individual Applications in areas known to be at risk now or in future from any form of flooding, by following the steps set out below.*

*174. Within this context 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.*

*175. The sequential test should be used in areas known to be at risk now or in the future from any form of flooding, except in situations where a site-specific flood risk assessment demonstrates that no built development within the site boundary, including access or escape*

*routes, land raising or other potentially vulnerable elements, would be located on an area that would be at risk of flooding from any source, now and in the future (having regard to potential changes in flood risk)...*

*…177. Having applied the sequential test, 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 Order Limits and of the development proposed, in line with the Flood Risk Vulnerability Classification set out in Appendix 3.'*

2.2.10 The NPPF sets out the requirement for the Exception Test, where applicable, in paragraphs 178-179. These tests are to be applied where appropriate, depending on the flood risk 'vulnerability', the Flood Zone in which it is located and the risk of flooding from other sources.

2.2.11 A draft update to the NPPF was released in December 2025 and is currently under consultation. The main change within the update for flood risk is the wording on the application of the Sequential and Exception Tests, which has been updated to reflect changes to paragraph 027 within the PPG September 2025 update as follows:

*'The sequential test should be applied to 'Major' and 'Non-major' development proposed in areas at risk of flooding, as set out in paragraphs 173 to 174 of the National Planning Policy Framework. Paragraphs 175, 176 and 180 set out exemptions from the sequential test.*

*In applying paragraph 175, a proportionate approach should be taken. Where a site-specific flood risk assessment demonstrates clearly that the proposed layout, design and mitigation measures would ensure that occupiers and users would remain safe from current and future surface water flood risk for the lifetime of the development (therefore addressing the risks identified e.g. by Environment Agency flood risk mapping), without increasing flood risk elsewhere, then the sequential test need not be applied.'*

2.2.12 The PPG demonstrates a flood risk management approach for the lifespan of the project considering the effects of climate change. The PPG sets the framework to minimise vulnerability, provide resilience to the impacts of climate change, and to fully consider the potential impacts of climate change for the lifetime of the project within the mitigation measures. In May 2022, the guidance within the PPG on the application of climate change allowances in FRA was significantly updated.

2.2.13 The PPG provides contingency allowances for the potential increases in peak river flow, peak rainfall intensity and sea level rise which are considered accordingly subject to the site conditions – discussed further in **Section 4**.

## 2.3 Local Policy and Guidance

2.3.1 Local planning policy in relation to flood risk and drainage is provided in the following:

- Greater Norwich Local Plan (GNLP) (Ref 14), adopted by SNC in March 2024; and
- South Norfolk Development Management Policies Document (DMPD) (Ref 15), adopted in October 2015, which forms part of the South Norfolk Local Plan. The relevant policy in relation to flood risk and drainage is Policy DM4.2 – Sustainable drainage and water management.

2.3.2 The NCC 'LLFA Statutory Consultee for Planning Guidance Document' (Ref 9) provides guidance on the implementation of SuDS within Norfolk and provides standing advice in relation to solar farms under Standing Advice 4. Further detail in relation to this guidance is provided in **Section 9**.

# 3 Site Setting

## 3.1 Hydrological Setting

3.1.1 The principal watercourses within or local to the Order Limits are shown on **ES: Figure 9.1 Site Location and Watercourses [EN0110014/APP/6.2.9.1]** in **Appendix A** and are summarised as follows:

- The **Hempnall Beck** (main river and chalk stream) flows between Site 7 and Sites 4 to 6 and through CRC7. Ordinary watercourse tributaries of the Hempnall Beck flow through CRC4 and CRCs 6 and 8 and adjacent to the western boundary of Sub-Sites 5B and 7A. The watercourse becomes part of the Waveney, Yare and Lothingland IDB district approximately 600metres (m) to the north-east of Sub-Site 4B and south of Sub-Site 7A;

- The **River Tas – Tasburgh to River Yare** (main river and chalk stream) flows along the boundary between Sub-Sites 8A and 8B (known as Shotesham Beck) and north-east of Sub-Site 7F. This tributary becomes part of the IDB district approximately 800m north of Sub-Site 8B. An ordinary watercourse tributary of the River Tas (Head to Tasburgh) flows north-east close to the western boundary of Sub-Site 4A and this becomes part of the IDB district approximately 200m south-west of Sub-Site 4A;

- The **Broome Beck** (ordinary watercourse at Order Limits boundary) flows in a south-westerly direction as an ordinary watercourse adjacent to the southern boundary of Sub-Sites 10A and 10C and becomes a main river shortly downstream of Sub-Site 10A. The watercourse flows into the River Waveney to the east of the village of Broome; and,

- **Little Beck** (ordinary watercourse tributary of the River Chet (main river)) flows in a northerly direction to the north-west of Sub-Site 10E and to the east of Site 9.

3.1.2 Other smaller unnamed ordinary watercourses/field boundary ditches are present within several of the Sub-Sites.

## 3.2 Topography

3.2.1 **Figure 9.2** in **Appendix A** show the EA LiDAR topography for the Site. The level range and direction of fall for each area of the Order Limits is summarised in **Table 3.1**.

3.2.2 A topographic survey was undertaken by Survey Solutions in May 2024 for the Sites, and this is consistent with the LiDAR. The survey also identifies the presence of several land drains between fields/along Sub-Site boundaries with typical depths of 0.5-1.0m.

3.2.3 The CRCs represent very narrow areas and have a topography similar to the adjoining Sub-Sites.

**Table 3.1: Site Topography**

| Site / Sub-Site | General Direction of Fall (High to Low) | Highest Level (m AOD) | Lowest Level (m AOD) |
|---|---|---|---|
| **BESS** | North-East to South-West | 55.0 | 54.0 |
| **1B** | North-East to South-West | 57.0 | 55.0 |
| **1A-1D** | North-East to South-West | 58.0 | 50.0 |
| **2A** | North to South | 54.0 | 48.0 |
| **2B** | West to East | 57.0 | 52.0 |
| **2C** | North to South | 56.0 (N) | 54.0 (S) |
| **3** | South-West to North-East | 52.0 | 48.0 |
| **4A & 4B** | South to North | 44.0 | 26.0 |
| **5A** | South to North/North-East | 44.0 | 27.0 |
| **5B** | South-West to North-East | 45.0 | 36.0 |
| **6** | South to North | 42.0 | 34.0 |
| **7A** | East to West | 38.0 | 23.0 |
| **7B** | North to South | 34.0 | 25.0 |
| **7C** | Centre to West, North & South | 44.0 | 40.0 (W), 42.0 (N) & 32.0 (S) |
| **7D** | East to West | 44.0 | 3.0 |
| **7E & 7F** | South-West to North/East | 44.0 | 41.0 (N)/39.0 (E) |
| **7G** | North-West to South-East | 45.0 | 40.0 |
| **7H & 7I** | North-East to South-West | 46.0 | 38.0/45.0 |
| **7J** | West to East | 46.0 | 44.0 |
| **7K** | West/South to North | 44.0 | 38.0 |
| **7L** | South to North | 42.0 | 40.0 |
| **8A-8B** | South to North/East to West | 40.0 (S/E) | 28.0 (W) |
| **9** | South-West to North-East | 41.0 | 32.0 |
| **10A** | East to West | 41.0 | 28.0 |
| **10B** | East to West | 42.0 | 29.0 |
| **10C** | North to South-East/South-West | 36.0 (N/S-E) | 30.0-32.0 |
| **10D** | East to West | 40.0 | 39.0 |

| Site / Sub-Site | General Direction of Fall (High to Low) | Highest Level (m AOD) | Lowest Level (m AOD) |
|---|---|---|---|
| **10E** | West to East | 40.0 | 37.0 |

## 3.3 Geology & Hydrogeology

3.3.1 **ES: Appendix 16.1 Phase 1 Ground Conditions Assessment [EN0110014/APP/6.3.16.1]** presents information in relation to the geology and hydrogeology within the Order Limits based on the BGS geology maps and historical borehole records, which is summarised below.

### Superficial Deposits

3.3.2 **ES: Figure 16.1 Superficial Geology [EN0110014/APP/6.2.16.1]** shows that the superficial deposits present across the majority of the Order Limits are the **Lowestoft Formation – Diamicton** (sand and gravel/chalky clay) and the **Lowestoft Formation – Sand and Gravel** (northern part of Sub-Site 4A only). These strata are designated as 'Secondary Undifferentiated/Secondary A' aquifers with a 'medium/high' groundwater vulnerability respectively.

3.3.3 Superficial deposits along watercourse corridors (within Sub-Sites 4A, 4B, 5A, 5B, 7A, 7B, 7C and CRC 4, 6, 7 and 8) are observed as the **Leet Hill Sand and Gravel Member, Head, Alluvium and River Terrace Deposits**. These strata are classified as either 'Secondary Undifferentiated' or 'Secondary A' aquifers with a 'high' groundwater vulnerability. **Peat** is present beneath CRC7, which is classified as 'Unproductive' strata.

3.3.4 **ES: Figure 16.4 Diamicton Thickness [EN0110014/APP/6.2.16.4]** also shows the location of historic borehole records and thickness of the Diamicton within vicinity of the Order Limits. The boreholes are located typically within 250m of the Order Limits, some less than 100m. Given the wide spatial extent of the Diamicton, the information in the borehole records is considered to be representative of the geological conditions within the Order Limits in the absence of site-specific information.

3.3.5 The records show that the Diamicton thickness is generally between 10.0m and 15.0m across the area that surrounds the Order Limits. A shallower thickness of 6.0m is present in the northern part of Sub-Site 4A where the Leet Hill Sand and Gravel Member is present over the Diamicton.

3.3.6 The thickness increases to 17.1m to the north of Sub-Site 10E, 25.3m to the west of Site 9 and 22.9m to the west of Sub-Site 1A.

3.3.7 The Diamicton is shown to consist of yellow/blue clay (adjacent to BESS Site/Sub-Sites 1A-1D), yellow clay (adjacent to Sub-Sites 4A-4B and Sub-Sites 5A-5B), silty clay (adjacent to Sub-Site 3) and blue/brown clay (adjacent to Sub-Sites 10C-10E). This demonstrates that the properties of

the Diamicton are relatively uniform across the area that encompasses the Order Limits.

3.3.8 Further information from the borehole records is provided in Tables 3.3-3.7 of **ES: Appendix 16.1 Ground Conditions Assessment [EN0110014/APP/6.3.16.1]**.

### Bedrock

3.3.9 The superficial deposits overlay a bedrock of either the **Norwich Crag Formation/Crag Group (sand)** or a combination of the Crag over the **Lewes Nodular, Seaford, Newhaven, Culver and Portsdown Chalk Formations**. These strata are designated as 'Principal' aquifers with a 'low' groundwater vulnerability.

3.3.10 The Chalk Formation is present immediately beneath the superficial deposits predominantly in the western parts of the Order Limits, notably Sub-Sites: 1A (except for the south-eastern corner), 1B (northern half only), 1D, 2B, 2C, 4A, 4B, 7A, 7C (western quarter only) and parts of CRCs 2-4 and 11.

3.3.11 Across the remainder of the Order Limits, the Crag Group is present immediately beneath the superficial deposits (with the Chalk Formations at depth).

### Drinking Water and Groundwater Protection Zones

3.3.12 The south-western areas of the Order Limits (BESS Site, Site 1 and Site 2), 10A-10D, the southern half of CRC4 and parts of CRC8 and CRC9 are located within a Drinking Water Safeguard Zone for surface water for Nitrate, Clopyralid, Metaldehyde and Propyzamide (pesticides). These substances are related to farming use and are therefore not relevant to the proposed uses of the Scheme. The Order Limits and CRC are not located within any Drinking Water Safeguard Zones for groundwater.

3.3.13 The south-western areas (Sub-Site 2A and CRC2-3), southern and central areas (northern part of Sub-Site 3, Sub-Sites 7D-7L and CRC 6, 8, 10, 12 and 13) and eastern areas (Sub-Sites 10A-10D and CRC 9 and 14) of the Order Limits are located within a Zone 3 (Total Catchment) groundwater Source Protection Zone (SPZ).

## 3.4 Existing Drainage Arrangements

3.4.1 The Order Limits is open rural land and is not served by any existing formalised surface water drainage systems; however, several field drains are present along field boundaries within and between Sub-Sites, and along boundaries with land adjacent to the Order Limits. Some of these features are shown on the OS Mapping base on **Figure 9.1 (Sheets 1-19)** in **Appendix A**.

3.4.2 Surface water runoff currently either infiltrates to ground where the geological and soil condition allows, or when the ground is saturated, drains naturally via runoff following the natural topography to the ditches/watercourses mentioned above and as shown on the overland flow route maps in **Figure 9.2 (Sheets 1-19)** in **Appendix A**. The maps indicate that the identified surface water flow routes are consistent with the lowest areas across the topography as flows are directed towards watercourses within and adjacent to the Order Limits.

# 4 Impact of Climate Change

## 4.1 Climate Change Allowances Guidance

4.1.1 In accordance with the NPS, this FRA sets out how the Scheme will take account of the projected impacts of climate change, using Government guidance and industry standard benchmarks, such as the EA 'Flood risk assessments: climate change allowances' guidance[7] in accordance with the EIA Regulations.

4.1.2 The EA guidance provides contingency allowances for potential increases due to climate change in:

- Peak river flow;
- Peak rainfall intensity; and
- Sea level rise.

4.1.3 Sea level rise is not applicable, as the Order Limits is located a significant distance away from tidal influences.

## 4.2 Peak River Flow

4.2.1 The peak river flow allowances provide a range of allowances based on percentile (i.e. the degree of certainty of an event occurring, based on the range of climate change scenarios assessed through scientific investigations). The applicable values for a site are dependent on the 'River Management Catchment' in which a site is located.

4.2.2 The Scheme is classified as 'Essential Infrastructure' in accordance with NPPF PPG Appendix 3 and therefore the 'Higher Central' allowance is applicable. For a scheme with an operational lifetime of up to 60 years (with the National Grid Substation remaining beyond this as permanent infrastructure) within the Broadland Rivers Management Catchment, the Applicable allowance is **+20%** ('Higher Central' 2080s epoch (2070-2125)).

4.2.3 The EA in their consultee response to the EIA Scoping Opinion advised that the 'Upper End' allowance/sensitivity test should also be a consideration. The 'Upper End' allowance for the 2080s epoch (based on a 60-year development lifetime and beyond) is **+44%**.

4.2.4 The EA model is dated 2014 and the climate change allowances for peak river flow have since been updated in 2022. The allowances included as part of the 2014 modelling are +25% (Central), +35% (Higher Central) and +65% (Upper End). The Higher Central and Upper End allowances from 2014 are higher than the equivalent current allowances and therefore utilising these outputs represents a conservative approach when considering climate

change in terms of peak river flow within the Order Limits, and they are considered in the assessment in **Section 5.7**.

## 4.3 Peak Rainfall Intensity

4.3.1 The potential for increase in peak rainfall intensity needs to be considered in the surface water drainage strategy for new developments.

4.3.2 The anticipated peak rainfall intensity in small catchments (less than 5km$^2$), or urbanised drainage catchments for the Broadland Rivers Management Catchment are summarised in **Table 4.1**.

**Table 4.1: Climate Change – Peak Rainfall Intensity Allowances**

| Broadland Rivers Management Catchment | Range of Climate Change Allowances (2070s epoch – 2061 to 2125) | |
|---|---|---|
| | Central | Upper End |
| **3.3% (1 in 30-year) rainfall** | 20% | 40% |
| **1.0% (1 in 100-year rainfall)** | 20% | 45% (2050s epoch) |

4.3.3 Considering the majority of the Scheme is classified as 'Essential Infrastructure', the 'Upper End' allowances will be utilised. The climate change allowance for the 1 in 100 (1.0%) AEP 2050s epoch 'Upper End' scenario is greater than that for the 2070s epoch, and as such the higher allowance of +45% has been considered in the surface water drainage strategy for the BESS, National Grid Substation, and Project Substations as a conservative approach.

4.3.4 Further detail of the proposed surface water drainage arrangements of the Scheme is provided in **Section 9**.

# 5 Assessment of Flood Risk

## 5.1 Overview

5.1.1 The assessment of flood risk has been undertaken based on the sources of information listed in **Section 1.5**.

5.1.2 The baseline flood maps have been taken from the GIS flood maps report in **Appendix A**, utilising EA Open Data datasets available online and reproduced with OS mapping under licence. The Flood Zone and Risk of Flooding from Surface Water (RoFSW) maps utilise the extents from the EA National Flood Risk Assessment ('NaFRA2') mapping updates released early 2025.

## 5.2 Historic Flooding Records

5.2.1 The accuracy of historic mapping is often dependant on the frequency of flooding and whether the watercourse is in an area with sensitive receptors to flooding. For example, a watercourse through a highly urbanised area is more likely to have an accurate record of flooding as flooding would have a greater potential impact on the local community than in a sparsely inhabited rural area. As such, the historic data over the Order Limits as detailed below is treated with caution and there is no further information from local stakeholders/landowners to be able to compare it with.

### Environment Agency

5.2.2 The EA Historic Flood map indicates that there is no record of land within the Order Limits being impacted by incidences of fluvial flooding.

### Norfolk County Council

5.2.3 The NCC Flood Investigation Reports indicate that flooding has occurred on local roads and properties of villages in the vicinity of the Order Limits, including Hempnall, Woodton and Long Stratton. The mechanisms of flooding were considered to be unmaintained drainage systems, with locations of properties adjacent to, or within, an overland flow path and the design standard of the drainage systems being unable to cope with significant rainfall events.

5.2.4 The increased cover and height of the proposed vegetation in the field will increase the surface roughness across the fields and contribute to increased interception of surface water runoff at source, thereby slowing and reducing the rate/volume of runoff across the Site and reducing flooding to villages located at the bottom of drainage catchments.

5.2.5 NCC has confirmed that there are no designated Critical Drainage Areas designations in the area (see correspondence in **Appendix B**).

### Great Norwich Strategic Flood Risk Assessment

5.2.6 A review of the Greater Norwich SFRA indicates that there are no records of flooding within the Order Limits from any source.

## 5.3 Tidal Flood Risk

5.3.1 Given the location and elevation of the Order Limits, the area is not affected by tidal sources and tidal flood risk has not been considered further.

## 5.4 Flood Risk from Reservoirs & Artificial Sources

5.4.1 Reservoir flooding occurs if the embankment retaining the body of water above normal ground level is subject to failure, causing a breach and resulting in inundation of the land downstream.

5.4.2 The EA provides maps showing the risk of flooding in the event of a reservoir failure. The reservoir breach extents are captured in the baseline flood maps in **Appendix A**.

5.4.3 The mapping confirms the Order Limits are not at risk of reservoir breach during either a 'dry-day' (scenario where predicting flooding occurs when a reservoir fails when rivers are at normal levels) or a 'wet-day' scenario (when the reservoir fail happens on a river experiencing an extreme natural flood).

5.4.4 The Greater Norwich SFRA mapping for reservoir flooding also indicates the Order Limits are not within an area at risk of flooding from reservoirs.

5.4.5 There are no other artificial structures such as canals in the area that would impact or be impacted by the Order Limits

5.4.6 The risk of flooding from reservoirs and artificial sources is considered to be **low**.

## 5.5 Sewer Flooding

5.5.1 The AWS sewer records have been obtained as part of a wider utilities search for the Order Limits and are provided in **Appendix C**. The records show that the majority of the Order Limits and the immediate vicinity are not served by public sewers. The areas within or close to the Order Limits boundary that are served by public sewers as follows:

- A 150mm diameter foul sewer and rising main are located beneath The Green (Saxlingham Green) within the boundary of Sub-Site 7D;
- A foul rising main runs through CRC7 to the Hempnall Fritton Road Water Recycling Centre (WRC);

- A 150mm diameter foul sewer runs beneath The Street (Woodton) approximately 400m from the boundary of Sub-Site 10A;
- A 150mm diameter foul sewer runs beneath Fairstead Lane (Tasburgh) within the boundary of Sub-Site 7A and a foul pumping station is located near the boundary; and
- A 150mm diameter foul sewer and rising main beneath High Green (Brooke) and a pumping station located approximately 60m north of Site 9.

5.5.2 Given the minimal presence of sewer infrastructure within the Order Limits (where sewers/rising mains are present they are confined to beneath roads) and the wider area, the risk from sewer flooding is considered to be **low**.

## 5.6 Groundwater Flood Risk

5.6.1 Groundwater flooding is caused by the emergence of water originating from sub-surface permeable strata. A groundwater flood event results from a rise in groundwater level, such that the water table rises above the ground surface and inundates low lying land. Groundwater floods may emerge from either a single point or diffuse locations and is highly dependent on the underlying geology of a catchment area.

5.6.2 The Greater Norwich Area SFRA 'Areas Susceptible to Groundwater Flooding' mapping indicates that the majority of the Order Limits, including the CRC, are not considered to be at risk from groundwater flooding. Sub-Sites 4A, 4B, 5A, 5B, 7A and the western areas of Sub-Sites 7B and 10A are shown to have a <25% susceptibility of groundwater flooding ('**Low**' risk).

5.6.3 A small area in the southern part of Sub-Site 5B, the eastern half of Sub-Site 7B and the southern boundary of Sub-Site 7C have a 25-50% susceptibility of groundwater flooding ('**Low-Medium**' risk), although this mapping is a high-level screening tool covering the country and based on an overview of the geology and topography rather than detailed modelling or historic data.

5.6.4 The areas of higher groundwater flood risk are in proximity to the Hempnall Beck and the Broome Beck. The higher groundwater flood risk also occurs within areas where sand and gravel members/alluvium overlie the Norwich Crag Formation (sand) in the central and eastern areas of the Order Limits (notably Sites 4, 5, 7 and 10), and the Chalk Formations at Site 4 and Sub-Site 7A.

5.6.5 It is envisaged that the groundwater would be in broad continuity with the water level in the local watercourses, and as such the groundwater table would slope towards the lowest areas of the Order Limits.

5.6.6 The risk of groundwater flooding within the Order Limits is considered to be **low**.

## 5.7 Fluvial (River) Flood Risk

5.7.1 Fluvial (river) flooding occurs when the volume of water draining from the surrounding land as a result of sustained or intense rainfall causes water levels in a river to rise above its banks and/or retaining structures and flow across land.

5.7.2 The EA Flood Zone map (Ref 16) shows that the majority of the Order Limits and the CRC are located within **Flood Zone 1 'Low Probability'** (defined as less than a 1 in 1000 (0.1%) annual exceedance probability (AEP) of fluvial or sea flooding).

5.7.3 Small/narrow areas of **Flood Zone 2 'Medium Probability'** (between a 1 in 100 (1.0%) and 1 in 1000 (0.1%) AEP of fluvial flooding) and **Flood Zone 3 'High Probability'** (greater than a 1 in 100 (1.0%) AEP of fluvial flooding) are located just within or adjacent to the boundary of the following Sub-Sites:

- South-eastern corner of Sub-Site 7B (which is proposed for Solar PV Arrays), narrow corridors within CRC4, CRC6, CRC7 and CRC8 (associated with the Hempnall Beck);
- Narrow corridors within Sub-Site 8A and a small area in the southern part of Sub-Site 8B (which is proposed for Solar PV Arrays) (associated with the River Tas); and
- Approximately 80m to the west of Sub-Site 1C (associated with the Starston Brook).

### Modelled Flood Data (River Tas/Shotesham Beck)

5.7.4 The EA provided the Yare-Tas 1D model (2014) for the area in September 2024 (EA ref. EAN/2024/374313 – see correspondence in **Appendix B**) which covers the watercourses in the areas of Flood Zones 2 and 3 within Sub-Sites 7B, 8A and 8B and narrow areas within CRC6-8.

5.7.5 The modelled extents for the present-day and equivalent climate change scenarios for Sub-Sites 8A and 8B are shown on **Figures 5.1** and **5.2**. The figures show that a small area in the northern and southern parts of Sub-Site 8A and Sub-Site 8B respectively are impacted by these extents both in the present-day and climate change scenarios.

5.7.6 A comparison of the Flood Zone maps and the modelled flood extents for these areas confirms that the Flood Zones within these areas are based on the 2014 Yare-Tas model outputs.

5.7.7 The modelled flood levels for the nodes adjacent to the northern most solar panel areas in Sub-Site 8A (node 2 (minimum) and node 9 (maximum) as shown on **Figure 5.1**)) are as follows:

- 1 in 100 AEP +35%cc (Higher Central proxy): 28.80m AOD - 29.33m AOD
- 1 in 100 AEP +65%cc (Upper End proxy): 28.83m AOD - 29.37m AOD
- 1 in 1000 AEP +25%cc: 28.85m AOD - 29.34m AOD

5.7.8 The above shows that there is minimal difference in flood level between the different climate change scenarios.

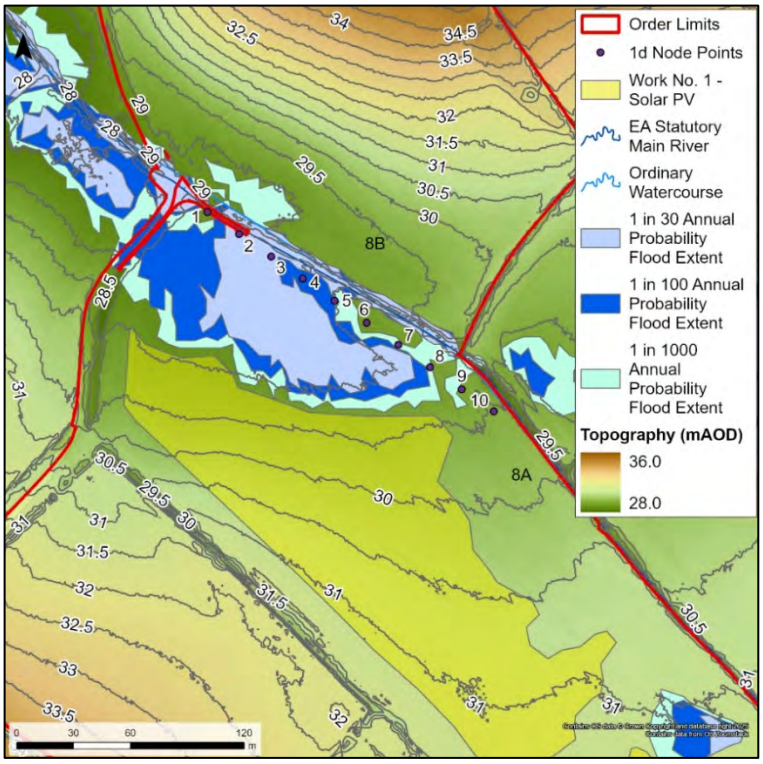



Figure 5.1: EA Yare-Tas Modelled Flood Extents Present-Day - Sub-Sites 8A & 8B

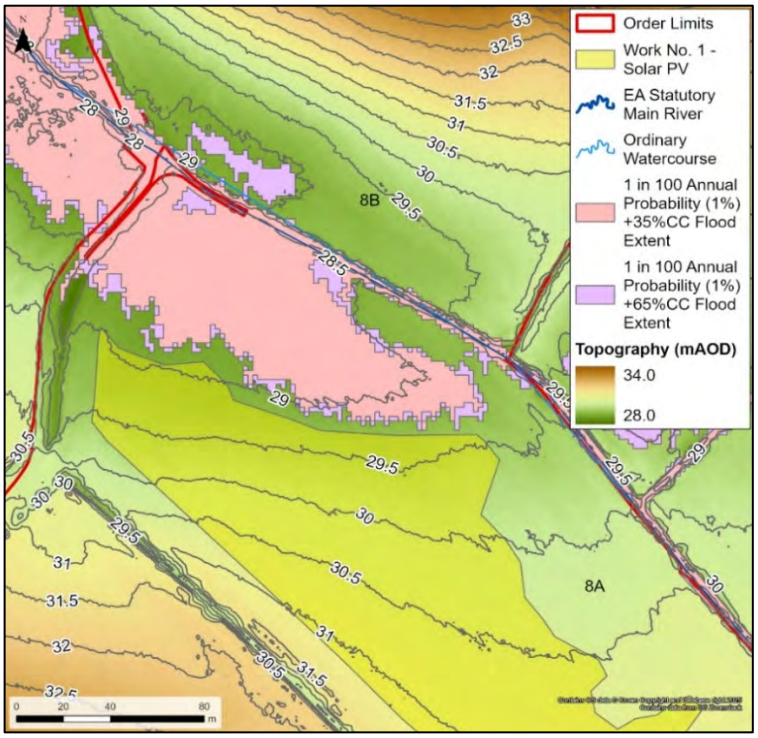



Figure 5.2: EA Yare-Tas Modelled Flood Extents Climate Change - Sub-Sites 8A & 8B

5.7.9 It is noted that a flow path is present in the eastern part of Sub-Site 8A which is not within the Yare-Tas model. The EA Flood Zones and surface water flood extents for Sub-Site 8A are shown on **Figure 5.3**. The EA has advised that the new (March 2025) Flood Zones within Sub-Site 8A are a composite of the Flood Zone extents and surface water extents. A copy of the correspondence is provided in **Appendix B**.

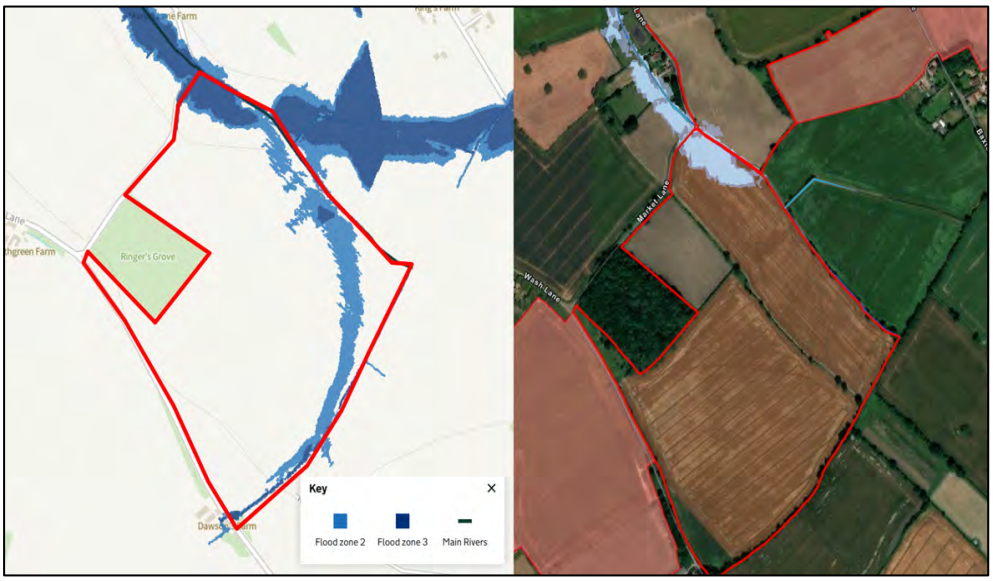



Figure 5.3: Comparison of EA Flood Zone Map March 2025 (Left) & Previous (Right)

5.7.10 All Inverters and Solar PV Arrays are located outside of the areas of Flood Zones 2 and 3 and outside all modelled fluvial floodplains up to and including the 1 in 1000 (0.1%) AEP floodplain as shown on **Figure 5.4**.

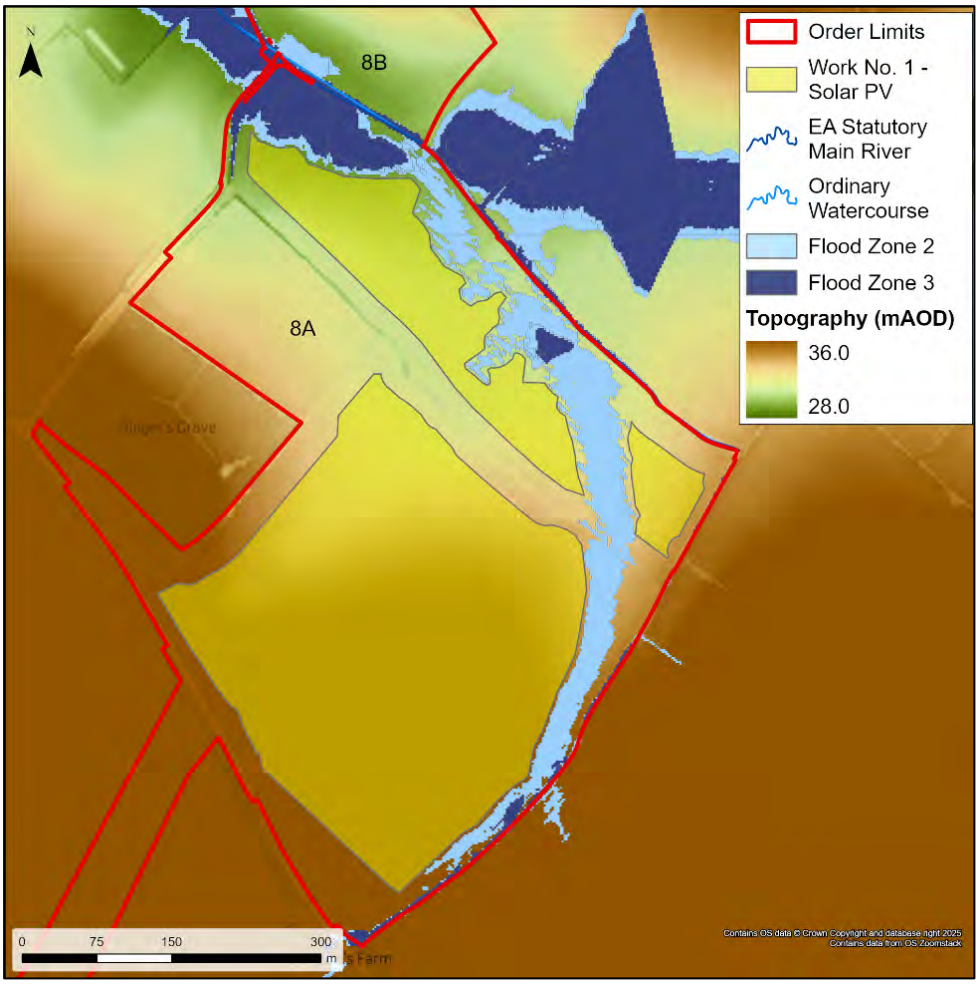



**Figure 5.4: Comparison of Masterplan with EA Flood Zones 2 and 3 for Sub-Site 8A**

## EA Modelled Data (Hempnall Beck)

5.7.11 The modelled flood extents (present-day and climate change) for the Hempnall Beck (taken from the Yare-Tas 2014 model) are provided in **Figures 5.5** and **5.6**. This shows that a very small area in the south-eastern corner of Sub-Site 7B is impacted.

5.7.12 CRC6 is shown to be impacted in the present-day scenario, however, the extents are not shown for the climate change scenario. The EA confirmed that the extents within CRC6 have been included by error, and that the model domain begins north of Mill Lane.

5.7.13 CRC6 has been reduced significantly in size in comparison to that presented in the PEIR and no works that would affect floodplain storage or flow in the watercourse are proposed within areas of Flood Zones 2 and 3. As such, it is considered unnecessary to undertake further assessment in relation to fluvial

flood risk for CRC6. The EA agreed that this approach is acceptable in a meeting in December 2025.

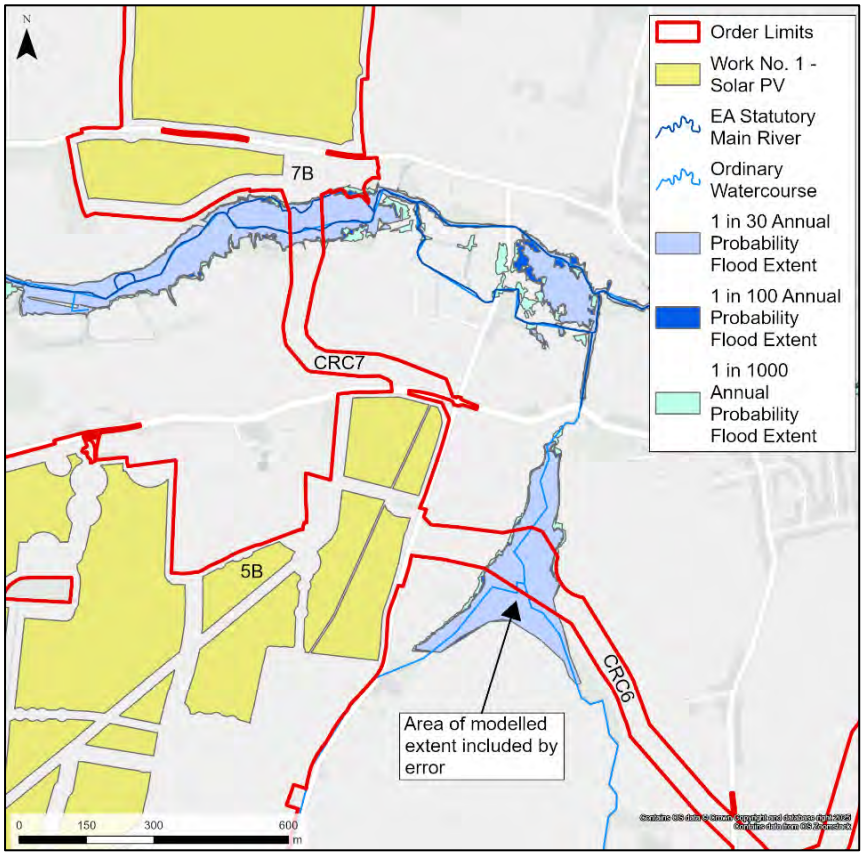



**Figure 5.5: EA Modelled Flood Extents Present-Day - Sub-Site 7B & CRC6-7**

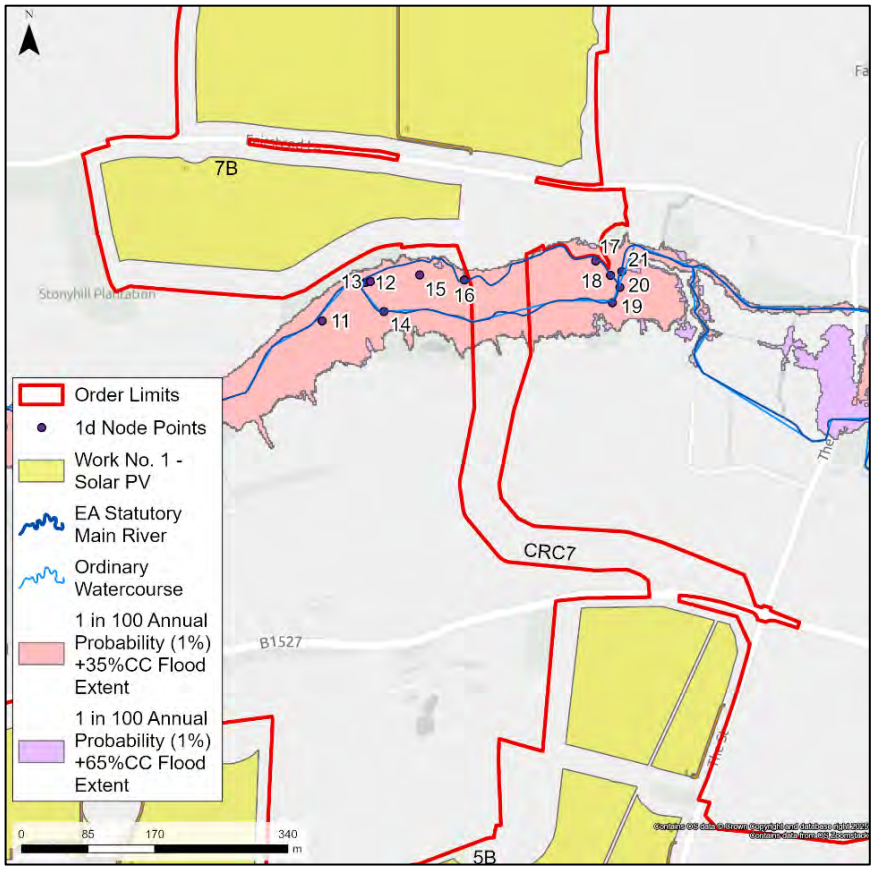



**Figure 5.6: EA Modelled Flood Extents Climate Change - Sub-Site 7B & CRC7**

5.7.14 For reference, the modelled flood levels for the Hempnall Beck within Sub-Site 7B (node 17) are as follows:

- 1 in 100 AEP +35%cc (Higher Central proxy): 24.22m AOD
- 1 in 100 AEP +65%cc (Upper End proxy): 24.31m AOD
- 1 in 1000 AEP +25%cc: 24.33m AOD

## EA Model Data (Starston Brook)

5.7.15 A data request was sent to the EA for modelled information for the Starston Brook to consider the areas of Flood Zones 2 and 3 adjacent to Sub-Site 1C.

5.7.16 The EA has confirmed that whilst the modelling has been refined for this watercourse, no flood levels/depths are available. A copy of the correspondence is provided in **Appendix B**. Notwithstanding this, using the LiDAR contours on **Figure 9.2**, an approximate flood level based on the limit of Flood Zone 2 has been identified as the 49.0m AOD contour.

5.7.17 The EA, as part of their consultee response to the PEIR, requested further assessment in relation to flood risk from the Starston Brook on the National Grid Substation area (now Sub-Site 1C). The Scheme has since been refined to relocate the National Grid Substation within Sub-Site 1B and the

areas of Flood Zone 2 and Flood Zone 3 associated with the Starston Brook are now excluded from the Order Limits.

5.7.18 Overhead Line (OHL) works proposed within Sub-Site 1C will comprise the modification and reconfiguration of the existing OHL, including new pylons and dismantling of the existing overhead transmission electric line and pylons, as shown on the **Works Plans [EN0110014/APP/2.3]**. **Figure 5.7** shows an overlay of the LiDAR topography with the EA Flood Zone 2 and 3 extents for the Starston Brook and shows that the 1 in 1000 (0.1%) AEP floodplain extends to contours of 49.60m AOD to 50.00m AOD.

5.7.19 The minimum ground level of the Order Limits in this area is 50.20m AOD and is located at least 80m away from the Starston Brook floodplain. As such, this area is located a significant distance away from and has a minimum 200mm freeboard above the Starston Brook floodplain (based on the 1 in 1000 (0.1%) AEP floodplain shown) and is therefore considered to be at low risk. The works proposed in this area will therefore not impede floodplain storage/flood flow routes or increase flood risk within the Order Limits or elsewhere.

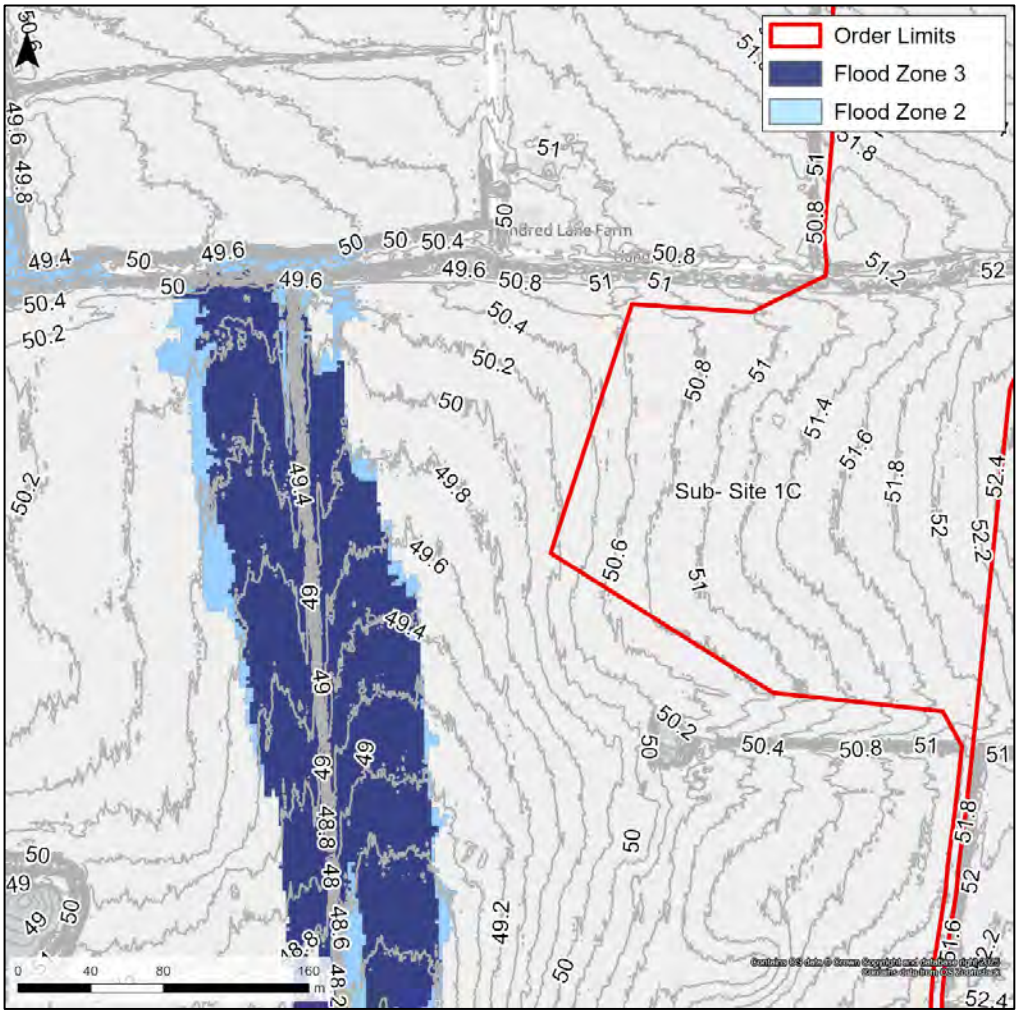



**Figure 5.7: EA Flood Zones 2/3 of Starston Brook & LiDAR Topography Overlay**

5.7.20 The BESS is situated at least 400m from - and a minimum of 2m above - the Starston Brook floodplain. As such, there will be no impact on flood risk from this element of the Scheme to the Starston Brook and no further assessment is required.

### Fluvial Flood Risk Summary

5.7.21 In summary, the risk of fluvial flood risk across the majority of the Order Limits is low both in present-day and climate change scenarios, with small areas of higher risk adjacent to main river watercourses.

5.7.22 It is considered that there will be no significant impact on fluvial flood risk in terms of floodplain storage for these areas due to the application of the sequential approach for the location of proposed 'built' electrical infrastructure (i.e. battery storage units, cabins etc.), the underground nature of the cable route crossings, and locating Solar PV Arrays within areas of lowest flood risk as far as reasonably practicable.

5.7.23 In addition, the Solar PV Arrays and their associated electrical infrastructure will be raised up on pile driven supports (or in limited areas concrete footings where sensitive archaeology has been identified). All electrical infrastructure associated with the panels (excluding cabling) will be elevated by the Mounting Structures so that it is no less than 300mm above the 1 in 100 (1%) Annual Exceedance Probability (AEP) flood level; or, where this is not possible, as high as practicable.

5.7.24 Further information on proposed embedded flood risk mitigation for the Scheme is provided in **Section 8**.

## 5.8 Pluvial (Surface Water) Flood Risk

5.8.1 A pluvial, or surface water flood, is caused when heavy rainfall creates a flood event independent of a water body. This can be due to local topography, or from the capacity of local surface water drainage sewer systems exceeded (or both).

5.8.2 The EA 'Risk of Flooding from Surface Water' (RoFSW) map has been overlaid onto the Works Plans and is provided in **Figure 9.4 (Sheets 1-19)** in **Appendix A**. The maps indicates that the majority of the Order Limits and the CRC have a 'Very Low' risk (less than a 1 in 1000 (0.1%) AEP) of surface water flooding.

5.8.3 Flow routes with 'Low' (between a 1 in 100 (1.0%) and 1 in 1000 (0.1%) AEP) to 'High' (greater than a 1 in 30 (3.3%) AEP) surface water flood risk run through and along the boundary of some of the Order Limits and parts of the CRC, notably CRC3, CRC4, CRC6, CRC8, CRC9 and CRC13, Site 9, and Sub-Sites 4B, 7A, 7E, 7F, 7K, 8A, and 10A-10D. The flow routes in these areas are associated with the routes of main rivers and ordinary

watercourses running close to the Order Limits or along field lines, or localised topographic depressions/crop lines within fields.

5.8.4 The surface water flood risk shown increases marginally in extent when climate change is considered up to the year 2060 (see **Figure 9.5 (Sheets 1-19)** in **Appendix A**).

5.8.5 It should be noted that the EA's surface water maps are created using a generic methodology on a national scale, whereby rainfall is routed over a ground surface model. Smaller field ditches running through the centre of fields appear to have not been included in the LiDAR used in the modelling, leading to larger surface water extents across fields that would in reality be intercepted and conveyed by these ditches, as is considered to be the case for Sub-Site 8A and Sub-Site 2B.

5.8.6 The Solar PV Arrays and built development (inverters, Substation infrastructure and compounds) will be located at least 10m from watercourses (main river and ordinary watercourses/field ditches) to allow for maintenance access in accordance with EA and IDB requirements. This buffer also places Solar PV Arrays along boundaries predominantly outside of surface water flow route corridors associated with watercourses. This is secured within the **Design Principles, Parameters and Commitments [EN0110014/APP/7.18].**

5.8.7 The majority of the Solar PV Arrays are located within areas of 'very low' surface water flood risk. Where they are located within 'low' to 'high' surface water flood risk areas, there is considered to be negligible impact on floodplain storage as the panels are raised up on narrow pile driven posts.

5.8.8 Concrete footings may be used however these will be limited to areas that are archeologically sensitive. Their dimensions are typically 4m length x 0.3m width x 0.3 depth (area of 1.2m$^2$) and represent a negligible impermeable area compared to the extent of the Order Limits. The volume that they would take up based on the above dimensions is 0.36m$^3$ which is also negligible.

## 5.9 Summary

5.9.1 In summary, it is considered that the Order Limits has a very low to low risk of flooding from groundwater, reservoirs, and sewers.

5.9.2 The majority of the area within the Order Limits is also at very low risk of surface water and fluvial flooding. While there are localised areas of higher flood risk from these sources (including areas of Flood Zones 2 and 3) within the Order Limits, given the nature of the Scheme it is considered that the risk of flooding from these sources is **low**. The sequential approach has been applied for the Order Limits and the design of the Scheme (see **Section 7**).

# 6 Hydrological Connectivity

6.1.1 Natural England has raised concerns on the potential impacts of the Scheme on designated Sites located adjacent to or within the wider downstream vicinity of the Order Limits. As such, further assessment has been requested of hydrological connectivity between the Order Limits and the designated sites within the Study Area as defined in **ES: Chapter 9 Water Environment [EN0110014/APP/6.1.9]**.

6.1.2 The designated sites, consisting of Ancient Woodlands (AW), Local Nature Reserves (LNRs), Special Areas of Conservation (SAC) and Sites of Specific Scientific Interest (SSSIs) have been added onto **Figure 9.2** in **Appendix A** and an assessment has been made of their hydrological connectivity to the Order Limits based on the presence of watercourses running through/downstream of the Order Limits/adjacent to the designated sites, LiDAR topography and the direction of overland flow routes.

6.1.3 It is assumed that groundwater flow would follow a similar direction in topography/overland flow routes towards watercourses as shown on the arrows on the figure mentioned above. Based on the above criteria, the designated sites listed in **Table 6.1** are hydrologically linked to the Order Limits via watercourses and groundwater flow and therefore have potential to be impacted by the Scheme.

6.1.4 The potential impacts from the Scheme on these receptors are assessed in **ES: Chapter 9 Water Environment [EN0110014/APP/6.1.9]**. Further designated sites, including Ramsar, SACs that are located outside of the Study Area are either located topographically above the Order Limits or are located at such a distance such that it is considered that the Scheme will not have a significant impact on these receptors.

**Table 6.1: Designated Sites and Hydrological Connectivity to Site**

| Designated Site | Area(s) of Site with Hydrological Connectivity to Designated Sites |
|---|---|
| **Smockhill Common LNR** | Sub-Sites: 4A-4B, 5A-5B, 6 and 7A-7H<br>CRCs: 4, 6, 7, 8, 11 and 12 |
| **Saxlingham Grove AW** | Sub-Sites: 7E-7F<br>CRCs: 10 |
| **Fritton Common and Pulham Market SSSIs** | CRCs: 4 |
| **Shotesham Woodton Hornbeam Woods SSSI** | Sub-Sites: 7H |
| **Shotesham Common SSSI** | Sub-Sites: 8A-8B and 7I-7L<br>CRCs: 10, 13 |
| **Hedenham Wood SSSI** | Sub-Sites: 10B |
| **Tindall Wood Ditchingham SSSI** | CRCs: 10 |

| Designated Site | Area(s) of Site with Hydrological Connectivity to Designated Sites |
|---|---|
| **Popes Wood and Doylys Grove AW** | Sub-Sites: 7C |

# 7 Flood Vulnerability and Sequential Test

## 7.1 Flood Risk Vulnerability

7.1.1 The NPPF Appendix 3 confirms the 'flood risk vulnerability classification' of a site, which depends upon the proposed usage. This classification is subsequently applied to PPG 'Flood Risk and Coastal Change' Table 3 to determine whether:

- The site is suitable for the Flood Zone in which it is located; and,
- Whether an Exception Test is required for the site.

7.1.2 The majority of the Scheme is classed as 'Essential Infrastructure' (solar farms) under Appendix 3. The BESS has been classified as a 'Highly Vulnerable' use as advised by the LLFA in their PEIR response.

7.1.3 The majority of the Order Limits is located within Flood Zone 1 'Low Probability' with small/narrow areas of Flood Zones 2 and 3 associated with the Hempnall Beck within Sub-Sites 7B, within CRCs 4 and 6-8, and of the River Tas within Sub-Sites 8A and 8B.

7.1.4 Solar farms are appropriate in Flood Zone 1, and within Flood Zone 2 subject to the Sequential Test. The type of development is also Appropriate in Flood Zones 3a and 3b subject to the Sequential Test and provided the requirements of the Exception Test are met.

## 7.2 NPPF Sequential Test and Sequential Approach

7.2.1 The NPPF encourages the application of the 'sequential approach' in the masterplanning process for new development. This includes locating the more sensitive/vulnerable elements of new development in the areas which lie at lowest probability of flooding; and, conversely, reserving the areas of the Order Limits at greatest risk of flooding for the least vulnerable elements of the Scheme (or preferably, leave such areas undeveloped or as soft landscaping).

7.2.2 EN-1 in paragraphs 5.8.6, 5.8.7 and 5.8.9 state the following in relation to the Sequential Test and sequential approach to energy infrastructure:

> *'The aims of planning policy on development and flood risk are to ensure that flood risk from all sources of flooding is taken into account at all stages in 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.*

*Where new infrastructure is exceptionally necessary in flood risk areas, 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.*

*If, following the 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.'*

7.2.3 In addition, the NPPF PPG paragraph 027 states that:

*'where a site-specific flood risk assessment demonstrates clearly that the proposed layout, design and mitigation measures would ensure that occupiers and users would remain safe from current and future surface water flood risk for the lifetime of the development (therefore addressing the risks identified e.g. by Environment Agency flood risk mapping), without increasing flood risk elsewhere, then the sequential test need not be applied.'*

7.2.4 The design of the Scheme has sought to balance several constraints and environmental sensitivities. The location of National Grid Substation within Sub-Site 1B is due to the requirement to be in proximity to the existing 400kV overhead lines and has been re-located from the previously proposed Option 1 which was located close to areas of Flood Zones 2 and 3 of the Starston Brook.

7.2.5 The proposed locations of the National Grid Substation and the Project Substation in Sub-Site 1B, contain isolated areas of surface water flood risk; however, these represent crop lines/topographic lows within the existing fields, and this will be managed within the surface water drainage system for the Scheme (see **Section 9**).

7.2.6 Temporary compounds associated with the construction and decommissioning phases, Project Substations, the BESS and the majority of the Solar PV Arrays will be directed within areas of Flood Zone 1 'Low Probability' and in the areas of lowest surface water flood risk. The Scheme has been refined to remove all Solar PV Arrays and other infrastructure from the Flood Zone 2 and 3 within Sub-Site 8A (eastern and northern flow routes northern area associated with the River Tas).

7.2.7 Any encroachment into larger areas of higher surface water flood risk areas from these parts of the Scheme is limited to Solar PV Arrays, which are considered to be the least sensitive element of the infrastructure proposed within the Scheme, as the associated electrical equipment will be set with an appropriate freeboard above the surrounding ground and flood levels (see

**Section 8.1**). This will ensure that the electrical components associated with Solar PV Arrays remain safe and operational for the lifetime of the Scheme in accordance with EN-1 and the NPPF.

7.2.8 The **Works Plan [EN0110014/APP/2.3]** has been refined so that inverter units, the National Grid Substation and Project Substations are located outside of the main surface water flood risk areas as far as reasonably practicable. Isolated areas of surface water flood risk are present within the locations proposed for the BESS, the National Grid Substation and Project Substations, however this will be captured within the proposed surface water drainage systems for these elements of the Scheme (see **Section 9**).

7.2.9 The small/narrow areas identified as Flood Zone 2 and 3 within Sub-Sites 7B and 8A will be left as open landscaped buffers to watercourses/open land free from Arrays.

7.2.10 In addition to the application of the sequential approach and provision of embedded mitigation as outlined in **Section 8** to make the proposed Scheme safe for its lifetime in accordance with paragraph 027 of the PPG, the Sequential and Exception Tests have been undertaken for the Scheme. These are set out in Appendix A of the **Planning Statement [EN0110014/APP/7.14]**.

7.2.11 The embedded flood risk mitigation measures outlined in this report and secured within the **Design Principles, Parameters and Commitments [EN0110014/APP/7.18]** form Part (ii) of the Exception Test.

# 8 Embedded Flood Risk Mitigation

## 8.1 Scheme Design and Freeboard

8.1.1 The EA advised in their consultee response to the EIA Scoping Report that the Solar PV Arrays and associated electrical infrastructure should be set at a minimum of 300mm above the modelled 1 in 100 (1.0%) AEP plus allowance for climate change flood level (using the Higher Central allowance).

8.1.2 As mentioned in **Section 4**, the Higher Central allowance, in accordance with the EA 'Climate change allowances' guidance, is +20% - however the EA 2014 modelling utilises a +35% Higher Central allowance which provides a conservate proxy.

8.1.3 The LLFA in their PEIR consultee response advised that infrastructure floor levels should be set either as outlined above by the EA, or a minimum of 150mm above external ground level; whichever is higher.

8.1.4 This guidance has been applied as follows in the relevant parts of the Order Limits:

### Sub-Site 7B (Hempnall Beck):

- The maximum 1 in 100 AEP +35% allowance for climate change flood level is 24.22m AOD. The Solar PV Arrays and other above ground electrical infrastructure are situated on a minimum ground level of 28.90m AOD which provides a freeboard in excess of 4m above the reference flood level;
- When comparing the minimum ground levels to the maximum 1 in 1000 AEP +25% allowance for climate change level of 24.33m AOD, the freeboard provided is also in excess of the EA and LLFA requirements.

### Sub-Site 8A (River Tas):

- The maximum modelled 1 in 100 AEP +35% allowance for climate change flood level is 29.33m AOD. The Solar PV Arrays within Sub-Site 8A are set at a minimum ground level of 29.00-29.40m AOD and the inverter units (indicative locations) are set at a minimum ground level of 30.80m AOD;
- When comparing the minimum ground levels to the maximum 1 in 1000 AEP +25% allowance for climate change level of 29.34m AOD, freeboard provided is also provided in excess of the EA and LLFA requirements;
- The lowest edge of the Solar PV Arrays will be set at a minimum of 0.4m above ground level. For the northern part of Sub-Site 8A, the lowest edge of the Solar PV Arrays would therefore be set at a minimum of 29.40m

AOD in the west and 29.80m AOD in the east and will have a minimum freeboard of 600mm (west) to 470mm (east) above the modelled flood levels.

8.1.5 The above parameters are secured in the **Design Principles, Parameters and Commitments [EN0110014/APP/7.18]**.

8.1.6 The Solar PV Arrays have been located within areas of lowest surface water flood risk within the Order Limits as far as reasonably practicable and given wider constraints. Where Solar PV Arrays have been located within higher surface water flood risk areas within the Order Limits, the maximum depths of flooding are typically up to and including 300mm, up to and including the 1 in 1000 (0.1%) AP event ('low' risk scenario).

8.1.7 Where depths of flooding are anticipated to be greater than 300mm (notably within Sub-Sites 2B and 7E), the Solar PV Arrays would be raised higher to provide a greater freeboard above anticipated depths of flooding where practicable. Alternatively, the use of Single Axis Tracker panels will be considered.

8.1.8 The Solar PV Arrays will be raised above the ground on thin pile driven steel stilts/supports that have a typical cross-sectional area of 2.8mm$^2$ (0.003m$^2$). For the purposes of this assessment, it is estimated that 1,738 supports are located within the 'Low', 'Medium' and 'High' surface water flood risk areas. This produces an approximate total area of 4,700mm$^2$ or 4.70m$^2$ and therefore represent a negligible increase in impermeable area both within the areas of surface flood risk and the wider Order Limits.

8.1.9 Concrete footing supports may be utilised where there is a requirement to protect any underground assets/resources i.e. the steel supports will sit on top of the concrete footing rather than being pile driven into the ground. The locations of these footings are not known at this stage; however, their use will be limited and will be informed by detailed design and archaeological assessments. The indicative design of the supports is that they have typical dimensions of 4m length x 0.3m width x 0.3m depth, representing an area of 1.2m$^2$ and a volume of 0.4m$^3$ Their extents will therefore represent a negligible increase in impermeable area within the Order Limits.

8.1.10 Where internal access crosses areas of Flood Zones 2 and 3 and/or significant 'low' to 'high' risk surface water flow routes/flood risk areas, ground will be maintained at existing level to preserve floodplain storage and flow routes.

8.1.11 The above parameters are secured in the **Design Principles, Parameters and Commitments [EN0110014/APP/7.18]**.

8.1.12 The incorporation of a grassland/wildflower meadow across the Solar PV sites will manage the risk of runoff concentration/rill formation, provide greater soil stability, manage the risk of rutting beneath the Arrays and

improve soil quality through the cessation of agricultural chemical/fertiliser applications.

8.1.13 The inverters will be typically set on blocks 100-150mm or concrete plinth above the surrounding ground level. Other ancillary buildings will likely consist of temporary style modular buildings over a concrete pad that provides a 150mm freeboard above the surrounding ground level.

8.1.14 As such, the Scheme will have negligible impact on existing flow routes and floodplain storage (both fluvial and pluvial).

## 8.2 Watercourse Buffers

8.2.1 The Scheme has been designed to incorporate a minimum 10m buffer from watercourses (main rivers and ordinary watercourses/field ditches) that are in proximity to, or within the Order Limits, to allow for maintenance access and to locate infrastructure outside of areas of highest flood risk.

8.2.2 The only IDB watercourse in close proximity to the Order Limits that requires buffer considerations is the River Tas (Head to Tasburgh) located to the west of Sub-Site 4A. The IDB has advised a minimum buffer of 9m from IDB maintained watercourses, however a blanket approach has been taken to apply a 10m buffer to align with other requirements and similar Schemes.

8.2.3 Any works within 8m of ordinary watercourses/main rivers may require an Ordinary Watercourse Consent (OWC) from NCC or a Flood Risk Activity Permit (FRAP) from the EA. These consents will be secured for relevant works following DCO consent, as required.

## 8.3 Watercourse Crossings for Cables & Access

8.3.1 Access tracks will be required to facilitate vehicle movement around the Order Limits for construction, operation and maintenance, and decommissioning purposes.

8.3.2 Where practicable, existing field accesses will be utilised for access between field parcels and existing agricultural tracks will remain accessible for agricultural and habitat management activities over the operational lifetime of the Scheme. Therefore, the requirement for road/watercourse crossings will be limited.

8.3.3 There will also be vehicles transporting equipment along the CRC for the cable installation and for the launch and reception pits. Where practicable, these temporary internal haul routes will be designed to avoid impacts on watercourses. Where this is not practicable, temporary construction access ramps would be used for these crossings. This will take of the following forms, which are listed in order of least to most impact and are likely to be appropriate, respectively, for the most to least sensitive features:

- Temporary access construction ramps that do not interfere with the channel (banksides, bed or water column); or
- Temporary access construction ramps with in-stream supports or pre-cast structures with natural bed; or
- Temporary construction access ramps with closed culverts with artificial invert.

8.3.4 Where closed culverts are utilised, these will be designed with consideration of whether they will be temporary or permanent to ensure that they have sufficient capacity for flows both in present-day and considering climate change.

8.3.5 The type of crossing selected for the temporary construction access ramps will be determined at detailed design in consultation with the relevant local authority, which is secured through the **Outline CEMP [EN0110014/APP/7.1]**. These haul routes will be removed following installation of the cables and the land fully reinstated back to its original use.

8.3.6 There is a commitment to Avoidance Areas of certain environmental receptors, including watercourses (as specified in Table 2.1 of the Outline CEMP), whereby open cut trenches and launch and reception pits associated with trenchless techniques, such as HDD will be located outside of the Avoidance Areas to minimise impacts. Avoidance Areas are locations where trenchless technologies rather than open cut trenches will be used to avoid certain environmental receptors within the CRC. The Avoidance Areas are set out and secured in the **Outline CEMP [EN0110014/APP/7.1].** For all other lengths of ordinary watercourses, open trenching will be the likely method of cable installation, however ground levels will be restored to existing following installation. The works associated with cable installation in areas of flood risk will be carefully managed through the **Outline CEMP [EN0110014/APP/7.1]**.

8.3.7 Cables will not be fluid-filled or contain hydrocarbons to reduce the risk of leaching of pollutants to the surrounding hydrogeological environment.

8.3.8 The cables will be laid at a minimum of 5m below the bed of surveyed main rivers. The thermal dynamics of the cables are limited to their immediate proximity and will therefore have no significant effect on receptors.

# 9 Outline Surface Water Drainage Strategy

## 9.1 Overview

9.1.1 The following section provides preliminary information on the surface water management measures that will be implemented for all phases of the Scheme.

9.1.2 The surface water drainage arrangements are indicative at this stage and will be subject to further refinement at the detailed design. The drainage principles are secured through the **Design Principles, Parameters and Commitments [EN0110014/APP/7.18]** and **Outline OEMP [EN0110014/APP/7.2]**.

## 9.2 Planning Policy and Guidance

9.2.1 The outline surface water drainage strategy for the Order Limits has been prepared in accordance with the guidance outlined in the CIRIA 'The SuDS Manual' C753 (Ref 5), the DEFRA 'National standards for sustainable drainage systems' and the NCC 'LLFA Statutory Consultee for Planning Guidance Document' (Ref 9). The strategy will be developed further at the detailed design stage, which will be secured as part of the DCO.

9.2.2 The requirements of the NPPF are for the implementation of SuDS unless it is not practicable to do so.

9.2.3 Paragraph 5.8.15 of NPS EN-1 and paragraph 056 of the NPPF PPG states that surface water runoff disposal should firstly consider infiltration to ground, then discharge to a surface water body/watercourse, then discharge to a surface water sewer. Where none of the above are viable and as a last resort, discharge to a combined sewer may be considered.

9.2.4 The DEFRA 'National standards for sustainable drainage systems' and the NCC 'LLFA Statutory Consultee' guidance states that rainwater re-use should be considered before infiltration drainage. The drainage hierarchy is discussed further in **Section 9.4**.

## 9.3 Solar Farms and Surface Water Runoff Dynamics

9.3.1 The surface water drainage strategy has been developed based on the research report 'Hydrologic Response of Solar Farms' by Cook and McCuen (2013) (Ref 2), which is referenced within the NCC 'LLFA Statutory Consultee for Planning Guidance Document'. This provides robust evidence that extensive formalised drainage measures are not required to manage solar farm surface water runoff, provided that the land use and ground cover is effectively managed.

9.3.2 Well managed solar farms provide full year-round vegetated ground cover, which is more effective at slowing runoff and providing a source for infiltration than land which is subjected to intensive arable or livestock grazing uses.

9.3.3 Cook and McCuen found that – providing that full vegetation cover beneath the Solar PV Arrays is maintained – then the change in runoff characteristics from solar farms is likely to be insignificant and that ground cover has a much more important control over runoff.

9.3.4 The NCC 'LLFA Statutory Consultee for Planning Guidance Document'**Error! Bookmark not defined.** provides guidance for the implementation of drainage for solar farms under Standing Advice 4 as follows:

> *'Generally, with a solar farm proposal a portion of the Order Limits will comprise of proposed solar/photovoltaic (PV) panels and energy storage facilities, whilst the remainder of the Order Limits comprises of the existing grassed space between rows and field margins. The design of PV panels means that the area represented by the proposed panels is not considered impermeable, as the ground beneath the panels will be grassed as such remains permeable.*
>
> *The common setup means sites are usually considered 95% permeable, but associated infrastructure like battery storage units, solar stations, substations, internal roads should be considered as fully impermeable.*
>
> *It should also be noted however that panel arrays can sometimes be very long and also pitched together which needs to be assessed differently and may require a different drainage strategy. Also, some panel types have wide pad foundations which can affect overall PIMP (percentage impermeable proportion of a catchment or development contributing to runoff from the site).*
>
> *Rainfall will drain freely off the panels onto the ground beneath the panels where the surface remains permeable. Thus, the total surface area of the photovoltaic array is not considered to act as an impermeable area and the impact is assumed to be nil. However, the nature of the underlying groundcover and antecedent conditions can have a demonstrable influence on the surface water run-off characteristics of a site, i.e. if the ground cover beneath panels is proposed as bare earth which is susceptible to hardening in summer months, then peak discharges can increase significantly. As such, it should be ensured as part of any proposed scheme that grass or wildflower cover will be well-maintained across the site to ensure that such proposed schemes will not increase the surface water run-off rate, volume or time of peak compared to the pre-development situation. This will also help provide biodiversity net gain.'*

9.3.5 To provide the most appropriate surface treatment (and wider landscape management) consistent with that advised above, the ground beneath the Solar PV Arrays will be covered by grass and/or wildflower meadow which will be maintained to a suitable height using machinery such that the plants will slow the rate of contact between rainfall and the soil. The management of the grass cover is outlined in the **Outline LEMP [EN0110014/APP/7.4]**.

9.3.6 The grassland will not only grow between Solar PV Array gaps; it will also extend to all ground under the Solar PV Arrays. This means that, with the exclusion of nominal areas of access track, Substations and ancillary buildings, the majority of the Order Limits will be a fully vegetated grassland.

## 9.4 Drainage Hierarchy

9.4.1 As mentioned in **Section 9.2**, the DEFRA 'National Standards' and NCC 'LLFA Statutory Consultee' guidance set out a hierarchy of options for surface water disposal, which are discussed in turn in this section.

### Rainwater Re-use

9.4.2 The SuDS hierarchy outlined in the national and regional documents above stipulates that rainwater re-use should be the first point of consideration for surface water disposal.

9.4.3 Rainwater re-use may be feasible for the Scheme for non-potable uses and this will be considered further at the detailed design.

### Infiltration to Ground

9.4.4 The next preferred method of surface water disposal in accordance with the SuDS hierarchy is infiltration to ground. The DCO is of an outline nature, and locations of above ground electrical infrastructure, notably the inverters are subject to refinement post-consent. In addition, the land within the Order Limits remains operational for agricultural use. As such, infiltration testing will be undertaken post-consent to inform the detailed design once infrastructure locations are finalised.

9.4.5 As outlined in **Section 3.3**, the Order Limits is underlain by the Lowestoft Diamicton. Boreholes located typically 100-250m from the Order Limits show the Diamicton to be of significant thickness (minimum 10.0m) and to consist of blue/yellow or silty/sandy clay.

9.4.6 Given the uniform properties of the Diamicton across the area encompassing the Order Limits, it is considered that the information represents the geological conditions within the Order Limits for the purposes of this assessment.

9.4.7 The high clay content and depth of the Diamicton are such that is considered that in the absence of site-specific infiltration testing that the use of infiltration features are not appropriate at this stage.

9.4.8 Shallow features that utilise infiltration may be feasible for the inverters however this would be verified by ground investigations, including infiltration testing, which will be secured as a DCO Requirement to support the detailed surface water drainage design.

9.4.9 The majority of the Scheme consists of Solar PV Arrays which will be raised above the ground on narrow supports, thereby maintaining the existing permeability of the soil. Surface water runoff from the Arrays will drip onto and naturally percolate into the ground.

### Discharge to Surface Water Body

9.4.10 The LLFA has advised in their guidance that where infiltration testing has not been undertaken to confirm that infiltration drainage is suitable, a 'Plan B' showing an alternative method of disposal should be provided.

9.4.11 It is assumed that, based on the available geological information for the area surrounding the Site, the use of infiltration drainage is not feasible and the Substations within the Sub-Sites will have a piped outfall to a watercourse for the purposes of this assessment in accordance with LLFA requirements.

9.4.12 Due to the presence of Drinking Water Protection Zones and to manage the potential impact of contamination from surface water runoff it is proposed that the BESS, National Grid Substation and Project Substation drainage systems will be installed with an impermeable membrane to prevent interaction with the strata underneath (see **Sections 9.9** and **9.10**).

9.4.13 The BESS facility will incorporate additional measures to manage the risk of contamination in the event of a fire (see **Section 9.10**).

9.4.14 This drainage strategy will contain measures to manage surface water in ways that will align with distinct characteristics, including footprint and permeability of each component of the Scheme. This will shape the detailed design of surface water drainage solutions which will be secured by DCO Requirement.

9.4.15 No surface water connections to AWS sewers are proposed.

## 9.5 Design Approach

9.5.1 Notwithstanding the guidance in **Section 9.3**, the Scheme will include surface water mitigation to address specific areas of significant new impermeable surfacing, notably the BESS, National Grid Substatipm.and Project Substations, and access tracks.

9.5.2 The Scheme will incorporate a minimum 10m buffer from watercourses along with appropriate mitigation for each land use to mimic the existing greenfield runoff mechanism. On this basis, further attenuation measures are not proposed for the majority of the Order Limits.

9.5.3 Further detail on the drainage strategy for each component of the Scheme is discussed in the sections below:

- Solar PV Arrays (see **Section 9.6**);
- Access tracks (see **Section 9.7**);
- Inverter/Conversion units (see **Section 9.8**);
- BESS (see **Section 9.9**); and
- Substations (see **Section 9.10**).

## 9.6 Solar PV Arrays

9.6.1 The Solar PV Arrays will be installed in rows and mounted on slim, pile driven posts with limited numbers of concrete feet for tracker panels. The Solar PV Arrays will intercept some rainfall before it reaches the ground. The runoff from the Solar PV Panel will fall between the gaps of each panel, allowing the surface water to sheet off in multiple locations, thereby approximating the baseline conditions.

9.6.2 The intercepted rainfall will either run down the face of the Solar PV Panels and drip onto the ground below via the multiple gaps across the arrays or will be lost due to evaporation from the face of the Solar PV Panels. Typical solar panel sections are shown in **ES: Chapter 4 Scheme Description [EN0110014/APP/6.1.4]**.

9.6.3 Based on the above, the impact of these Solar PV Arrays is negligible with the only ground level impact being the pile-driven posts. These posts each have a typical effective ground level footprint of 2.7mm$^2$ (0.003m$^2$).

9.6.4 The provision of fully vegetated grassed/wildflower meadow beneath and in between the rows of Solar PV Arrays will maintain the current hydrological response of the Order Limits. As such, it will not interfere with existing runoff characteristics or infiltration rates in a way that might increase flood risk elsewhere. The proposed planting will reduce runoff, encourage interception, infiltration and evapotranspiration, and provide water quality treatment before surface water enters any watercourses within and surrounding the Order Limits. The proposed planting will also provide effective mitigation against soil erosion.

9.6.5 Further details on planting and landscaping management are provided in the **Outline LEMP [EN0110014/APP/7.4]** that is secured by DCO Requirement.

## 9.7 Access Tracks

9.7.1 Access tracks will be required to facilitate vehicle movement around the Order Limits for construction, operation and maintenance, and decommissioning purposes.

9.7.2 Where practicable, existing field accesses will be utilised for access between field parcels and existing agricultural tracks will remain accessible for agricultural and habitat management activities over the operational lifetime of the Scheme.

9.7.3 Access tracks will follow existing farm tracks, where possible, and will not represent new routes, although existing routes to be used would be upgraded as required and will be constructed to meet the same standards required for any new routes.

9.7.4 Access tracks are likely to constructed of hardcore or gravel over a levelling layer of substrate. This will be a permeable surface allowing percolation into the substrate and ground below. Where required, passive drainage features such as swales and filter drains will be incorporated parallel to or downhill of the tracks depending on topography.

9.7.5 The movement of vehicles within the Sub-Sites will be limited to lighter vehicles, where possible, with HGVs typically making deliveries to the Site temporary construction compounds and Sub-Site laydown areas. However, HGVs may utilise some access tracks as internal haul routes (notably within Sites 7 and 8) to minimise impacts on local road network traffic).

9.7.6 The temporary internal haul routes will be constructed of hardcore or gravel over a levelling layer of substrate. The majority will be constructed using a hardcore Ministry of Transport (MoT) Type 1 stone base. Where permissible, aluminium ‘trackway’ (or similar ground protection mats) will be used as an alternative to minimise ground disturbance. The internal haul routes will be removed and reinstated back to original use following the construction of the Sites.

9.7.7 It is also likely that HGVs delivering aggregate (typically 10m tipper) would be within the Order Limits as part of the access track construction. This will be limited and controlled with measures embedded into the design of the Scheme. Further information on internal haul routes, traffic movements and construction access is contained within an **Outline Construction Traffic Management Plan (CTMP) [EN0110014/APP/7.6]** which is secured by DCO Requirement.

9.7.8 During the Scheme’s operation and maintenance phase, vehicular movements are likely to be by small van or 4x4 type vehicle. Personnel will visit the Site infrequently to check apparatus and carry out monitoring, and maintenance/repairs to broken/faulty equipment.

9.7.9 There could also be an occasional ad-hoc visit by HGV for operations such as equipment replacement, particularly during the panel replacement phase. The permanent site access will be designed to accommodate HGVs allowing them to enter and exit in forward gear. As such, the impacts of the operational phase on traffic and access are expected to be minimal. This means there is low risk of over-use causing compaction, that could compromise permeability.

9.7.10 In summary, there is a low risk of traffic/vehicles causing excess soil compaction either in construction or during operation which could limit the efficacy of track permeability.

## 9.8 Inverter/Conversion Units

9.8.1 Conversion unit is a collective term used for the combination of electrical components including inverters, transformers and switchgear. These components may be housed or integrated within a container, or they may be housed in standalone cabinets.

9.8.2 The total number of inverters within the wider Order Limits is to be confirmed but will in any event represent a negligible increase in impermeable area. Further information on these components is provided in **ES: Chapter 4 The Scheme [EN0110014/APP/6.1.4]**.

9.8.3 Inverters/converter units will be set on a concrete foundation slab, strips or footings up to 1m greater than the maximum dimension of the relevant piece of equipment and a level layer of aggregate, or a concrete plinth set onto the topsoil where non-ground penetrative works are required.

9.8.4 Surface water runoff of Standalone Conversion Units and Integrated Conversion Units/33kV Sub-Distribution Switch Rooms will be managed via a filter drain around the perimeter or permeable aggregate surface with underlying sub-base, with appropriate overflow outlet, if required, should infiltration testing confirm that rates are too low to facilitate infiltration drainage as a stand-alone solution.

9.8.5 The nature of the superficial deposits over majority of the Order Limits are such that the rate of percolation into and through the soil is considered to be low. The utilisation of an aggregate sub-base or filter drain for the inverters will provide improvement over the existing conditions as it will have a greater porosity than the soil, allowing it to serve an attenuation function and hold more water over a given area and depth before runoff naturally percolates through the base.

## 9.9 Battery Energy Storage System (BESS)

9.9.1 The BESS and its compound are anticipated to be up to 6.5ha in area and will include battery units, DC/AC inverters and heating, ventilation and cooling systems.

9.9.2 The BESS will also have larger areas of hardstanding/roof areas, and there is a potential for pollution from firewater from this area. The proposed drainage features (including access tracks) be lined with an impermeable membrane, with a controlled discharge to the nearest watercourse/ditch.

9.9.3 The greenfield runoff rates in litres/second/hectare (l/s/ha) for the Order Limits have been calculated using the FEH2008 Method and are provided in **Table 9.1**. A copy of the calculations is provided in **Appendix D**.

**Table 9.1: Greenfield Runoff Rates**

| Return Period | Greenfield Runoff Rate (l/s/ha) |
|---|---|
| **1 in 1 year** | 2.9 |
| **$Q_{BAR}$** | 3.3 |
| **1 in 30 year** | 8.5 |
| **1 in 100 year** | 11.9 |

9.9.4 A Quick Storage Estimate has been undertaken within InfoDrainage based on indicative impermeable area for the BESS compound, a runoff coefficient (Cv) of 1 and a $Q_{BAR}$ allowable discharge rate of 3.3 l/s/ha.

9.9.5 The Quick Storage Estimate range calculated is **1,218-1,541m³/ha**. A copy of the calculations is provided in **Appendix D**.

9.9.6 The indicative impermeable/compound area for the BESS with indicative attenuation storage estimates and proposed discharge rates are shown in **Table 9.2**.

**Table 9.2: BESS Attenuation Indicative Requirements**

| Scheme Element | Indicative Impermeable Area (ha) | Allowable Discharge Rate (l/s) | Indicative Attenuation Volume Range (m3) |
|---|---|---|---|
| **BESS** | 6.5 | 21.5 | 7,917-10,017 |

9.9.7 The attenuation volume requirements outlined above have been refined in InfoDrainage through modelling permeable surfaces with aggregate sub-base (30% porosity) based on the indicative impermeable areas and allowable discharge rates. The extent of the proposed attenuation is shown on **Stantec drawing 333101678-300.03-002** in **Appendix D**. The flow from the sub-base has been controlled using a Hydrobrake.

9.9.8 The revised indicative attenuation volume (Maximum Resident Volume in InfoDrainage) is **8,982m³**.

9.9.9 A copy of the InfoDrainage schedule and results is provided in **Appendix D**. The form/depth of attenuation, impermeable areas and location of the BESS will be refined at the detailed design stage.

### Fire Suppressant Volume

9.9.10 Based on NFCC recommendations (Ref 17), a burn time of 4 hours and a requirement of 1,900l/minute of fire suppression water has been used to calculate the volume of fire suppressant water to be stored onsite in the event of a container fire. This equates to **456m$^3$** of storage which will be stored in 2 no. tanks either above or below ground.

9.9.11 The proposed aggregate sub-bases serving the BESS and Substation compounds are sized to accommodate the 1 in 100 AEP +45% allowance for climate change.

9.9.12 The InfoDrainage results show that the BESS, National Grid Substation and 400kV Substation sub-bases have additional volume available for the required firewater suppression volume.

9.9.13 Self-actuated/penstock valves linked to an automated system will be placed on the manhole downstream of the aggregate sub-base outlet and would be shut off in the event of a fire suppression event. This will isolate the system and prevent potentially contaminated water from discharging to watercourses and the hydrogeological environment.

9.9.14 The penstock would remain closed until testing of the captured water has taken place. Water will then likely be tankered from the Order Limits.

9.9.15 It is recommended that the BESS compound (and other Substations as appropriate) has a shallow bund to limit the potential for run-off to leave the aggregate areas.

9.9.16 Further detail on the management of firewater runoff and fire procedures, including maintenance and testing of the penstock valve systems is provided in the **Outline BSMP [EN0110014/APP/7.5]**.

## 9.10 Substations

### National Grid Substation

9.10.1 The National Grid Substation situated within Sub-Site 1B will have a maximum compound area of 6.0ha and contain switchgear equipment, a control building and car parking/access tracks.

9.10.2 Whilst it is anticipated that the pollution risk from the National Grid Substation is low, it is located over a Principal aquifer and within a Drinking Safeguard Zone, and as such, the system will be lined with an impermeable membrane to mitigate against residual risk of pollutant mobilisation into the

geology beneath, with a controlled discharge to the nearest watercourse/ditch.

9.10.3 The indicative attenuation volumes for the National Grid Substation derived from the Quick Storage Estimate (1,218-1,541m$^3$/ha) are provided in **Table 9.3**.

**Table 9.3: National Grid Substation Indicative Attenuation Requirements**

| Scheme Element | Indicative Impermeable Area (ha) | Allowable Discharge Rate (l/s) | Indicative Attenuation Volume Range (m3) |
|---|---|---|---|
| **National Grid Substation** | 6.0 | 19.8 | 7,308-9,246 |

9.10.4 These volumes have been refined in InfoDrainage through modelling permeable surfaces with aggregate sub-base (30% porosity) based on the indicative impermeable area and allowable discharge rates and produces a revised indicative attenuation volume (Maximum Resident Volume in InfoDrainage) is **8,256m$^3$**. The extent of attenuation provision is shown on **Stantec drawing 333101678-300.03-001** in **Appendix D**.

9.10.5 A copy of the InfoDrainage schedule and results is provided in **Appendix D**. The form/depth of attenuation, impermeable areas and location of the National Grid Substation will be refined at the detailed design stage.

## Project Substations

9.10.6 The 132kV Project Substations consist of electrical infrastructure such as switchgear, transformers and control equipment and will have compound areas of 0.5ha to 0.75ha.

9.10.7 One 400kV Project Substations is proposed to be located within the BESS Site (compound area 3.0ha) and another within Sub-Site 5A (compound area 3.5ha). These Project Substations will consist of electrical infrastructure such as switchgear, transformers and control equipment, office space/welfare facilities and operational monitoring/maintenance equipment. A third 400kV Project Substation is also shown in Sub-Site 1B (compound area 1.1ha).

9.10.8 Due to the nature of the internal equipment, these units are likely to require a full concrete pad for stability. However, it will not require a poured concrete foundation. These Project Substations will include a limited area of office space and welfare facilities, as well as operational maintenance and monitoring equipment.

9.10.9 Whilst it is anticipated that the pollution risk from the Project Substations is low, they are located over a Principal aquifer and some are located within a Drinking Safeguard Zone; as such, the proposed drainage system (permeable gravel surface with aggregate sub-base across compound area) will be lined with an impermeable membrane to mitigate against residual risk

of pollutant mobilisation into the geology beneath, with a controlled discharge to the nearest watercourse/ditch.

9.10.10 Due to the level of design information available at the time of writing, detailed modelling of the 132kV Project Substations and the 400kV Project Substation within Sub-Site 5A has not been undertaken within InfoDrainage for these areas but their surface water drainage arrangements will be similar to those outlined above for other Project Substations.

9.10.11 The indicative attenuation volume ranges for the 132kV Project Substations and 400kV Project Substation within Sub-Site 5A based on the Quick Storage Estimate (1,218-1,541m$^3$/ha) are set out in **Table 9.4**.

**Table 9.4: 132kV Project Substation & 400kV Project Substation within Sub-Site 5A Attenuation Requirements**

| Scheme Element | Indicative Impermeable Area (ha) | Allowable Discharge Rate (l/s) | Indicative Attenuation Volume Range (m3) |
|---|---|---|---|
| **132 kV** | 0.75 | 2.5 | 914-1,156 |
| **400kV Project Substation (Sub-Site 5A)** | 3.5 | 11.6 | 4,263-5,394 |

9.10.12 The attenuation requirements for the 400kV Project Substations in the BESS Site and Sub-Site 1B have been refined in InfoDrainage. The extents of the sub-base for these elements of the Scheme are assumed to cover the compound area as shown on **Stantec drawings 333101678-300.03-001 & 002** in **Appendix D**.

9.10.13 The revised indicative attenuation volumes (Maximum Resident Volume in InfoDrainage) are as follows:

- 400kV Project Substation in BESS Site – 4,188m$^3$
- 400kV Project Substation Sub-Site 1B– 1,511m$^3$

9.10.14 A copy of the InfoDrainage schedule and results is provided in **Appendix D**.

9.10.15 The form/depth of attenuation, impermeable areas, and locations of the Project Substations will be refined at the detailed design stage.

9.10.16 It is acknowledged that there are areas of localised surface water flood risk in/around the National Grid Substation and 400kV Project Substation in Sub-Site 1B. An appropriate solution will be considered at the detailed design stage for the conveyance of surface water exceedance flows from the fields upstream of these areas.

## 9.11 Pollution Control

9.11.1 During the operation and maintenance phase of the Scheme, the proposed access roads (infrequent vehicle movements for maintenance/infrastructure replacement), standalone inverter/converter/cabin roofs and Solar PV Arrays are considered to have a low pollution risk.

9.11.2 The incorporation of permeable surfaces and/or a gravel filter drain around converter/inverter units within the wider Order Limits and any standalone ancillary building perimeters will provide adequate treatment as shown by the application of the Simple Index Approach within the CIRIA 'The SuDS Manual C753' and set out in **Table 9.5** and **Table 9.6**.

**Table 9.5: Pollution Hazard Indices (Table 26.2 of CIRIA SuDS Manual)**

| Land Use | Destination of Runoff | Pollution Hazard Level | Total Suspended Solids | Metals | Hydrocarbons |
|---|---|---|---|---|---|
| **Other Roof type (e.g. commercial)** | To Ground or Watercourse | Very Low | 0.3 | 0.3 | 0.05 |
| **Commercial yards/delivery areas** | Watercourse | Medium | 0.7 | 0.6 | 0.7 |

**Table 9.6: SuDS Mitigation Indices (Extract of Table 26.3 of CIRIA SuDS Manual)**

| Mitigation Indices | | | | |
|---|---|---|---|---|
| **Runoff Source** | **Type of SuDS Component** | **Total Suspended Solids (TSS)** | **Metals** | **Hydrocarbons** |
| **Roof and commercial yard/delivery areas** | Permeable Pavement | 0.7 | 0.6 | 0.7 |

9.11.3 The BESS, National Grid Substation, and Project Substations will require additional mitigation due to the risk of fire from batteries/transformers and mobilisation of contaminants in firewater which would impact watercourses, groundwater bodies/aquifers and private water supplies.

9.11.4 The BESS may be split into 'compartments' of battery units, each with their own associated lined aggregate sub-base area and separated by lengths of access track. This would aid in the isolating and testing of surface water runoff, and remediation of affected areas following a fire incident.

9.11.5 Fuel and other potentially polluting chemicals will either be in self-bunded leak proof containers or stored in a secure impermeable and bunded area (minimum capacity of 110% of the capacity of the containers), If pollution is detected it will be suctioned to a self-bunded (or similar) tank and removed from site for suitable disposal.

9.11.6 All smaller fixed infrastructure (e.g. transformers) will be self-bunded to prevent any leaks from reaching the watercourse. If pollution is detected it will be suctioned to a self-bunded (or similar) tank and removed from site for suitable disposal.

9.11.7 Oil drip trays (for maintenance/replacement activities) would be visually inspected and any polluting materials suctioned out and stored in a bunded tank, then once full, removed from the Order Limits for disposal

9.11.8 The proposed surface water drainage system for the BESS will have an auto-shut-off valve that activates in the event of the fire alarms sounding to isolate the system from on and off-site receptors. Fire water will be tankered from the Order Limits, if required, should there be a fire incident. Further information is provided within the **Outline BSMP [EN0110014/APP/7.5]** which is submitted as part of the DCO application.

9.11.9 Concerns have been raised from parish councils in the EIA Scoping Opinion with respect to the potential contamination of land and local water supplies from Per- and Polyfluoroalkyl Substances (PFAS). All Solar PV Panels will be certified as 'PFAS Free', meaning there is no risk of mobilisation of PFAS coatings on the panels being leached or otherwise mobilised and entering ground or surface water. There is no legal constraint on using these materials where there is no reasonable alternative. IGP will adopt a proactive position and will use the available products/technology that minimises impact to the environment at the time of construction.

9.11.10 Mitigation measures in relation to surface water pollution management for the Operational and Maintenance Phase will be contained within and secured by the **Outline OEMP [EN0110014/APP/7.2]**.

9.11.11 The cables will have standard cross-linked polyethylene (XLPE) insulation which is typically not a fluorinated polymer (unlike PTFE or FEP), so pure XLPE insulation generally does not inherently contain PFAS. However, associated components or manufacturing steps might involve PFAS, for which their use will be avoided if there is a reasonable alternative.

## 9.12 Construction & Decommissioning Mitigation

9.12.1 Construction activities have the potential to alter the pattern of surface water runoff within the Order Limits, through the presence of above ground obstructions such as construction materials/compounds and through compaction of ground resulting from vehicular activity.

9.12.2 Temporary construction compounds will be required for the Order Limits, and the grid connection works along the CRC. These will include parking areas, temporary portacabins, secure compound for storage, temporary hardstanding and wheel washing facilities. The locations of the temporary construction compounds are shown on **ES: Figure 4.2 Indicative Temporary Construction Compound Locations [EN0110014/APP/6.2.4.2]**.

9.12.3 Mitigation for the possible mobilisation of contaminants from surface water runoff generated by the Construction and Decommissioning Phases of the Scheme to watercourses and groundwater is set out and secured in the following documents:

- **Outline CEMP [EN0110014/APP/7.1]** (for the construction phase);
- **Outline CTMP [EN0110014/APP/7.6]** (for both phases); and
- **Outline DEMP [EN0110014/APP/7.3]** (for the decommissioning phase).

9.12.4 Measures to be included within these management plans consist of the following:

- Limitation of heavy goods vehicles (HGV) movements to compound areas as far as practicable. Several internal haul routes for construction vehicles are proposed to connect Site 7 and Site 8.
- No temporary construction compounds and stockpiles would be located within Flood Zones 2 and 3.
- The storage and handling of materials will be undertaken in temporary compounds/designated areas, away from main rivers and watercourses.
- Management of runoff and pollution in temporary construction compounds through the use of bunding, silt traps, oil drip trays and filter drains.
- All chemicals will be stored in a secure impermeable and bunded area and accordance with the Control of Substances Hazardous to Health (COSHH) guidelines. Spillage kits will be held, and personnel will be trained in their use.
- Oil drip trays will be utilised and be inspected. Any polluting materials suctioned out and stored in a bunded tank will be removed for disposal.
- All reasonably practicable measures will be taken to prevent the deposition of sediment or other material in, and the pollution by sediment of, any watercourse, arising from construction activities. These measures will include soil bunds/silt traps where ground differences.
- There is a commitment to Avoidance Areas of certain environmental receptors, including watercourses (as specified in Table 2.1 of the Outline CEMP), whereby open cut trenches and launch and reception pits associated with trenchless techniques, such as HDD will be located outside of the Avoidance Areas to minimise impacts. Avoidance Areas are locations where trenchless technologies rather than open cut trenches will be used to avoid certain environmental receptors within the CRC. The Avoidance Areas are set out and secured in the **outline CEMP [EN0110014/APP/7.1]**.

- Use of temporary access ramps for internal haul route vehicular crossing points over watercourses. Following installation haul routes will be removed and the ground reinstated to original condition as secured within the **Outline CTMP [EN0110014/APP/7.6]**.

- The management of the cable works in areas of flood risk areas will be managed through measures outlined in the **Outline CEMP [EN0110014/APP/7.1]** so as not to impact on floodplain storage or increase flood risk at the Order Limits or elsewhere;

- The cables will be laid at a minimum of 5m below the surveyed bed of main rivers. The thermal dynamics of the cables are limited to their immediate proximity and therefore will not significantly affect the thermal dynamics in the watercourses and their associated receptors.

- Foul water from welfare facilities during the construction and decommissioning phases will be contained within sealed systems and tankered from the Order Limits.

- Water neutrality options have been given priority to reduce the supply requirements. These options include rainwater harvesting, on-site water storage, and water tankering (to meet peak demand). Tankering is the preferred method of embedded mitigation.

## 9.13 Adoption and Maintenance

### Landscape Management

9.13.1 The Order Limits will be unmanned with a limited number of visits for maintenance/replacement activities as set out in the **Outline OEMP [EN0110014/APP/7.2]**. During the operational (and maintenance) phase, ad-hoc replacement of defective Solar PV Panels will occur due to routine wear and tear or unforeseen damage. These replacements will be carried out on a small scale typically by using light servicing vehicles (e.g., 4x4 or Panel Vans).

9.13.2 Grass cover would be inspected and maintained throughout the Operational Phase. It is recommended that, during maintenance, any patchy grass or bare ground is re-seeded. Grass/plant height will be controlled by machinery during the operational phase. The future management of the Scheme will be carried out in accordance with and secured by the **Outline LEMP [EN0110014/APP/7.4]**, which is submitted with the DCO application. This will secure the successful long-term establishment of the mitigation proposals. The detailed design will be submitted within the final LEMP prior to construction, which will be secured via a DCO Requirement.

### Drainage System Maintenance

9.13.3 Preliminary surface water drainage system maintenance activities and frequency is outlined in Appendix A of the **Outline OEMP [EN0110014/APP/7.2]**.

9.13.4 Following finalisation of the detailed drainage design, a maintenance schedule for all drainage infrastructure for the Scheme will be agreed with the LLFA prior to the construction phase commencing and secured in the **Outline OEMP [EN0110014/APP/7.2]**. The maintenance schedule will include the regular testing of the auto shut-off valve/penstock to ensure that this does not seize up and remains functional.

## 9.14 Wastewater Disposal

9.14.1 Wastewater from welfare facilities associated with all phases of the Scheme will be contained in a sealed system associated with these facilities and tankered from the Order Limits. No connections to AWS sewers are proposed.

# 10 Conclusions

10.1.1 This 'Flood Risk Assessment and Outline Surface Water Drainage Strategy' (FRA and DS) report has been prepared on behalf of East Pye Solar Limited (the Applicant) to accompany a Development Consent Order (DCO) application for a solar photovoltaic (PV) electricity generating station and associated development.

## Flood Risk

10.1.2 The majority of the Order Limits is located within Flood Zone 1 'Low Probability' and has a low risk of fluvial flooding. Small/narrow areas of Sub-Sites 7B, 8A, 8B and CRCs 4, 6, 7 and 8 are located within Flood Zones 2 'Medium Probability' and 3 'High Probability' which are associated with the floodplains of the Hempnall Beck and the River Tas.

10.1.3 The majority of the Order Limits has a 'very low' surface water flood risk. However, flow routes exist that represent 'low' to 'high' surface water flood risk. These are mostly associated with ordinary watercourses located within or along Sub-Site boundaries, or topographic low points within Sub-Sites.

10.1.4 The flood risk within the Order Limits is considered to be low from reservoir, groundwater and sewers.

## Sequential Test and Vulnerability

10.1.5 The proposed use of the Scheme is classified as 'Essential Infrastructure' as defined in the PPG 'Flood Risk and Coastal Change' in Appendix 3.

10.1.6 The majority of the Order Limits is located within Flood Zone 1 and has a 'very low' surface water flood risk and low risk of flooding from other sources. Areas adjacent to watercourses are located within Flood Zones 2 and 3 however all above ground electrical infrastructure will be located outside of these areas.

10.1.7 A sequential approach to the Scheme has been taken as far as reasonably practicable given wider constraints within the Order Limits. The most sensitive above ground electrical infrastructure such as the BESS, Substations and inverters have been located within Flood Zone 1, and outside of areas of higher surface water flood risk as far as reasonably practicable. Localised areas of surface water flood risk may be present across the BESS and Substation areas however this will be managed within the proposed surface water drainage systems for these elements of the Scheme.

10.1.8 Solar PV Arrays are located within Flood Zone 1 and in areas of 'very low' surface water flood risk as far as practicable, but some Arrays extend into areas of higher surface water flood risk. However, the Arrays are raised above the ground on thin stilts/supports (or in limited areas concrete footings

where sensitive archaeology has been identified) and will therefore not impede flow routes/floodplain storage and are designed to remain operational in times of flood.

10.1.9 The raised design of the Arrays also means that they represent a negligible increase in impermeable area as the natural ground cover is retained beneath.

10.1.10 In addition to the application of the sequential approach and provision of embedded mitigation as outlined in **Section 8** to make the proposed Scheme safe for its lifetime in accordance with paragraph 027 of the PPG, the Sequential and Exception Tests have been undertaken for the Scheme. These are set out in Appendix A of the **Planning Statement [EN0110014/APP/7.14]**. The embedded flood risk mitigation measures outlined in this report and secured within the **Design Principles, Parameters and Commitments [EN0110014/APP/7.18]** form Part (ii) of the Exception Test.

## Mitigation Strategy

10.1.11 The National Grid Substation, Project Substations and Battery Energy Storage System (BESS) infrastructure are located within Flood Zone 1 and outside of significant areas of surface water flood risk/flow routes. Localised areas of surface water flood risk are present however these will be captured within the proposed surface water drainage systems for these elements of the Scheme.

10.1.12 All above ground electrical infrastructure will be located within Flood Zone 1. Inverters and Solar PV Arrays will be located outside areas of surface water flood risk as far as possible.

10.1.13 Works within the CRC will not significantly affect ground levels within flood risk areas. The requirement for new access road crossings over watercourses will be minimised through the utilisation of existing access tracks/Sub-Site vehicular entry points, where possible.

10.1.14 The Solar PV Arrays will be raised on thin stilts/supports above the ground (or in some cases concrete feet, where sensitive archaeology has been identified) and therefore represent a negligible increase in impermeable area in comparison to the area of the Order Limits. The incorporation of a grass cover across the Solar PV Arrays will manage the risk of runoff concentration/rill formation, provide greater soil stability and improve soil quality through the cessation of agricultural chemical/fertiliser applications. The management of the grass cover is outlined in the **Outline LEMP [EN0110014/APP/7.4]**.

10.1.15 Sensitive water receptors (private drinking water supplies) and designated sites (SACs and SSSIs) are located within the Study Area and are identified in **ES: Chapter 9 Water Environment [EN0110014/APP/6.1.9]**. They have the potential to be impacted by the Scheme through the mobilisation of

contaminants to surface water and groundwater receptors without appropriate mitigation during all phases of the Scheme. The impacts of the Scheme on these receptors have been assessed as Not Significant within the chapter.

10.1.16 A concept surface water drainage strategy has been provided for the BESS, National Grid and 400kV Project Substations 1 and 3 (Sub-Site 1B). The locations of the 400kV 2 and the 132kV Project Substations are shown on the **Works Plans [EN0110014/APP/2.3]** and will follow the same surface water drainage approach to that of the Project Substations and National Grid Substation north and south of the BESS. The proposed surface water drainage systems incorporate a permeable aggregate surface with underlying sub-base lined with an impermeable membrane, with a controlled discharge at $Q_{BAR}$ to the nearest watercourse.

10.1.17 The drainage system for the BESS has been designed to contain runoff from fire water in the unlikely event of a fire, which will be tested and if required tankered off-Site. Further details are provided in the **Outline BSMP [EN0110014/APP/7.5]** and secured by DCO Requirement.

10.1.18 Inverter units are small in area and are considered to be a low pollution risk and will incorporate an aggregate permeable surface with sub-base or gravel filter drains around their perimeters. These features will locally improve the attenuation storage capacity as they have a higher porosity than that of the local soils. The sub-base or filter drain will have an appropriate overflow outlet should infiltration testing demonstrate poor rates.

10.1.19 New and upgraded access tracks will have a permeable surface with additional drainage features such as shallow ditches and filter drains incorporated parallel to or downstream of the tracks.

10.1.20 The potential for impacts from the mobilisation of contaminated sediment and surface water runoff arising from the construction and decommissioning phases will be managed through the incorporation of measures outlined in and secured through the following documents:

- **Outline CEMP;** and
- **Outline DEMP [EN0110014/APP/7.3]**.

10.1.21 In conclusion, this report concludes that the Scheme complies with national and local planning policy with respect to flood risk and is an appropriate development at this location.

# References

Ref 1 Contains Ordnance Survey data © Crown copyright and database right [2025] and also contains Environment Agency information © Environment Agency and database right

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Ref 13 The Construction (Design and Management) Regulations 2015. Available at: Construction - Construction Design and Management Regulations 2015 (hse.gov.uk). Accessed March 2025

Ref 14 Various (2024) Greater Norwich Local Plan, available at: https://www.gnlp.org.uk/local-plan-examination-local-plan-examination-document-library/j-inspectors-report-and-adoption

Ref 15 South Norfolk and Broadland District Council (2015) Development Management Policies Document

Ref 16 Environment Agency online Flood Maps, Available at: https://flood-Map-for-planning.service.gov.uk/ Accessed March 2025

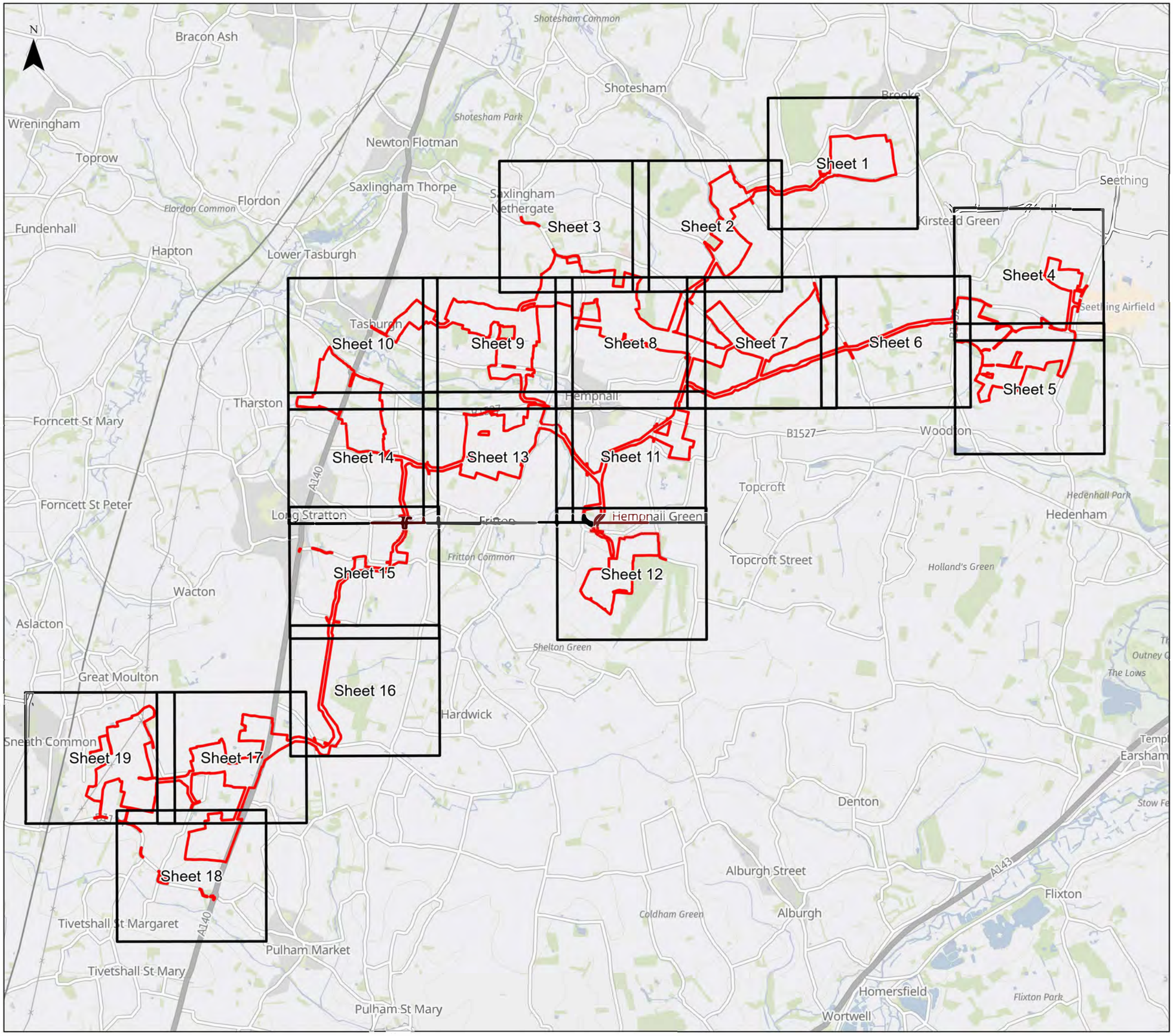
Ref 17 National Fire Chiefs Council (2025) https://nfcc.org.uk/our-services/national-operational-guidance/guidance/

Ref 18 Ministry of Housing, Communities and Local Government (2024) National Planning Policy Framework. <https://www.gov.uk/government/publications/national-planning-policy-framework--2 >

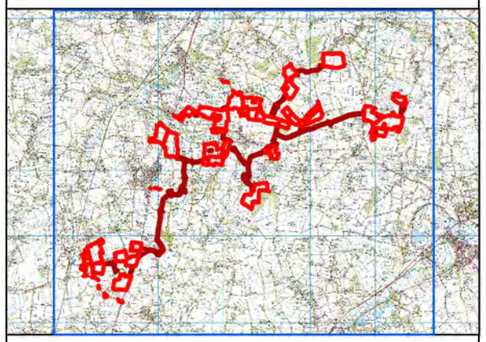
Ref 19 Department for Levelling Up, Housing and Communities (2025) National Planning Policy Framework Planning Practice Guidance Flood Risk and Coastal Change. < https://www.gov.uk/guidance/flood-risk-and-coastal-change. >

# Appendix A EA Opendata Maps

- Figure 9.1 (Sheets 1-19) Site Location
- Figure 9.2 (Sheets 1-19) Topography & Overland Flow Routes
- Figure 9.3 (Sheets 1-19) Flood Zone for Planning
- Figure 9.4 (Sheets 1-19) Risk from Surface Water Map
- Figure 9.5 (Sheets 1-19) Risk from Surface Water Map (Climate Change)
- Figure 9.6 Risk of Flooding from Reservoirs Map
- Figure 9.7 EA Groundwater Source Protection Zones
- Figure 9.8 EA Historic Flood Map




Island GREEN POWER



**Legend**

- Order Limits
- Sheet Index

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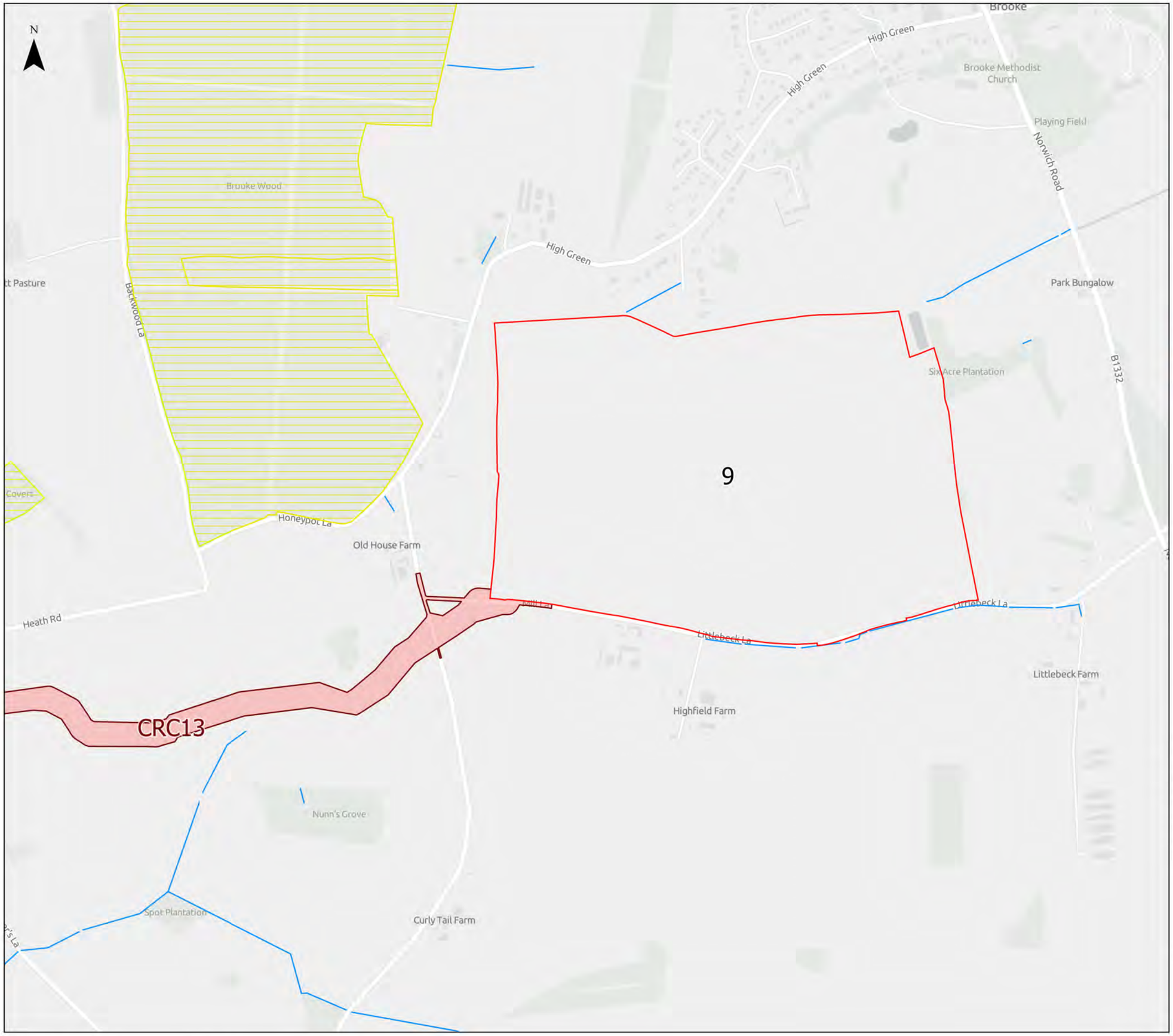
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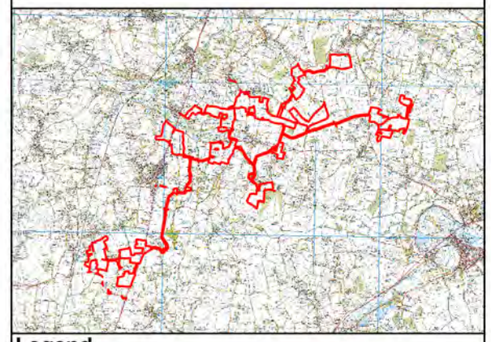
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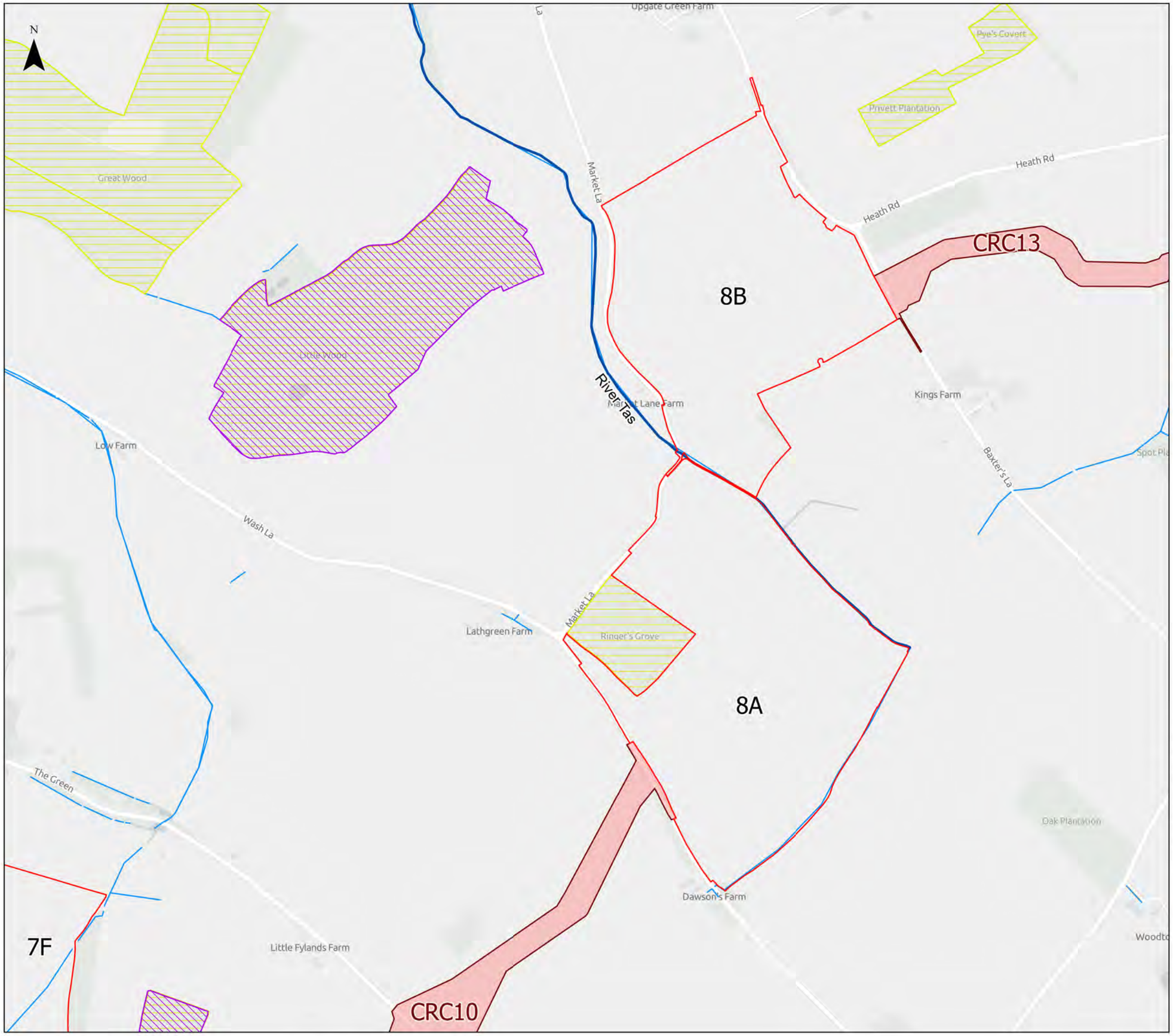
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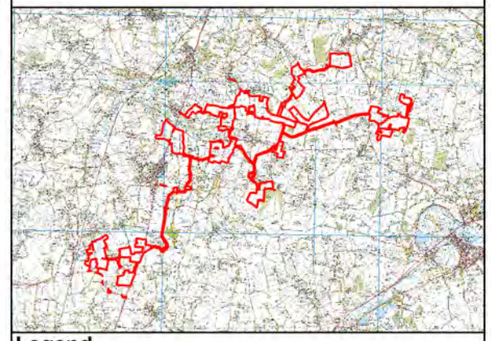
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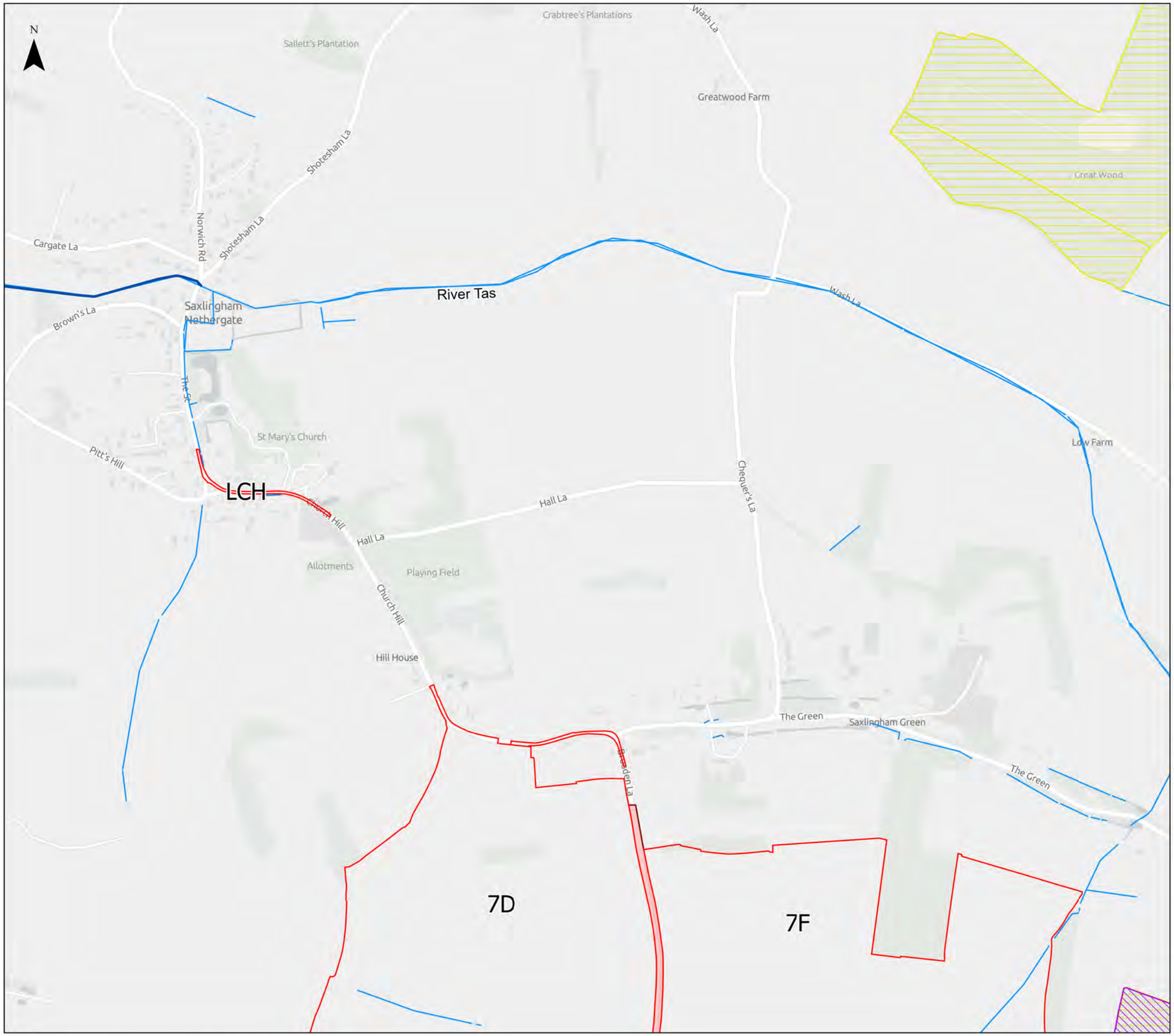
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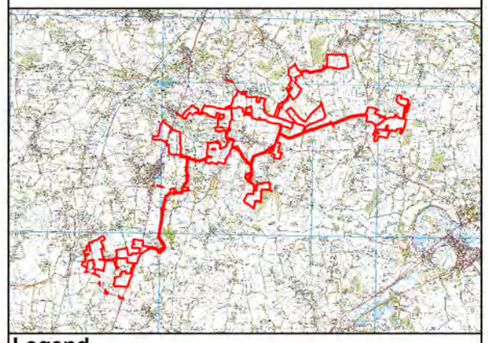
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**Figure 9.1 - Site Location and Watercourses**

Sheet 3 of 19
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Norwich Rd

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Upgate Rd

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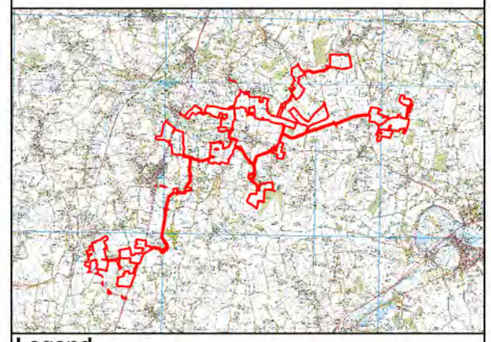
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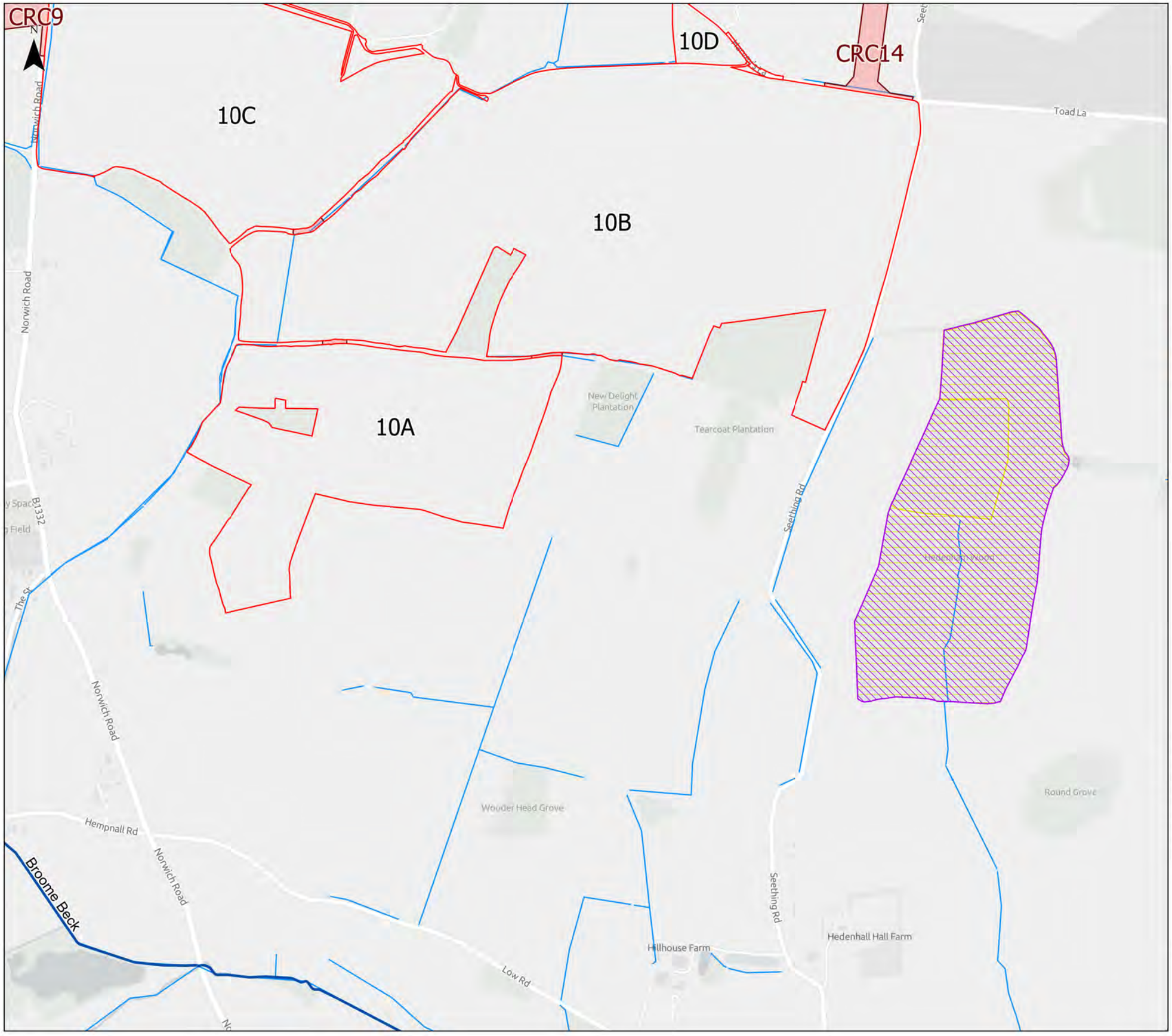
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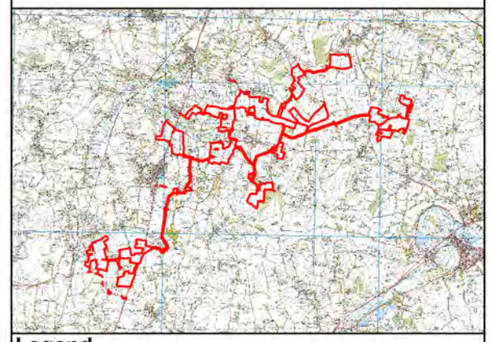
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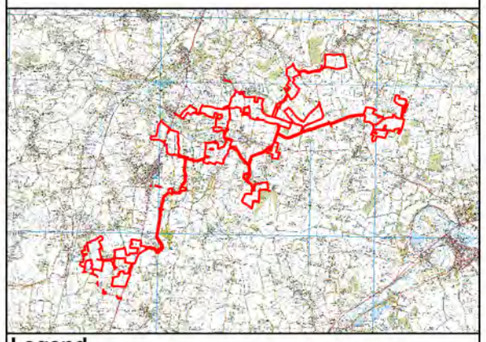
**Figure 9.1 - Site Location and Watercourses**

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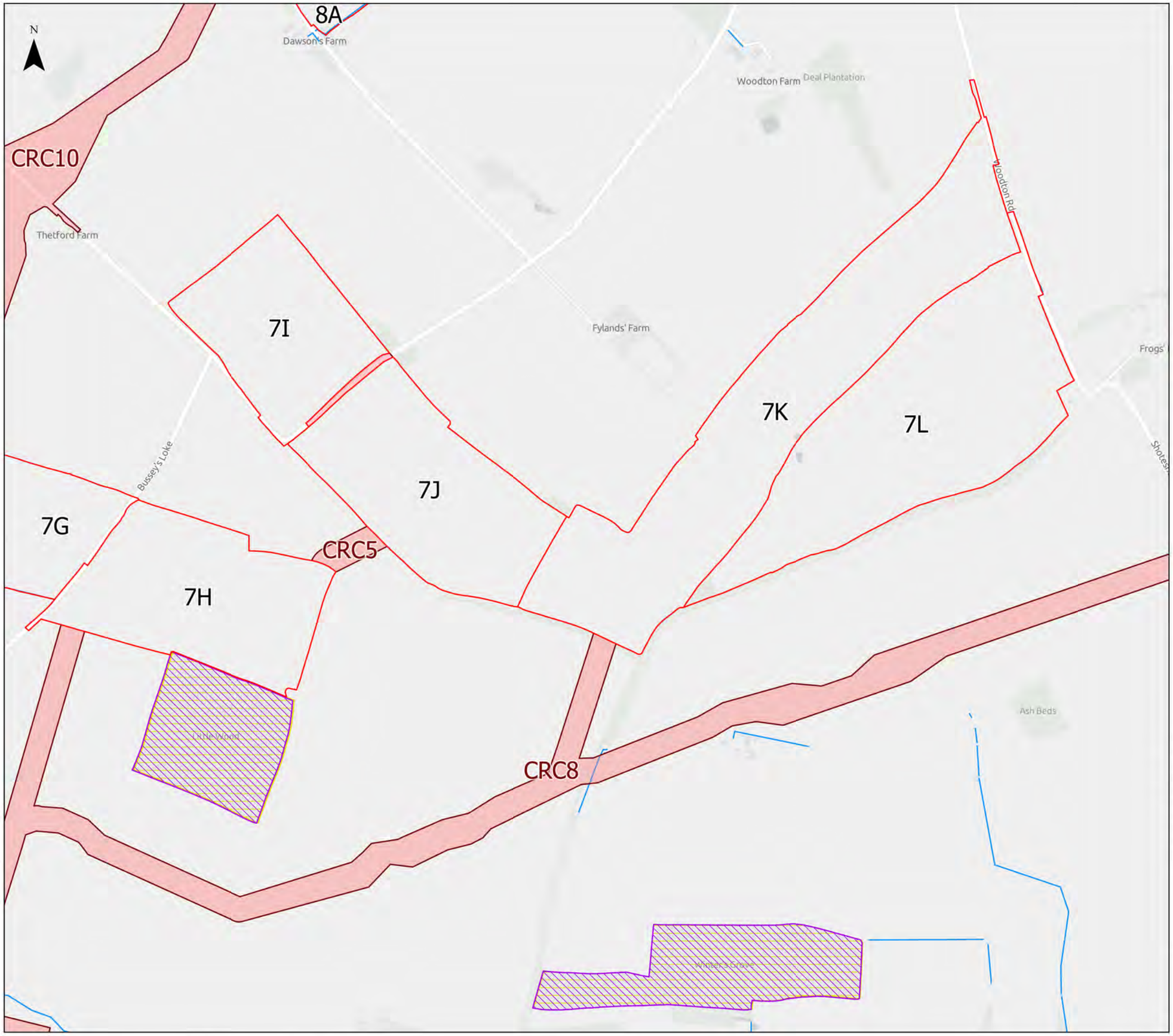
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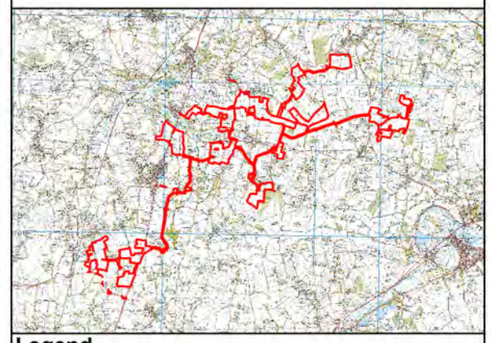
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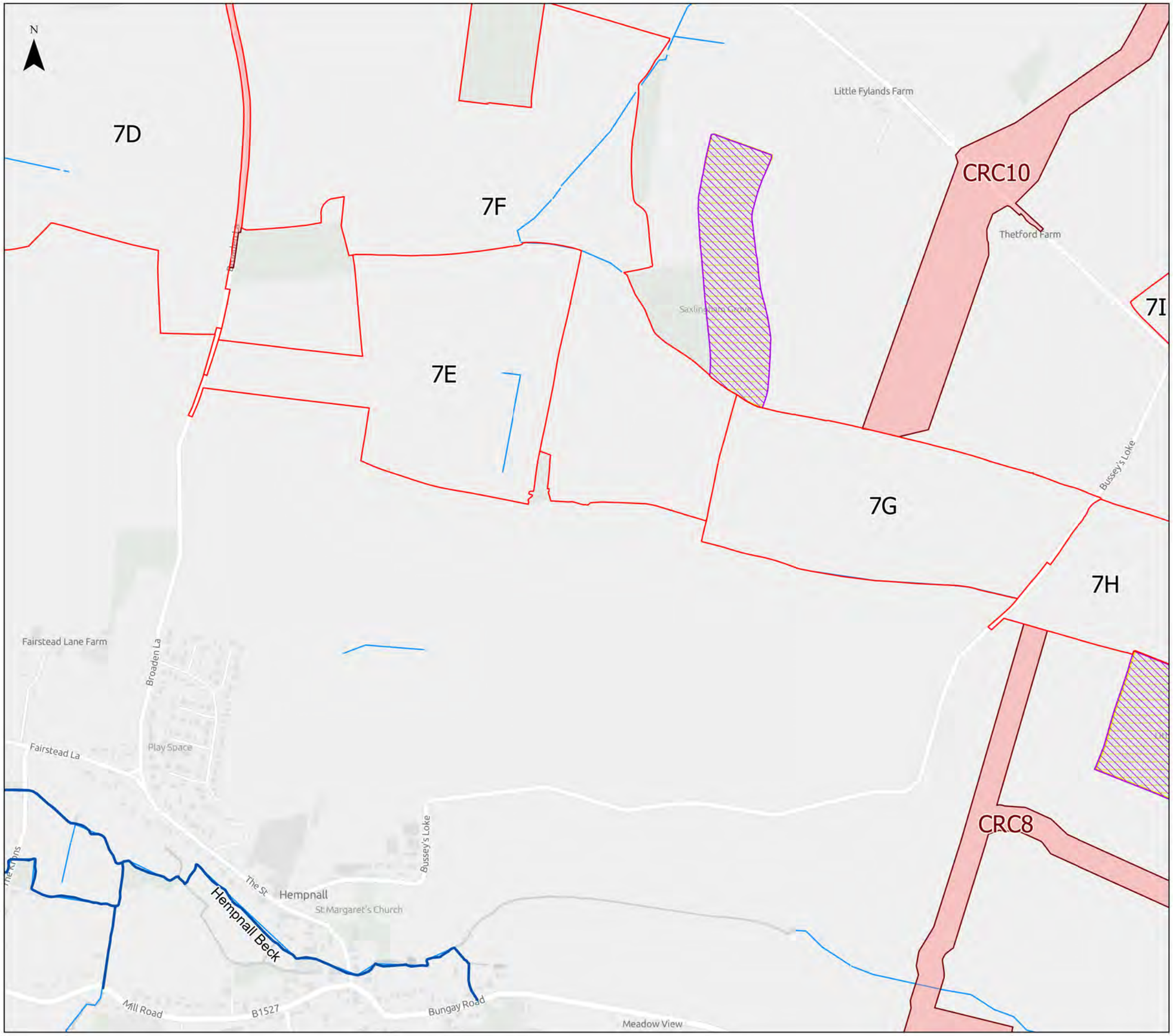
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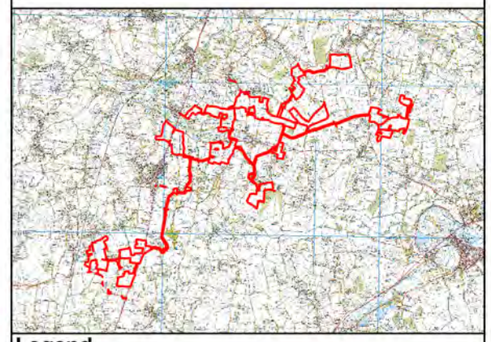
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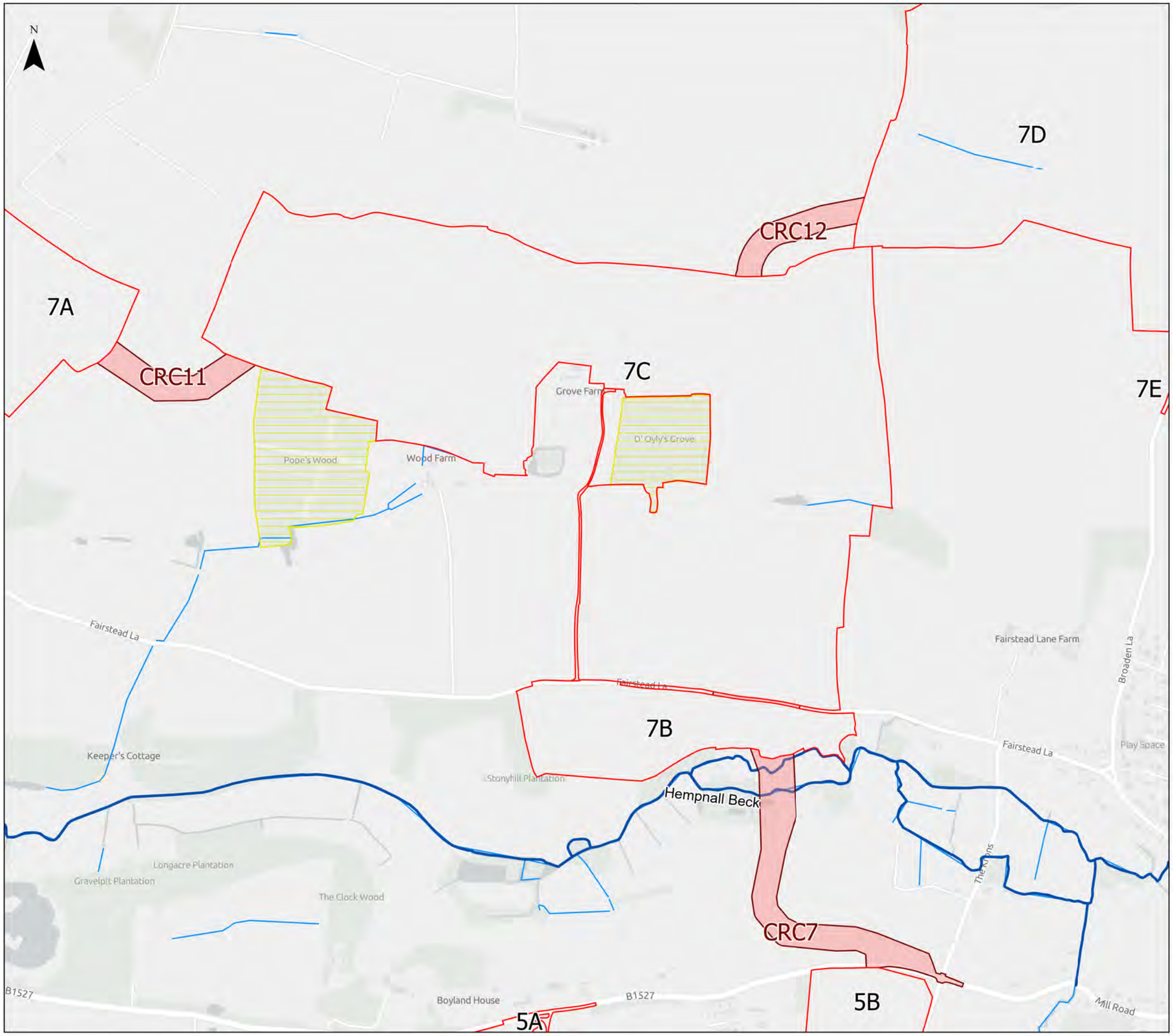
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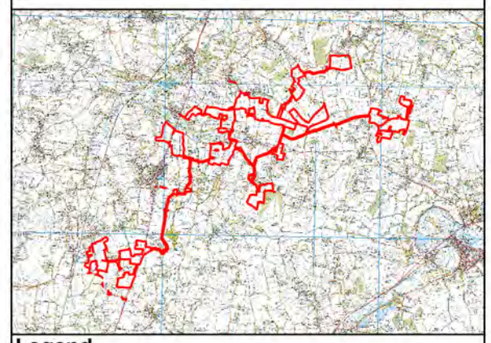
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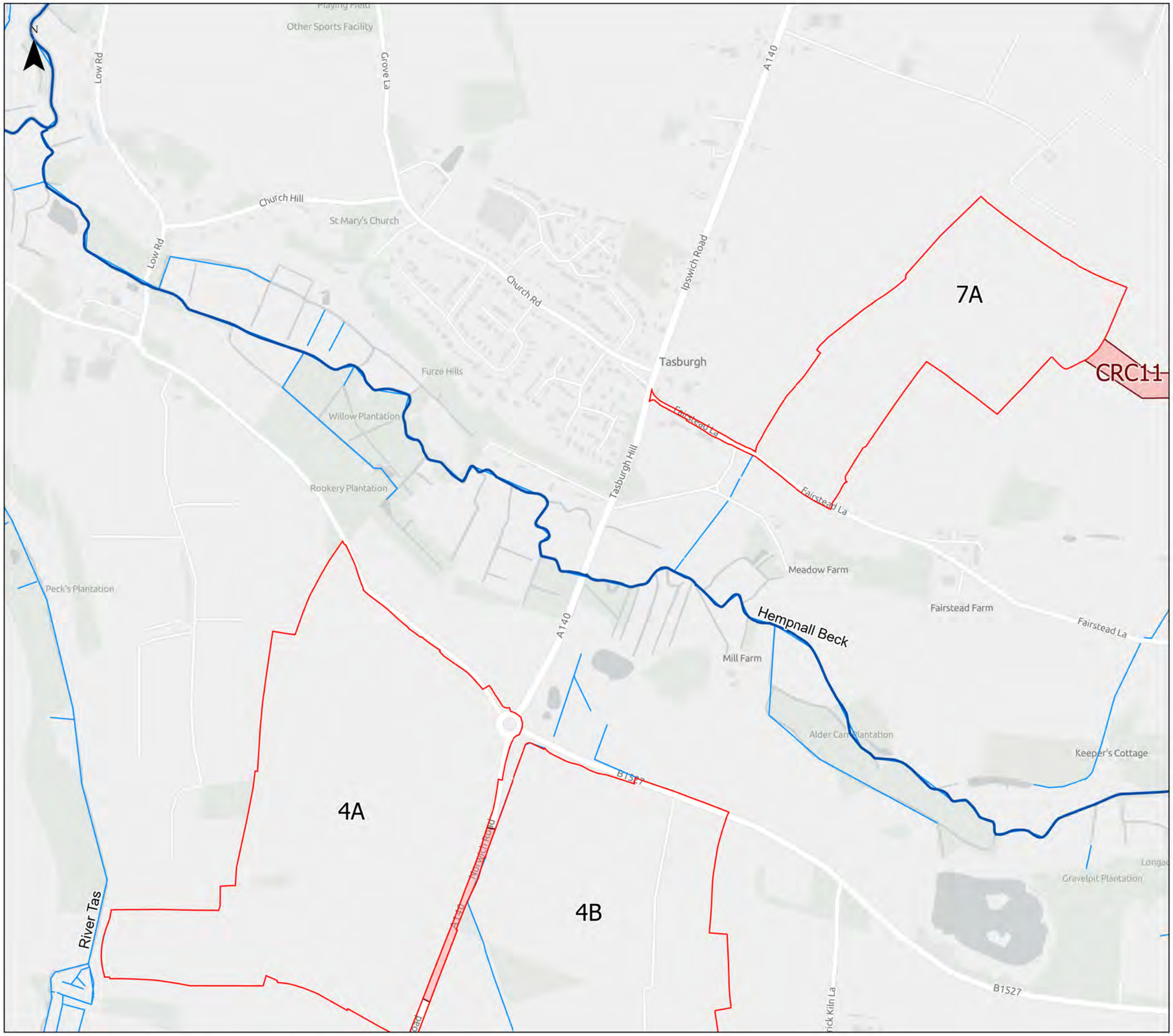
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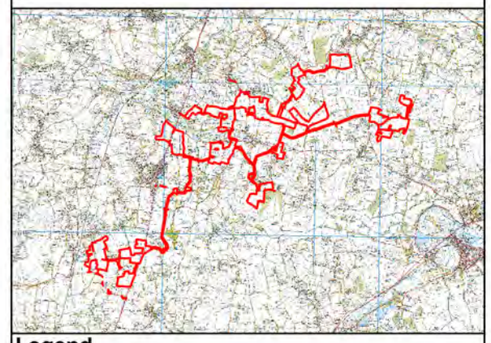
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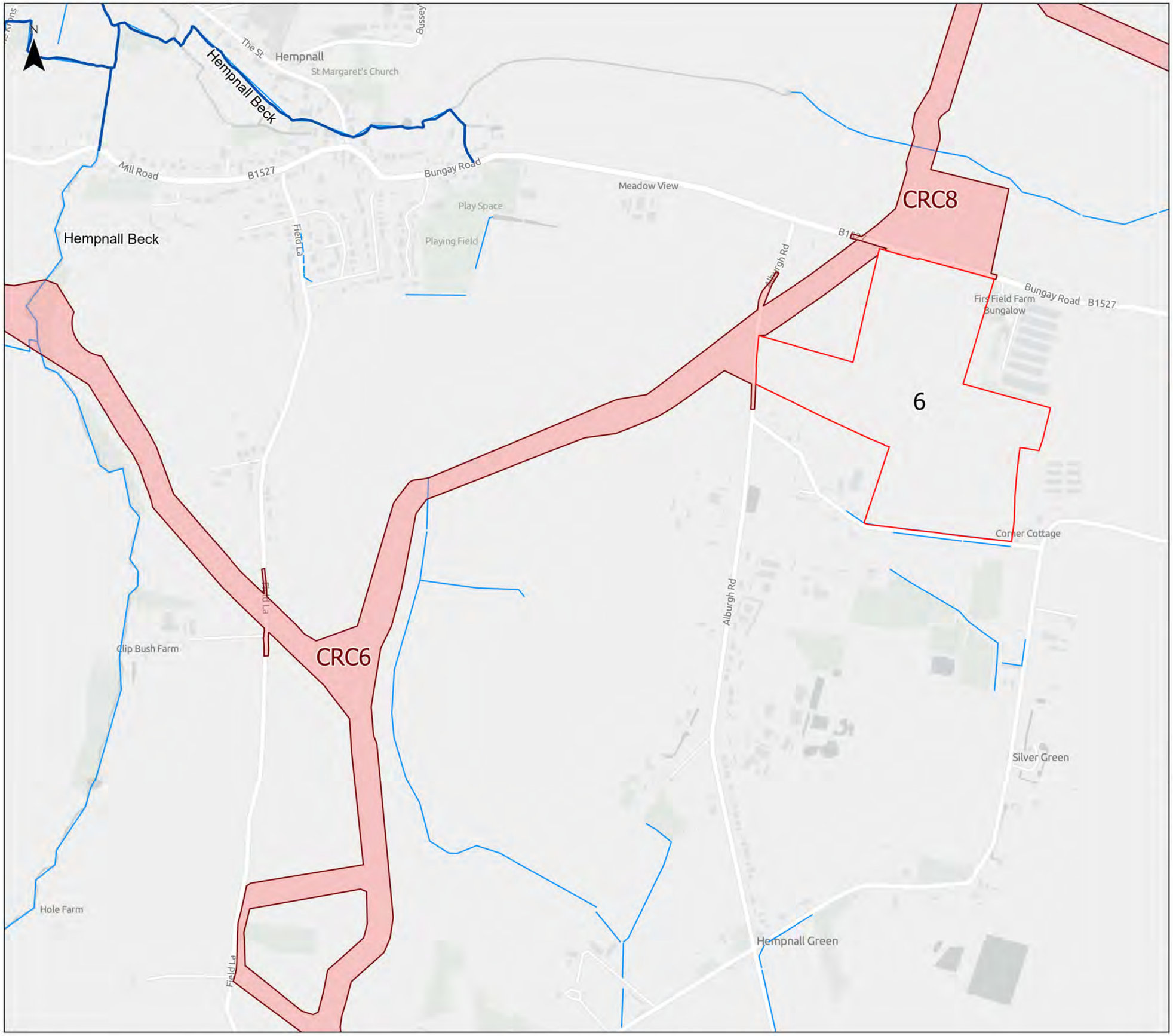
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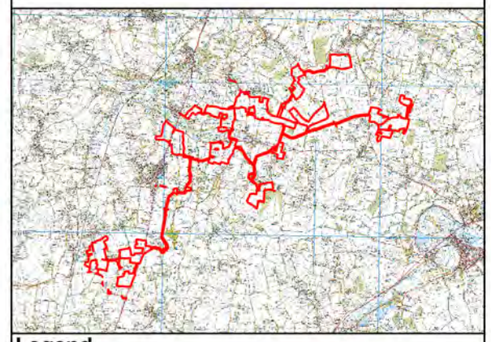
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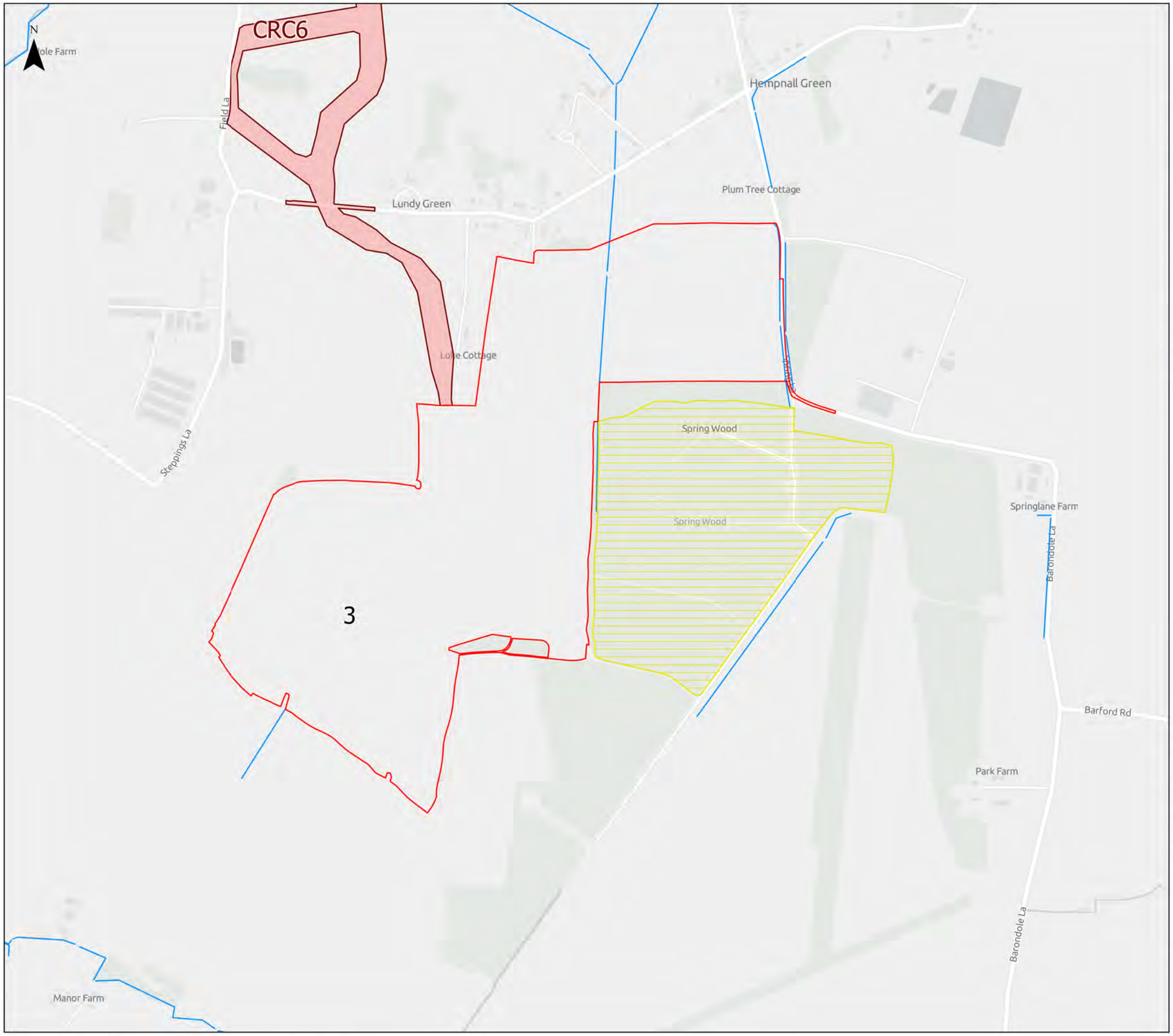
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**Figure 9.1 - Site Location and Watercourses**

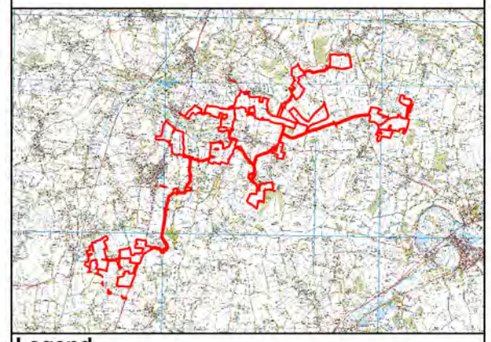
Sheet 11 of 19
Revision A

East Pye SOLAR

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Island GREEN POWER



**Legend**

- Order Limits
- Cable Route Corridor
- EA Statutory Main River
- Ordinary Watercourse
- Ancient Woodland

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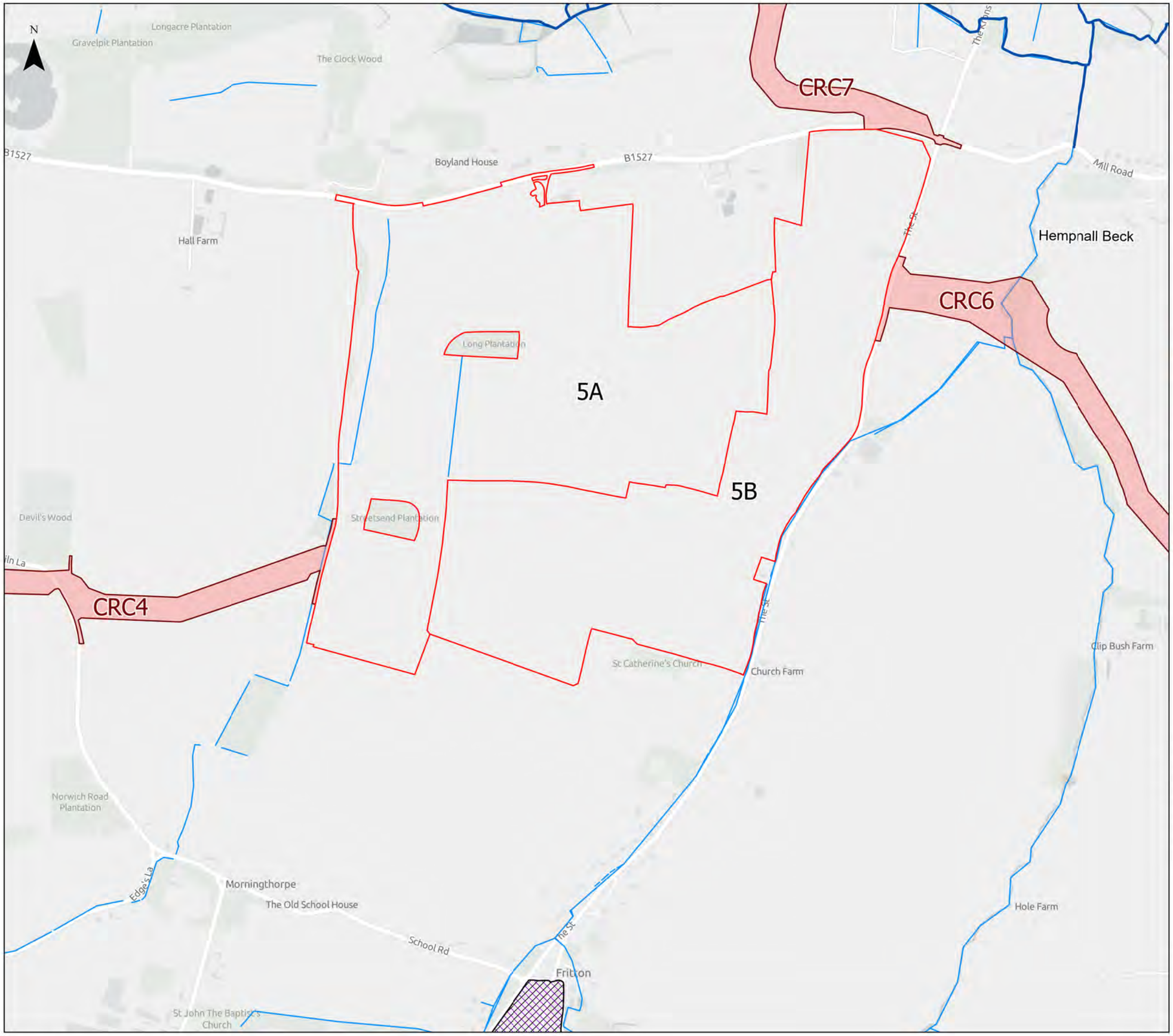
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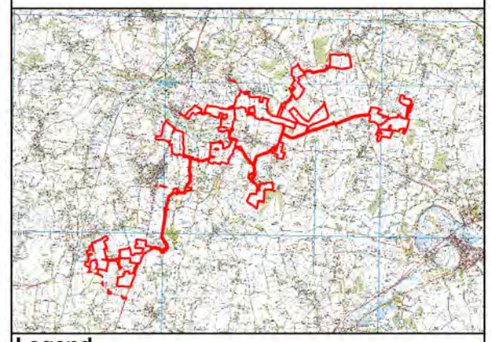
Sheet 12 of 19
Revision A

East Pye SOLAR

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Island GREEN POWER



**Legend**

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- Site of Special Scientific Interest (SSSI)
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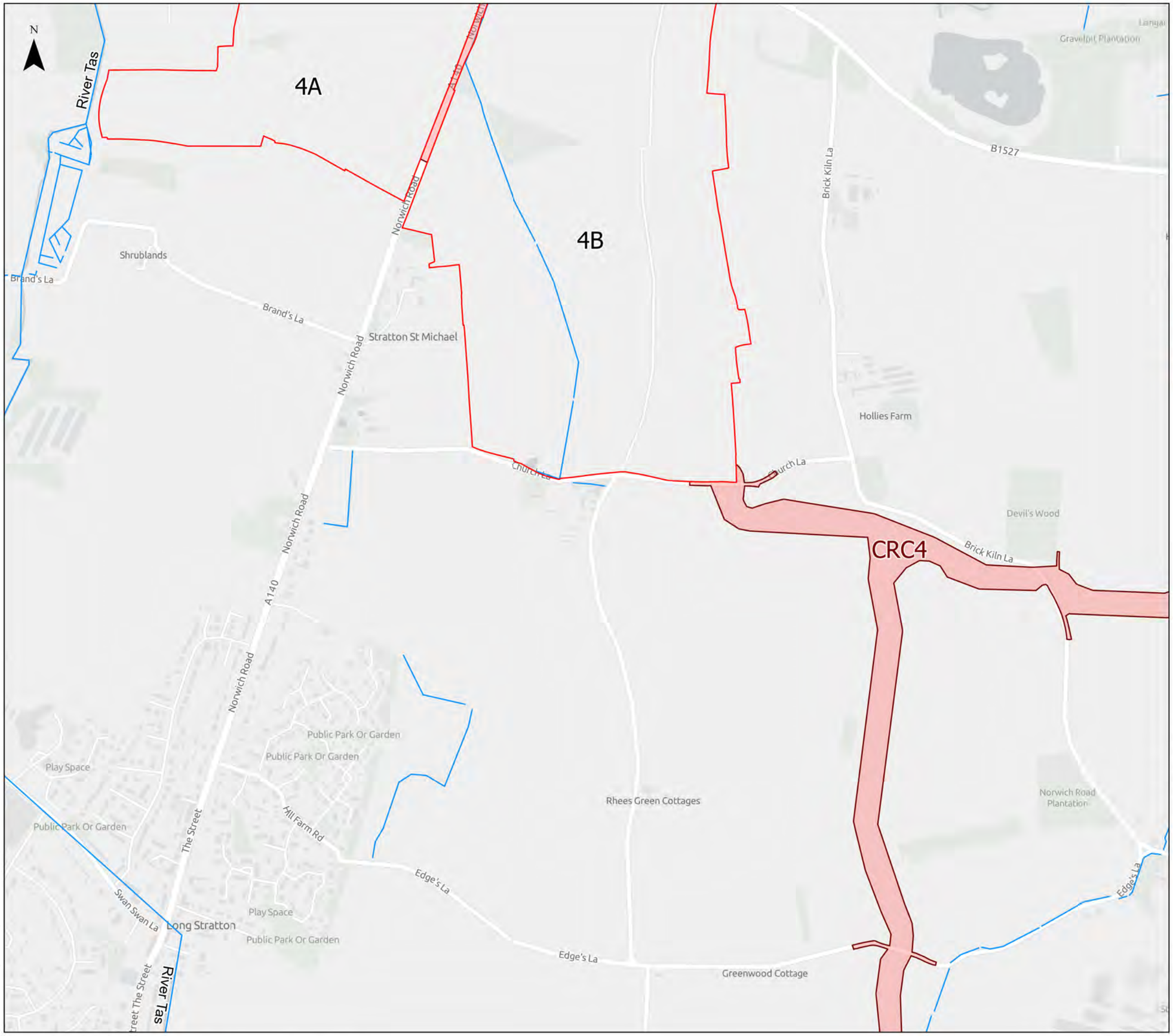
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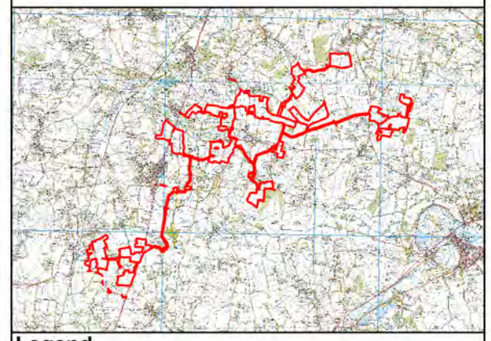
Sheet 13 of 19
Revision A

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Island GREEN POWER



**Legend**

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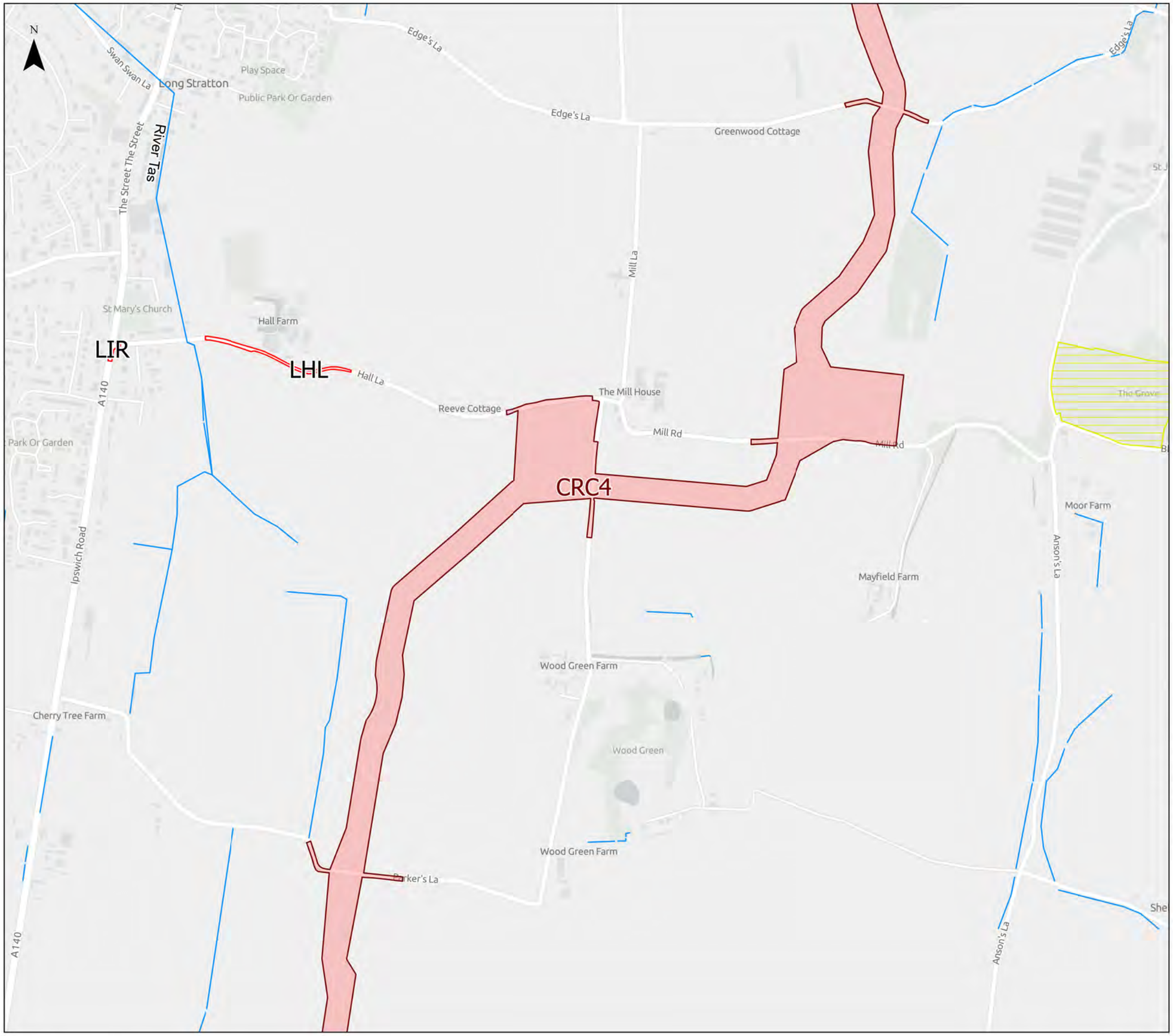
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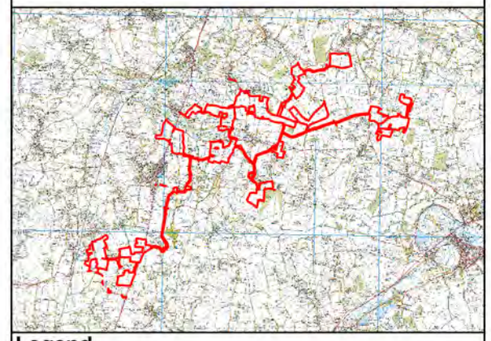
Sheet 14 of 19
Revision A

East Pye SOLAR

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**Legend**

- Order Limits
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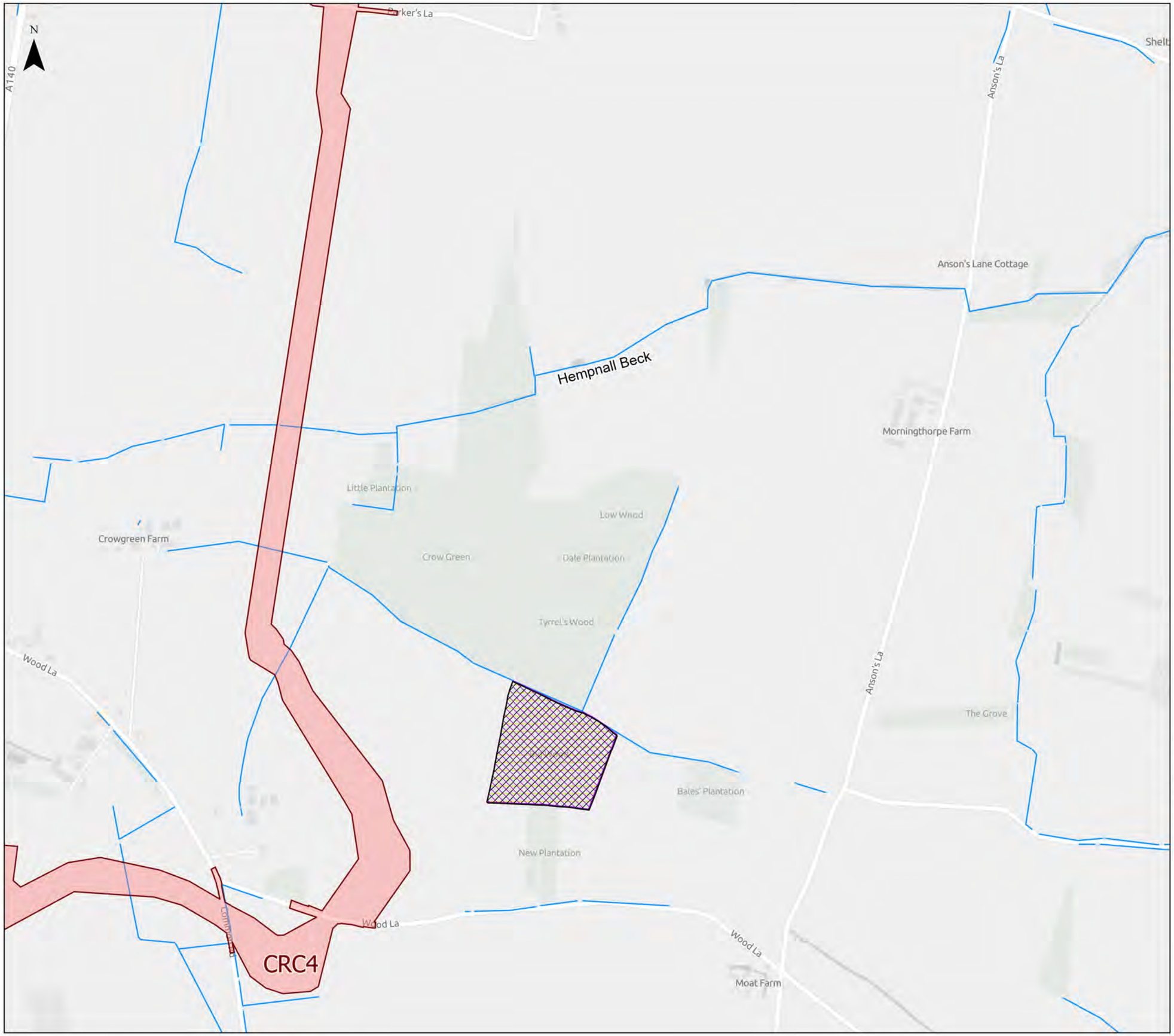
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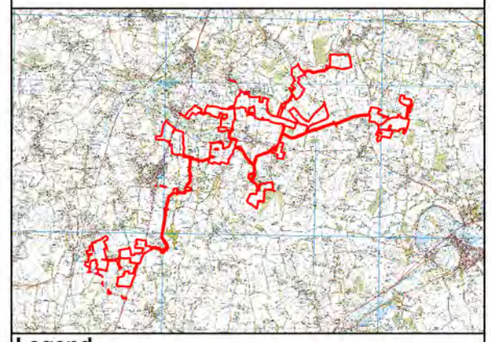
Sheet 15 of 19
Revision A

East Pye SOLAR

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Island GREEN POWER



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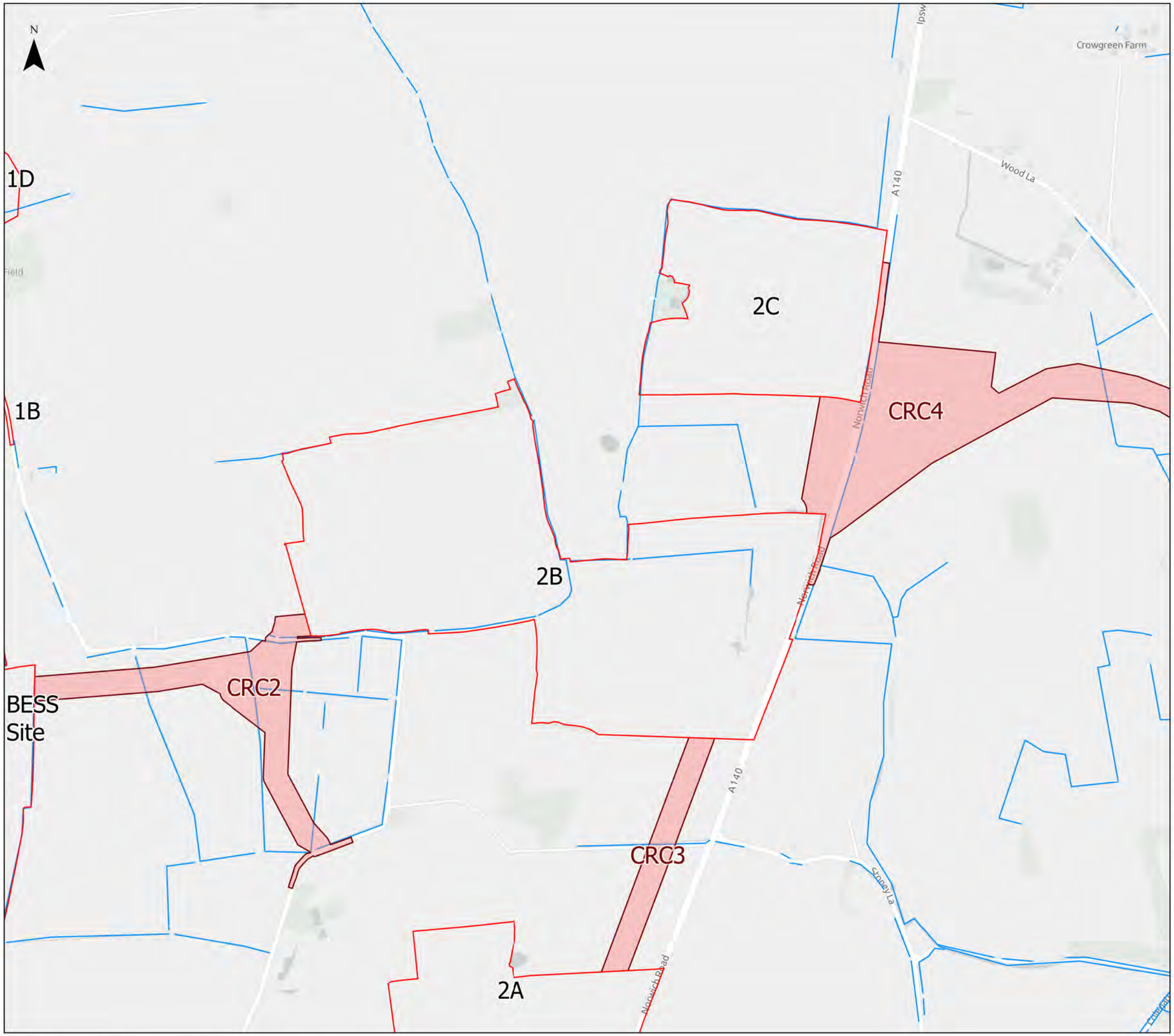
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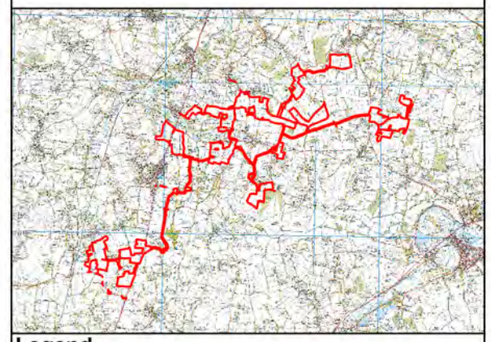
Sheet 16 of 19
Revision A

East Pye SOLAR

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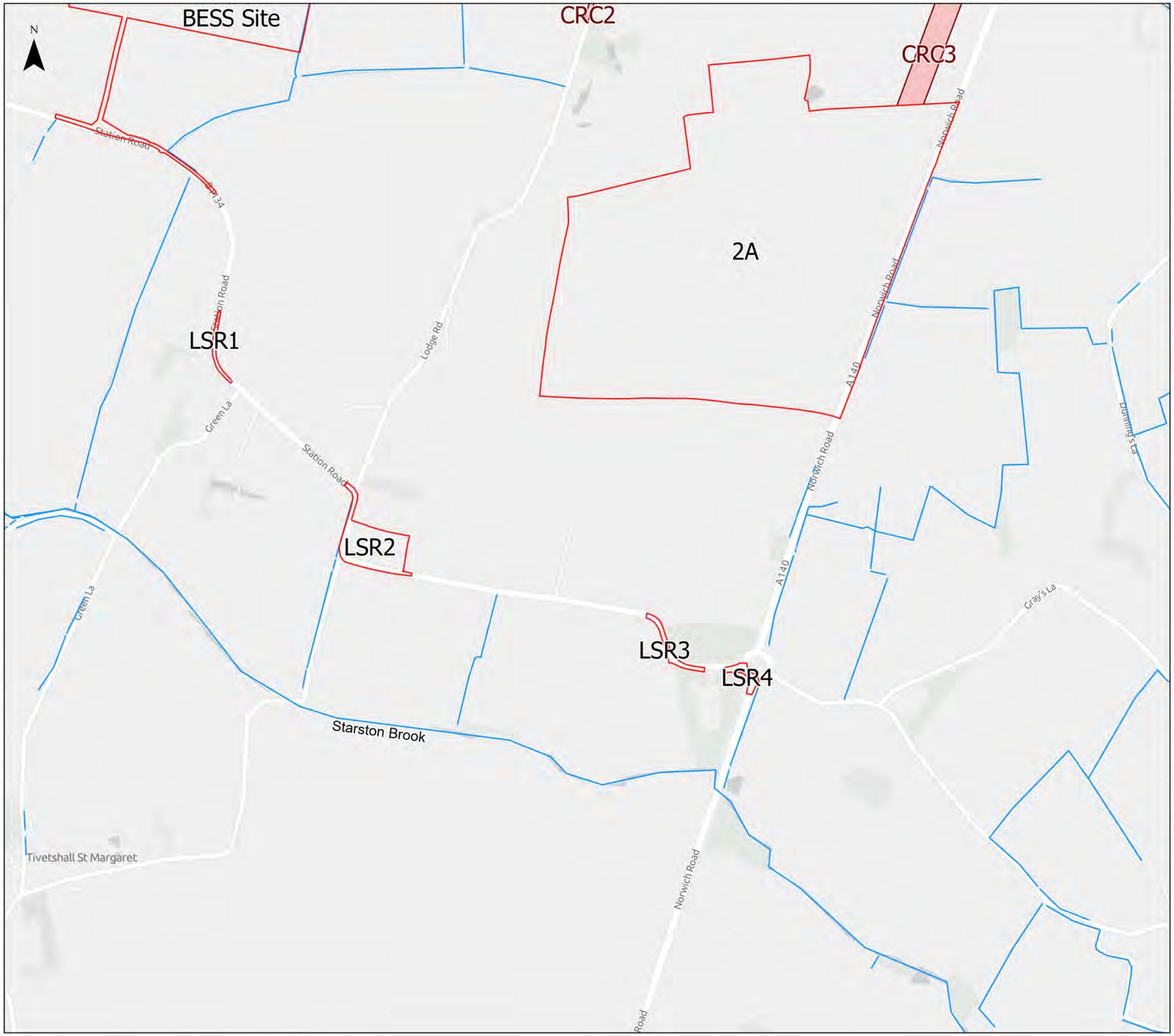
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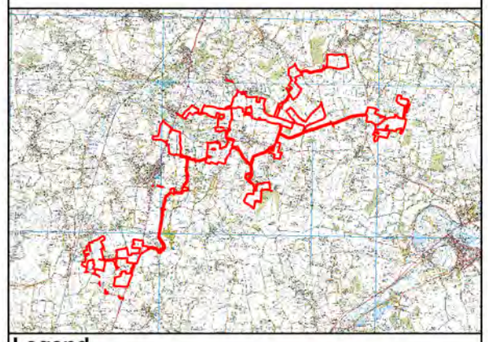
Sheet 17 of 19
Revision A

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Island GREEN POWER



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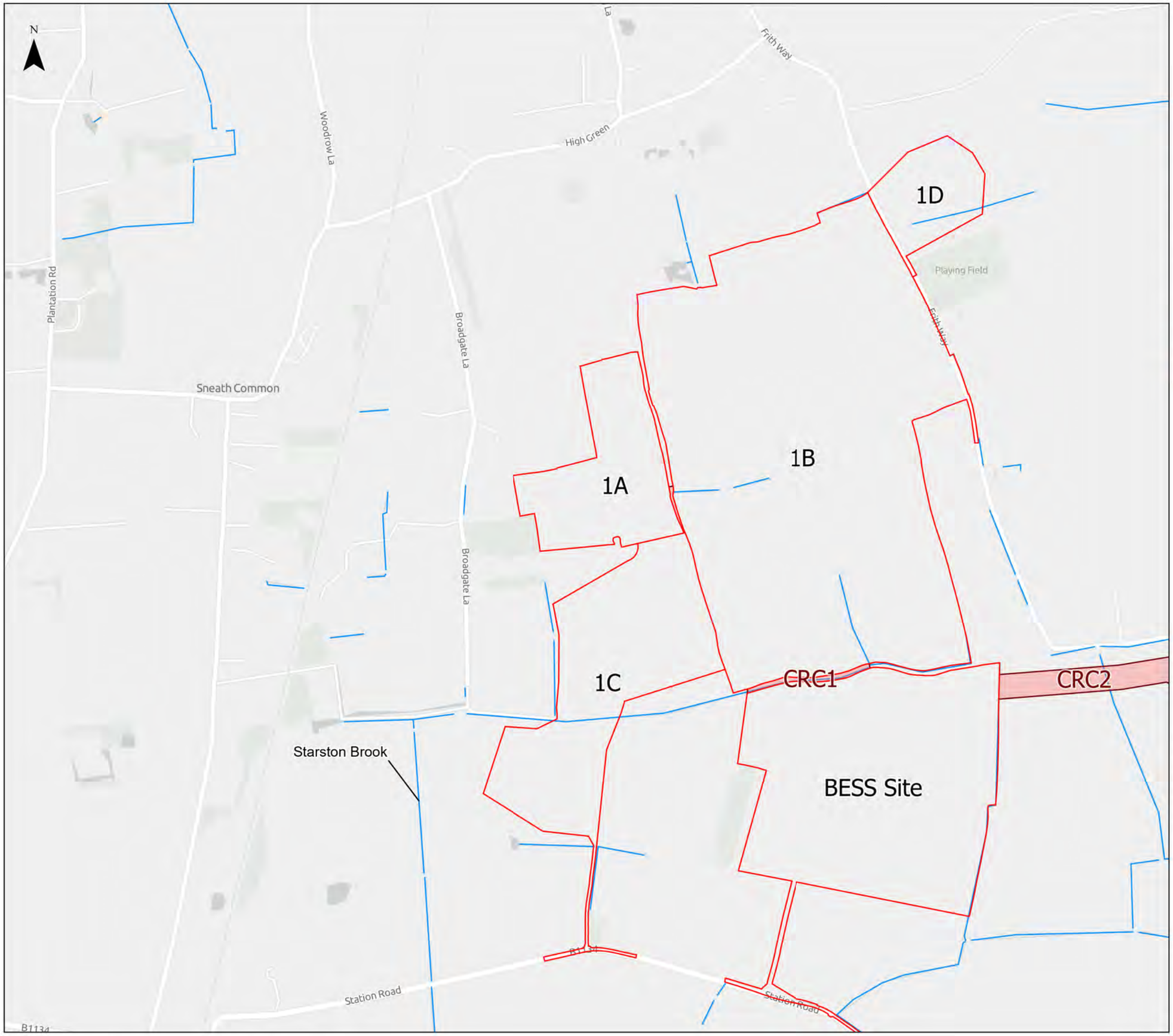
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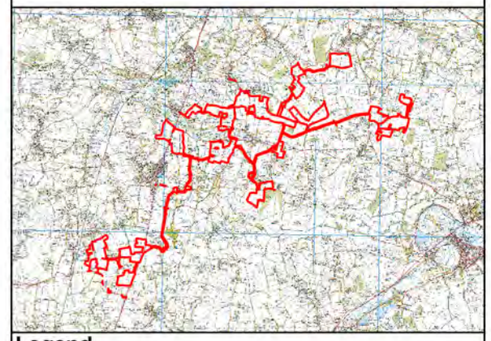
Sheet 18 of 19
Revision A

East Pye SOLAR

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Island GREEN POWER



**Legend**

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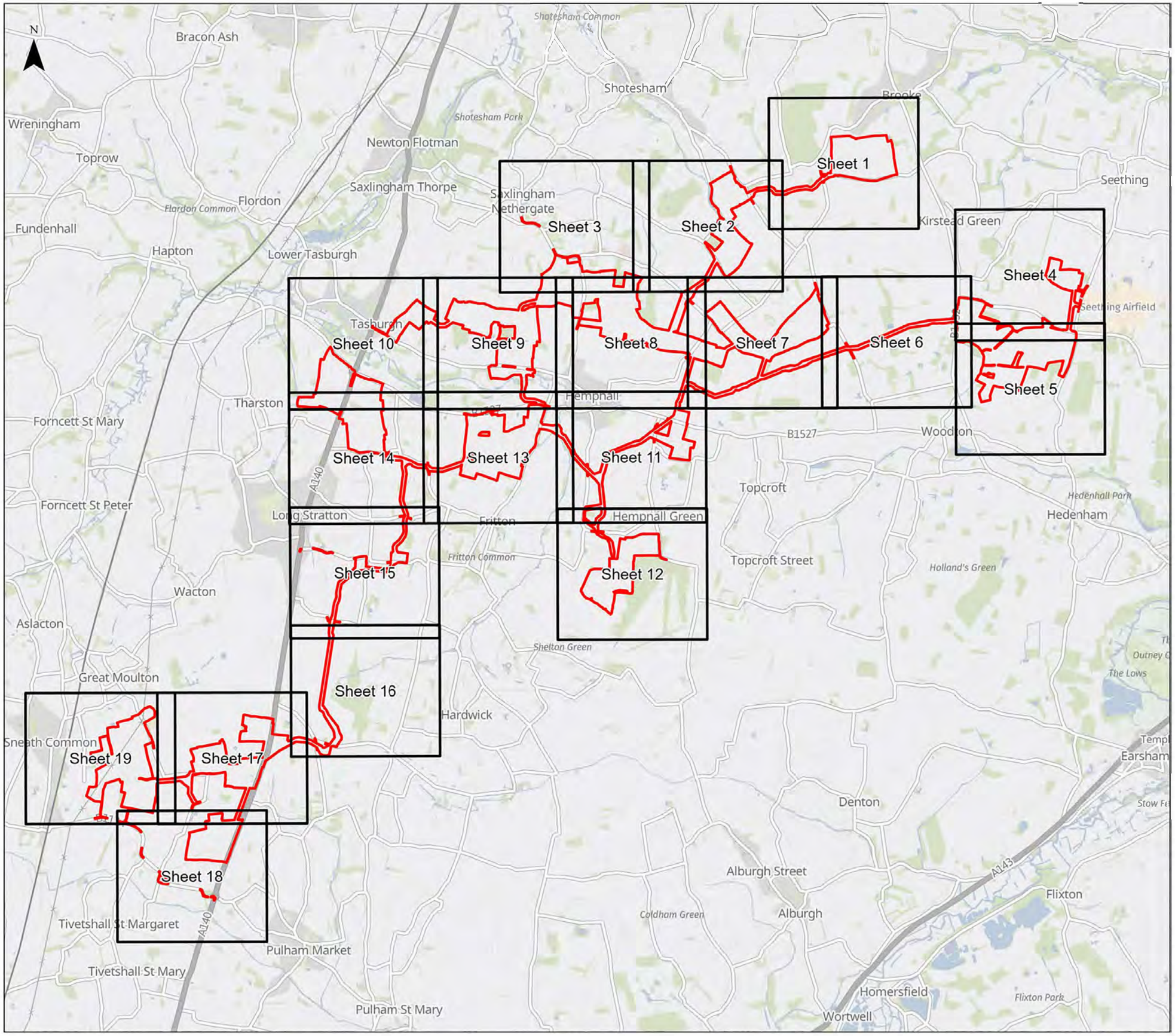
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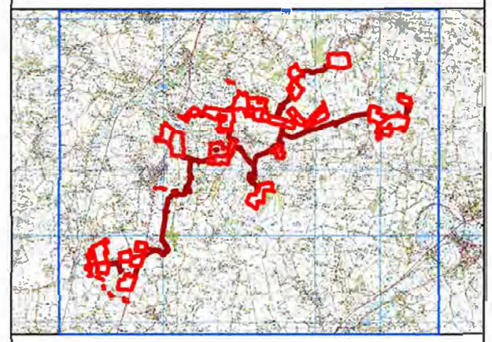
Sheet 19 of 19
Revision A

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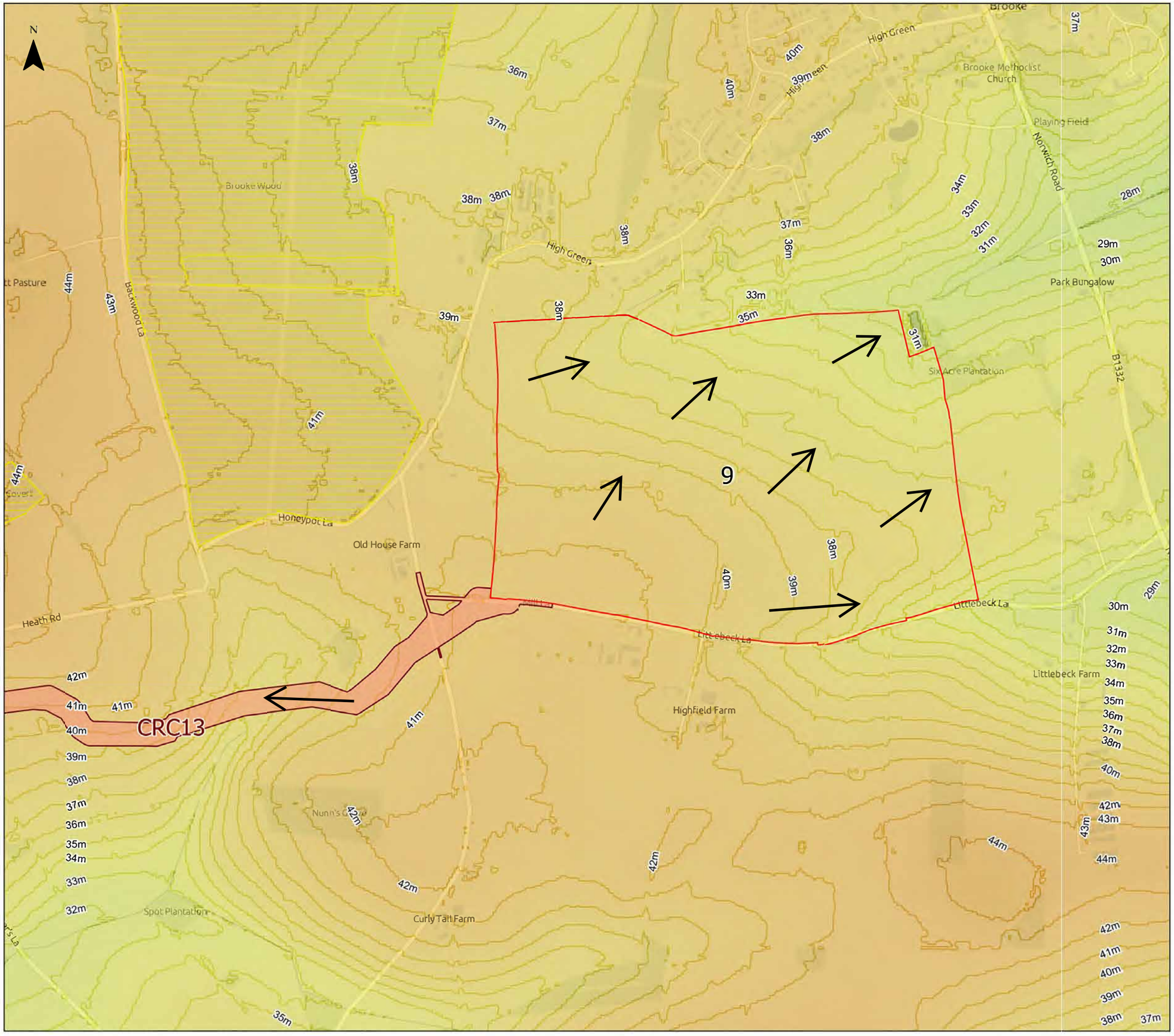
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**Figure 9.2 - Topography & Overland Flow Routes**

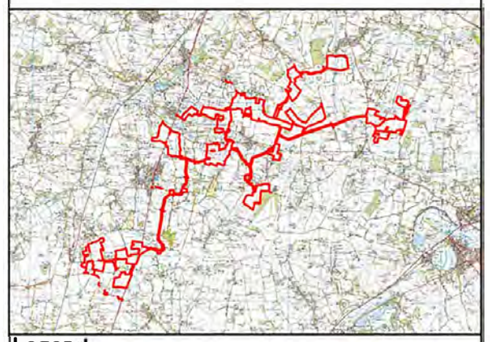
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Island GREEN POWER



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**Topography (mAoD)**

59.8

41.44

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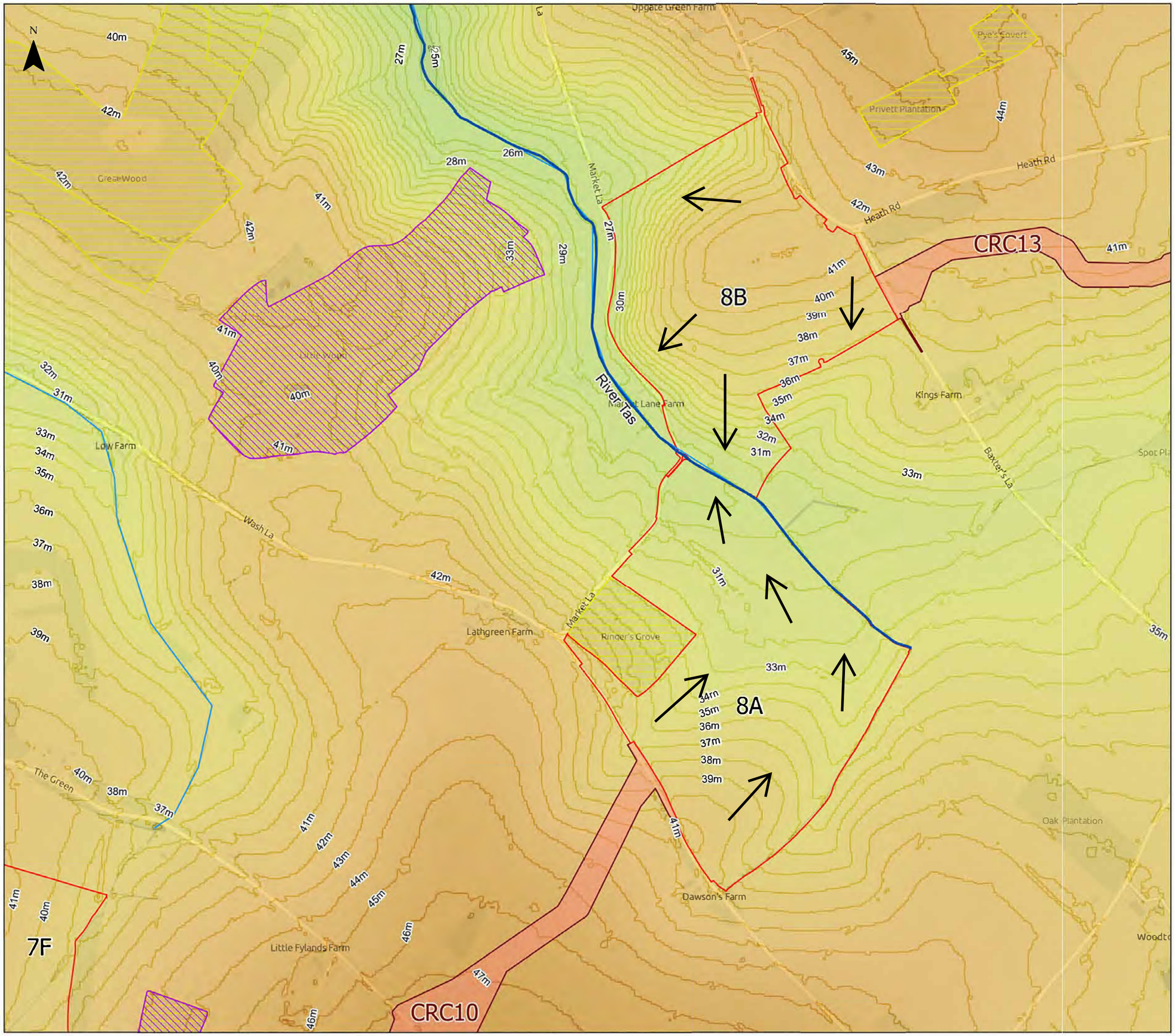
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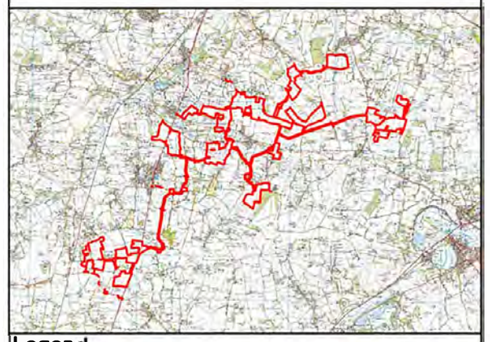
Sheet 1 of 19
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59.8

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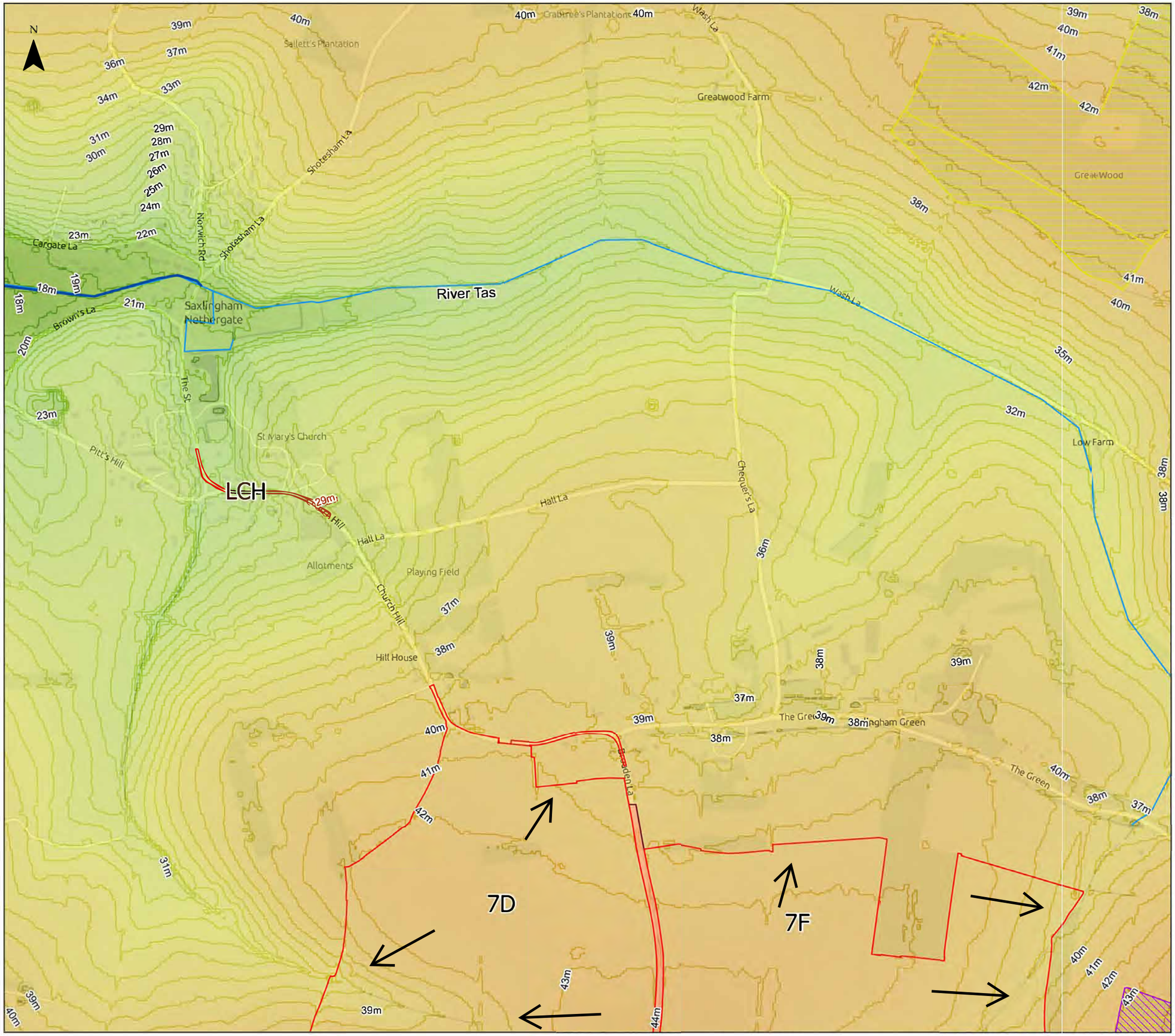
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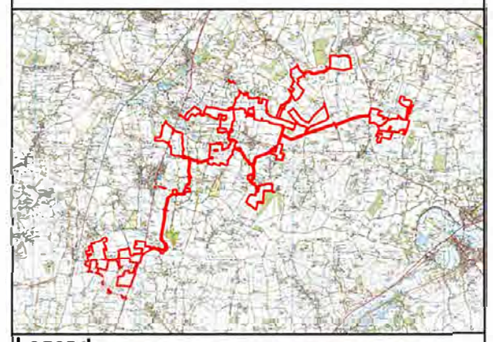
Sheet 2 of 19
Revision A

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Island GREEN POWER



**Legend**

- Order Limits
- Cable Route Corridor
- EA Statutory Main River
- Ordinary Watercourse
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland

**Topography (mAoD)**

59.8

41.44

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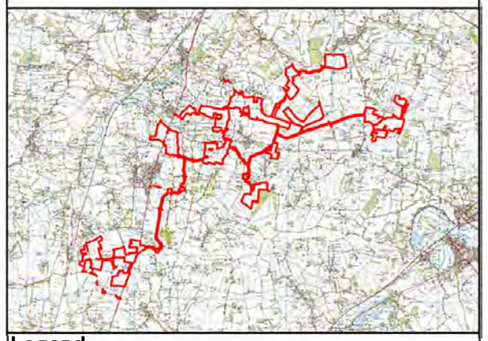
**Figure 9.2 - Topography and Overland Flow Routes**

Sheet 3 of 19
Revision A

East Pye SOLAR

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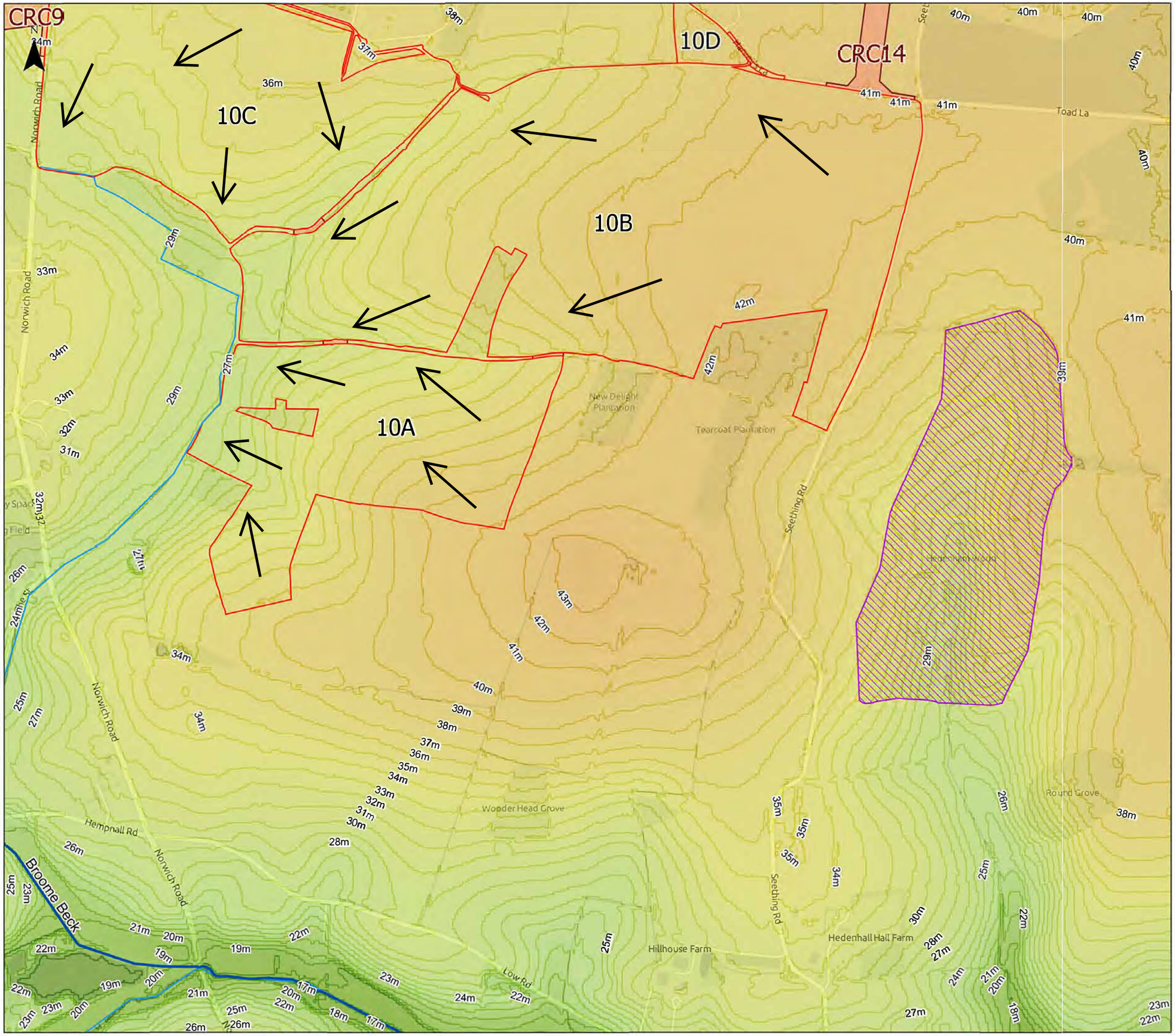
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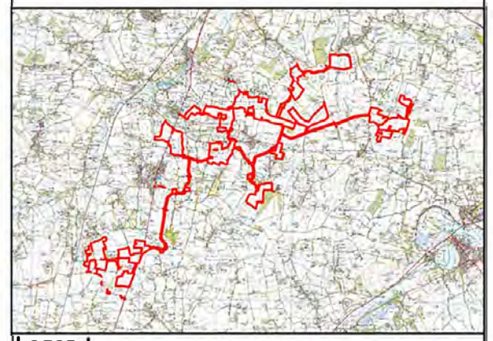
Sheet 4 of 19
Revision A

East Pye SOLAR

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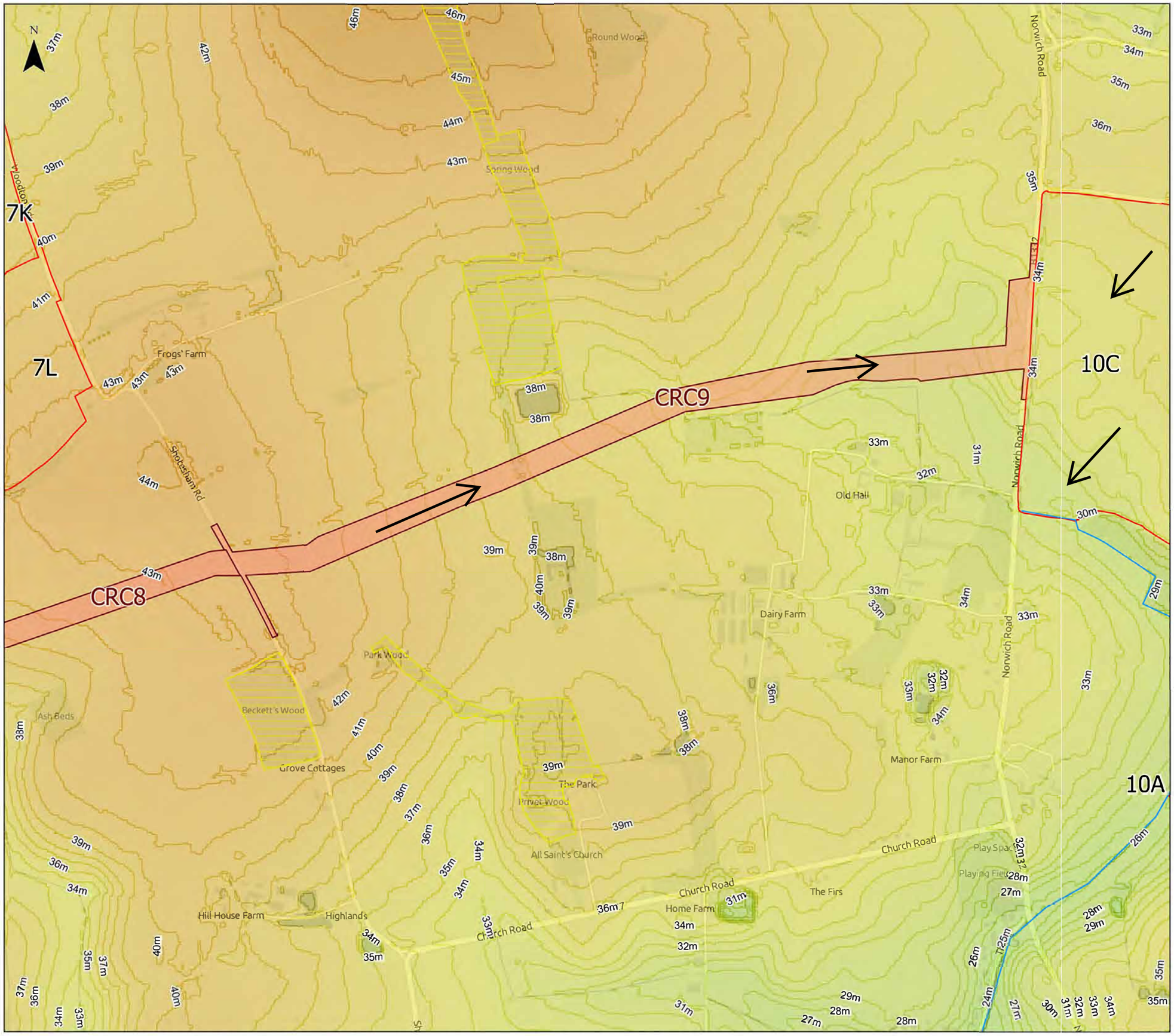
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**Figure 9.2 - Topography and Overland Flow Routes**

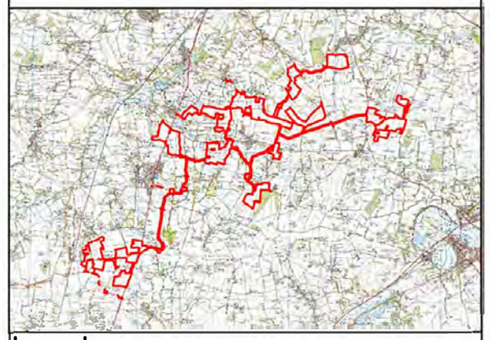
Sheet 5 of 19
Revision A

East Pye SOLAR

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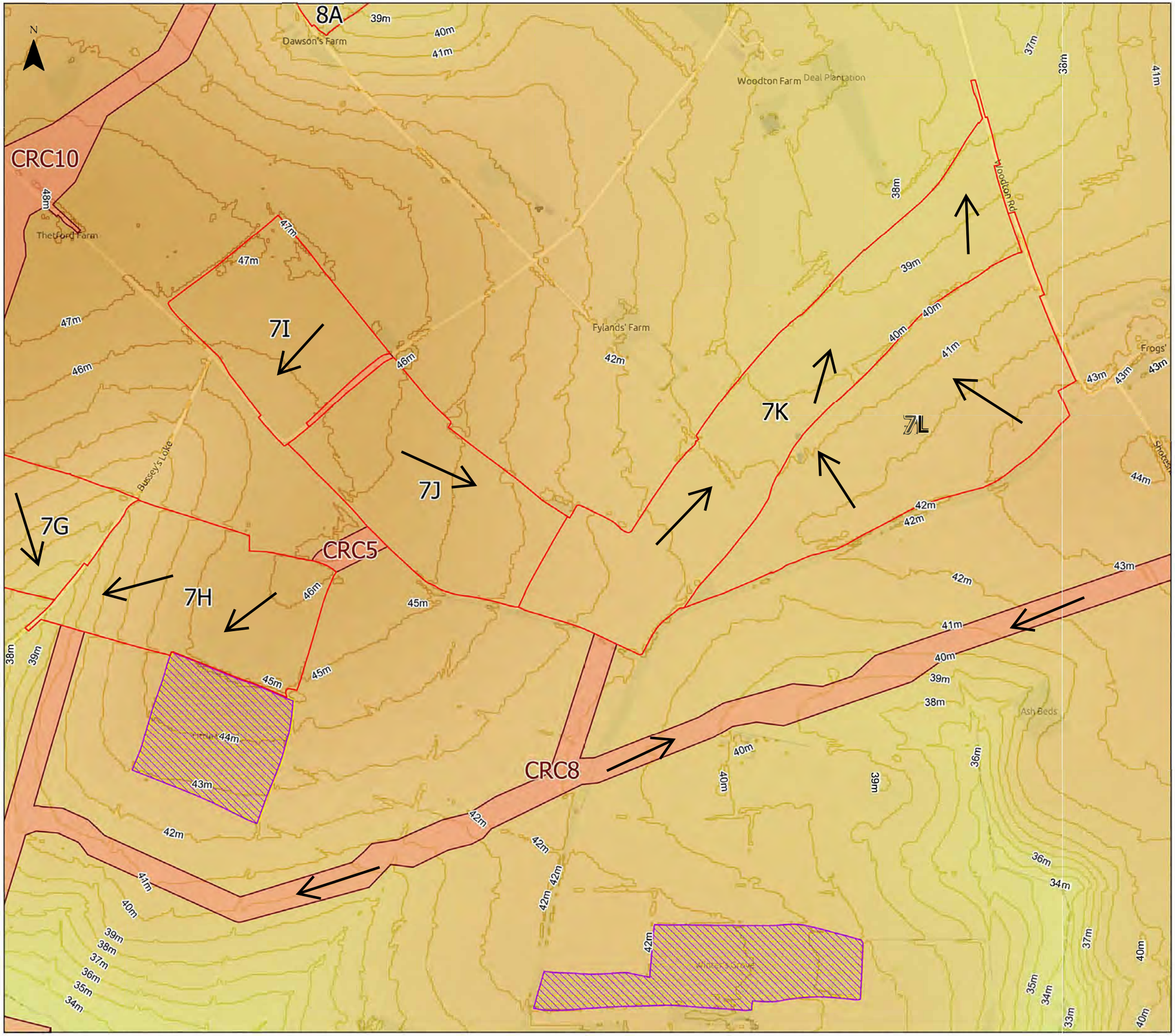
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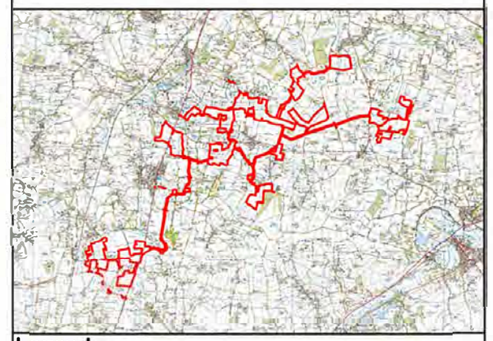
Sheet 6 of 19
Revision A

East Pye SOLAR

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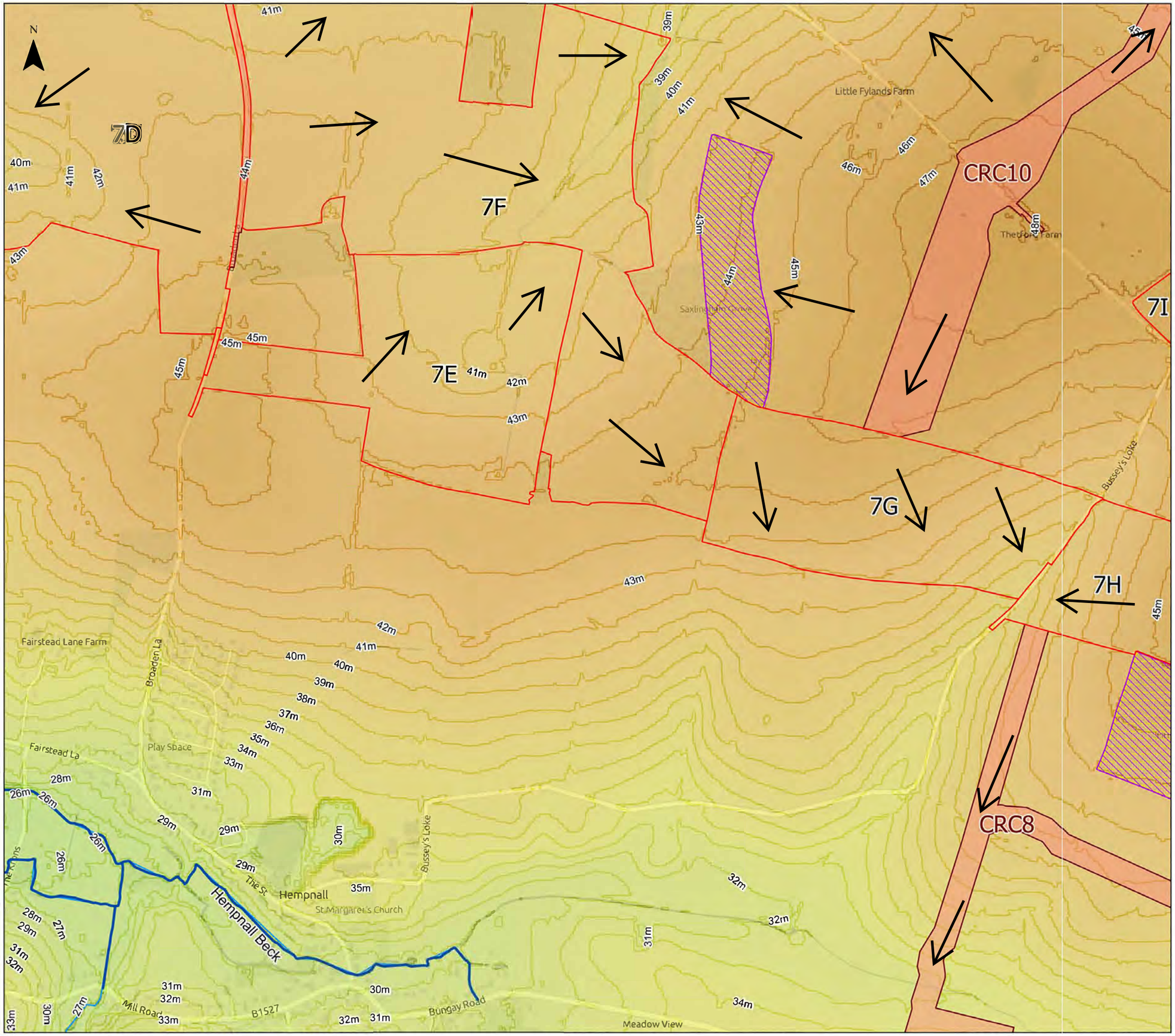
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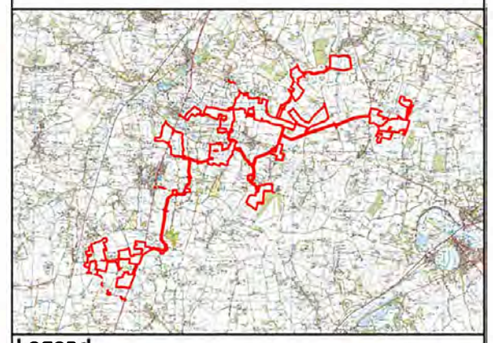
Sheet 7 of 19
Revision A

East Pye SOLAR

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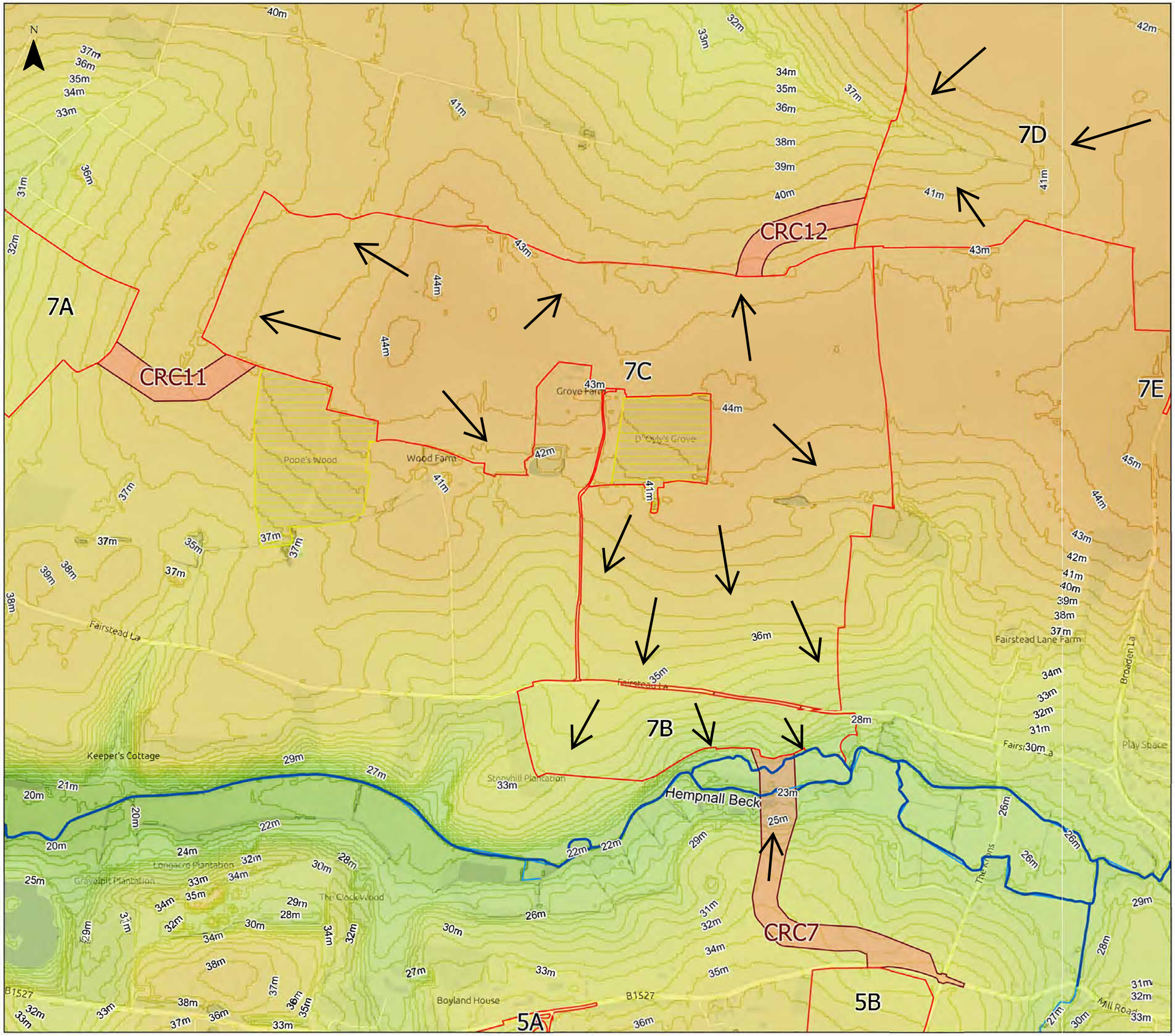
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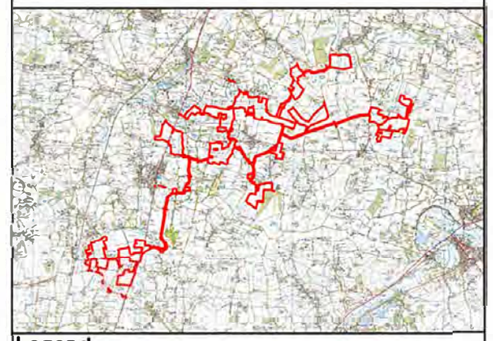
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East Pye SOLAR

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Island GREEN POWER



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**Topography (mAoD)**

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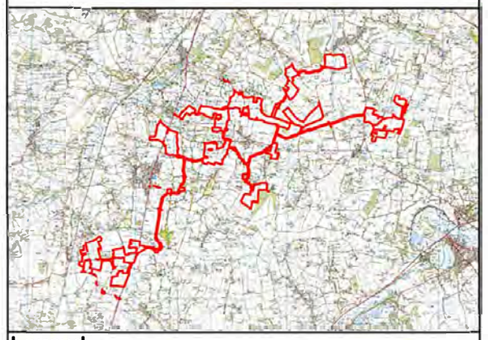
**Figure 9.2 - Topography and Overland Flow Routes**

Sheet 9 of 19
Revision A

East Pye SOLAR

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Island GREEN POWER



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**Topography (mAoD)**

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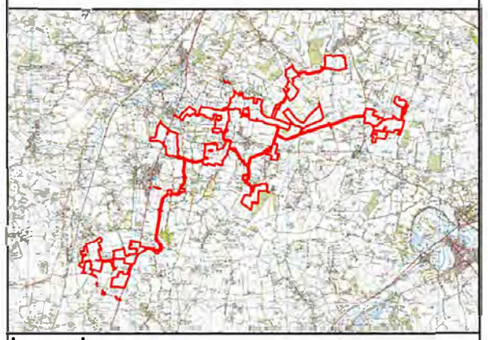
**Figure 9.2 - Topography and Overland Flow Routes**

Sheet 10 of 19
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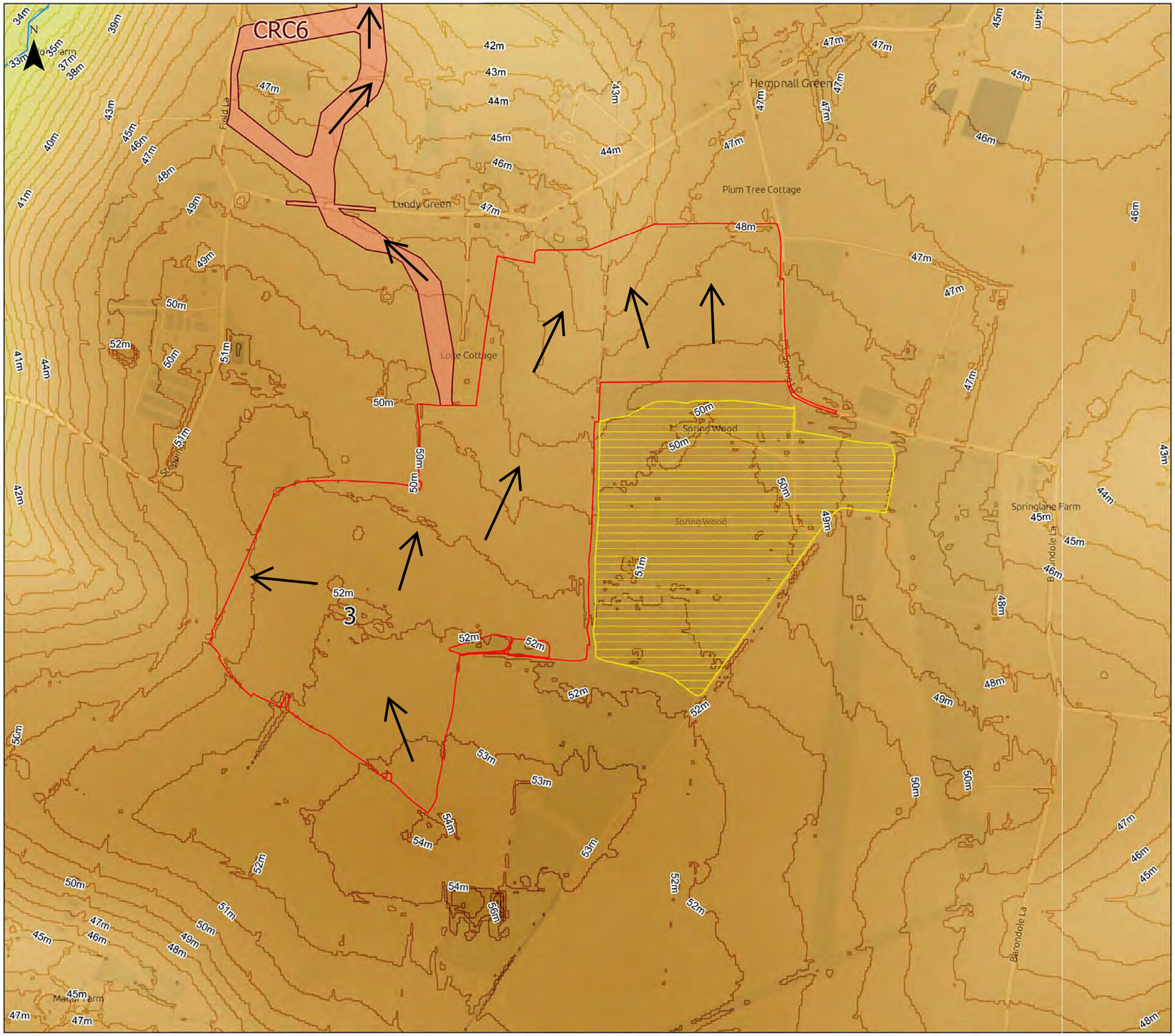
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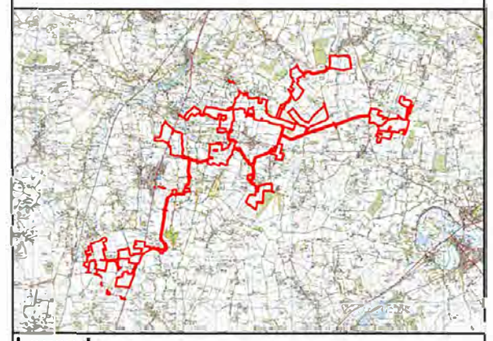
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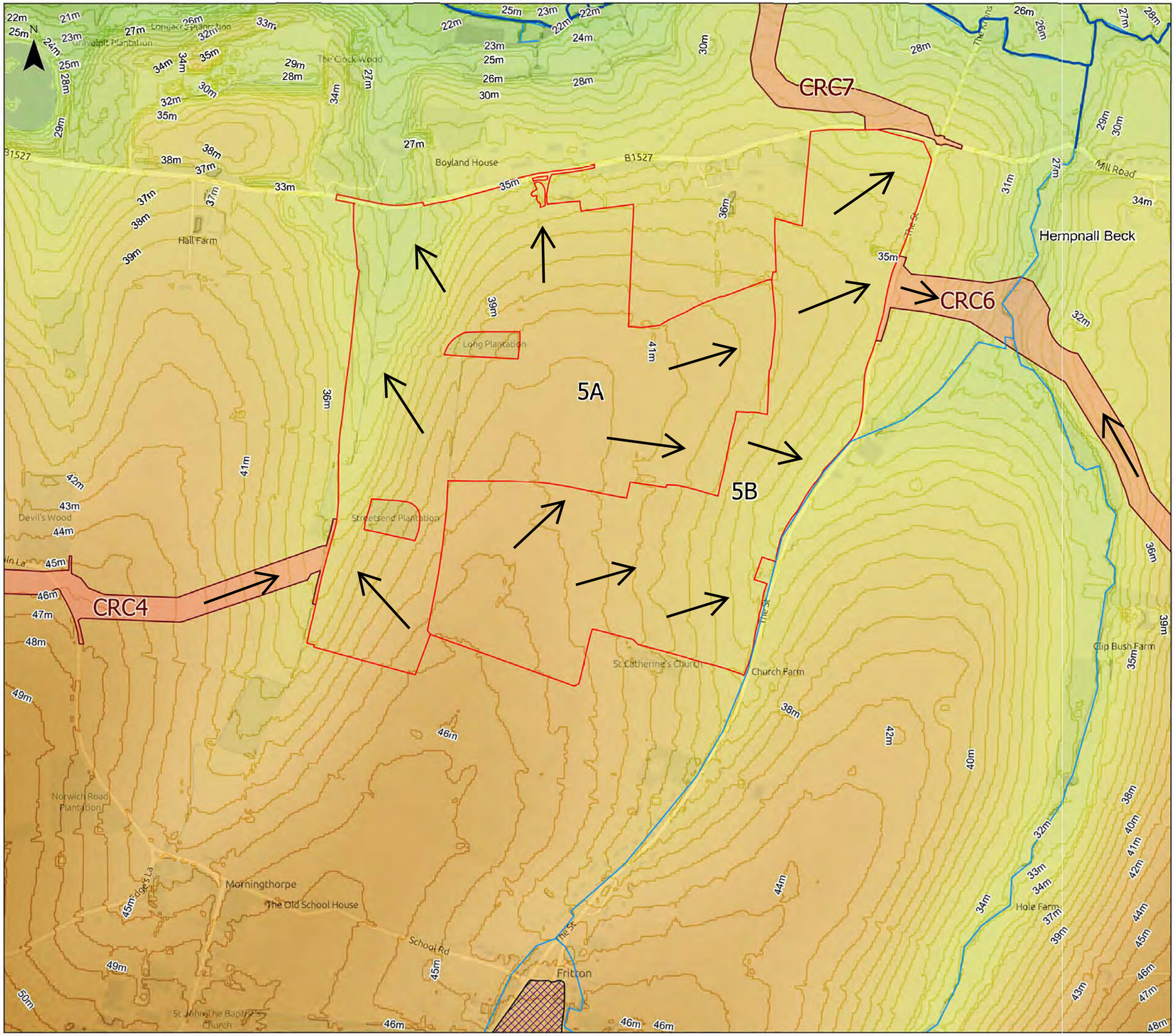
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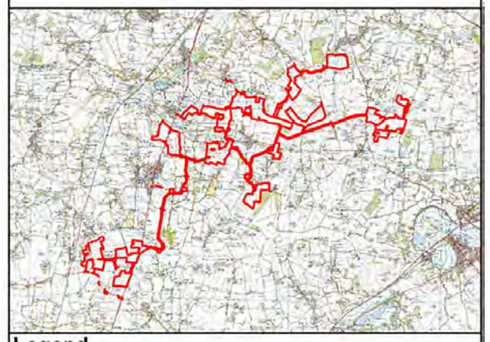
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**Topography (mAoD)**

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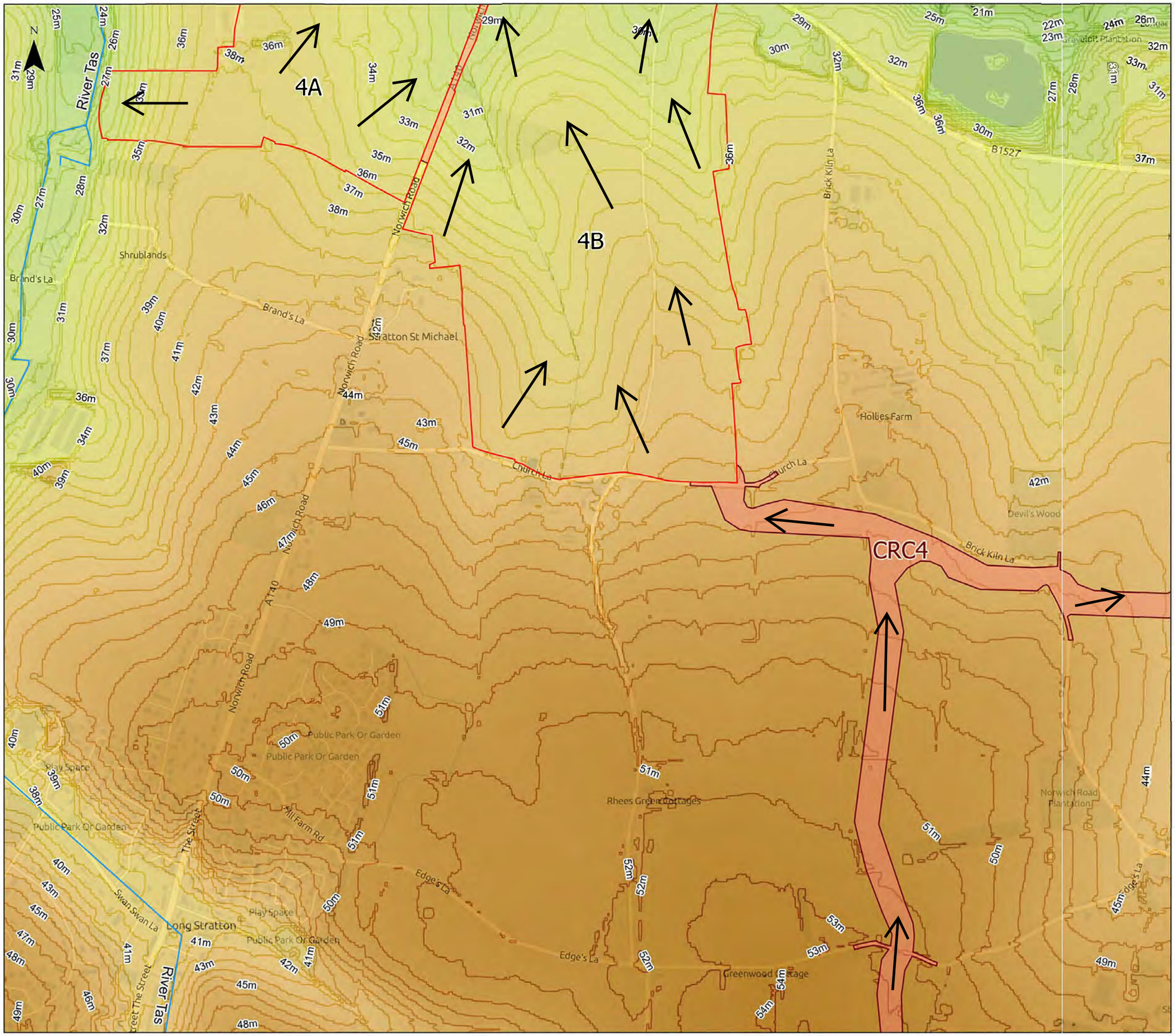
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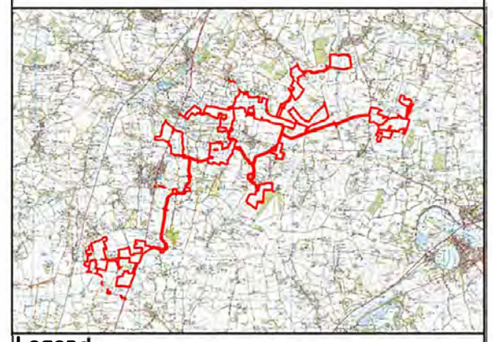
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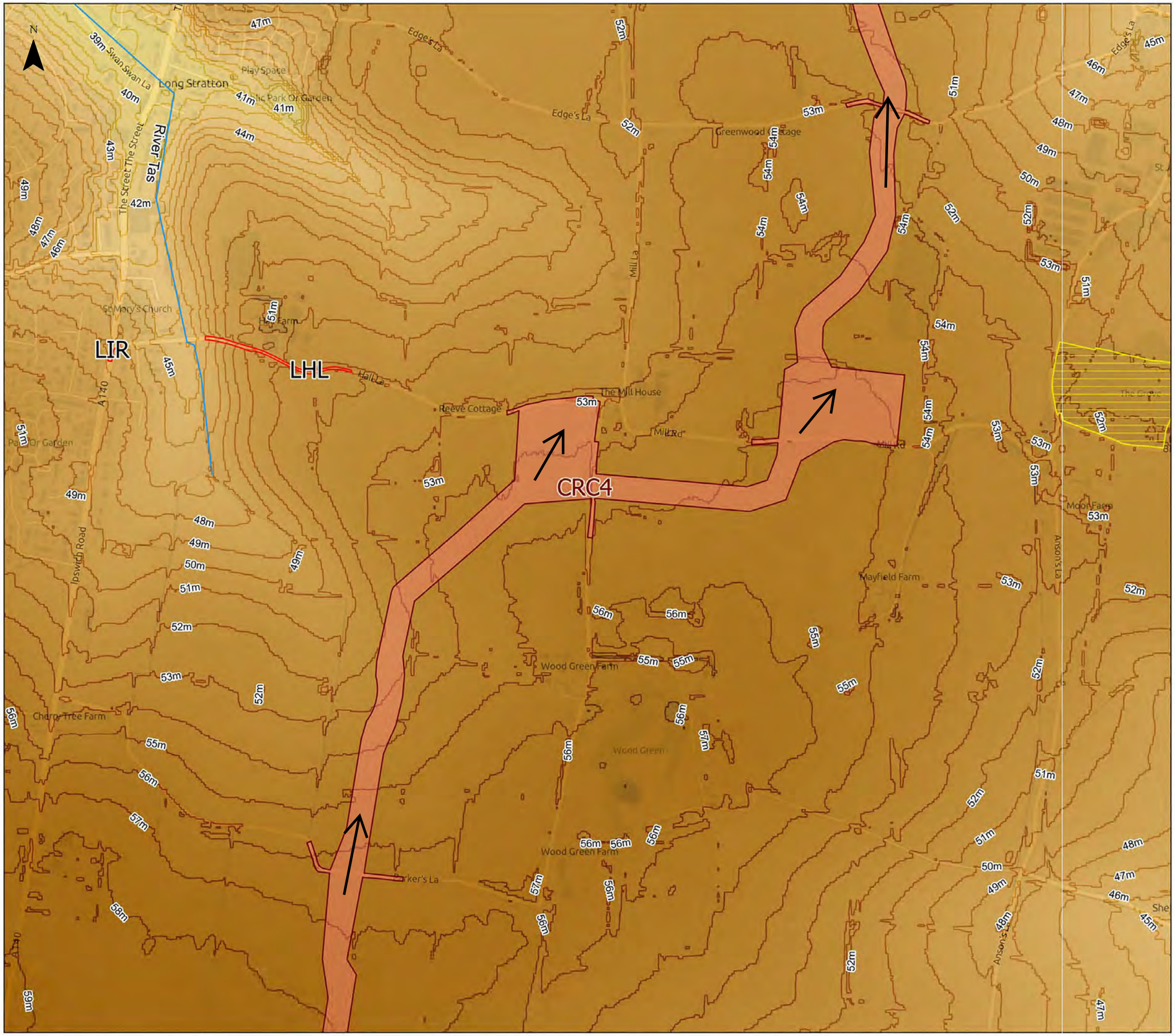
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**Figure 9.2 - Topography and Overland Flow Routes**

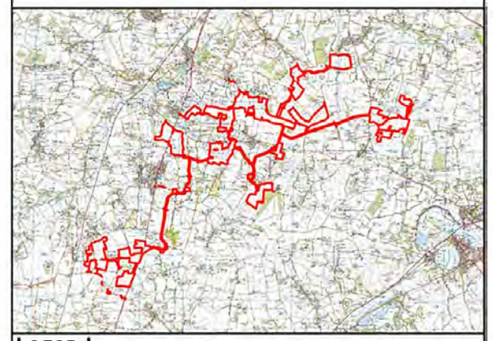
Sheet 14 of 19
Revision A

East Pye SOLAR

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Island GREEN POWER



**Legend**

- Order Limits
- Cable Route Corridor
- EA Statutory Main River
- Ordinary Watercourse
- Ancient Woodland

**Topography (mAoD)**

59.8

41.44

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0 250 500 m

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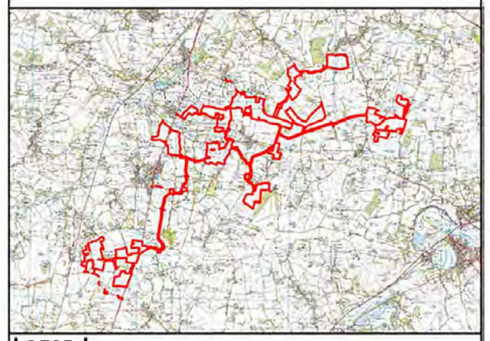
**Figure 9.2 - Topography and Overland Flow Routes**

Sheet 15 of 19
Revision A

East Pye SOLAR

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Island GREEN POWER



**Legend**

- Order Limits
- Cable Route Corridor
- EA Statutory Main River
- Ordinary Watercourse
- Groundwater Dependent Ecosystem (GDE)
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland

**Topography (mAoD)**

59.8

41.44

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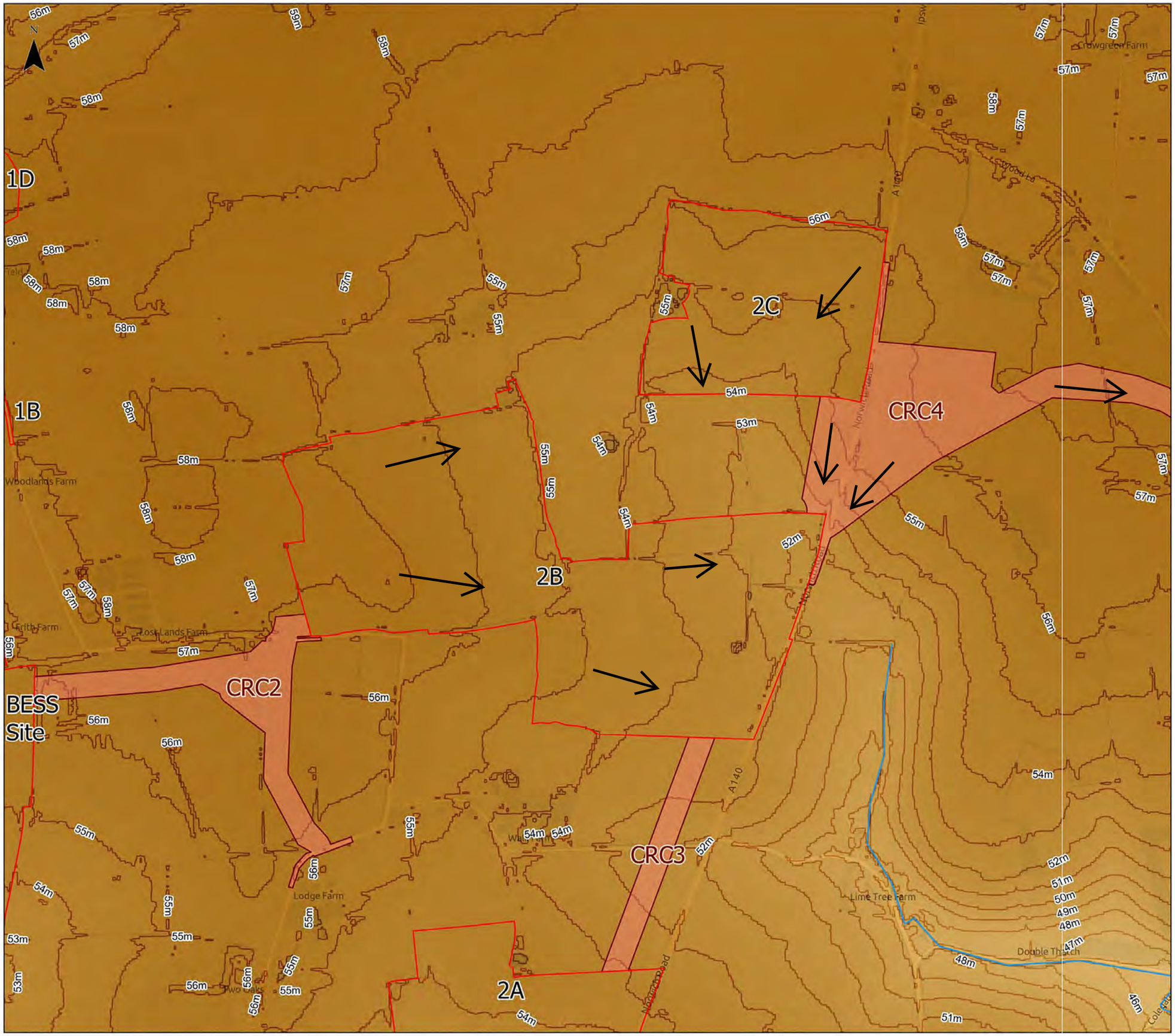
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**Figure 9.2 - Topography and Overland Flow Routes**

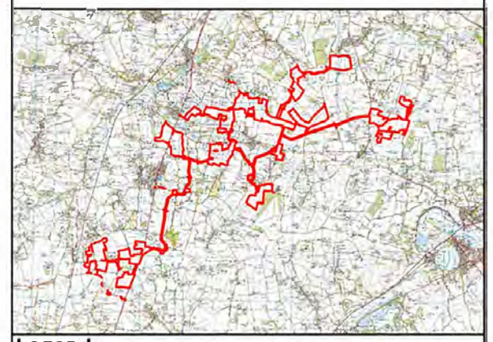
Sheet 16 of 19
Revision A

East Pye SOLAR

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Island GREEN POWER



**Legend**

- Order Limits
- Cable Route Corridor
- EA Statutory Main River
- Ordinary Watercourse

**Topography (mAoD)**

59.8

41.44

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0 250 500 m

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**Figure 9.2 - Topography and Overland Flow Routes**

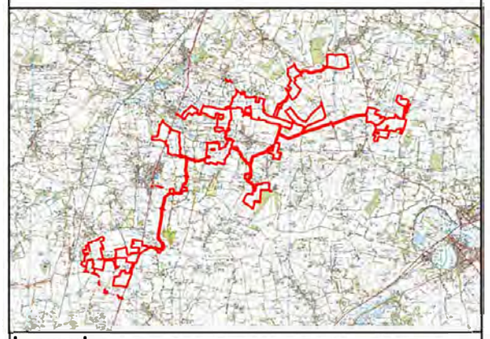
Sheet 17 of 19
Revision A

East Pye SOLAR

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BESS Site
CRC2
CRC3
2A
LSR1
LSR2
LSR3
LSR4
Lodge Farm
Two Oaks
Fenleigh Cottages
Saddleback Farm
Pringle Farm
Star Green Farm
The Valley Farm
The Old Queen's Head Farm
Great Barn
Rookery Farm
Crossing House
Star Gatehouse
Julian House
Tivetshall St Margaret
Turnpike Cottage
Starston Brook
Norwich Road
A140
Station Road
Green Ln
Star La
Tivetshall Rd
Gravel La
Dunning's La

Island GREEN POWER



**Legend**

- Order Limits
- Cable Route Corridor
- EA Statutory Main River
- Ordinary Watercourse

**Topography (mAoD)**

59.8
41.44

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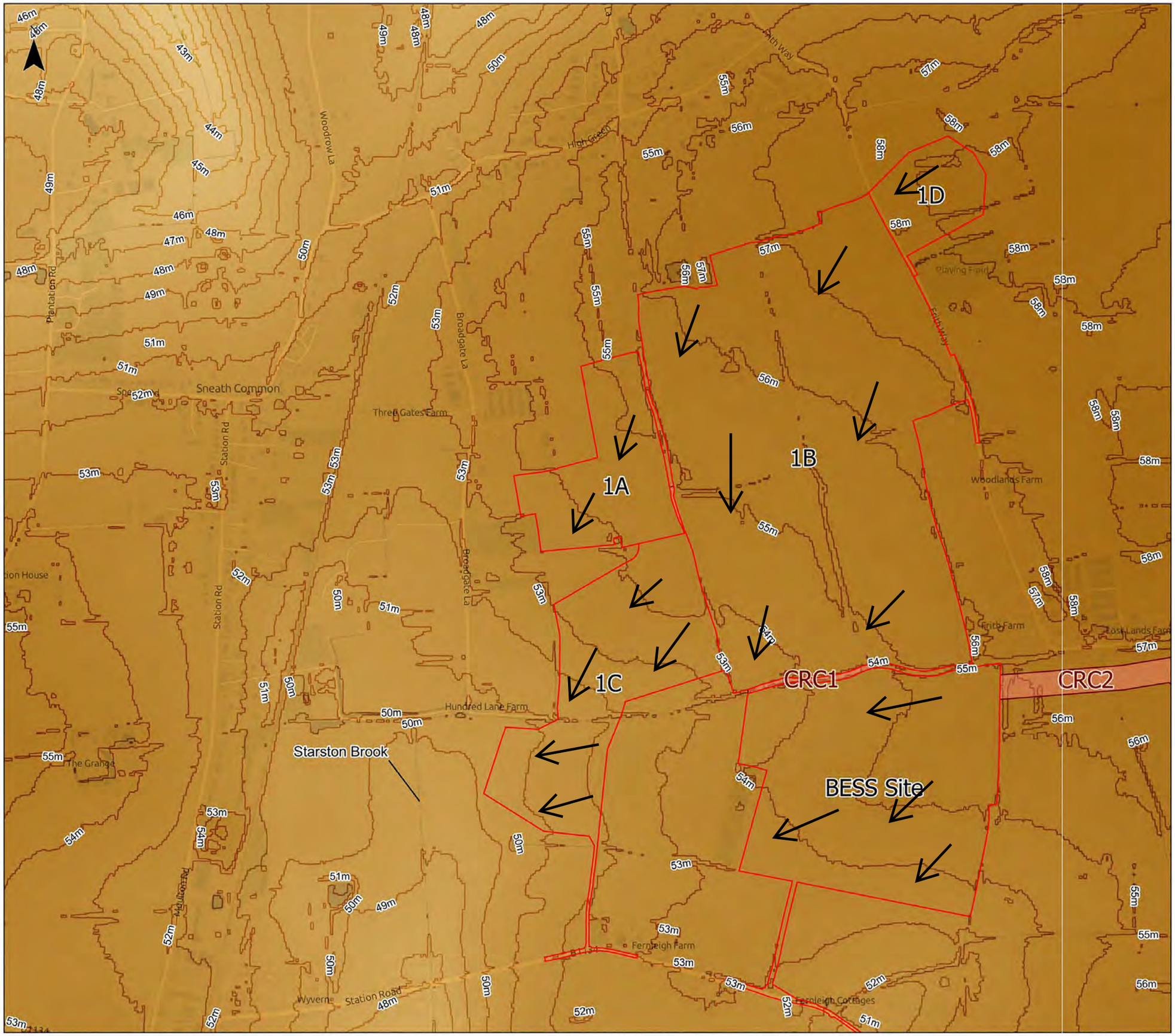
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**Figure 9.2 - Topography and Overland Flow Routes**

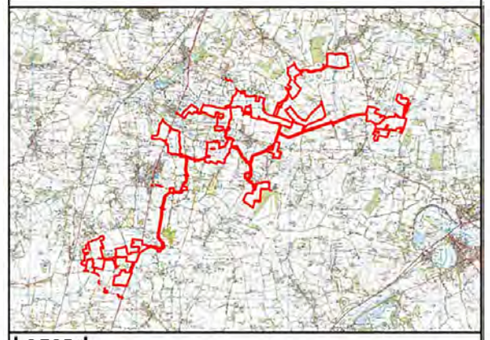
Sheet 18 of 19
Revision A

East Pye SOLAR

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Island GREEN POWER



**Legend**

- Order Limits
- Cable Route Corridor
- EA Statutory Main River
- Ordinary Watercourse

**Topography (mAoD)**

59.8

41.44

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0 250 500 m

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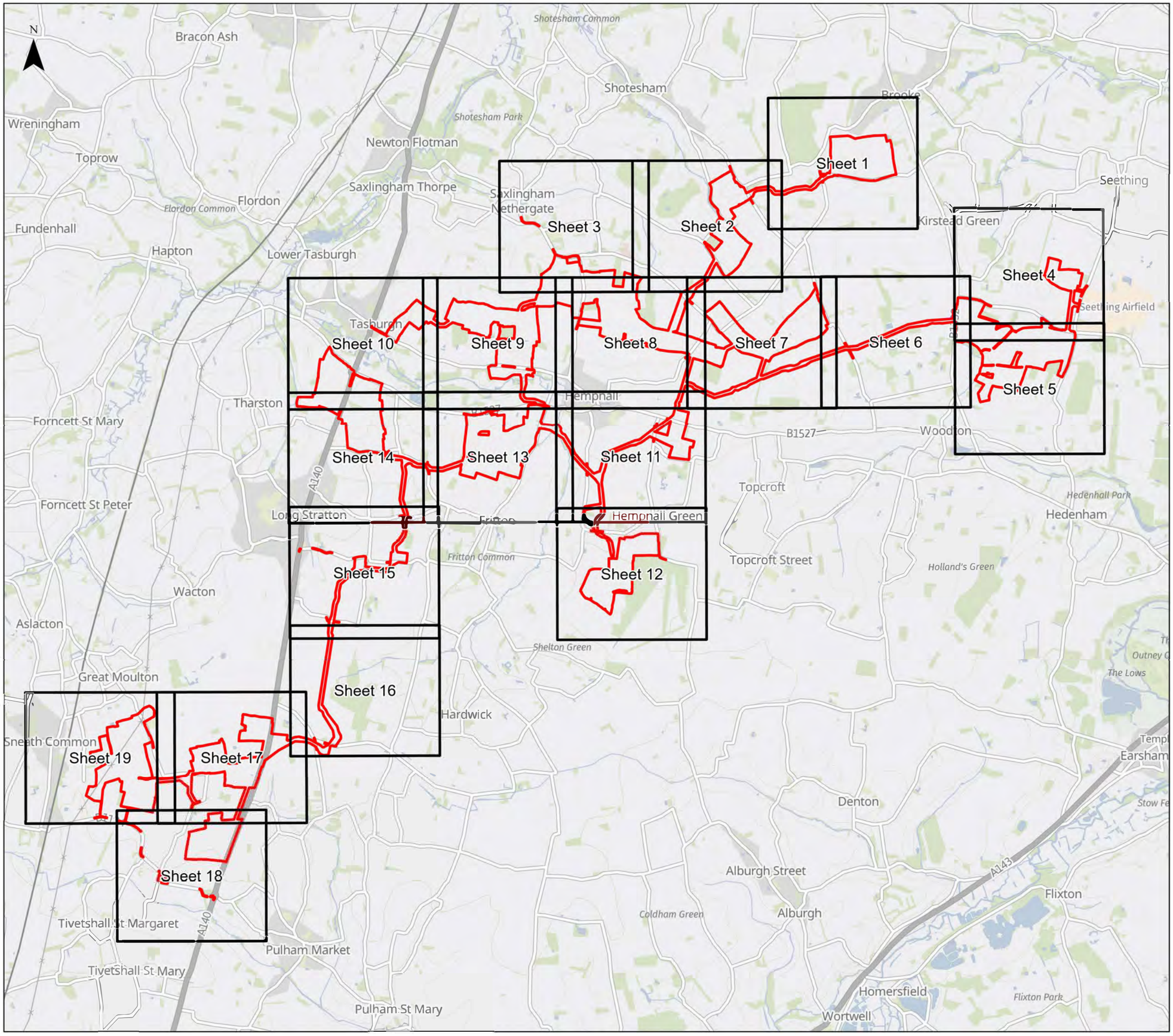
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**Figure 9.2 - Topography and Overland Flow Routes**

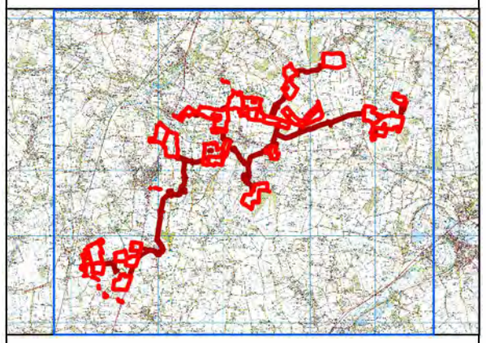
Sheet 19 of 19
Revision A

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Island GREEN POWER



**Legend**

- Order Limits
- Sheet Index

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**Figure 9.3 - Flood Zones**

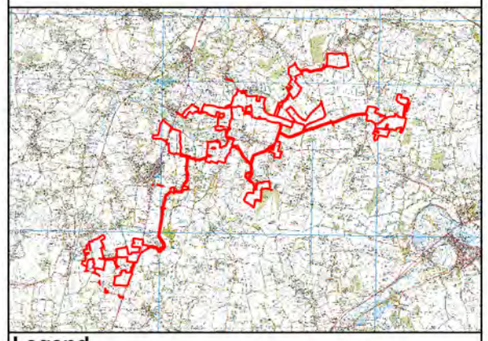
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Island GREEN POWER



**Legend**

- Order Limits
- Cable Route Corridor

**Spatial Flood Defences**

- Natural High Ground
- Other

**Flood Zones**

- Flood Zone 3
- Flood Zone 2
- Area outside Flood Zone 2 and 3 is defined as Flood Zone 1 'Low Probability'

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**Figure 9.3 - Flood Zones**

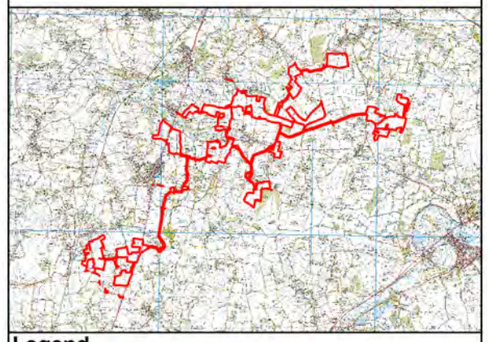
Sheet 1 of 19
Revision A

East Pye SOLAR

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Island GREEN POWER



**Legend**

- Order Limits
- Cable Route Corridor
- EA Statutory Main River
- Ordinary Watercourse

**Spatial Flood Defences**

- Natural High Ground
- Other

**Flood Zones**

- Flood Zone 3
- Flood Zone 2
- Area outside Flood Zone 2 and 3 is defined as Flood Zone 1 'Low Probability'

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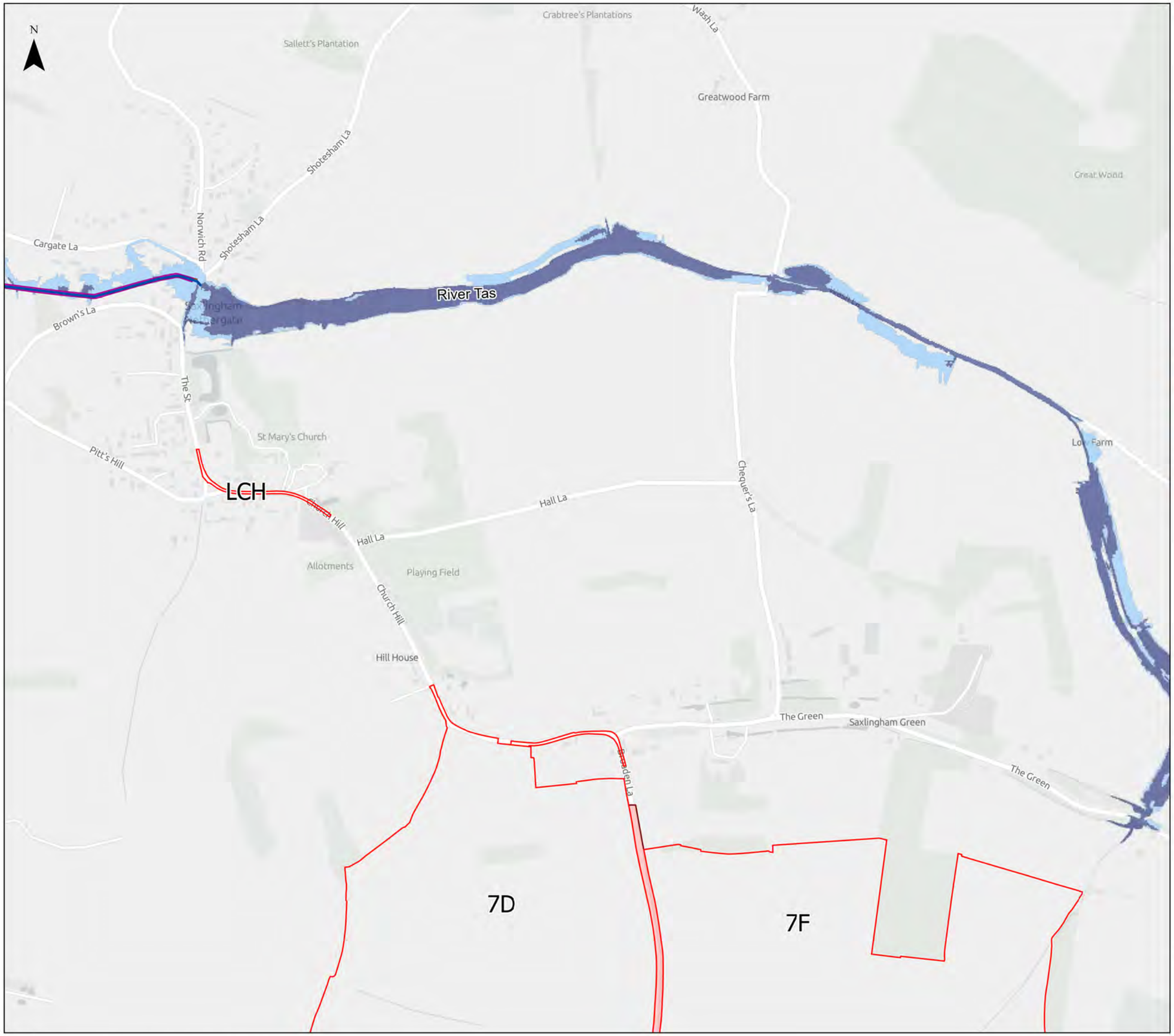
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**Figure 9.3 - Flood Zones**

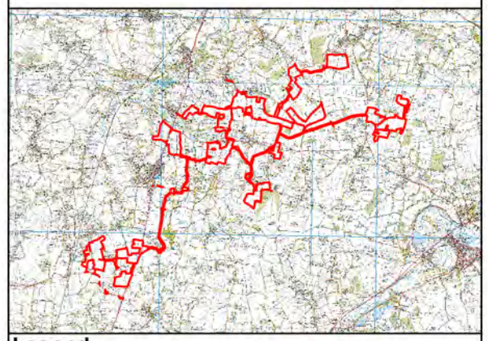
Sheet 2 of 19
Revision A

East Pye SOLAR

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Island GREEN POWER



**Legend**

- Order Limits
- Cable Route Corridor
- EA Statutory Main River
- Ordinary Watercourse

**Spatial Flood Defences**

- Natural High Ground
- Other

**Flood Zones**

- Flood Zone 3
- Flood Zone 2
- Area outside Flood Zone 2 and 3 is defined as Flood Zone 1 'Low Probability'

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**Figure 9.3 - Flood Zones**

Sheet 3 of 19
Revision A

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Green Man La

Kirstead Green

Swargate La

Seething Rd

Kirstead Green

Langhale House

Norwich Road

Playing Field

B1332

Gerrin's Farm

Upgate Rd

Pever's Farm

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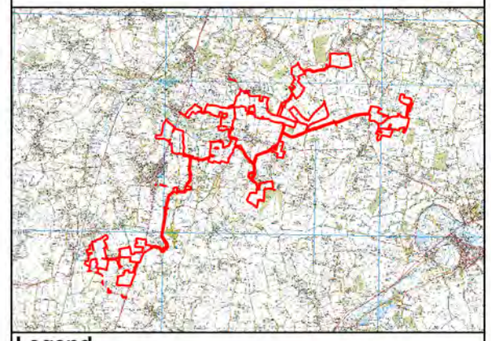
Seething Rd

Norwich Road

Toad La

10B

Island GREEN POWER



**Legend**

- Order Limits
- Cable Route Corridor
- Ordinary Watercourse

**Spatial Flood Defences**

- Natural High Ground
- Other

**Flood Zones**

- Flood Zone 3
- Flood Zone 2
- Area outside Flood Zone 2 and 3 is defined as Flood Zone 1 'Low Probability'

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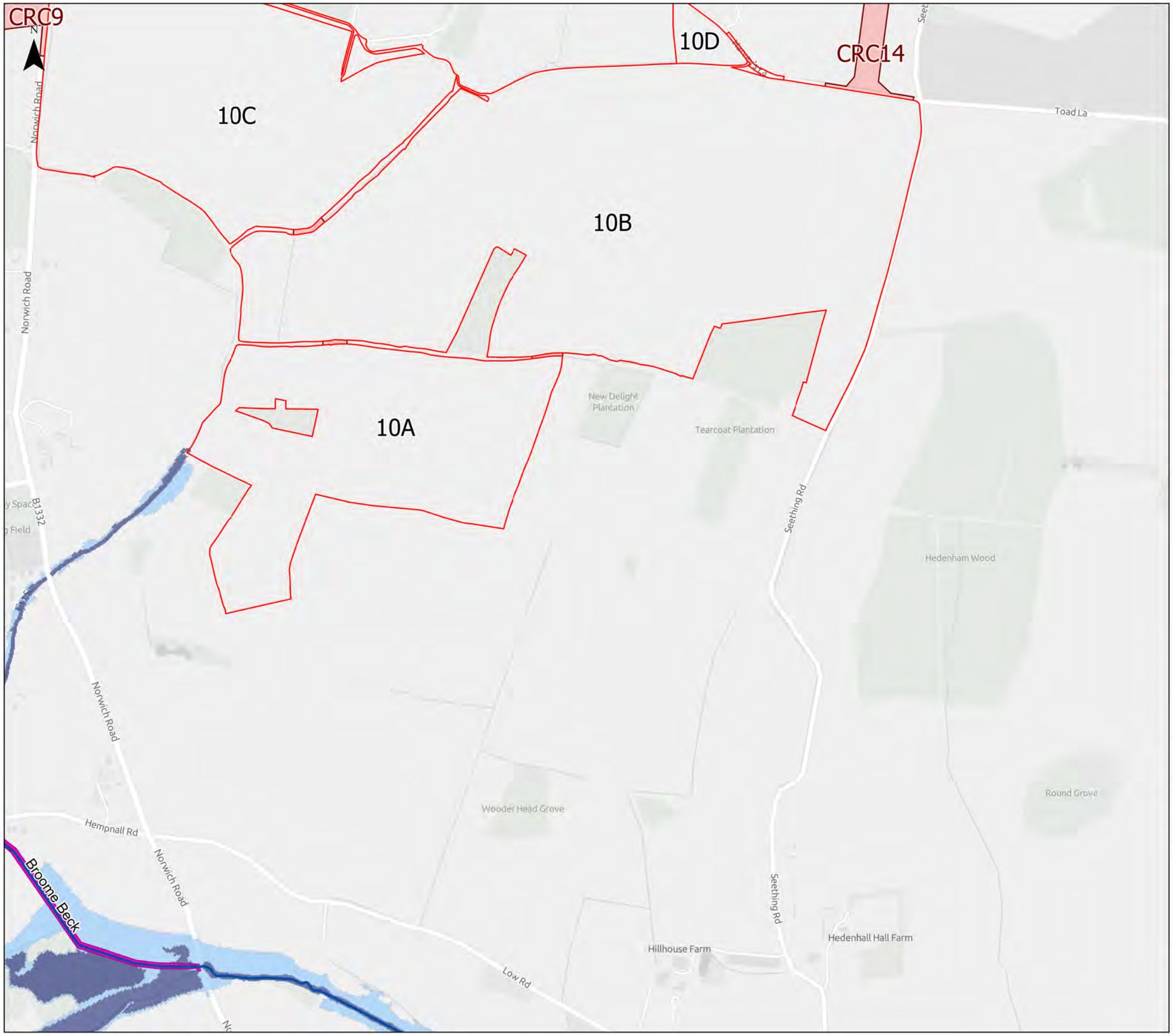
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**Figure 9.3 - Flood Zones**

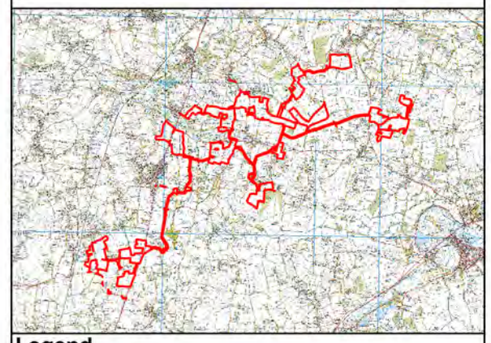
Sheet 4 of 19
Revision A

East Pye SOLAR

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Island GREEN POWER



**Legend**

- Order Limits
- Cable Route Corridor
- EA Statutory Main River
- Ordinary Watercourse

**Spatial Flood Defences**

- Natural High Ground
- Other

**Flood Zones**

- Flood Zone 3
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- Area outside Flood Zone 2 and 3 is defined as Flood Zone 1 'Low Probability'

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**Figure 9.3 - Flood Zones**

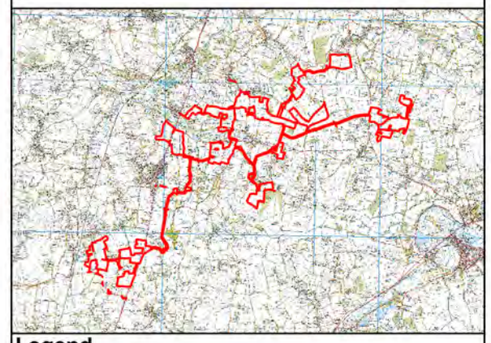
Sheet 5 of 19
Revision A

East Pye SOLAR

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Island GREEN POWER



**Legend**

- Order Limits
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- Ordinary Watercourse

**Spatial Flood Defences**

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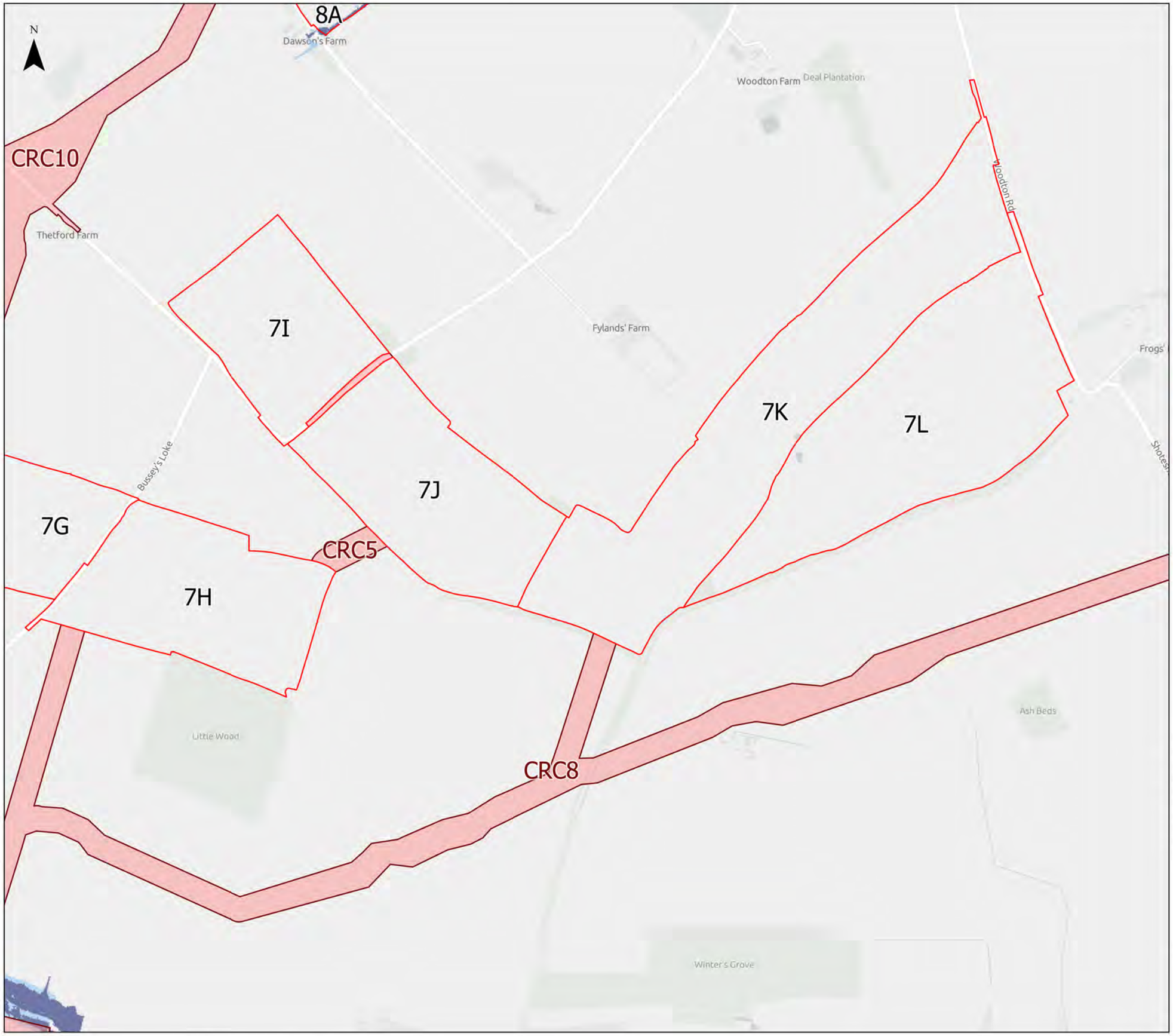
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**Figure 9.3 - Flood Zones**

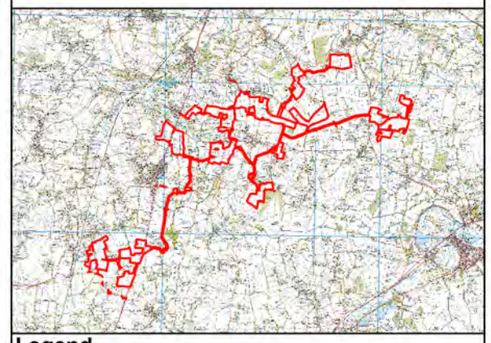
Sheet 6 of 19
Revision A

East Pye SOLAR

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Island GREEN POWER



**Legend**

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**Spatial Flood Defences**

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**Flood Zones**

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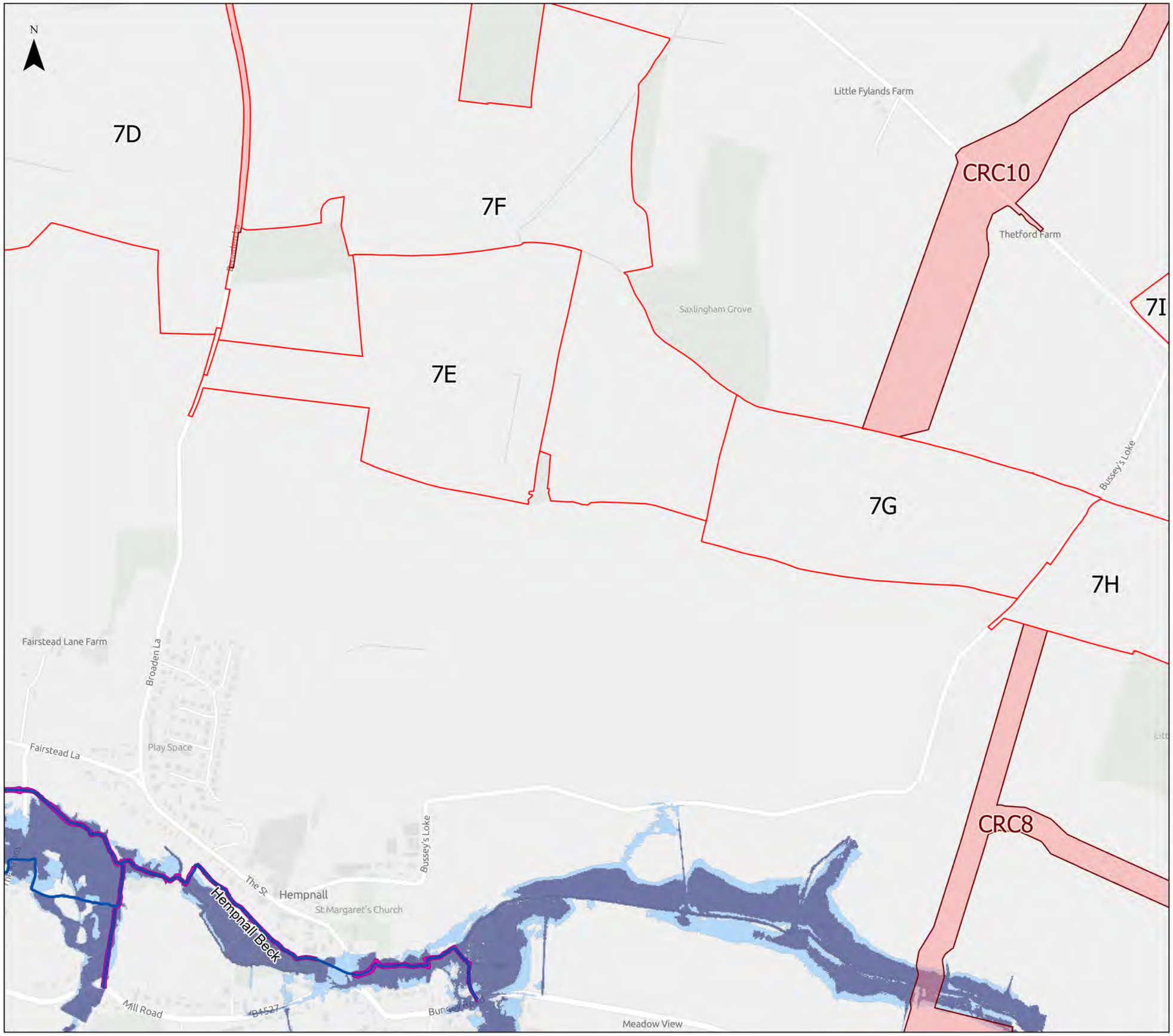
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**Figure 9.3 - Flood Zones**

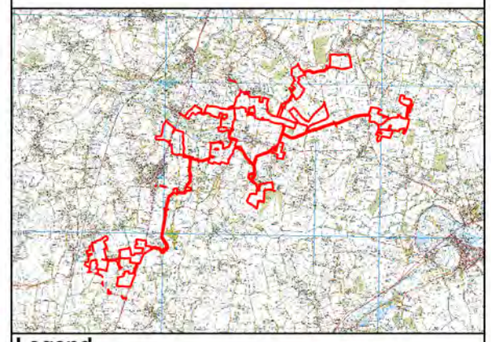
Sheet 7 of 19
Revision A

East Pye SOLAR

Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx




Island GREEN POWER



**Legend**

- Order Limits
- Cable Route Corridor
- EA Statutory Main River
- Ordinary Watercourse

**Spatial Flood Defences**

- Natural High Ground
- Other

**Flood Zones**

- Flood Zone 3
- Flood Zone 2
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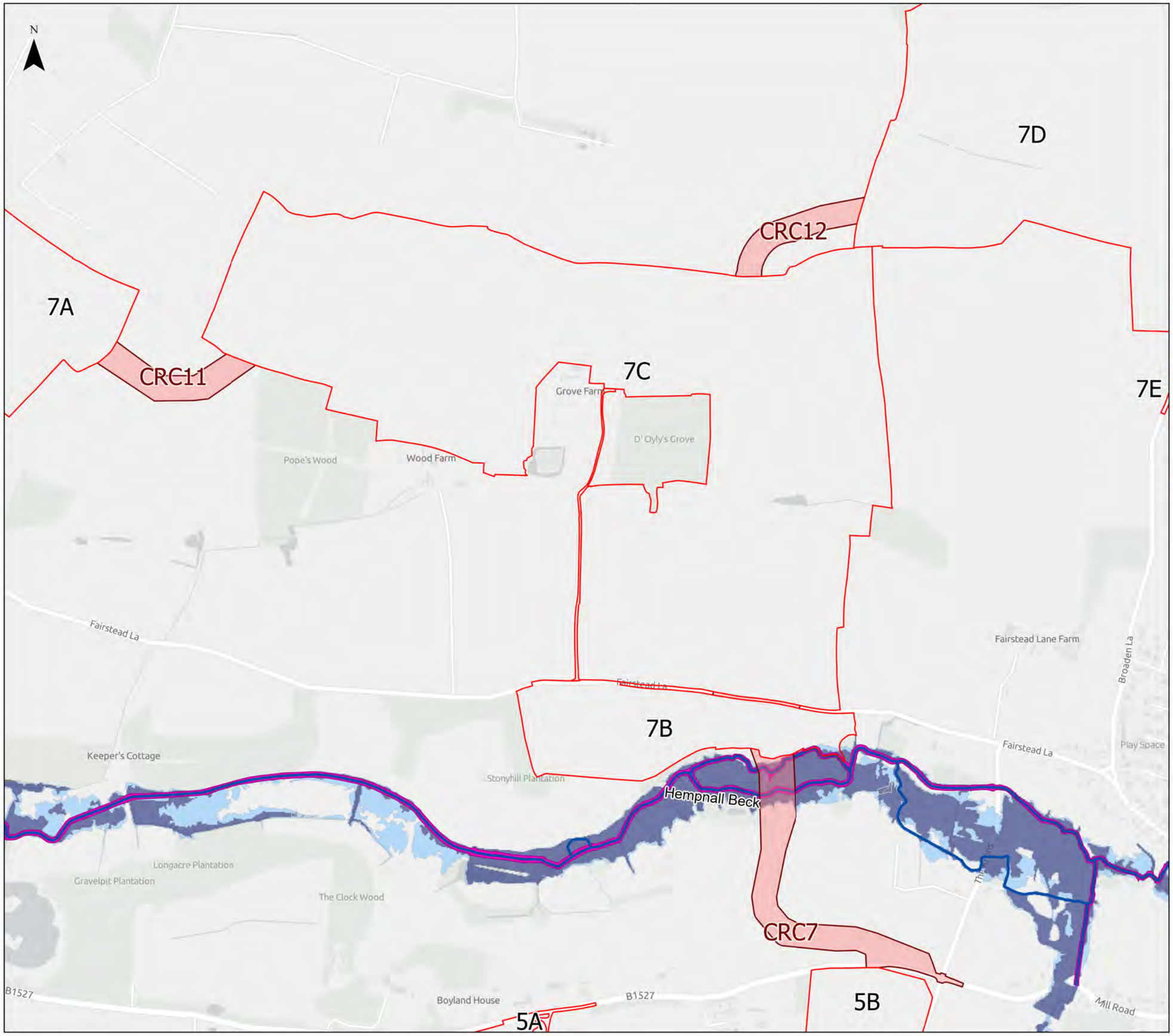
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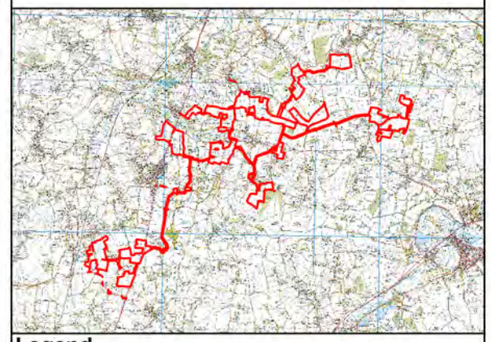
Sheet 8 of 19
Revision A

East Pye SOLAR

Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx




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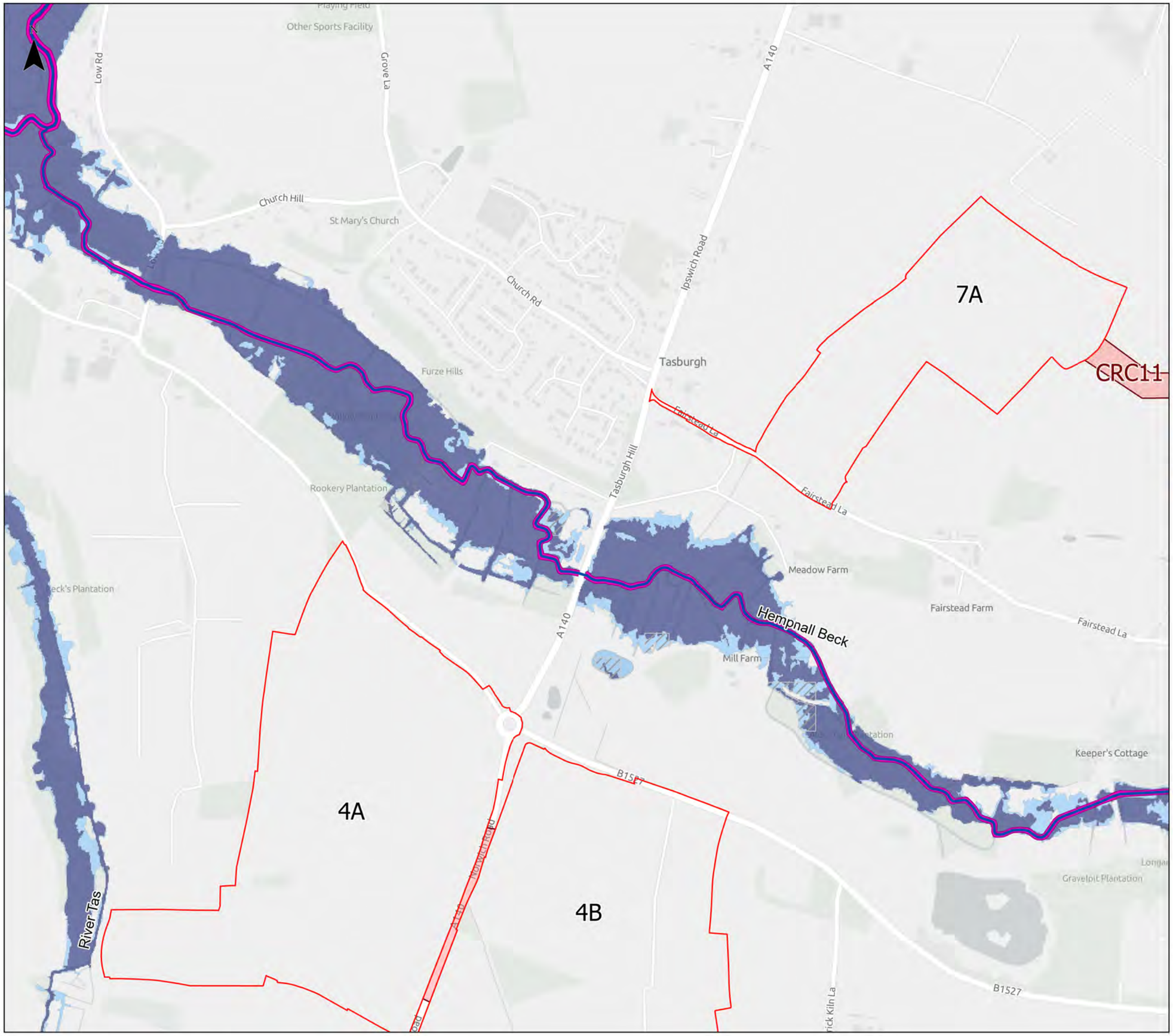
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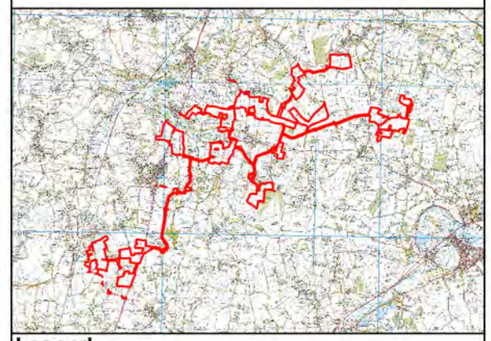
Sheet 9 of 19
Revision A

East Pye SOLAR

Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx




Island GREEN POWER



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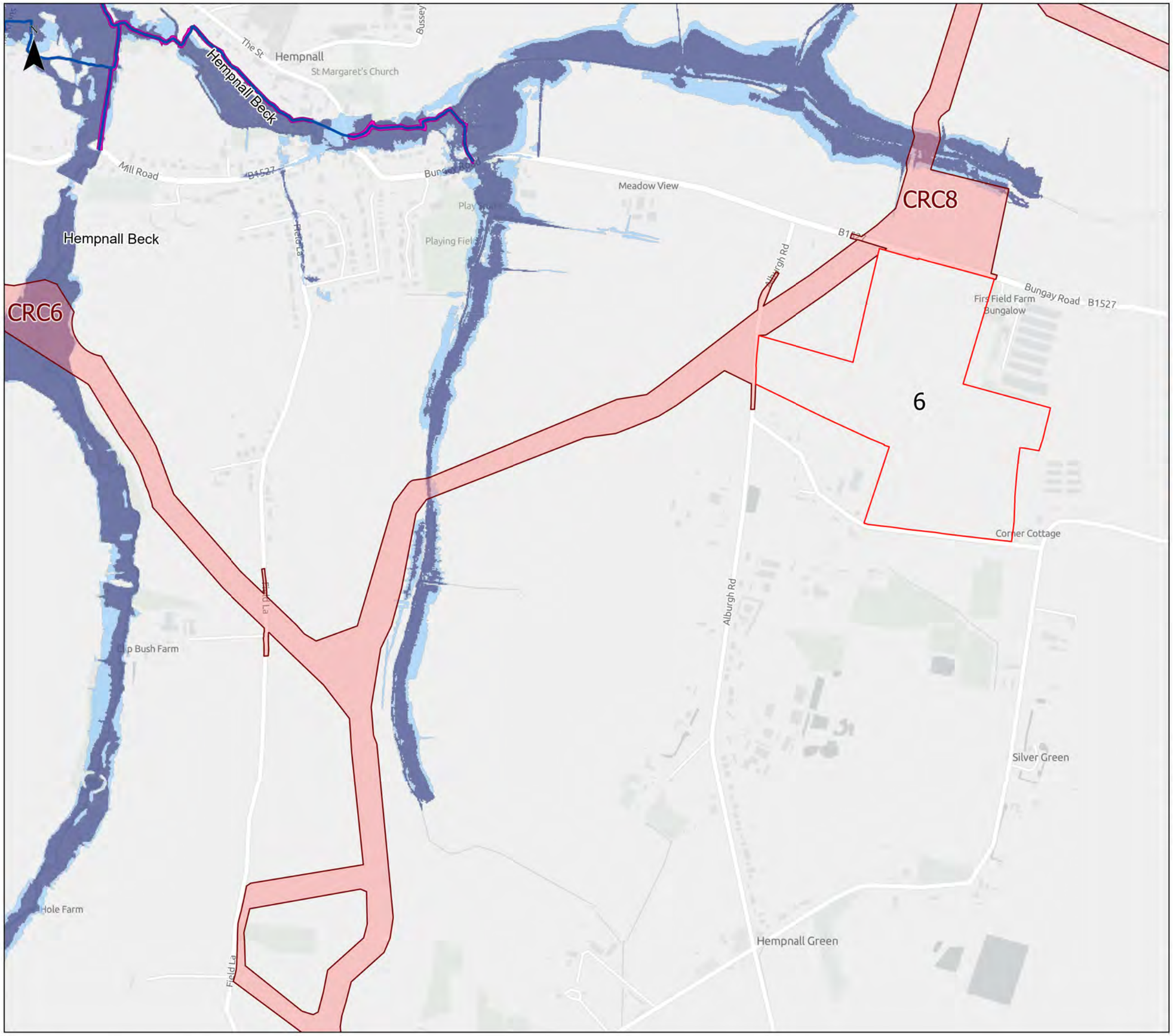
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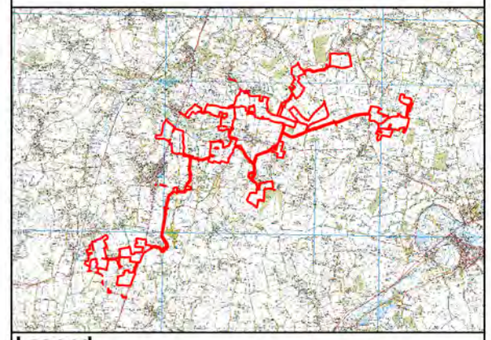
Sheet 10 of 19
Revision A

East Pye SOLAR

Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx




Island GREEN POWER



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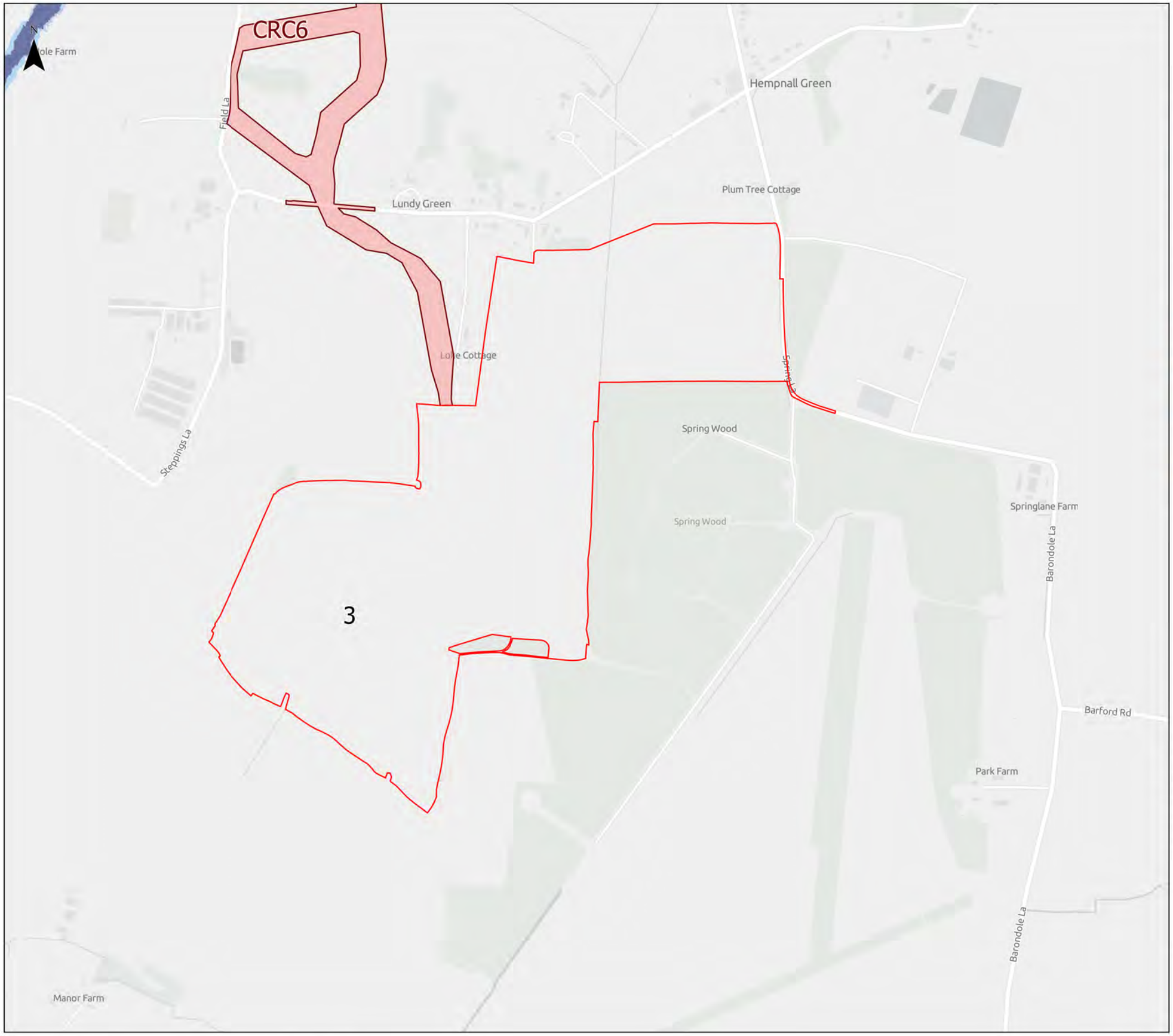
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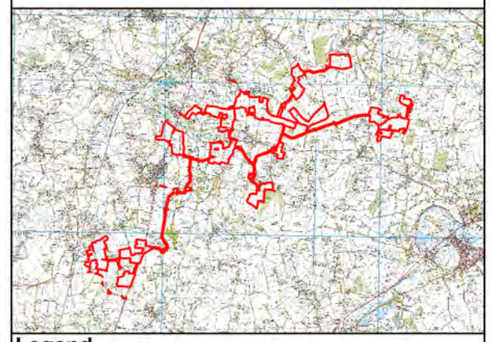
Sheet 11 of 19
Revision A

East Pye SOLAR

Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx




Island GREEN POWER



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0 250 500 m

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**Figure 9.3 - Flood Zones**

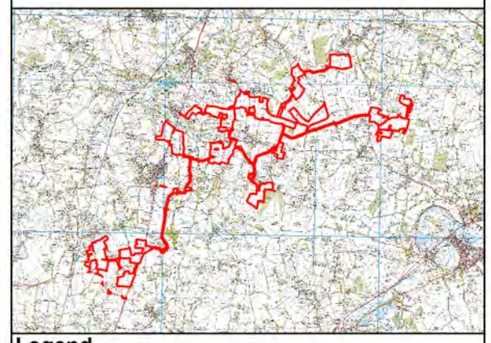
Sheet 12 of 19
Revision A

East Pye SOLAR

Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx




Island GREEN POWER



**Legend**

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0 250 500 m

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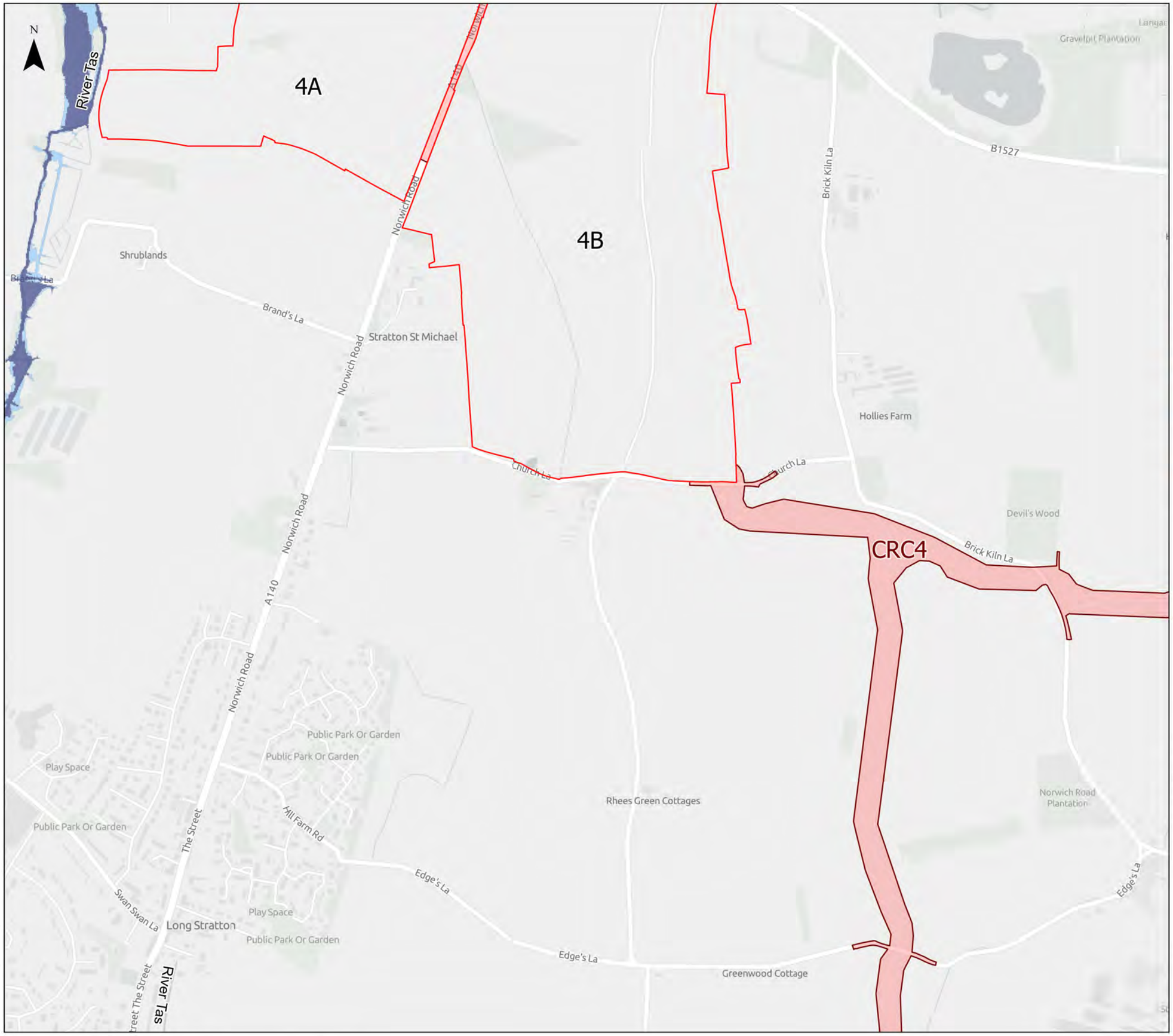
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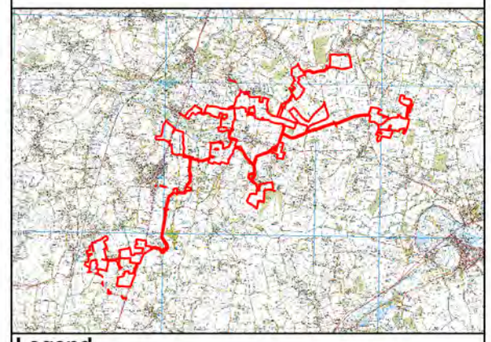
Sheet 13 of 19
Revision A

East Pye SOLAR

Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx




Island GREEN POWER



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0 250 500 m

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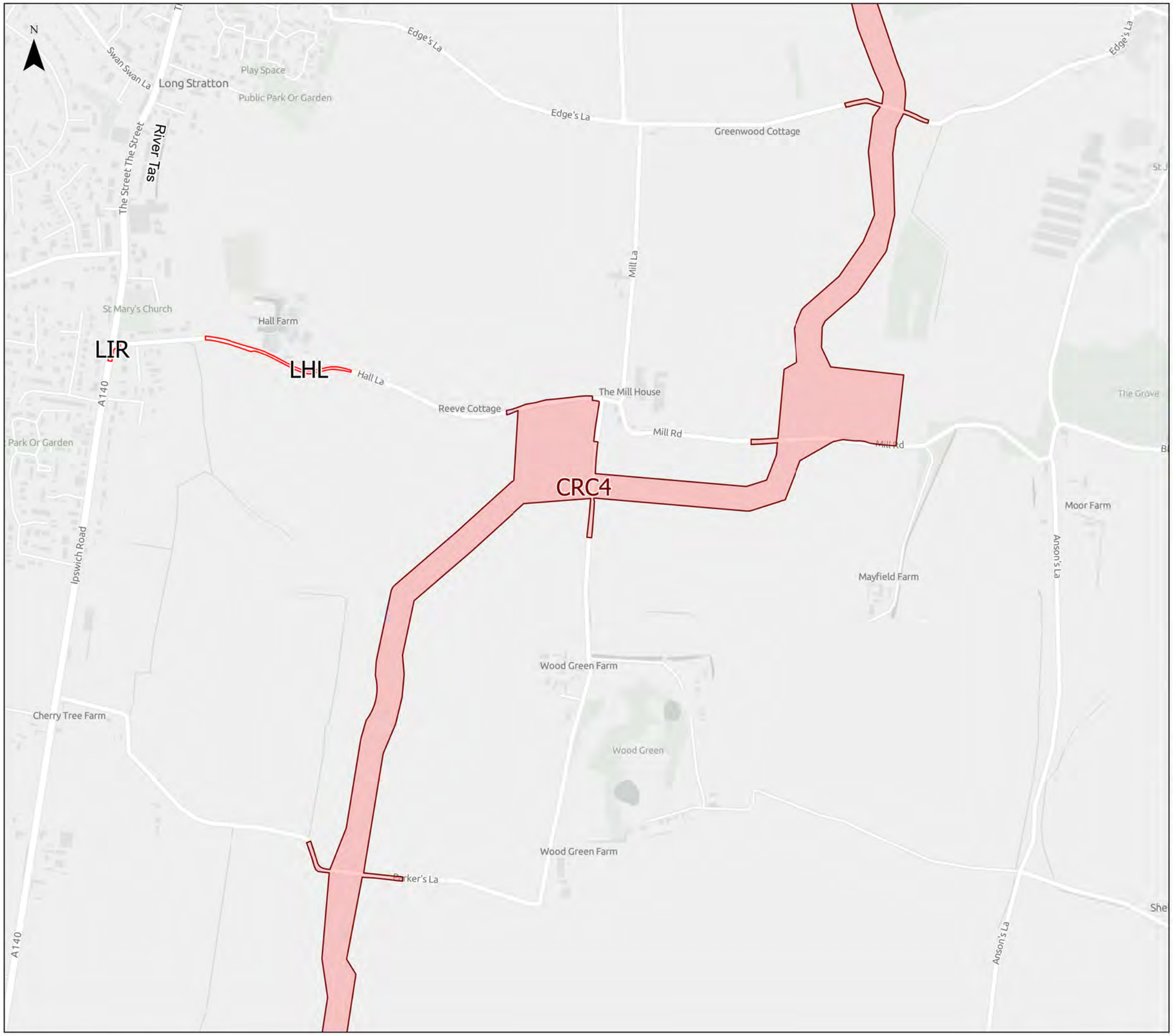
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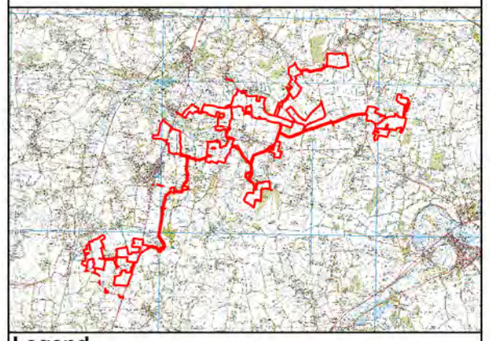
Sheet 14 of 19
Revision A

East Pye SOLAR

Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx




Island GREEN POWER



**Legend**

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1:7,500 @ A3

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**Figure 9.3 - Flood Zones**

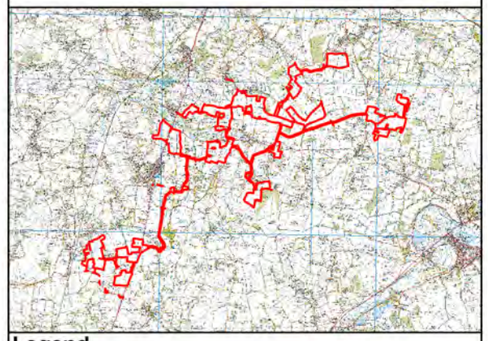
Sheet 15 of 19
Revision A

East Pye SOLAR

Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx




Island GREEN POWER



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**Figure 9.3 - Flood Zones**

Sheet 16 of 19
Revision A

East Pye SOLAR

Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx

N

1D

1B

2C

2B

CRC4

CRC2

BESS Site

CRC3

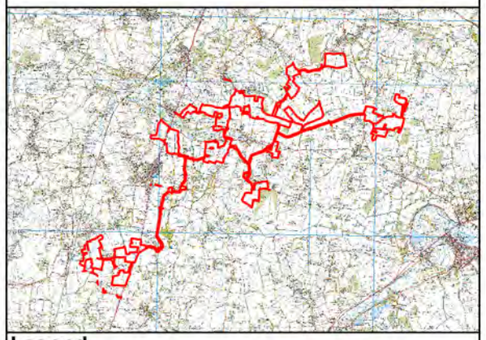
2A

A140

Norwich Road

Wood La

Crowgreen Farm



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0 250 500 m

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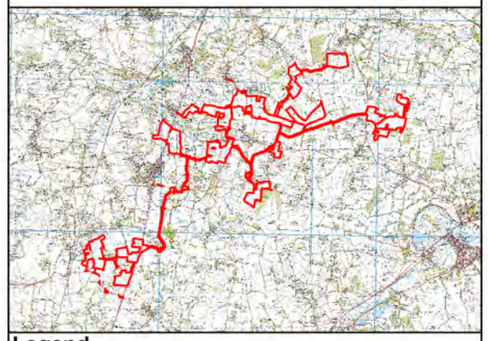
**Figure 9.3 - Flood Zones**

Sheet 17 of 19
Revision A

Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx




Island GREEN POWER



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0 250 500 m

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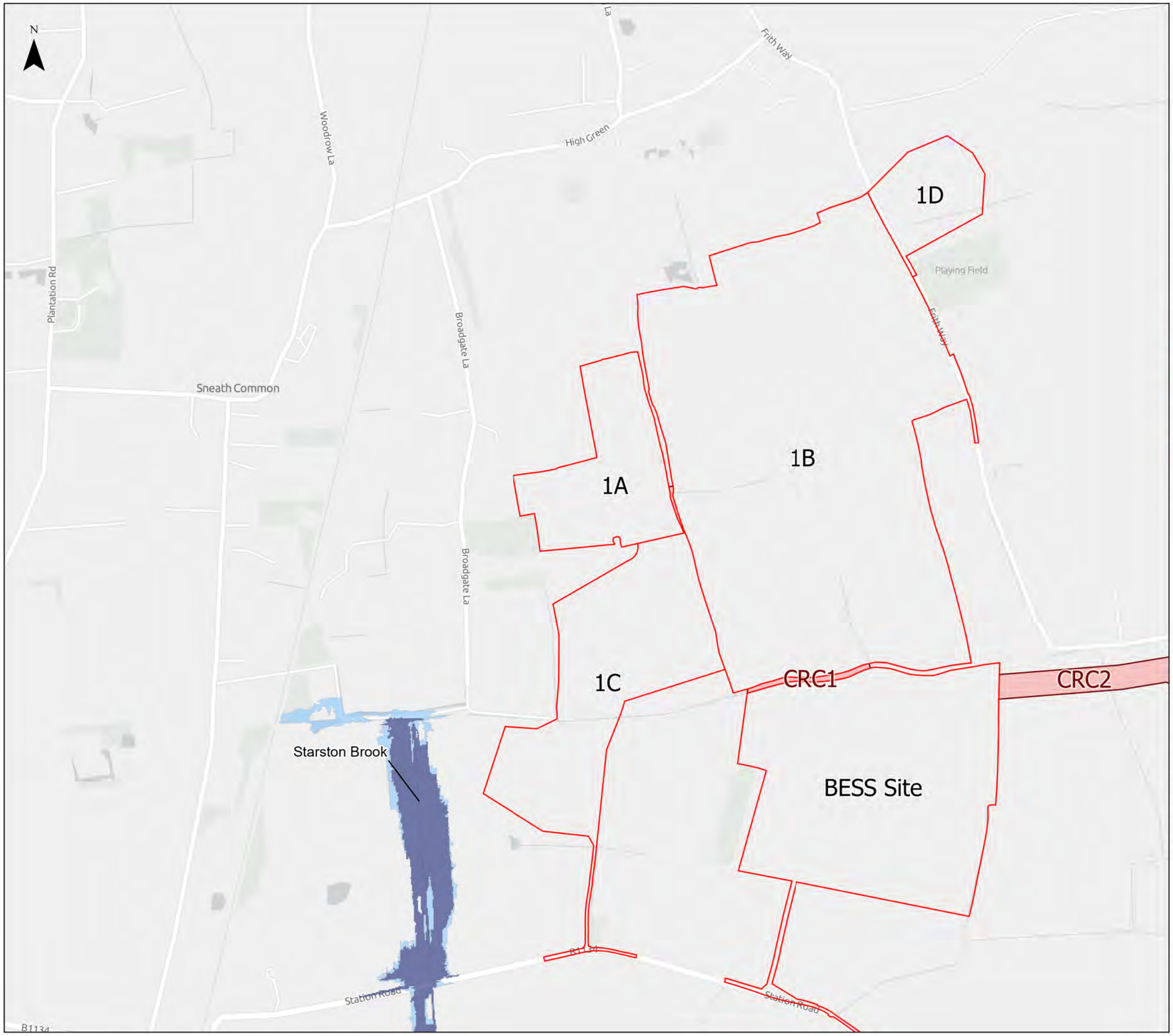
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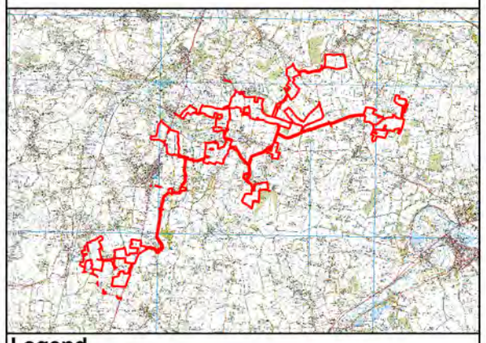
Sheet 18 of 19
Revision A

East Pye SOLAR

Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx




Island GREEN POWER



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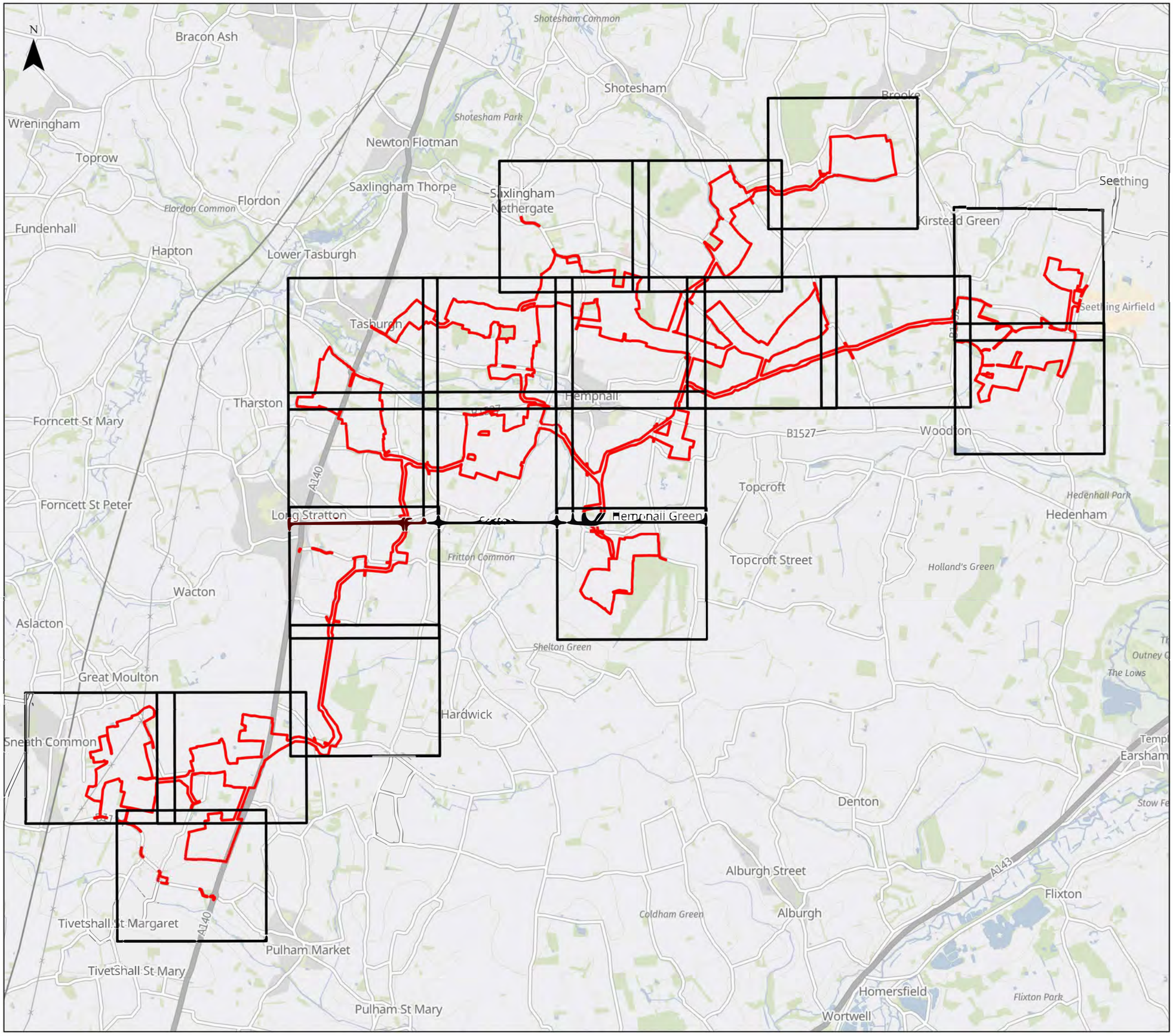
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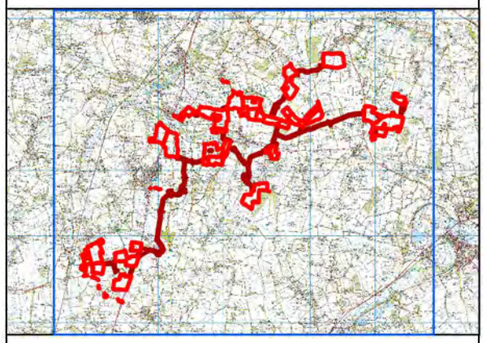
Sheet 19 of 19
Revision A

East Pye SOLAR

Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx




Island GREEN POWER



**Legend**

- Order Limits
- Sheet Index

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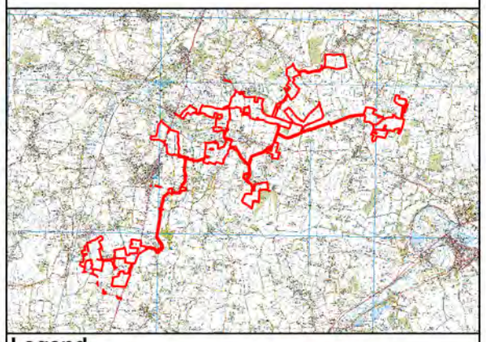
**Figure 9.4 - Risk of Flooding from Surface Water Extent**

Index Sheet
Revision A

East Pye SOLAR

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**Legend**

- Order Limits
- Cable Route Corridor
- Ordinary Watercourse
- EA Statutory Main River

**Risk of Flooding from Surface Water**

- High (3.3%) - 1 in 30 Annual Probability
- Medium (1%) - 1 in 100 Annual Probability
- Low (0.1%) - 1 in 1000 Annual Probability

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0 250 500 m

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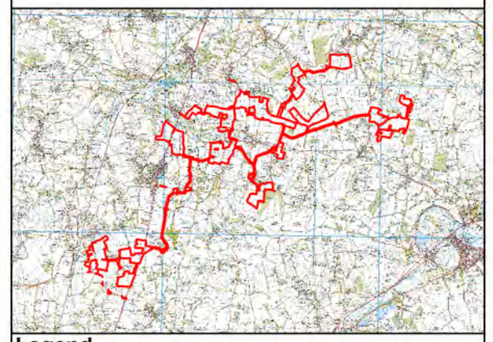
**Figure 9.4 - EA Risk of Flooding from Surface Water Extent**

Sheet 1 of 19
Revision A

Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx




Island GREEN POWER



**Legend**

- Order Limits
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- Ordinary Watercourse
- EA Statutory Main River

**Risk of Flooding from Surface Water**

- High (3.3%) - 1 in 30 Annual Probability
- Medium (1%) - 1 in 100 Annual Probability
- Low (0.1%) - 1 in 1000 Annual Probability

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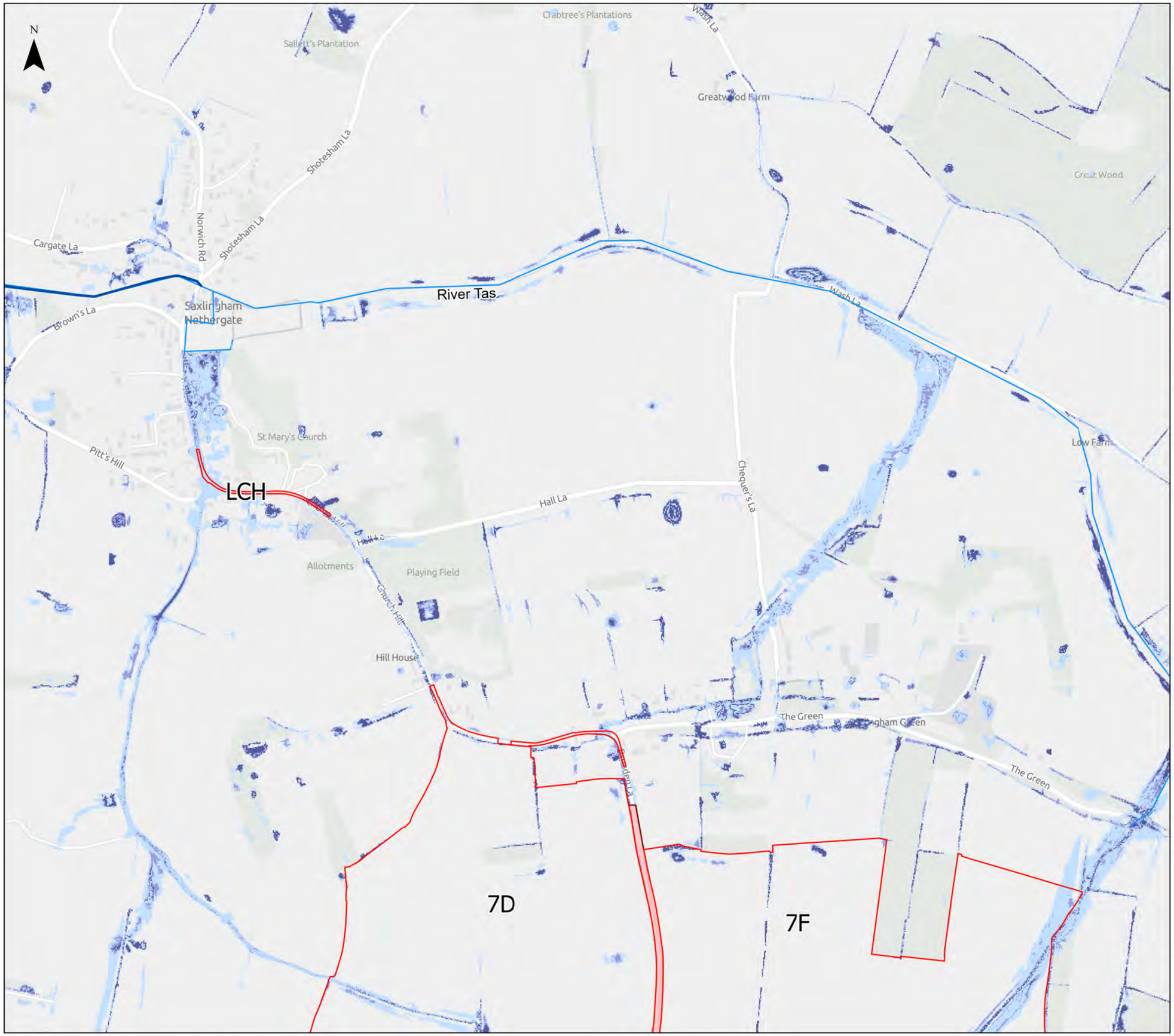
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**Figure 9.4 - EA Risk of Flooding from Surface Water Extent**

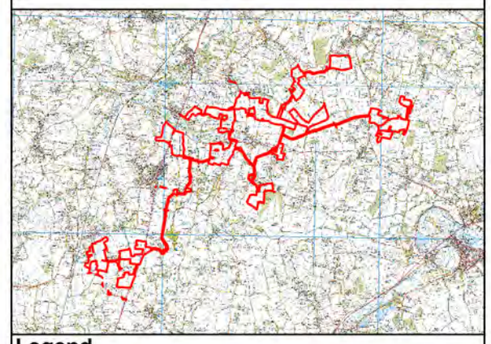
Sheet 2 of 19
Revision A

East Pye SOLAR

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Island GREEN POWER



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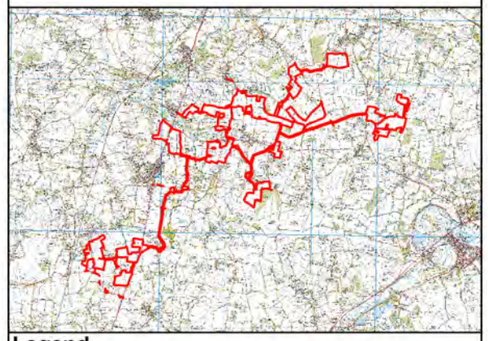
**Figure 9.4 - EA Risk of Flooding from Surface Water Extent**

Sheet 3 of 19
Revision A

East Pye SOLAR

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**Figure 9.4 - EA Risk of Flooding from Surface Water Extent**

Sheet 4 of 19
Revision A

East Pye SOLAR

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CRC14

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Toad La

Norwich Road

New Delight Plantation

Teardoat Plantation

Seething Rd

Hedenham Wood

B1332

The St

Norwich Road

Hempnall Rd

Norwich Road

Broome Beck

Wooder Head Grove

Round Grove

Hillhouse Farm

Low Rd

Seething Rd

Hedenham Hall Farm

Island GREEN POWER

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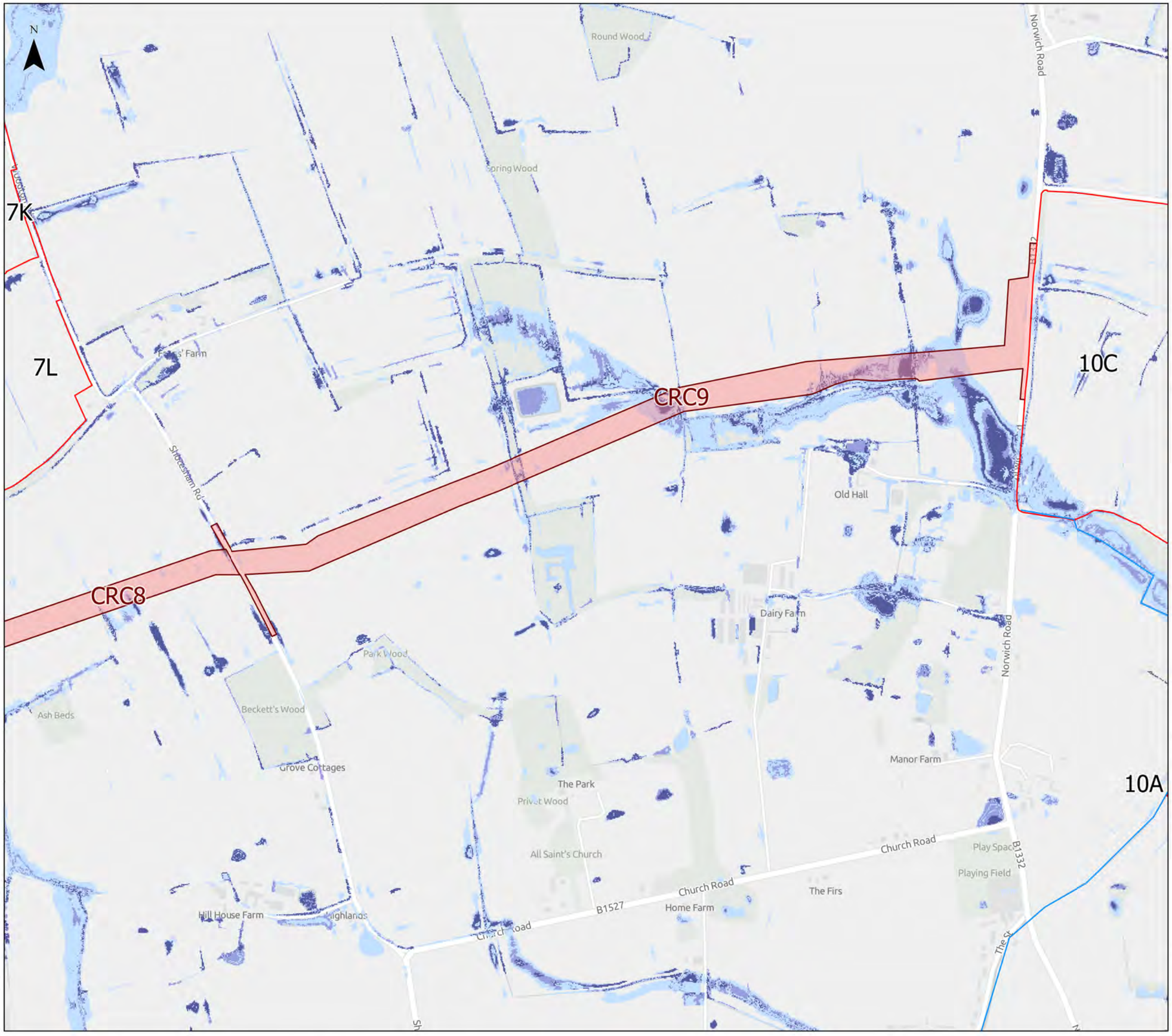
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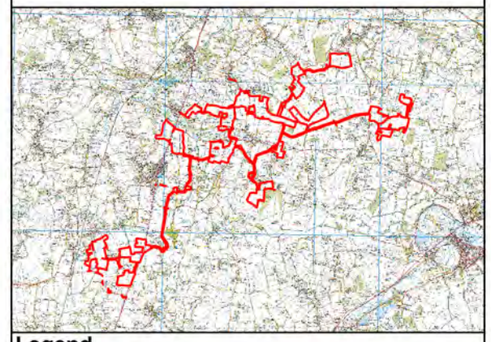
Sheet 5 of 19
Revision A

East Pye SOLAR

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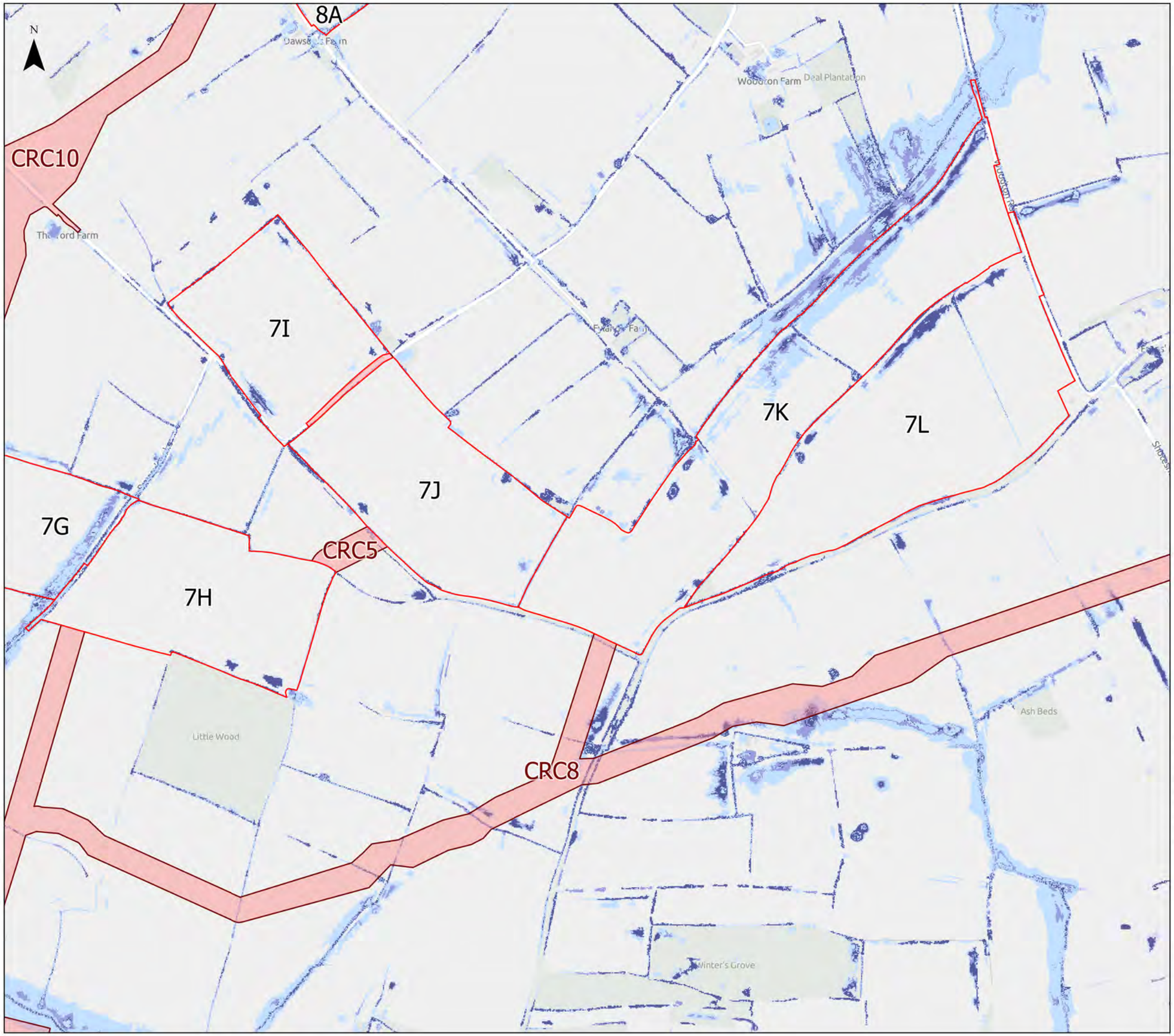
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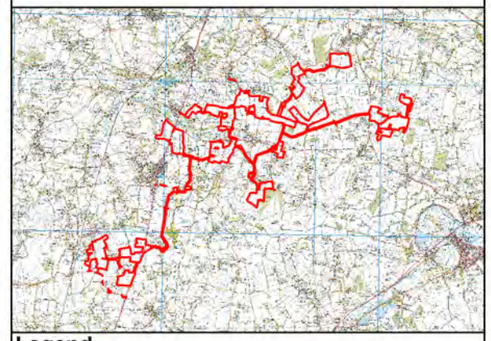
Sheet 6 of 19
Revision A

East Pye SOLAR

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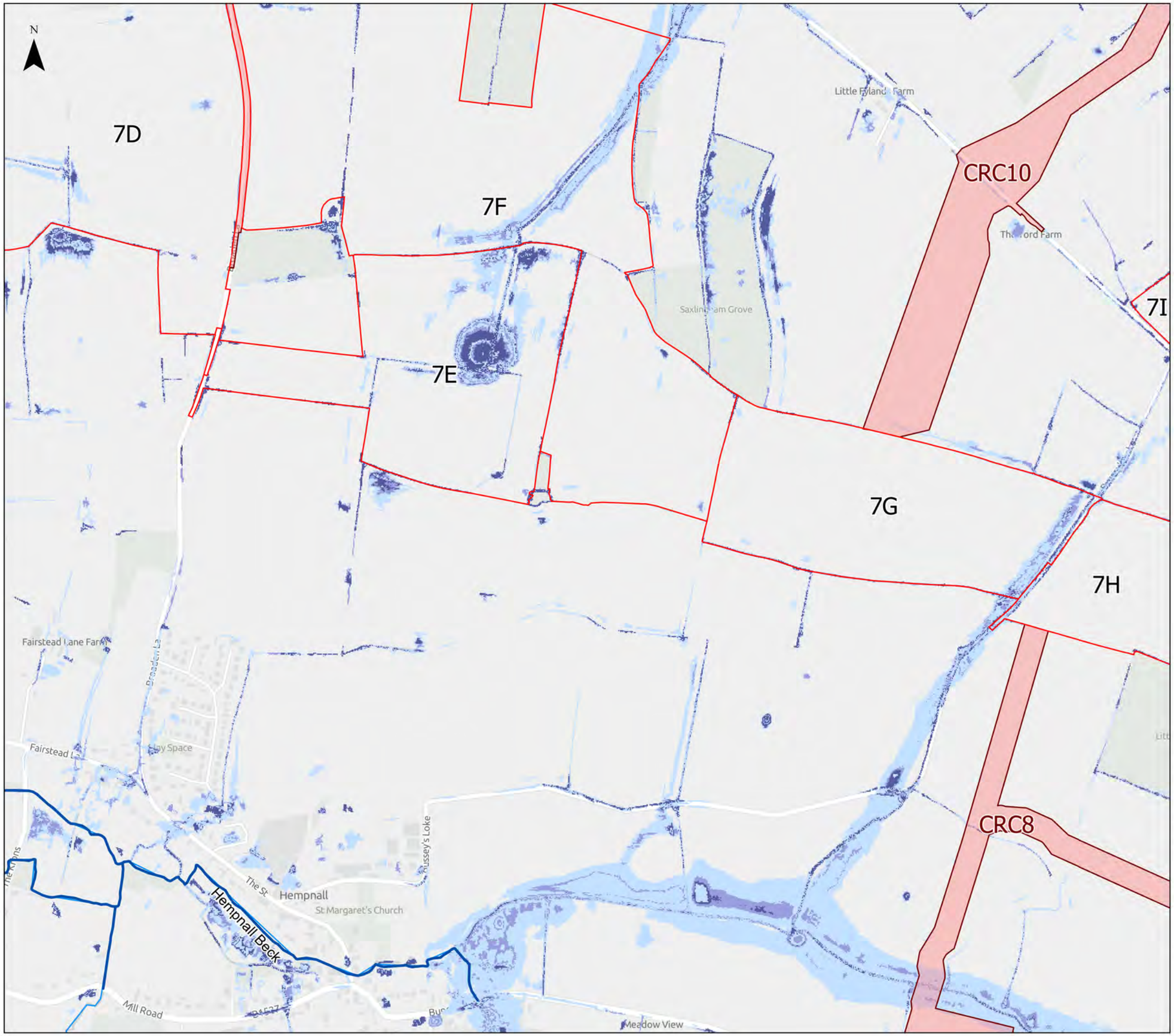
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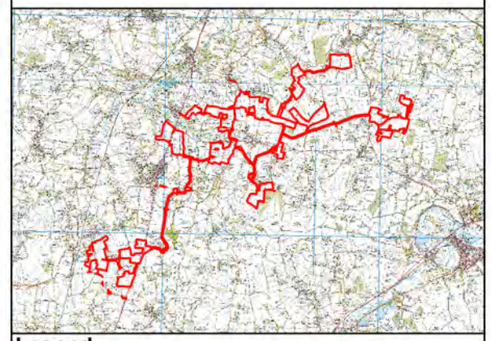
Sheet 7 of 19
Revision A

East Pye SOLAR

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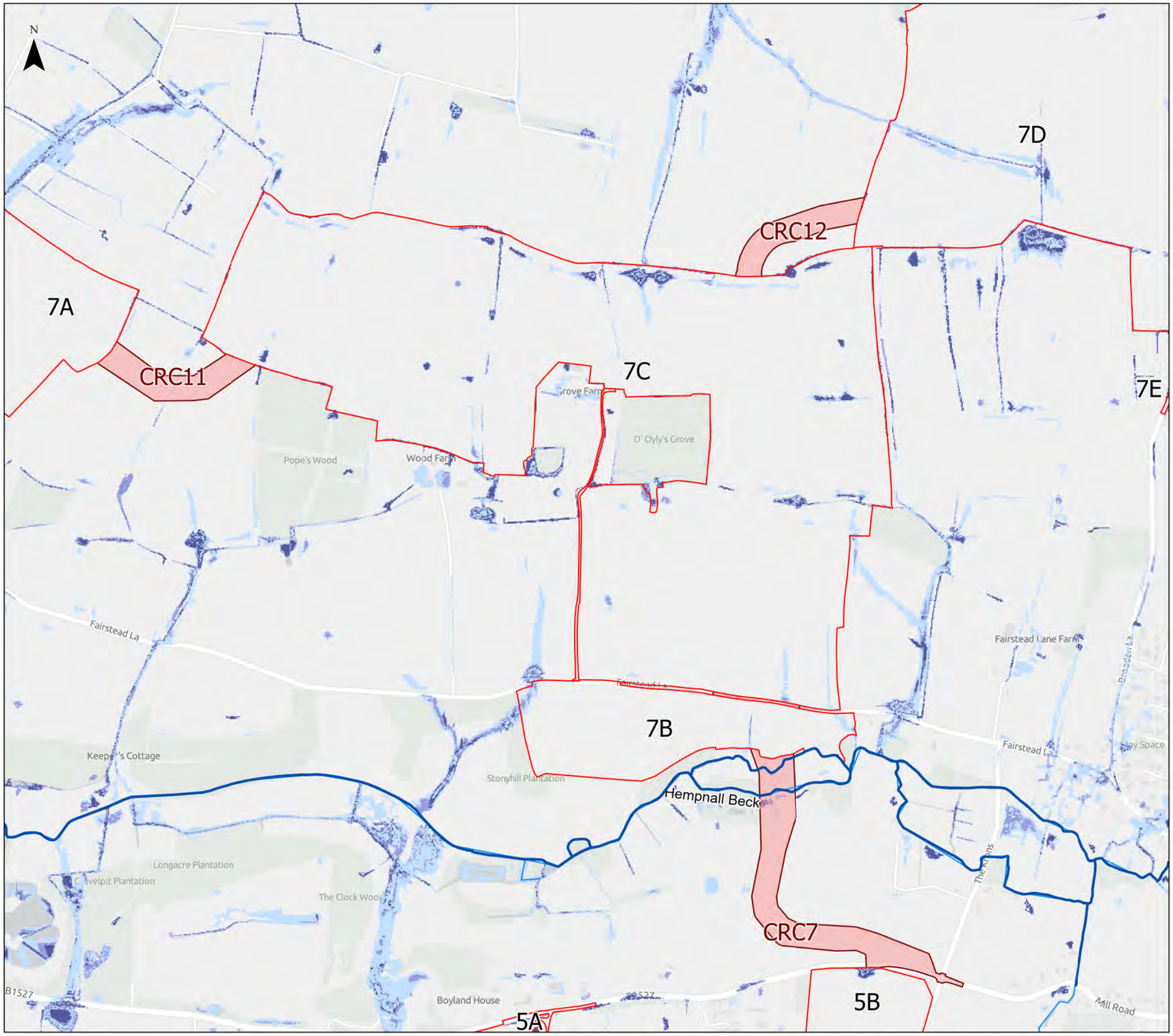
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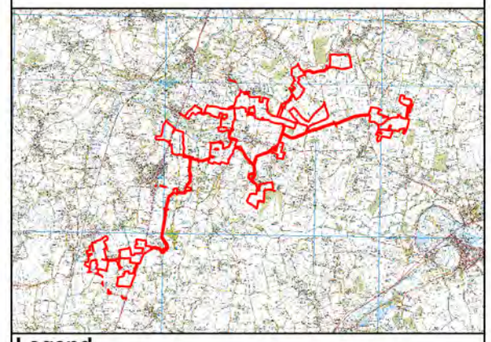
Sheet 8 of 19
Revision A

East Pye SOLAR

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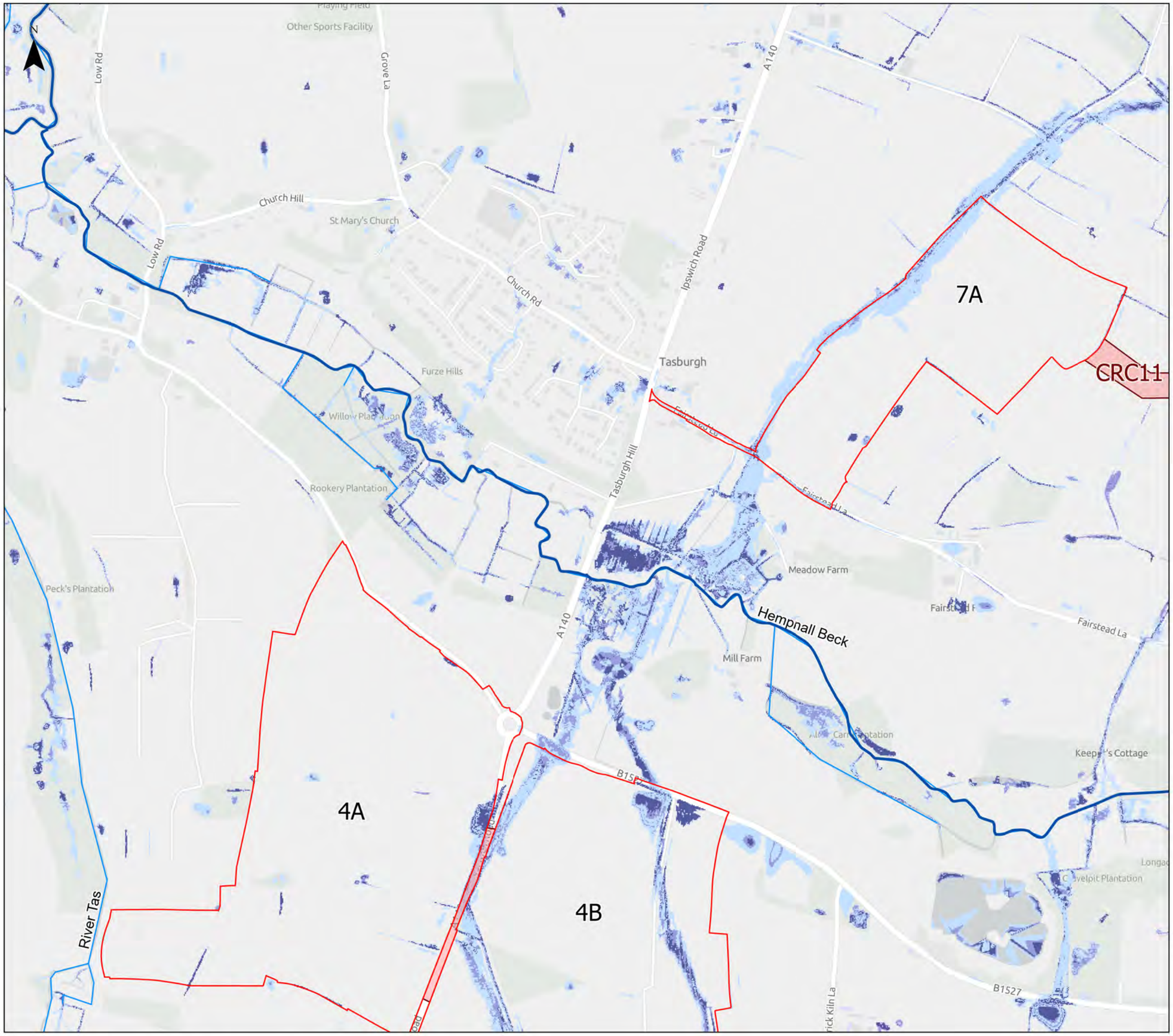
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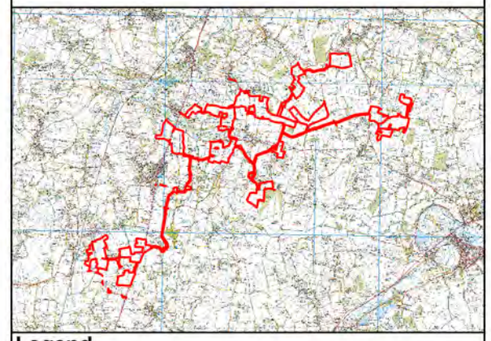
Sheet 9 of 19
Revision A

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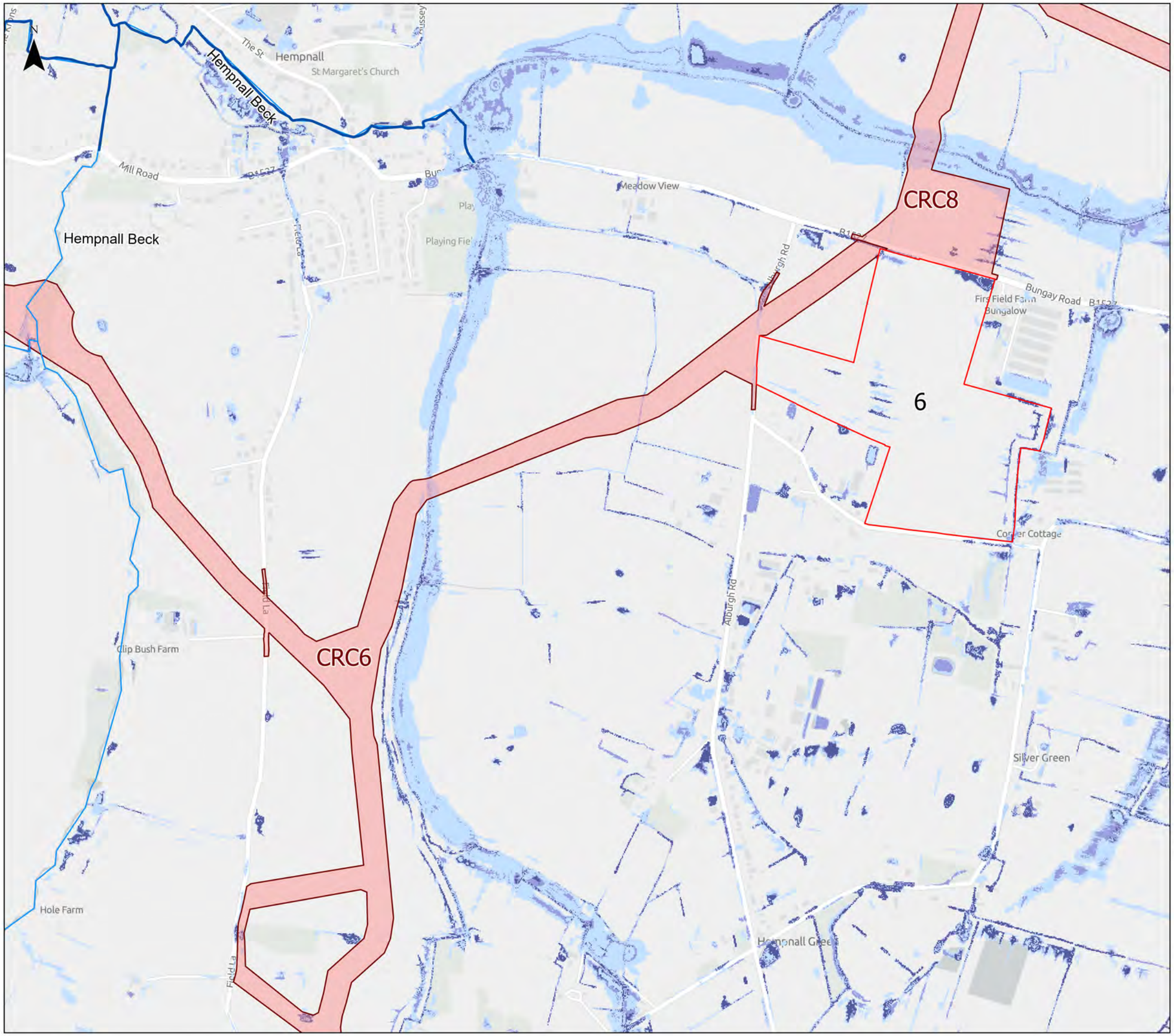
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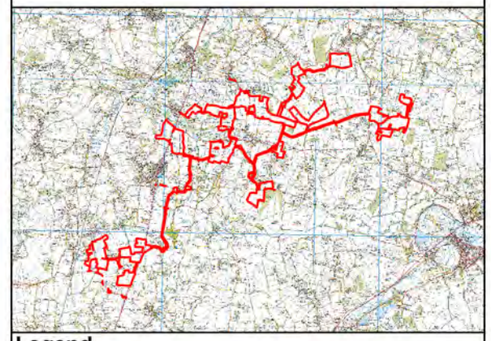
Sheet 10 of 19
Revision A

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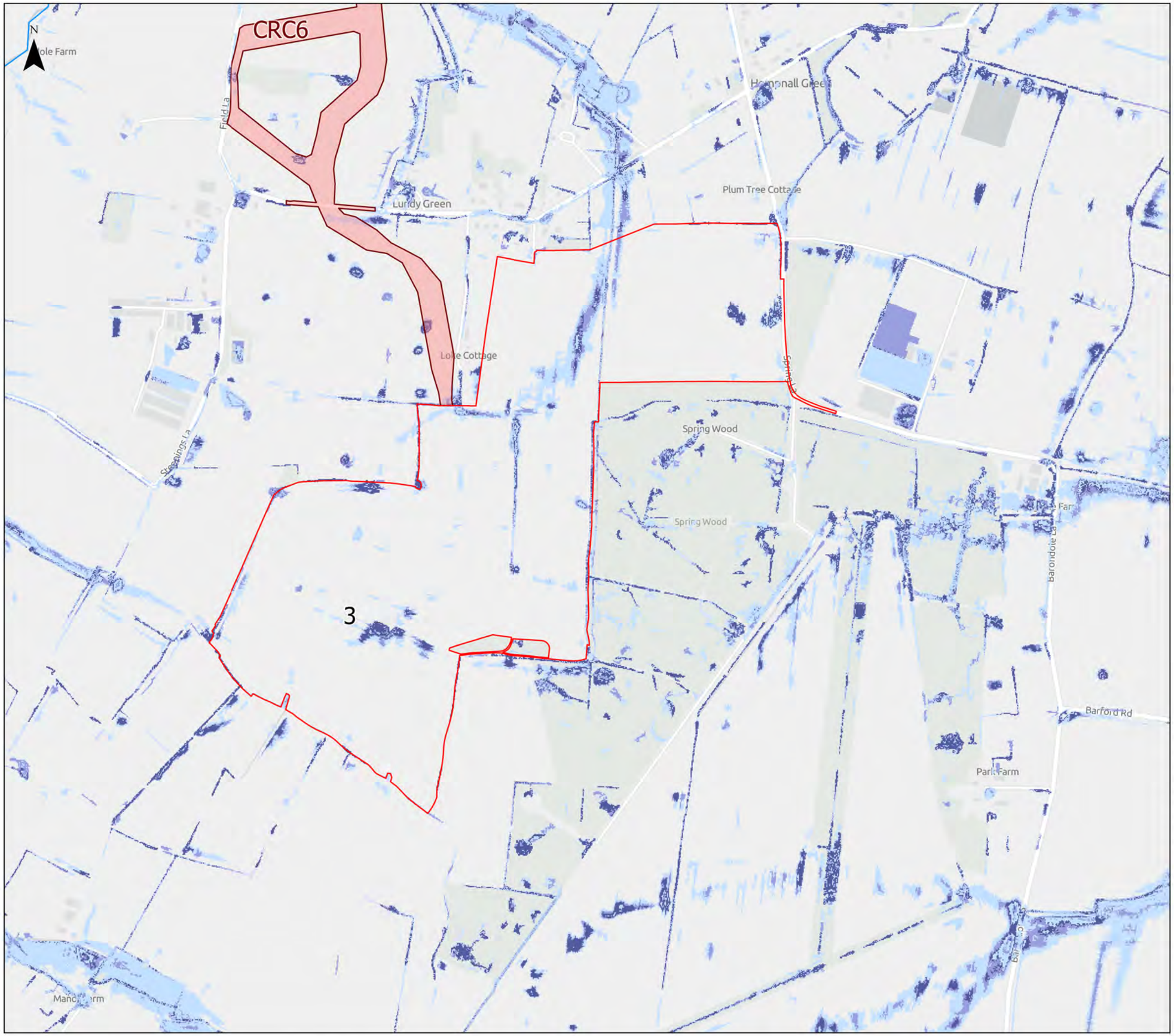
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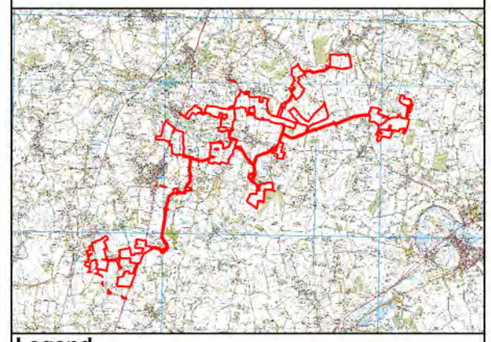
Sheet 11 of 19
Revision A

East Pye SOLAR

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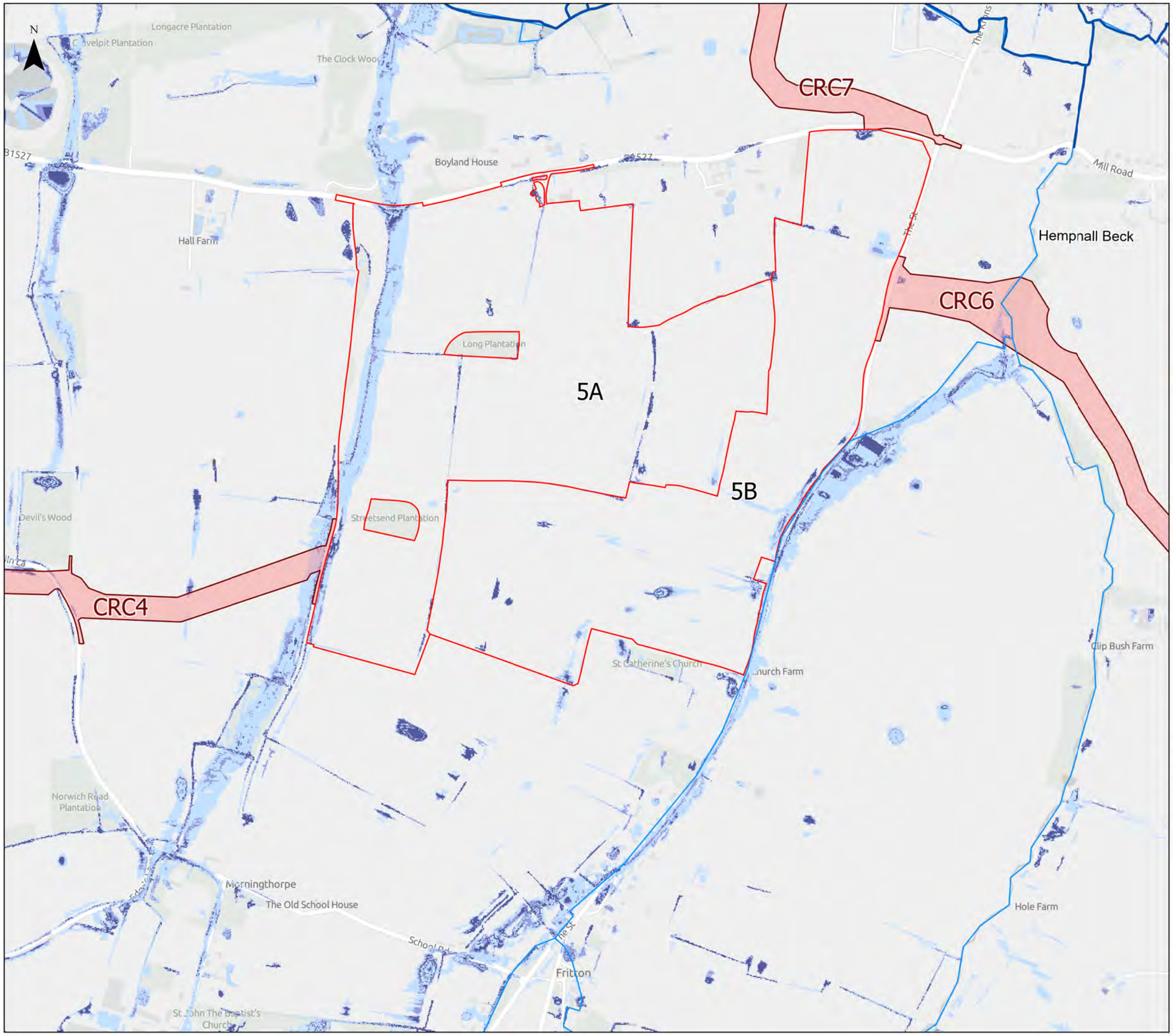
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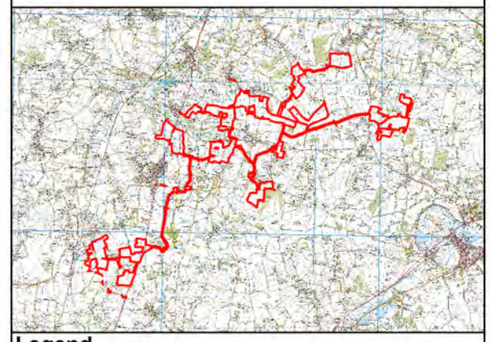
Sheet 12 of 19
Revision A

East Pye SOLAR

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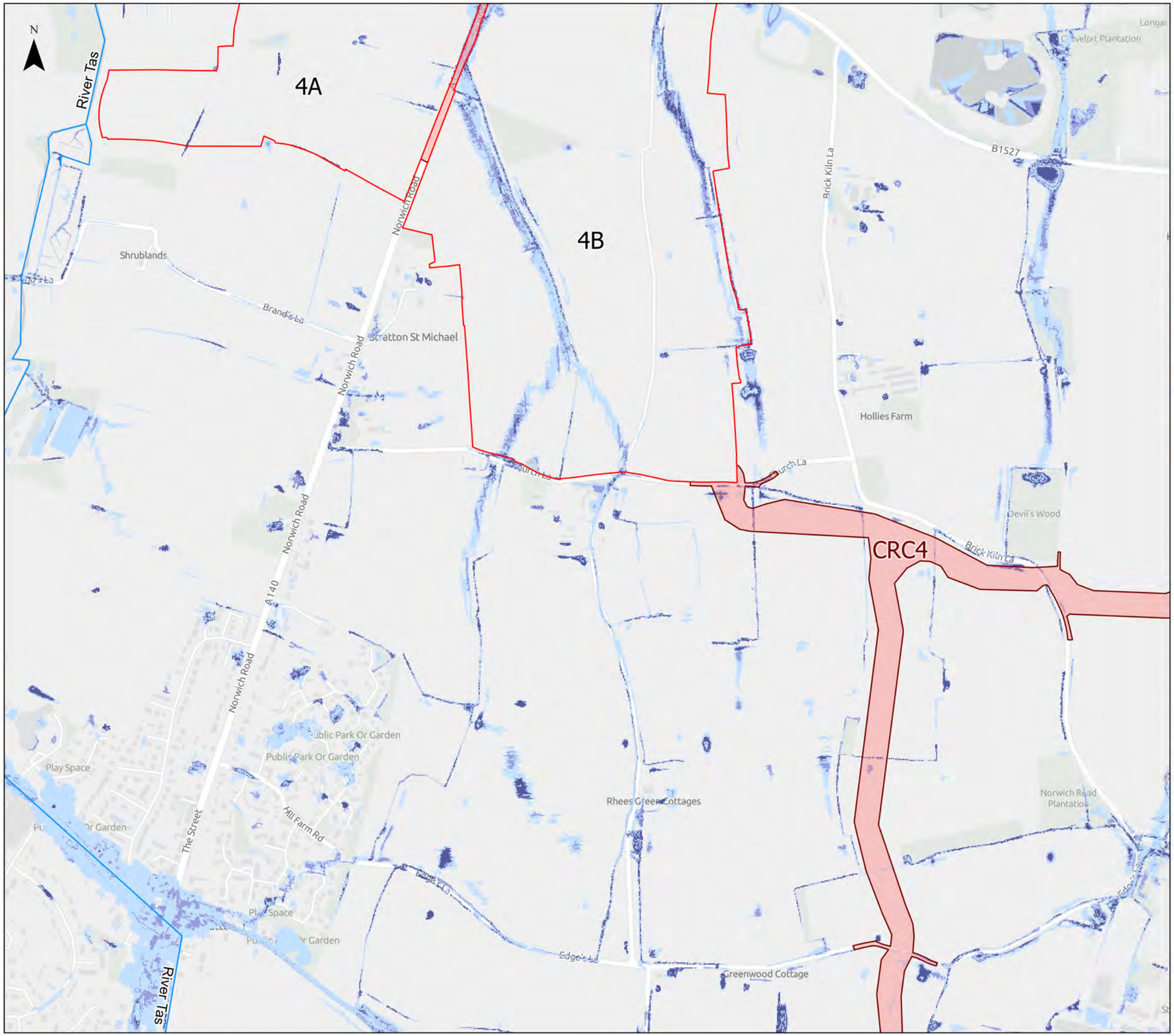
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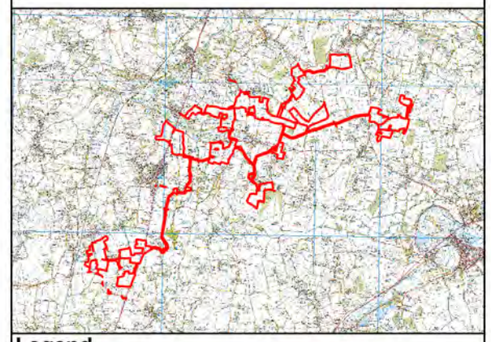
Sheet 13 of 19
Revision A

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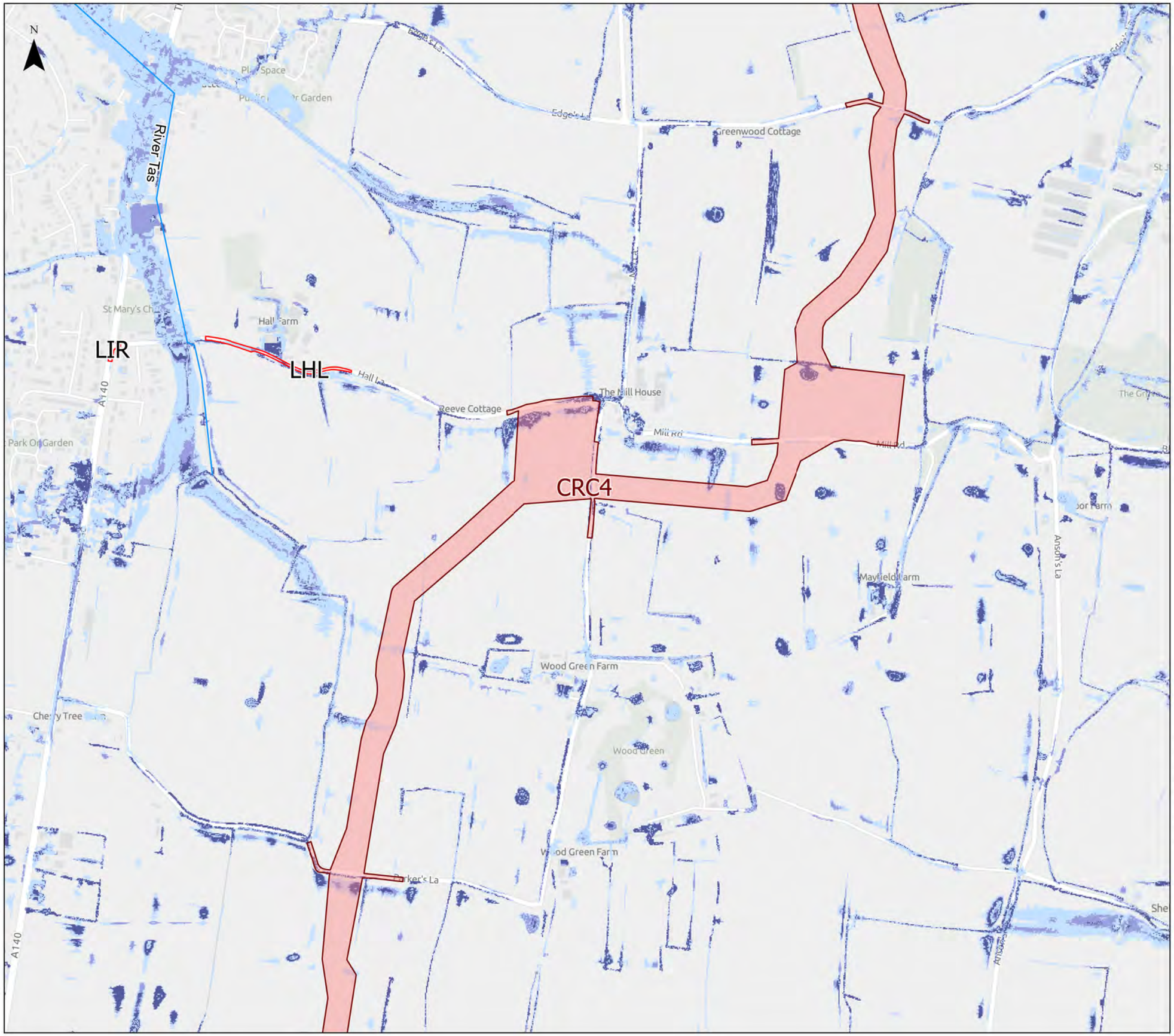
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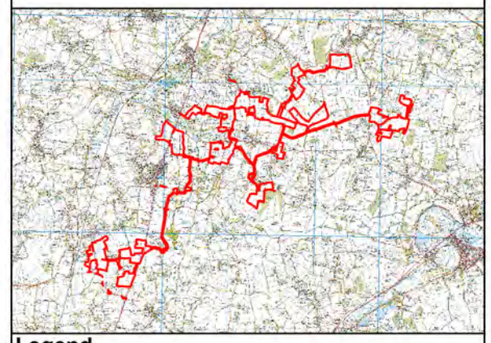
Sheet 14 of 19
Revision A

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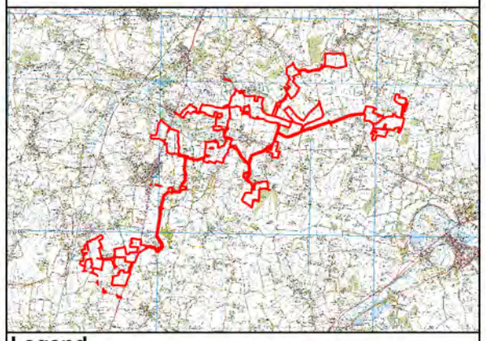
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Sheet 15 of 19
Revision A

East Pye SOLAR

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Island GREEN POWER



**Legend**

- Order Limits
- Cable Route Corridor
- Ordinary Watercourse
- EA Statutory Main River

**Risk of Flooding from Surface Water**

- High (3.3%) - 1 in 30 Annual Probability
- Medium (1%) - 1 in 100 Annual Probability
- Low (0.1%) - 1 in 1000 Annual Probability

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| Ref: 6.2.9.1 | Date: 04/C3/2026 |
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**Figure 9.4 - EA Risk of Flooding from Surface Water Extent**

Sheet 16 of 19
Revision A

East Pye SOLAR

Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx

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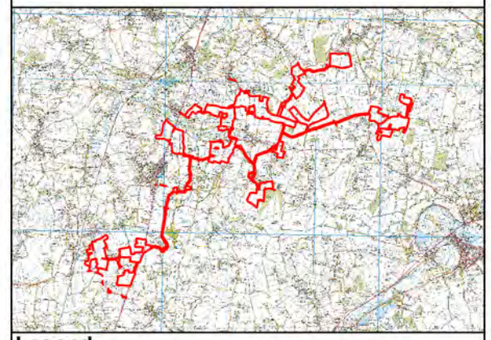
BESS Site

A140

Norwich Road

Crowgreen Farm

Island GREEN POWER



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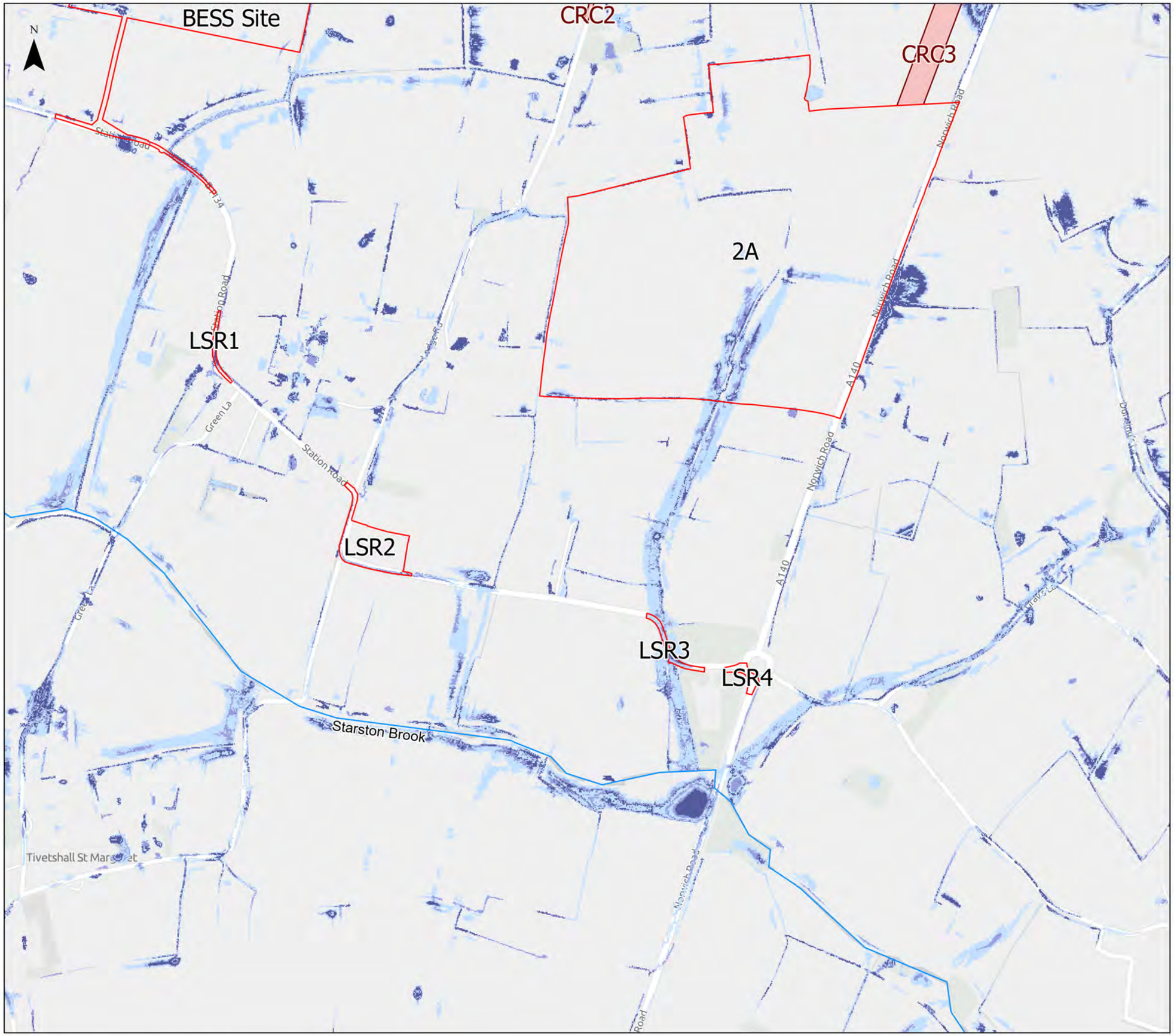
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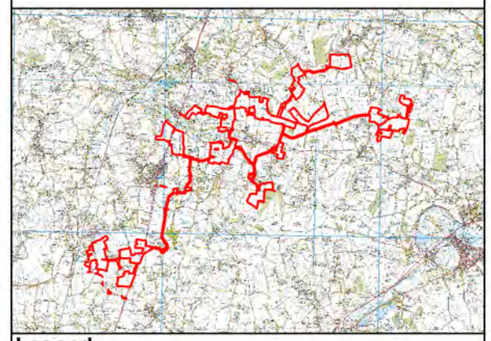
Sheet 17 of 19
Revision A

East Pye SOLAR

Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx




Island GREEN POWER



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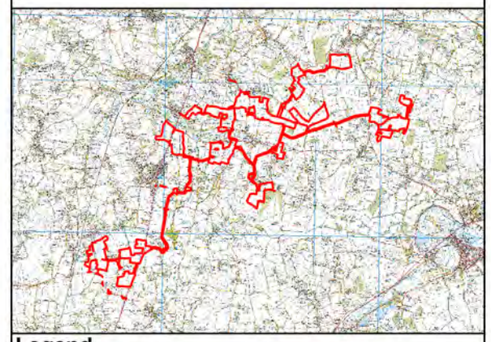
Sheet 18 of 19
Revision A

East Pye SOLAR

Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx




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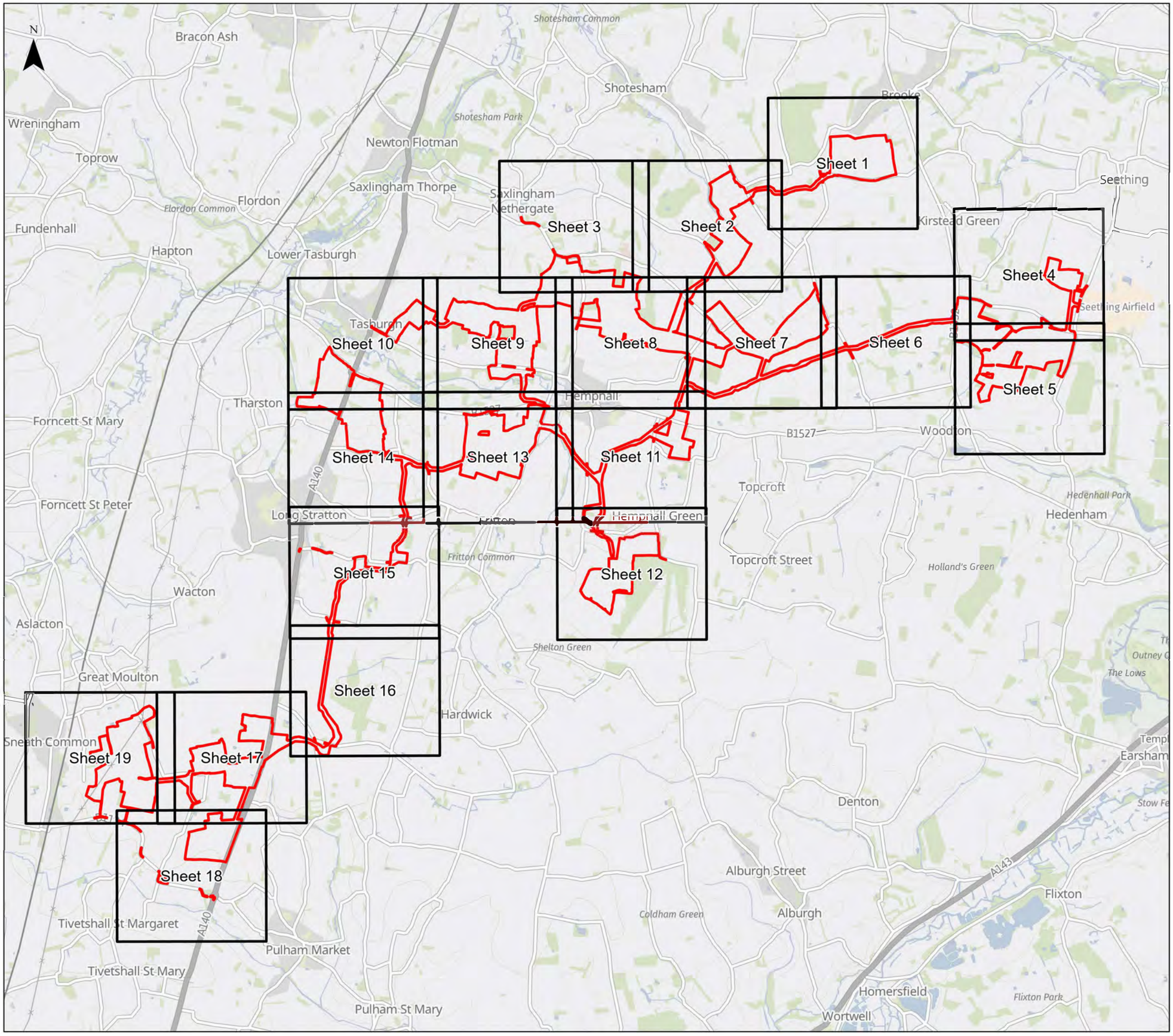
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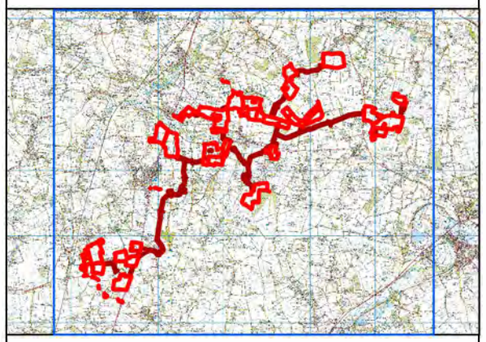
Sheet 19 of 19
Revision A

East Pye SOLAR

Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx




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**Legend**

- Order Limits
- Sheet Index

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**Figure 9.5 - Risk of Flooding from Surface Water - Climate Change Extent**

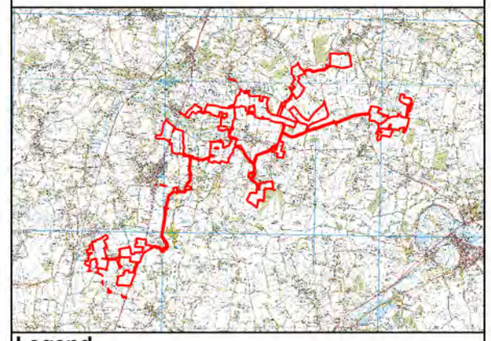
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Revision A

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Island GREEN POWER



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**Figure 9.5 - EA Risk of Flooding from Surface Water - Climate Change Extent**

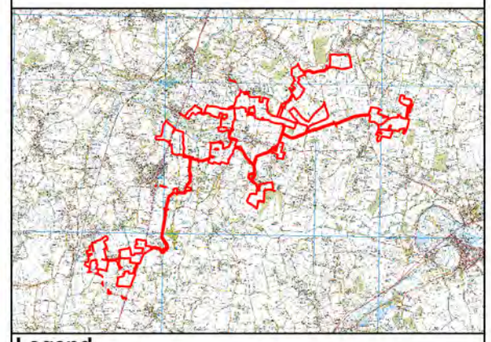
Sheet 1 of 19
Revision A

East Pye SOLAR

Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx




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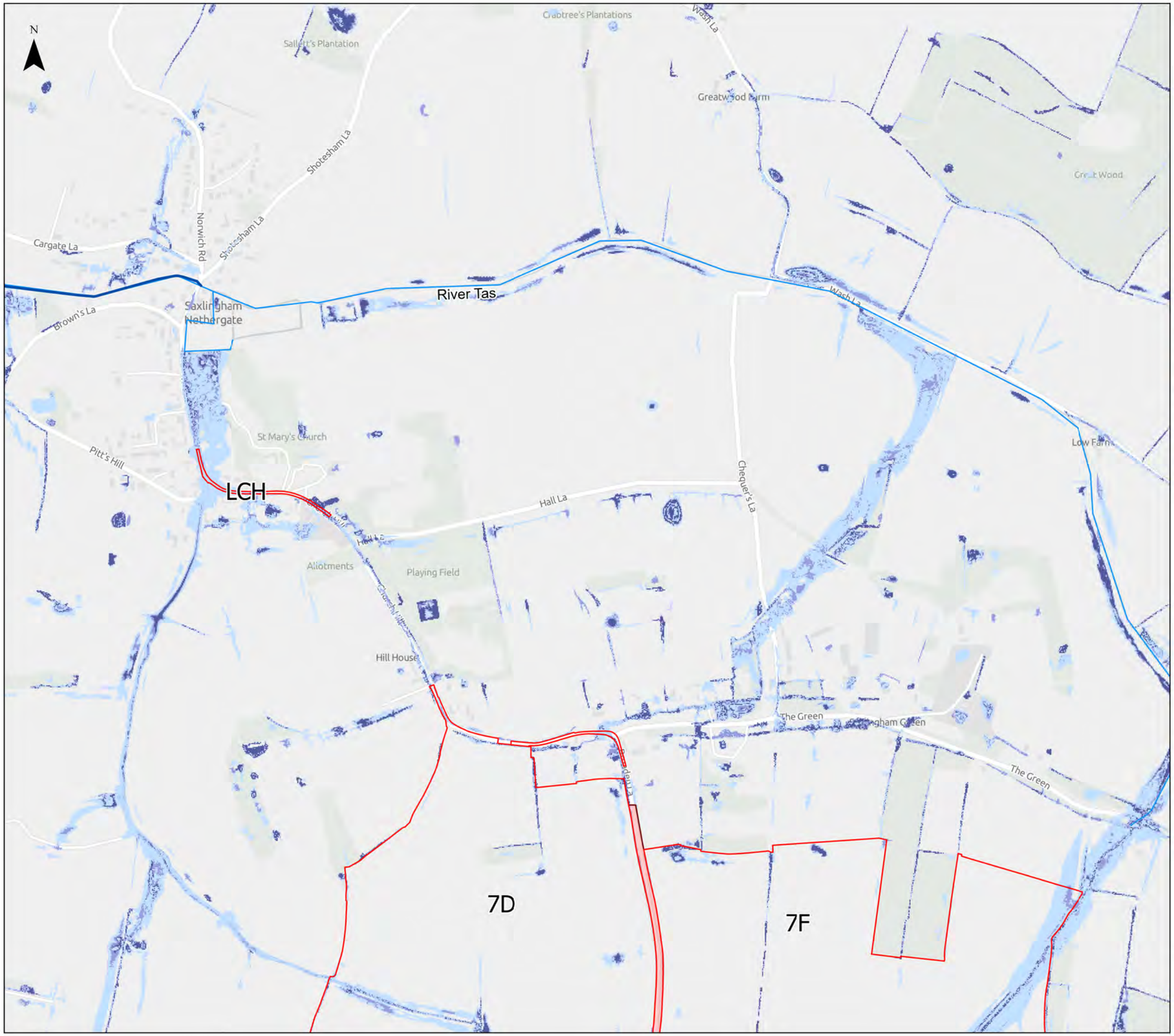
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**Figure 9.5 - EA Risk of Flooding from Surface Water - Climate Change Extent**

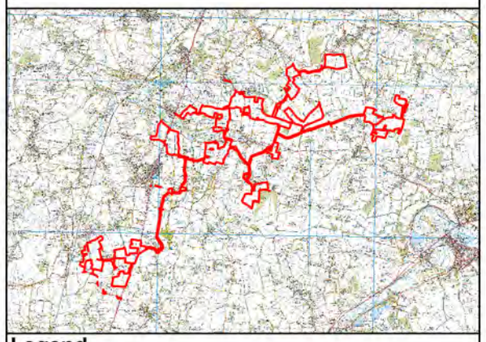
Sheet 2 of 19
Revision A

East Pye SOLAR

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Island GREEN POWER



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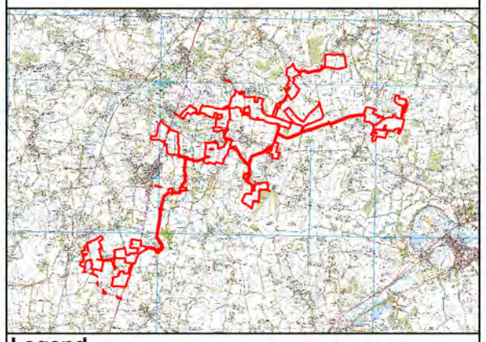
**Figure 9.5 - EA Risk of Flooding from Surface Water - Climate Change Extent**

Sheet 3 of 19
Revision A

East Pye SOLAR

Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx

Island GREEN POWER



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**Figure 9.5 - EA Risk of Flooding from Surface Water - Climate Change Extent**

Sheet 4 of 19
Revision A

East Pye SOLAR

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CRC9

10C

10D

CRC14

10B

10A

Toad La

Norwich Road

New Delight Plantation

Tearcoat Plantation

Seething Rd

Hedenham Wood

B1332

The St

Norwich Road

Hempnall Rd

Norwich Road

Broome Beck

Wooder Head Grove

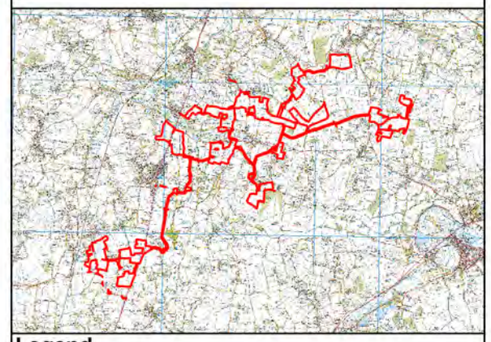
Round Grove

Hillhouse Farm

Hedenhall Hall Farm

Low Rd

Island GREEN POWER



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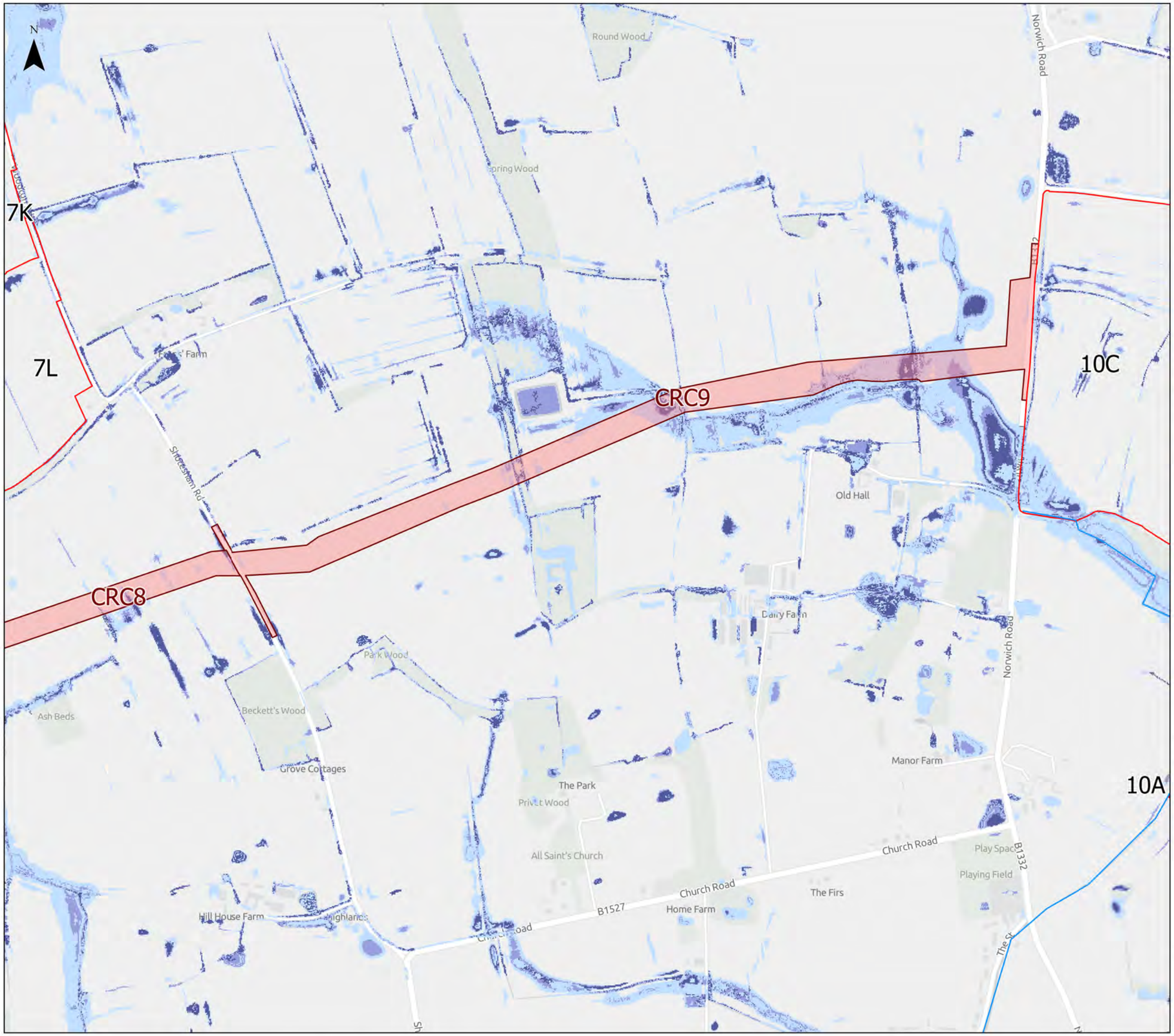
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**Figure 9.5 - EA Risk of Flooding from Surface Water - Climate Change Extent**

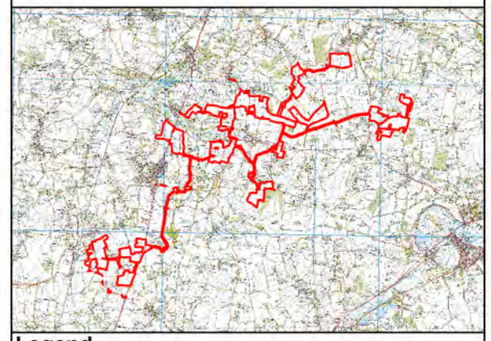
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Revision A

East Pye SOLAR

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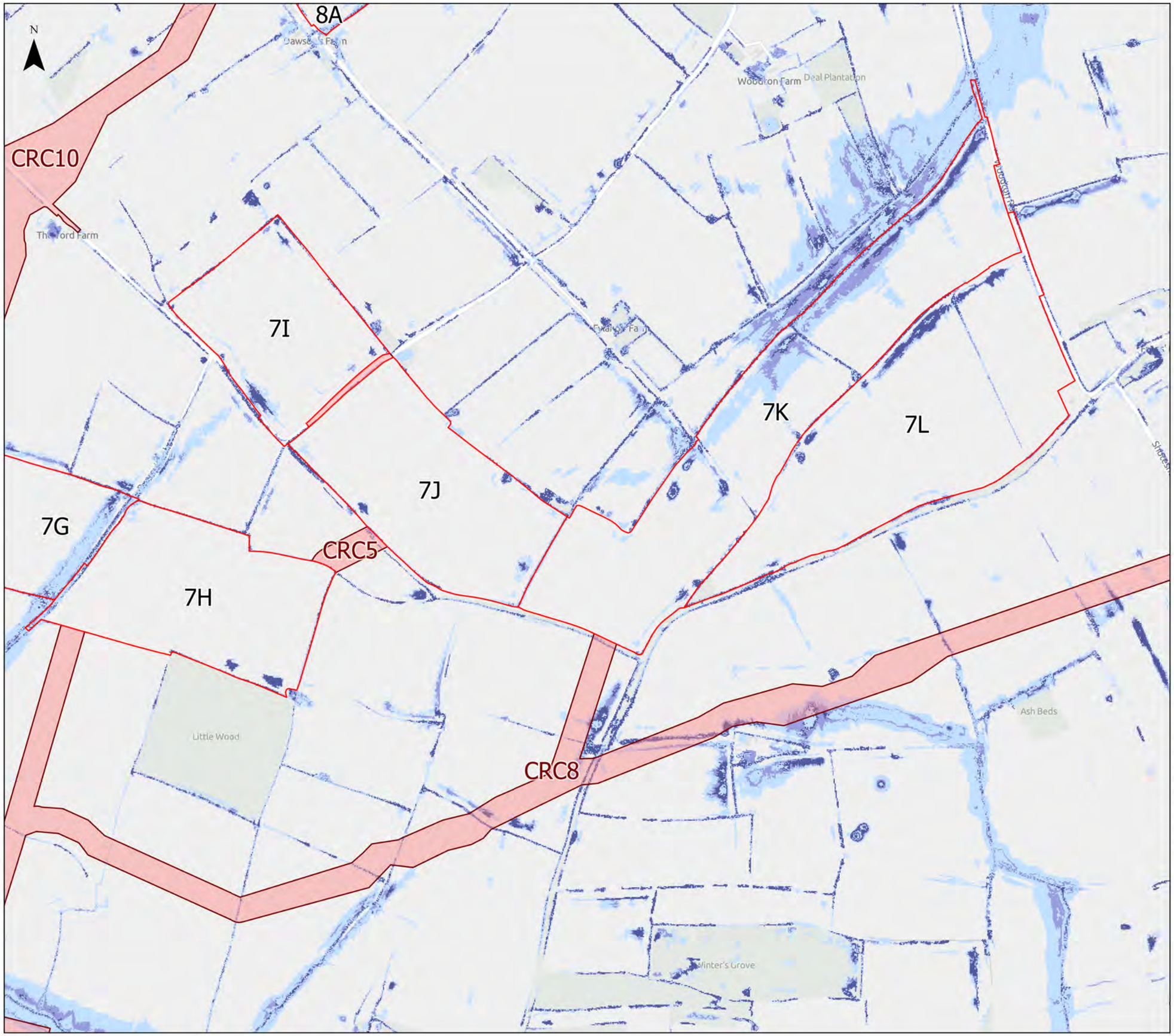
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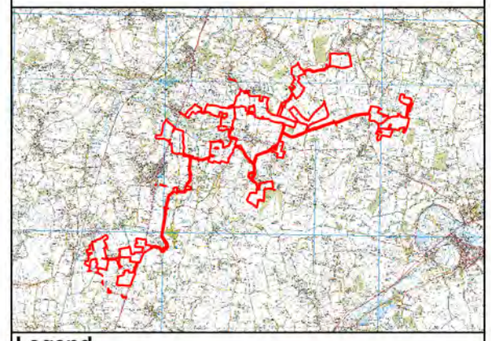
Sheet 6 of 19
Revision A

East Pye SOLAR

Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx




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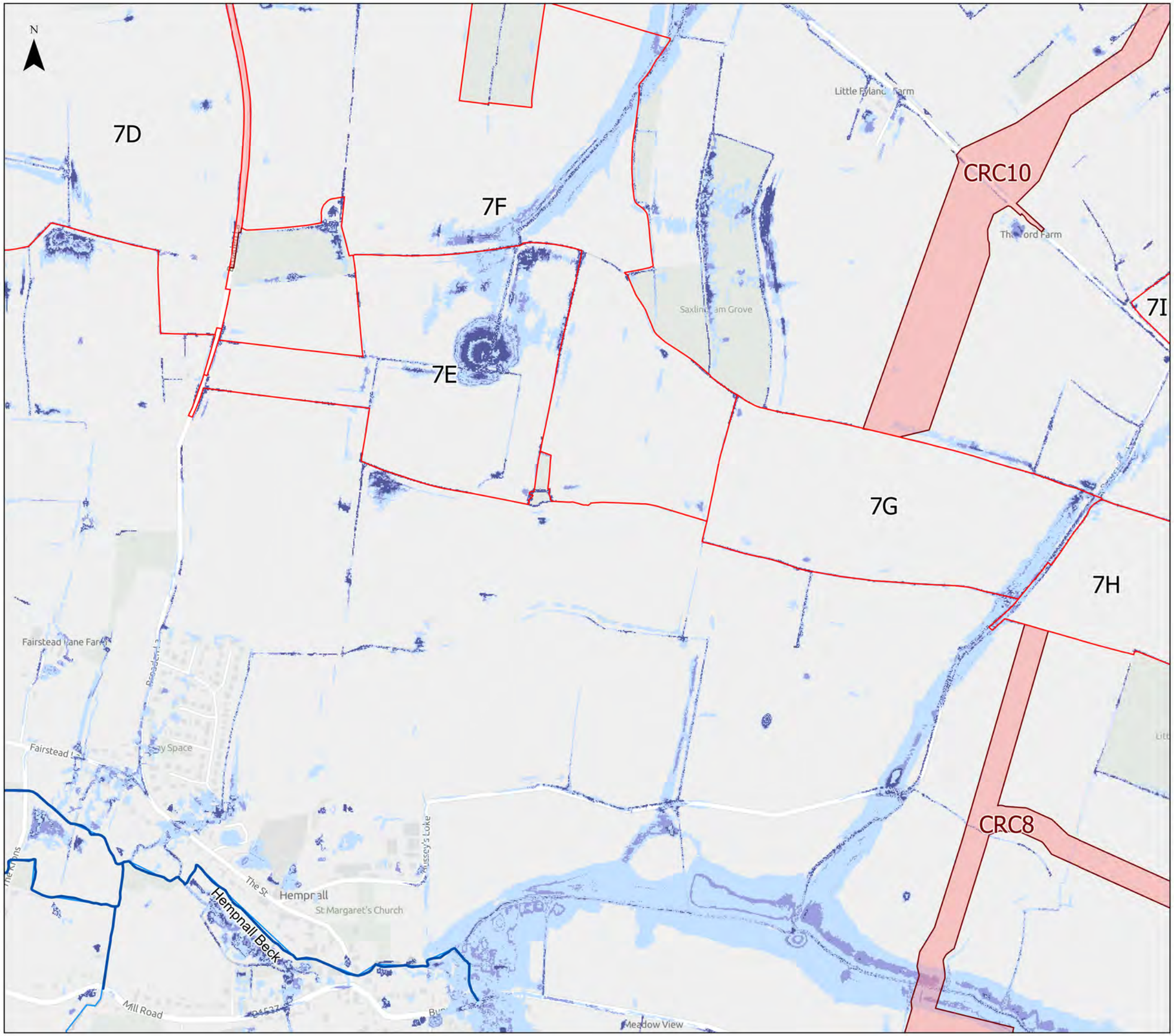
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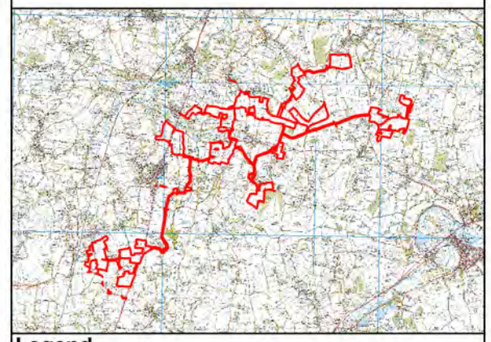
Sheet 7 of 19
Revision A

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Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx




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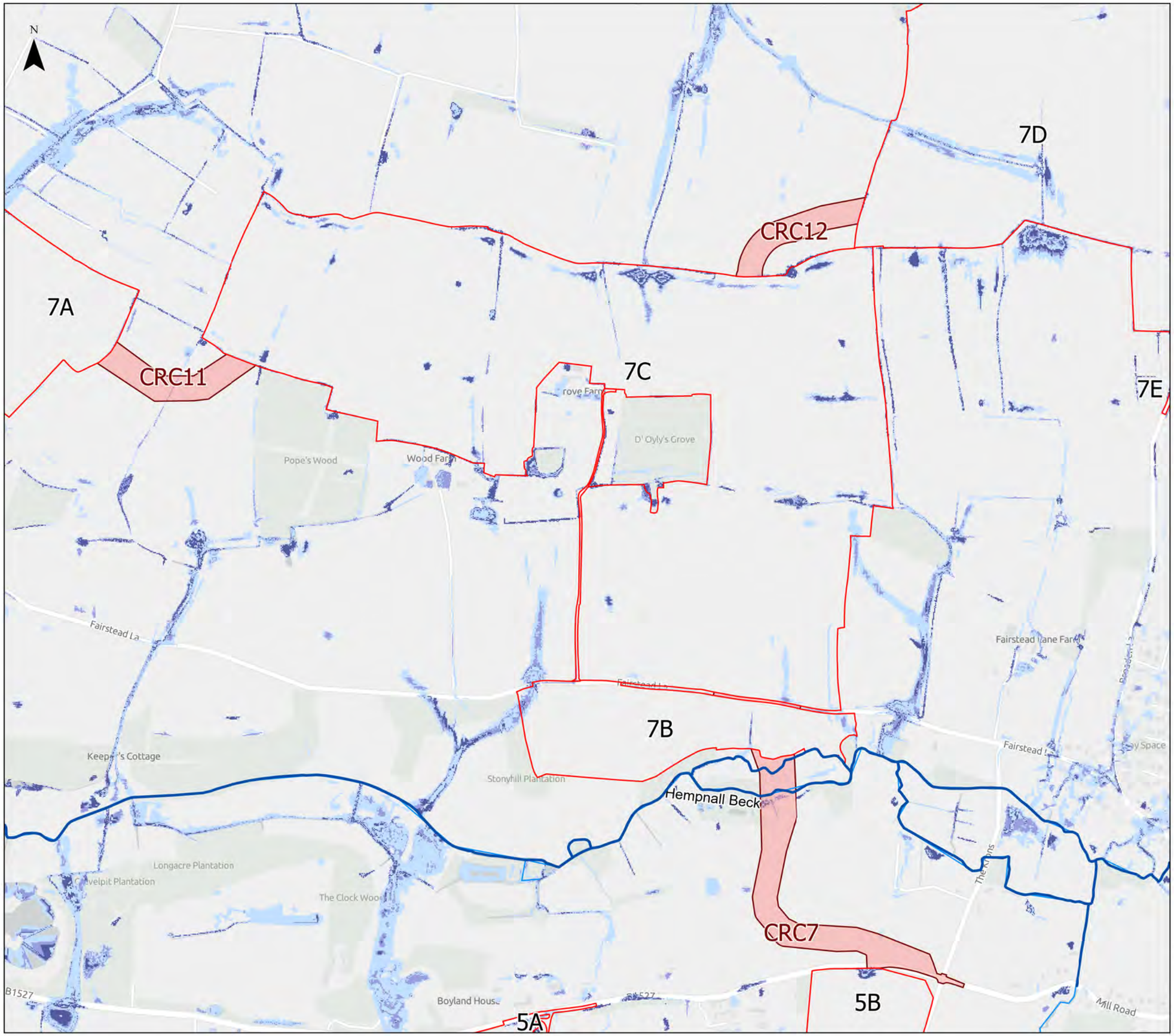
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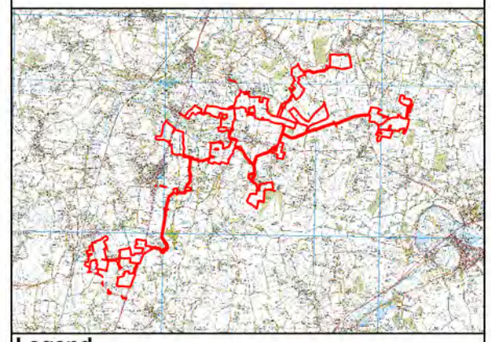
Sheet 8 of 19
Revision A

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Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx




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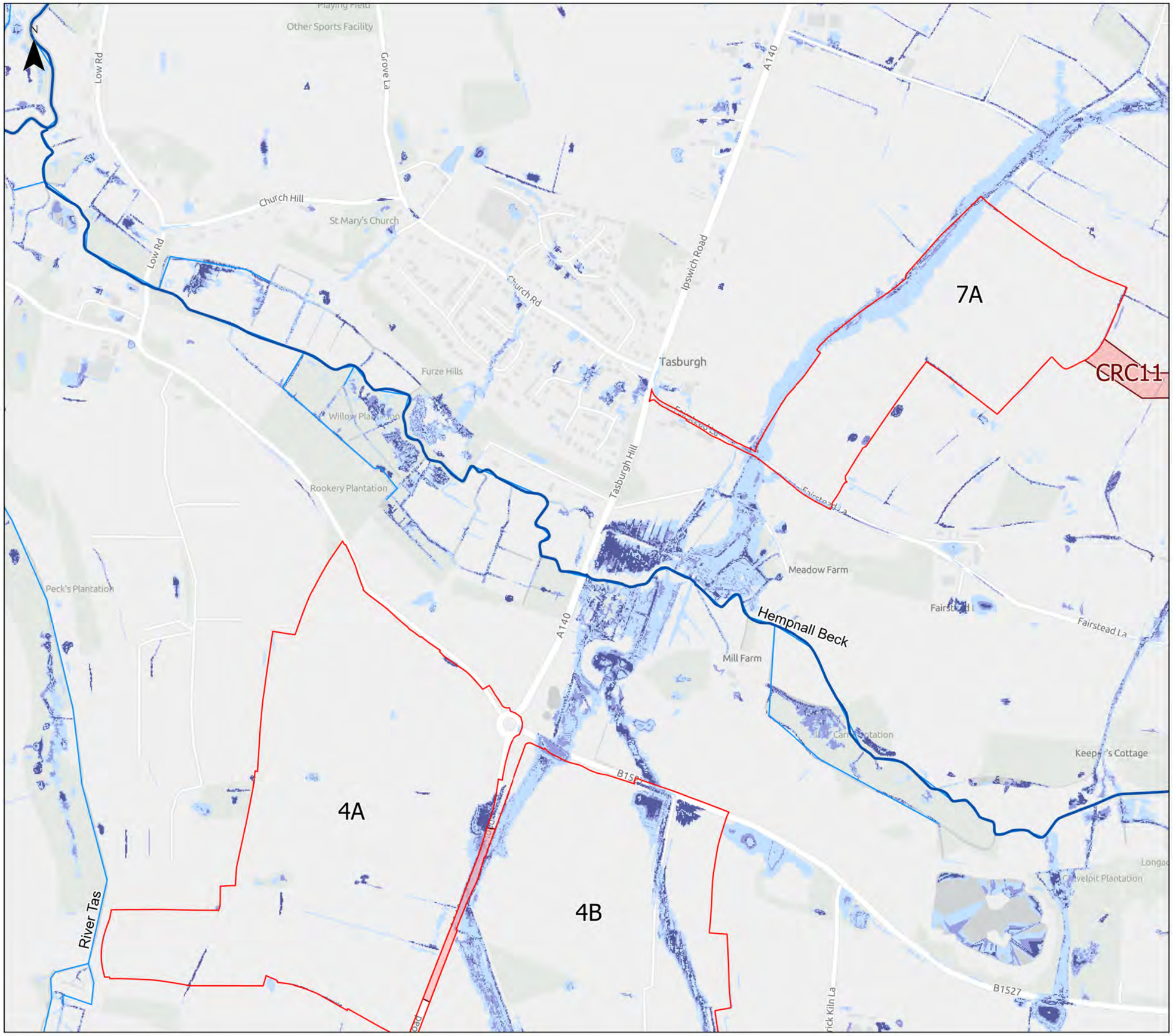
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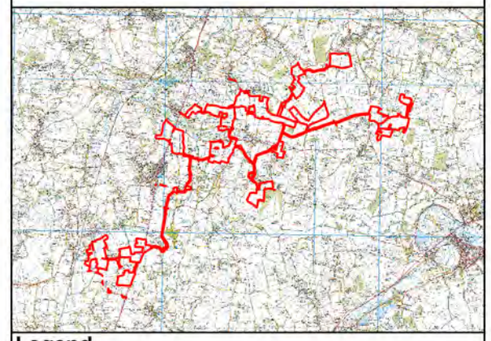
Sheet 9 of 19
Revision A

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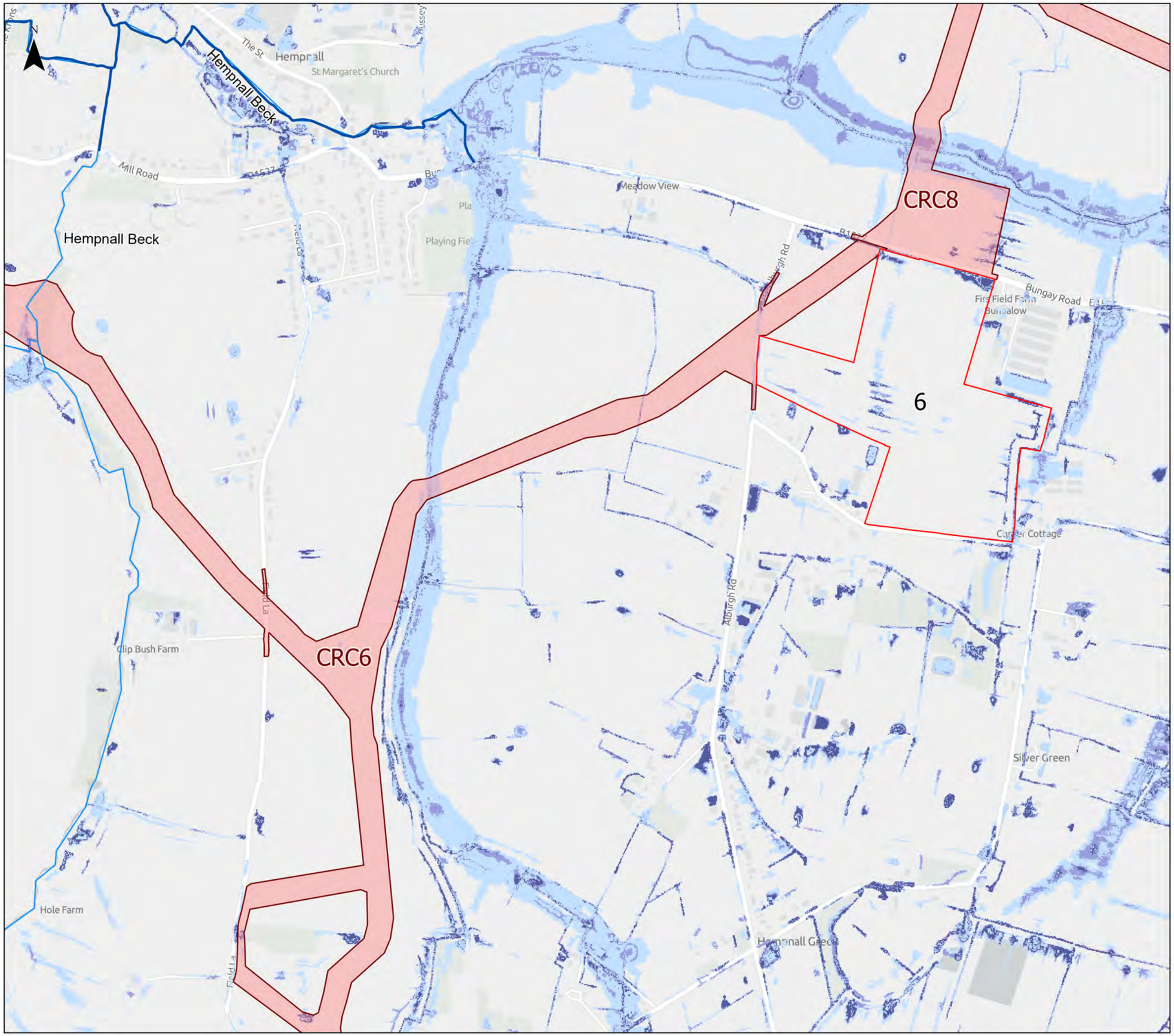
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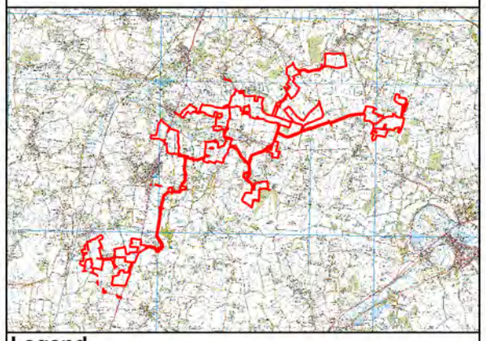
**Figure 9.5 - EA Risk of Flooding from Surface Water - Climate Change Extent**

Sheet 10 of 19
Revision A

East Pye SOLAR

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**Legend**

- Order Limits
- Cable Route Corridor
- Ordinary Watercourse
- EA Statutory Main River

**Risk of Flooding from Surface Water - Climate Change**

- High (3.3%) - 1 in 30 Annual Probability
- Medium (1%) - 1 in 100 Annual Probability
- Low (0.1%) - 1 in 1000 Annual Probability

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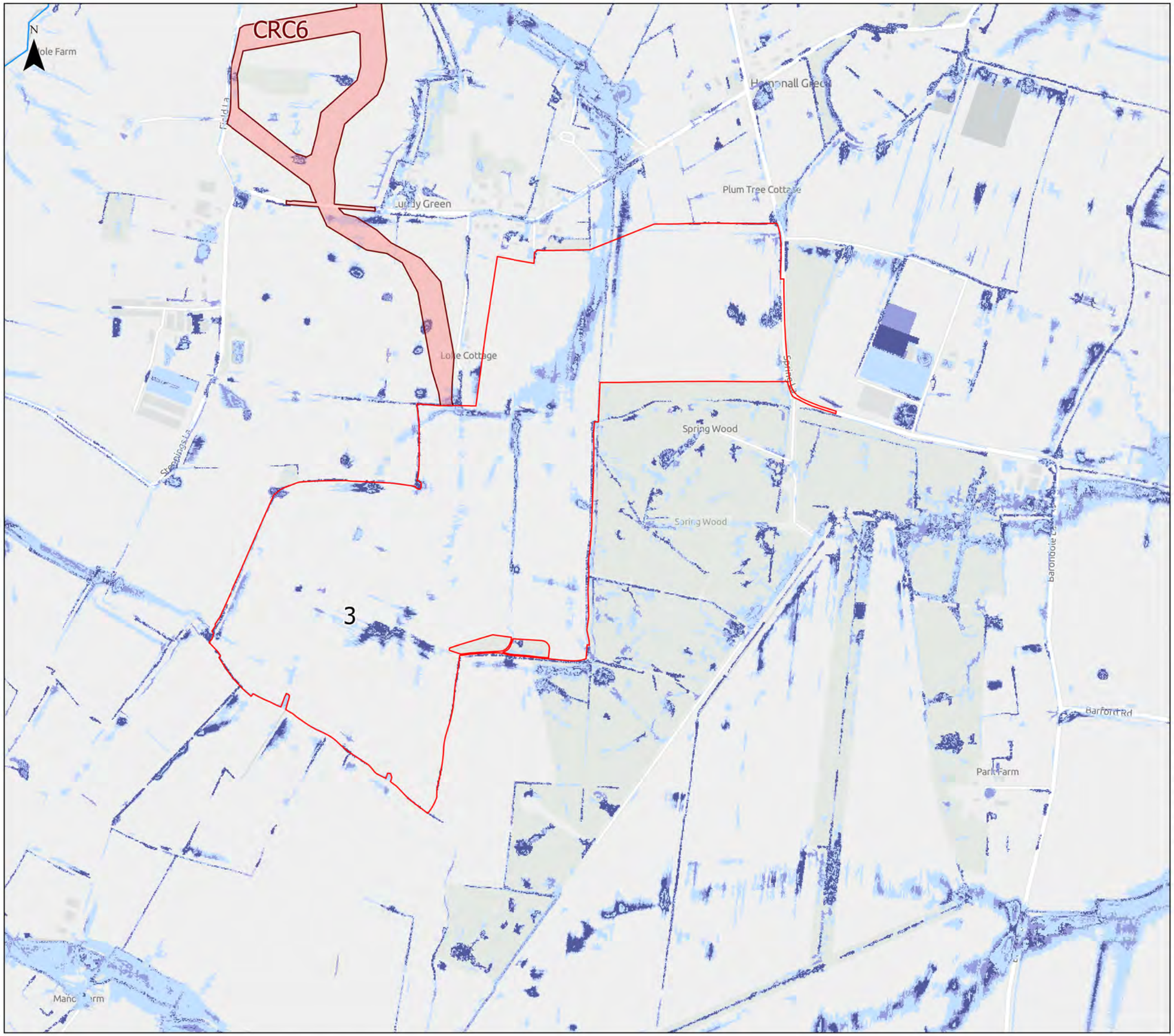
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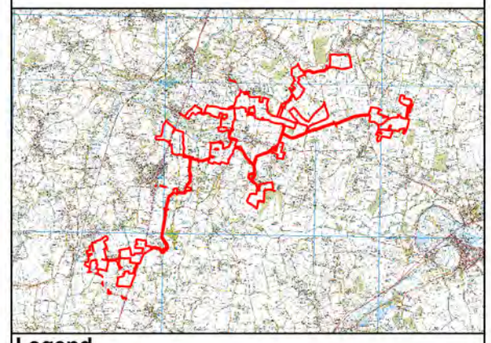
**Figure 9.5 - EA Risk of Flooding from Surface Water - Climate Change Extent**

Sheet 11 of 19
Revision A

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**Legend**

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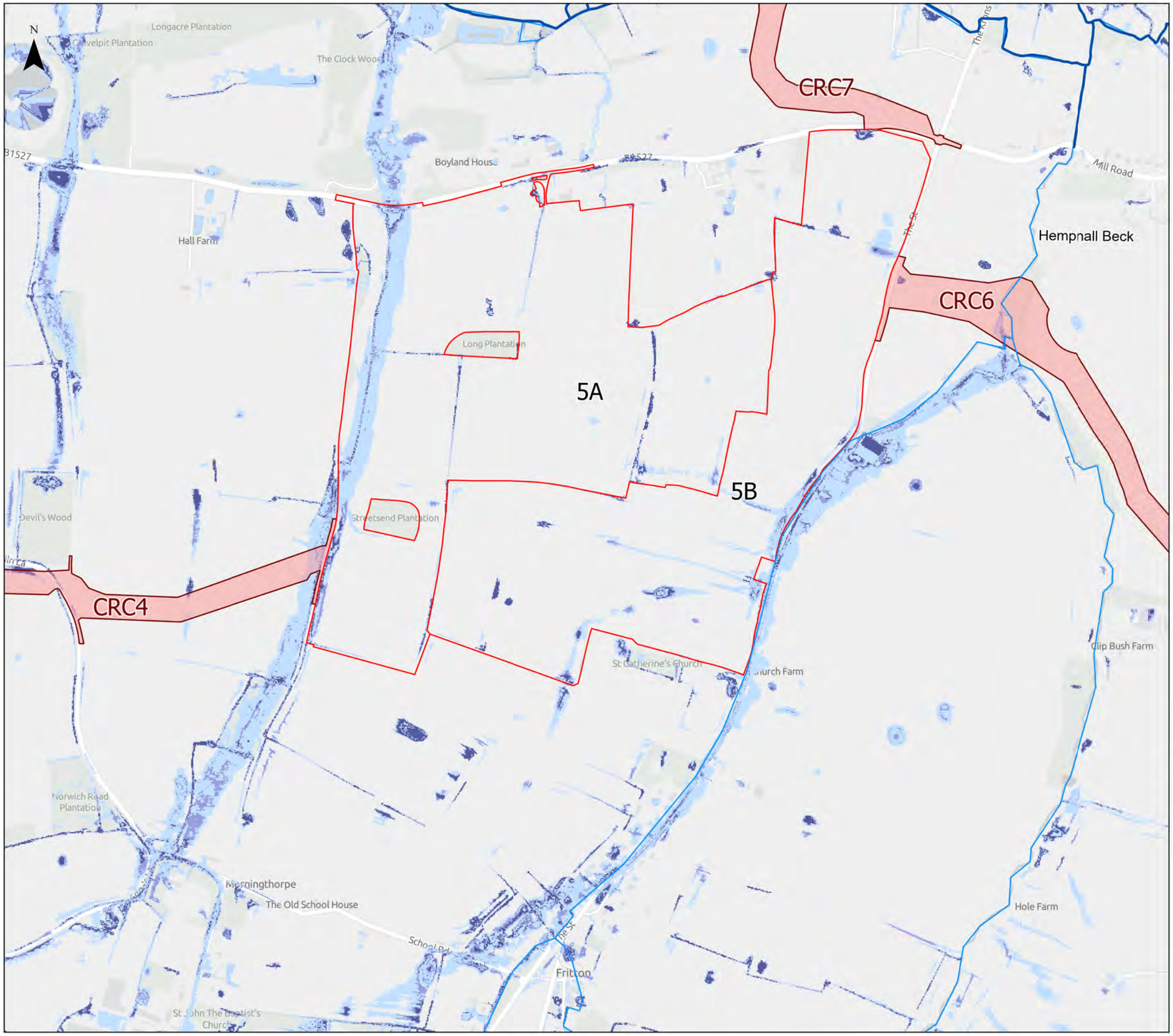
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**Figure 9.5 - EA Risk of Flooding from Surface Water - Climate Change Extent**

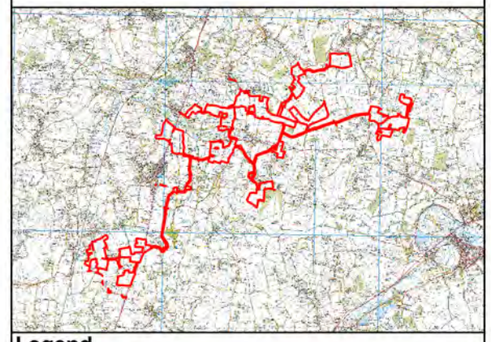
Sheet 12 of 19
Revision A

East Pye SOLAR

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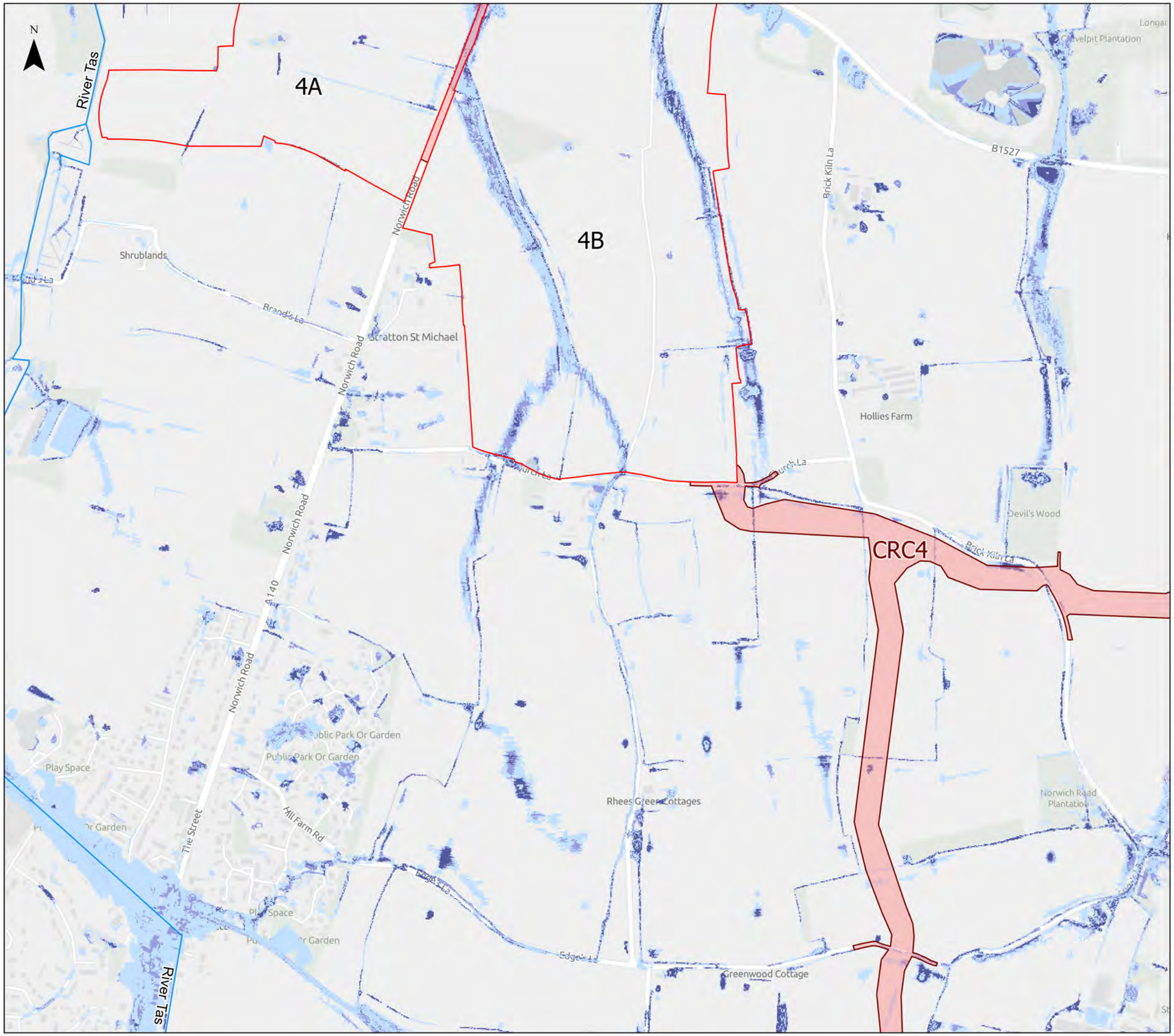
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**Figure 9.5 - EA Risk of Flooding from Surface Water - Climate Change Extent**

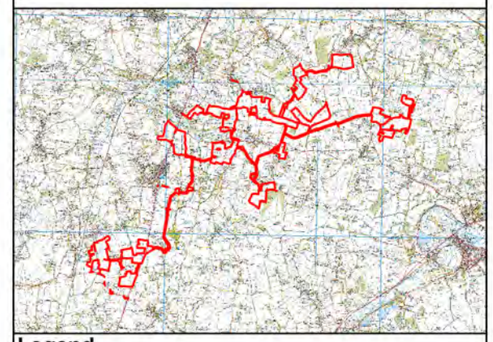
Sheet 13 of 19
Revision A

East Pye SOLAR

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Island GREEN POWER



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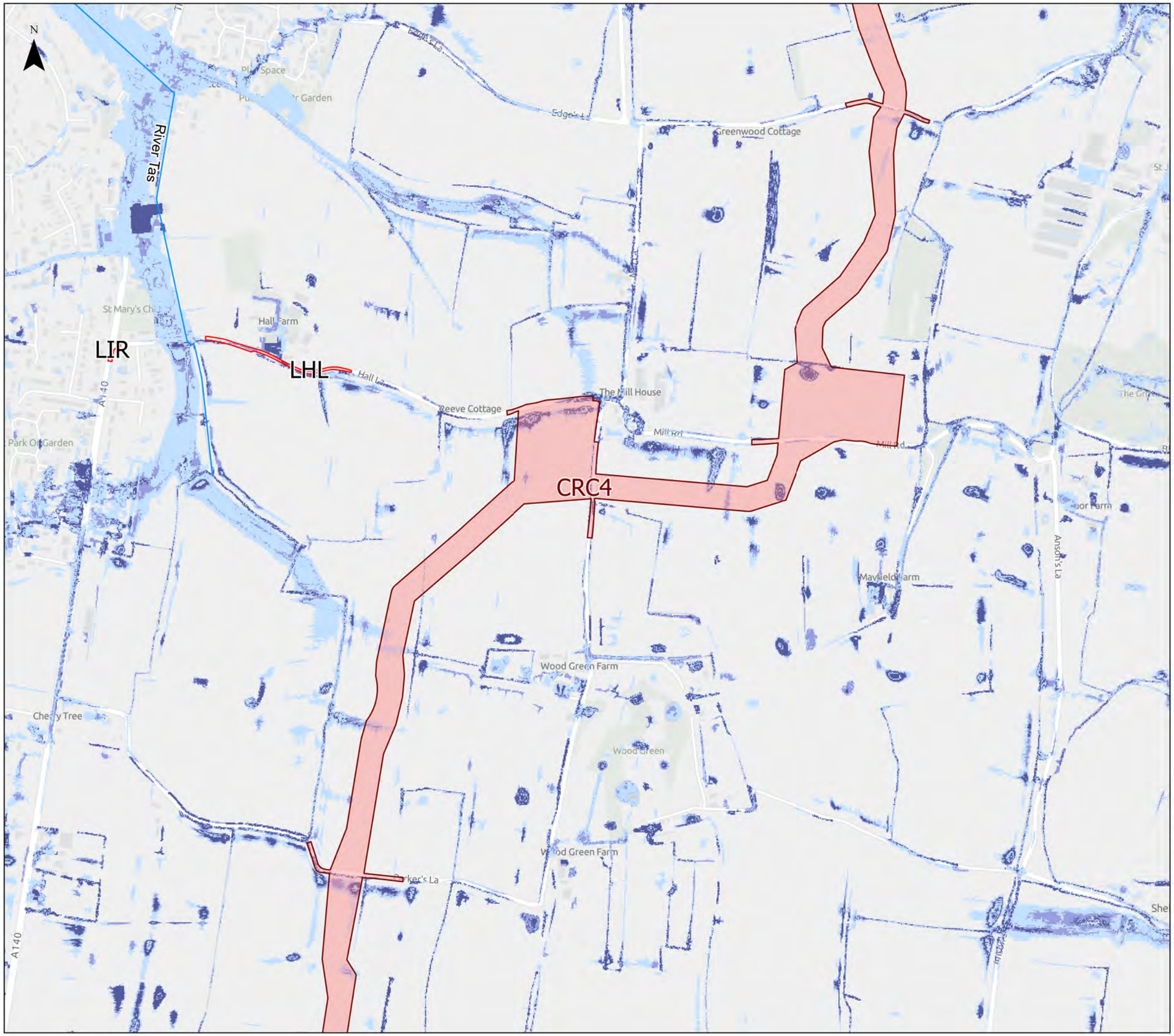
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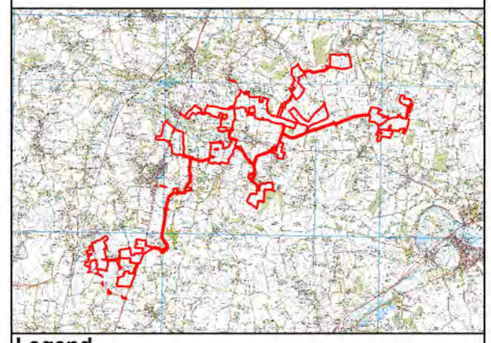
Sheet 14 of 19
Revision A

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Island GREEN POWER



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**Figure 9.5 - EA Risk of Flooding from Surface Water - Climate Change Extent**

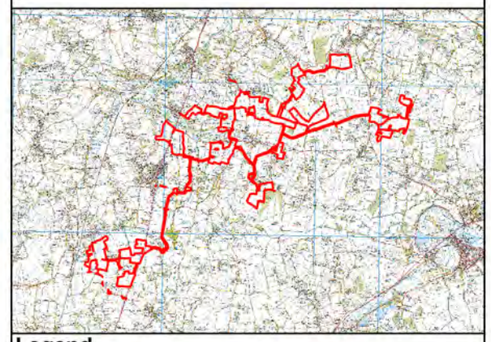
Sheet 15 of 19
Revision A

East Pye SOLAR

Document Path: U:\333101678\02_UserData\333101211_EastPye_FRA\333101211_FRA\333101211_FRA.aprx




Island GREEN POWER



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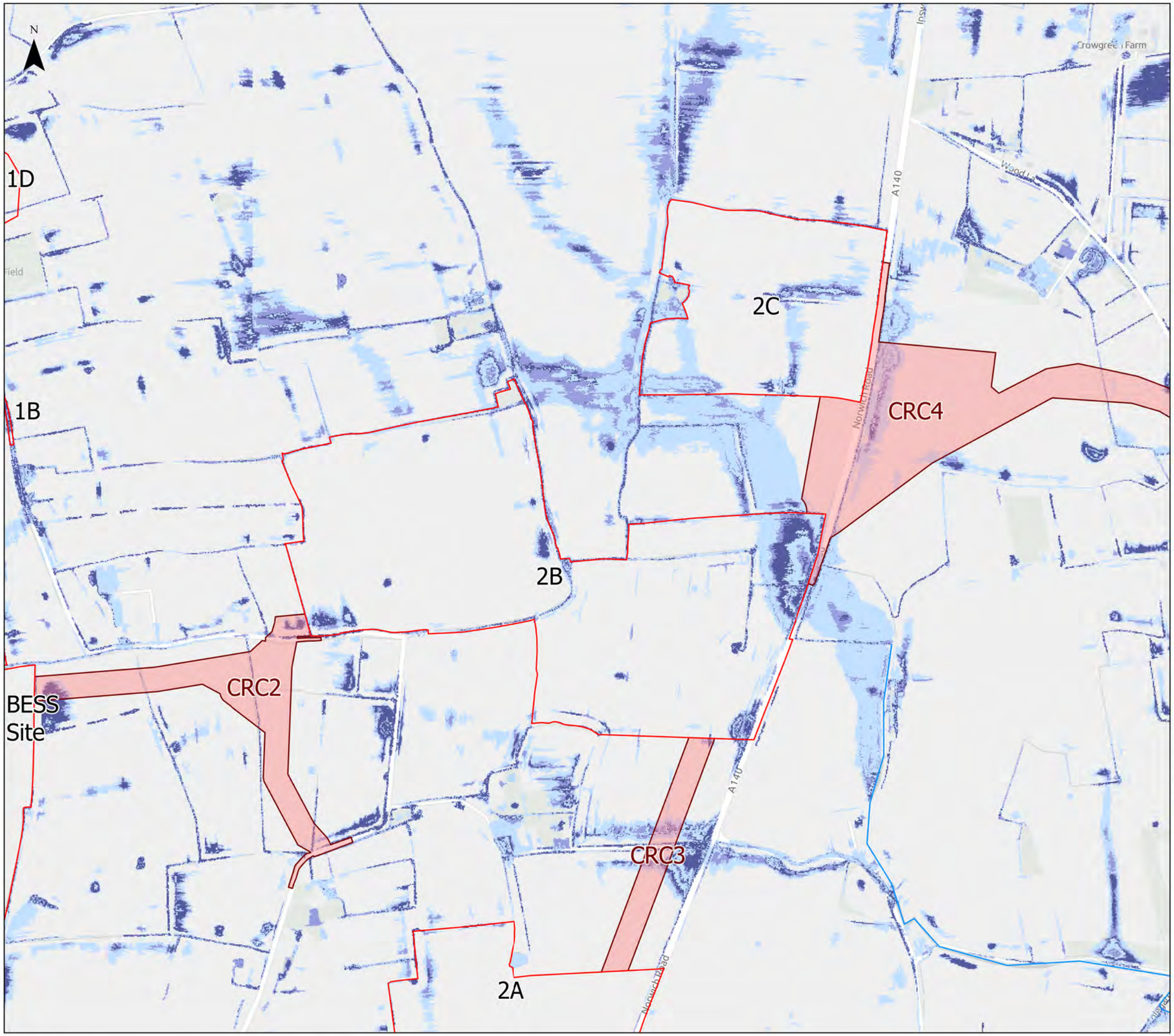
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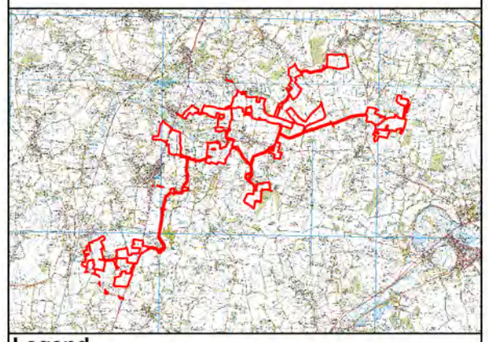
Sheet 16 of 19
Revision A

East Pye SOLAR

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Island GREEN POWER



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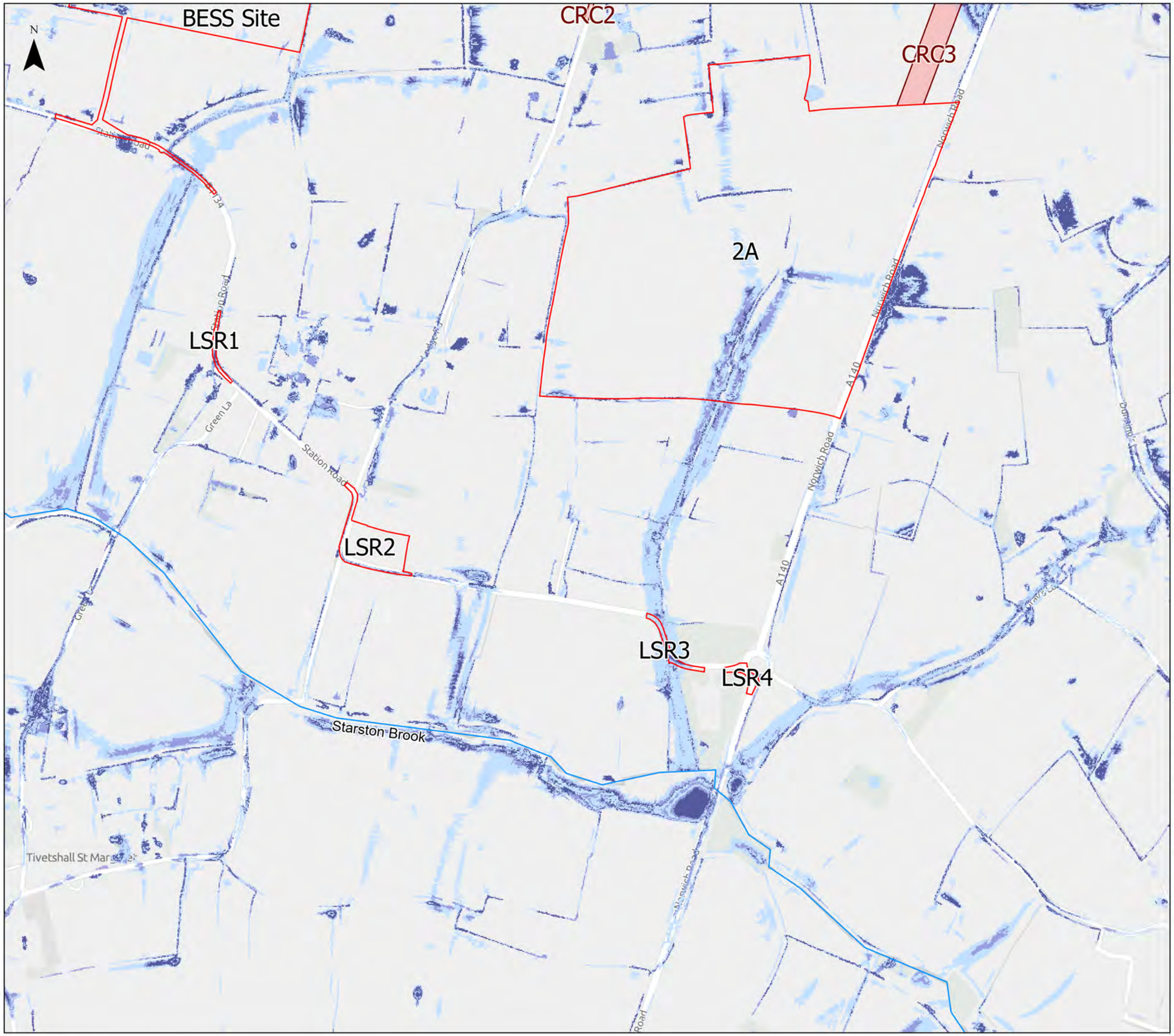
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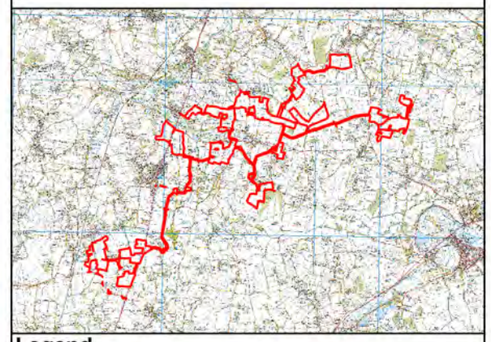
Sheet 17 of 19
Revision A

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Island GREEN POWER



**Legend**

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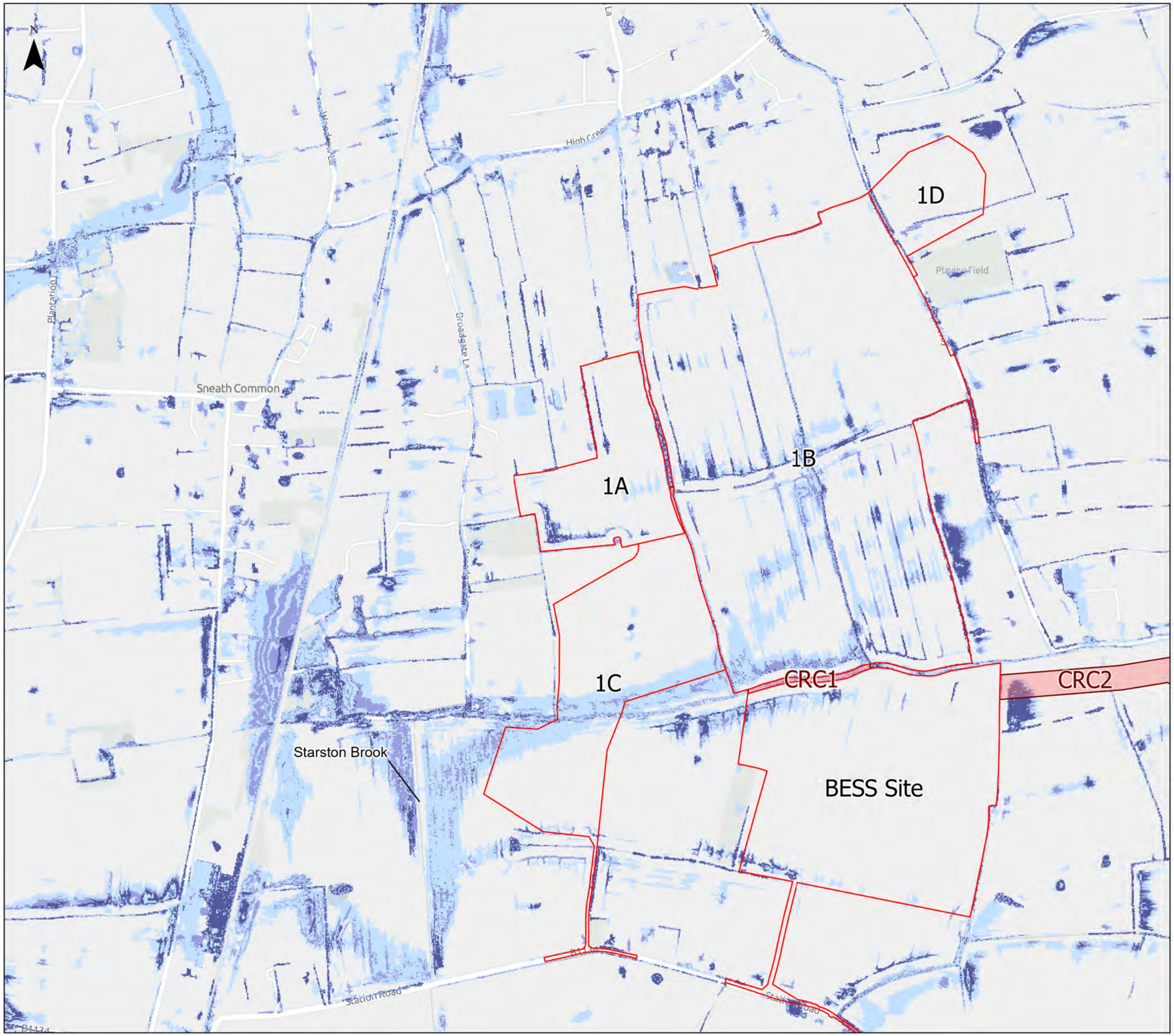
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**Figure 9.5 - EA Risk of Flooding from Surface Water - Climate Change Extent**

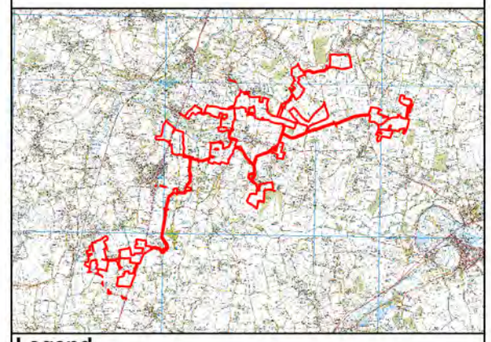
Sheet 18 of 19
Revision A

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Island GREEN POWER



**Legend**

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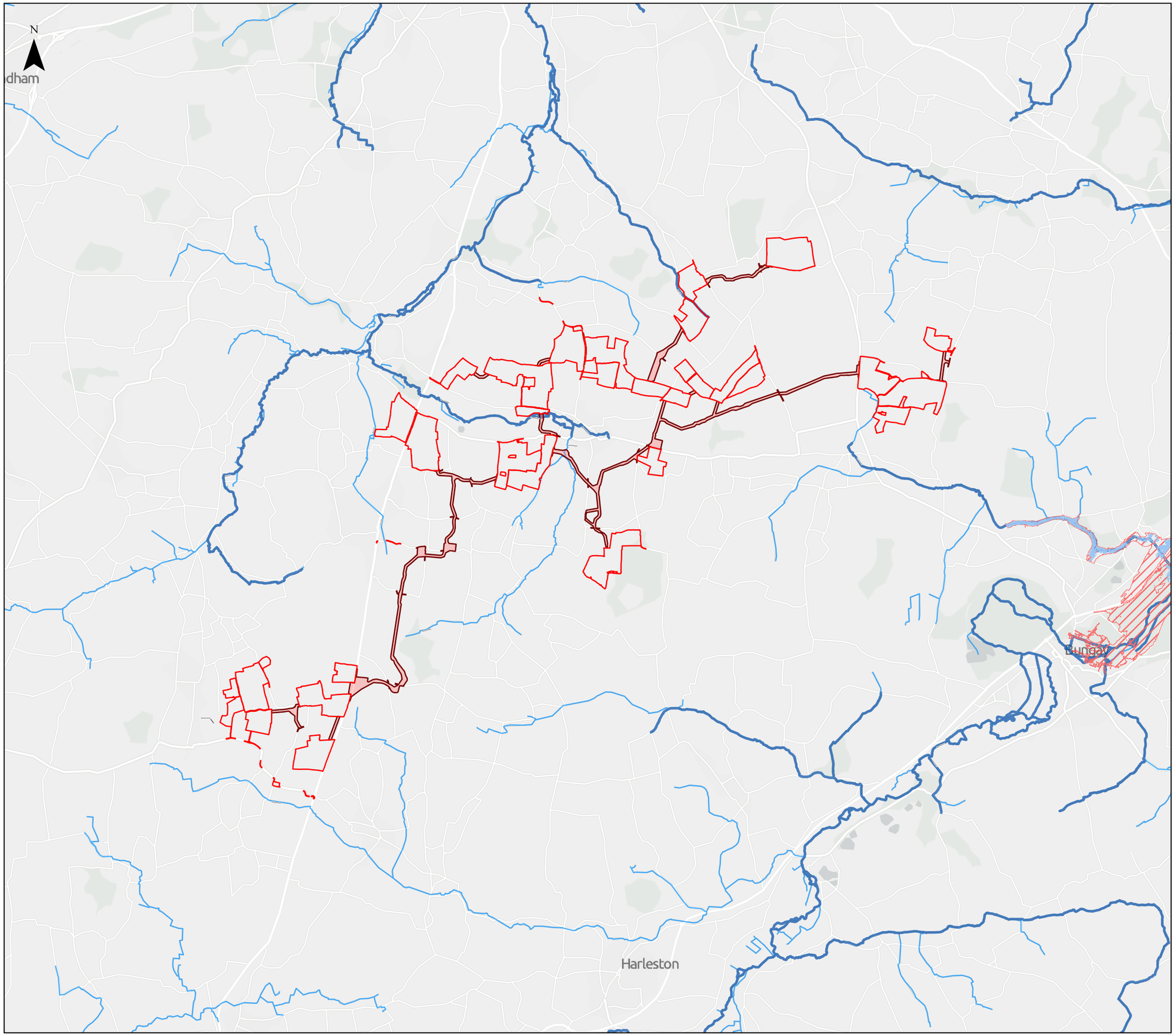
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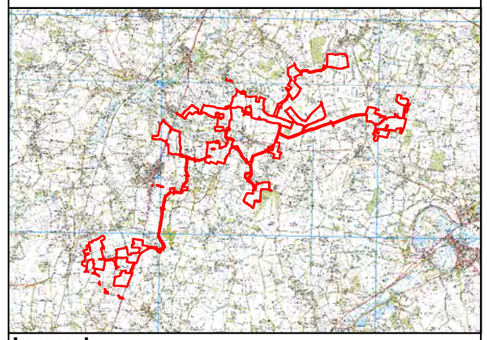
**Figure 9.5 - EA Risk of Flooding from Surface Water - Climate Change Extent**

Sheet 19 of 19
Revision A

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**Legend**

- Order Limits
- Cable Route Corridor
- EA Statutory Main River
- Ordinary Watercourse

**Maximum Extent of Flooding from Reservoirs**

- When the River Levels are Normal
- When There is Also Flooding from Rivers

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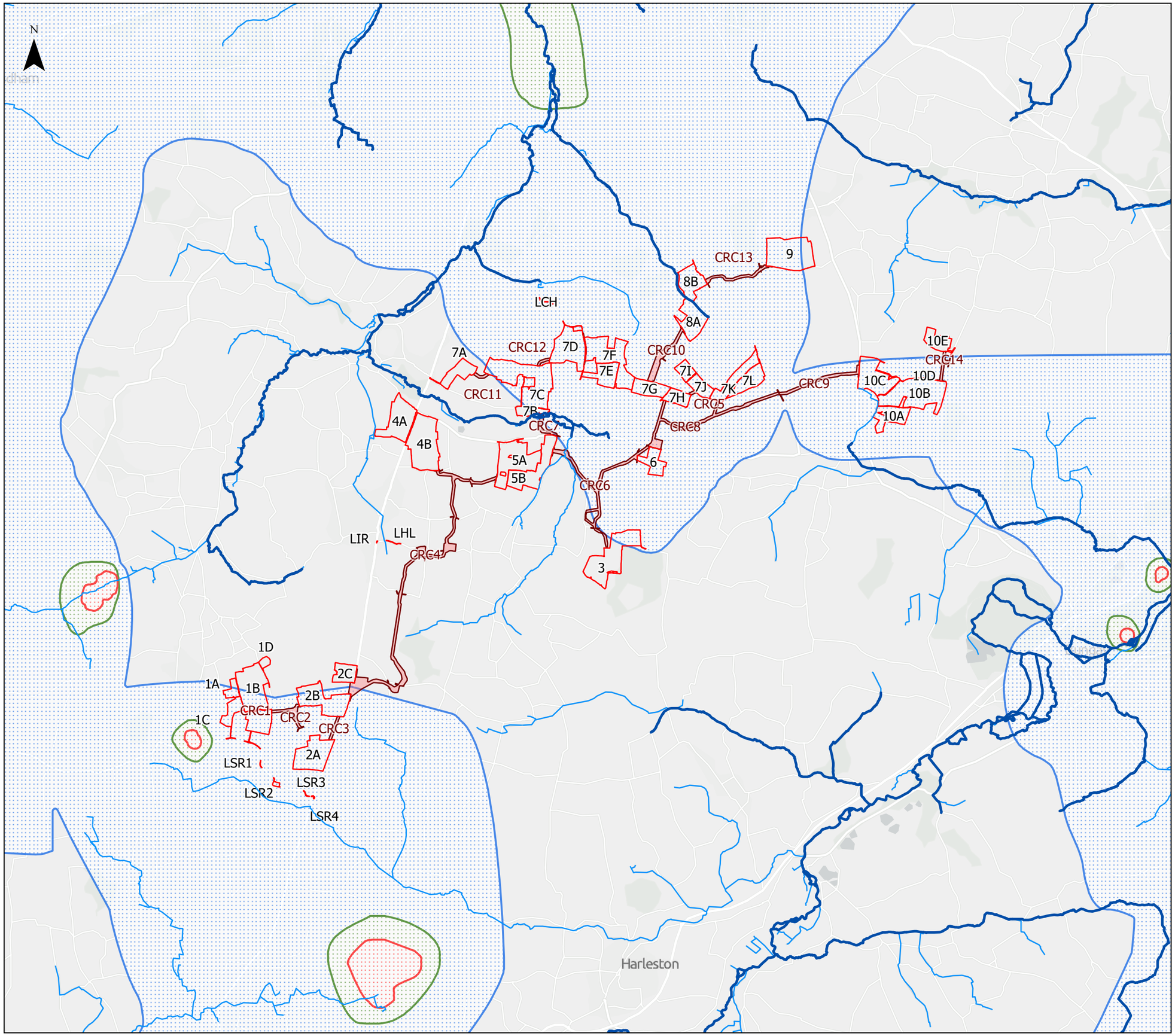
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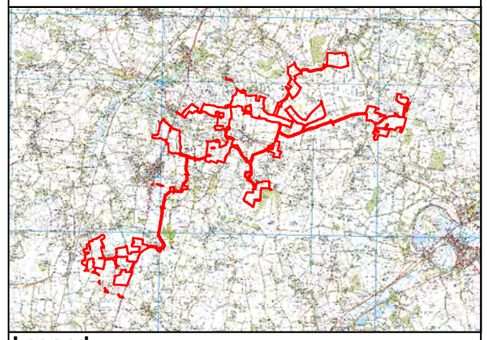
**Figure 9.6 - Risk of Flooding from Reservoirs - Maximum Flood Extent**

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Island GREEN POWER



**Legend**

- Order Limits
- Cable Route Corridor
- Ordinary Watercourse
- EA Statutory Main River

**Source Protection Zones**

- Zone I - Inner Protection Zone
- Zone II - Outer Protection Zone
- Zone III - Total Catchment

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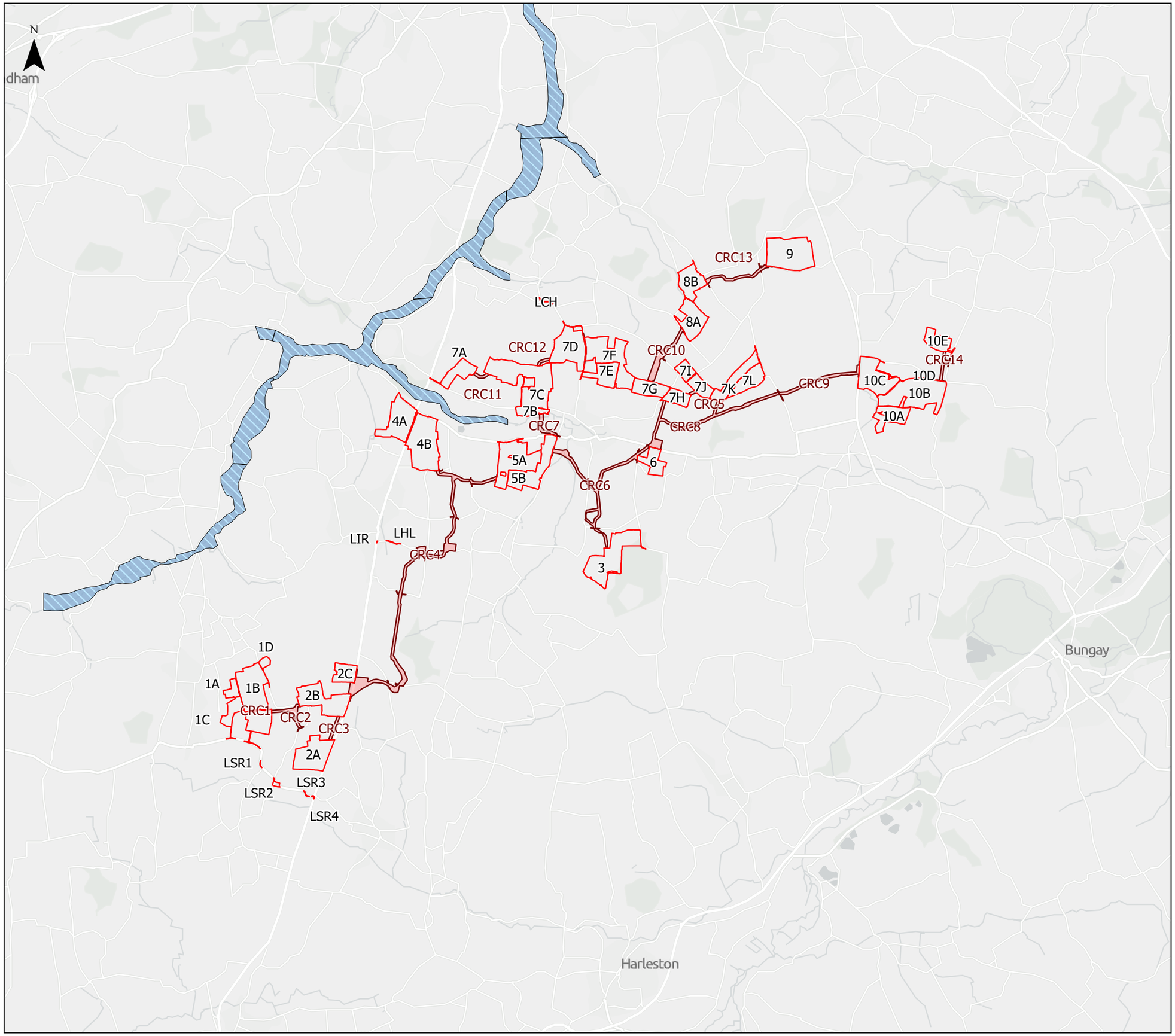
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**Figure 9.7 - EA Ground Water Source Protection Zones**

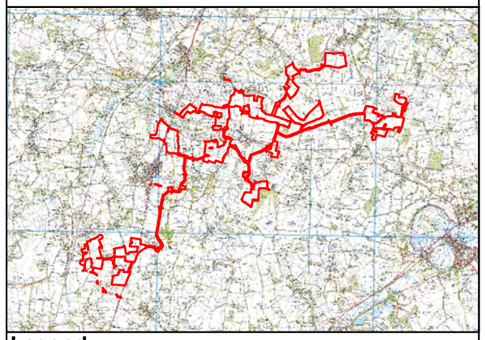
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**Legend**

- Order Limits
- Cable Route Corridor
- Historic Flood Map
- Recorded Flood Outlines
- Recorded_Flood_Outlines

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Historic Flood Map shows the maximum extent of all individual Recorded Flood Outlines from river, the sea and groundwater springs and shows areas of land that have previously been subject to flooding in England.
Recorded Flood Outlines shows all EA records of historic flooding from rivers, the sea, groundwater and surface water© Crown copyright and database rights 2025 Ordnance Survey AC0000808122

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**Figure 9.8 - EA Recorded Historic Flood Extents**

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# Appendix B Stakeholder Correspondence

- EA Correspondence:
  - ref. EAN/2024/374313 dated 19th September 2024 (Yare-Tas model link);
  - 17th April 2025 (query on Flood Zone extents in Sub-Site 8A);
  - 31st March 2025 (Starston Brook modelled extents); and
  - Meeting Minutes 29th April 2025.
- LLFA Flood History response ref. FW2024_0744 dated 3rd October 2024

[redacted]

**From:** Enquiries_EastAnglia <Enquiries_EastAnglia@environment-agency.gov.uk>
**Sent:** 19 September 2024 12:25
**To:** [redacted]
**Subject:** EAN/2024/374313: Response for Product 5/6/7 Data request for East Pye (East of Long Stratton), Norfolk
**Attachments:** East Pye Site Boundary Location.png; 374313 Flood History Map.pdf; FRA advisory note.pdf; East_Anglian_External Climate Change Allowances Guidance_March2022.pdf

You don't often get email from enquiries_eastanglia@environment-agency.gov.uk. Learn why this is important

Dear [redacted]

Thank you for your enquiry which we received on 28 August 2024.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

Please see below for responses to additional questions:

- **whether you hold any records of flooding within the site boundary.**

Please find the Flood History map attached for recorded flood outlines within the boundary.

- **whether the land is located within a Critical Drainage Area.**

Critical drainage areas can be identified via the government website - https://www.data.gov.uk/dataset/d10fb8e5-f3af-48c1-a489-8c975b0165de/areas-with-critical-drainage-problems

- **whether the Environment Agency East Anglia region is currently offering a chargeable pre-application service.**

Our planning advice is now chargeable. Please email planning.eastanglia@environment-agency.gov.uk who will be able to provide a quote.

We also have a non-charged pre-application service for Flood Risk Activity Permits. Please email with PSO.EastAnglia@environment-agency.gov.uk for FRAP pre-app advice.

Please refer to the Open Government Licence available here: http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/ which explains the permitted use of the information contained in the additional questions above.

**Enquiry regarding Product 5, 6 & 7 data for East Pye (East of Long Stratton), Norfolk**

The information we hold for Products 5, 6 & 7 has been uploaded to our sharefile system and can be accessed for 30 days using this link: https://ea.sharefile.com/public/share/web-sd0815e8507fa48378a57ae1ed2a9026b

Further Asset Management Data and Information can be found online using this link: https://environment.data.gov.uk/asset-management/index.html

A copy of the Flood Risk Assessment (FRA) advisory note is attached to my email.

**Abstract**

| | |
|---|---|
| Name | Products 5, 6 and 7 |
| Description | Model output data for Yare – 2014 – CH2M Hill |
| Licence | The following information is not available under the Open Government Licence but we may be able to license it to you under the Environment Agency Conditional Licence Environment Agency Conditional Licence:<br>However, you MUST first check the supporting information and the above link to determine if the conditions on use are suitable for your purposes. If they aren't, this information is not provided with a licence for use, and the data is provided for read right only. |
| Conditions | 1.0 You may use the Information for your internal or personal purposes and may only sublicense others to use it if you do so under a written licence which includes the terms of these conditions and the agreement and in particular may not allow any period of use longer than the period licensed to you.<br>2.0 Notwithstanding the fact that the standard wording of the Environment Agency Conditional Licence indicates that it is perpetual, this Licence has a limited duration of 5 years at the end of which it will terminate automatically without notice.<br>3.0 We have restricted use of the Information as a result of legal restrictions placed upon us to protect the rights or confidentialities of others. In this instance it is because of third party data. If you contact us in writing (this includes email) we will, as far as confidentiality rules allow, provide you with details including, if available, how you might seek permission from a third party to extend your use rights.<br>4.1 The Information may contain some data that we believe is within the definition of "personal data" under the Data Protection Act 1998 but we consider that we will not be in breach of the Act if we disclose it to you with conditions set out in this condition and the conditions above. This personal data comprises names of individuals or commentary relating to property that may be owned by an individual or commentary relating to the activities of an individual.<br>4.2 Under the Act a person who holds and uses or passes to others personal data is responsible for any compliance with the Act and so we have no option but to warn you that this means you have responsibility to check that you are compliant with the Act in respect of this personal data.<br>5.0 The location of public water supply abstraction sources must not be published to a resolution more detailed than 1km2. Information about the operation of flood assets should not be published.<br>6.1 Where we have supplied model data which may include model inputs or outputs you agree to supply to the Environment Agency copies of any assessments/studies and related outputs, modifications or derivatives created pursuant to the supply to you of the Information, all of which are hereinafter referred to as "the Data".<br>6.2 You agree, in the public interest to grant to the Environment Agency a perpetual royalty free non-exclusive licence to use the Data or any part thereof for its internal purposes or to use it in any way as part of Environment Agency derivative products which it supplies free of charge to others such as incorporation into the Environment Agency's Open Data mapping products. |
| Information Warnings | Please be aware that model data is not raw, factual or measured but comprises of estimations or modelled results based on the data available to us. |
| Attribution | Contains Environment Agency information © Environment Agency and/or database rights.<br>May contain Ordnance Survey data © Crown copyright 2024 Ordnance Survey OS AC0000807064. |

**Coastal Modelling**

You may be aware that some Local Planning Authorities have updated their Strategic Flood Risk Assessments (SFRAs) using data from this modelling study. As SFRA's are not updated regularly we agreed that they could use draft outputs as we wanted to ensure that the SFRA's were not out of date as soon as they were published.

**If you are using our 2018 Coastal Flood Modelling Data outputs: Please refer to page 13 of the Product 4 supporting document.**

**Data Available Online**
Many of our flood datasets are available online:

- Flood Map For Planning (Flood Zone 2, Flood Zone 3 ,Flood Storage Areas, Flood Defences, Areas Benefiting from Defences,)
- Risk of Flooding from Rivers and Sea
- Historic Flood Map
- Current Flood Warnings

**What's In Your BackYard (WIYBY) is no longer available.**
Most of the data is still available via other sharing services such as DATA.GOV.UK, MAGIC map and new GOV.UK digital services. Where the datasets are no longer available as maps, you will be able to download and use within specialist applications.

To find out all the services the Environment Agency have available, please click here.

For any other enquiries please send your request to us at:
Enquiries_EastAnglia@environment-agency.gov.uk.

Additional information

Please be aware that we now charge for planning advice provided to developers, agents and landowners. If you would like advice to inform a future planning application for this site then please complete our https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion and email it to our Sustainable Places team. planning.eastanglia@environment-agency.gov.uk. They will initially provide you with a free response identifying the following:

- the environmental constraints affecting the proposal;
- the environmental issues raised by the proposal;
- the information we need for the subsequent planning application to address the issues identified and demonstrate an acceptable development;
- any required environmental permits.

If you require any further information from them (for example, a meeting or the detailed review of a technical document) they will need to set up a charging agreement. Further information can be found on our website.

**Climate Change Allowances**

For information on the use climate change allowances in Flood Risk Assessments, please see the attached document - **East_Anglian_External Climate Change Allowances Guidance_March2022.pdf**.

The guidance provides climate change allowances for peak river flow, peak rainfall, sea level rise, wind speed and wave height. The guidance provides a range of allowances to assess fluvial flooding, which varies depending on which management catchment a site lies within. It advises on which allowances to use for assessing the impact of climate change on fluvial flood risk based on vulnerability classification, flood zone and development lifetime.

Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

Kind regards,

[redacted]
Customers & Engagement Officer, Customers & Engagement Team, East Anglia Area
**Environment Agency** | Bromholme Lane, Brampton, Huntingdon, Cambridgeshire, PE28 4NE
**Environment Agency** | Iceni House, Cobham Road, Ipswich IP3 9JD
[redacted]






---

**From:** [redacted]
**Sent:** 28 August 2024 08:55
**To:** Enquiries_EastAnglia <Enquiries_EastAnglia@environment-agency.gov.uk>
**Subject:** Product 5/6/7 Data request for East Pye (East of Long Stratton), Norfolk

Good Morning

Our Client is looking at opportunities within the red line boundary attached for land known as East Pye (located to the east of Long Stratton). Some of this area is located within Flood Zones 2 and 3. Please can you provide Product 5/6/7 data via a link for these areas.

Please can you also confirm the following:

- whether you hold any records of flooding within the site boundary;
- whether the land is located within a Critical Drainage Area;
- whether the Environment Agency East Anglia region is currently offering a chargeable pre-application service.

Many thanks in advance for your help.

Kind Regards,

[redacted]
BSc MSc MCIWEM
Principal Flood Risk and Drainage Engineer
[redacted]

Stantec UK Ltd
Caversham Bridge House
Waterman Place
Reading RG1 8DN

Stantec

Please visit stantec.com/uk to learn more about how Stantec designs with community in mind.

[redacted]

**From:** [redacted]
**Sent:** 17 April 2025 15:02
**To:** [redacted]
**Subject:** FW: Cost Recovered Advice: East Pye Solar : ENVPAC/1/NIT/00077 - Flood Zone Map Query

Please find a response to your query from our flood risk specialist.

*Hi* [redacted]

*Thanks for your email.*

*I can see that the new NaFRA2 flood zones include an area of flood zone 2 within the development site not corresponding with mapping showing risk from rivers and sea, but appearing to show risk from surface water flooding.*

*Flood Zones are created using undefended local model and national model scenarios for the defined probabilities. Within the national flood zone modelling, it wasn't appropriate to model some small watercourses using the main fluvial modelling approach due to limited hydrological data available. These have been modelled using the techniques used for the surface water national modelling (a direct rainfall approach). In these cases, the relevant data is copied across from the surface water outputs, and hence it is understandable that the flood zone 2 associated with the smaller watercourse is similar to the surface water flood risk and is likely following local topography.*

*In this case, I would recommend presentation of each of the datasets within the FRA for the site. This will allow distinction to be made between the sources of flood risk. A review of the topography on the site and surrounding area using survey or LiDAR will also enable the FRA to show how the flood zones compare with low lying areas within the site boundary and relative to the adjacent watercourses.*

*I trust this helps, but please feel free to get in touch with any further queries.*

*Thanks*

[redacted]

**FCRM Specialist** | National Infrastructure Team
Environment Agency

---

**From** [redacted]
**Sent:** 26 March 2025 13:45
**To:** [redacted]
**Subject:** Cost Recovered Advice: East Pye Solar : ENVPAC/1/NIT/00077 - Flood Zone Map Query

[redacted]

We have been reviewing the updated Flood Zone mapping released yesterday for East Pye. There is an area within one parcel of land that has a length of Flood Zone 2 and 3 running across it which was not originally shown on the Flood Zone mapping and is also not shown on the Flooding from Rivers and Sea Mapping. This area corresponds more to the surface water flood risk mapping, and doesn't follow the route of the watercourses around the boundary of

I've attached a screenshot showing the area in question. The new Flood Zone mapping is on the left, the old Flood Zones are on the right. Would you be able to ask a member of the technical team to look into this and advise if this has been included erroneously please?

Thanks.

Kind Regards,

[redacted]
BSc MSc MCIWEM
Principal Flood Risk and Drainage Engineer
[redacted]

Stantec UK Ltd
Caversham Bridge House
Waterman Place
Reading RG1 8DN

Stantec

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**Atención:** Este correo electrónico proviene de fuera de Stantec. Por favor, tome precauciones adicionales.

creating a better place
for people and wildlife

Environment Agency

[redacted]

Our ref: EIR2025/02594

[redacted]

Date: 31 March 2025

Dear [redacted]

**RE: Environmental Information Regulations: EIR2025/02594**

Thank you for your request for information regarding Model data for sites are located near the village of Colegate End in Norfolk, which we received on 26 March 2025.

We respond to requests for information that we hold under the Environmental Information Regulations 2004 (EIR). The Regulations requires that we respond to requests by advising you whether information is held or not, and if so by providing you with that information.

Unfortunately, we cannot provide you with any flood levels for the area you requested. We have not conducted any detailed modelling in this area. The Flood Zone maps in your area are formed of national generalised modelling which was used in 2004 to create fluvial floodplain maps on a national scale. This modelling was improved more recently, using a more detailed terrain model for the area. This modelling is not a detailed local assessment, it is used to give an indication of areas at risk from flooding.

JFLOW outputs are not suitable for detailed decision making. Normally, in these circumstances, an FRA will need to undertake a modelling exercise in order to derive flood levels and extents, both with and without allowances for climate change, for the watercourse, in order to inform the design for the site. Without this information, the risk to the development from fluvial flooding associated with the ordinary watercourse is unknown.

Detailed modelling is not a cheap process and we have focused our resources on areas with most properties at risk of flooding. At some point in the future we may conduct detailed modelling in this area. However presently we have no plans to conduct any such modelling now or in the near future.

The data we do have is too far away to demonstrate that your site is at risk or not. Maybe it would be best to contact your local authority about flood risk. Your local authority may have conducted some modelling in this area on their own behalf.

**Information not held**

EIR Regulation 3(2) states that information is held if it is in our possession and has been produced or received by us, or it is held by another person on our behalf at the time the request is received.

In this case, the information you have requested is not held by the Environment Agency, and we are therefore refusing your request on the grounds that there is no information we can provide.

Where a request is for environmental information, the Regulations allow us to refuse to disclose it if the exception at EIR Regulation 12(4)(a) applies. The regulation states that a public authority may refuse to disclose environmental information to the extent that it does not hold that information when an applicant's request is received.

It is not possible for us to conduct a public interest balancing test because the reason for non-disclosure is that the information is not held.

**Rights of appeal**

If you are not satisfied with our decision, you can contact us within two calendar months to ask for the decision to be reviewed. We will then conduct an internal review of our response to your request and give you our decision in writing within 40 working days.

If you are not satisfied with the outcome of the internal review, you can then make an appeal to the Information Commissioner Office, the statutory regulator for EIR and the Freedom of Information Act 2002. The address is: Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire. SK9 5AF.

Tel: [redacted] (local rate) or [redacted] (national rate) | Fax: 01625 524 510 Email: casework@ico.org.uk | Website: www.ico.org.uk

Yours sincerely

[redacted]

East Anglia Area Customers and Engagement

Norfolk County Council
Community and Environmental Services
County Hall
Martineau Lane
Norwich
NR1 2SG

NCC contact number: 0344 800 8020
Textphone: 0344 800 8011

**via e-mail**
[redacted]
**Stantec**
Caversham Bridge House
Waterman Place
Reading
RG1 8DN

Cc: [redacted] Norfolk County Council
NSIP Project Manager

Your Ref: East Pye Solar
Date: 03 October 2024

My Ref: FW2024_0744
Tel No.:
Email: [redacted]

*Case Officer:* [redacted], Strategic Flood Risk Planning Officer
*Reviewed by:* [redacted], Senior Flood Risk Officer

Dear [redacted]

**LLFA Flood History Request for the East Pye Solar Farm, South Norfolk**

Thank you for your flood history request on the above site and as denoted in the two plans, received on 12 September 2024. We have reviewed the submitted information request.

In relation to your query, we can confirm that there are no defined Critical Drainage Areas identified in the denoted site areas.

With regards to the flood history of this area, this information is freely available on our website in the Flood Investigation Reports (https://www.norfolk.gov.uk/article/38645/Flood-investigations). All the flood investigation reports produced by the LLFA are available for you to review. There are a small number of reports anticipated to be published in the coming months from the previous winter.

In relation to the query regarding the need for SuDS, the LLFA provides Standing Advice in the LLFA Developer Guidance. Standing Advice 4, indicates the need for SuDs for the solar panels element of the development will depend on the arrangement of the solar arrays and the scale and nature of the foundations proposed to support the arrays. Without further information being made available to the LLFA on the arrangement of the arrays, it is not possible to confirm the suitability of your proposal. The LLFA is available to provide LLFA advice on the matter although more information such as options will need to be made available for constructive feedback to be provided to the applicant. In order to arrange an advice meeting, please liaise with the LLFA through our monitored inbox, LLFA@norfolk.gov.uk.

Further guidance on the information required by the LLFA from applicants can be found at https://www.norfolk.gov.uk/rubbish-recycling-and-planning/flood-and-water-management/information-for-developers.

Yours sincerely,

[redacted]

**On behalf of Norfolk County Council as Lead Local Flood Authority**

***Disclaimer***
*We have relied on the accuracy and completeness of the information supplied to us in providing the above advice and can take no responsibility for incorrect data or interpretation, or omissions, in such information. If we have not referred to a particular issue in our response, it should not be assumed that there is no impact associated with that issue.*

# Appendix C Anglian Water Sewer Records

- Extract from Apogee Property & Utility Consultants Full Utility Search ref. 426206 (Anglian Water refs. 1286760 and 1287274) dated August 2023

Apogee Property
& Utility Consultants

**Report Type:** Full Utility Search

**Apogee Job Number:** 426206

**Client Site Name:** Long Stratton 1

**Client Job Number:**

**Report Speed:** 20 (Working) Day

**Percentage Complete:** 100%

**No. Utilities Affected:** 7

CENTRE MAPS LIVE.




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Date: 09/10/23 | Scale: 1:1250 | Map Centre: 626060,286072 | Data updated: 31/08/23 | Our Ref: 1286760 - 1 | Glenn Water Plan A0

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Raw Water
Decommissioned Water
Fitting
Hydrant

amanda.white@apogeeutilityconsultants.co.uk

1286206 - 1

love every drop
anglianwater


digdat
There are no assets within this map area
Track
Post
Ditch
Pond
Ditch
Track
Ditch
Track
Ditch
Ditch
Track
Ditch
Ditch
Track
Ditch


digdat
There are no assets within this map area
Lethgrave Farm
Dawson's Farm
100m


Lodge Farm
Tattingh Barn
Tattingh House
Poultry Houses
Cedar Lodge
Cheltenham
The Countryman
(PH)
Hill Farm
Pumping Station
Friends House
Lime Tree Farm
Track
Track
Track


Grove Farm
WASH LANE (PUBLIC)
WASH LANE (PRIVATE)
WASH LANE (PRIVATE)
WASH LANE (PRIVATE)
Ditch
Ditch
Ditch




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Date: 09/10/23 | Scale: 1:1250 | Map Centre: 622844,282218 | Data updated 31/08/23 | Our Ref: 1267274 - 4 | Glen Water Plan A0

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Scale: 1:1250 Date: 03/12/20 Over Water Plan (0)
Map Centre: 623626,298765 Our Ref: 130721 - 0 Powered by digital

Potable Water — Fitting
Raw Water — Valve
Decommissioned Water — Hydrant

Please note: not all fittings are shown on the map

amanda.white@apogeeutilityconsultants.co.uk

623200 7

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Date: 09/10/23

Scale: 1:1250

Map Centre: 624741,284475

Data updated: 31/08/23

Our Ref: 1287274 - 8

Grain Water Plan A0

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Raw Water
Decommissioned Water
Fitting
Hydrant

amanda.white@pagepenlittyconsultants.co.uk
4312008 8

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digdat
There are no assets within this map area
Guide Post
Islands' Farm
Bridge Lane
Bridge Lane
Bridge Lane




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Date: 07/11/23 | Scale: 1:1250 | Map Centre: 527229,259497 | Data updated: 31/08/23 | Our Ref: 1287274 • 12 | Clean Water Plan A0

This plan is provided by Anglian Water pursuant to its obligations under the Water Industry Act 1991 sections 199 to 198. It must be used for one purpose only, namely for giving information to persons who are proposing to carry out works in the vicinity of the Company's pipes and mains. We generally but assume, unless of this map are accurate as to current date then we is only of the main pipes in the area. Private pipes are not shown on this plan. Accurate surveying and easy survey. The actual position of all apparatus MUST be established by excavation. Anglian Water will not be liable for any damage, injury, loss or expense which may be caused by the actual position being different from that shown on the plan. Anglian Water will not be liable for any damage, injury, loss or expense caused by any inaccuracy, omission, misstatement or misrepresentation in any part of its contents. This information is valid for the date supplied. This plan is produced by Anglian Water Services Limited (c) Crown copyright and database rights 2023 Ordnance Survey 100022432. This map is to be used for the purposes of viewing the location of Anglian Water plant only. Any other uses of the map data or further copies is not permitted. This notice is not intended to exclude or restrict liability for death or personal injury resulting from negligence.

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Raw Water
Decommissioned Water
Fitting
Hydrant

amanda.wills@opusgeoEBycons.ultantsv.co.uk
4080909 10

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Date: 09/10/23 | Scale: 1:1250 | Map Centre 629300,298072 | Data updated: 3 10 2023 | Our Ref: 1298760 - 2 | Wastewater Plan A3

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| | | | |
|---|---|---|---|
| Foul Sewer | | Outfall* | Sewage Treatment Works |
| Surface Sewer | | | |
| Combined Sewer | | Inlet* | Public Pumping Station |
| Final Effluent | | | |
| Rising Main* | | Manhole* | Decommissioned Pumping Station |
| Private Sewer* | | | |
| Decommissioned Sewer* | | | *Other makes of fluent type |

jenanda.white@pagesutilityconsultants.co.uk

6262206 - 1

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Date: 07/11/23 | Scale: 1:1250 | Map Centre: 628029,297924 | Data updated: 31/08/23 | Our Ref: 1291100 + 2 | Wastewater Plan A0

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| | | | |
|---|---|---|---|
| Foul Sewer | Outfall* | Sewage Treatment Works | |
| Surface Sewer | | | |
| Combined Sewer | Inlet* | Public Pumping Station | |
| Foul / Trunk | | | |
| Rising Main* | Manhole* | Decommissioned Pumping Station | |
| Private Sewer* | | | |
| Decommissioned Sewer* | *Other devices of each type | | |

anneka.wilde@pipgas.dl.bureau.toucan
628029 - 0.1

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Foul Sewer
Surface Sewer
Combined Sewer
Final Effluent Sewer
Rising Main*
Private Sewer*
Decommissioned Sewer*

Outfall*
Inlet*
Manhole*

Sewage Treatment Works
Public Pumping Station
Decommissioned Pumping Station

*Other devices affixed/spur

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428256 - 2.2

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Date: 09/10/23 | Scale: 1:1250 | Map Centre: 621460,295692 | Data updated: 3 10 2023 | Our Ref: 126/2274 - 2 | Wastewater Plan 03

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| | | | |
|---|---|---|---|
| Foul Sewer | Outfall* | Sewage Treatment Works | |
| Surface Sewer | | | |
| Combined Sewer | | | |
| Final Effluent | Inlet* | Public Pumping Station | |
| Rising Main* | | | |
| Private Sewer* | Manhole* | Decommissioned Pumping Station | |
| Decommissioned Sewer* | | *Other than sewage effluent types | |

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07825208 4

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| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|
| 7401 | 620792 | 295489 | F | 26.64 | 24.86 | 1.78 |
| 7603 | 620762 | 295683 | F | - | - | - |
| 7701 | 620761 | 295768 | F | 35.85 | 34.28 | 1.57 |
| 8401 | 620847 | 295459 | F | 24.45 | 22.9 | 1.55 |
| 8402 | 620893 | 295429 | F | 22.58 | 21.38 | 1.2 |
| 8403 | 620862 | 295420 | F | 23.02 | 21.17 | 1.85 |
| 8801 | 620822 | 295854 | F | 37.9 | 36.34 | 1.56 |

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|




There are no assets within this map area

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Date: 09/10/23 | Scale: 1:1250 | Map Centre: 622775,296000 | Data updated: 3.10.8.23 | Our Ref: 1267566 - 1 | Wastewater Plan A3

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| | | | |
|---|---|---|---|
| Foul Sewer | Outfall* | Sewage Treatment Works | |
| Surface Sewer | | | |
| Combined Sewer | | | |
| Final Effluent | Inlet* | Public Pumping Station | |
| Rising Main* | | | |
| Private Sewer* | Manhole* | De-commissioned Pumping Station | |
| Decommissioned Sewer* | | *Other makes of plant type | |

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Date: 09/10/23 | Scale: 1:1250 | Map Centre 622986,209218 | Data updated: 3 10 2023 | Our Ref: 126727/4 - 5 | Wastewater Plan 03

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| | | | |
|---|---|---|---|
| Foul Sewer | Outfall* | Sewage Treatment Works | |
| Surface Sewer | | | |
| Combined Sewer | | | |
| Final Effluent | Inlet* | Public Pumping Station | |
| Rising Main* | | | |
| Private Sewer* | Manhole* | De-commissioned Pumping Station | |
| Decommissioned Sewer* | | *Other makes of plant type | |

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PE8 6DB

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| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|
| 9801 | 623565 | 294803 | F | 29.97 | 28.38 | 1.59 |

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|




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Data updated: 31/08/20

Scale: 1:1250
Map Centre: 623626,298765

Date: 03/12/20
Our Ref: 130725 - 7

Wastewater Plan 03
Powered by digital

Foul Sewer
Surface Sewer
Combined Sewer
Final Effluent Sewer
Rising Main*
Private Sewer*
Decommissioned Sewer*

Outfall*
Inlet*
Manhole*

Sewage Treatment Works
Public Pumping Station
Decommissioned Pumping Station

*Colour denotes effluent type

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626236 7

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| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|
| 0601 | 624002 | 296842 | F | 37.75 | 35.5 | 2.25 |
| 0602 | 624085 | 296850 | F | 37.11 | 35.09 | 2.02 |
| 1601 | 624139 | 296834 | F | 38.35 | 36.02 | 2.33 |
| 1602 | 624140 | 296856 | F | 37.5 | 34.78 | 2.72 |
| 1603 | 624143 | 296888 | F | 37.23 | 34.57 | 2.66 |
| 1701 | 624137 | 296776 | F | 36.22 | 34.18 | 2.04 |
| 1801 | 624121 | 296846 | F | 35.39 | 33.77 | 1.62 |
| 2601 | 624297 | 296842 | F | 39.15 | 36.78 | 2.37 |
| 2602 | 624233 | 296836 | F | 38.95 | 36.49 | 2.46 |
| 3701 | 623397 | 296780 | F | 38.89 | 35.29 | 1.6 |
| 4601 | 623471 | 296819 | F | 40.21 | 38.68 | 1.53 |
| 4602 | 623453 | 296851 | F | 39.38 | 37.85 | 1.53 |
| 4603 | 623434 | 296868 | F | 39.66 | 37.13 | 2.53 |
| 4701 | 623416 | 296741 | F | 38.35 | 36.81 | 1.54 |
| 5601 | 623502 | 296805 | F | 40.87 | 39.34 | 1.53 |
| 7601 | 623795 | 296809 | F | 40.6 | 39.18 | 1.42 |
| 7602 | 623798 | 296806 | F | 39.54 | 38.01 | 1.53 |
| 9601 | 623902 | 296823 | F | 38.86 | 37.17 | 1.69 |

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|




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Date: 09/10/23 | Scale: 1:1250 | Map Centre: 624781,295475 | Data updated: 3.10.0823 | Our Ref: 1202574 - 9 | Wastewater Plan A3

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| | | | |
|---|---|---|---|
| Foul Sewer | Outfall* | Sewage Treatment Works | |
| Surface Sewer | | | |
| Combined Sewer | | | |
| Final Effluent | Inlet* | Public Pumping Station | |
| Rising Main* | | | |
| Private Sewer* | Manhole* | De-commissioned Pumping Station | |
| Decommissioned Sewer* | | *Other members of fluent type | |

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Date: 09/10/23 | Scale: 1:1250 | Map Centre: 625587,295258 | Data updated: 3 10 2023 | Our Ref: 1292574 - 11 | Wastewater Plan A3

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Hylands' Farm
Frogs' Farm
Oldshore Beeches Village
Oldshore Beeches
Oldshore Beeches
Oldshore Beeches

Apogee Property
& Utility Consultants

**Report Type:** Full Utility Search

**Apogee Job Number:** 426206

**Client Site Name:** Long Stratton 2

**Client Job Number:**

**Report Speed:** 20 (Working) Day

**Percentage Complete:** 100%

**No. Utilities Affected:** 7

CENTRE MAPS LIVE.

Burgess Cottage
The Cottage
Alpha House
Thistlewood
LODDON CORNER
Lay-by
SEETHING ROAD
Gate House
HARVEY'S LANE
NORWICH ROAD
Track
Albion Bar
Woodton Grange
The Lodge
Woodton Barn
Beulah House
POUND LANE (TRACK)
MS
0m
100m
200m
300m

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Data updated: 31/08/23

Scale: 1:1250 | Date: 03/10/23 | Clean Water Plan A0
Map Centre: 629679,295687 | Our Ref: 1287274 - 14 | Powered by digdat

Potable Water
Raw Water
Decommissioned Water
Fitting
Hydrant
Please note: Not all fittings are shown on the map

amanda.white@apogeeutilityconsultants.co.uk
426206 11

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Decommissioned Water
Fitting
Hydrant

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42620612

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Date: 03/10/23

Scale: 1:1250

Map Centre: 630753,295232

Data updated: 31/08/23

Our Ref: 1287274 - 18

Clean Water Plan A0

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Fitting
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426206 13

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Data updated: 31/08/23

Scale: 1:1250 | Date: 03/10/23 | Clean Water Plan A0
Map Centre: 631104,296371 | Our Ref: 1287274 - 20 | Powered by digdat

Potable Water
Raw Water
Decommissioned Water
Fitting
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Please note: Not all fittings are shown on the map

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The Dell
Rose Cottage
MARL
160mm HPPE PE100
160mm HPPE PE100
160mm HPPE PE100




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Data updated: 31/08/23

Scale: 1:1250 | Date: 03/10/23 | Clean Water Plan A0
Map Centre: 620584,294273 | Our Ref: 1287274 - 24 | Powered by digdat

Potable Water
Raw Water
Decommissioned Water
Fitting
Hydrant

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426206 16

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Date: 03/10/23

Scale: 1:1250

Map Centre: 622735,294261

Data updated: 31/08/23

Our Ref: 1287274 - 26

Clean Water Plan A0

This plan is provided by Anglian Water pursuant to obligations under the Water Industry Act 1991 sections 198 or 199. It must be used in conjunction with any search results attached. The information on this plan is based on data currently recorded but position must be regarded as approximate. Service pipes, private sewers and drains are generally not shown. Users of this map are strongly advised to commission their own survey of the area shown on the plan before carrying out any works. The actual position of all apparatus MUST be established by trial holes. No liability whatsoever, including liability for negligence, is accepted by Anglian Water for any error or inaccuracy or omission, including the failure to accurately record, or record at all, the location of any water main, discharge pipe, sewer or disposal main or any item of apparatus. This information is valid for the date printed. This plan is produced by Anglian Water Services Limited (c) Crown copyright and database rights 2023 Ordnance Survey 100022432.This map is to be used for the purposes of viewing the location of Anglian Water plant only. Any other uses of the map data or further copies is not permitted. This notice is not intended to exclude or restrict liability for death or personal injury resulting from negligence.

Potable Water

Raw Water

Decommissioned Water

Fitting

Hydrant

amanda.white@apogeeutilityconsultants.co.uk

426206 17

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BOYLANDHALL LANE (TRACK)

BOYLANDHALL LANE (TRACK)

THE STREET

THE STREET

Coomb Barn

Beech Farm

Track

Beeches Cottages

Clay Cottage

Track

Track

St Catherine's Church

Lych Gate

Church Farm

Track

0m 250m 500m 750m

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Date: 03/10/23

Scale: 1:1250

Map Centre: 622640,293580

Data updated: 31/08/23

Our Ref: 1287274 - 28

Clean Water Plan A0

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Potable Water

Raw Water

Decommissioned Water

Fitting

Hydrant

amanda.white@apogeeutilityconsultants.co.uk

426206 18

love every drop anglianwater

Track
Track
180mm MDPE/PE80
B 1527
GP
4in GI
4in GI
180mm HPPE/PE100
BUNGAY ROAD
Firs Field Farm
Bungalow
180mm HPPE/PE100
B 1527
BUNGAY ROAD
Poultry Houses
Leprechauns
Falgate Cottage
3in GI
3in GI
Poachers Cottage
Pear Tree
Cottage
Melrey
The Firs
Firs Farm
Firs Farm Cottage
Council Houses
Constantia
Beechcroft
Tahiti
The Ferns
125mm MDPE/PE80
125mm MDPE/PE80
125mm MDPE/PE80
Poultry Houses
High Hedges
Corner Cottage
125mm MDPE/PE80
Appletree
Farm
A1120
ALBURGH ROAD
Sgurr-Nan-Gillean
Sawmill
Woodlands
Chestnut Tree Farm
Silver Green Farm
0m
100m
200m
300m

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Data updated: 31/08/23

Scale: 1:1250 | Date: 03/10/23 | Clean Water Plan A0
Map Centre: 625391,293915 | Our Ref: 1287274 - 30 | Powered by digdat

Potable Water
Raw Water
Decommissioned Water
Fitting
Hydrant
Please note: Not all fittings are shown on the map

amanda.white@apogeeutilityconsultants.co.uk
426206 19

love every drop
anglianwater

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Date: 03/10/23

Scale: 1:1250

Map Centre: 624497,291990

Data updated: 31/08/23

Our Ref: 1287274 - 32

Clean Water Plan A0

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Potable Water

Raw Water

Decommissioned Water

Fitting

Hydrant

amanda.white@apogeeutilityconsultants.co.uk

426206 20

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Date: 03/10/23

Scale: 1:1250

Map Centre: 624554,291095

Data updated: 31/08/23

Our Ref: 1287274 - 34

Clean Water Plan A0

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Potable Water
Raw Water
Decommissioned Water
Fitting
Hydrant

amanda.white@apogeeutilityconsultants.co.uk

426206 21

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Data updated: 31/08/23

Scale: 1:1250 | Date: 03/10/23 | Wastewater Plan A0
Map Centre: 629679,295687 | Our Ref: 1287274 - 15 | Powered by digdat

Foul Sewer
Surface Sewer
Combined Sewer
Final Effluent Sewer
Rising Main*
Private Sewer*
Decommissioned Sewer*

Outfall*
Inlet*
Manhole*

Sewage Treatment Works
Public Pumping Station
Decommissioned Pumping Station

*(Colour denotes effluent type)

amanda.white@apogeeutilityconsultants.co.uk
426206 11

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Date: 03/10/23

Scale: 1:1250

Map Centre: 629985,294767

Data updated: 31/08/23

Our Ref: 1287274 - 17

Wastewater Plan A0

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| | | | |
|---|---|---|---|
| Foul Sewer | | Outfall* | Sewage Treatment Works |
| Surface Sewer | | | |
| Combined Sewer | | Inlet* | Public Pumping Station |
| Final Effluent | | | |
| Rising Main* | | Manhole* | Decommissioned Pumping Station |
| Private Sewer* | | | |
| Decommissioned Sewer* | | | |

*(Colour denotes effluent type)

amanda.white@apogeeutilityconsultants.co.uk

42620612

love every drop
anglianwater

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|
| 2200 | 629282 | 294287 | F | 28.982 | 26.15 | 2.832 |
| 2300 | 629273 | 294346 | F | 29.36 | 26.775 | 2.585 |
| 2400 | 629266 | 294418 | F | 29.416 | 27.399 | 2.017 |
| 2500 | 629257 | 294503 | F | 31.578 | 29.764 | 1.814 |
| 3201 | 629393 | 294287 | F | 23.599 | 20.829 | 2.77 |
| 4300 | 629411 | 294374 | F | 23.874 | 21.554 | 2.32 |
| 4400 | 629429 | 294429 | F | 24.177 | 21.117 | 3.06 |
| 4401 | 629450 | 294460 | F | 24.358 | 22.468 | 1.89 |
| 4402 | 629482 | 294494 | F | 25.573 | 24.083 | 1.49 |

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|




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Date: 03/10/23

Scale: 1:1250

Map Centre: 630753,295232

Data updated: 31/08/23

Our Ref: 1287274 - 19

Wastewater Plan A0

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| | | | | | |
|---|---|---|---|---|---|
| Foul Sewer | | Outfall* | | Sewage Treatment Works | |
| Surface Sewer | | | | | |
| Combined Sewer | | | | | |
| Final Effluent | | Inlet* | | Public Pumping Station | |
| Rising Main* | | | | | |
| Private Sewer* | | Manhole* | | Decommissioned Pumping Station | |
| Decommissioned Sewer* | | | | | |

*(Colour denotes effluent type)

amanda.white@apogeeutilityconsultants.co.uk

426206 13

love every drop
anglianwater




0m 100m 200m 300m

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Data updated: 31/08/23

Scale: 1:1250 | Date: 03/10/23 | Wastewater Plan A0
Map Centre: 631104,296371 | Our Ref: 1287274 - 21 | Powered by digdat

Foul Sewer
Surface Sewer
Combined Sewer
Final Effluent Sewer
Rising Main*
Private Sewer*
Decommissioned Sewer*

Outfall*
Inlet*
Manhole*

Sewage Treatment Works
Public Pumping Station
Decommissioned Pumping Station

*(Colour denotes effluent type)

amanda.white@apogeeutilityconsultants.co.uk

426206 14

love every drop anglianwater

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Data updated: 31/08/23

Scale: 1:1250 | Date: 03/10/23 | Wastewater Plan A0

Map Centre: 619979,294743 | Our Ref: 1287274 - 23 | Powered by digdat

| | | | |
|---|---|---|---|
| Foul Sewer | | | |
| Surface Sewer | Outfall* | Sewage Treatment Works | |
| Combined Sewer | | | |
| Final Effluent Sewer | Inlet* | Public Pumping Station | |
| Rising Main* | | | |
| Private Sewer* | Manhole* | Decommissioned Pumping Station | |
| Decommissioned Sewer* | | | |

*(Colour denotes effluent type)

amanda.white@apogeeutilityconsultants.co.uk

426206 15

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| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|
| 4451 | 620430 | 295412 | S | 21.31 | 19.49 | 1.82 |

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|




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Data updated: 31/08/23

Scale: 1:1250 | Date: 03/10/23 | Wastewater Plan A0

Map Centre: 619979,294743 | Our Ref: 1287274 - 23 | Powered by digdat

| | | | |
|---|---|---|---|
| Foul Sewer | | | |
| Surface Sewer | Outfall* | Sewage Treatment Works | |
| Combined Sewer | | | |
| Final Effluent Sewer | Inlet* | Public Pumping Station | |
| Rising Main* | | | |
| Private Sewer* | Manhole* | Decommissioned Pumping Station | |
| Decommissioned Sewer* | | | |

*(Colour denotes effluent type)

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426206 15

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| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|
| 4451 | 620430 | 295412 | S | 21.31 | 19.49 | 1.82 |

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|




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Data updated: 31/08/23

Scale: 1:1250 | Date: 03/10/23 | Wastewater Plan A0

Map Centre: 620584,294273 | Our Ref: 1287274 - 25 | Powered by digdat

| | | | |
|---|---|---|---|
| Foul Sewer | Outfall* | Sewage Treatment Works | |
| Surface Sewer | | | |
| Combined Sewer | | | |
| Final Effluent Sewer | Inlet* | Public Pumping Station | |
| Rising Main* | | | |
| Private Sewer* | Manhole* | Decommissioned Pumping Station | |
| Decommissioned Sewer* | | | |

*(Colour denotes effluent type)

amanda.white@apogeeutilityconsultants.co.uk

426206 16

love every drop anglianwater

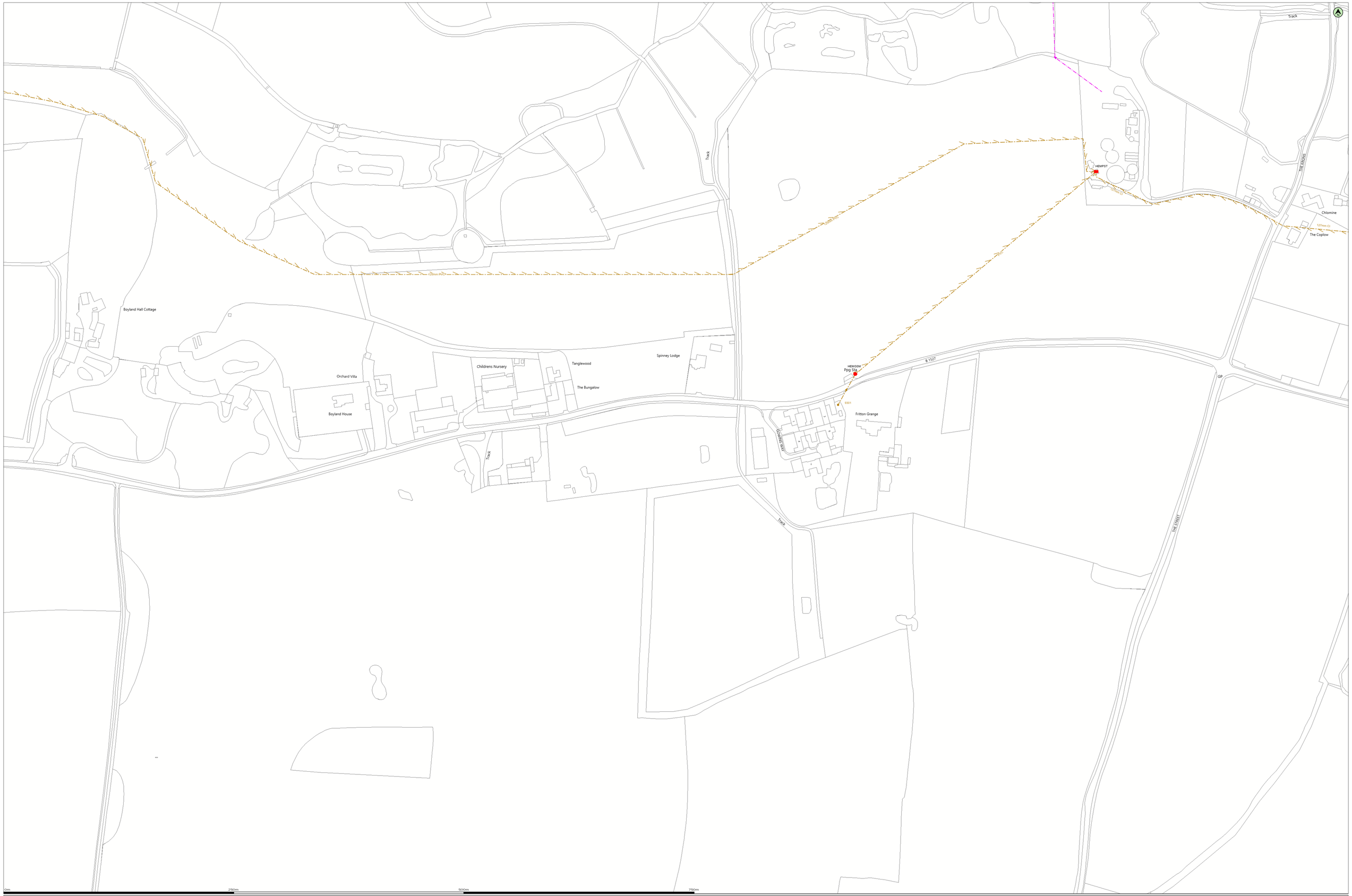
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| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|




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Date: 03/10/23

Scale: 1:1250

Map Centre: 622735,294261

Data updated: 31/08/23

Our Ref: 1287274 - 27

Wastewater Plan A0

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| | | | | | |
|---|---|---|---|---|---|
| Foul Sewer | | Outfall* | | Sewage Treatment Works | |
| Surface Sewer | | Inlet* | | Public Pumping Station | |
| Combined Sewer | | Manhole* | | Decommissioned Pumping Station | |
| Final Effluent | | | | | |
| Rising Main* | | | | | |
| Private Sewer* | | | | | |
| Decommissioned Sewer* | | | | | |

*(Colour denotes effluent type)

amanda.white@apogeeutilityconsultants.co.uk

426206 17

love every drop
anglianwater

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|
| 9301 | 622911 | 294308 | F | 35.81 | 34.6 | 1.21 |

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|

| Manhole Reference | Easting | Northing | Liquid Type | Cover Level | Invert Level | Depth to Invert |
|---|---|---|---|---|---|---|




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Date: 03/10/23

Scale: 1:1250

Map Centre: 622640,293580

Data updated: 31/08/23

Our Ref: 1287274 - 29

Wastewater Plan A0

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| | | | |
|---|---|---|---|
| Foul Sewer | | | |
| Surface Sewer | Outfall* | Sewage Treatment Works | |
| Combined Sewer | | | |
| Final Effluent | Inlet* | Public Pumping Station | |
| Rising Main* | | | |
| Private Sewer* | Manhole* | Decommissioned Pumping Station | |
| Decommissioned Sewer* | | | |

*(Colour denotes effluent type)

amanda.white@apogeeutilityconsultants.co.uk

426206 18

love every drop
anglianwater

B 1527

GP

BUNGAY ROAD

Track

Firs Field Farm Bungalow

Poultry Houses

Leprechauns

Falgate Cottage

Poachers Cottage

Pear Tree Cottage

Melrey

The Firs

Firs Farm

Council Houses

Firs Farm Cottage

Constantia

Beechcroft

Tahiti

The Ferns

Appletree Farm

ALBURGH ROAD

Sgurr-Nan-Gillean

High Hedges

Corner Cottage

Silver Green Farm

Sawmill

Woodlands

Chestnut Tree Farm

0m 100m 200m 300m

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Data updated: 31/08/23

Scale: 1:1250 Date: 03/10/23 Wastewater Plan A0

Map Centre: 625391,293915 Our Ref: 1287274 - 31 Powered by digdat

Foul Sewer
Surface Sewer
Combined Sewer
Final Effluent Sewer
Rising Main*
Private Sewer*
Decommissioned Sewer*

Outfall*
Inlet*
Manhole*

Sewage Treatment Works
Public Pumping Station
Decommissioned Pumping Station

*(Colour denotes effluent type)

amanda.white@apogeeutilityconsultants.co.uk

426206 19

love every drop anglianwater

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Date: 03/10/23

Scale: 1:1250

Map Centre: 624497,291990

Data updated: 31/08/23

Our Ref: 1287274 - 33

Wastewater Plan A0

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| | | | | | |
|---|---|---|---|---|---|
| Foul Sewer | | Outfall* | | Sewage Treatment Works | |
| Surface Sewer | | | | | |
| Combined Sewer | | Inlet* | | Public Pumping Station | |
| Final Effluent | | | | | |
| Rising Main* | | Manhole* | | Decommissioned Pumping Station | |
| Private Sewer* | | | | | |
| Decommissioned Sewer* | | | | | |

*(Colour denotes effluent type)

amanda.white@apogeeutilityconsultants.co.uk

426206 20

love every drop anglianwater




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Date: 03/10/23

Scale: 1:1250

Map Centre: 624554,291095

Data updated: 31/08/23

Our Ref: 1287274 - 35

Wastewater Plan A0

This plan is provided by Anglian Water pursuant its obligations under the Water Industry Act 1991 sections 198 or 199. It must be used in conjunction with any search results attached. The information on this plan is based on data currently recorded but position must be regarded as approximate. Service pipes, private sewers and drains are generally not shown. Users of this map are strongly advised to commission their own survey of the area shown on the plan before carrying out any works. The actual position of all apparatus MUST be established by trial holes. No liability whatsoever, including liability for negligence, is accepted by Anglian Water for any error or inaccuracy contained in this plan in relation to the actual position of any sewer, lateral drain, service pipe, discharge pipe, sewer or disposal main or any item of apparatus. This information is valid for the date printed. This plan is produced by Anglian Water Services Limited (c) Crown copyright and database rights 2023 Ordnance Survey 100022432.This map is to be used for the purposes of viewing the location of Anglian Water plant only. Any other uses of the map data or further copies is not permitted. This notice is not intended to exclude or restrict liability for death or personal injury resulting from negligence.

Foul Sewer
Surface Sewer
Combined Sewer
Final Effluent
Rising Main*
Private Sewer*
Decommissioned Sewer*

Outfall*
Inlet*
Manhole*

Sewage Treatment Works
Public Pumping Station
Decommissioned Pumping Station

*(Colour denotes effluent type)

amanda.white@apogeeutilityconsultants.co.uk

426206 21

love every drop
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# Appendix D Proposed Drainage Information

- Greenfield Runoff Rates
- FEH22 Point Descriptors
- Quick Storage Estimate 1ha
- InfoDrainage schedule and results
- Stantec drawings 333101678/300.03/001 & 002

# FEH Greenfield Runoff

## Using the 2008 Statistical Method QMED Equation

| | | |
|---|---|---|
| **Project Title** | East Pye Solar DCO - Greenfield Runoff | |
| **Project No** | 333101678 | 300.03 |

Methodology as set out in SuDS Manual 24.3.2 — SUDS Manual Chapter 24

### 1 Retrieve FEH Catchment Information

| | | | |
|---|---|---|---|
| Define BFIHOST definition source | | FEH | *see note 1* |
| Catchment Descriptors | **BFIHOST** | 0.333 | |
| | **SAAR** | 606 | *see note 1* |
| | **FARL** | 1.0 | *see note 2* |

### 2 Derive QBAR (mean annual flood)

| | | | | |
|---|---|---|---|---|
| Define area | **Site Area** | 1.00 | ha | |
| | **Applied Area** | 50.0 | ha | *see note 3* |
| FEH Index Flood (SuDS Manual Equation 24.2) | **QMED ($Q_2$)** | 3.0 | l/s | *see note 4* |
| Calculate QBAR by dividing QMED by 2yr growth factor | **QBAR** | 3.3 | l/s | *see note 5* |

### 3 Select appropriate growth factors

| | | | |
|---|---|---|---|
| FSR Hydrological Region | | 5 | *(refer to FSR Hydrological Region tab)* |
| 100yr Growth Curve Factor | **$GQ_{100}$** | 3.56 | |
| 30yr Growth Curve Factor | **$GQ_{30}$** | 2.55 | |
| 10yr Growth Curve Factor | **$GQ_{10}$** | 1.65 | |
| 2yr Growth Curve Factor | **$GQ_2$** | 0.89 | |
| 1yr Growth Curve Factor | **$GQ_1$** | 0.87 | |



### 4 Derive Flood Frequency

Greenfield Runoff per 1ha

| | | | |
|---|---|---|---|
| 100yr Peak Runoff Rate | **$Q_{100}$** | 11.9 | l/s/ha |
| 30yr Peak Runoff Rate | **$Q_{30}$** | 8.5 | l/s/ha |
| 10yr Growth Curve Rate | **$Q_{10}$** | 5.5 | l/s/ha |
| QBAR Peak Runoff Rate | **QBAR** | 3.3 | l/s/ha |
| 2yr Peak Runoff Rate | **$Q_2$** | 3.0 | l/s/ha |
| 1yr Peak Runoff Rate | **$Q_1$** | 2.9 | l/s/ha |

**DOCUMENT ISSUE RECORD**

| Rev | Comments | Prepared | Date | Checked | Date |
|---|---|---|---|---|---|
| - | Original calculation | E Edney | 24/10/2025 | A Johnson | 03/12/2025 |
| | | | | | |
| | | | | | |

Notes This spreadsheet has been created to allow derivation of greenfield runoff rates using the FEH statistical method applied in a manner consistent with the recommendations of the SuDS Manual. If you have recommendations to improve this spreadsheet please contact Alex Bearne.

Note 1 FEH Web version 3 allows extraction of BFIHOST and SAAR values for each square kilometre grid Export point data from FEH Webs Service as .XML file and save in project folder and import in the FEH Point Data Import tab. If you do not think the BFIHOST value is representative of your site then it is possible to derive it manually. This should not normally be necessary. BFI can be derived manually using the methodology set out in the Flood Estimation Handbook (see Manual Derivation *of BFIHOST tab)* or can be defined from ground investigation information.
As default the sheet references the imported FEH data

Note 2 FARL value is a measure of attenuation from reservoirs and lakes for the majority of studies this should be set to 1 (representing no attenuation). If your site includes a large water body with an attenuating affect on runoff please consult a hydrologist.
*FARL is a measurement of studies water bodies in the catchment so that their attenuation effects so this term becomes 1.0 and therefore drops out.* (see page 23 of the Preliminary rainfall runoff management for developments EA/Defra 2013)
Rainfall runoff management for developments.pdf

Note 3 If the site area is less than 50 hectare the spreadsheet will calculate QMED for 50ha and scale the results automatically to the defined Site Area

Note 4 QMED is calculated using the statistical equation as revised by Kjeldsen in 2008

$$Q_{MED} = 8.3062AREA^{0.8510} .0.1536^{(1000/SAAR)} .FARL^{3.4451} .0.0460^{BFIHOST\wedge 2}$$

Rainfall runoff management for developments.pdf
It is reproduced as Equation 24.2 in the SUDS Manual (pg 512)

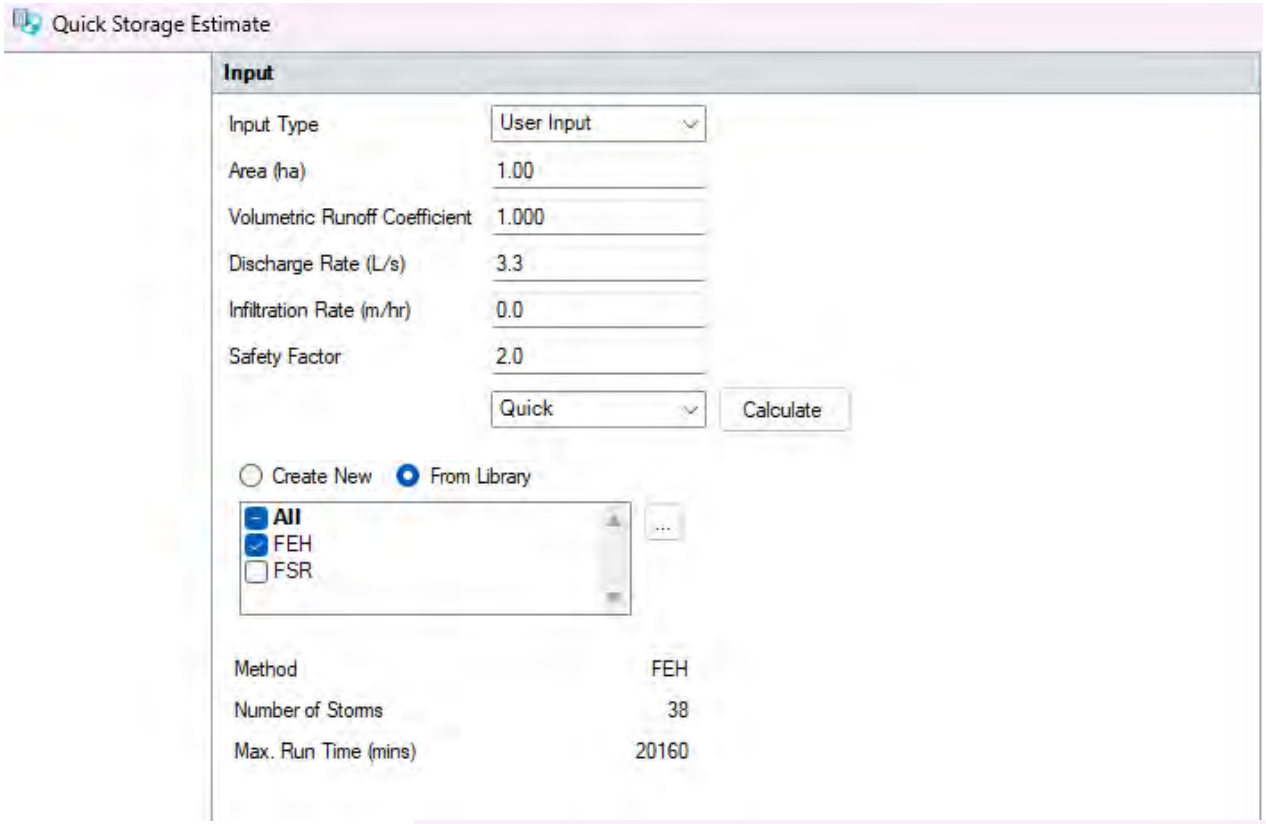
Note 5 QBAR is calculated by dividing QMED by the growth factor for the 2 year event, as per the methodology set out in paragraph 6.2.2 of 'Rainfall runoff management for developments' .
QBAR is then used as the index flood for the basis of applying the growth factors.

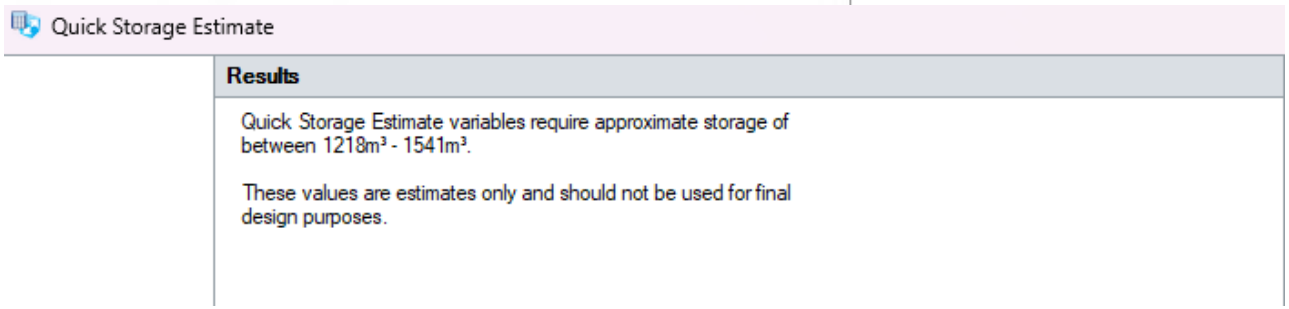
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# East Pye DCO Solar Quick Storage Estimate



| | | | |
|---|---|---|---|
| East Pye Solar DCO:<br>Outline Surface Water Drainage<br>BESS, National Grid Substation &<br>Project Substations BESS Site and Sub-Site 1B | Date:<br>04/03/0026 | | |
| | Designed by:<br>EE | Checked by:<br>AJ | Approved By:<br>ID |
| Report Details:<br>Type: Inflows<br>Storm Phase: BESS and Sub-Site 1B_Mar26 | Stantec UK Ltd.:<br>Caversham Bridge House<br>Waterman Place<br>Reading RG1 8DN | | |



**CA BESS**

Type : Catchment Area

| | |
|---|---|
| Area (ha) | 6.50 |

## Preliminary Sizing

| | |
|---|---|
| Volumetric Runoff Coefficient | 1.000 |
| Percentage Impervious (%) | 100 |
| Time of Concentration (mins) | 5 |

## Dynamic Sizing

| Runoff Method | Time of Concentration |
|---|---|
| Summer Volumetric Runoff | 1.000 |
| Winter Volumetric Runoff | 1.000 |
| Time of Concentration (mins) | 5 |
| Percentage Impervious (%) | 100 |



**CA National Grid Substation**

Type : Catchment Area

| | |
|---|---|
| Area (ha) | 6.00 |

## Preliminary Sizing

| | |
|---|---|
| Volumetric Runoff Coefficient | 0.750 |
| Percentage Impervious (%) | 100 |
| Time of Concentration (mins) | 5 |

## Dynamic Sizing

| Runoff Method | Time of Concentration |
|---|---|
| Summer Volumetric Runoff | 1.000 |
| Winter Volumetric Runoff | 1.000 |
| Time of Concentration (mins) | 5 |
| Percentage Impervious (%) | 100 |



**CA 400kV Project Substation Sub-Site 1B**

Type : Catchment Area

| | |
|---|---|
| Area (ha) | 1.10 |

## Preliminary Sizing

| | |
|---|---|
| Volumetric Runoff Coefficient | 0.750 |
| Percentage Impervious (%) | 100 |
| Time of Concentration (mins) | 5 |

## Dynamic Sizing

| Runoff Method | Time of Concentration |
|---|---|
| Summer Volumetric Runoff | 1.000 |
| Winter Volumetric Runoff | 1.000 |
| Time of Concentration (mins) | 5 |
| Percentage Impervious (%) | 100 |



**CA 400kV Project Substation BESS Site**

Type : Catchment Area

| | |
|---|---|
| Area (ha) | 3.00 |

## Preliminary Sizing

| | |
|---|---|
| Volumetric Runoff Coefficient | 0.750 |
| Percentage Impervious (%) | 100 |
| Time of Concentration (mins) | 5 |

## Dynamic Sizing

| Runoff Method | Time of Concentration |
|---|---|
| Summer Volumetric Runoff | 1.000 |
| Winter Volumetric Runoff | 1.000 |
| Time of Concentration (mins) | 5 |
| Percentage Impervious (%) | 100 |

| East Pye Solar DCO:<br>Outline Surface Water Drainage<br>BESS, National Grid Substation &<br>Project Substations BESS Site and Sub-Site 1B | Date:<br>04/03/0026 | | |
|---|---|---|---|
| | Designed by:<br>EE | Checked by:<br>AJ | Approved By:<br>ID |
| Report Details:<br>Type: Junctions<br>Storm Phase: BESS and Sub-Site 1B_Mar26 | Stantec UK Ltd.:<br>Caversham Bridge House<br>Waterman Place<br>Reading RG1 8DN | | |

| Name | Junction Type | Easting (m) | Northing (m) | Cover Level (m) | Depth (m) | Invert Level (m) | Chamber Shape | Diameter (m) | |
|---|---|---|---|---|---|---|---|---|---|
| OF BESS | Simple Junction | 617093.947 | 288726.490 | | | | | | |
| BESS FC | Manhole | 617121.538 | 288677.894 | 54.550 | 1.130 | 53.420 | Circular | 3.000 | None |
| NG SS FC | Manhole | 616856.302 | 289205.618 | 55.700 | 0.870 | 54.830 | Circular | 3.000 | None |
| OF NG | Simple Junction | 616833.537 | 289117.073 | | | | | | |
| OF PSS1B | Simple Junction | 617084.320 | 289206.805 | | | | | | |
| PSS1B FC | Manhole | 617101.754 | 289220.610 | 55.800 | 0.720 | 55.080 | Circular | 1.200 | None |
| OF PSS BESS Site | Simple Junction | 617432.540 | 288303.347 | | | | | | |
| PSS BESS Site FC | Manhole | 617386.046 | 288318.541 | 54.480 | 0.700 | 53.780 | Circular | 3.000 | None |



**BESS**

Type : Porous Paving

## Dimensions

| | |
|---|---|
| Exceedance Level (m) | 54.550 |
| Depth (m) | 0.650 |
| Base Level (m) | 53.900 |
| Paving Layer Depth (mm) | 80 |
| Membrane Percolation (m/hr) | 32.4 |
| Porosity (%) | 30 |
| Length (m) | 318.500 |
| Long. Slope (1:X) | 430.00 |
| Width (m) | 204.058 |
| Total Volume (m³) | 11116.341 |

## Under Drain

| | |
|---|---|
| Height Above Base (m) | 0.000 |
| Diameter (mm) | 150 |
| No. of Barrels | 1 |
| Release Height (m) | 0.000 |
| Friction Scheme | Colebrook-White Roughness |
| Roughness (mm) | 0.6 |

## Inlets

### Inlet

| | |
|---|---|
| Inlet Type | Lateral Inflow |
| Incoming Item(s) | CA BESS |
| Bypass Destination | (None) |
| Capacity Type | No Restriction |

## Outlets

### Outlet

| | |
|---|---|
| Outgoing Connection | 1.000 |
| Outlet Type | Free Discharge |

## Advanced

| | |
|---|---|
| Conductivity (m/hr) | 50.0 |



**National Grid Substation**

Type : Porous Paving

## Dimensions

| | |
|---|---|
| Exceedance Level (m) | 55.700 |
| Depth (m) | 0.650 |
| Base Level (m) | 55.050 |
| Paving Layer Depth (mm) | 80 |
| Membrane Percolation (m/hr) | 34.2 |
| Porosity (%) | 30 |
| Length (m) | 368.409 |
| Long. Slope (1:X) | 470.00 |
| Width (m) | 162.869 |
| Total Volume (m³) | 10263.272 |

## Under Drain

| | |
|---|---|
| Height Above Base (m) | 0.000 |
| Diameter (mm) | 150 |
| No. of Barrels | 1 |
| Release Height (m) | 0.000 |
| Friction Scheme | Colebrook-White Roughness |
| Roughness (mm) | 0.6 |

## Inlets

### Inlet

| | |
|---|---|
| Inlet Type | Lateral Inflow |
| Incoming Item(s) | CA National Grid Substation |
| Bypass Destination | (None) |
| Capacity Type | No Restriction |

## Outlets

### Outlet

| | |
|---|---|
| Outgoing Connection | 3.000 |
| Outlet Type | Free Discharge |

## Advanced

| | |
|---|---|
| Conductivity (m/hr) | 50.0 |



**400kV Project Substation Sub-Site 1B**

Type : Porous Paving

## Dimensions

| | |
|---|---|
| Exceedance Level (m) | 55.800 |
| Depth (m) | 0.700 |
| Base Level (m) | 55.100 |
| Paving Layer Depth (mm) | 80 |
| Membrane Percolation (m/hr) | 34.2 |
| Porosity (%) | 30 |
| Length (m) | 148.332 |
| Long. Slope (1:X) | 600.00 |
| Width (m) | 74.154 |
| Total Volume (m³) | 2047.728 |

## Under Drain

| | |
|---|---|
| Height Above Base (m) | 0.000 |
| Diameter (mm) | 150 |
| No. of Barrels | 1 |
| Release Height (m) | 0.000 |
| Friction Scheme | Colebrook-White Roughness |
| Roughness (mm) | 0.6 |

## Inlets

### Inlet

| | |
|---|---|
| Inlet Type | Lateral Inflow |
| Incoming Item(s) | CA 400kV Project Substation<br>Sub-Site 1B |
| Bypass Destination | (None) |
| Capacity Type | No Restriction |

## Outlets

### Outlet

| | |
|---|---|
| Outgoing Connection | 4.000 |
| Outlet Type | Free Discharge |

## Advanced

| | |
|---|---|
| Conductivity (m/hr) | 50.0 |



**400kV Project Substation BESS Site**

Type : Porous Paving

## Dimensions

| | |
|---|---|
| Exceedance Level (m) | 54.480 |
| Depth (m) | 0.660 |
| Base Level (m) | 53.820 |
| Paving Layer Depth (mm) | 80 |
| Membrane Percolation (m/hr) | 34.2 |
| Porosity (%) | 30 |
| Length (m) | 278.021 |
| Long. Slope (1:X) | 480.00 |
| Width (m) | 107.892 |
| Total Volume (m³) | 5222.353 |

## Under Drain

| | |
|---|---|
| Height Above Base (m) | 0.000 |
| Diameter (mm) | 150 |
| No. of Barrels | 1 |
| Release Height (m) | 0.000 |
| Friction Scheme | Colebrook-White Roughness |
| Roughness (mm) | 0.6 |

## Inlets

### Inlet

| | |
|---|---|
| Inlet Type | Lateral Inflow |
| Incoming Item(s) | CA 400kV Project Substation BESS Site |
| Bypass Destination | (None) |
| Capacity Type | No Restriction |

## Outlets

### Outlet

| | |
|---|---|
| Outgoing Connection | 2.000 |
| Outlet Type | Free Discharge |

## Advanced

| | |
|---|---|
| Conductivity (m/hr) | 50.0 |

| East Pye Solar DCO:<br>Outline Surface Water Drainage<br>BESS, National Grid Substation &<br>Project Substations BESS Site and Sub-Site 1B | Date:<br>04/03/0026 | | |
|---|---|---|---|
| | Designed by:<br>EE | Checked by:<br>AJ | Approved By:<br>ID |
| Report Details:<br>Type: Connections<br>Storm Phase: BESS and Sub-Site 1B_Mar26 | Stantec UK Ltd.:<br>Caversham Bridge House<br>Waterman Place<br>Reading RG1 8DN | | |

| Name | Length (m) | Connection Type | Slope (1:X) | Manning's n | Colebrook-White Roughness (mm) | Diameter / Base Width (mm) | Upstream Cover Level (m) | Upstream Invert Level (m) | Downstream Cover Level (m) | Downstream Invert Level (m) | Lock | Flow Restriction (L/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 37.035 | Pipe | 77.156 | | 0.6 | 150 | 54.550 | 53.900 | 54.550 | 53.420 | None | |
| 1.001 | 55.882 | Pipe | 96.349 | | 0.6 | 150 | 54.550 | 53.420 | 54.390 | 52.840 | None | 23.5 |
| 3.000 | 16.459 | Pipe | 74.813 | | 0.6 | 150 | 55.700 | 55.050 | 55.700 | 54.830 | None | |
| 3.001 | 91.425 | Pipe | 99.375 | | 0.6 | 150 | 55.700 | 54.830 | 55.450 | 53.910 | None | 21.7 |
| 4.000 | 1.880 | Pipe | 93.999 | | 0.6 | 150 | 55.800 | 55.100 | 55.800 | 55.080 | None | |
| 4.001 | 22.238 | Pipe | 96.688 | | 0.6 | 150 | 55.800 | 55.080 | 55.600 | 54.850 | None | 3.6 |
| 2.000 | 5.439 | Pipe | 135.977 | | 0.6 | 150 | 54.480 | 53.820 | 54.480 | 53.780 | None | |
| 2.001 | 48.914 | Pipe | 84.334 | | 0.6 | 150 | 54.480 | 53.780 | 53.920 | 53.200 | None | 9.9 |

| Name | Culvert Type | Culvert Entrance |
|---|---|---|
| 1.000 | (None) | (None) |
| 1.001 | (None) | (None) |
| 3.000 | (None) | (None) |
| 3.001 | (None) | (None) |
| 4.000 | (None) | (None) |
| 4.001 | (None) | (None) |
| 2.000 | (None) | (None) |
| 2.001 | (None) | (None) |

| East Pye Solar DCO:<br>Outline Surface Water Drainage<br>BESS, National Grid Substation &<br>Project Substations BESS Site and Sub-Site 1B | Date:<br>04/03/0026 | | |
|---|---|---|---|
| | Designed by:<br>EE | Checked by:<br>AJ | Approved By:<br>ID |
| Report Details:<br>Type: Junctions Summary<br>Storm Phase: BESS and Sub-Site 1B_Mar26 | Stantec UK Ltd.:<br>Caversham Bridge House<br>Waterman Place<br>Reading RG1 8DN | | |

**FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Outflow**

| Junction | Storm Event | Cover Level (m) | Invert Level (m) | Max. Level (m) | Max. Depth (m) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| OF BESS | FEH: 2 years: +0 %: 10080 mins: Summer | | 52.840 | 52.930 | 0.090 | 12.3 | 4010.159 | OK |
| BESS FC | FEH: 2 years: +0 %: 10080 mins: Summer | 54.550 | 53.420 | 53.674 | 0.254 | 12.3 | 4010.182 | Surcharged |
| NG SS FC | FEH: 2 years: +0 %: 10080 mins: Summer | 55.700 | 54.830 | 55.072 | 0.242 | 11.1 | 3702.110 | Surcharged |
| OF NG | FEH: 2 years: +0 %: 10080 mins: Summer | | 53.910 | 53.995 | 0.085 | 11.1 | 3702.077 | OK |
| OF PSS1B | FEH: 2 years: +0 %: 2160 mins: Summer | | 54.850 | 54.892 | 0.042 | 3.1 | 381.312 | OK |
| PSS1B FC | FEH: 2 years: +0 %: 2160 mins: Summer | 55.800 | 55.080 | 55.263 | 0.183 | 3.1 | 381.330 | Surcharged |
| OF PSS BESS Site | FEH: 2 years: +0 %: 10080 mins: Summer | | 53.200 | 53.262 | 0.062 | 6.9 | 1896.087 | OK |
| PSS BESS Site FC | FEH: 2 years: +0 %: 10080 mins: Summer | 54.480 | 53.780 | 53.991 | 0.211 | 6.9 | 1896.097 | Surcharged |

| East Pye Solar DCO:<br>Outline Surface Water Drainage<br>BESS, National Grid Substation &<br>Project Substations BESS Site and Sub-Site 1B | Date:<br>04/03/0026 | | |
|---|---|---|---|
| | Designed by:<br>EE | Checked by:<br>AJ | Approved By:<br>ID |
| Report Details:<br>Type: Junctions Summary<br>Storm Phase: BESS and Sub-Site 1B_Mar26 | Stantec UK Ltd.:<br>Caversham Bridge House<br>Waterman Place<br>Reading RG1 8DN | | |

**FEH: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Outflow**

| Junction | Storm Event | Cover Level (m) | Invert Level (m) | Max. Level (m) | Max. Depth (m) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| OF BESS | FEH: 30 years: +0 %: 720 mins: Winter | | 52.840 | 52.950 | 0.110 | 16.3 | 1088.789 | OK |
| BESS FC | FEH: 30 years: +0 %: 720 mins: Winter | 54.550 | 53.420 | 53.742 | 0.322 | 16.3 | 1089.183 | Surcharged |
| NG SS FC | FEH: 30 years: +0 %: 960 mins: Winter | 55.700 | 54.830 | 55.116 | 0.286 | 13.7 | 1204.881 | Surcharged |
| OF NG | FEH: 30 years: +0 %: 960 mins: Winter | | 53.910 | 54.008 | 0.098 | 13.7 | 1204.350 | OK |
| OF PSS1B | FEH: 30 years: +0 %: 2160 mins: Summer | | 54.850 | 54.895 | 0.045 | 3.6 | 550.775 | OK |
| PSS1B FC | FEH: 30 years: +0 %: 4320 mins: Summer | 55.800 | 55.080 | 55.394 | 0.314 | 3.6 | 922.637 | Surcharged |
| OF PSS BESS Site | FEH: 30 years: +0 %: 2880 mins: Winter | | 53.200 | 53.272 | 0.072 | 9.1 | 2091.947 | OK |
| PSS BESS Site FC | FEH: 30 years: +0 %: 2880 mins: Winter | 54.480 | 53.780 | 54.058 | 0.278 | 9.1 | 2092.047 | Surcharged |

| East Pye Solar DCO:<br>Outline Surface Water Drainage<br>BESS, National Grid Substation &<br>Project Substations BESS Site and Sub-Site 1B | Date:<br>04/03/0026 | | |
|---|---|---|---|
| | Designed by:<br>EE | Checked by:<br>AJ | Approved By:<br>ID |
| Report Details:<br>Type: Junctions Summary<br>Storm Phase: BESS and Sub-Site 1B_Mar26 | Stantec UK Ltd.:<br>Caversham Bridge House<br>Waterman Place<br>Reading RG1 8DN | | |



**FEH: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Outflow**

| Junction | Storm Event | Cover Level (m) | Invert Level (m) | Max. Level (m) | Max. Depth (m) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| OF BESS | FEH: 30 years: +40 %: 960 mins: Winter | | 52.840 | 52.957 | 0.117 | 17.4 | 1586.009 | OK |
| BESS FC | FEH: 30 years: +40 %: 960 mins: Winter | 54.550 | 53.420 | 53.766 | 0.346 | 17.4 | 1586.417 | Surcharged |
| NG SS FC | FEH: 30 years: +40 %: 960 mins: Winter | 55.700 | 54.830 | 55.154 | 0.324 | 15.7 | 1389.905 | Surcharged |
| OF NG | FEH: 30 years: +40 %: 960 mins: Winter | | 53.910 | 54.018 | 0.108 | 15.7 | 1389.322 | OK |
| OF PSS1B | FEH: 30 years: +40 %: 4320 mins: Winter | | 54.850 | 54.895 | 0.045 | 3.6 | 1181.334 | OK |
| PSS1B FC | FEH: 30 years: +40 %: 4320 mins: Winter | 55.800 | 55.080 | 55.480 | 0.400 | 3.6 | 1181.383 | Surcharged |
| OF PSS BESS Site | FEH: 30 years: +40 %: 8640 mins: Winter | | 53.200 | 53.275 | 0.075 | 9.9 | 4179.151 | OK |
| PSS BESS Site FC | FEH: 30 years: +40 %: 8640 mins: Winter | 54.480 | 53.780 | 54.109 | 0.329 | 9.9 | 4179.161 | Surcharged |

| East Pye Solar DCO:<br>Outline Surface Water Drainage<br>BESS, National Grid Substation &<br>Project Substations BESS Site and Sub-Site 1B | Date:<br>04/03/0026 | | |
|---|---|---|---|
| | Designed by:<br>EE | Checked by:<br>AJ | Approved By:<br>ID |
| Report Details:<br>Type: Junctions Summary<br>Storm Phase: BESS and Sub-Site 1B_Mar26 | Stantec UK Ltd.:<br>Caversham Bridge House<br>Waterman Place<br>Reading RG1 8DN | | |

**FEH: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Outflow**

| Junction | Storm Event | Cover Level (m) | Invert Level (m) | Max. Level (m) | Max. Depth (m) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| OF BESS | FEH: 100 years: +0 %: 1440 mins: Summer | | 52.840 | 52.958 | 0.118 | 17.6 | 2373.259 | OK |
| BESS FC | FEH: 100 years: +0 %: 1440 mins: Summer | 54.550 | 53.420 | 53.769 | 0.349 | 17.6 | 2373.662 | Surcharged |
| NG SS FC | FEH: 100 years: +0 %: 1440 mins: Winter | 55.700 | 54.830 | 55.158 | 0.328 | 15.9 | 2102.320 | Surcharged |
| OF NG | FEH: 100 years: +0 %: 1440 mins: Winter | | 53.910 | 54.019 | 0.109 | 15.9 | 2101.749 | OK |
| OF PSS1B | FEH: 100 years: +0 %: 8640 mins: Winter | | 54.850 | 54.895 | 0.045 | 3.6 | 1458.062 | OK |
| PSS1B FC | FEH: 100 years: +0 %: 7200 mins: Summer | 55.800 | 55.080 | 55.455 | 0.375 | 3.6 | 1427.609 | Surcharged |
| OF PSS BESS Site | FEH: 100 years: +0 %: 7200 mins: Summer | | 53.200 | 53.275 | 0.075 | 9.9 | 3841.841 | OK |
| PSS BESS Site FC | FEH: 100 years: +0 %: 5760 mins: Winter | 54.480 | 53.780 | 54.199 | 0.419 | 9.9 | 3716.105 | Surcharged |

| East Pye Solar DCO:<br>Outline Surface Water Drainage<br>BESS, National Grid Substation &<br>Project Substations BESS Site and Sub-Site 1B | Date:<br>04/03/0026 | | |
|---|---|---|---|
| | Designed by:<br>EE | Checked by:<br>AJ | Approved By:<br>ID |
| Report Details:<br>Type: Junctions Summary<br>Storm Phase: BESS and Sub-Site 1B_Mar26 | Stantec UK Ltd.:<br>Caversham Bridge House<br>Waterman Place<br>Reading RG1 8DN | | |

**FEH: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Outflow**

| Junction | Storm Event | Cover Level (m) | Invert Level (m) | Max. Level (m) | Max. Depth (m) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| OF BESS | FEH: 100 years: +45 %: 480 mins: Summer | | 52.840 | 52.990 | 0.150 | 19.0 | 858.439 | OK |
| BESS FC | FEH: 100 years: +45 %: 1440 mins: Winter | 54.550 | 53.420 | 53.860 | 0.440 | 18.8 | 2675.186 | Surcharged |
| NG SS FC | FEH: 100 years: +45 %: 2160 mins: Winter | 55.700 | 54.830 | 55.228 | 0.398 | 18.7 | 3711.840 | Surcharged |
| OF NG | FEH: 100 years: +45 %: 1440 mins: Winter | | 53.910 | 54.060 | 0.150 | 18.7 | 2505.551 | OK |
| OF PSS1B | FEH: 100 years: +45 %: 8640 mins: Winter | | 54.850 | 54.895 | 0.045 | 3.6 | 2110.042 | OK |
| PSS1B FC | FEH: 100 years: +45 %: 7200 mins: Summer | 55.800 | 55.080 | 55.591 | 0.511 | 3.6 | 2030.394 | Surcharged |
| OF PSS BESS Site | FEH: 100 years: +45 %: 8640 mins: Winter | | 53.200 | 53.275 | 0.075 | 9.9 | 5708.278 | OK |
| PSS BESS Site FC | FEH: 100 years: +45 %: 8640 mins: Winter | 54.480 | 53.780 | 54.321 | 0.541 | 9.9 | 5708.295 | Surcharged |

| East Pye Solar DCO:<br>Outline Surface Water Drainage<br>BESS, National Grid Substation &<br>Project Substations BESS Site and Sub-Site 1B | Date:<br>04/03/0026 | | |
|---|---|---|---|
| | Designed by:<br>EE | Checked by:<br>AJ | Approved By:<br>ID |
| Report Details:<br>Type: Stormwater Controls Summary<br>Storm Phase: BESS and Sub-Site 1B_Mar26 | Stantec UK Ltd.:<br>Caversham Bridge House<br>Waterman Place<br>Reading RG1 8DN | | |

**FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume**

| Stormwater Control | Storm Event | Max. US Level (m) | Max. DS Level (m) | Max. US Depth (m) | Max. DS Depth (m) | Max. Inflow (L/s) | Max. Resident Volume (m³) | Max. Flooded Volume (m³) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Half Drain Down Time (mins) | Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BESS | FEH: 2 years: +0 %: 10080 mins: Summer | 54.710 | 53.986 | 0.070 | 0.086 | 27.4 | 2084.842 | 0.000 | 12.3 | 4010.471 | | OK |
| National Grid Substation | FEH: 2 years: +0 %: 10080 mins: Summer | 55.903 | 55.136 | 0.069 | 0.086 | 25.3 | 1913.580 | 0.000 | 11.1 | 3702.362 | | OK |
| 400kV Project Substation Sub-Site 1B | FEH: 2 years: +0 %: 720 mins: Winter | 55.404 | 55.258 | 0.057 | 0.158 | 20.2 | 293.350 | 0.000 | 3.0 | 176.657 | | OK |
| 400kV Project Substation BESS Site | FEH: 2 years: +0 %: 5760 mins: Summer | 54.456 | 53.999 | 0.057 | 0.179 | 17.5 | 904.013 | 0.000 | 6.8 | 1450.413 | | OK |

| East Pye Solar DCO:<br>Outline Surface Water Drainage<br>BESS, National Grid Substation &<br>Project Substations BESS Site and Sub-Site 1B | Date:<br>04/03/0026 | | |
|---|---|---|---|
| | Designed by:<br>EE | Checked by:<br>AJ | Approved By:<br>ID |
| Report Details:<br>Type: Stormwater Controls Summary<br>Storm Phase: BESS and Sub-Site 1B_Mar26 | Stantec UK Ltd.:<br>Caversham Bridge House<br>Waterman Place<br>Reading RG1 8DN | | |

**FEH: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume**

| Stormwater Control | Storm Event | Max. US Level (m) | Max. DS Level (m) | Max. US Depth (m) | Max. DS Depth (m) | Max. Inflow (L/s) | Max. Resident Volume (m³) | Max. Flooded Volume (m³) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Half Drain Down Time (mins) | Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BESS | FEH: 30 years: +0 %: 1440 mins: Winter | 54.794 | 54.061 | 0.153 | 0.161 | 135.4 | 3819.094 | 0.000 | 16.2 | 2072.163 | | OK |
| National Grid Substation | FEH: 30 years: +0 %: 1440 mins: Winter | 55.985 | 55.224 | 0.151 | 0.174 | 125.0 | 3585.837 | 0.000 | 13.7 | 1794.711 | | OK |
| 400kV Project Substation Sub-Site 1B | FEH: 30 years: +0 %: 1440 mins: Summer | 55.438 | 55.413 | 0.091 | 0.313 | 35.5 | 645.459 | 0.000 | 3.6 | 334.115 | | OK |
| 400kV Project Substation BESS Site | FEH: 30 years: +0 %: 1440 mins: Winter | 54.513 | 54.068 | 0.114 | 0.248 | 62.5 | 1759.844 | 0.000 | 8.8 | 1122.941 | | OK |

| East Pye Solar DCO:<br>Outline Surface Water Drainage<br>BESS, National Grid Substation &<br>Project Substations BESS Site and Sub-Site 1B | Date:<br>04/03/0026 | | |
|---|---|---|---|
| | Designed by:<br>EE | Checked by:<br>AJ | Approved By:<br>ID |
| Report Details:<br>Type: Stormwater Controls Summary<br>Storm Phase: BESS and Sub-Site 1B_Mar26 | Stantec UK Ltd.:<br>Caversham Bridge House<br>Waterman Place<br>Reading RG1 8DN | | |

**FEH: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Resident Volume**

| Stormwater Control | Storm Event | Max. US Level (m) | Max. DS Level (m) | Max. US Depth (m) | Max. DS Depth (m) | Max. Inflow (L/s) | Max. Resident Volume (m³) | Max. Flooded Volume (m³) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Half Drain Down Time (mins) | Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BESS | FEH: 30 years: +40 %: 2160 mins: Winter | 54.860 | 54.130 | 0.220 | 0.230 | 135.6 | 5565.331 | 0.000 | 17.2 | 3496.316 | 35 | OK |
| National Grid Substation | FEH: 30 years: +40 %: 2160 mins: Winter | 56.051 | 55.293 | 0.217 | 0.243 | 125.2 | 5193.057 | 0.000 | 15.5 | 3034.743 | 110 | OK |
| 400kV Project Substation Sub-Site 1B | FEH: 30 years: +40 %: 1440 mins: Summer | 55.514 | 55.502 | 0.167 | 0.402 | 49.7 | 943.245 | 0.000 | 3.6 | 372.708 | | OK |
| 400kV Project Substation BESS Site | FEH: 30 years: +40 %: 1440 mins: Winter | 54.579 | 54.140 | 0.180 | 0.320 | 87.5 | 2519.858 | 0.000 | 9.9 | 1320.643 | | OK |

| East Pye Solar DCO:<br>Outline Surface Water Drainage<br>BESS, National Grid Substation &<br>Project Substations BESS Site and Sub-Site 1B | Date:<br>04/03/0026 | | |
|---|---|---|---|
| | Designed by:<br>EE | Checked by:<br>AJ | Approved By:<br>ID |
| Report Details:<br>Type: Stormwater Controls Summary<br>Storm Phase: BESS and Sub-Site 1B_Mar26 | Stantec UK Ltd.:<br>Caversham Bridge House<br>Waterman Place<br>Reading RG1 8DN | | |

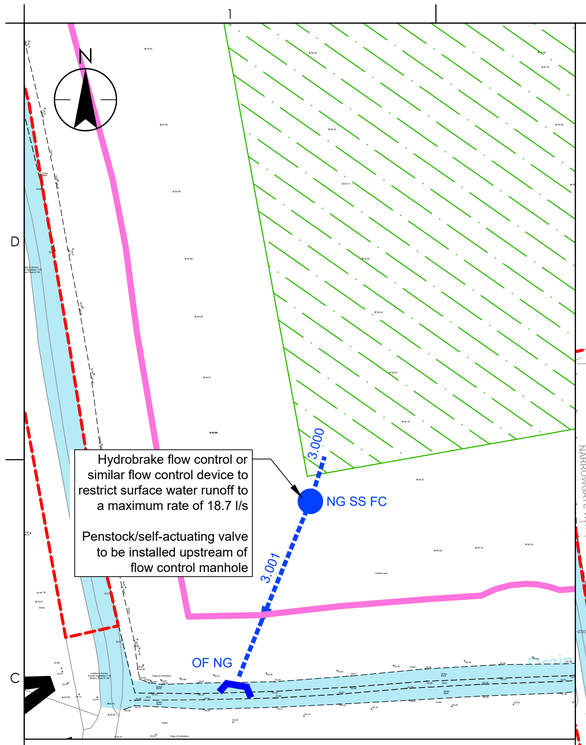
**FEH: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume**

| Stormwater Control | Storm Event | Max. US Level (m) | Max. DS Level (m) | Max. US Depth (m) | Max. DS Depth (m) | Max. Inflow (L/s) | Max. Resident Volume (m³) | Max. Flooded Volume (m³) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Half Drain Down Time (mins) | Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BESS | FEH: 100 years: +0 %: 2160 mins: Winter | 54.876 | 54.145 | 0.235 | 0.245 | 142.8 | 5904.142 | 0.000 | 17.5 | 3560.770 | 380 | OK |
| National Grid Substation | FEH: 100 years: +0 %: 2160 mins: Winter | 56.066 | 55.306 | 0.232 | 0.256 | 131.8 | 5499.622 | 0.000 | 15.8 | 3105.770 | 445 | OK |
| 400kV Project Substation Sub-Site 1B | FEH: 100 years: +0 %: 2160 mins: Winter | 55.530 | 55.518 | 0.183 | 0.418 | 24.2 | 997.223 | 0.000 | 3.6 | 575.599 | | OK |
| 400kV Project Substation BESS Site | FEH: 100 years: +0 %: 2160 mins: Winter | 54.572 | 54.217 | 0.173 | 0.397 | 65.9 | 2726.646 | 0.000 | 9.9 | 1585.082 | 310 | OK |

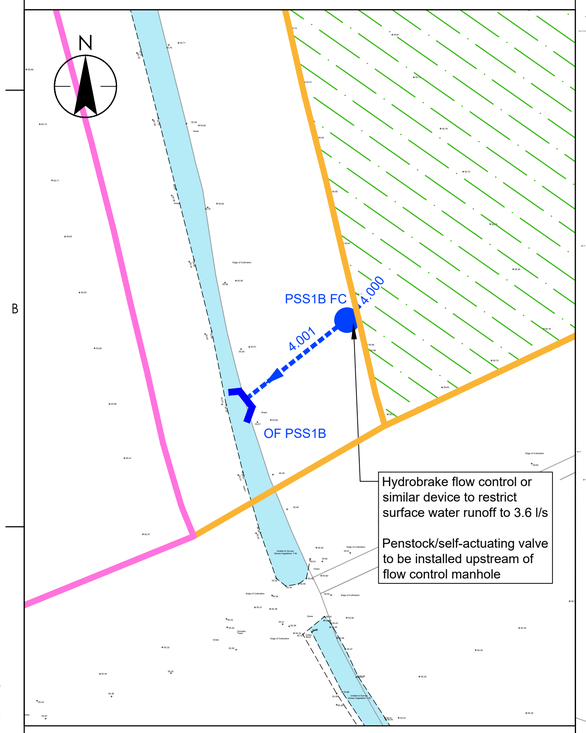
| East Pye Solar DCO:<br>Outline Surface Water Drainage<br>BESS, National Grid Substation &<br>Project Substations BESS Site and Sub-Site 1B | Date:<br>04/03/0026 | | |
|---|---|---|---|
| | Designed by:<br>EE | Checked by:<br>AJ | Approved By:<br>ID |
| Report Details:<br>Type: Stormwater Controls Summary<br>Storm Phase: BESS and Sub-Site 1B_Mar26 | Stantec UK Ltd.:<br>Caversham Bridge House<br>Waterman Place<br>Reading RG1 8DN | | |

**FEH: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Resident Volume**

| Stormwater Control | Storm Event | Max. US Level (m) | Max. DS Level (m) | Max. US Depth (m) | Max. DS Depth (m) | Max. Inflow (L/s) | Max. Resident Volume (m³) | Max. Flooded Volume (m³) | Max. Outflow (L/s) | Total Discharge Volume (m³) | Half Drain Down Time (mins) | Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BESS | FEH: 100 years: +45 %: 2160 mins: Winter | 55.024 | 54.285 | 0.384 | 0.385 | 207.1 | 8982.433 | 0.000 | 18.8 | 3999.070 | | OK |
| National Grid Substation | FEH: 100 years: +45 %: 2160 mins: Winter | 56.213 | 55.430 | 0.379 | 0.380 | 191.2 | 8256.295 | 0.000 | 18.7 | 3714.222 | | OK |
| 400kV Project Substation Sub-Site 1B | FEH: 100 years: +45 %: 2160 mins: Winter | 55.687 | 55.671 | 0.340 | 0.571 | 35.0 | 1511.414 | 0.000 | 3.6 | 679.821 | | OK |
| 400kV Project Substation BESS Site | FEH: 100 years: +45 %: 2160 mins: Summer | 54.712 | 54.379 | 0.313 | 0.559 | 148.1 | 4187.852 | 0.000 | 10.0 | 1782.826 | | OK |



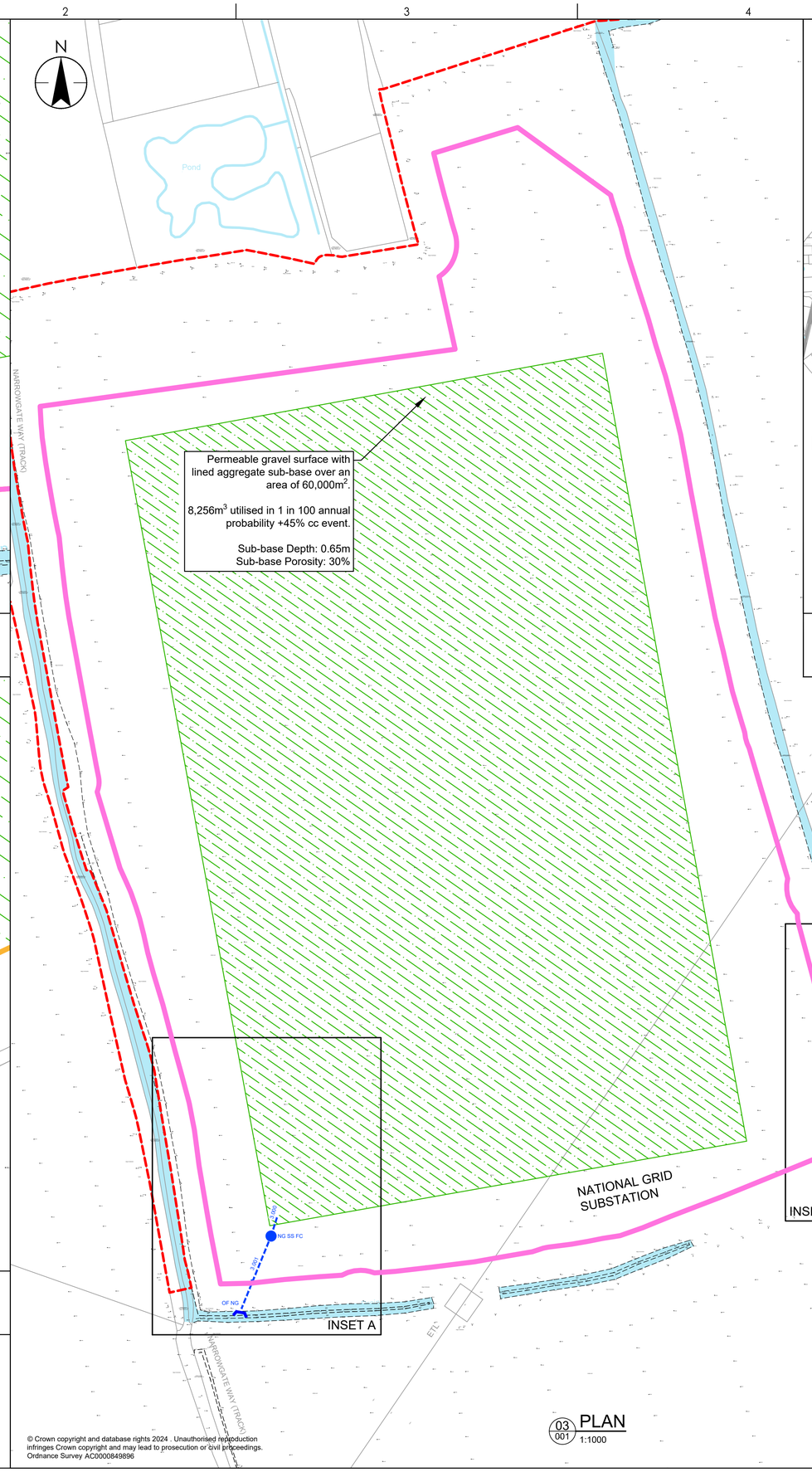

01 003 INSET A
1:500




02 001 INSET B
1:500

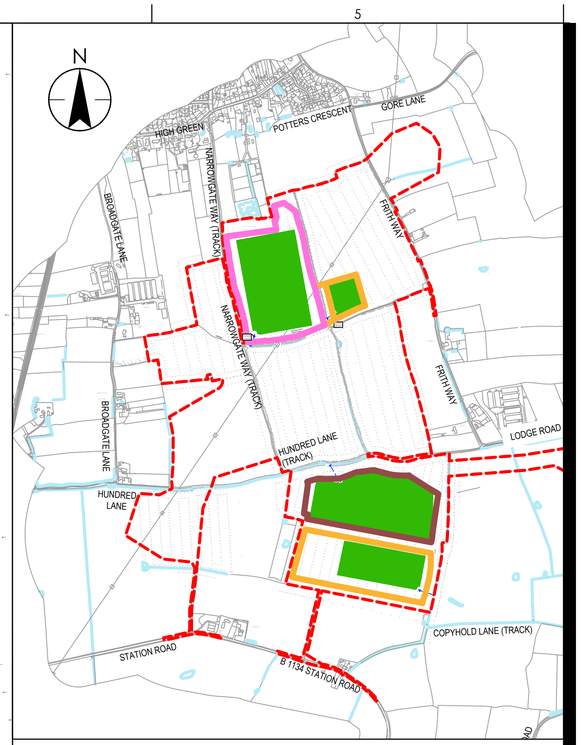
0 10 20 30 40 50m
SCALE 1:500

0 20 40 60 80 100m
SCALE 1:1000




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03 001 PLAN
1:1000




04 001 SITE KEY PLAN
NTS

KEY:

- ORDER LIMITS
- EXISTING DITCH
- ACCESS TRACK
- WORK 4 - NATIONAL GRID SUBSTATION
- WORK 6 - 132kV AND 400kV PROJECT SUBSTATIONS
- AGGREGATE SUB-BASE
- PROPOSED SOLID SURFACE WATER PIPE
- PROPOSED FLOW CONTROL CHAMBER
- PROPOSED HEADWALL

Stantec

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1. ALL DIMENSIONS ARE IN METRES UNLESS STATED OTHERWISE.
2. TOPOGRAPHICAL SURVEY BASED ON DRAWING EAST PYE SOLAR FARM, BY ISLAND GREEN POWER UK, DATED 19.11.2025.
3. LAYOUT TAKEN FROM DRAWING DRAWING EAST PYE SOLAR FARM, BY ISLAND GREEN POWER UK, DATED 19.11.2025. BESS LAYOUT BASED ON UPDATED LAYOUT 11.11.2025.
4. FORM AND DEPTH OF ATTENUATION TO BE REFINED AT DETAILED DESIGN STAGE.
5. SUB-STATION COMPOUNDS TO INCORPORATE BUNDS AT LOWEST POINTS TO CONTAIN SURFACE WATER RUNOFF AS REQUIRED.
6. ACCESS TRACKS WITHIN SUB-SITES AND THAT CONNECT ELEMENTS OF THE SCHEME (AND WHERE REQUIRED WITHIN BESS AND SUBSTATION COMPOUNDS) TO DRAIN TO SWALES OR FILTER DRAINS RUNNING PARALLEL WITH THE TRACKS.

| | | | | |
|---|---|---|---|---|
| 1 | FIRST ISSUE | EE | - | 2026.03.04 |
| Issued/Revision | | By | Appd | YYYY.MM.DD |
| | | GD | EE | - | 2026.03.04 |
| | | Dwn. | Dsgn. | Chkd. | YYYY.MM.DD |

Issue Status

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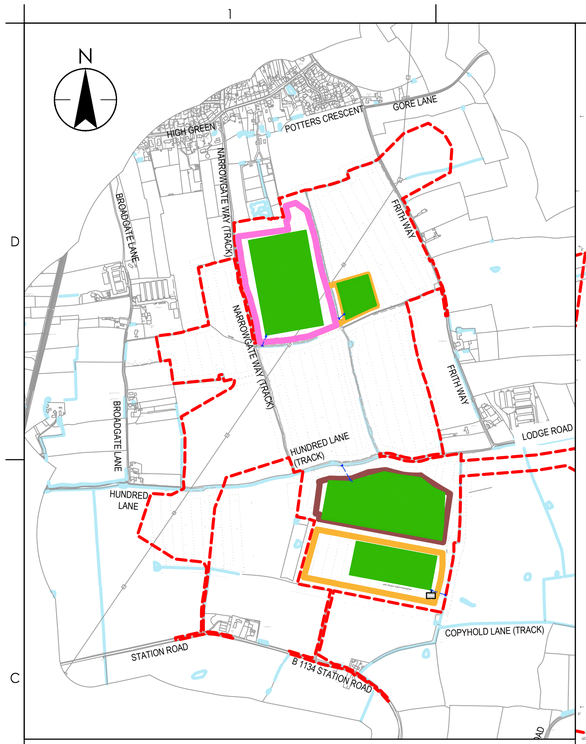
Client/Project Logo

Client/Project
EAST PYE SOLAR Ltd.

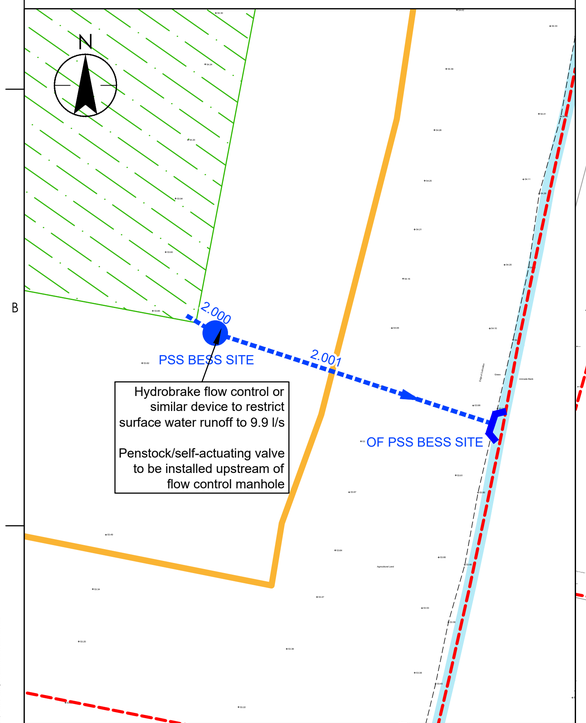
Title
CONCEPT SURFACE WATER DRAINAGE NATIONAL GRID AND 400KV PROJECT SUBSTATION SUB-SITE 1B

| Project No. | A1 Scale |
|---|---|
| 333101678 | AS SHOWN |
| Revision | Drawing No. |
| 1 | 333101678-300.03-001 |

Plotted: 04.03.2026 09:43:21 PM By: Davies, Greg
File: C:\Users\gdavies\Documents\333101678_EAST PYE SOLAR_detailed_design_GD_EE_v1.rvt



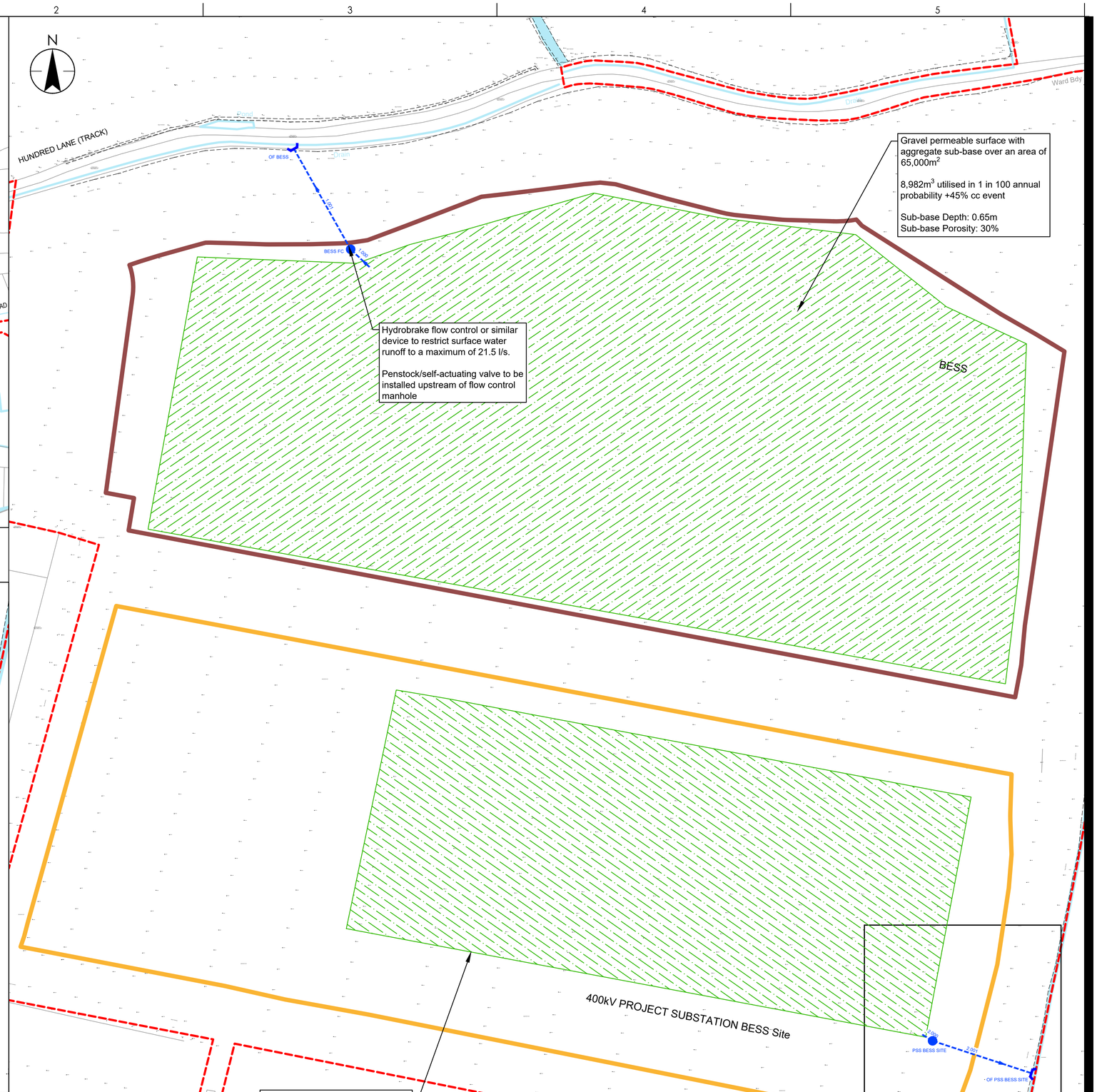

01/002 SITE KEY PLAN
NTS




02/002 INSET A
1:500

0 10 20 30 40 50m
SCALE 1:500

0 20 40 60 80 100m
SCALE 1:1000




03/002 PLAN
1:1000

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1. ALL DIMENSIONS ARE IN METRES UNLESS STATED OTHERWISE.
2. TOPOGRAPHICAL SURVEY BASED ON DRAWING EAST PYE SOLAR FARM, BY ISLAND GREEN POWER UK, DATED 19.11.2025.
3. LAYOUT TAKEN FROM DRAWING DRAWING EAST PYE SOLAR FARM, BY ISLAND GREEN POWER UK, DATED 19.11.2025. BESS LAYOUT BASED ON UPDATED LAYOUT 11.11.2025.
4. FORM AND DEPTH OF ATTENUATION TO BE REFINED AT DETAILED DESIGN STAGE.
5. BESS FACILITY (AND WHERE APPROPRIATE SUBSTATION COMPOUNDS) TO INCORPORATE BUNDS AT LOWEST POINTS OF COMPOUND TO CONTAIN SURFACE AND FIREWATER RUNOFF.
6. ACCESS TRACKS WITHIN SUB-SITES AND THAT CONNECT ELEMENTS OF THE SCHEME (AND WHERE REQUIRED WITHIN BESS AND SUBSTATION COMPOUNDS) TO DRAIN TO SWALES OR FILTER DRAINS RUNNING PARALLEL WITH THE TRACKS.

KEY:

- ORDER LIMITS
- EXISTING DITCH
- ACCESS TRACK
- WORK 2 - BATTERY ENERGY STORAGE SYSTEM (BESS)
- WORK 6 - 132kV AND 400kV PROJECT SUBSTATIONS
- AGGREGATE SUB-BASE
- PROPOSED SOLID SURFACE WATER PIPE
- PROPOSED FLOW CONTROL CHAMBER
- PROPOSED HEADWALL

| Issued/Revision | By | Appd | |
|---|---|---|---|
| 1 FIRST ISSUE | EE | - | 2026.03.04 YYYY.MM.DD |
| | GD Dwn. | EE Dsgn. | - Chkd. | 2026.03.04 YYYY.MM.DD |

Issue Status

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Title
CONCEPT SURFACE WATER DRAINAGE BESS AND 400KV PROJECT SUBSTATION BESS SITE

| Project No. | A1 Scale |
|---|---|
| 333101678 | AS SHOWN |
| Revision | Drawing No. |
| 1 | 333101678-300.03-002 |

Plotted: 04/03/2026 2026.03.04 4:17:28 PM By: Davies, Greg
PC3Plot-A1-SHEET-TEDM1 - \\GBDM1WSP01\Projects\333101211\eng\drw\dwg\333101678-300.03-002