Annex D – Revised Drainage Strategy Plans

Annex D Revised Drainage Technical Note

1 Introduction

1.1 Scheme Description and Background

1.1.1 Sunnica Energy Farm (hereafter referred to as the Scheme) is located within the counties of Cambridgeshire and Suffolk and falling within the administrative areas of East Cambridgeshire District Council (ECDC) and West Suffolk Council (WSC). The location and Scheme components are described in more detail in **Chapters 2 [APP-034]** and **Chapter 3 [REP2-022]** of the Environmental Statement**,** respectively.

1.1.2 The Order limits covers an area of approximately 1,113 hectares, comprising arable fields interspersed with tree shelter belts (linear), small woodland and copses, agricultural fields, and farm access tracks and farm buildings.

1.1.3 The Scheme comprises two main sites: Sunnica West Site and Sunnica East Site. Both sites are split into Sunnica East Sites A and B and Sunnica West Sites A and B and connected by Grid Connection Routes A and B, with an extension to the existing Burwell National Grid Substation.

1.1.4 The maximum developable areas are as follows:

a. Sunnica East Site A – 115.0 ha

b. Sunnica East Site B – 227.0 ha

c. Sunnica West Site A – 256.0 ha

d. Sunnica West Site B – 23.0 ha

1.1.5 Totalling 621.00 ha, the remaining areas will be set aside for environmental and archaeological mitigation and cable routes.

1.1.6 The Sites (Sunnica East Site A, Sunnica East Site B, Sunnica West Site A and Sunnica West Site B) will comprise the principal infrastructure as follows:

a. Solar PV modules;

b. PV module mounting structures;

c. Inverters;

d. Transformers;

e. Switchgears;

f. Onsite cabling;

g. One or more Battery Energy Storage Systems (BESS) (expected to be formed of lithium ion batteries storing electrical energy);

h. An electrical compound comprising a substation and control building (Sunnica East Site A, Sunnica East Site B and Sunnica West Site A only);

i. Office/warehouse (Sunnica East Site A and Sunnica East Site B only)

j. Fencing and security measures;

k. Drainage;

l. Internal access roads and car parking;

m. Landscaping including habitat creation areas; and

n. Construction laydown areas

1.1.7 This Drainage Technical Note sets out the revised outline drainage strategy for the Scheme, with regards to handling surface water generated within the PV panel areas, Compound and BESS areas, and is included in Annex D of the FRA Addendum [**APP 8.66**].

1.1.8 The revision takes into account revised rainfall data using FEH, and updates to planning practice guidance (PPG) and climate change allowances, released post DCO submission. Relevant changes are confined to Chapter 3 (Sections 3.1 to 3.5) of this Note.

1.1.9 No drainage is proposed for the cable routes; the cables will be buried, and the routes will be restored to greenfield conditions

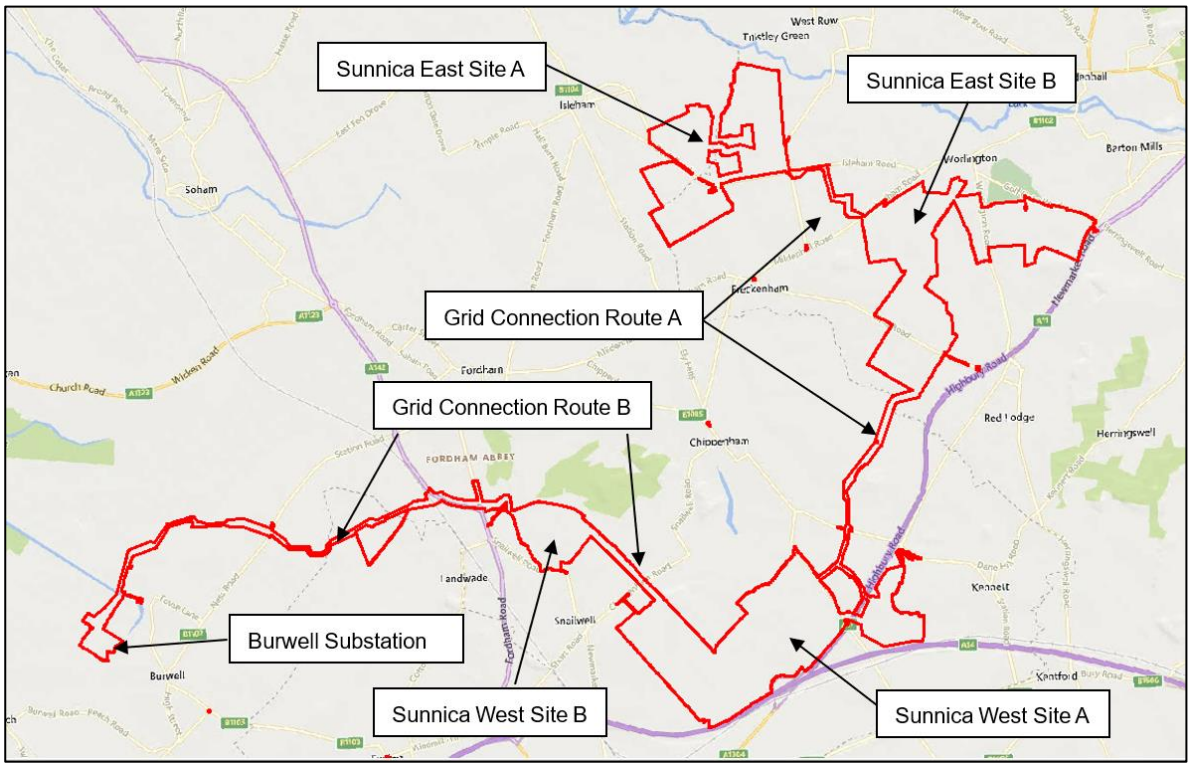


Figure 1 The Scheme

1.2 Design Assumptions

1.2.1 The following design assumptions have been used to produce this assessment.

a. Existing levels for the areas listed in 1.1.7 have been taken from drone topographical survey conducted by Above Surveying Ltd on behalf of Sunnica Ltd.

b. Due to the size of the Site, a ground investigation is cost prohibitive at this stage. Instead, information on the Sites ground conditions have been determined through a desktop study: British Geological Survey (BGS) show the majority of the south of the site lies within the Holywell Nodular Chalk Formation and Woburn Sands Formation, whilst the majority of the north of the site (Sunnica East sites A and B) lies in the Zig Zag Chalk Formation. Where the BGS had information on Superficial Deposits, they indicate areas of sand and gravel.

c. An infiltration rate of 1 x 10-5 m/s has been assumed. This is based on a conservative infiltration rate estimation for soil suitable for infiltration, referenced from CIRIA SuDS Manual (C753).

d. The drainage system has been designed to accommodate the 1 in 100-year storm, plus a 40% allowance for an increase in peak rainfall intensity due to climate change.

e. A Volumetric Runoff Coefficient (Cv) of 1 has been used in this design. The percentage impermeable area (PIMP) value was assumed to be 10% equivalent for the solar fields and 100% for compound areas and 100% for the BESS areas.

f. All swale features will avoid all archaeological sites and will maintain a minimum 10m buffer to watercourses and sensitive sites.

g. No permanent water features are proposed. Surface water runoff will largely collect at existing low spots and infiltrate to ground, es existing. Bird strike risk from nearby aviation sites precludes any permanent water feature as part of the SuDS strategy

h. FEH catchment data has been applied to the calculations.

i. In accordance with BRE 365, a minimum of 1m should be provided between the base on any infiltration system and the groundwater table to allow for fluctuations in the groundwater level and to protect groundwater quality. As groundwater levels are not fully known at this stage, proposed infiltration attenuation features have been kept shallow (maximum depth of 600mm) to lower the possibility of encountering groundwater. Assumptions are also referred from Chapter 9 for anticipated ground conditions.

2 Supporting Information

2.1 Flood Risk

2.1.1 The potential flood risk to the Scheme is summarised in Table 1 below. For further detail on the site's potential flood risk, refer to the Flood Risk Assessment (**Appendix 9C** of the Environmental Statement **[AS-007 to AS-010] and** the Flood Risk Assessment Addendum **[EN010106/APP/8.67]**).

Table 1 Flood Risk Summary

Flood Risk Source	Pre-Development Risk	Post Development Risk	Comments
Fluvial	Low	Low (Residual)	The majority of the Order limits are within Flood Zone 1, but certain areas lie in Flood Zone 2, 3a, 3b. No permanent above ground development will occur in Flood Zone 3b. Residual risk of PV panels within Flood Zone 3a has been taken into account with panels raised by up to 100mm above the ground level. Sea Level rise has been taken into account with lo residual risk.
Tidal	Very Low	Very Low	Not in a tidal area
Pluvial (Surface Water)	Low	Low	Surface water risk varies throughout the Order limits indicating patches of the Order limits which are susceptible to surface water flooding. However, flooding is localised and generally shallow (low risk).
Groundwater	Medium	Medium	Groundwater risk also varies, with all Sites between <25% and >75%, therefore further ground investigation, groundwater monitoring and infiltration testing is proposed to confirm groundwater levels. Furthermore, both the Sunnica East Site B and Sunnica West Sites A and B Sites are shown to be within a Source Protection Zone III, with small areas of Source Protection Zone II. Therefore, infiltration techniques must ensure mitigation measures are put in effect to protect groundwater interaction in these areas.
Sewers	Low	Low	Sewer flood risk remains low

Artificial Sources	Low (residual)	Low (residual)	Statutory Reservoirs (large raised reservoirs with volumes above ground of 25,000m^3 or over) are regularly inspected and maintained as set out in the Reservoirs Act 1975. On that basis they are deemed to pose a low (residual) risk. Other artificial sources such as canals and waterways are considered to be regularly maintained and therefore only deemed to pose a low (residual) risk to the Scheme

2.2 Existing Drainage

2.2.1 The area within the Order limits is largely greenfield. It consists of individual trees, hedgerow, tree belts (linear) small woodland block, agricultural fields (arable) and farm access tracks. There is currently no formal piped drainage system within the Order Limits. It is assumed that for low intensity rainfall events, rainfall would infiltrate to ground where it lands. For rainfall events where rainfall intensity exceeds the local rate of infiltration, it is assumed that any runoff generated within the Order limits would naturally flow overland to low spots within the Order limits where it would collect and infiltrate as the event subsides. Where parts of the Order limits interact with watercourses, excess runoff will naturally drain form the catchment into the watercourse.

2.3 Geology and Hydrogeology

2.3.1 The bedrock and superficial geology for the area has been identified from mapping produced by the British Geological Survey. These maps indicate Superficial Deposits are absent for portions of the site. However, there are areas of sand and gravel from Glacial River Terrace Deposits throughout portions of the Order limits.

2.3.2 The Bedrock covering the majority of the south of the site is Holywell Nodular Chalk Formation and New Pit Chalk Formation, whilst the majority of the north of site is the Zig Zag Chalk Formation. Both bedrock geologies are chalk member formations.

2.3.3 The EA's Online Interactive Maps for Groundwater shows the site is situated partly within a Groundwater Source Protection Zone 3 (Total Catchment Zone). An SPZ typically means there is an underlying aquifer supplying a borehole for potable use.

3 Proposed Drainage Arrangements

3.1 Surface Water Drainage Strategy

3.1.1 As previously mentioned, the Scheme is largely a greenfield site. It is considered that rainfall will mostly permeate into the ground where it falls and that any runoff generated within arable fields collects in local low spots where it infiltrates to ground or enter a watercourse as appropriate where the site drainage interacts with one. The proposed surface water drainage strategy for the Scheme areas noted in 1.1.7 aims to mimic the natural drainage conditions of the site as much as possible.

3.1.2 The proposed solar PV panels with be held above ground individually on narrow diameter piled legs (<100mm diameter). This prevents sealing the ground with an impermeable surface beneath solar panels allowing rainfall/runoff to infiltrate to ground throughout the Sites. As a result, it is considered that the site's impermeable area will remain consistent to its pre-development state.

3.1.3 To prevent ponding occurring around the solar panels or overland flow routes directing runoff off site, a series of swales and infiltration basins will be constructed within the solar PV panel fields in identified low spots throughout the Sites to collect and store runoff, allowing it to infiltrate to ground. The locations of the proposed swales and detention basins can be seen in outline drainage drawings WPP-ACM-XX-DR-C-ZZ-001 to WPP-ACM-XX-DR-C-ZZ-008, in Appendix F. Detailed drainage designs and SuDS feature locations will be determined post consent at detailed design stage.

3.1.4 Throughout the Sites, there are several areas demarcated as archaeology or heritage areas that will not contain solar PV panels or associated infrastructure. No drainage infrastructure is proposed for these areas. Swales or infiltration basins will be positioned to prevent any runoff from the solar panel fields flowing into these areas. Drawings WPP-ACM-XX-DR-C-ZZ-001 to WPP-ACM-XX-DR-C-ZZ-008 annotate the outline locations of these features, to be confirmed at detailed design, post consent. Within Sunnica East Sites A and B and Sunnica West Site A, there will also be compound areas and BESS and on-site substations that have an impermeable surface. The outline design of swales and detention basins have been sized to demonstrate there is sufficient capacity available to accommodate the increased runoff from these areas.

3.2 Contributing Areas

3.2.1 The total area contributing to the proposed drainage system is presented in Table 2 below. In calculating this area, the following assumptions were made:

a. Heritage, Archaeological Mitigation, Ecology Enhancement and Proposed Woodland areas were deemed to contribute 0% of their total area to runoff.

b. Access tracks will be permeable, as set out in Section 3.5.61 of Scheme Description [**REP2-022**]. Access tracks will be constructed within each of the Sites. These will be compacted stone tracks up to 3.5m wide with 1:2 gradient slopes on either side. As a result these will not contribute a nett increase in

peak surface water runoff. Figure 2 below, taken form the Scheme Description, indicated the access track detail:

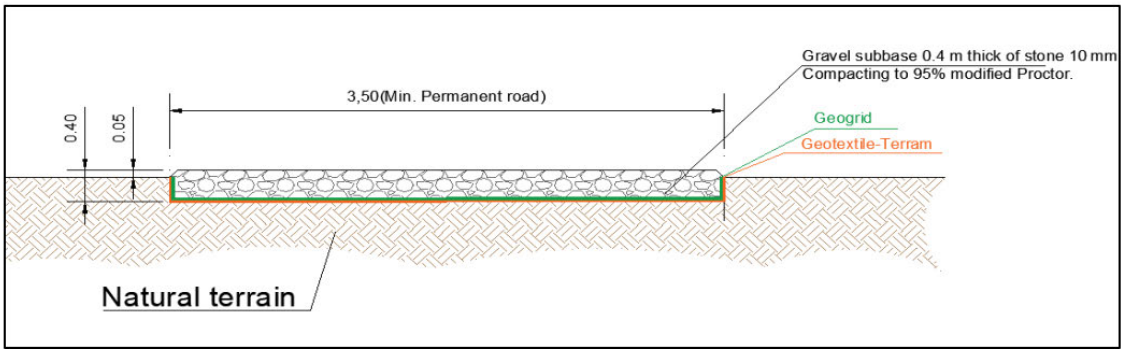


Figure 2: Proposed Access Track Detail

c. Compound areas would contribute 100% runoff with BESS and Substation areas were deemed to contribute 100% of their total area to runoff.

d. As the solar panel fields are greenfield areas, the contributing area for calculations was pro-rata'd to represent an effective impermeable area in order to calculate runoff volumes using the MicroDrainage software, as it only allows impermeable areas to include in the calculation. It is generally accepted that 10% of the greenfield area would be a fair representation of the equivalent impermeable area to input into MicroDrainage or other modelling software, to enable a model to analyse greenfield runoff (modelling software does not inherently facilitate greenfield areas as a positive drainage catchment; drainage software defaults to impermeable contributing areas only (i.e. 100% impermeable). As previously mentioned, the solar PV panels will be held above ground on four-legged stands. This will allow most rainfall to infiltrate to ground within the solar PV fields.

e. Cable routes were not deemed to contribute any runoff to the drainage system. The proposed cable will be buried, and the greenfield conditions will be restored.

Table 2 Contributing Areas

Sites	Area (ha)	Pre-Development PIMP* (%)	Post-Development PIMP* (%)	Post Development Greenfield Contributing Area (ha) as Effective Impermeable area	Post-Development Impermeable Areas (ha) (BESS / Compound Areas)	Effective combined Post-Development Contributing Area (ha) to proposed drainage system **
Sunnica West Sites A and B	542	0%	8%	33.4	8.8	42.2
Sunnica East Sites A and B	439	0%	11%	24.7	25.1	50.1
Cable Routes	132	0%	0%	0	0	0
TOTAL	**1,113**				**TOTAL**	**92.3**

*- Percentage Impermeable (PIMP)
**- Includes Solar Panel Sites and

3.3 Greenfield Runoff Rates

3.3.1 The equivalent greenfield runoff rates for the site have been calculated for the site using HR Wallingford's UKSuDS Greenfield Runoff Rate Estimation tool based on the proposed contributing impermeable area. These rates are shown in Table 3.

Table 3 Greenfield Discharge Rates

Return Period (years)	Discharge Rate (l/s) (1113 ha)
1	87.39
Qbar	100.45
30	246.10
100	357.60

3.4 Proposed Discharge Rates

3.4.1 As mentioned earlier, it is not intended to discharge surface water runoff off-site. Instead any surface water runoff generated within the Sites will be disposed of via infiltration to mimic existing conditions. As a full ground investigation for the entire site would be cost prohibitive at this stage, the site's infiltration potential has been assessed based on the desktop study.

3.4.2 As mentioned earlier, the vast majority of Sites lies in areas of sand and gravel atop chalk; ground material typically associated with good infiltration rates. As a conservative approach, the Sites infiltration rate has been modelled with an

infiltration rate of 1 x 10-5m/s. The percentage of impermeable area for compound areas, BESS and on-site substations has not yet been confirmed; detailed layouts will be re-assessed post planning to ensure the SuDS strategy and required attenuation is provided. Taking a conservative approach, at present it is assumed 100% impermeable area for site compounds and sub-stations, and 100% impermeable for BESS areas, to account for fire water capture and runoff. Increases to existing contributing area are to be balanced by infiltration techniques, with exceedance flows captured by surrounding swales.

3.5 Proposed Attenuation

3.5.1 Attenuation will be required onsite to temporarily store any surface water runoff generated within the site boundary before it is infiltrated to ground. Attenuation will be provided in the form of swales and infiltration basins. These features will be strategically located based on existing overland flow routes to capture runoff. The swales/infiltration basins will be 600 mm deep with minimum 1 in 3 side slopes. Check dams will be placed strategically within swales to optimise their storage potential on steeper slopes Where the attenuation lies within the solar field, the legs of the solar panel will be extended so that the solar panel lies above any potential flooding. The outline strategy presents locations for attenuation, which will be refined during detail design, post consent.

3.5.2 The Scheme will provide minimal alterations to the existing topography and ground conditions on-site. It was therefore assumed a portion of runoff generated would infiltrate to ground before it reached a proposed storage feature or would become trapped in a local low spot. As such, it was decided that the upper estimate for the storage volume required would result in redundant storage. The required storage volume was therefore based on the average of the upper and lower estimate. The total storage to be provide onsite is presented in Table 4 below. For a detail breakdown of the storage to provide for each catchment, refer to Appendix C.

3.5.3 Revised Planning Practice Guidance on the changes to climate change allowances to peak rainfall was published in May 2022, post DCO submission, for application of climate change allowances for the 1 in 30 year event, as well as the climate change allowance for the 1in 100 year event.

3.5.4 The revised guidance has mimicked the changes to the fluvial flood risk approach to climate change allowances, which are now based on river catchment areas, as discussed in the submitted FRA [**AS-007**].

3.5.5 The drainage strategy has been revised to take into account relevant latest guidance.

3.5.6 The sole river catchment that the Scheme falls within is the Cam and Ely Ouse catchment. Figure 3 below notes the climate change allowances for the Cam and Ely Ouse:

Cam and Ely Ouse Management Catchment peak rainfall allowances

3.3% annual exceedance rainfall event

Epoch	Central allowance	Upper end allowance
2050s	20%	35%
2070s	20%	35%

1% annual exceedance rainfall event

Epoch	Central allowance	Upper end allowance
2050s	20%	40%
2070s	25%	40%

*Use '2050s' for development with a lifetime up 2060 and use the 2070s epoch for development with a lifetime between 2061 and 2125.

Figure 3: Cam and Ely Ouse Catchment Peak Rainfall allowances (extracted from online catchment mapping, 6 September 2022)

1 in 30 year Runoff Assessment

3.5.7 Assessing the 1 in 30 year return period event plus 35% climate change scenario, the calculation was run with FEH data, instead of FSR previously used, in response to statutory consultee comments.

3.5.8 The ‘Quick Storage Estimate’ tool provides an upper and lower estimate for the storage volume required, as shown in Figure 4, using FEH data.

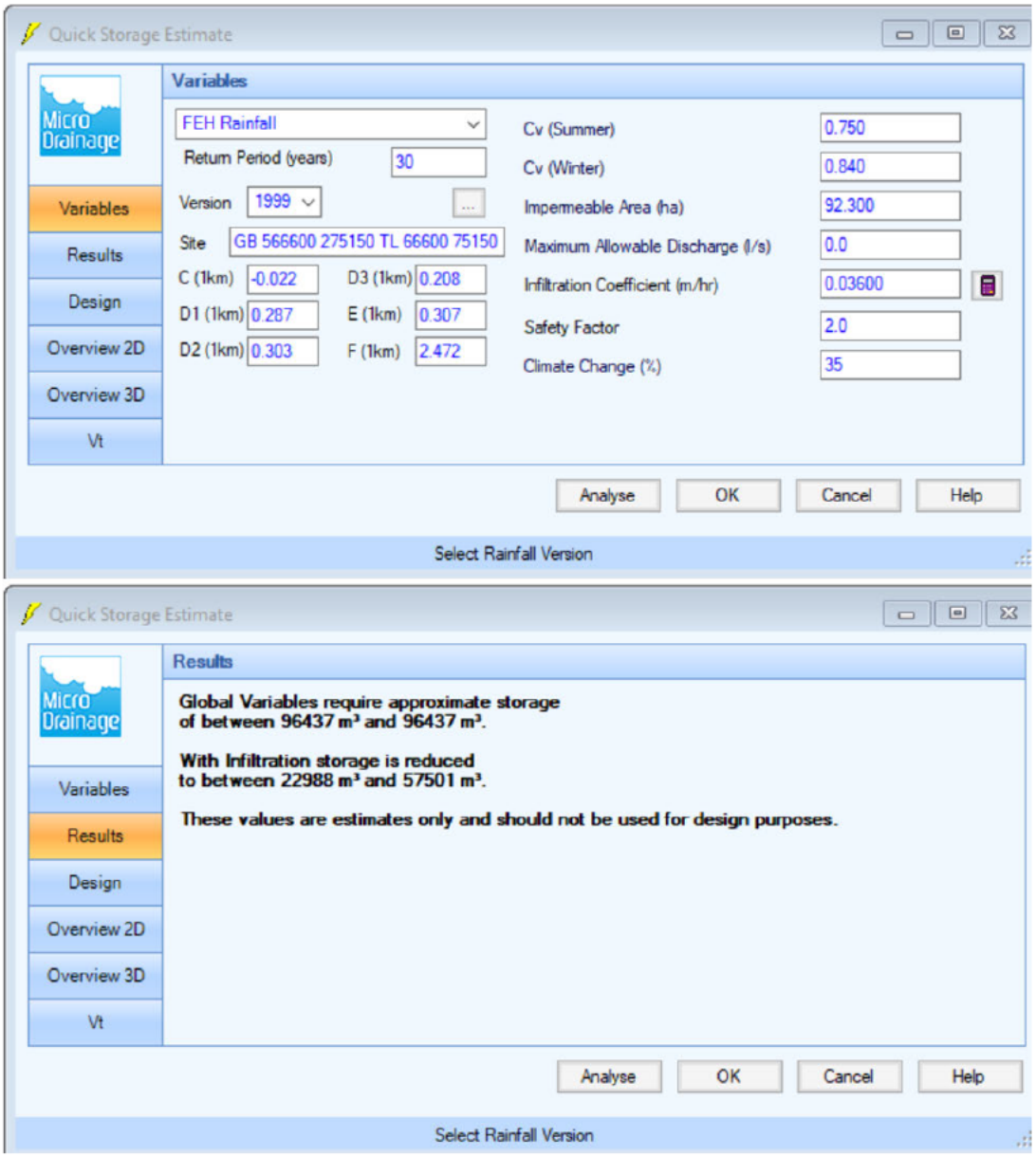


Figure 4 MicroDrainage Quick Storage Estimate for 1 in 30 yr plus 35% climate change

3.5.9 Table 4 below summarises the 1 in 30 year attenuation volumes, compared to the available attenuation within the Scheme, based on infiltration, as per the original principals of the strategy.

Table 4 Proposed Storage Features

Total storage required (m^3) 1 in 30 year + 35% Climate Change	Total storage provided (m^3)
22,988 to 57,501 (40,244 average)	55,869.20

3.5.10 The results indicate there is sufficient storage within the system, to provide an additional 16,904.70m^3 capacity in the event of a 1 in 30 year event including an allowance for climate change. This is considered to provide a robust level of capacity.

1 in 100 year Runoff Assessment, including 40% Climate Change

3.5.11 For the 1in 100 year return period event, the Upper End climate change allowance of 40% has not changed, based on the 2070s epoch for the development lifetime as a worst case approach.

3.5.12 The calculation was run with FEH data, instead of FSR previously used, in response to statutory consultee comments.

3.5.13 The previous average volume required, using FSR was 51,302m^3. Using FEH data, the required average volume is 56,825m^3. The Scheme provided an overall volume of 55,869.20m^3, using FSR rainfall data. With FEH dataset, there is now a nett deficit difference of -955.80m^3 (Approx. 1.75% less capacity).

3.5.14 FEH data can often provide higher runoff values than FSR, for larger catchment analysis and longer duration storm events. This can be due in part to more recent rainfall data and data from more rainfall gauges than older FSR data. In this case, the higher runoff rates lead to higher attenuation requirements.

3.5.15 Subsequently, the drainage strategy has been reviewed in terms of swales and detention basins, to review and potentially increase attenuation for the FEH analysis. Refer to Figure 5 and Table 5 below for results, Annex A for revised table of swale and basin volumes, and Annex B for the revised Drainage Strategy Plans that reflect increases swales and basins; the Order limits are not space limited; therefore, additional volumes have been relatively simple to provide.

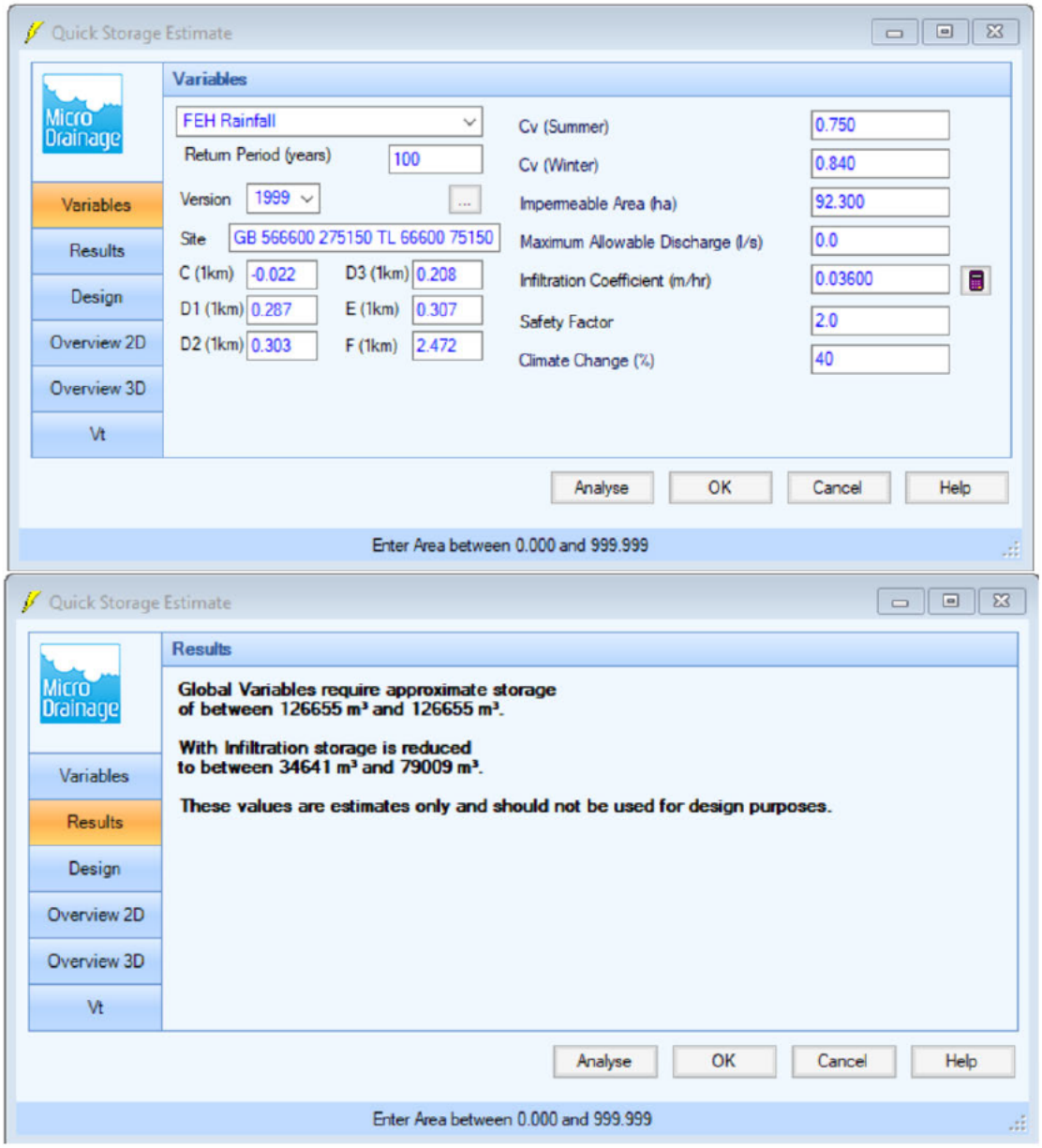


Figure 5: MicroDrainage 1 in 100 yr plus 40% climate change results

Table 5 Proposed Storage Features

Total storage required (m^3) 1 in 30 year + 35% Climate Change	Total storage provided (m^3)
34,641 to 79,909 (56,825 average)	57,245

3.5.16 The results indicate a revised excess capacity of 420m^3 average.

3.5.17 As a result of the revised drainage assessment, the Scheme does not increase flood risk elsewhere.

3.5.18 In conclusion, it is considered that for both the 1 in 30 year event and the 1 in 100 year event, both including climate change, the drainage strategy complies fully with the revised guidance.

Four Pillars of Sustainable Drainage Systems (SuDS)

3.5.19 The latest planning practice guidance places an emphasis on SuDS, with clear evidence to be provided to justify that the use of SuDS would be inappropriate.

3.5.20 The definition of SuDS in the guidance now means the 4-pillars need to be considered. The 4 pillars of SuDS are:

a. Water Quality

b. Water Quantity

c. Amenity

d. Biodiversity

3.5.21 Below ground storage is not proposed as part of the drainage strategy of the Scheme. Above ground swales and attenuation basins that mimic the natural, existing, runoff regime are proposed.

3.5.22 Swales provide natural water quality improvement by trapping and treating pollutants as they travel in the swale.

3.5.23 Amenity value applies to use of features for public amenity; as the PV panel areas will be on private land not open to the public,

3.5.24 The drainage strategy has shown that it provides sufficient quantity of attenuation to ensure flood risk is not increase on site or elsewhere, with additional capacity for exceedance events provided within the swales.

3.6 Water Quality

3.6.1 CIRIA C753 The SuDS Manual states that *"SuDS provide an opportunity to capture and treat runoff by intercepting, filtering, and degrading pollutants, and by reducing the volume of potentially contaminated water…while at the same time conveying, storing and infiltrating surface water to protect flood risk, river morphology and water resources, and delivering amenity and biodiversity value for the development*". In order to assess the risk to receiving watercourses an assessment has been undertaken of the proposed surface water drainage system in accordance with the SuDS manual. This is a simplistic method that can be used to assess the level of treatment a drainage system could potentially provide to captured surface water runoff.

3.6.2 This method is known as the Simple Index Approach; it states the following:

Total SuDS Mitigation Index ≥ Pollution hazard index

3.6.3 The SuDS manual only provides a limited number of land uses. The land uses in Table 6 below were chosen as the most suitable components of the Scheme. The pollution hazard indices for solar PV panels were based on residential roofs as the outside casing of the panel is constructed from glass and is unlikely to create a significant pollution risk (no oil / fluid is present in the panels etc).

3.6.4 Surface water runoff from the solar PV panel fields, compound areas, BESS and substation areas will drain runoff overland to either swales or infiltration basins. From here, runoff will infiltrate to ground. Table 6 below lists the pollutant hazard indices and mitigation indices used as part of the Simple Index Approach (SIA) and demonstrates the proposed SuDS are sufficient to treat the Scheme runoff.

3.6.5 The impermeable areas chosen within the simple index method below consist of the solar PV panels and the low traffic roads and non-residential car parking with infrequent movements. The areas containing BESS and transformers are contained within the 'low traffic roads' as they are self-contained containers or bunded areas. Under normal operation, runoff from these areas is considered to be low risk as it will be treated as roof / road runoff.

3.6.6 Firefighting water, and its potential containments, is not included here as any fire water applied to BESS areas would be contained within a separate lagoon structure and removed from site via controlled methods (e.g. tanker) if the water is polluted, i.e. it will not drain into the surface water drainage network without prior testing to confirm it is clean water *(please see section below on Fire Water Runoff).*

Table 6 Assessment against CIRIA C753 The SuDS Manual Sample Index Approach

Land use	*Pollution Hazard Indices*			
	Pollution Hazard Level	*Total Suspended Solids (TSS)*	*Metals*	*Hydrocarbons*
*Solar PV panels**	*Very Low*	*0.2*	*0.2*	*0.05*
*Low Traffic roads and non-residential car parking with infrequent change (i.e. <300 traffic movements/day)***	*Low*	*0.5*	*0.4*	*0.4*
Total Pollution index		*0.7*	*0.6*	*0.45*

**The pollution hazard indices for solar panels has been based on residential roofs.*

***Compound areas and substation areas*

Type of SuDS Component	Mitigation indices		
	TSS	Metals	Hydrocarbons
Swales	0.5	0.6	0.6
Infiltration Basin	0.5	0.5	0.6
Total Mitigation Index	1.0	1.1	1.2

3.6.7 From the above assessment the results are calculated, a pass is where the total mitigation index is greater than the pollution hazard index. According to the SIA, with the provision of swales and infiltration basins, there is adequate treatment being provided for the key pollutants considered by the SIA of the SuDS manual (i.e. TSS, metals and hydrocarbons).

3.7 Exceedance Flows

3.7.1 The proposed surface water drainage network has been designed to accommodate runoff from all storms up to and including the 100 year +40% return period. For an extreme storm event, any exceedance flows that cannot be retained by the proposed attenuation flow overland, following the existing topography, where ultimately, they will be contained within the SuDS features. The swale capacity can theoretically contain a in 100 year runoff event, including climate change with little to no infiltration.

3.8 Amenity and Ecological Value of SuDS Features

3.8.1 Due to the nature of the Scheme, personnel involved in the Scheme will have minimal interaction with the proposed drainage features. Consequently, the potential amenity benefit provided by the drainage is not considered relevant to the design. The design of the drainage, however, will be discreet so that is does not hinder the aesthetic value of the Sites.

3.8.2 Incorporating swales and infiltration basins within the Sites should maintain some ecological value within the fields that may be lost from the introduction of solar panels.

3.9 Impact on Sites of Special Scientific Interest (SSSI) Sites

3.9.1 Drainage is primarily designed to intercept increased impermeable area runoff from the Sites. Solar panel field runoff has been treated as greenfield runoff. Surface water is to be collected and treated in Swales to improve water quality and largely infiltrate to ground as per existing regime. Excess flows will enter the watercourses, although regular inflows may be less from these solar panel areas, i.e. there is an overall presumption of reduced flood risk downstream through the proposals

Snailwell Fen SSSI

3.9.2 Sunnica West Site A drains away from the SSSI, naturally following the topography (Chippenham Road is a watershed line effectively). Surface water in Sunnica West Site B is to be collected and treated in Swales to improve water quality. In this parcel, the drainage generally falls within the site to low spots with a small portion west to the River Snail; any drainage to the far west adjacent to the River Snail joins downstream of the SSSI, so there is minimal impact.

3.9.3 There will be no increase in runoff volumes, and no reduction in water quality. It is considered the drainage catchment for the Site does not affect the primary River Snail catchment and spring upstream which would feed the majority of water for the Snailwell SSSI. Runoff from firewater from the battery storage area will be captured so it cannot discharge off site or to ground and will be tested/removed by tanker off site if contamination is found to be present.

Chippenham Fen and Snailwell Poor's Fen

3.9.4 As mentioned above, the proposed drainage network is largely contained within the Sites, as there are natural low-lying areas. The Sites are also downstream of

the Chippenham SSSI, so impact to SSSI is considered negligible from all elements of drainage. There will be no reduction in water quality entering watercourses or groundwater through the current drainage proposals.

3.9.5 Refer to Figure 6 below for SSSI location adjacent to Sunnica West Site B (Proposed Swales shown a green lines):

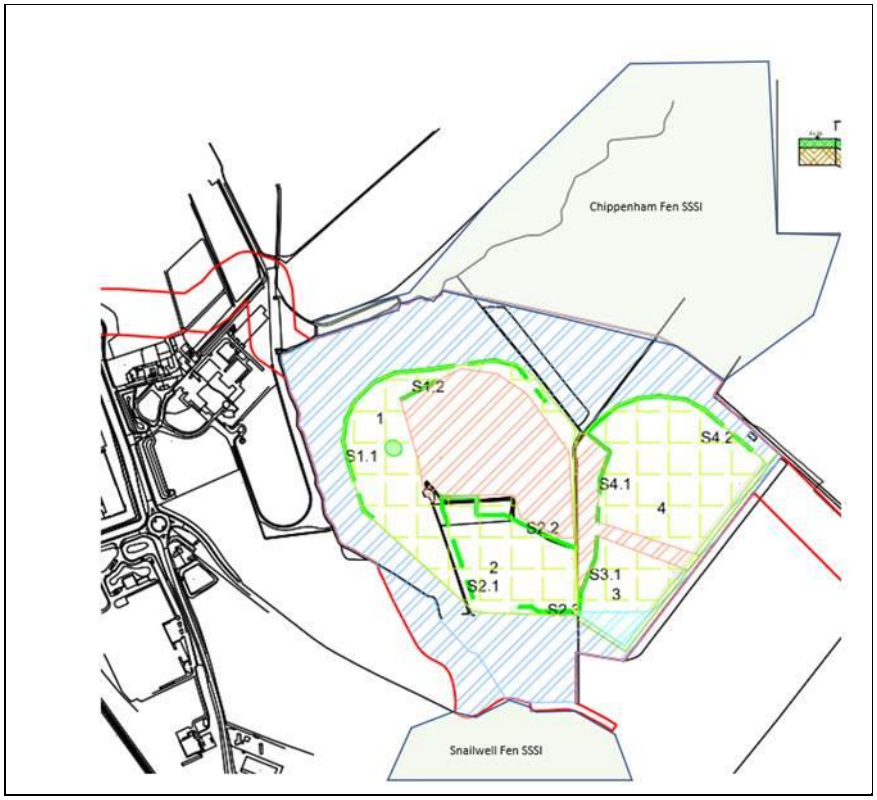


Figure 6 SSSI Sites in relation to Sunnica West Site B

3.10 Fire Water Runoff

3.10.1 The BESS areas require fire water tanks to supress a fire, should one break out in the BESS containers.

3.10.2 A fire strategy has been prepared as part of the development proposals. Fire water tanks are to be located at each BESS site, capable of retaining 242.5m^3 water per site. The tanks are to be filled with standard water, with no chemical additives.

3.10.3 Should a fire break out in a container, the strategy proposes to contain fire within the individual container by using automated fire suppression. This water will be contained in a sump within the battery container and transported off-site. Fire water will be used to soak nearby containers to prevent heat transfer and damage to other containers, see Outline Battery Fire Safety Management Plan **[REP2-032]**.

3.10.4 Fire water runoff may, however, contain particles from a fire. In the unlikely event of fire water being discharged, the runoff must be contained and tested/treated

before being allowed to discharge to the proposed SuDS (watercourse / infiltration).

3.10.5 It is proposed to contain the fire water runoff within a bunded lagoon structure where it can be held and tested before either being released into the SuDS system or taken off site by a tanker for treatment elsewhere. The lagoon will then be cleaned of all contaminants.

3.10.6 The lagoon will be controlled by a penstock valve that can be automatically closed during a fire, i.e. under normal circumstances rainfall will be allowed to drain through the lagoon into the SuDS system.

3.10.7 The lagoons will be 0.6m deep and 410m^2 in area. This is to allow attenuation of the 242.5m^3 fire water runoff plus an additional 10% capacity.

3.11 Adoption and Maintenance

3.11.1 The proposed drainage strategy will be maintained by the Applicant or a private company employed by the Applicant. All proposed drainage features should be maintained according to standard practice. Refer to Appendix E for maintenance schedules of proposed SuDS features.

Appendix A Topographic Surveys

Power line with utility post

Gas pipeline

Tree canopy/hedgerow/foliage.

Water

Road

Buildings

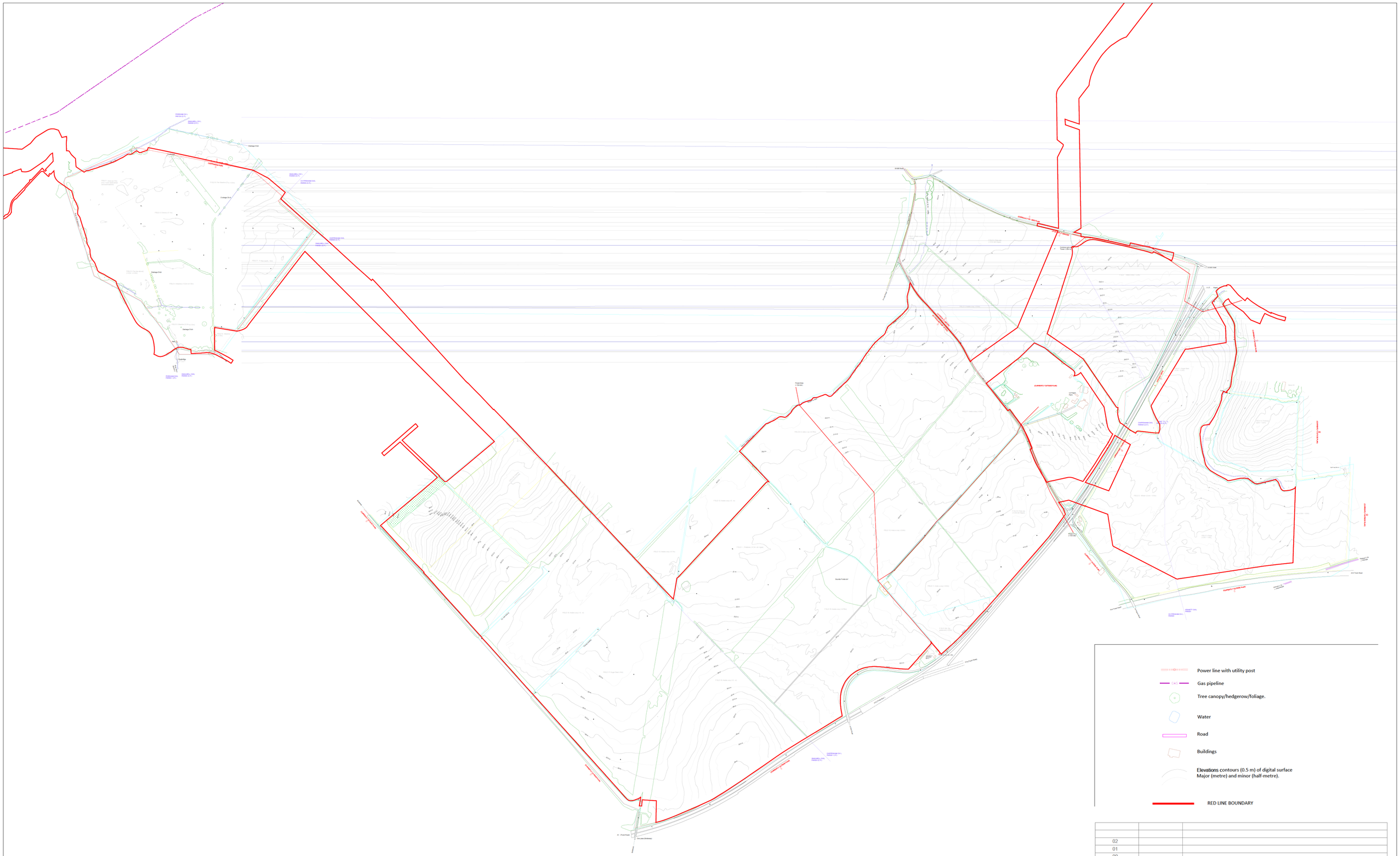
Elevations contours (0.5 m) of digital surface
Major (metre) and minor (half-metre).

RED LINE BOUNDARY

Rev.	Date	Description Of change
02		
01		
00		

PS Renewables
Green Energy Investments

PROJECT:	SUNNICA ENERGY FARM DEVELOPMENT CONSENT ORDER (DCO)				
COMPANY:	PS RENEWABLES				
LAYOUT:	TOPOGRAPHIC LAYOUT - EAST				
DRAW BY:	Sergio Sema	PS RENEWABLES: 5 Stubbings Estate Maidenhead, Berkshire SL6 6QL	DATE:	-	Rev.: 5.4.1
DESIGN BY:	Nacho Perez		SCALE:	1:7.500	
CHECK BY:	David Ortiz		SIZE:	A1	



Rev.	Date	Description Of change
02		
01		
00		

PS Renewables
Green Energy Investments

PROJECT:	SUNNICA ENERGY FARM DEVELOPMENT CONSENT ORDER (DCO)				
COMPANY:	PS RENEWABLES				
LAYOUT:	TOPOGRAPHIC LAYOUT - WEST				
DRAW BY:	Sergio Sema	PS RENEWABLES: 5 Stubbings Estate Maidenhead, Berkshire SL6 6QL	DATE:	-	Rev.: 5.4.2
DESIGN BY:	Nacho Perez		SCALE:	1:7.500	
CHECK BY:	David Ortiz		SIZE:	A1	

Appendix B Order limits

566000 567000 568000 569000 570000 571000

275000 274000 273000 272000 271000

E01 E02 E03 E04 E05 E08 E09 E10 E33 Office/Warehouse

ECO1 ECO2 ECO3

E12 E13 E14 E15 E16 E17 E18 E19 E20 E21 E22 Office/Warehouse

E24 E25 E26 E27 E28 E29 E30 E31 E32

0 500 1,000m

N

THIS DRAWING IS TO BE USED ONLY FOR THE PURPOSE OF ISSUE THAT IT WAS ISSUED FOR AND IS SUBJECT TO AMENDMENT

LEGEND

- The Order limits
- Public Highway within Scheme

Proposed Scheme Plan

- Developable Area
- Boundary Fence
- BESS and Substation
- Compound Area (Permanent)
- Solar PV Array
- Flood Zone 2
- Flood Zone 3
- Illustrative Locations of Solar Stations
- Proposed Road
- Potential Provision of Permissive Route

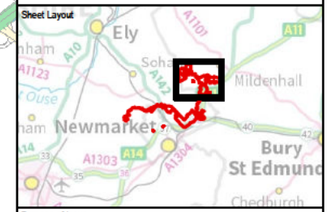
Green Infrastructure

- Native Grassland Planting
- Native Grassland Planting within Archaeological Mitigation Areas
- Proposed Woodland (new planting or infilling of existing vegetation)
- Proposed Hedgerow (new planting or infilling of existing vegetation)

Note Developable fields previously referred to as E06 E07 E11 and E23 are no longer being developed with solar infrastructure and now form part of the mitigation strategy however the field numbering for the remaining developable fields has been retained for consistency.

Document Reference EN010106/APP/6.3
APFP Regulation 5(2)(a)

Sheet Layout



Purpose of Issue
FOR ENVIRONMENT AGENCY CONSULTATION

Client
SUNNICA LTD

Project Title
sunnica energy farm

Drawing Title
SUNNICA EAST
PARAMETER PLAN
AND FLOOD ZONES

Drawn	Checked	Approved	Date
LL	DW	NC	16/03/2022

AECOM Internal Project No.	Scale @ A3
60589004	1:18,000

AECOM
Unit 1 Wel brook Court
Girton
Cambridge CB3 0NA
United Kingdom
Telephone (01223) 488000
www.aecom.com

AECOM

Drawing Number

Rev 0

File Name:\\eu.aecomnet.com\UKUKCBG1\Vobs\PR-334327_Sunnica_Energy_Farm\400_Technical\434_Technical Disciplines\17. GIS\Layout\ES\Chapter 3 - Scheme Description\220316_Sunnica_Energy_Farm_FloodZones_East.mxd

564000 565000 566000 567000 568000 569000

270000 269000 268000 267000 266000

ECO4 W01 W02 W03 ECO5 W04 W05 W06 W07 W08 W09 W10 W11 W12 W15 W17

0 500 1,000m

N

THIS DRAWING IS TO BE USED ONLY FOR THE PURPOSE OF ISSUE THAT IT WAS ISSUED FOR AND IS SUBJECT TO AMENDMENT

LEGEND

- The Order limits
- Woodstore - 20m Buffer
- Public Highway within Scheme
- Proposed Fencing

Proposed Scheme Plan

- Developable Area
- Solar PV Array
- BESS and Substation
- Boundary Fence
- Flood Zone 2
- Flood Zone 3
- Illustrative Location of Solar Stations
- Proposed Road

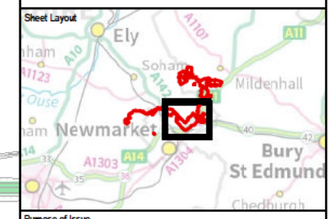
Green Infrastructure

- Native Grassland Planting
- Native Grassland Planting within Archaeological Mitigation Areas
- Native Grassland/Wetland
- Heritage Offset with additional planting along The Avenue
- Proposed Woodland (new planting or infilling of existing vegetation)
- Retained Woodland
- Proposed Hedgerow (new planting or infilling of existing vegetation)

Note: Developable fields previously referred to as W13, W14 and W15 are no longer within the Order limits; however, the field numbering for the remaining developable fields has been retained for consistency.

Document Reference: EN010106/APP/6.3
APFP Regulation: 5(2)(a)

Sheet Layout



Purpose of Issue
FOR ENVIRONMENT AGENCY CONSULTATION

Client
SUNNICA LTD

Project Title
sunnica energy farm

Drawing Title
SUNNICA WEST A AND B PARAMETER PLAN AND FLOOD ZONES

Drawn	Checked	Approved	Date
LL	DW	NC	16/03/2022

AECOM Internal Project No.	Scale @ A3
60589004	1:17,500

AECOM
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Drawing Number

Rev 0

File Name: \\eu.aecomnet.com\UK\UKCB\$1\Jobs\PR-334327_Sunnica_Energy_Farm\400_Technical\434_Technical Disciplines\17. GIS\Layout\ES\Chapter 3 - Scheme Description\220316_SunnicaEnergyFarm_FloodZones_West.mxd

Appendix C Proposed Attenuation Volume

Catchment No.	Area (ha.)	PIMP	Impermeable Area (ha.)	Storage Required (m^3)	Total Volume Available (m^3)	Ref $S.C_n.1$	Ref $S.C_n.2$	Ref $S.C_n.3$	Ref $S.C_n.4$	Ref $S.C_n.5$	Ref $P.C_n.1$	Ref $P.C_n.2$	Ref $P.C_n.3$	Ref $P.C_n.4$
1	5.1	10%	0.5	288	837	679	79	79	0	0	0	0	0	0
2	5.4	10%	0.5	310	640	213	319	108	0	0	0	0	0	0
3	3.2	10%	0.3	185	160	160	0	0	0	0	0	0	0	0
4	8.9	10%	0.9	506	583	326	257	0	0	0	0	0	0	0
5	32.1	10%	3.2	1826	679	447	231	0	0	0	0	0	0	0
6	26.5	10%	2.6	1506	638	638	0	0	0	0	0	0	0	0
7	25.3	10%	2.5	1438	720	720	0	0	0	0	0	0	0	0
8	7.1	10%	0.7	402	525	525	0	0	0	0	0	0	0	0
9	4.3	10%	0.4	245	304	153	151	0	0	0	0	0	0	0
10	23.3	10%	2.3	1327	548	386	162	0	0	0	0	0	0	0
11	23.3	10%	2.3	1328	609	609	0	0	0	0	0	0	0	0
12	19.5	10%	2	1111	2432	253	329	480	0	0	1370	0	0	0
13	8.8	100%	8.8	7287	872	228	397	248	0	0	0	0	0	0
14	12.8	10%	1.3	729	729	446	284	0	0	0	0	0	0	0
15	19.6	10%	2	1114	765	342	423	0	0	0	0	0	0	0
16	15.2	10%	1.5	862	1297	244	153	0	0	0	900	0	0	0
17	13.9	10%	1.4	790	1198	190	117	76	315	0	200	300	0	0
18	22.5	10%	2.3	1282	1888	488	0	0	0	0	700	700	0	0
19	25.5	10%	2.6	1451	1466	0	366	302	270	528	0	0	0	0
20	NO LONGER USED													
21	NO LONGER USED													

22	NO LONGER USED													
23	11.9	10%	1.2	679	443	283	160	0	0	0	0	0	0	0
24	15.8	10%	1.6	669	1980	180	0	0	0	0	600	600	600	0
25	11.8	10%	1.2	900	520	179	341	0	0	0	0	0	0	0
26	4.3	10%	0.4	247	374	184	190	0	0	0	0	0	0	0
27	4	100%	4	5501	740	162	228	138	212	0	0	0	0	0
28	8.4	100%	8.4	2021	401	236	166	0	0	0	0	0	0	0
29	9.9	10%	1	564	2970	0	0	0	0	0	2970	0	0	0
30	3.3	10%	0.3	187	300	0	0	0	0	0	300	0	0	0
31	7.9	10%	0.8	450	4319	203	157	0	0	0	3960	0	0	0
32	15.7	10%	1.6	894	1352	140	89	157	149	216	150	150	150	150
33	15	10%	1.5	855	1284	520	164	0	0	0	300	300	0	0
34	17	10%	1.7	964	1420	177	146	97	0	0	300	400	300	0
35	5.4	10%	0.5	307	787	241	195	0	0	0	200	150	0	0
36	10.2	10%	1	600	643	293	0	0	0	0	350	0	0	0
37	NO LONGER USED													
38	7.4	10%	0.7	422	1000	0	0	0	0	0	1000	0	0	0
39	8.7	10%	0.9	492	1075	309	159	257	0	0	350	0	0	0
40	11.3	10%	1.1	641	1377	176	417	0	0	0	785	0	0	0
41	11.1	10%	1.1	632	3134	140	483	0	0	0	512	1000	1000	0
42	47	10%	4.7	2736	5653	1368	0	0	0	0	705	3580	0	0
43	3.8	10%	0.4	219	400	0	0	0	0	0	400	0	0	0
44	9	10%	0.9	559	834	211	330	293	0	0	0	0	0	0
45	8.1	100%	8.1	1916	1250	0	0	0	0	0	1250	0	0	0
46	9	10%	0.9	513	711	176	134	0	0	0	400	0	0	0
47	8.8	10%	0.9	498	755	155	0	0	0	0	600	0	0	0
48	7.5	10%	0.8	427	785	185	0	0	0	0	600	0	0	0

49	4.4	10%	0.4	2480	2328	153	380	207	346	242	300	300	400	0
50	4.5	100%	4.5	2760	2293	255	315	0	0	0	1075	648	0	0
51	17	10%	1.7	1011	401	401	0	0	0	0	0	0	0	0
52	17	10%	1.7	1010	828	111	570	148	0	0	0	0	0	0

Appendix D Greenfield Runoff Rates

Greenfield runoff rate estimation for sites

[redacted] | Greenfield runoff tool

Calculated by:	Chris Brandon
Site name:	Sunnica Energy Farm
Site location:	Chippenham/Worlington

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	52.30907° N
Longitude:	0.46225° E
Reference:	2149007725
Date:	May 06 2021 08:57

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 1138

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	1	1
HOST class:	N/A	N/A
SPR/SPRHOST:	0.1	0.1

Hydrological characteristics

	Default	Edited
SAAR (mm):	551	551
Hydrological region:	5	5
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	2.45	2.45
Growth curve factor 100 years:	3.56	3.56
Growth curve factor 200 years:	4.21	4.21

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	102.46	102.46
1 in 1 year (l/s):	89.14	89.14
1 in 30 years (l/s):	251.02	251.02
1 in 100 year (l/s):	364.74	364.74
1 in 200 years (l/s):	431.34	431.34

Appendix E Maintenance Schedules

Infiltration Basins

Infiltration basins are vegetated open surface basins designs to store water and allow it to infiltrate into the ground. Vegetation provides amenity benefit and filtration of pollutants and is therefore as important to its function as the basin itself. A schedule setting out the maintenance operations, actions and frequency is included below. Please also refer to the manufacturer's operation and maintenance manual for any inlet structures or valves if available.

CIRIA C753 TABLE 13.2 Operation and maintenance requirements for infiltration basins

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter, debris and trash	Monthly
	Cut grass – for landscaped areas and access routes	Monthly (during growing season) or as required
	Cut grass – meadow grass in and around basin	Half yearly: spring (before nesting season) and autumn
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
Occasional maintenance	Reseed areas of poor vegetation growth	Annually, or as required
	Prune and trim trees and remove cuttings	As required
	Remove sediment from pre-treatment system when 50% full	As required
Remedial actions	Repair erosion or other damage by reseeding or re-turfing	As required
	Realign the rip-rap	As required
	Repair or rehabilitate inlets, outlets and overflows	As required
	Rehabilitate infiltration surface using scarifying and spiking techniques if performance deteriorates	As required
	Relevel uneven surfaces and reinstate design levels	As required
Monitoring	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly

Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
Inspect inlets and pre-treatment systems for silt accumulation; establish appropriate silt removal frequencies	Half yearly
Inspect infiltration surfaces for compaction and ponding	Monthly

Swales

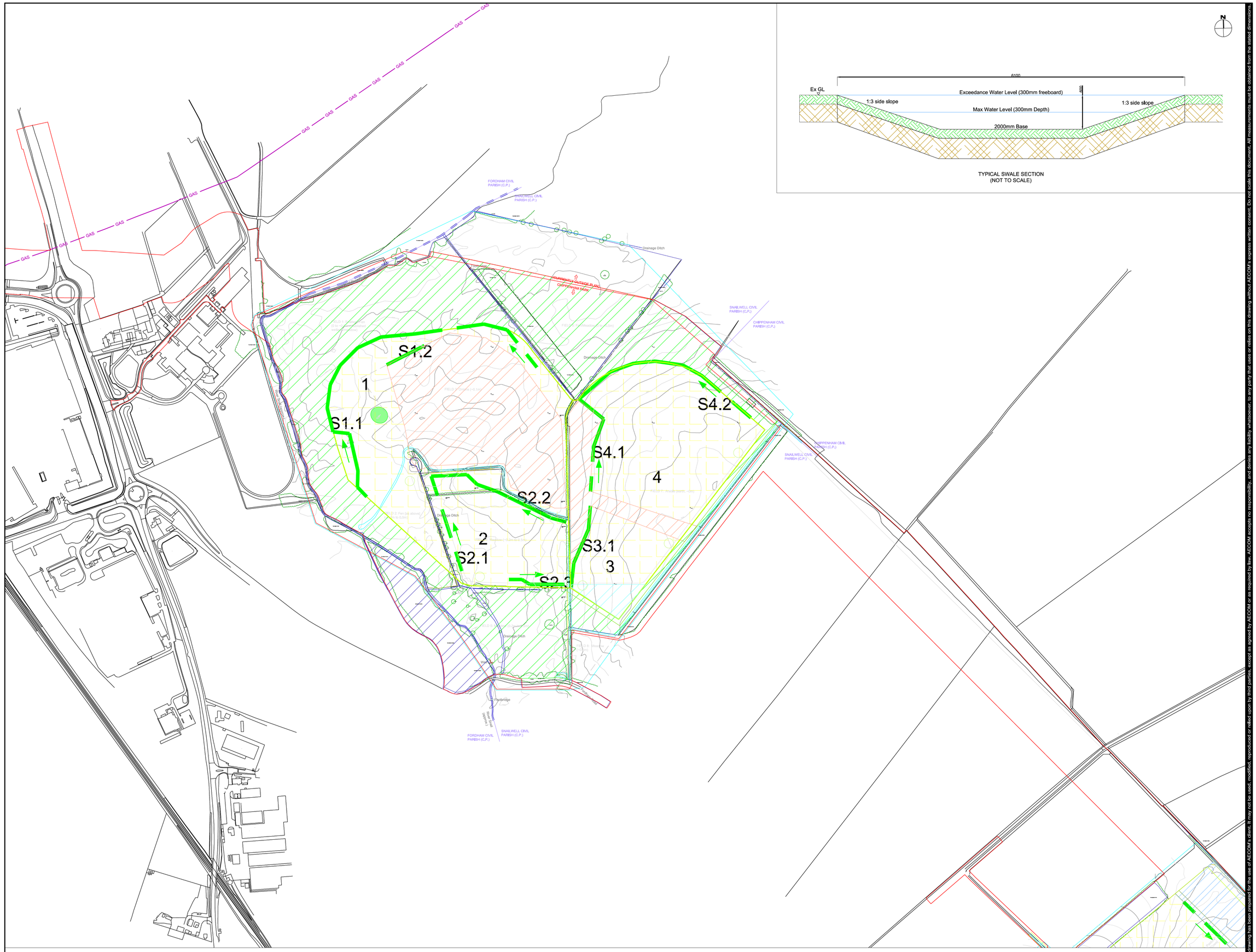
Swales are man-made linear depressions designed to convey water along a specified route. Upkeep of swales and their inlets and outlets is key to their function.
A schedule setting out the maintenance operations, actions and frequency is included below. Please also refer to the manufacturers operation and maintenance manual for any inlet structures if available.

CIRIA C753 TABLE 17.1 Operation and maintenance requirements for swales

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter and debris	Monthly, or as required
	Cut grass – to retain grass height within specified design range	Monthly (during growing season), or as required
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding	Monthly, or when required
	Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
	Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Half yearly
Occasional maintenance	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required	As required or if bare soil is exposed over 10% or more of the swale treatment area

Remedial actions	Repair erosion or other damage by re-turfing or reseeding	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface	As required
	Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required

Appendix F Drainage General Arrangements



TYPICAL SWALE SECTION
(NOT TO SCALE)

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LAYOUT

- RED LINE BOUNDARY
- SOLAR FIELD AREA
- ARCHAEOLOGICAL MITIGATION AREA
- COMPOUND AREA (PERMANENT)
- ECOLOGY ENHANCEMENT
- ECOLOGY ENHANCEMENT WETLAND
- RETAINED WOODLAND
- BATTERY STORAGE / COMPOUND
- SWALE (0.6m DEEP)
- INFILTRATION BASIN (0.6m DEEP)
- FIRE WATER STORAGE LAGOON WITH PENSTOCK
- FIREWATER DRAINAGE ROUTE
- FLOOD ZONE 3
- FLOOD ZONE 2

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S5.1
S6.1
S7.1
S8.1
S9.1
S9.2
S10.1
S10.2
S11.1
S12.1
S12.2
S12.3
S13.1
S13.2
S13.3
S14.1
S14.2
S16.1
S17.1
P12.1
P17.1
P1
5
6
7
8
9
10
11
12
13
14
16
Swale
Swale
Tunnel Ramp
A14 (Trunk Road)
Overpass (Bridleway)
(CURRENTLY OUTSIDE PLAN)
(CURRENTLY OUTSIDE PLAN)
CHIPPENHAM CIVIL PARISH (C.P.)
SNAILWELL CIVIL PARISH (C.P.)
'Sounds Plantation'
A14 (Trunk Road)
A1304 Road

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LAYOUT

- RED LINE BOUNDARY
- SOLAR FIELD AREA
- ARCHAEOLOGICAL MITIGATION AREA
- COMPOUND AREA (PERMANENT)
- ECOLOGY ENHANCEMENT
- ECOLOGY ENHANCEMENT WETLAND
- RETAINED WOODLAND
- BATTERY STORAGE / COMPOUND
- SWALE (0.6m DEEP)
- INFILTRATION BASIN (0.6m DEEP)
- FIRE WATER STORAGE LAGOON WITH PENSTOCK
- FIREWATER DRAINAGE ROUTE
- FLOOD ZONE 3
- FLOOD ZONE 2

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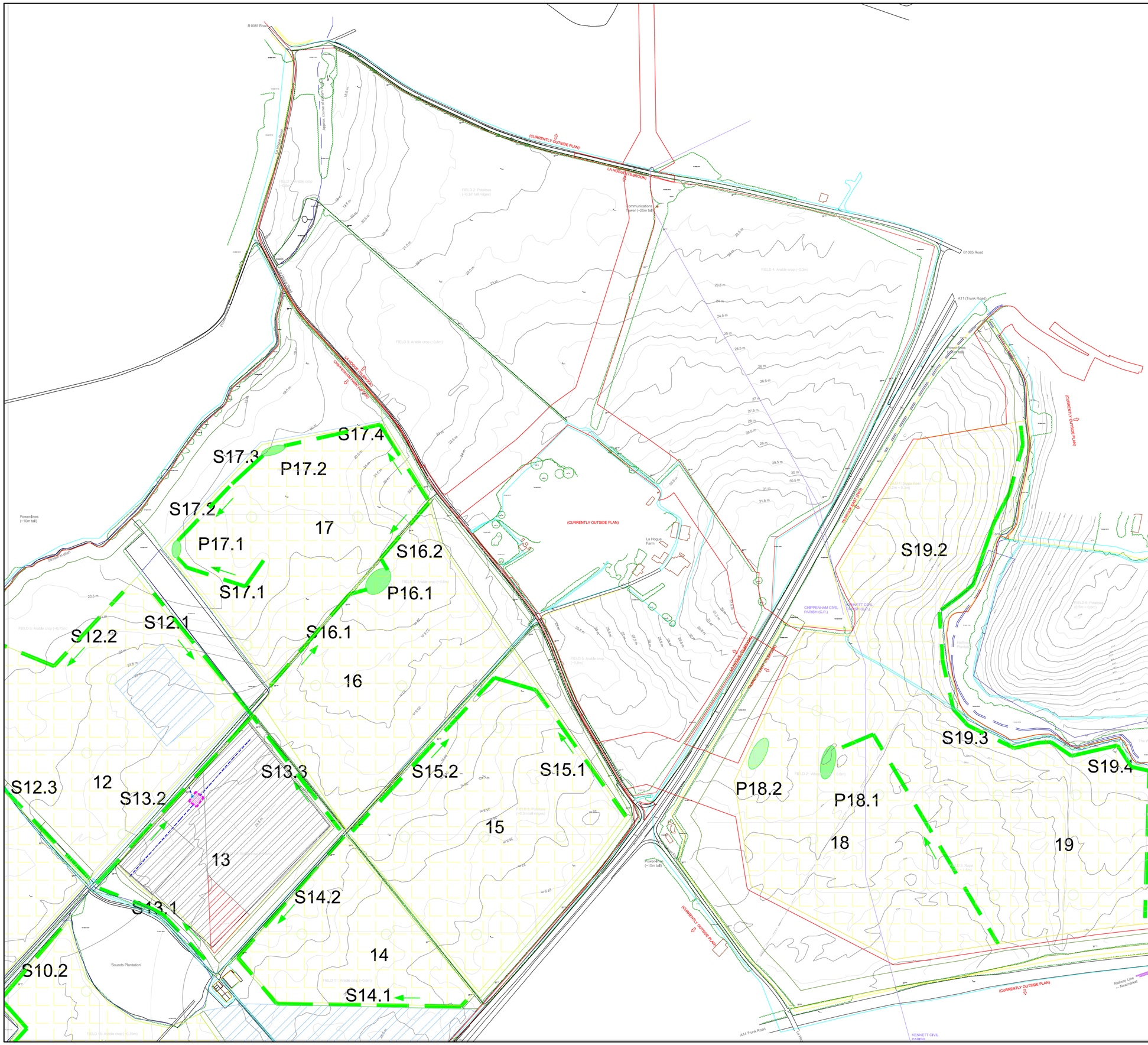

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LAYOUT

- RED LINE BOUNDARY
- SOLAR FIELD AREA
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- ECOLOGY ENHANCEMENT
- ECOLOGY ENHANCEMENT WETLAND
- RETAINED WOODLAND
- BATTERY STORAGE / COMPOUND
- SWALE (0.6m DEEP)
- INFILTRATION BASIN (0.6m DEEP)
- FIRE WATER STORAGE LAGOON WITH PENSTOCK
- FIREWATER DRAINAGE ROUTE
- FLOOD ZONE 3
- FLOOD ZONE 2

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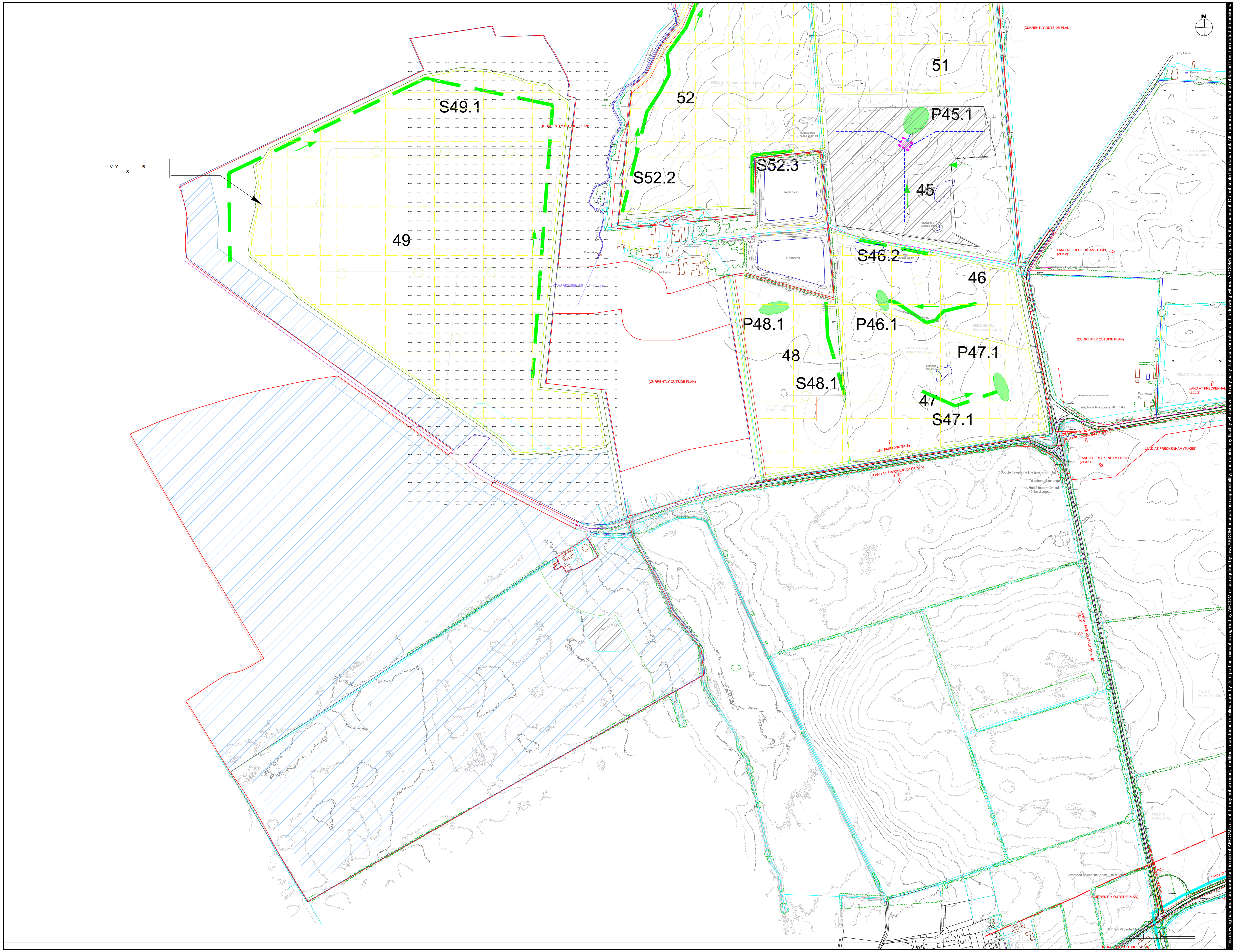


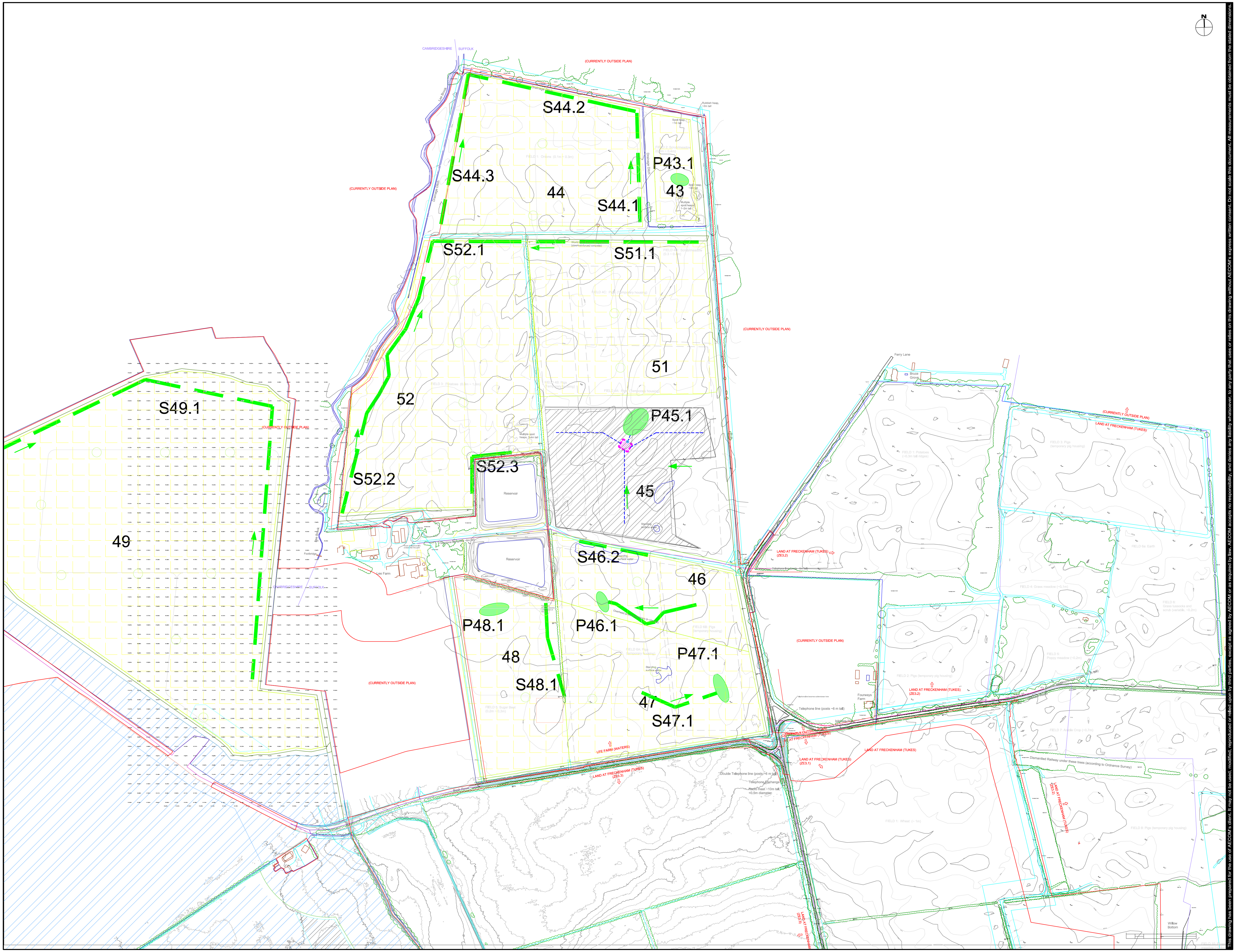
AECOM

sunnica energy farm

P A

LAYOUT

RED LINE BOUNDARY
SOLAR FIELD AREA
ARCHAEOLOGICAL MITIGATION AREA
COMPOUND AREA (PERMANENT)
ECOLOGY ENHANCEMENT
ECOLOGY ENHANCEMENT WETLAND
RETAINED WOODLAND
BATTERY STORAGE / COMPOUND
SWALE (0.6m DEEP)
INFILTRATION BASIN (0.6m DEEP)
FIRE WATER STORAGE LAGOON WITH PENSTOCK
FIREWATER DRAINAGE ROUTE
FLOOD ZONE 3
FLOOD ZONE 2



AECOM

sunnica energy farm

LAYOUT

- RED LINE BOUNDARY
- SOLAR FIELD AREA
- ARCHAEOLOGICAL MITIGATION AREA
- COMPOUND AREA (PERMANENT)
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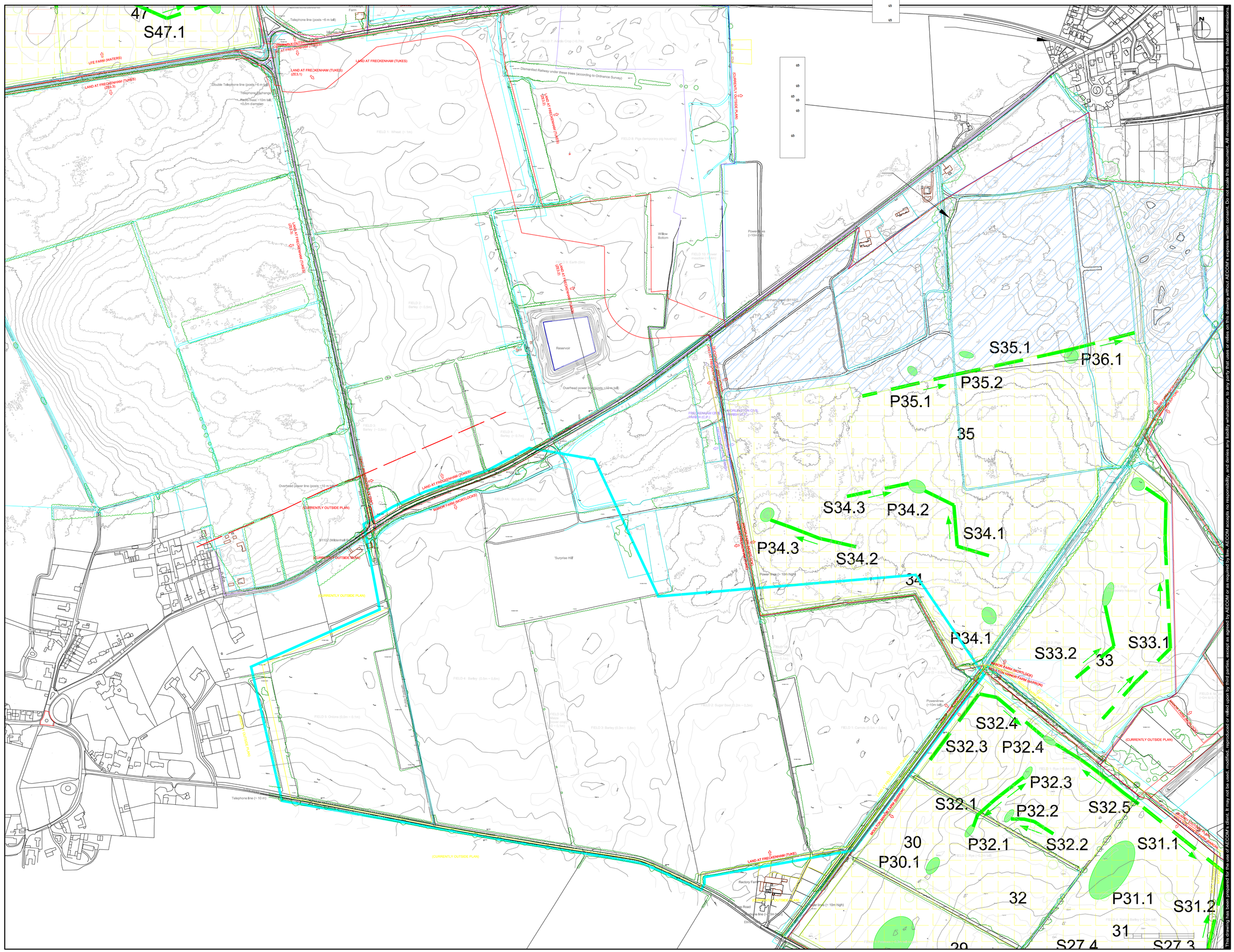
- FIRE WATER STORAGE LAGOON WITH PENSTOCK
- FIREWATER DRAINAGE ROUTE
- FLOOD ZONE 3
- FLOOD ZONE 2



AECOM

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sunnica energy farm

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LAYOUT

- RED LINE BOUNDARY
- SOLAR FIELD AREA
- ARCHAEOLOGICAL MITIGATION AREA
- COMPOUND AREA (PERMANENT)
- ECOLOGY ENHANCEMENT
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- FLOOD ZONE 3
- FLOOD ZONE 2

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sunnica energy farm

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LAYOUT

- RED LINE BOUNDARY
- SOLAR FIELD AREA
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- FIREWATER DRAINAGE ROUTE
- FLOOD ZONE 3
- FLOOD ZONE 2

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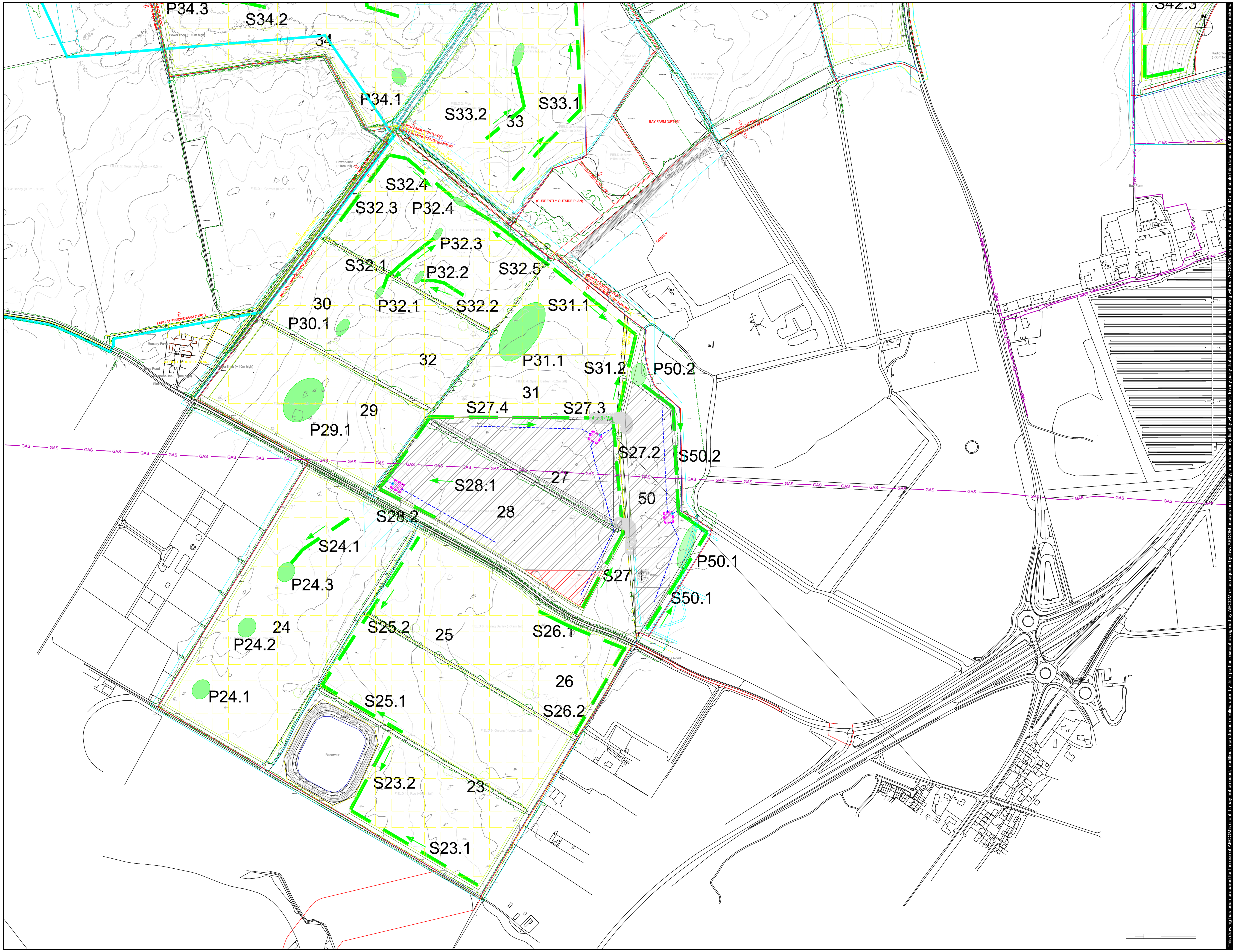


AECOM

sunnica energy farm

LAYOUT

- RED LINE BOUNDARY
- SOLAR FIELD AREA
- ARCHAEOLOGICAL MITIGATION AREA
- COMPOUND AREA (PERMANENT)
- ECOLOGY ENHANCEMENT
- ECOLOGY ENHANCEMENT WETLAND
- RETAINED WOODLAND
- BATTERY STORAGE / COMPOUND
- SWALE (0.6m DEEP)
- INFILTRATION BASIN (0.6m DEEP)
- FIRE WATER STORAGE LAGOON WITH PENSTOCK
- FIREWATER DRAINAGE ROUTE
- FLOOD ZONE 3
- FLOOD ZONE 2

Annex E – EA Product 4 Data

Datasheet - Product 4

17 October 2022

Reference Number	222441
Site	Site adjacent to River Lark, near West Row / Worlington
Customer	Christopher Brandon
NGR	TL6651675068

This datasheet provides supporting information for your Product 4. It will be clearly indicated if we are unable to provide information to fulfil any part of your request.

Model Summary

Model Name	Model Code
Eastern Rivers - River Kennett (MP13)	EA052372_013

Important Information

The following information should considered when using the material provided to fulfil this request.

Information	
Limited Modelled Extents Provided	We have only provided a limited number of modelled flood extents for clarity. If you require further extents we will be happy to provide them.

Modelled Water Levels and Flows

The following tables provide modelled in channel water level and flow values. Values are provided for Annual Exceedence Probability (AEP) events, which is the probability of a given event occurring in any one year. This is not a return period.

The fluvial models used to produce these results are intended for strategic scale use only.

If the tables show a value of -9999, this indicates that we have no level or flow data for that particular AEP or node point.

Level Data

Level values are measured in metres above Ordnance Datum (m aOD).

All level data included are subject to standard modelling tolerance of +/-150 millimetres.

Present Day Levels

Node	Model	Easting	Northing	20%	10%	5%	4%	2%	1.33%	1%	0.5%	0.1%
KEN_01000	EA052372_013	566209	274180	2.678	2.757	2.808	2.82	2.854	2.886	2.909	2.954	3.155
KEN_01380	EA052372_013	566173	273850	3.248	3.306	3.343	3.353	3.381	3.409	3.429	3.468	3.59
KEN_01700u	EA052372_013	566187	273559	3.721	3.757	3.788	3.797	3.821	3.845	3.863	3.9	4.089
KEN_02009d	EA052372_013	566234	273286	4.563	4.723	4.883	4.933	5.056	5.16	5.243	5.433	6.055

Climate Change Levels

Node	Model	Easting	Northing	1%+20%cc	1%+25%cc	1%+35%cc	1%+65%cc	0.5%+20%cc	0.1%+20%cc
KEN_01000	EA052372_013	566209	274180	2.961	-9999	-9999	-9999	-9999	-9999
KEN_01380	EA052372_013	566173	273850	3.475	-9999	-9999	-9999	-9999	-9999
KEN_01700u	EA052372_013	566187	273559	3.907	-9999	-9999	-9999	-9999	-9999
KEN_02009d	EA052372_013	566234	273286	5.469	-9999	-9999	-9999	-9999	-9999

Flow Data

Flow values are measured in cubic metres per second (cumecs - m3/s).

Present Day Flows

Node	Model	Easting	Northing	20%	10%	5%	4%	2%	1.33%	1%	0.5%	0.1%
KEN_01000	EA052372_013	566209	274180	5.232	6.196	7.067	7.31	8.044	8.824	9.416	10.70	19.46
KEN_01380	EA052372_013	566173	273850	5.236	6.201	7.064	7.311	8.045	8.826	9.42	10.70	15.82
KEN_01700u	EA052372_013	566187	273559	5.241	6.205	7.068	7.312	8.047	8.828	9.421	10.71	19.89
KEN_02009d	EA052372_013	566234	273286	5.241	6.205	7.067	7.312	8.685	9.644	10.12	11.00	16.60

Flow Data

Flow values are measured in cubic metres per second (cumecs - m3/s).

Present Day Flows

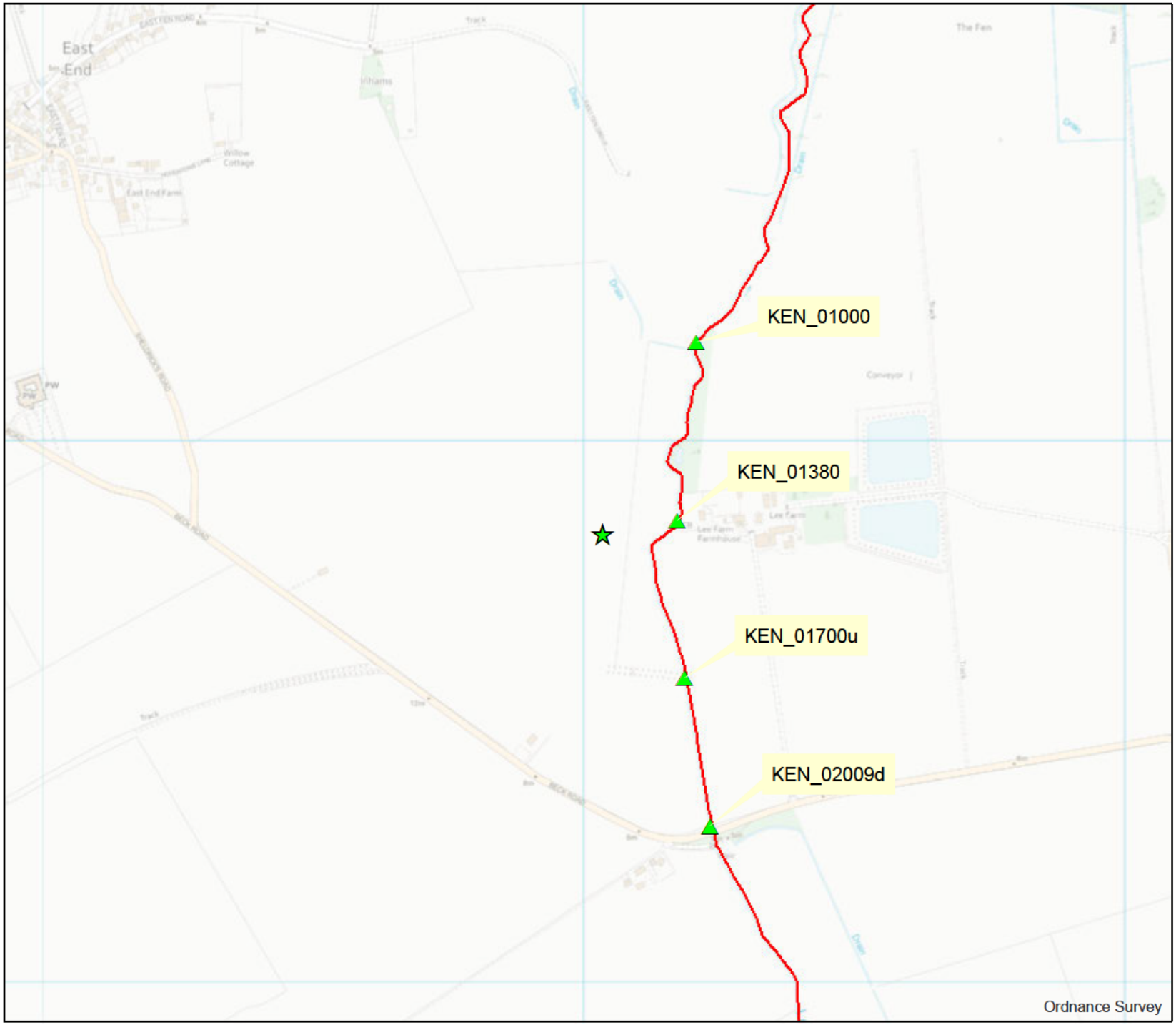
Node	Model	Easting	Northing	20%	10%	5%	4%	2%	1.33%	1%	0.5%	0.1%
KEN_01000	EA052372_013	566209	274180	5.232	6.196	7.067	7.31	8.044	8.824	9.416	10.70	19.46
KEN_01380	EA052372_013	566173	273850	5.236	6.201	7.064	7.311	8.045	8.826	9.42	10.70	15.82
KEN_01700u	EA052372_013	566187	273559	5.241	6.205	7.068	7.312	8.047	8.828	9.421	10.71	19.89
KEN_02009d	EA052372_013	566234	273286	5.241	6.205	7.067	7.312	8.685	9.644	10.12	11.00	16.60

Climate Change Flows

Node	Model	Easting	Northing	1%+20%cc	1%+25%cc	1%+35%cc	1%+65%cc	0.5%+20%cc	0.1%+20%cc
KEN_01000	EA052372_013	566209	274180	10.93	-9999	-9999	-9999	-9999	-9999
KEN_01380	EA052372_013	566173	273850	10.93	-9999	-9999	-9999	-9999	-9999
KEN_01700u	EA052372_013	566187	273559	10.94	-9999	-9999	-9999	-9999	-9999
KEN_02009d	EA052372_013	566234	273286	11.29	-9999	-9999	-9999	-9999	-9999

Modelled Node Point Locations centred on Area E05, Sunnica Solar Farm

NGR TL6600973865
Ref 222441
Created 17/10/2022



Environment Agency
Bromholme Lane,
Brampton,
Cambridgeshire
PE28 4NE

Environment Agency

Legend

- Site
- Node Point Locations
- Main river

0 0.125 0.25 0.5 km

Information

Model Tolerance - Any data included in this product is subject to a standard modelling tollerance of +/- 150mm.The fluvial models used to produce these results are intended for strategic scale use only.

Flood Risk Assessments - The Environment Agency recommends any Flood Risk Assessment should only consider these results in the context of a site specific assessment.

AEP - Annual Exceedance Probability - The probability of a given event occurring in any one year. Please note this is not a return period.

Strategic Scale Model - This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences if present.

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY Tel: 03708 506 506 (Mon-Fri 8-6).
Email: enquiries@environment-agency.gov.uk

Datasheet - Product 4

13 October 2022

Reference Number	222441
Site	Site adjacent to River Lark, near West Row / Worlington
Customer	Christopher Brandon
NGR	TL6651675068

This datasheet provides supporting information for your Product 4. It will be clearly indicated if we are unable to provide information to fulfil any part of your request.

Model Summary

Model Name	Model Code
Eastern Rivers - Cut Off Channel (MP1)	EA052372_001

Important Information

The following information should considered when using the material provided to fulfil this request.

Information	
Limited Modelled Extents Provided	We have only provided a limited number of modelled flood extents for clarity. If you require further extents we will be happy to provide them.

Modelled Water Levels and Flows

The following tables provide modelled in channel water level and flow values. Values are provided for Annual Exceedence Probability (AEP) events, which is the probability of a given event occurring in any one year. This is not a return period.

The fluvial models used to produce these results are intended for strategic scale use only.

If the tables show a value of -9999, this indicates that we have no level or flow data for that particular AEP or node point.

Level Data

Level values are measured in metres above Ordnance Datum (m aOD).

All level data included are subject to standard modelling tolerance of +/-150 millimetres.

Present Day Levels

Node	Model	Easting	Northing	20%	10%	5%	4%	2%	1.33%	1%	0.5%	0.1%
KEN_00600	EA052372_013	566379	274526	2.255	2.304	2.342	2.352	2.381	2.41	2.432	2.473	2.614
KEN_01000	EA052372_013	566209	274180	2.678	2.757	2.808	2.82	2.854	2.886	2.909	2.954	3.155
LARK_15278	EA052372_001	566313	275157	2.3	2.45	2.55	2.58	2.72	2.76	2.78	2.82	2.95
LARK_15441	EA052372_001	566480	275100	2.31	2.46	2.56	2.6	2.73	2.77	2.79	2.84	2.98
LARK_15604	EA052372_001	566610	275139	2.31	2.47	2.57	2.6	2.73	2.77	2.8	2.84	2.99
LARK_15913	EA052372_001	566790	275033	2.33	2.49	2.59	2.62	2.75	2.79	2.81	2.86	3.02
LARK_16112	EA052372_001	566960	274968	2.34	2.5	2.6	2.63	2.76	2.8	2.82	2.86	3.03

Climate Change Levels

Node	Model	Easting	Northing	1%+20%cc	1%+25%cc	1%+35%cc	1%+65%cc	0.5%+20%cc	0.1%+20%cc
KEN_00600	EA052372_013	566379	274526	2.48	-9999	-9999	-9999	-9999	-9999
KEN_01000	EA052372_013	566209	274180	2.961	-9999	-9999	-9999	-9999	-9999
LARK_15278	EA052372_001	566313	275157	2.94	-9999	-9999	-9999	-9999	-9999
LARK_15441	EA052372_001	566480	275100	2.96	-9999	-9999	-9999	-9999	-9999
LARK_15604	EA052372_001	566610	275139	2.96	-9999	-9999	-9999	-9999	-9999
LARK_15913	EA052372_001	566790	275033	2.97	-9999	-9999	-9999	-9999	-9999
LARK_16112	EA052372_001	566960	274968	2.98	-9999	-9999	-9999	-9999	-9999

Flow Data

Flow values are measured in cubic metres per second (cumecs - m3/s).

Present Day Flows

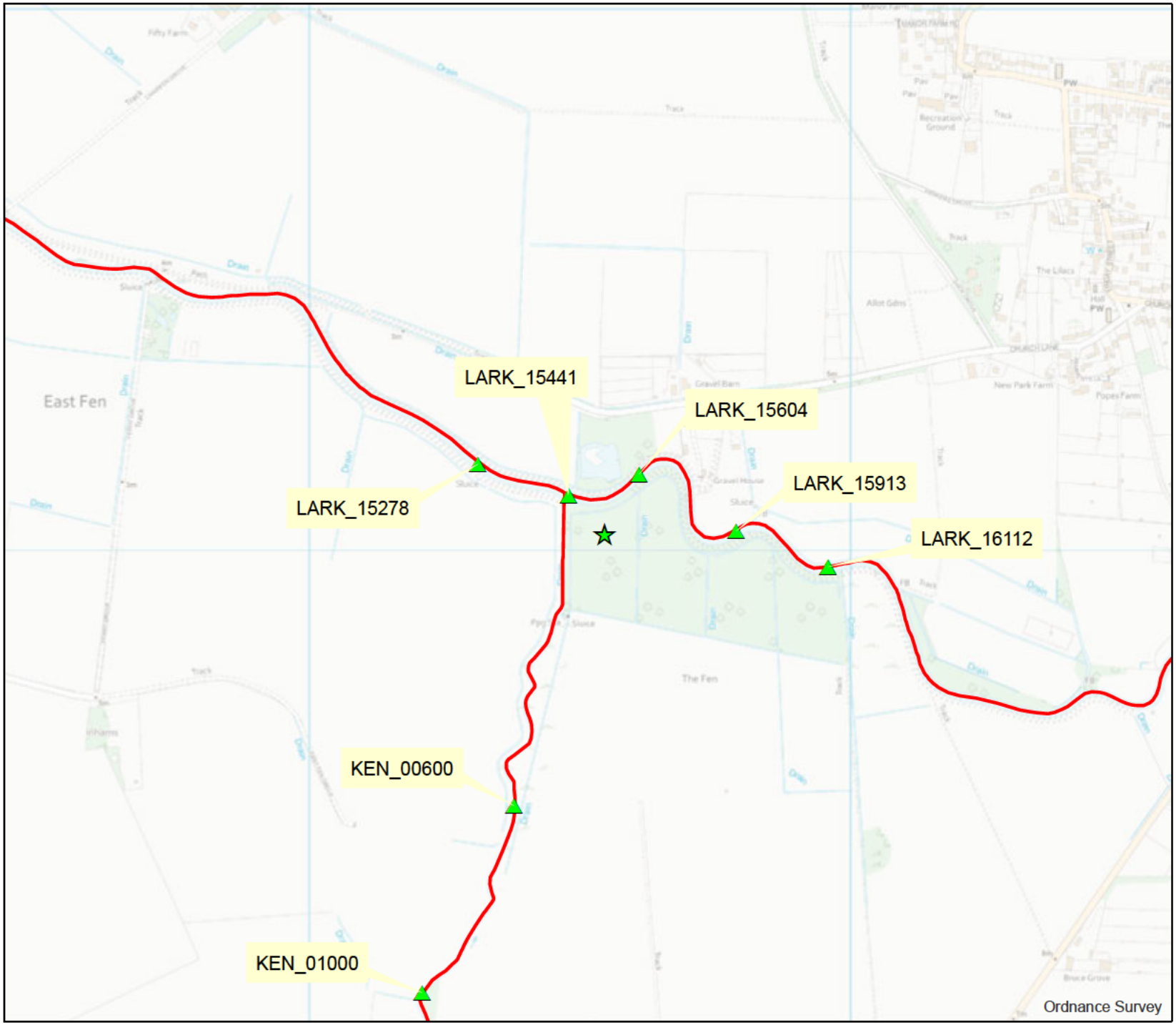
Node	Model	Easting	Northing	20%	10%	5%	4%	2%	1.33%	1%	0.5%	0.1%
KEN_00600	EA052372_013	566379	274526	5.229	6.191	7.064	7.307	8.041	8.817	9.408	10.70	15.67
KEN_01000	EA052372_013	566209	274180	5.232	6.196	7.067	7.31	8.044	8.824	9.416	10.70	19.46
LARK_15278	EA052372_001	566313	275157	9.81	11.76	13.03	13.4	14.77	15.6	16.14	18.62	26.79
LARK_15441	EA052372_001	566480	275100	6.49	7.71	8.12	8.32	8.88	9.05	9.28	9.64	16.92
LARK_15604	EA052372_001	566610	275139	6.49	7.71	8.12	8.31	8.87	9.05	9.28	9.64	16.91
LARK_15913	EA052372_001	566790	275033	6.5	7.71	8.11	8.31	8.87	9.05	9.28	9.64	16.01
LARK_16112	EA052372_001	566960	274968	6.5	7.72	8.11	8.31	8.87	9.05	9.27	9.64	16.89

Climate Change Flows

Node	Model	Easting	Northing	1%+20%cc	1%+25%cc	1%+35%cc	1%+65%cc	0.5%+20%cc	0.1%+20%cc
KEN_00600	EA052372_013	566379	274526	10.93	-9999	-9999	-9999	-9999	-9999
KEN_01000	EA052372_013	566209	274180	10.93	-9999	-9999	-9999	-9999	-9999
LARK_15278	EA052372_001	566313	275157	18.16	-9999	-9999	-9999	-9999	-9999
LARK_15441	EA052372_001	566480	275100	9.86	-9999	-9999	-9999	-9999	-9999
LARK_15604	EA052372_001	566610	275139	9.85	-9999	-9999	-9999	-9999	-9999
LARK_15913	EA052372_001	566790	275033	9.7	-9999	-9999	-9999	-9999	-9999
LARK_16112	EA052372_001	566960	274968	9.8	-9999	-9999	-9999	-9999	-9999

Modelled Node Point Locations centred on Sunnica Solar Farm

NGR TL6651675068
Ref 222441
Created 13/10/2022



Environment Agency
Bromholme Lane,
Brampton,
Cambridgeshire
PE28 4NE

Environment Agency

Legend

- Site
- Node Point Locations
- Main river

0 0.125 0.25 0.5 km

Information

Model Tolerance - Any data included in this product is subject to a standard modelling tollerance of +/- 150mm.The fluvial models used to produce these results are intended for strategic scale use only.

Flood Risk Assessments - The Environment Agency recommends any Flood Risk Assessment should only consider these results in the context of a site specific assessment.

AEP - Annual Exceedance Probability - The probability of a given event occurring in any one year. Please note this is not a return period.

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Email: enquiries@environment-agency.gov.uk