Lime Down Solar Park

Environmental Statement

Volume 3, Flood Risk Assessment and Outline Drainage Strategy – Lime Down D / BESS (Tracked)

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Appendix 11-6: Flood Risk Assessment and Outline Drainage Strategy – Lime Down D / BESS

Lime Down Solar Park Ltd

Site: Lime Down Solar Park

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1. Site Details

1.1.1 The aim of this section of the report is to outline key environmental information associated with the baseline environment of Lime Down D.

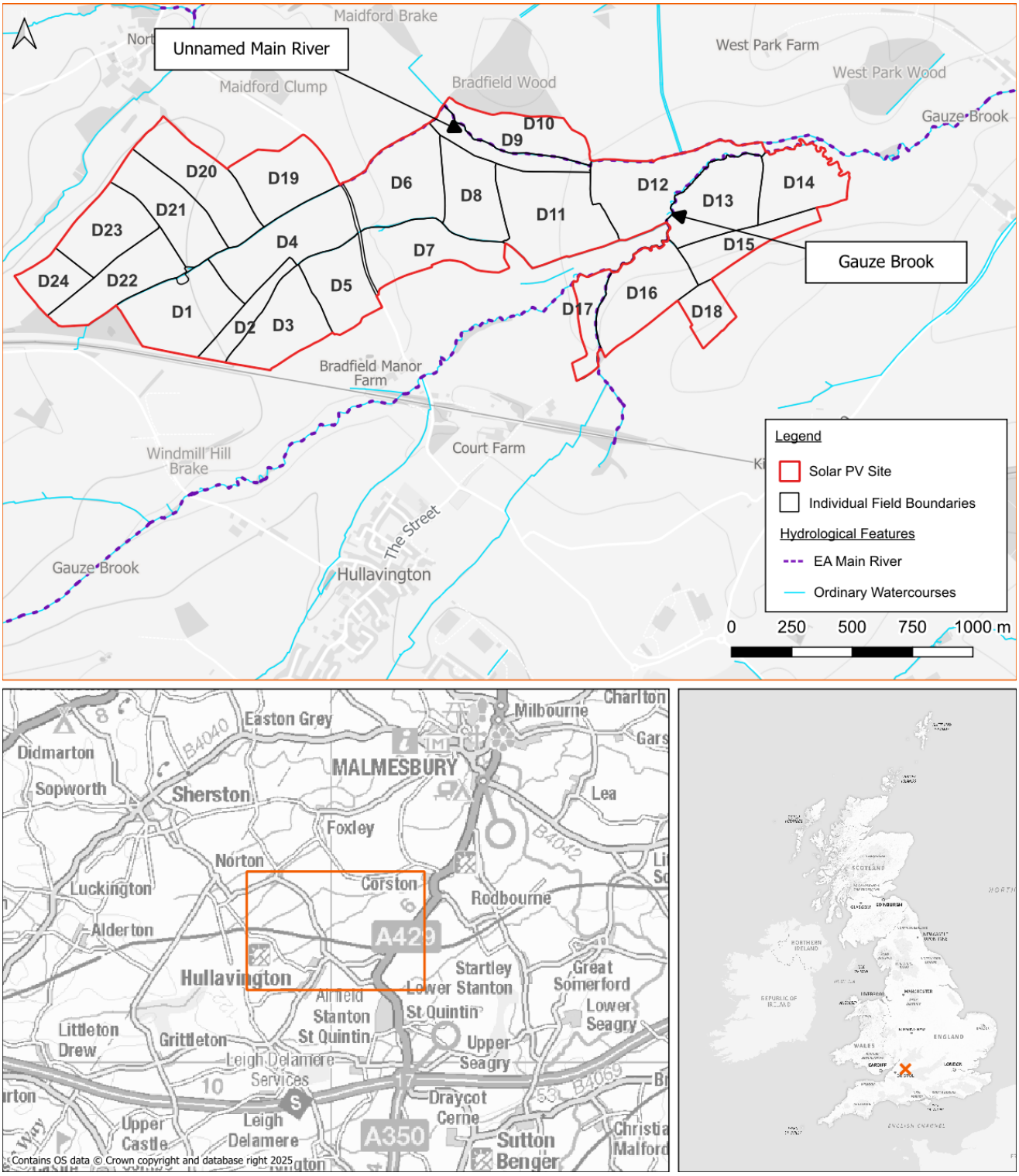


Figure 1: Site Location

1.2 Site Location

1.2.1 Lime Down D is in a rural area situated approximately 820m north-east of Hullavington and 300m south-east of Norton. Grid references are as follows: 387940E, 183590N (western extents); 390070E, 184030N (northern extents); 391720E, 183780N (eastern extents), and 390423, 183192 (southern extents).

1.3 Existing Site Conditions

1.3.1 Online mapping (including Google Maps / Google Streetview imagery[i], (accessed May 2025) shows that Lime Down D is greenfield. Lime Down D is bordered by more rural land in all orientations. Access to the Lime Down D is provided via Bradfield cottages to the south, which runs north and southwards in the western section of the Lime Down D.

1.4 Topography

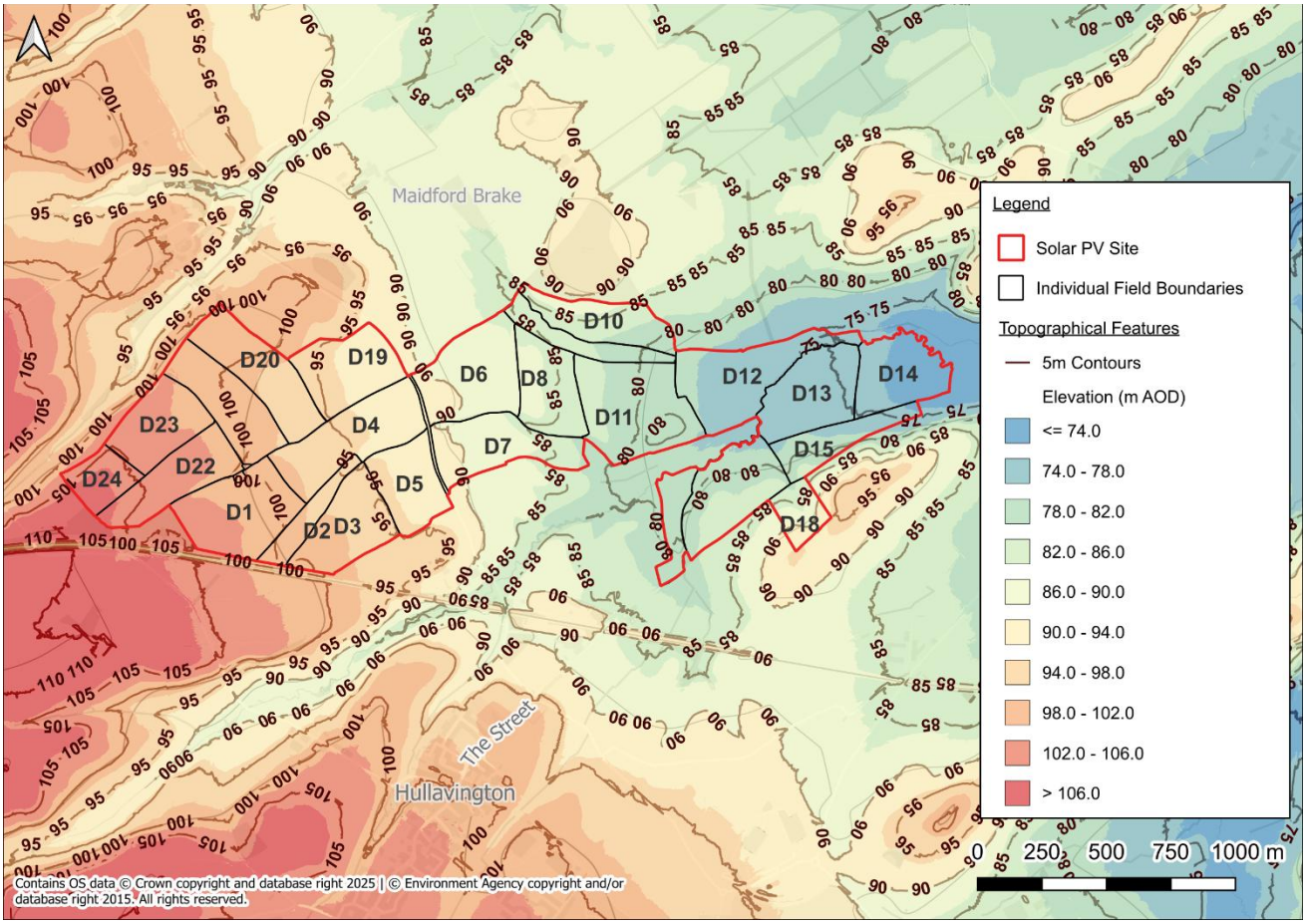


Figure 2: LiDAR Plan

1.4.1 Topographic levels to metres Above Ordnance Datum (m AOD) have been derived from a 1m resolution Environment Agency (EA) composite 'Light Detecting and Ranging' (LiDAR) Digital Terrain Model (DTM). A review of LiDAR ground elevation data shows that the sub-site Lime Down D slopes from approximately 107m AOD in the west to approximately 73m AOD in the east (Figure 2).

1.5 Hydrology

1.5.1 The nearest watercourse is Gauze Brook, a Main River, which is located through the eastern extent of Lime Down D flowing from south to north-east of the Lime Down D.

1.5.2 There is also an Unnamed Main River which flows along the northern boundary of the Lime Down D in an easterly direction until its confluence with Gauze Brook at the north-eastern boundary of the Lime Down D. There are also minor tributaries of both Gauze Brook, and the Unnamed Main River located in the western and central areas on-site, which are classified as Ordinary Watercourses. Main Rivers fall within the responsibility of the EA, whereas Ordinary Watercourses fall within the responsibility of the Wiltshire County Lead Local Flood Authority (LLFA).

1.6 Water Framework Directive Status

1.6.1 Lime Down D is located within the Gauze Brook - source to conf R Avon (Brist) Water Body Catchment and the Avon (Brist) conf Tetbury Avon to conf R Marden Water Body Catchment. The Gauze Brook – source to conf R Avon (Brist) Water Body catchment has a Cycle 3 Ecological status of Moderate in 2019 in 2022 and a Failing chemical status in 2019 (no data in 2022). The Avon (Brist) conf Tetbury Avon to conf R Marden Water Body Catchment has a Cycle 3 Ecological status of Moderate in 2019 and 2022 and a Failing chemical status in 2019 (no data in 2022). A summary of the Water Body Classifications can be found in Annex A.

1.7 Geology

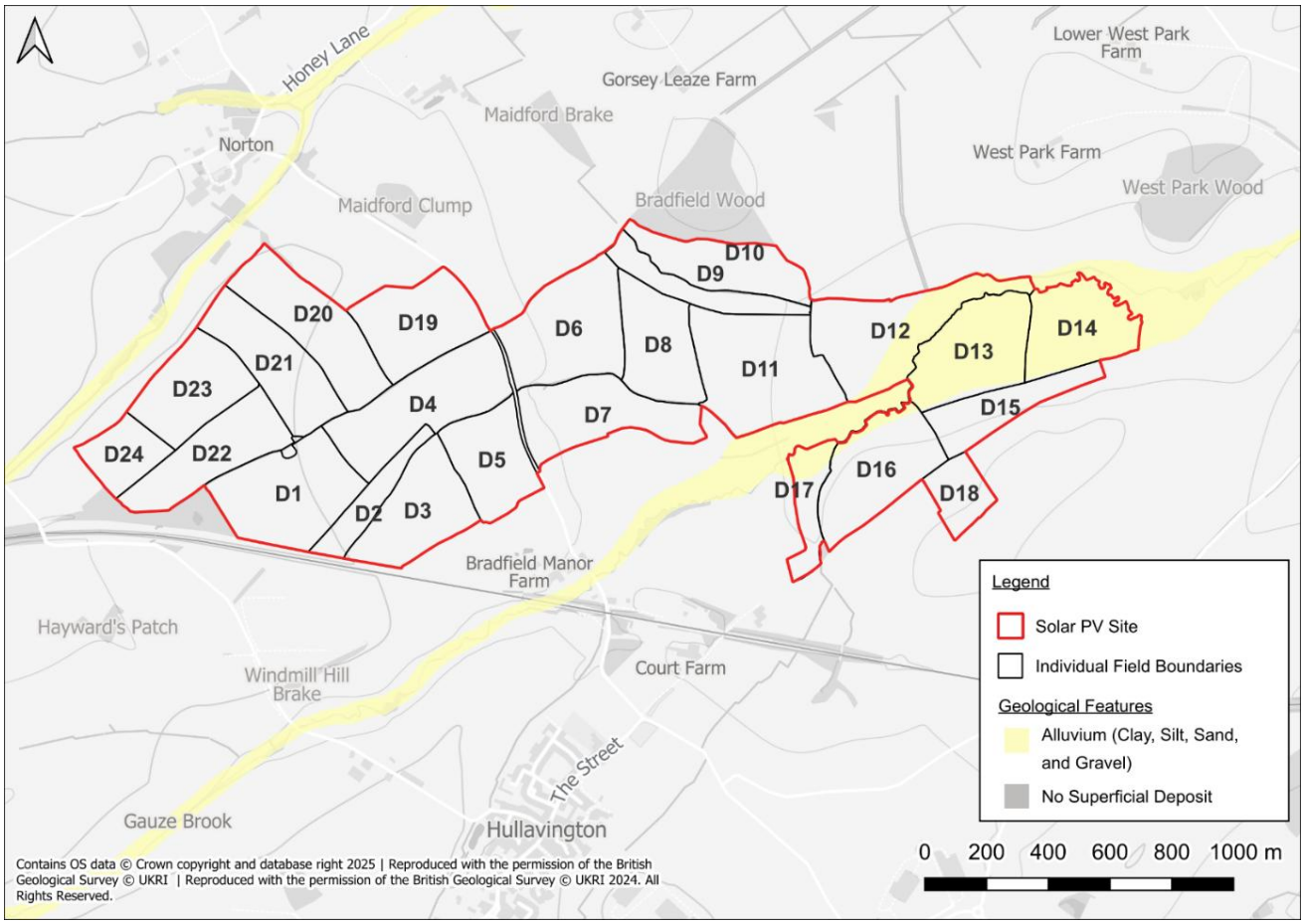


Figure 3: Superficial Deposits

1.7.1 Reference to the British Geological Survey (BGS) online mapping[ii] (1:50,000 scale) indicates that the sub-Site is largely not underlain by any superficial deposits. However, the east of Lime Down D is underlain by Alluvium, comprising clay, silt, sand and gravel (Figure 3).

1.7.2 The superficial deposits are identified as being underlain by differing bedrock deposits as detailed in Figure 4 and below:

- Forest Marble Formation, comprising mudstone;
- Kellaways Clay Member, comprising mudstone;
- Cornbrash Formation, comprising limestone

1.7.3 The geological mapping is available at a scale of 1:50,000 and as such may not be accurate on a site-specific basis.

1.7.4 There are no historical BGS borehole records in the near vicinity of Lime Down D.

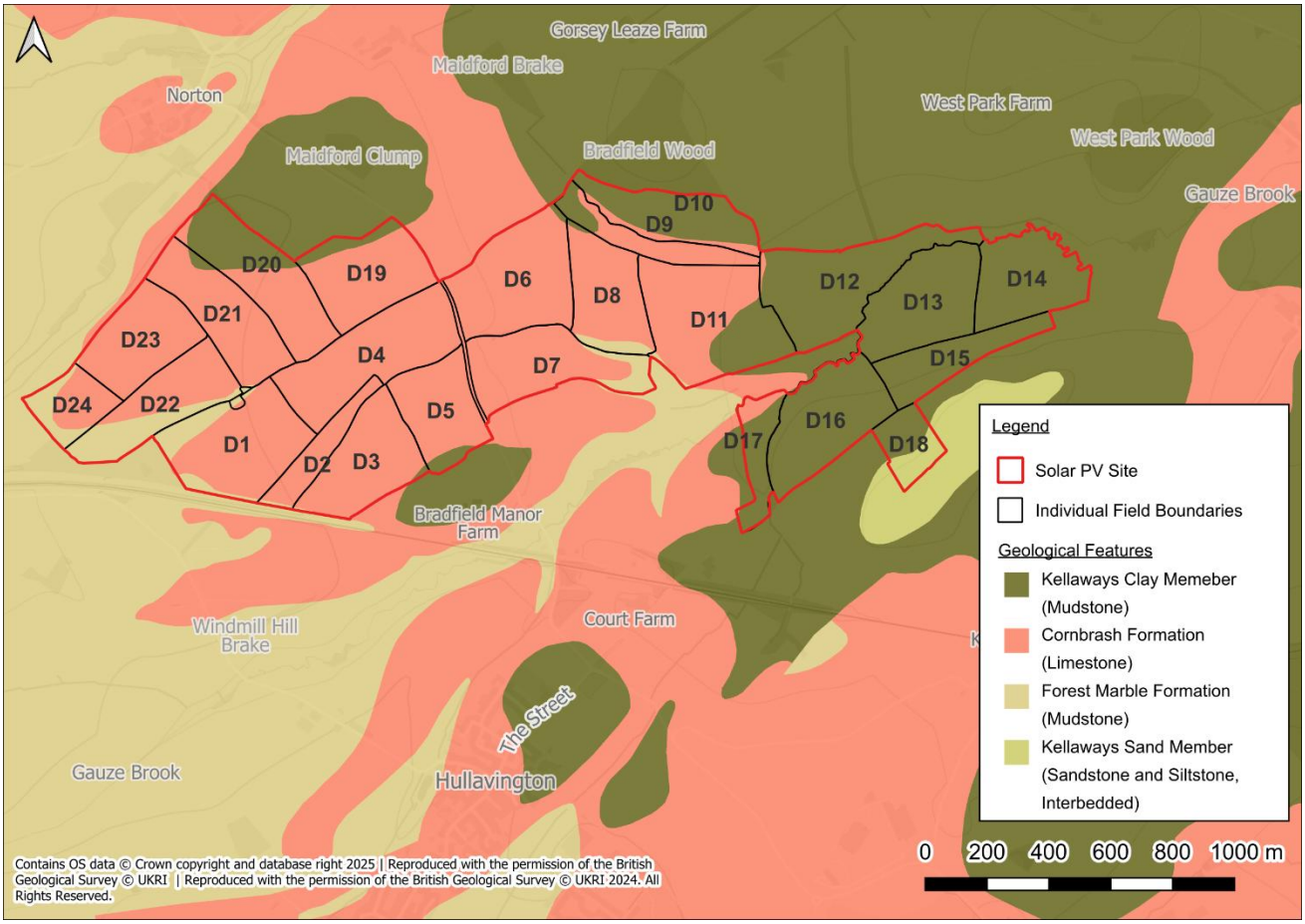


Figure 4: Bedrock Deposits

1.8 Hydrogeology

1.8.1 According to the EA's Aquifer Designation data, obtained from MAGIC Map's online mapping[iii] [accessed 02/06/2025], the Alluvium is identified as a Secondary A Aquifer.

1.8.2 The underlying Kellaways Clay Member is described as an unproductive aquifer, whereas the Forest Marble Formation and the Cornbrash Formation are defined as Secondary A Aquifers.

1.8.3 The EA's 'Source Protection Zones' data, obtained from MAGIC Map's online mapping [accessed 02/06/2025], indicates that the west of Lime Down D is located within a Zone II - Subsurface Activity Groundwater Source Protection Zone and the east is located within a Zone I - Subsurface Activity Groundwater Source Protection Zone.

1.8.4 Further assessment of hydrogeological risk, including HDD-related considerations, is provided in **ES Volume 1, Chapter 19: Ground Conditions and Contamination [EN010168/APP/6.1].**

1.9 Proposed Site Conditions

1.9.1 Lime Down D comprises ground-mounted solar panels, a Battery Energy Storage System (BESS) Area located in Field D1 and associated electrical infrastructure and access. Two substations are also proposed, one adjacent to the BESS in Field D22, and a second standalone substation in Field D18. See Chapter 3: Scheme Description of the ES.

1.9.2 The proposed BESS Area arrangement at Lime Down D is described in Section 3 of this report, which sets out the Drainage Strategy specific to the BESS Area.

1.9.3 An **Outline Landscape and Ecological Management Plan (LEMP) [EN010168/APP/7.18]** has been prepared to support the DCO application. The Outline LEMP confirms that the majority of the Site will be used for solar panels, electrical infrastructure and internal access, with peripheral areas providing landscaped buffers, in accordance with the embedded mitigation strategy described throughout the ES.

1.9.4 Where a 132kV or 400kV substation is proposed within this area, the detailed design will include a controlled drainage strategy for the substation compound. This will include sealed drainage or sealed drainage components where required, together with suitable treatment, interception, containment and isolation measures to prevent spills, leaks or firewater from affecting ground or controlled waters. The drainage principles for substations are set out in the **Firewater Containment and Drainage Strategy – Lime Down D BESS [EN010168/EXAM/9.8]** and the **Firewater Containment and Drainage Strategy – Lime Down Substation [EN010168/EXAM/9.9]** which is the governing reference for containment and release matters.

2. Assessment of Flood Risk

2.1.1 The aim of this Section of the report is to assess and summarise the existing flood risk at Lime Down D and the location of the BESS Area.

2.2 Tidal Flood Risk

2.2.1 Lime Down D is situated at a minimum of approximately 73m AOD and is significantly above sea level. Therefore, there is **Negligible** risk from tidal flooding.

2.2.2 Flood maps are included as Figure 5 below and **ES Volume 2, Figure 11-5: Lime Down D Fluvial and Surface Water Risk Map [EN010168/EXAM/6.2] (Rev 2)** produced at Deadline 3 of Examination

2.3 Fluvial Flood Risk

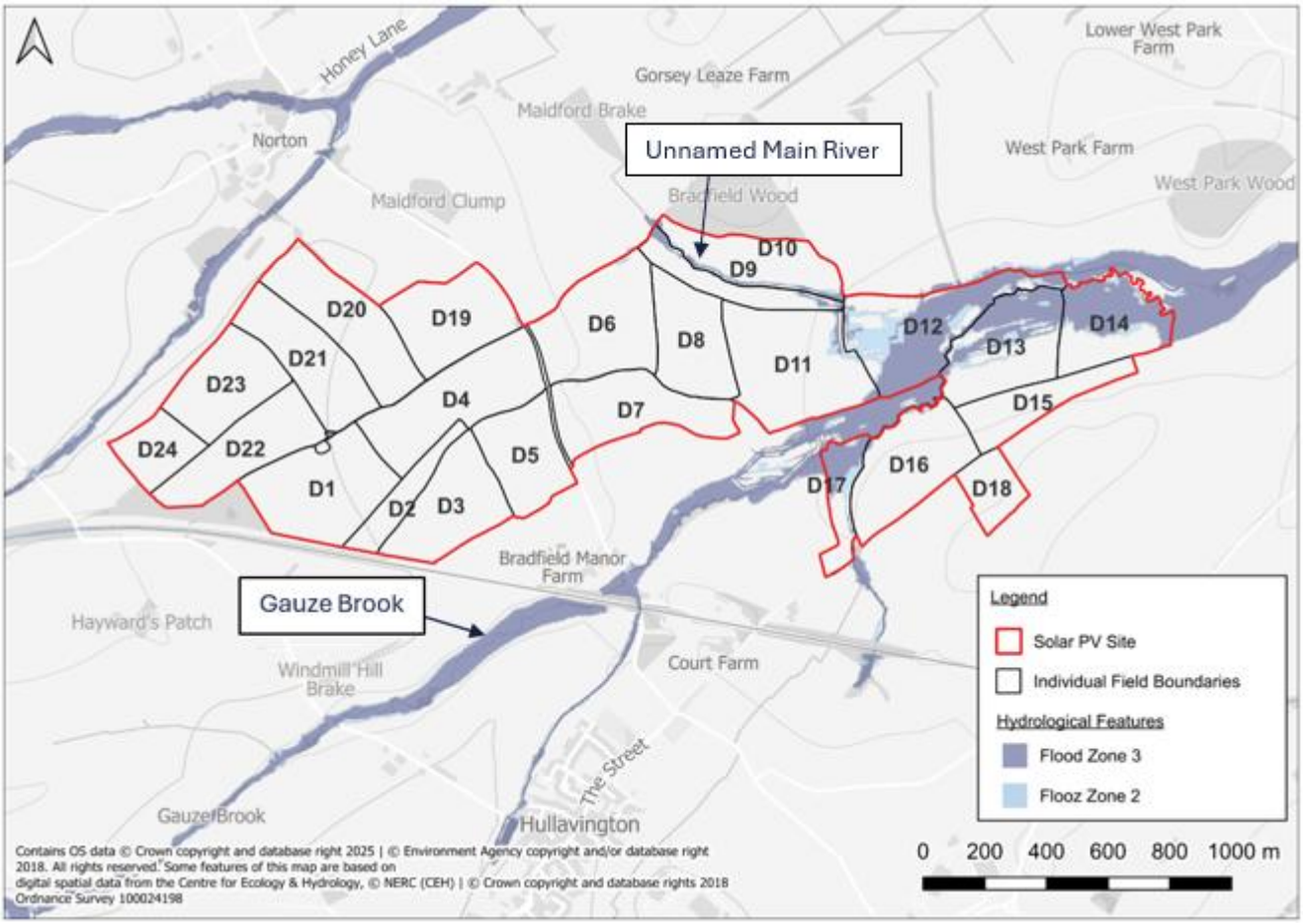


Figure 5: EA's Flood Map for Planning

2.3.1 According to the EA's Flood Map for Planning (updated in March 2025)[iv], Lime Down D is situated largely within Flood Zone 1 (meaning it is an area considered to have <0.1% annual probability of flooding from rivers or the sea). However, Fields D9 – D14, D16 – D17 have significant areas within Flood Zones 2 / 3. Furthermore, the area bisecting Fields D19 – D22 are also located within Flood Zone 3, however this is

considered to be associated with a small watercourse and does not encroach into Lime Down D or into the area allocated for the proposed development.

2.3.2 The BESS Area and substations are located wholly in Flood Zone 1 and are therefore at low probability of fluvial flooding.

2.3.3 Where solar PV panels interact with mapped flood extents, these comprise flood-compatible development only (panel tables on raised support posts and permeable fencing) and do not constitute built development for the purposes of flood risk classification.

2.3.4 Embedded mitigation ensures that any associated electrical equipment, where required within these areas at detailed design stage, would be made resilient to flood risk through appropriate siting, elevation above the design flood level including freeboard, or localised protection measures.

2.3.5 No material loss of functional floodplain storage or unacceptable increase in flood risk would arise from the proposed layout.

Local Watercourses and Flooding Mechanisms

2.3.6 The nearest watercourse is Gauze Brook, which flows in a north-easterly direction along the eastern boundary of Lime Down D. An Unnamed Main River flows along the northern boundary before converging with Gauze Brook near the north-east corner of the Site. Several minor ordinary watercourses and ephemeral drainage channels traverse the central and western parts of the Site.

2.3.7 The mapped Flood Zone extents predominantly correspond with areas below 80m AOD.

2.3.8 Fluvial flooding could occur if Gauze Brook or the Unnamed Main River overtopped their banks during or following extreme rainfall events, or in the event of channel blockage from debris or vegetation accumulation.

2.3.9 The Environment Agency's Spatial Flood Defences with Standardised Attributes dataset identifies a natural high ground feature providing an indicative Standard of Protection up to a 1 in 2 year event. No formal engineered defences with defined crest levels are present adjacent to the Site.

Historical Flooding

2.3.10 The EA's Historical Flood Map records a flood event in May 1932 affecting the eastern parts of Lime Down D, which is consistent with the mapped Flood Zone extents.

2.3.11 No other site-specific records of historic fluvial flooding have been identified in Environment Agency datasets or third-party sources.

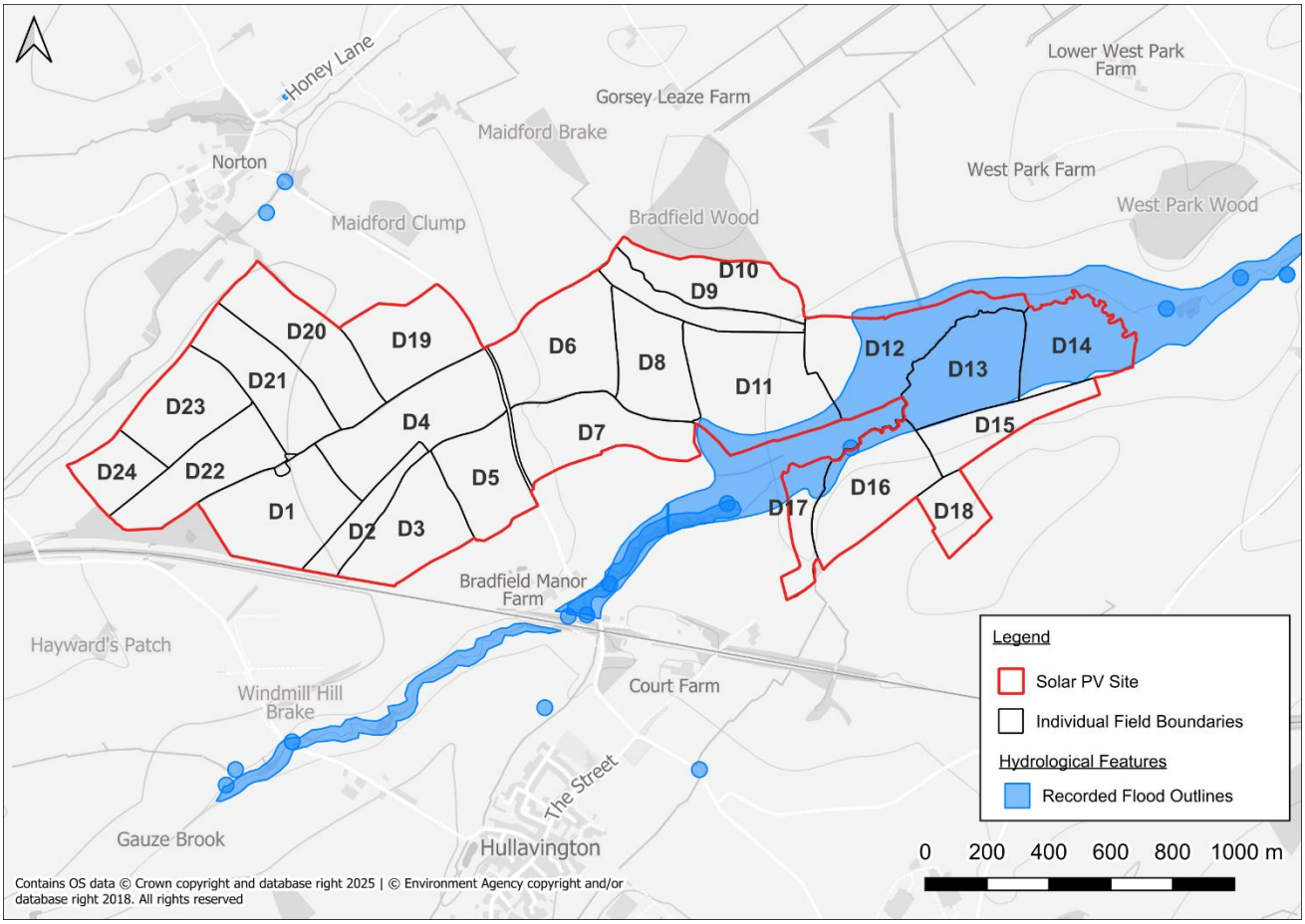


Figure 6: Historic Flood Map

Hydraulic Modelling of Gauze Brook

2.3.12 In the absence of detailed Environment Agency model outputs, site-specific hydraulic modelling was undertaken by Arthian to quantify flood extents, depths, and the influence of climate change allowances across a comprehensive range of design and exceedance events. The modelling focused on Gauze Brook and the mapped Flood Zone 3 area in the lower-lying eastern section of Lime Down D.

2.3.13 To ensure a robust and proportionate assessment in accordance with Environment Agency guidance, the following flood scenarios were simulated:

- Q2 (1 in 2-year flood event);
- Q20 (1 in 20-year flood event);
- Q100 (1 in 100-year flood event);
- Q1000 (1 in 1,000-year flood event);
- Q100 with a 39% climate change uplift;
- Q100 with a 71% climate change uplift;
- Q1000 with a 39% climate change uplift; and
- Q1000 with a 71% climate change uplift.

2.3.14 The hydraulic model incorporated a combination of high-resolution Environment Agency LiDAR topographic data and site-specific topographical channel survey to accurately define cross-sectional geometry. This approach allowed refinement of the model to reflect localised channel variations and bank profiles not captured in national datasets alone. Roughness coefficients were specified using conservative values representative of the channel substrate and adjacent floodplain vegetation. The model was built to generate outputs including predicted flood extents, maximum water levels, and depth grids across the Site.

2.3.15 Results indicate that during the Q100 event including a 39% climate change uplift, predicted flood depths within the areas containing the proposed solar PV arrays are shallow, predominantly below 0.2m, with isolated depressions reaching up to approximately 0.3m. No flooding is predicted within the BESS area or substation compound under any of the modelled scenarios. The modelling demonstrates that flooding is limited to established low-lying margins adjacent to Gauze Brook, with no significant encroachment into operational or critical infrastructure areas. Access and egress via Bradfield Cottages and the internal track network remain viable during all design events, ensuring continuity of site operation and safe movement for maintenance personnel.

2.3.16 Figure 7 illustrates the spatial distribution of modelled flood extents and maximum water depths across the Site under the Q100 plus 39% climate change scenario. The mapping confirms that inundation is restricted to shallow ponding in discrete depressions adjacent to Gauze Brook, with the majority of the Site remaining flood-free. The figure provides visual confirmation of the limited extent and depth of fluvial flooding predicted to occur under design standard and climate change uplift conditions.

2.3.17 This detailed modelling provides a robust, site-specific evidence base demonstrating that the primary fluvial flood hazard is both predictable and of low magnitude. It confirms that the proposed development footprint is largely located outside the principal flood extents and that residual risk can be managed without the requirement for additional engineered mitigation. Outputs from the hydraulic modelling are included as Annex B.

2.3.18 In line with the embedded mitigation strategy presented in ES Volume 3, Appendix 11-1: Flood Risk Assessment and Outline Drainage Strategy – Covering Report [EN010168/APP/6.3], smaller electrical components such as conversion units, where present, will be made resilient to both fluvial and surface water flood risk. Sensitive electrical equipment located within areas of flood interaction, including any areas within the modelled design flood extent or Flood Zone 3b, will preferentially be located outside the design flood extent where practicable. Where this is not practicable, equipment will be raised to a minimum of ~~0.6 m~~600 mm above the design flood level including the appropriate climate change allowance, or protected through suitable localised resistance and resilience measures.

2.3.19 For both fixed and tracker panels, ~~all sensitive electrical equipment mounted on the~~ where Solar PV Panels are located within the 1% AEP plus climate change design flood extent, the lowest leading edge of the panels will be ~~elevated by the supporting legs or frame so that it is~~set no less than ~~0.6 m~~600 mm above the design flood level, including the appropriate climate change allowance. ~~The lowest leading edge of the panel itself does not comprise sensitive electrical equipment and may sit lower depending on~~This will be achieved through the final ~~fixed or tracker~~ panel arrangement, including any required adjustment to panel tilt, tracker operating range or panel micrositing, while remaining within the maximum panel heights secured in Design Principles and Parameters [REP3-083]. Sensitive electrical

equipment mounted on the Solar PV Panels will also be set above the design flood level with appropriate resilience.

2.3.20 The solar panel support posts comprise small-diameter, widely spaced elements and do not form a continuous barrier to flood flows. Individual panel tables are raised above ground level and oriented to allow water to pass freely beneath and between them. On this basis, the panelled areas would not be expected to materially deflect, obstruct or constrict flood flow routes within the meaning of NPS EN-1 Section 5.8.12.

2.3.21 Where perimeter fencing is required within the mapped Flood Zone 2 or Flood Zone 3 extents, it will comprise post and wire mesh fencing specified with the widest mesh aperture available within the selected fencing system, so as to maximise the passage of floodwater and debris and avoid obstruction of flood flows. Fencing in these locations will not be solid, close-boarded or fine-mesh. The detailed fencing specification will be confirmed at the detailed design stage in accordance with this principle.

2.3.22 The potential for debris interaction with the panelled areas has been considered. Any floating debris that could affect the Site would originate from upstream sources. The nature of the upstream catchment and watercourse corridor, together with local constraints such as existing crossings and channel features, limits the likelihood of larger floating debris reaching the panelled areas in material quantities. The panel support structures and tables are robust, flood-compatible elements that are not expected to be materially damaged by short-duration flood inundation. The Site is not expected to become a significant source of downstream debris. The potential for materially adverse debris interaction with the panelled areas is considered to be Low.

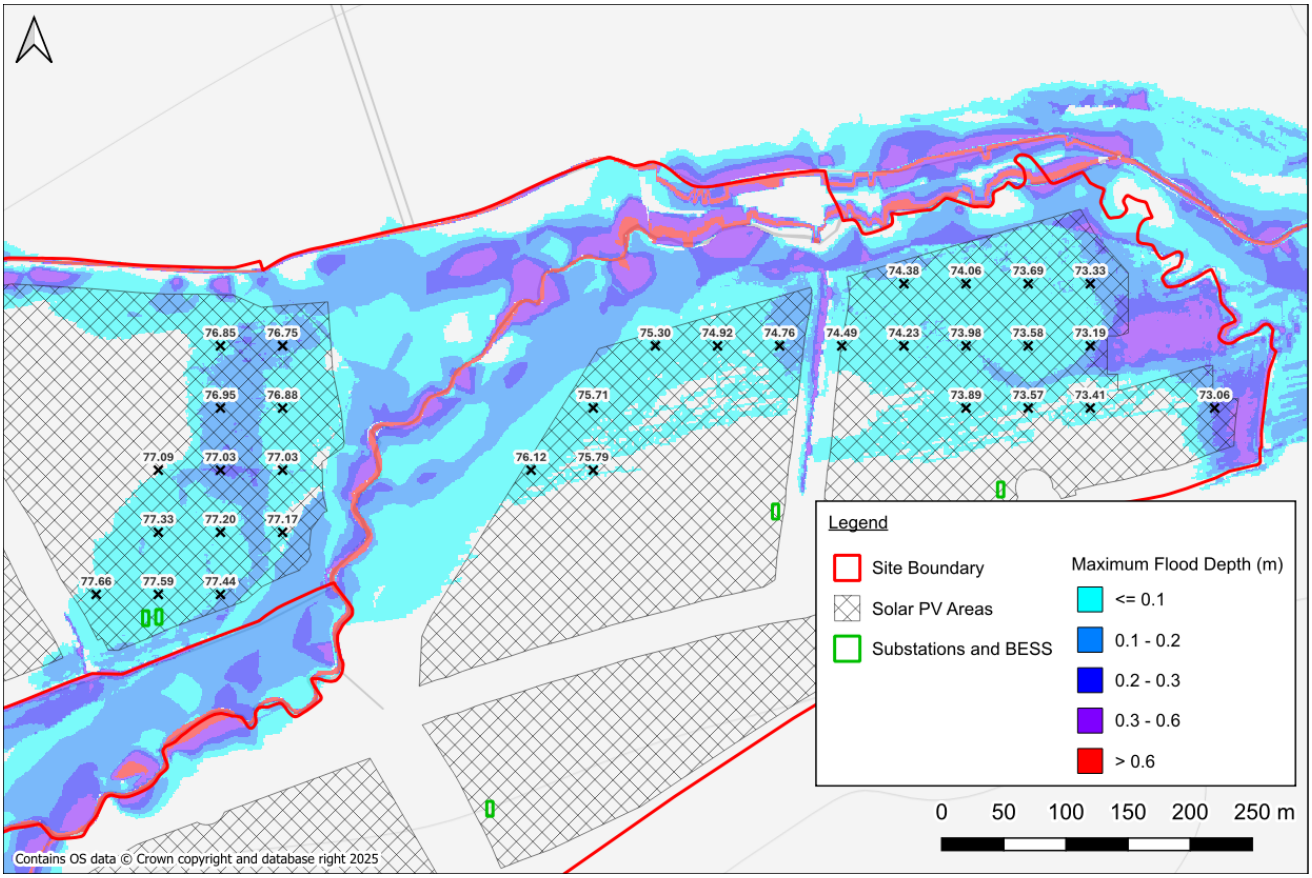


Figure 7: Maximum Flood Depths and Water Levels During the 1 in 100 year +39% CC Flood Event Map

Assessment of Minor Tributaries and Ordinary Watercourses

2.3.23 In the upper reaches of Lime Down D, particularly across the western and central fields where only shallow tributaries and ephemeral channels are present, detailed hydraulic modelling was not considered proportionate due to the limited catchment size, shallow profile, and absence of formalised flow routes. Instead, updated Environment Agency surface water flood mapping (NaFRA2, January 2025) has been used in conjunction with supplementary Manning's open channel calculations to provide a conservative assessment of potential fluvial flooding. The Manning's calculation is included as Annex C.

2.3.24 Surface water mapping shows ponding depths in these areas typically below 0.3m during extreme rainfall, with occasional isolated depressions predicted to reach up to 0.6m. No persistent conveyance channels were identified, and any inundation is expected to be transient and low hazard.

2.3.25 Manning's calculations were applied to estimate flood levels for the Q100 flood event incorporating a 71% climate change allowance. Cross-sectional profiles were derived from EA LiDAR survey data captured in Q1 2020, and conservative roughness coefficients were specified to account for potential variability in channel condition and vegetation. The calculated flood levels suggest that extents are expected to be smaller than those shown by the conservative 0.1% EA surface water mapping. The EA mapping has therefore been used as a precautionary indication of potential exceedance flow routes and extents only, with the 1% AEP plus climate change Manning's assessment adopted as the basis for the design event assessment.

2.3.26 It is noted that the Manning's calculations predate the publication of the NaFRA2 dataset, which shows a reduction in modelled extents. This supports the view that the assessment remains precautionary and appropriately conservative.

Floodplain Storage Compensation

2.3.27 Flood Zone 2 and 3 extents are expected to impact the proposed solar Scheme in Fields D11 – D14 and D17. A flood compensation analysis is detailed below. The potential for floodwaters to interact with the solar panels or their supports is minimal, as the Scheme in these areas is either located outside of the floodplain or raised sufficiently to avoid contact with flood flows. As a result, any associated displacement of floodplain storage is considered negligible, and the implementation of specific flood compensation measures in these locations is not considered necessary or proportionate.

2.3.28 The EA has advised that, for any development located within Flood Zone 3a (i.e. the 1 in 100-year plus climate change flood extent), floodplain storage compensation should be incorporated into the design. Compensation should be provided on a level-for-level and volume-for-volume basis, ensuring direct replacement of any lost storage.

2.3.29 Flood volume loss has been conservatively estimated based on the cross-sectional area of the proposed panel supports (28.65cm^2), multiplied by the number of supports located within Flood Zones 2 and 3 across the Site (assumed as 10 piles per 100 m of panels, equating to approximately 3,371 piles in Lime Down D), and applying a worst-case flood depth of 1.2m. This results in a total displaced volume of just 11.59m^3 across Lime Down D.

2.3.30 To assess the potential increase in flood levels resulting from the loss of floodplain storage, a deliberately conservative approach has been adopted. The total displaced volume has been assumed to be redistributed uniformly across the modelled flood extent within the Site only for the 1% AEP plus 39% climate change event. This approach is intentionally precautionary, as it assumes that all displaced floodwater is retained within the Site boundary, whereas in reality floodwaters are hydraulically connected to a wider floodplain and any displacement would be distributed over a substantially larger area.

2.3.31 The potential increase of flood depths are considered negligible and well within the natural variability of floodplain behaviour, and would result in no perceptible change in flood levels or flow routes. It therefore represents a highly conservative assessment of worst-case impacts.

2.3.32 The on-site flood extent for the design event is approximately 222,530m^2 - presented in Figure 8. When the total displaced volume of 11.59m^3 is distributed across this area, the resulting theoretical increase in flood level is approximately **0.000052mm** (5.2×10^{-5}mm). This increase is several orders of magnitude below the precision at which flood levels can be meaningfully defined, and is well within the inherent uncertainty of hydraulic modelling, topographic data, and natural floodplain variability. The effect is therefore imperceptible and would not result in any measurable change to flood levels, flood extents, flow routes, or flood risk to third parties. Furthermore, the proposed solar panel supports comprise discrete, widely spaced elements with a negligible cumulative footprint relative to the floodplain area. As such, they would not materially affect floodplain conveyance or flow paths.

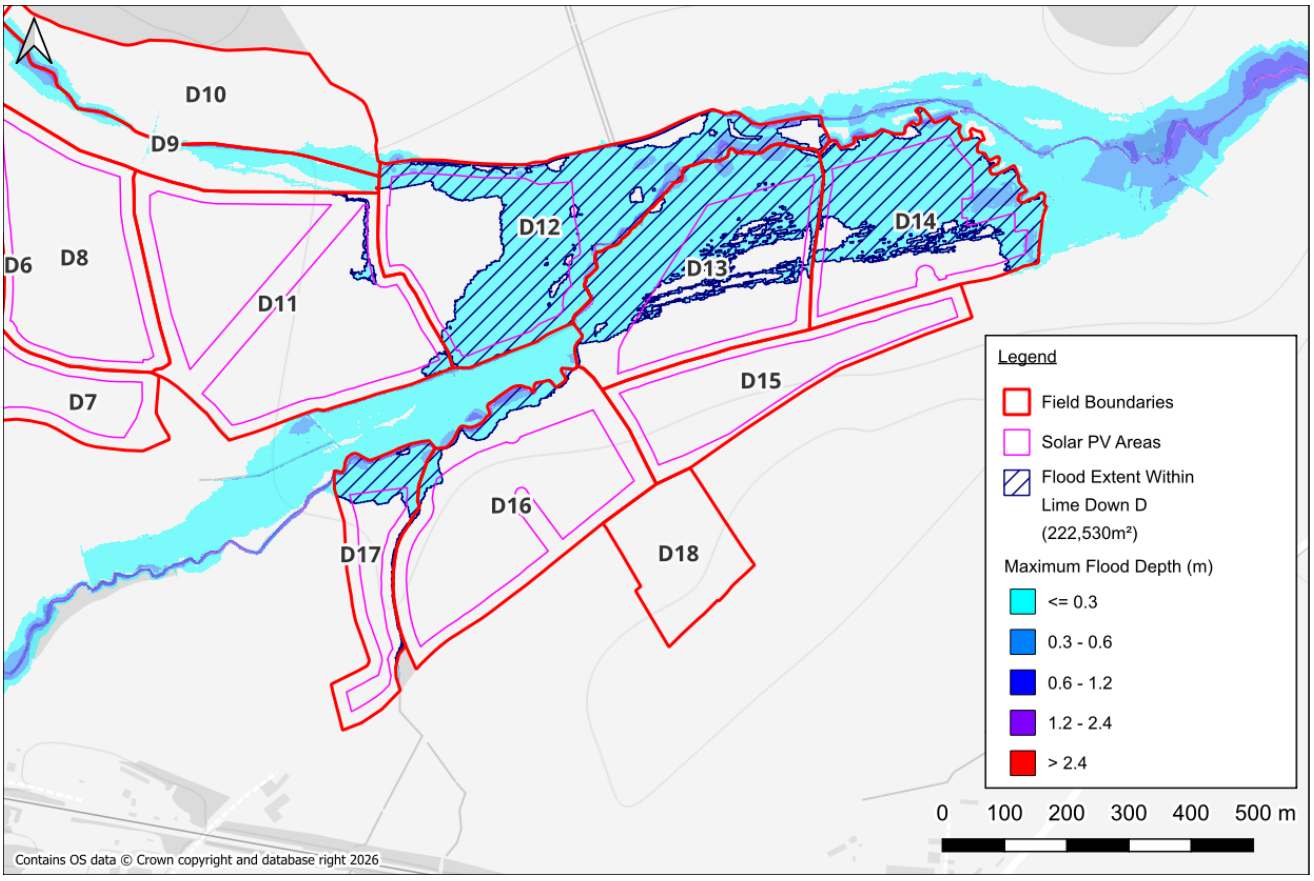


Figure 8: Lime Down D displacement calculation area – 222,530m^2

2.3.33 Given the extremely limited displacement, the conservative assumptions applied, and the imperceptible increase in flood depth, the impact on flood storage capacity is considered de minimis. On this basis, it is concluded that further consideration or provision of compensatory flood storage resulting from panelled areas encroaching into the flood extents is not necessary or proportionate for the proposed development.

Consultation

2.3.34 The EA were consulted in October 2024 for any site specific flood data and modelling; a response was received on the 13/11/24 and is included as Annex D. Product 4 data received for the area has been produced using the EA's National Generalised Model- JFLOW. This modelling is fit for the purpose of the Flood Zones; however, it is not based on a specific channel survey. The basic JFLOW water depths for the 1% Annual Exceedance Probability event and the 0.1% Annual Exceedance Probability Event are also included in Annex D. The JFLOW mapping finds that at Lime Down D, flood depths in the area identified as Flood Zone 3 are below 0.5m in depths during both the 1% Annual Exceedance Probability scenario and the 0.1% Annual Exceedance Probability Scenario, with the remainder of the Site shown to not expect any flood depths.

2.3.35 Consultation has been undertaken throughout the EIA process with the Environment Agency and Wiltshire Council in their role as the LLFA. Comments and recommendations received have been noted and applied throughout this Flood Risk Assessment and Drainage Strategy. This includes the methodology applied to undertaking Floodplain Storage Compensation calculations, the approach to which was agreed by the Environment Agency and Wiltshire Council during consultation meetings. A record of consultation and The Applicant's responses are included in **ES Volume 1, Chapter 11: Hydrology, Flood Risk and Drainage [EN010168/APP/6.1].**

2.3.36 Lime Down D is not located within an Internal Drainage Board (IDB) area.

Summary

2.3.37 Lime down D is located partially within an area where flooding is at a **Low to Moderate** risk, however given the nature of the Scheme and sensitive design layout in this area, Lime Down D is considered to be at **Low** risk of fluvial flooding. The BESS Area, and substation are proposed to be located wholly outside of Flood Zones 2 and 3 and therefore are considered to be at a **Low** risk.

2.4 Surface Water Flood Risk

2.4.1 The EA's National Flood Risk Assessment Mapping (NaFRA), known as the 'Long Term Flood Risk Map' (Surface Water)[v], was updated in January 2025. The NaFRA mapping provides an updated view of surface water flooding across the Site, however it should be noted that at the time of writing, the NaFRA mapping only delivers climate change insight up to the year 2060.

2.4.2 According to the EA's Long Term Flood Risk Map (Surface Water) the majority of Lime Down D is at Very Low risk of surface water flooding, meaning it has a <0.1% annual probability of flooding. However, there are areas of Low to High risk (0.1 - >3.3% annual chance of flooding), particularly at Fields D11 – D14, which is considered to be associated with the presence of Gauze Brook. Other areas of risk across Lime

Down D are associated with isolated topographic depressions within the Fields.

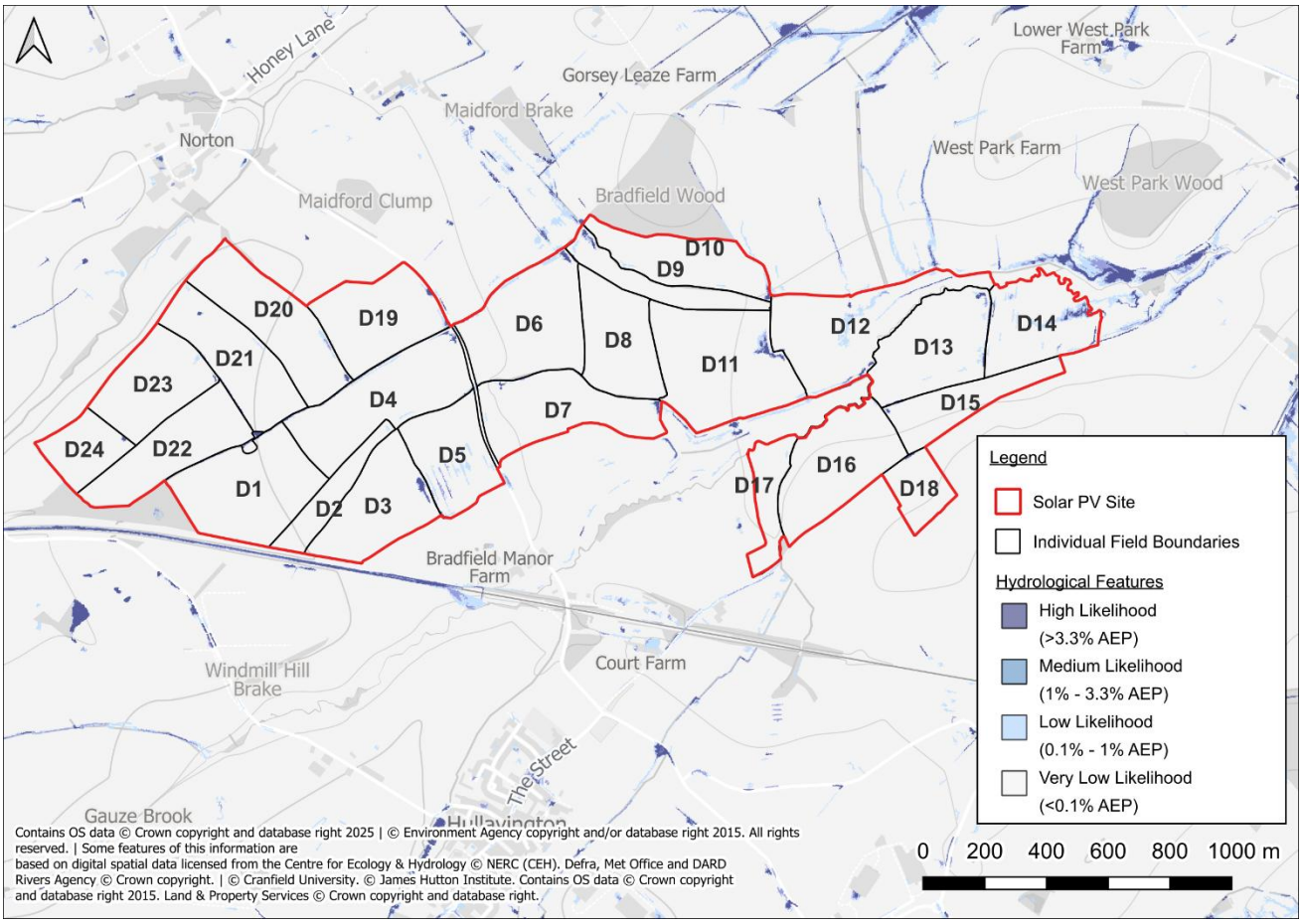


Figure 9: EA's Long-Term Flood Risk Map (Flood Risk from Surface Water)

2.4.3 With reference to the depth mapping provided by the NaFRA data, flood depths are anticipated to be low, with depths remaining largely below 300mm which is considered passable to people and vehicles. Some depths between 300mm and 600m are anticipated in Fields D5 and D12 – D14, however these are small and largely isolated areas and can be associated with the existing land drains and isolated topographic depressions.

2.4.4 Any potential surface water flooding arising at or near to Lime Down D would be directed eastwards, away from Lime Down D, following the local topography and the watercourses.

2.4.5 It can therefore be concluded that Lime Down D is at **Low** risk of surface water flooding. The solar panels and other electrical infrastructure (which will be sat on a concrete foundation / pad) will be mounted on frames and raised above ground level allowing flood water to flow freely underneath thereby reducing the potential to be impacted in the event of surface water flooding.

2.4.6 The impact of the Scheme on surface water risk is covered in Section 3.0 below to ensure that surface water risk is not exacerbated through appropriate Sustainable Drainage Systems (SuDS) measures.

2.5 Groundwater Flood Risk

2.5.1 Details of geology can be found in Section 1.0 above.

2.5.2 The 2015 SFRA interactive mapping[vi] details that the Kellaways Clay member has no risk of groundwater flooding with the remainder of Lime Down D (Forest Marble Formation and Cornbrash Formation) is classified as having groundwater levels of between 0.025m and 0.5m below ground level (bgl) or 0.5m and 5m bgl.

2.5.3 Groundwater levels correspond with river levels. As such groundwater flooding could occur during periods of prolonged high water levels at Gauze Brook or the Unnamed Main River.

2.5.4 The BESS Area and substations will be predominantly hardstanding surfaces, limiting the vertical migration of groundwater. No buildings and no basement levels are identified on plans which may otherwise be at increased risk from groundwater seepage.

2.5.5 It can therefore be concluded that the risk of groundwater flooding is **Low** and no specific mitigation measures are required.

2.6 Sewer Flooding

2.6.1 No site-specific incidents of sewer flooding have been identified from relevant third-party reports.

2.6.2 On the basis of Lime Down D's rural setting the presence of sewerage infrastructure is unlikely. Utility records have been checked and there are no public sewers identified within Lime Down D.

2.6.3 It can therefore be concluded that the risk of sewer flooding is **Negligible**; therefore, no specific mitigation measures are required.

2.7 Reservoir and Canal Flooding

2.7.1 There are no canals within the vicinity of Lime Down D, therefore there is no associated risk.

2.7.2 The EA's 'Flood Risk from Reservoirs' map shows that Lime Down D is not at risk of flooding from reservoirs.

2.7.3 It can therefore be concluded that there is **Negligible** risk of flooding from artificial sources; therefore, no specific mitigation measures are required.

2.8 Residual Flood Risks

2.8.1 A residual risk is an exceedance event, such as the greater than 1 in 1000 year (<0.1% AEP) flood event that would overtop Gauze Brook or the and potentially impact Lime Down D. As the probability of a 1 in 1000 year flood event occurring is <0.1% in any given year, the probability is low and, therefore, no further mitigation beyond what is proposed is required.

2.8.2 In the event of the defences failing or an exceedance event occurring, the residual risk to people working within the Site can be managed through the implementation of an appropriate Site management plan,

which recognises the residual risks and details what action is to be taken by staff in the event of a flood to put occupants in a place of safety.

2.9 Summary of Flood Risk and Mitigation

2.9.1 It can be concluded that the risk to Lime Down D from all sources of flooding is **Negligible to Low**, however it would be prudent to include the below mitigation measures.

2.10 Embedded Mitigation

2.10.1 Embedded Mitigation is detailed in **ES Volume 3, Appendix 11-1: Flood Risk Assessment and Outline Drainage Strategy – Covering Report [EN010168/APP/6.3].**

2.10.2 During the construction phase, temporary works and construction activities will be managed to maintain existing floodplain storage, floodplain capacity and overland flood flow routes. Temporary compounds, plant and material storage will be located outside areas identified as potentially susceptible to flooding where reasonably practicable, and construction activities will be undertaken in accordance with the **Outline CEMP [REP2-019]** to ensure flood risk is not increased elsewhere.

BESS Area/substation:

2.10.3 All equipment will be raised by a minimum of 150mm, or as high as practically possible, above surrounding ground levels

2.10.4 In the unlikely event of a chemical leak and/or fire, an automatic actuating valve would be triggered to lock ensuring that no contaminants are discharged to watercourses.

2.10.5 The BESS infrastructure can be adequately waterproofed to withstand the effect of flooding. Batteries have been located within areas outside of the 1 in 1000 year flood event extent.

Flood Warnings and Evacuation

2.10.6 Flood Warnings/Flood Alerts do cover this area therefore Site management should sign up to the free EA's Floodline service to receive flood alerts.

2.10.7 Access to Lime Down D will be required relatively infrequently, typically by technicians for maintenance and inspection works or Site management. Such works can be scheduled as to avoid Lime Down D during times of flood.

2.11 Impact on Off-Site Flood Risk

2.11.1 Floodplain Storage Compensation has been considered in Section 2.4 above and surface water management has been considered in Section 3.0 below.

3. Outline Drainage Strategy ~~– BESS Area~~

3.1 Introduction

3.1.1 ~~The~~ Lime Down D forms part of the wider Scheme ~~is for a ground mounted solar photo-voltaic plant~~ and includes Solar PV Panelled Areas, one 400kV Substation with associated ~~electrical infrastructure and~~ access~~, as well as a~~ track, one 132kV Substation with associated access track, a Battery Energy Storage System (BESS) Area~~.~~ and 28 Conversion Units / 33kV Sub-distribution Switch Rooms. This section provides the Outline Drainage Strategy ~~will assess the BESS Area only. The~~ for Lime Down D. It identifies the areas requiring formal drainage consideration, sets out the basis of the runoff and attenuation calculations, and demonstrates that a feasible drainage solution can be accommodated within the assessed design envelope. Excluding the BESS Area, the 400kV and 132kV Substations, their associated access tracks where conservatively assessed as hardstanding surfaces, and the Conversion Unit / 33kV Sub-distribution Switch Room equipment pads, Lime Down D will remain largely permeable following development. Solar PV infrastructure is not treated as contributing to the overall extent of positively drained hardstanding surfaces for the purposes of this Outline Drainage Strategy.

3.1.2 For the purpose of this assessment, this Outline Drainage Strategy is split as follows:

- A description of surface water drainage from the Solar PV Panelled Areas, excluding the BESS Area, the 400kV and 132kV Substation, the 400kV and the 132kV Substation access tracks and the Conversion Units / 33kV Sub-distribution Switch Rooms; and
- An outline drainage strategy for the positively drained hardstanding surfaces, comprising the BESS Area, the 400kV and 132kV Substations, their associated access tracks (which have been conservatively assessed as hardstanding surfaces), and the Conversion Unit / 33kV Sub-distribution Switch Rooms.

3.1.3 The detailed drainage layout, final SuDS components, conveyance routes, levels, outfalls, flow controls, treatment train, isolation arrangements and maintenance regime will be confirmed at detailed design and secured through the relevant DCO drainage requirement.

3.2 Solar PV Panelled Areas

3.2.1 Solar PV panelled areas are not treated as formal impermeable drainage catchments within this Outline Drainage Strategy. The panels are elevated above ground level, drain to the existing ground, are not sealed into a drainage network, and do not create a connected impermeable surface.

3.2.2 This approach is supported by national policy and the submitted evidence base. **NPS EN-3 paragraph 2.10.84** recognises that solar PV panels drain to the existing ground and that the drainage impact ~~of the Scheme on surface water risk is covered~~will not, in general, be significant. This position is also addressed in **ES Volume 1, Chapter 11: Hydrology, Flood Risk and Drainage [REP3-015], ES Volume 3, Appendix 11-1: Flood Risk Assessment and Outline Drainage Strategy – Covering Report [~~EN010168/~~REP3-039]** and the **Applicant's Response to the Lead Local Flood Authority on Hydraulic Modelling Requirements [REP2-045].**

3.2.3 The Applicant's review of the relevant research and guidance confirms that, where vegetated ground

cover is established and maintained, soil compaction is avoided or remediated, and connected preferential flow routes are not created, solar PV panels are not predicted to increase surface water runoff rates or volumes in a manner that requires formal attenuation.

3.2.4 The principal effect of the panels is local redistribution of rainfall within the same field, including potential concentration at panel drip-lines. This does not generate additional rainfall volume. Whether redistributed rainfall becomes runoff is governed by the condition of the receiving ground, including vegetation cover, soil structure, compaction, surface roughness, slope and hydrological connectivity.

3.2.5 Those controlling factors are addressed through the embedded mitigation secured for the Scheme. Construction phase controls are secured through **the Outline Construction Environmental Management Plan [REP3-092]** and **Outline Soil Resources Management Plan [REP3-098]**, including controls on construction trafficking, soil handling, temporary drainage, decompaction and reinstatement. Operational ground cover and land management controls are secured through the **Outline Landscape and Ecological Management Plan [REP3-100]** and **Outline Operational Environmental Management Plan [REP3-094]**, including the establishment and maintenance of vegetated ground cover beneath and between the arrays.

3.2.6 On this basis, no formal attenuation storage is proposed for the solar PV panelled areas. Additional built SuDS across the panelled fields would not be proportionate, as the policy and evidence base indicate that solar PV panels do not materially increase surface water runoff where the relevant ground condition, vegetation and flow connectivity controls are secured. The Outline Drainage Strategy for these areas is therefore to maintain diffuse drainage to the existing ground, preserve existing field-scale flow behaviour, protect existing drainage features, and manage soil and vegetation condition through the secured construction and operational controls. Internal access tracks within the Solar PV Panelled Areas will be formed using permeable materials and, where practicable, maintained at existing ground levels. These tracks are not treated as positively drained hardstanding surfaces requiring formal attenuation, except where specifically and conservatively assessed within this Outline Drainage Strategy, such as the 400kV and 132kV Substation access tracks.

3.3 Drainage Strategy – Proposed Hardstanding Surfaces

3.3.1 Lime Down D currently comprises agricultural land. For the purposes of the runoff calculations, the undeveloped areas are treated as greenfield and permeable, with existing field drainage and local drainage features forming part of the baseline drainage regime. Table 1 identifies the assessed hardstanding surfaces within Lime Down D. These areas have been included within this Outline Drainage Strategy because they would either be positively drained or have been conservatively assessed as requiring positive drainage.

Table 1: Proposed Hardstanding Surfaces

Hardstanding Infrastructure	Hardstanding Area (m^2)
BESS Area	37,021
400kV Substation	41,968
132kV Substation	9,000
Access Tracks	10,266
Conversion Units / 33kV Sub-Distribution Switch Rooms	2,100 (28 × 75 m^2)

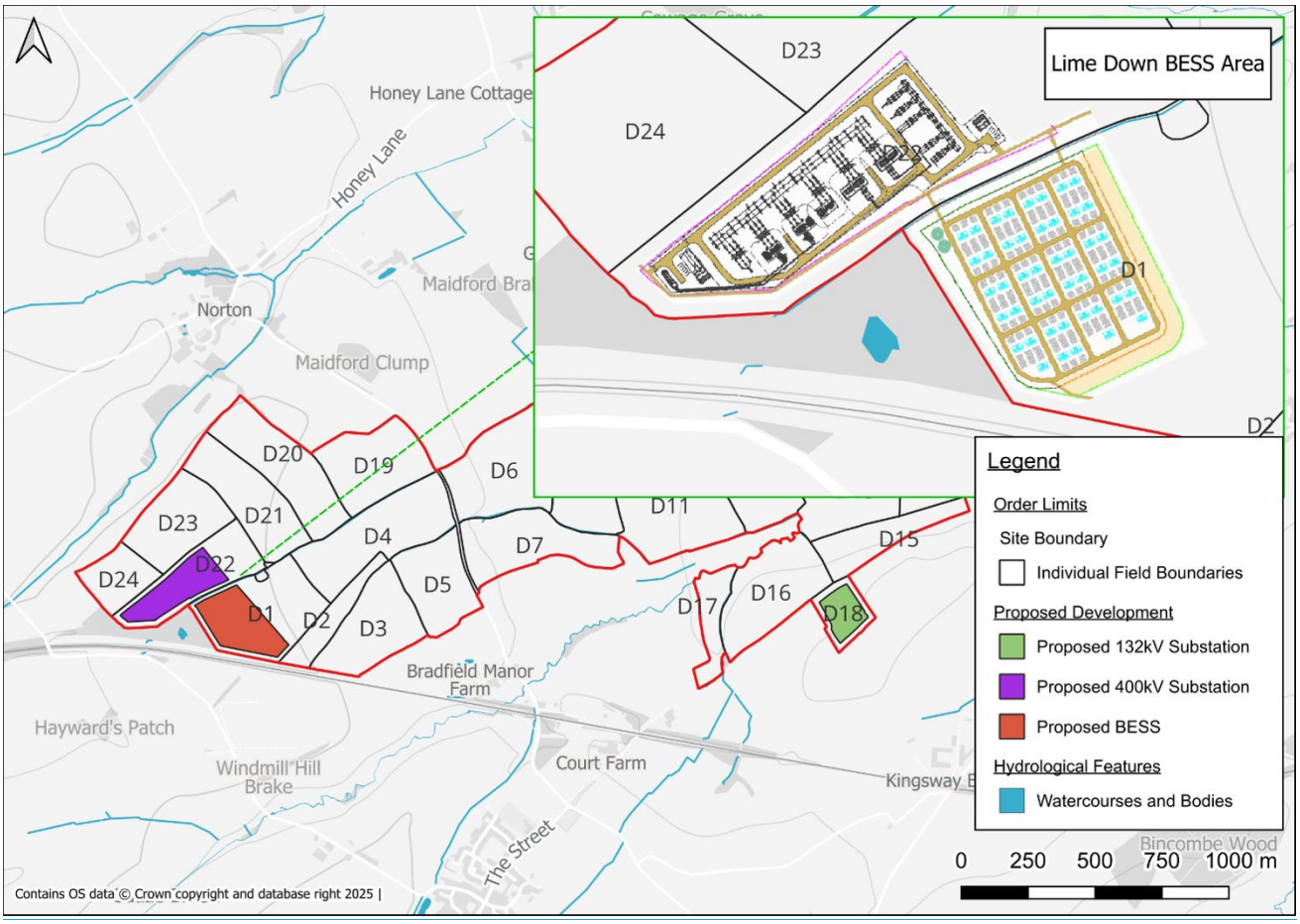


Figure 10: Lime Down D BESS Area, Substations and Hydrological Features

3.3.2 Figure 10 identifies the principal positively drained infrastructure at Lime Down D, comprising the BESS Area, the 400kV Substation and the 132kV Substation, in relation to the Order Limits, field boundaries and nearby hydrological features. The figure is provided to support the Outline Drainage Strategy by showing the location of the principal BESS and substation infrastructure assessed in Table 1. It does not show a fixed detailed drainage layout, final SuDS components, conveyance routes, levels, outfalls or flow controls. These matters will be confirmed at detailed design and secured through the relevant DCO drainage requirement.

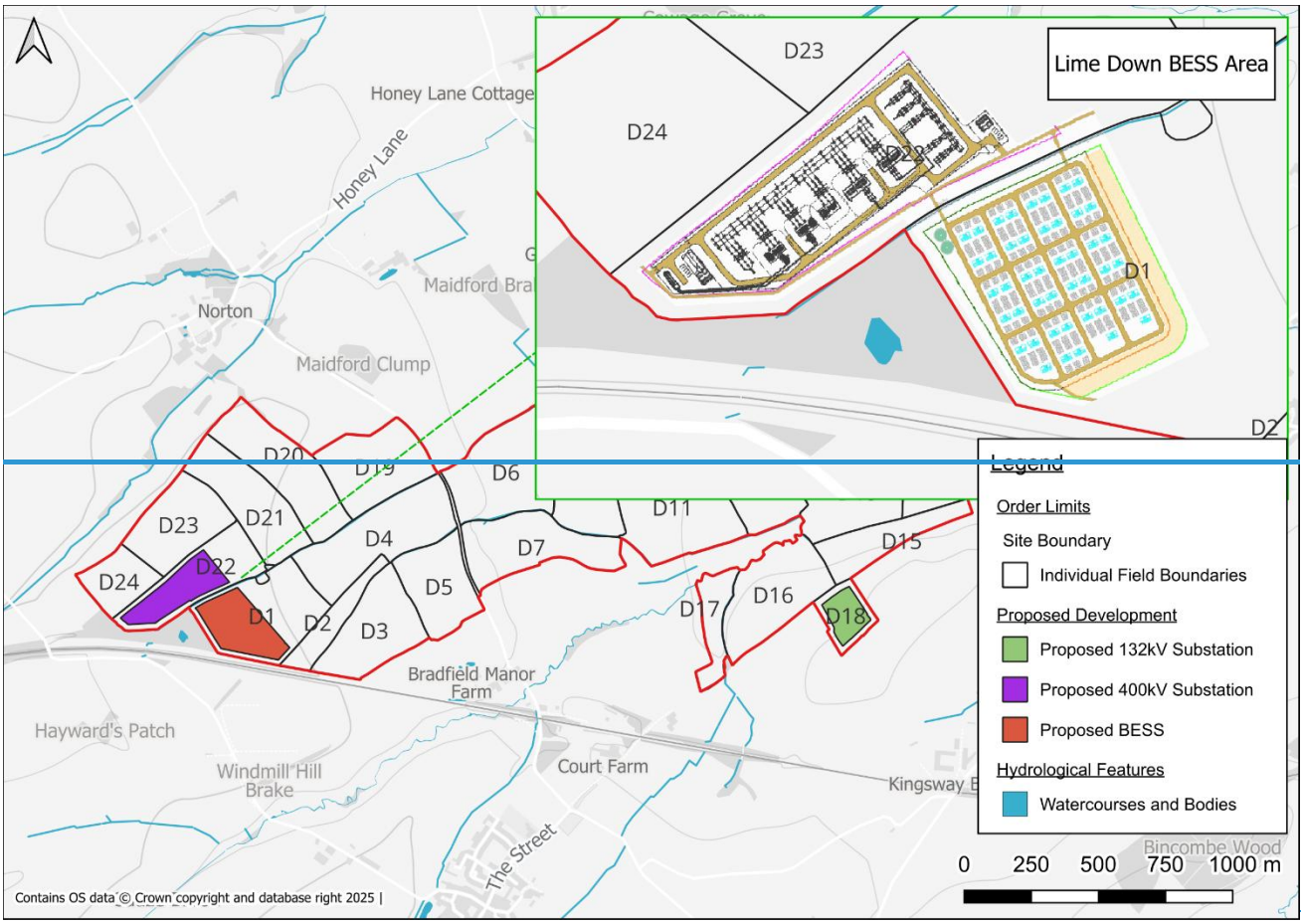
3.3.3 The assessed hardstanding surfaces have been identified using the indicative infrastructure areas currently proposed for Lime Down D, or, where the final equipment layout is not fixed, the relevant maximum design parameters set out in **ES Volume 1, Chapter 3: The Scheme [APP~~/6.3~~] ~~to ensure that surface water risk is not exacerbated through appropriate~~-055].** Where the Works Plan envelope or indicative infrastructure area is smaller than the relevant Chapter 3 maximum parameter, the assessed area has been limited to the area that can feasibly be accommodated within Lime Down D. This provides a conservative but realistic basis for demonstrating that the required drainage infrastructure can be delivered within the assessed design envelope.

3.3.4 The assessed hardstanding surfaces have the potential to increase surface water runoff rates and volumes if unmanaged. Surface water runoff from these areas will therefore be controlled so that the

Scheme does not result in a material increase in flood risk on-site or elsewhere.

~~3.1.1~~3.3.5 Wiltshire Council Sustainable Drainage Systems (SuDS) ~~measures.~~Guidance states the following:

~~3.1.2 Lime Down D currently comprises undeveloped land which is not formally drained and is therefore considered to be 100% permeable.~~



~~Figure 10: Proposed BESS location and watercourses~~

~~The increase in hardstanding area will result in an increase in~~ *"With regards the control of* surface water ~~runoff rates and volumes. In order to ensure the Scheme will not increase flood risk elsewhere, surface water discharge~~ *discharges* from *new development, Wiltshire Council requires post development discharges from greenfield sites to provide 30% betterment over pre-development discharges for all storm events between* the ~~BESS and associated substations~~*1 in 1 year and 1 in 100 year return period events."*

~~3.1.3~~3.3.6 The purpose of this Outline Drainage Strategy is to demonstrate that a feasible drainage solution can be accommodated within Lime Down D ~~will be~~ based on the assessed hardstanding surfaces, greenfield runoff rates, controlled discharge rates, indicative attenuation volumes, SuDS options, containment principles and maintenance arrangements. The detailed drainage design, including the final layout, levels, outfall arrangement, isolation measures and maintenance access, will be submitted and

approved in accordance with the relevant DCO drainage requirement before the relevant part of the authorised development commences.

~~3.2~~3.4 Drainage Hierarchy

3.4.1 The ~~recommended~~proposed surface water drainage strategy has been prepared in accordance with the drainage hierarchy ~~(~~set out in the National Standards for Sustainable Drainage Systems (SuDS) and in line with Paragraph ~~5.8.15 of the NPS EN-1 and Paragraph 056 (Ref ID: 7-056-20220825) of the PPG:~~080 of the National Planning Practice Guidance (NPPG): Flood Risk and Coastal Change~~) is to utilise soakaway systems or~~. The hierarchy prioritises reuse and infiltration where feasible, followed by discharge to an above-ground surface water body, discharge to a surface water sewer or other surface water drainage system, and finally discharge to a combined sewer.

3.4.2 The following drainage hierarchy review considers normal operation. In the event of a potential pollution incident, including a firewater scenario where relevant, the drainage system would be isolated and managed in accordance with the relevant containment strategy. Firewater management is discussed further below.

3.4.3 ~~discharging~~The hierarchy establishes the following order of preference for runoff destinations:

- Priority 1: Collect surface water for reuse within the development (e.g. irrigation or non-potable supply).
- Priority 2: Infiltrate runoff to the ground, where ground conditions and groundwater levels permit.
- Priority 3: Discharge runoff to an ~~appropriate~~above-ground surface water body such as a watercourse~~. If neither option is viable, discharge~~, pond or wetland.
- Priority 4: Discharge runoff to a ~~public~~ surface water sewer~~ should be considered, followed by a combined sewer. As a last resort, discharge to a~~, highway drain or other drainage system~~ may be considered~~.
- ~~The following options assume normal operation; during a potential pollution event (such as a fire), the system will be isolated by an automatic actuating valve and managed~~Priority 5: Discharge runoff to a combined sewer.

3.4.4 Where higher levels of the hierarchy cannot be achieved, proportionate justification must be provided to demonstrate compliance with national policy while ensuring effective flood risk management and long-term sustainability.

~~3.2.1~~1.1.1 **Priority 1:** ~~. Firewater management is discussed further below.~~

Surface Water ~~Discharge to Soakaway~~**Collected for non-Potable Use**

3.4.5 ~~The first consideration for the disposal of surface water~~ Rainwater harvesting has been considered for the proposed development. However, Lime Down D does not include a sustained non-potable demand capable of receiving and using runoff from the positively drained hardstanding surfaces during design rainfall events. Reuse therefore cannot provide the sole means of disposal, and a secondary discharge route is required.

Priority 2: Surface Water Infiltrated to Ground

~~3.2.2~~3.4.6 Where surface water collected for non-potable use (Priority 1) cannot be the sole method of disposal, the next consideration is infiltration (soakaways and permeable surfaces).

~~3.2.3~~3.4.7 As described above, ~~Lime Down D~~the Site is largely not underlain by any superficial deposits~~, and this includes the area where BESS is proposed.~~ including the areas of the proposed hardstanding surfaces. However, the east of Lime Down D is underlain by Alluvium, comprising clay, silt, sand and gravel. The underlying bedrock varies across Lime Down D and consists of Forest Marble Formation (mudstone), Kellaways Clay Member (mudstone) and Cornbrash Formation (limestone). Soilscapes mapping describes the areas of proposed hardstanding surfaces on the Site as having "*Lime-rich loamy and clayey soils with impeded drainage*" or "*Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils with impeded drainage*".

~~3.2.4 Where underlying ground conditions are permeable, groundwater levels will likely be in conductivity with local watercourses given their close proximity. It can, therefore, be concluded that soakaways may not be suitable for the discharge of surface water runoff.~~

3.4.8 In line with the National Standards for SuDS, infiltration should only be used where ground conditions are suitable, groundwater is protected, and land stability is not compromised. The available ground condition information indicates that infiltration potential is likely to be limited, with impeded drainage soils and mudstone bedrock reducing the likelihood of reliable long-term soakaway performance.

~~3.2.5~~3.4.9 Infiltration testing was undertaken at Lime Down D (Field D1) in January 2025, with full test results provided in Annex E. Three trial pits were excavated across the site. The results showed slow infiltration rates ~~which resulted in~~, with no observable infiltration after three hours. ~~It can be concluded that soakaway drainage / infiltration systems will not be a feasible option for surface water disposal.~~

~~Surface Water Discharge to Watercourse~~

~~3.2.6 Where soakaways are not suitable, a connection to a watercourse is the next consideration.~~

~~3.2.7 The nearest watercourse to the BESS Area is the tributary off the Unnamed Main River as shown in Figure 8. Given that BESS Areas is raised above the watercourse, discharge to the watercourse at a limited discharge rate of 8.64l/s (see Section 3.3 for further details on calculations of the rate), appears to be feasible via gravity.~~

3.4.10 Infiltration is therefore not considered suitable as the primary method of surface water disposal for the BESS Area or the Substation drainage catchments. This avoids relying on soakaways where ground conditions are unlikely to provide adequate infiltration capacity, particularly during prolonged or high intensity rainfall.

3.4.11 This does not preclude the use of permeable surfaces, shallow filter drains or local French drain arrangements as source-control features for small, discrete areas of supporting infrastructure, where appropriate. Such features would manage small volumes locally and would not be relied upon as the primary outfall for the BESS Area or Substation drainage catchments.

3.4.12 Surface water from the BESS Area, the Substations and other positively drained hardstanding surfaces will therefore be managed through a controlled drainage system, with attenuation and restricted discharge to an appropriate receiving drainage feature or watercourse.

Priority 3: Discharge to an Above Ground Surface Water Body

3.4.13 Where surface water collected for non-potable use (Priority 1) cannot be the sole method of disposal, and infiltration to ground (Priority 2) has been demonstrated to be unsuitable, discharge to an above ground waterbody should be the next consideration.

3.4.14 Lime Down D has various land drains and two Main Rivers that cross the Site. Gauze Brook is located within the lower-lying topography of Lime Down D and is considered to provide a feasible receiving watercourse for controlled surface water discharge by gravity, subject to detailed design of the outfall arrangement and any necessary approvals. Discharge to this watercourse at controlled rates is considered feasible, subject to detailed design of the outfall arrangement and any necessary approvals.

Priority 4: Discharged to a Surface Water ~~Discharge to~~ Sewer, or Another Piped Surface Water Drainage System

~~3.2.8~~3.4.15 As described above, ~~connections~~discharge to the ~~unnamed tributary are~~Gauze Brook appears feasible ~~and~~; therefore, a connection to ~~the~~a public surface water sewer is not ~~the preferred option.~~proposed. Should ~~it be determined~~detailed design demonstrate that direct discharge to the ~~above~~ watercourse is not ~~preferable, a discharge to the public~~ feasible, alternative lower-priority destinations would be reviewed in accordance with the drainage ~~system could be considered.~~ hierarchy and subject to the relevant approvals.

~~Surface Water~~ **Priority 5: Discharge** ~~for the BESS Area~~**to a Combined Sewer**

3.4.16 ~~The existing greenfield runoff rates generated for~~ As described above, discharge to the Gauze Brook appears feasible; therefore, discharge to a combined sewer is not proposed.

3.5 Surface Water Discharge

3.5.1 In accordance with the 2025 National Standards for SuDS in England Guidance, runoff destinations have been assessed following the required hierarchy.

3.5.2 As infiltration is not considered suitable as the primary discharge route for the BESS Area ~~has been estimated using the Revitalised Flood Hydrograph Model (ReFH2) method, provided in Table 1 below.~~ or the Substation drainage catchments, runoff from the positively drained hardstanding surfaces will be attenuated on Site and discharged at controlled rates to the Gauze Brook in line with greenfield runoff principles and the LLFA requirement for 30% betterment.

~~3.2.9~~3.5.3 Greenfield runoff ~~calculations~~rates have been calculated for each assessed hardstanding surfaces using the FEH Statistical (2025) method and are ~~based off the 63,715m^2~~ summarised in Table 2. The proposed ~~hardstanding area.~~ discharge rates and associated attenuation volumes are indicative and have been prepared using the indicative infrastructure areas currently proposed, or the maximum relevant design parameters set out in **ES Volume 1, Chapter 3: The Scheme [APP-055]** where the final

equipment layout is not fixed. Greenfield calculation input parameters and results are provided in Annex F.

3.5.4 This approach demonstrates that a feasible drainage solution can be accommodated within Lime Down D and that peak runoff from positively drained hardstanding surfaces can be controlled so that the Scheme does not result in a material increase in flood risk on-site or elsewhere. The attenuation volumes are indicative and are provided to demonstrate the feasibility of the Outline Drainage Strategy. The final drainage design may rationalise the number, location and form of SuDS components, provided the detailed design remains within the assessed design envelope and achieves the drainage principles secured through the relevant DCO drainage requirement.

Table ~~1.~~2: Greenfield Runoff Rates

~~Flood Event (Years)~~Infrastructure	1 in 2 year (l/s)	1 in 30 year (l/s)	1 in 100 year (l/s)	1 in 2 year +30% betterment (l/s)	~~Runoff~~Proposed Discharge Rate (l/s~~/Ha~~)	Attenuation (m^3)
10.3		21.6	26.9	~~1 in~~ 7.2	~~12.34~~7.2	4,507.0
~~1 in 10~~400kV Substation	~~20.65~~11.4	24.0	29.9	8.0	8.0	5,112.3
~~1 in 30~~132kV Substation	~~26.64~~2.5	5.3	6.6	3.7	3.7	970.6
~~1 in 100~~Access Tracks	~~34.68~~2.9	6.0	7.4	2.0	2.0	1,238.4
Conversion Units / 33kV Sub-distribution Switch Rooms	0.6	1~~ in 1000~~.2	~~58.39~~1.5	0.4	0.4	3.1 per unit; 86.8 cumulative

~~3.2.10~~ Sustainable Drainage Systems~~A flow rate of 8.64/s is proposed for the BESS Area in Lime Down D, which provides a 30% betterment to the existing 1 in 2 year rate (rate restriction to 70% as per advice from the Wiltshire Council LLFA).~~

~~3.3 Attenuation Storage~~

~~3.3.1 In order to achieve a discharge rate of 8.64/s, attenuation storage will be required. Storage estimates have been provided using Causeway Flow and are included in Annex F. Table 2 below provides the input parameters for the calculations and the estimated storage volumes required for the proposed BESS Area.~~

~~Table 2: Attenuation Storage Volume Parameters~~

3.6

3.6.1 The SuDS appraisal approach outlined in the SuDS Manual (C753) has been applied to determine the most suitable methods for achieving sustainable surface water attenuation and conveyance to support the proposed development. The SuDS options summarised in Table 3 below have been considered:

Table 3: SuDS Options for Proposed Development

~~**BESS Area**~~

SuDS Measure	Amenity Benefit	Biodiversity Benefit	Suitability for Proposed ~~Discharge Rate~~ Development	~~8.64 l/s~~Reasoning
Soakaways	Although soakaways are typically below ground, they can contribute to amenity by allowing the land above to be used for landscaping or recreation. When integrated with visible SuDS features or planting, they can enhance the visual quality of a site and support multifunctional, attractive spaces.	Soakaways support biodiversity indirectly by promoting groundwater recharge and maintaining natural hydrological conditions. When combined with vegetated SuDS components, they can enhance habitat connectivity and contribute to ecological networks across a site.	X	As described above, the use of soakaways is not considered to be feasible.
Swales, Detention Basins and Ponds	Swales, detention basins and ponds contribute positively to site amenity by providing visually attractive, multifunctional spaces that enhance the quality and character of a development. These features can be	Swales, detention basins and ponds deliver significant biodiversity value through the provision of varied and connected habitats. Swales function as linear green corridors, enabling wildlife movement and	✓	Sufficient space is available on site to utilise a pond, basin or swale as an above ground attenuation feature. In order to facilitate gravity drainage, attenuation features should be located towards the topographic lower levels.

	integrated within the landscape as green corridors, linking open spaces and promoting interaction between people and water. When appropriately designed, they offer opportunities for recreation, education and visual interest, creating a more appealing and liveable environment.	supporting diverse vegetation. Detention basins create temporary wetland conditions that benefit a range of species, while ponds provide permanent aquatic and marginal habitats supporting invertebrates, amphibians and birds. Collectively, these features enhance habitat diversity, strengthen ecological connectivity and contribute to the establishment of a resilient green-blue network across the site.		
Filter Drains/ Strips	Filter drains and filter strips can contribute to site amenity by creating attractive, vegetated edges that soften hard surfaces and integrate drainage within the landscape. When aligned along roads or paths, they form part of functional green corridors that enhance visual quality and support a sense of place.	These features provide ecological value through vegetated zones that support invertebrates and small fauna. When linked with other SuDS components, they strengthen habitat connectivity and contribute to the wider green-blue network promoted within the SuDS approach.	✓	Filter drains are trenches filled with stone/gravel that create temporary subsurface storage for the filtration, attenuation, and conveyance of surface water runoff. Ideally, filter drains receive lateral inflow from adjacent impermeable surfaces pretreated over a filter strip. Filter drains can help manage peak flows by naturally limiting rates of conveyance through the filter medium and by providing attenuation storage when the rate of flow at the outlet is controlled.

Bioretention Systems	Bioretention systems, including rain gardens and bioretention planters, provide attractive, vegetated features that enhance the streetscape and create visually appealing focal points within developments. They contribute to high-quality, multifunctional spaces by integrating drainage into the landscape and improving the relationship between people, water and planting.	These systems deliver biodiversity value through diverse planting and soil conditions that support pollinators, invertebrates and small fauna. They also play a key role in improving water quality by filtering and treating pollutants from surface runoff before infiltration or discharge. Collectively, they enhance ecological connectivity and contribute to the wider green-blue infrastructure.	✓	Bioretention systems (including rain gardens and raised box planters) are shallow landscaped depressions that can reduce runoff rates and volumes and treat pollution. They also provide attractive landscape features and biodiversity. Bioretention systems can help reduce flow rates from a site by promoting infiltration / evapotranspiration and providing some attenuation storage. Bioretention systems can also provide very effective treatment functionality. Bioretention systems are a very flexible surface water management component that can be integrated into a wide variety of developments / densities using different shapes, materials, planting, and dimensions. Bioretention systems (including rain gardens) should be considered within the detailed drainage design stage.
Rainwater Harvesting	Rainwater harvesting systems can contribute to site amenity by visibly demonstrating sustainable water management and promoting environmental awareness. When integrated within building or landscape design, they can enhance the character of a development by supporting water features, irrigation, or other non-potable uses that add functional and	By reducing surface water runoff, rainwater harvesting systems help protect downstream SuDS features and receiving watercourses from pollution and erosion. Stored water can also be used to support planting and green infrastructure, indirectly benefiting biodiversity through improved vegetation health and habitat provision.	X	The attenuation benefits provided through the use of rainwater harvesting are considered to be limited and would only be realised when the tanks were not full. Water usage on site is unlikely to be significant and therefore the benefit of retaining water is limited.

	aesthetic value to spaces.			
Green Roofs	Green roofs enhance the visual quality of buildings and contribute to the creation of more attractive and liveable urban environments. They can provide accessible or visual green spaces within dense developments, offering opportunities for recreation, relaxation, and improved wellbeing while demonstrating sustainable design in practice.	Green roofs support biodiversity by providing valuable habitats for invertebrates, birds, and pollinators, particularly where native or species-rich planting is used. They also improve water quality and reduce runoff rates by capturing, filtering, and slowly releasing rainfall, supporting the wider SuDS objectives of managing water quantity, quality, and ecology.	X	Green roofs are not identified on development plans. Given the nature of the Scheme, green roofs are not considered a practical option. The benefits achieved through installing a green roof would be disproportionate to the significant ongoing maintenance and construction costs involved.
Porous/ Permeable Surfacing (infiltration)	Porous and permeable surfaces can enhance the quality and functionality of developed areas by integrating drainage directly into hardstanding such as car parks, footpaths and access roads. They maintain a natural appearance, reduce surface water ponding, and contribute to safer, more attractive public spaces while supporting the seamless	Infiltration-based permeable surfaces promote natural groundwater recharge and improve water quality by filtering and retaining pollutants within the sub-base before infiltration. When combined with adjacent vegetated SuDS features, they can contribute to habitat connectivity and support the wider green-blue network across a site.	X	~~**Total Proposed Impermeable Area**~~Controlled drainage measures, including sealed surfacing or sealed drainage components where required, can be incorporated within the BESS Area and Substation Areas to prevent uncontrolled infiltration of spills, leaks or firewater into ground or controlled waters. The detailed drainage design should include appropriate treatment, interception, containment and isolation measures proportionate to the substances stored and the sensitivity of the receiving environment. The drainage principles are set out in the **Firewater Containment and Drainage Strategy – Lime Down Substation [REP3-120].** The final extent, depth and configuration of any lined permeable surfacing or lined sub-base storage will be

	integration of SuDS within the built environment.			confirmed at detailed design. Where such storage is used, the available storage volume will be calculated based on the surface area, proposed depth and appropriate void ratio for the selected material.
~~**Design Head**~~Porous/ Permeable Surfacing (Lined)	~~1m~~Lined porous and permeable surfaces provide an attractive, functional drainage solution that manages runoff close to source while maintaining the appearance and usability of hardstanding areas such as car parks, courtyards and footpaths. They support high-quality, multi-functional urban design by integrating water management within the built environment without detracting from site amenity.	Although infiltration is prevented, lined permeable surfaces still contribute to SuDS objectives by providing effective pollutant removal through filtration and sedimentation within the surface and sub-base layers. By controlling and treating runoff before discharge to other SuDS components, they protect downstream water quality and can indirectly support biodiversity by maintaining cleaner flows to connected green-blue infrastructure.	✓	
Underground Attenuation Tanks / Geocellular Storage / Oversized Pipes	Underground attenuation tanks and geocellular storage systems provide essential runoff control while preserving the use and appearance of surface areas. By locating storage below	These systems offer limited direct biodiversity value but can contribute indirectly by facilitating above-ground green spaces and protecting downstream SuDS	✗	Underground attenuation storage is not proposed, as alternative SuDS features have been selected that provide sufficient on-site attenuation while offering additional water quality, amenity, and biodiversity benefits.

	ground, they enable land above to be used for landscaping, parking, or recreation, supporting efficient land use and maintaining overall site amenity.	features. When designed with pre-treatment measures, they assist in pollutant removal, improving water quality prior to discharge and supporting the performance of connected ecological SuDS components.		
~~**Additional Storage**~~		~~0m^3/ha~~		

~~3.3.2 The attenuation volumes are provided for indicative purposes only and should be verified at the detailed design stage.~~

~~3.4 Sustainable Drainage Systems~~

3.7 Attenuation Storage

Extreme Rainfall

3.4.1 Attenuation storage ~~should be provided in the form of~~ will be required to manage ~~Sustainable Drainage Systems (SuDS) where practical. The following SuDS options have been considered:~~

~~Soakaways~~

3.4.2 ~~As described in Section 3.2, the use of soakaways is not considered to be feasible.~~

~~Swales, Detention Basins and Ponds~~

3.4.3 ~~Sufficient space is available on Site to utilise a pond, basin or swale as an above ground attenuation feature. In order to facilitate gravity drainage, attenuation features should be located towards the topographical lower levels in the east of Lime Down D and outside of the 1 in 1000 year flood event extents.~~

~~Filter Drains/Strips~~

3.4.4 ~~Filter drains are trenches filled with stone/gravel that create temporary subsurface storage for the filtration, attenuation, and conveyance of~~ surface water runoff~~. Ideally, filter drains receive lateral inflow~~ from ~~adjacent impermeable~~the positively drained hardstanding surfaces ~~pretreated over a filter strip. Filter drains can help manage peak flows by naturally limiting rates of conveyance through the filter medium and by providing attenuation storage when the rate of flow at the outlet is~~ and achieve the controlled~~.~~

~~Bioretention Systems~~

3.4.5 discharge rates ~~Bioretention systems (including rain gardens and raised box planters) are shallow landscaped depressions that can reduce runoff rates and volumes and treat pollution. They also provide attractive landscape features and biodiversity. Bioretention systems can help reduce flow rates from a Site by promoting infiltration / evapotranspiration and providing some attenuation storage. Bioretention systems can also provide very effective treatment functionality. Bioretention systems are a very flexible surface water management component that can be integrated into a wide variety of developments / densities using different shapes, materials, planting, and dimensions. Bioretention systems (including rain gardens) should be considered within the detailed drainage design.~~

~~Rainwater Harvesting~~

3.4.6 ~~The attenuation benefits provided through the use of rainwater harvesting are considered to be limited and would only be realised when the tanks were not full. Water usage on Site is unlikely to be significant and therefore the benefit of retaining water is limited.~~

~~Green Roofs~~

~~3.4.7 Green roofs are not identified on Scheme plans. Given the nature of the Scheme, green roofs are not considered a practical option. The benefits achieved through installing a green roof would be disproportionate to the significant ongoing maintenance and construction costs involved.~~

~~Porous/Permeable Surfacing~~

~~3.4.8~~3.7.1 ~~Controlled drainage measures, including sealed surfacing or sealed drainage components where required, will be incorporated within the BESS and substation areas to prevent uncontrolled infiltration of spills, leaks or firewater into ground or controlled waters. The detailed drainage design will include appropriate treatment, interception, containment and isolation measures proportionate to the substances stored and the sensitivity of the receiving environment. The drainage principles are~~ set out ~~in the **Firewater Containment and Drainage Strategy – Lime Down D BESS [EN010168/EXAM/9.8]** and the **Firewater Containment and Drainage Strategy – Lime Down Substation [EN010168/EXAM/9.9].**~~ below. A combination of SuDS features, and flow control devices is proposed to manage surface water runoff at Lime Down D.

~~3.4.9 Fixed areas of the BESS Area are not yet available and therefore accurate permeable surfacing storage estimates must be calculated at the detailed design stage. Typically, the storage offered can be calculated by multiplying the surface area of the permeable surfacing (m^2) by the proposed depth (m) by a porosity ratio of 0.3.~~

~~3.4.10 The provision of storage within the sub-grade material would only be feasible in areas with a proposed gradient of <1 in 20 as detailed within CIRIA RP992/28 (Design Assessment Checklists for Permeable/Porous Pavement). Site gradients should be confirmed at the detailed design stage. The amount of storage provided within permeable surfacing is subject to sub-grade depth and gradient. Given the nature of Lime Down D the proposed gravel subgrade should be lined to prevent potential pollution incidents from mobilising to the ground.~~

~~3.4.11 The use of permeable surfacing should be considered further at the detailed design stage.~~

~~Underground Attenuation Tanks~~

~~3.4.12 Storage could be provided within underground attenuation tanks or within oversized pipes. This will be considered further within the detailed design stage.~~

~~3.4.13 The use of underground attenuation should be considered at the detailed design stage.~~

3.7.2 The hardstanding surfaces requiring positive drainage have been identified using either the indicative area of the infrastructure proposed at Lime Down D, or, where the final equipment layout is not fixed, the relevant maximum design parameters for that equipment set out in **ES Volume 1, Chapter 3: The Scheme [APP-055]**. The calculations are therefore conservative and are provided for illustrative purposes to demonstrate that a feasible drainage solution can be accommodated within Lime Down D and within the assessed design envelope.

3.7.3 Greenfield runoff rates have been calculated for each assessed hardstanding surface. The proposed

discharge rates have then been restricted in accordance with the LLFA drainage requirement, with attenuation storage sized to manage runoff up to and including the 1% AEP plus 45% climate change event.

3.7.4 The larger hardstanding surfaces, including the BESS Area, the 400kV and 132kV Substation Areas and associated access tracks where conservatively assessed as hardstanding surfaces, will be collected and conveyed to formal attenuation and flow control features prior to discharge at the restricted rate.

3.7.5 The Conversion Units / 33kV Sub-distribution Switch Rooms comprise small, discrete areas of supporting electrical infrastructure. Switchgear comprises electrical disconnect switches, fuses and circuit breakers used to control, protect and isolate electrical equipment. For the purposes of this assessment, runoff calculations have been based on the maximum 15m by 5m footprint for Integrated Conversion Units / 33kV Sub-distribution Switch Rooms defined in **ES Volume 1, Chapter 3: The Scheme [APP-055]**, equivalent to 75m^2 per unit. This provides a conservative basis for assessment.

3.7.6 For an individual 75m^2 unit, the indicative local storage volume is approximately 3.1m^3. Across Lime Down D, 28 Conversion Units / 33kV Sub-distribution Switch Rooms are proposed, giving a cumulative assessed area of 2,100m^2 and a cumulative indicative local storage requirement of approximately 86.8m^3. The calculated greenfield runoff rates for the combined Conversion Unit / 33kV Sub-distribution Switch Room area are 0.6l/s for the 1 in 2 year event, 1.2l/s for the 1 in 30 year event and 1.5l/s for the 1 in 100 year event. Runoff from each unit will be managed locally through source-control SuDS, with final flow controls confirmed at detailed design.

3.7.7 Given the small contributing area, low calculated runoff volumes and dispersed nature of the infrastructure, it is not considered proportionate to provide long piped drainage connections from each unit to a formal outfall. Runoff from each unit will therefore be managed locally using a perimeter French drain, filter drain or equivalent source-control SuDS arrangement. These features will provide local storage and source control around the equipment pads and will not be relied upon as strategic attenuation basins or as part of a wider piped drainage network.

3.7.8 Final dimensions, aggregate specification, freeboard and maintenance requirements for the French drains will be confirmed at detailed design, having regard to the final equipment layout and local ground conditions. This approach is consistent with the drainage hierarchy and source control principles set out in CIRIA C753: The SuDS Manual, and avoids creating unnecessary point discharges from small, isolated areas of supporting electrical infrastructure.

3.7.9 Hydraulic calculations carried out in Causeway Flow demonstrate that the illustrative drainage approach has sufficient capacity to manage runoff from the assessed hardstanding surfaces up to and including the 1% AEP plus 45% climate change event. Key details for the proposed attenuation storage and flow control required to manage surface water runoff are summarised in the tables below. Hydraulic calculations are provided in Annex G.

Table 4: BESS Area Attenuation Storage

Contributing Area	37,021m^2
Flow Rate	7.2l/s

Flow Control	HydroBrake
Flow Control Design Head	1.0m
Estimated Required Volume (1 in 100 year +45%CC)	4,507.0m^3

Table 5: 400kV Substation Area Attenuation Storage

Contributing Area	41,968m^2
Flow Rate	8.0l/s
Flow Control	HydroBrake
Flow Control Design Head	1.0m
Estimated Required Volume (1 in 100 year +45%CC)	5,112.3m^3

Table 6: 132kV Substation Area Attenuation Storage

Contributing Area	9,000m^2
Flow Rate	3.7l/s
Flow Control	HydroBrake
Flow Control Design Head	1.0m
Estimated Required Volume (1 in 100 year +45%CC)	970.6m^3

Table 7: Access Tracks Attenuation Storage

Contributing Area	10,266m^2
Flow Rate	1.0l/s
Flow Control	HydroBrake
Flow Control Design Head	0.75m
Estimated Required Volume (1 in 100 year +45%CC)	1,238.4m^3

Table 8: Conversion Units/ 33kV Distribution Switch Room Attenuation Storage

Contributing Area	75m^2 (per unit)
Flow Rate	0.4l/s
Flow Control	HydroBrake
Flow Control Design Head	0.75m
Estimated Required Volume (1 in 100 year +45%CC)	3.1m^3

Everyday Rainfall

3.7.10 In addition to managing extreme rainfall events, measures should be implemented to ensure runoff generated during more frequent everyday rainfall events is sustainably managed. For these events, where

practicable, the volume of runoff generated from the first 5mm of rainfall should not leave the Site.

Table 9: BESS Area Everyday Rainfall*

Contributing Area	37,021m^2
Rainfall Depth	0.005m
Runoff Volume	185.1m^3
Required Additional Depth	0.03m

Table 10: 400kV Substation Area Everyday Rainfall*

Contributing Area	41,968m^2
Rainfall Depth	0.005m
Runoff Volume	209.8m^3
Required Additional Depth	0.03m

Table 11:132kV Substation Area Everyday Rainfall*

Contributing Area	9,000m^2
Rainfall Depth	0.005m
Runoff Volume	45.0m^3
Required Additional Depth	0.03m

Table 12: Access Track Everyday Rainfall*

Contributing Area	10,266m^2
Rainfall Depth	0.005m
Runoff Volume	51.3m^3
Required Additional Depth	0.03m

Table 13: Conversion Unit/33kV Distribution Switch Room Everyday Rainfall*

Contributing Area	75m^2
Rainfall Depth	0.005m
Runoff Volume	0.4m^3
Required Additional Depth	0.08m

**The calculations above assume that the storage is provided within a basin for the purposes of illustration. The final form of storage may differ depending on the detailed layout and may include other SuDS components capable of providing equivalent storage and treatment.*

3.7.11 As shown in the tables above, the everyday rainfall volumes are limited and can be accommodated within the preferred SuDS features by providing the required additional storage depth. This allows the first 5 mm of rainfall to be retained and managed within the drainage system, through infiltration where local ground conditions permit, evaporation, evapotranspiration, or subsequent controlled release depending on the final SuDS arrangement.

~~3.5~~3.8 Preferred Drainage Scheme

~~3.5.1 The nearest watercourse to the BESS Area is the tributary off the Unnamed Main River as shown in Figure 9. Given that BESS Areas is raised above the watercourse, discharge to the watercourse at a limited discharge rate of 8.64l/s, appears to be feasible via gravity.~~

~~3.5.2 Surface water runoff up to the 1 in 100 year + 45% climate change allowance event will be attenuated within the BESS Area. The required attenuation at Lime Down D is 6,494 m^3. The required attenuation can be provided in the form of lined gravel surfacing located under the proposed battery units and substation area. The remaining required attenuation can be provided in a combination of the Sustainable Drainage Systems (SuDS) features detailed in Section 3.5 above.~~

~~3.5.3 The proposed surface water drainage scheme will ensure no increase in runoff over the lifetime of the Scheme.~~

3.8.1 The viable SuDS features and associated hydraulic calculations have been reviewed above. The final extent and arrangement of hardstanding surfaces will be confirmed at detailed design; however, the calculations presented in this report have been prepared using the indicative infrastructure areas currently proposed, or the maximum relevant design parameters set out in **ES Volume 1, Chapter 3: The Scheme [APP-055]** where the final equipment layout is not fixed. The calculations are therefore conservative and are provided to demonstrate that a feasible drainage solution can be accommodated

within Lime Down D and within the assessed design envelope.

3.8.2 Greenfield runoff rates have been calculated for the assessed hardstanding surfaces and the proposed discharge rates have been restricted in accordance with the LLFA drainage requirement. The identified receiving watercourse is the Gauze Brook within Lime Down D, with the indicative cumulative controlled discharge rates provided within Tables 4 to 8. The proposed SuDS features will attenuate surface water runoff from the positively drained hardstanding surfaces up to and including the 1% AEP plus 45% climate change event. The final drainage design will confirm the detailed layout, attenuation volumes, flow controls, outfall arrangement, treatment train, isolation measures and maintenance requirements, and will ensure that peak runoff from positively drained hardstanding surfaces is controlled so that the Scheme does not result in a material increase in flood risk on-site or elsewhere.

~~3.6~~3.9 Event Exceedance

3.6.1~~3~~3.9.1 ~~Storage will be provided for~~ The illustrative SuDS approach has been sized to manage surface water runoff from the ~~1 in 100 year~~positively drained hardstanding surfaces up to and including the 1% AEP plus 45% ~~CC~~climate change event. Storm events in excess of ~~the 1 in 100 year plus 45% CC~~this design event ~~should be permitted to produce~~ may result in temporary shallow ~~depth~~exceedance flooding within ~~non developed~~lower-risk areas ~~including where necessary the access roads.~~ of Lime Down D.

~~3.6.2 Surface water on-Site will be managed through a comprehensive drainage system designed to modern standards and guidance (as detailed in Section 3.4). This will ensure there is no surface water ponding or surcharging above ground during events up to the 1 in 100 year + 45% CC flood event. The units will be raised by a minimum of 150mm, or as high as practically possible, above surrounding ground levels to prevent exceedance flooding from impacting Lime Down D and to ensure significant resilience to flooding.~~

3.9.2 Finished levels for sensitive electrical infrastructure and equipment plinths will be set above surrounding ground levels where practicable. Exceedance routes will be confirmed at detailed design and will direct residual flows away from critical equipment, buildings and access points where practicable, so that exceedance flooding does not result in a material increase in flood risk on-site or elsewhere.

~~3.7~~3.10 Surface Water Treatment

3.7.1~~3~~3.10.1 In accordance with DEFRA's National standards for sustainable drainage systems and the ~~CIRIA~~Simple Index Approach as described in C753 ~~publication 'The SuDS Manual'~~Manual (2015), other roofs have a 'low' pollution hazard level, with commercial yards classified as having a 'medium' pollution hazard level. ~~Table 3~~ The table below shows the pollution hazard indices for each land use.

Table ~~3:~~14: Pollution Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Other Roofs (typically commercial/industrial roofs)	Low	0.5	0.2**	0.4
Commercial Yard and Delivery Areas, Non-residential Car Parking and all roads except Low Traffic Roads	Medium	0.7	0.6	0.7

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 26.2

* Indices values range from 0-1.

** up to 0.8 where there is potential for metals to leach from the roof

3.7.2~~3~~3.10.2 ~~Where practical,~~ Runoff from ~~roofs and roads~~positively drained hardstanding surfaces will be ~~directed to the existing drainage or the gravel where it can infiltrate into the ground.~~routed through an appropriate SuDS treatment train before controlled discharge. Table ~~4~~15 below demonstrates ~~that the porous surfacing provides sufficient treatment~~the mitigation indices for typical SuDS components that

may be used within the final drainage design.

Table 4:15: SuDS Mitigation Indices (CIRIA C753 compliant)*

	Criteria Mitigation Indices			
Water Quantity (Attenuation)Type of SuDS	Medium (sub-base storage provides attenuation)Total Suspended Solids (TSS)	MetalsMedium (conveyance and storage within voids)	HydrocarbonsHigh (primary attenuation feature)	
Volume Control	No (tined system prevents infiltration)	No (tined system prevents infiltration)	No (tined system prevents infiltration)	None
Water Quality (Total Suspended Solids)Permeable Surfacing	0.7	0.5–0.76	0.3–0.5 (dependent on pre-treatment)0.7	
Water Quality (SwaleMetals)	0.6 5	0.4–0.6	0.3 6	
Detention basin	0.5	0.5	0.6	
Water Quality (PondHydrocarbons)	0.7	0.5–0.7	0.3 5	
Amenity	Low to Medium (functional hardstanding integrating drainage at source)	Low (subsurface feature with no public interface)	Medium (if above ground basin providing visual and landscape benefit) / Low (if underground tank)	None
Biodiversity	Low (lined system limits habitat creation)	Low (subsurface feature with negligible ecological value)	Low to Medium (above ground basin can provide habitat if vegetated)	None

**Water quality mitigation indices are derived from CIRIA C753 The SuDS Manual (2015), Table 26.3, where applicable. Qualitative ratings for water quantity, volume control, amenity and biodiversity are based on professional judgement and reflect the proposed scheme design. The mitigation indices should be considered in the context of the overall SuDS treatment train, with the effectiveness of each component dependent on its position within the drainage system (i.e. primary, secondary or tertiary treatment).*

*** Emergency shut-off valve / isolation measures are provided for firewater and accidental spill containment only and are not relied upon for routine surface water quantity management or standard SuDS water quality treatment.*

~~3.7.3 The proposed drainage strategy adopts a treatment train approach comprising lined permeable surfacing, gravel sub-base storage and attenuation features. The lined permeable surfacing and underlying sub-base provide attenuation storage, temporarily storing runoff and releasing it at a controlled rate to the receiving watercourse.~~

~~3.7.4 As the system is intentionally lined within the BESS and substation areas to prevent infiltration and protect controlled waters, no volume control is provided. However, effective water quality treatment is achieved through filtration and sedimentation within the permeable surfacing and sub-base layers, with additional attenuation provided upstream of the controlled discharge.~~

~~3.7.5 An automatic shut-off valve / isolation system will also be incorporated to provide additional pollution control during firewater and other emergency scenarios. Further details are provided in Section 3.93.9.~~

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' -Table 26.3

3.10.3 It is concluded that a suitable combination of SuDS components, such as detention basins, ponds, swales, lined permeable surfacing and/or filter drains, can provide sufficient treatment for the assessed pollution hazard indices. The final treatment train will be confirmed at detailed design and will be coordinated with the required attenuation, isolation and maintenance arrangements.

~~3.8~~3.11 Firewater Consideration

~~3.8.1~~3.11.1 The firewater containment and pollution control principles ~~described for the BESS Area also~~ apply to the ~~associated 400 kV substation drainage~~BESS Area, the 400kV Substation and the 132kV Substation at Lime Down D. Detailed design will identify the appropriate containment, isolation and treatment measures for each ~~compound~~drainage catchment, in accordance with the principles set out in ~~the~~ **Firewater Containment and Drainage Strategy – Lime Down D BESS [~~EN010168/EXAM/9.8]~~** ~~and the~~ **REP3-118], Firewater Containment and Drainage Strategy – Lime Down Substation ~~[EN010168/EXAM/9.9~~ [REP3-120]** and the **Outline Battery Safety Management Plan [REP3-106]**.

~~3.8.2 Given the nature of the Scheme there is a risk of fire, and contamination may be mobilised by fire suppression water.~~ The principal ~~route~~potential pathway for ~~any~~contaminated firewater ~~loss~~or polluted runoff from ~~Lime Down D is via~~the BESS Area and Substation Areas would be through the proposed surface water drainage system ~~into the~~ or uncontrolled discharge to ground~~, which is associated with the BESS Area. In order to isolate Lime Down D's drainage, the proposed gravel subbase should be lined and the proposed outfalls from~~. The drainage system ~~should be controlled by automatically actuated valves. In the event of a fire, the valve~~ will therefore be designed ~~to activate to close off the BESS Area's drainage system triggered by the fire alarm systems. Flows will then back up in the system. The SuDS system will be designed to accommodate the 1 in 100 plus 40% climate change storm event, therefore a sufficient amount of storage is provided to contain a reasonable worst case 1 in 10 year storm event.~~

3.11.2 ~~According to National Fire Chiefs Council Grid Scale Battery Energy Storage System planning Guidance for FR Guidance, a tank measuring 228m^3 will be~~so that it can be isolated in the event of a pollution incident or firewater containment scenario. Where required~~ to supply a fire hydrant located adjacent to the BESS. Guidance also states that Fire and rescue services may wish to increase,~~ this ~~requirement, given the size of the Scheme there is available space on-Site~~will include lined drainage components,

controlled outfalls and shut-off valves to ~~provide additional storage~~[vii]. ~~-~~prevent uncontrolled discharge to ground or surface water receptors.

~~3.8.3~~3.11.3 The BESS Area will ~~contain~~include a minimum of two firefighting water storage units of no less than 228,000 litres in capacity, capable of delivering ~~1900~~1,900 litres per minute for ~~4~~four hours ~~(exceeding NFCC guidance).~~. The design approach, including containment, valve operation and emergency response procedures, is further detailed in the **Outline Battery Safety Management Plan [~~EN010168/APP/7.21~~REP3-106].**

~~3.8.4 Following a fire event, the wastewater will be tested to ascertain the level of contamination. A decision will then be made as to the appropriate methodology to dispose of the attenuated water. This may involve on-Site treatment and release or tankering.~~

3.11.4 In the event of a fire or pollution incident, the relevant outfall valve would be closed and retained water would be held within the drainage system. The retained water would then be sampled and tested to determine the appropriate disposal route. Depending on the results, this may comprise treatment and controlled discharge subject to the relevant approval, or removal from Site by tanker.

3.11.5 The detailed containment volume, valve arrangement, testing procedure, treatment requirements and maintenance regime will be confirmed through detailed design and will be consistent with the relevant BESS and substation firewater containment strategies. This does not alter the outline drainage assessment, which demonstrates that normal operational surface water runoff can be managed without increasing flood risk.

~~3.9~~3.12 Maintenance

3.12.1 Routine inspections and maintenance of the surface water drainage system will be required to ensure that the drainage infrastructure continues to operate effectively for the lifetime of the development, without increasing flood risk on or off Site.

~~3.9.1~~3.12.2 Maintenance of ~~communal~~surface water drainage features ~~such as permeable surfacing or an attenuation tank~~ will be the responsibility of the ~~landowner.~~undertaker or operator. Maintenance of ~~shared surface water~~the operational drainage ~~systems can~~system will be carried out in accordance with the final drainage design and the principles set out in the **Outline Operational Environmental Management Plan ~~(OEMP) [EN010168/APP/7.13~~[REP3-094]** and **Outline Battery Safety Management Plan [~~EN010168/APP/7.21~~].REP3-106],** where relevant. Firewater-related inspection, testing and maintenance requirements for the BESS Area and Substation drainage systems will be confirmed in accordance with **Firewater Containment and Drainage Strategy – Lime Down D BESS [REP3-118]** and **Firewater Containment and Drainage Strategy – Lime Down Substation [REP3-120].**

~~3.9.2 Maintenance schedules for an attenuation tank and permeable surfacing are included in Annex C. Maintenance of the separator will be as per the manufacturer's guidance.~~

3.12.3 The final maintenance arrangements will be confirmed at detailed design and will reflect the final drainage components, flow controls, treatment measures, isolation valves and outfall arrangements.

4. Conclusions and Recommendations

4.1 Conclusions

4.1.1 The Scheme is for a ground mounted solar photo-voltaic plant and associated electrical infrastructure and access, as well as a BESS Area.

4.1.2 Lime Down D comprises ground mounted Solar PV Panels, a BESS Area, one 400kV Substation, one 132kV Substation, associated access tracks and supporting electrical infrastructure.

Flood Risk

~~4.1.2~~4.1.3 Lime Down D is situated largely within Flood Zone 1; however, Fields D9 – D14, D16 – D17 have significant areas within Flood Zones 2 / 3. Furthermore, the area bisecting Fields D19 – D22 are also located within Flood Zone 3, however this is considered to be associated with a small watercourse and does not encroach into Lime Down D or into the area allocated for the proposed development.

~~4.1.3~~4.1.4 The majority of Lime Down D is at Very Low risk of surface water flooding. However, there are areas of Very Low to High risk particularly at Fields D11 – D14, which is considered to be associated with the presence of Gauze Brook. Other areas of risk across Lime Down D are associated with isolated topographic depressions within the Fields.

~~4.1.4~~4.1.5 It is concluded that fluvial flooding is the main source of potential flood risk to Lime Down D. All other sources of flooding are considered to have a **Low to Negligible** risk.

~~4.1.5~~4.1.6 Hydraulic Modelling has been undertaken to ensure the risk remains Low as a result of climate change. The BESS Area is proposed to be sequentially located in Flood Zone 1, and therefore is considered to be at a **Low** risk.

Drainage Strategy

4.1.7 ~~The BESS Area will introduce~~Solar PV panelled areas are not treated as formal impermeable drainage ~~area in the form of equipment~~catchments within this Outline Drainage Strategy. The panels are elevated above ground level, drain to the existing ground, are not sealed into a drainage network, and ~~access; this will result in an increase in~~do not create a connected impermeable surface ~~water~~.

4.1.8 Greenfield runoff~~. In order to ensure the increase in~~ rates have been calculated for the assessed hardstanding surfaces and the proposed discharge rates have been restricted in accordance with the LLFA drainage requirement. The identified receiving watercourse is the Gauze Brook within Lime Down D, with the indicative cumulative controlled discharge rates provided within Tables 4 to 8. The proposed SuDS features will attenuate surface water runoff from the positively drained hardstanding surfaces up to and including the 1% AEP plus 45% climate change event.

4.1.9 The everyday rainfall volumes are limited and can be accommodated within the preferred SuDS features by providing the required additional storage depth.

4.1.10 Storm events in excess of this design event may result in temporary shallow exceedance flooding within lower-risk areas of Lime Down D.

4.1.11 It is concluded that a suitable combination of SuDS components, such as detention basins, ponds, swales, lined permeable surfacing and/or filter drains, can provide sufficient treatment for the assessed pollution hazard indices.

~~4.1.6~~4.1.12 In addition, the drainage system will be designed so that it can be isolated in the event of a pollution incident or firewater containment scenario. Where required, this will ~~not increase flood risk elsewhere, flow control will be used, and attenuation provided on-Site in the form of lined gravel surfacing beneath the BESS and~~include lined drainage components, controlled outfalls and shut-off valves to prevent uncontrolled discharge from the substation ~~areas to accommodate storm events up to and including the 1 in 100 year plus 45% climate change event.~~ drainage system.

~~4.1.7 Any surface water exceeding the infiltration capacity of the surrounding strata will naturally drain to the surrounding land drains in line with the existing scenario.~~

~~4.1.8 The heavily managed agricultural land will be replaced with wildflowers and grassland. This will help to reduce run off rates by increasing the roughness of the ground, helping to increase infiltration by reducing compaction, and improve water quality by reducing erosion and mobilisation of pollutants. As a result, runoff rates may be reduced following Scheme when compared to the existing greenfield scenario.~~

~~4.1.9 The proposed drainage scheme therefore meets the four pillars of SuDS (water quality, water quantity, amenity and biodiversity).~~

4.2 Recommendations

4.2.1 Embedded Mitigation is detailed in **ES Volume 3, Appendix 11-1: Flood Risk Assessment and Outline Drainage Strategy – Covering Report [EN010168/APP/6.3]**.

BESS Area/Substations:

4.2.2 All equipment will be raised by a minimum of 150mm, or as high as practically possible, above surrounding ground levels.

4.2.3 Firewater (including water run-off from fire-fighting equipment) and other surface water pollution risks will be managed through the use of impermeable liners, containment systems and isolation valves that close automatically in the event of a fire. With these measures in place, all potential effects on flood risk and water quality are considered to be not significant.

4.2.4 The BESS and substation infrastructure can be adequately waterproofed to withstand the effect of flooding. Proposed batteries and substations have been sequentially located within areas of the Site which are located in Flood Zone 1.

Annexes

Annex A- Water Body Catchment Classifications Summaries

Gauze Bk - source to conf R Avon (Brist) Water Body Classification Summary

Classification Item	2019 Classification		2022 Classification	Cycle 3 Objectives		
	Cycle 2	Cycle 3	Cycle 3	Status	Year	Reasons
Ecological	Moderate	Moderate	Moderate	Good	2027 - Low Confidence	Disproportionately expensive: Disproportionate burdens
Biological Quality Elements	High	High	Good	Good	2015	
Invertebrates	High	High	High	Good	2015	
Macrophytes and Phytobenthos Combined	High	High	Good	Good	2015	
Macrophytes sub element	High	High	Good	Good		
Physio-Chemical Quality Elements	Moderate	Moderate	Moderate	Good	2027 - Low Confidence	Disproportionately expensive: Disproportionate burdens
Acid Neutralising Capacity						
Ammonia (Phys-Chem)	High	High	High	Good	2015	
Dissolved Oxygen	Poor	Poor	Poor	Good	2015	
Phosphate	Poor	Poor	Poor	Good	2027 - Low Confidence	Disproportionately expensive: Disproportionate burdens
Temperature	High	High	High	Good	2015	
pH	High	High	High	Good	2015	
Hydromorphological Supporting Elements	Supports Good	Supports Good	Supports Good	Supports Good	2015	
Hydrological Regime	Does not support good	Does not support good	Supports Good	Does not support good		Disproportionately expensive: Unfavourable balance of costs and benefits
Morphology	Supports Good	Supports Good	Supports Good			
Supporting Elements (surface Water)				N/A	2015	
Specific Pollutants				N/A	2015	
Copper						
Triclosan						
Zinc						
Iron						
Maganese						
Chemical	Fail	Fail	N/A	Good	2063	Natural conditions: Chemical status recovery time
Priority Hazardous Substances	Fail	Fail	N/A	Good	2063	Natural conditions: Chemical status recovery time
Benzo(a)pyrene	Good	Good		Good	2015	
Cadium and Its Compounds						
Dioxins and dioxin-like compounds	Good	Good		Good	2015	
Heptachlor and cis-Heptachlor Epoxide	Good	Good		Good	2015	
Hexabromocyclododecane	Good	Good		Good	2015	
Hexachlorobenzene	Good	Good		Good	2015	
Hexachlorobutadiene	Good	Good		Good	2015	
Mercury and Its Compounds	Fail	Fail		Good	2040	Natural conditions: Chemical status recovery time
Nonylphenol						
Perfluorooctane sulphonate (PFOS)	Good	Good		Good	2015	
Polybrominated diphenyl ethers (PBDE)	Fail	Fail		Good	2063	Natural conditions: Chemical status recovery time
Priority substances	Good	Good	N/A	Good	2015	
Cypermethrin (Priority)	Good	Good	N/A	Good	2015	
Fluoranthene	Good	Good	N/A	Good	2015	
Lead and Its Compunds						
Nickel and Its Compunds						
Other Pollutants	N/A	N/A	N/A	N/A	2015	Did not require assessment

Avon (Brist) conf Tetbury Avon to conf R Marden Water Body Classification Summary

Classification Item	2019 Classification		2022 Classification	Cycle 3 Objectives		
	Cycle 2	Cycle 3	Cycle 3	Status	Year	Reasons
Ecological	Moderate	Moderate	Moderate	Good	2027 - Low Confidence	Disproportionately expensive: Disproportionate burdens
Biological Quality Elements	Moderate	Moderate	Moderate	Good	2027 - Low Confidence	Disproportionately expensive: Disproportionate burdens
Fish	Good	Good	Good	Good	2015	
Invertebrates	Good	Good	Good	Good	2015	
Macrophytes and Phytobenthos Combined	Moderate	Moderate	Moderate	Good	2027 - Low Confidence	Disproportionately expensive: Disproportionate burdens
Macrophytes sub element	Moderate	Moderate	Moderate	Good	2027 - Low Confidence	Disproportionately expensive: Disproportionate burdens
Physio-Chemical Quality Elements	Moderate	Moderate	Moderate	Good	2027 - Low Confidence	Disproportionately expensive: Disproportionate burdens
Acid Neutralising Capacity	High	High	High	Good	2015	
Ammonia (Phys-Chem)	High	High	High	Good	2015	
Dissolved Oxygen	Good	Good	High	Good	2015	
Phosphate	Moderate	Moderate	Moderate	Good	2027 - Low Confidence	Disproportionately expensive: Disproportionate burdens
Temperature	Good	Good	High	Good	2015	
pH	High	High	High	Good	2015	
Hydromorphological Supporting Elements	Supports Good	Supports Good	Supports Good	Supports Good	2015	
Hydrological Regime	Does not support good	Does not support good	Supports Good	Does not support good	2015	Disproportionately expensive: Unfavourable balance of costs and benefits
Morphology	Supports Good	Supports Good	Supports Good			
Supporting Elements (surface Water)				N/A	2015	
Specific Pollutants	High	High	High	High	2015	
Arsenic	High	High	High	High	2015	
Copper	High	High	High	High	2015	
Triclosan	High					
Zinc	High	High	High	High	2015	
Iron	High	High	High	High	2015	
Maganese	High	High	High	High	2015	
Chemical	Fail	Fail	N/A	Good	2063	Natural conditions: Chemical status recovery time
Priority Hazardous Substances	Fail	Fail	N/A	Good	2063	Natural conditions: Chemical status recovery time
Benzo(a)pyrene		Good		Good	2015	
Cadium and Its Compounds	Good	Good		Good	2015	
Dioxins and dioxin-like compounds	Good	Good		Good	2015	
Heptachlor and cis-Heptachlor Epoxide	Good	Good		Good	2015	
Hexabromocyclododecane	Good	Good		Good	2015	
Hexachlorobenzene	Good	Good		Good	2015	
Hexachlorobutadiene	Good	Good		Good	2015	
Mercury and Its Compounds	Fail	Fail		Good	2040	Natural conditions: Chemical status recovery time
Perfluorooctane sulphonate (PFOS)	Good	Good		Good	2015	
Polybrominated diphenyl ethers (PBDE)	Fail	Fail		Good	2063	Natural conditions: Chemical status recovery time
Priority substances	Good	Good	N/A	Good	2015	
Cypermethrin (Priority)	Good	Good		Good	2015	
Fluoranthene	Good	Good		Good	2015	
Lead and Its Compunds	Good	Good		Good	2015	
Nickel and Its Compunds	Good	Good		Good	2015	
Other Pollutants	Good	Good	N/A	Good	2015	

Annex B – Hydraulic Modelling Outputs

390400 390600 390800 391000 391200 391400 391600 391800

184200 184000 183800 183600 183400 183200 183000

West Park Wood

D10 D9 D12 D13 D14 D11 D15 D16 D17 D18

A429

0 500 1000 m

Project Reference:
317212 | Lime Down

Client:
Island Green Power UK Ltd

Drawing Title:
Maximum Flood Depth
1% AEP Fluvial Event
Existing Site Layout

Drawing Name:	Revision:	Date:
317212-ENG-DAT-02	1	04 Jul 2025

Drawing Scale (A3):	Drawing Status:	Drawn:	Checked:	Approved:
1:5000	Final	GO	DH	JR

Legend

- Solar PV Site
- Individual Field Boundaries
- 2D Model Extent

Maximum Flood Depth (mm)

- <= 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.6
- > 0.6



Arthian

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390400 390600 390800 391000 391200 391400 391600 391800

184200 184000 183800 183600 183400 183200 183000

West Park Wood

D10 D9 D12 D13 D14 D11 D15 D16 D17 D18

A429

0 500 1000 m

Project Reference:
317212 | Lime Down

Client:
Island Green Power UK Ltd

Drawing Title:
Maximum Flood Depth
1% AEP + 39% CC Fluvial Event
Existing Site Layout

Drawing Name:	Revision:	Date:
317212-ENG-DAT-04	1	04 Jul 2025

Drawing Scale (A3):	Drawing Status:	Drawn:	Checked:	Approved:
1:5000	Final	GO	DH	JR

Legend

- Solar PV Site
- Individual Field Boundaries
- 2D Model Extent

Maximum Flood Depth (mm)

- <= 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.6
- > 0.6



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390400 390600 390800 391000 391200 391400 391600 391800

184200 184000 183800 183600 183400 183200 183000

West Park Wood

D10 D9 D12 D13 D14 D11 D15 D16 D17 D18

A429

0 500 1000 m

Project Reference:
317212 | Lime Down

Client:
Island Green Power UK Ltd

Drawing Title:
Maximum Flood Depth
1% AEP + 71% CC Fluvial Event
Existing Site Layout

Drawing Name:	Revision:	Date:
317212-ENG-DAT-05	1	04 Jul 2025

Drawing Scale (A3):	Drawing Status:	Drawn:	Checked:	Approved:
1:5000	Final	GO	DH	JR

Legend

- Solar PV Site
- Individual Field Boundaries
- 2D Model Extent

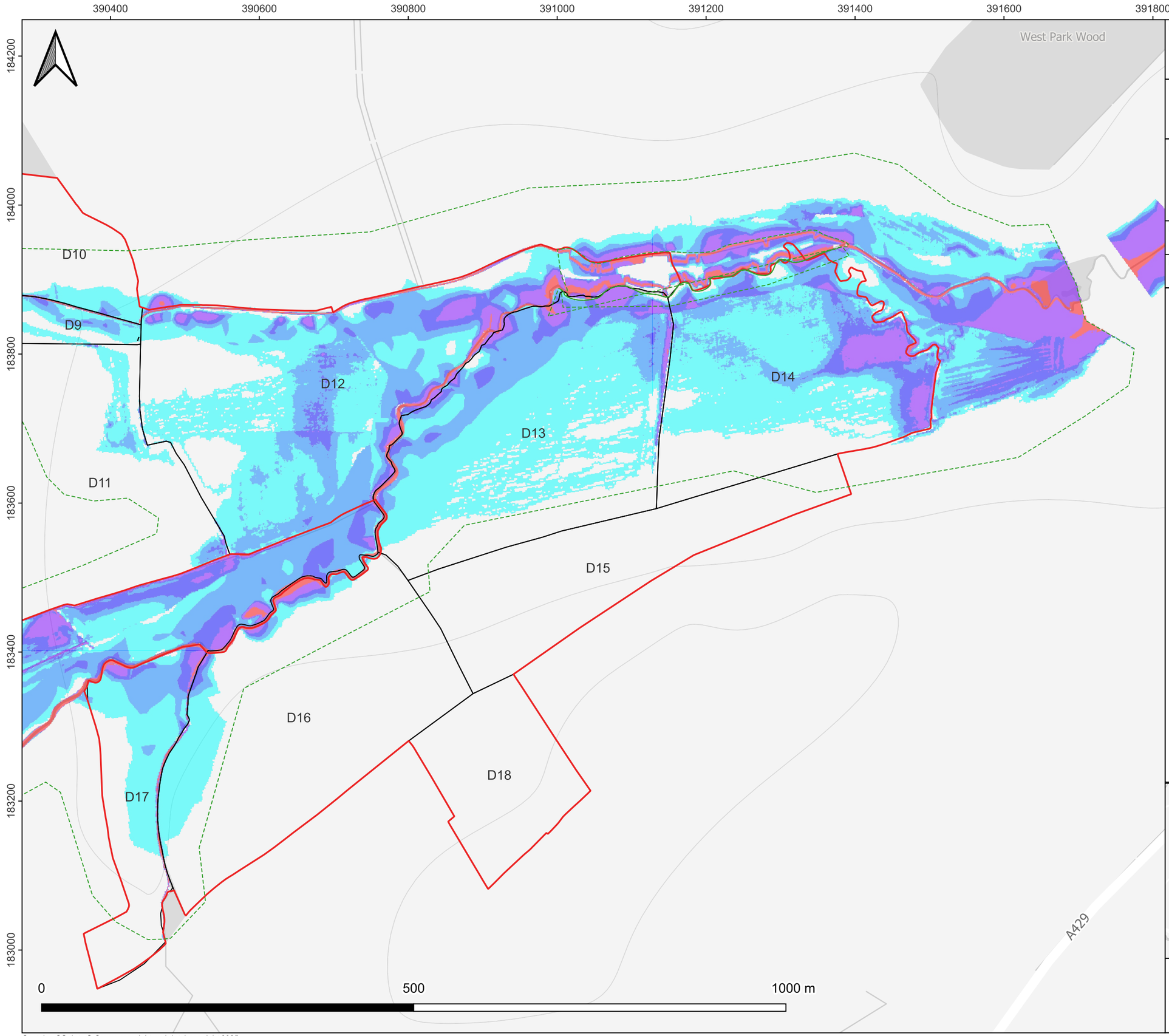
Maximum Flood Depth (mm)

- <= 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.6
- > 0.6



Arthian

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Project Reference:

317212 | Lime Down

Client:

Island Green Power UK Ltd

Drawing Title:

Maximum Flood Depth
0.1% AEP Fluvial Event
Existing Site Layout

Drawing Name:	Revision:	Date:
317212-ENG-DAT-06	1	04 Jul 2025

Drawing Scale (A3):	Drawing Status:	Drawn:	Checked:	Approved:
1:5000	Final	GO	DH	JR

Legend

- Solar PV Site
- Individual Field Boundaries
- 2D Model Extent

Maximum Flood Depth (mm)

- <= 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.6
- > 0.6



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390400 390600 390800 391000 391200 391400 391600 391800

184200 184000 183800 183600 183400 183200 183000

West Park Wood

D10 D9 D12 D13 D14 D11 D15 D16 D18 D17

A429

0 500 1000 m

Project Reference:
317212 | Lime Down

Client:
Island Green Power UK Ltd

Drawing Title:
Maximum Flood Depth
0.1% AEP + 31% CC Fluvial Event
Existing Site Layout

Drawing Name:	Revision:	Date:
317212-ENG-DAT-07	1	04 Jul 2025

Drawing Scale (A3):	Drawing Status:	Drawn:	Checked:	Approved:
1:5000	Final	GO	DH	JR

Legend

- Solar PV Site
- Individual Field Boundaries
- 2D Model Extent

Maximum Flood Depth (mm)

- <= 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.6
- > 0.6



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390400 390600 390800 391000 391200 391400 391600 391800

184200 184000 183800 183600 183400 183200 183000

West Park Wood

D10 D9 D12 D13 D14 D11 D15 D16 D18 D17

A429

0 500 1000 m

Project Reference:
317212 | Lime Down

Client:
Island Green Power UK Ltd

Drawing Title:
Maximum Flood Depth
0.1% AEP + 71% CC Fluvial Event
Existing Site Layout

Drawing Name:	Revision:	Date:
317212-ENG-DAT-08	1	04 Jul 2025

Drawing Scale (A3):	Drawing Status:	Drawn:	Checked:	Approved:
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Legend

- Solar PV Site
- Individual Field Boundaries
- 2D Model Extent

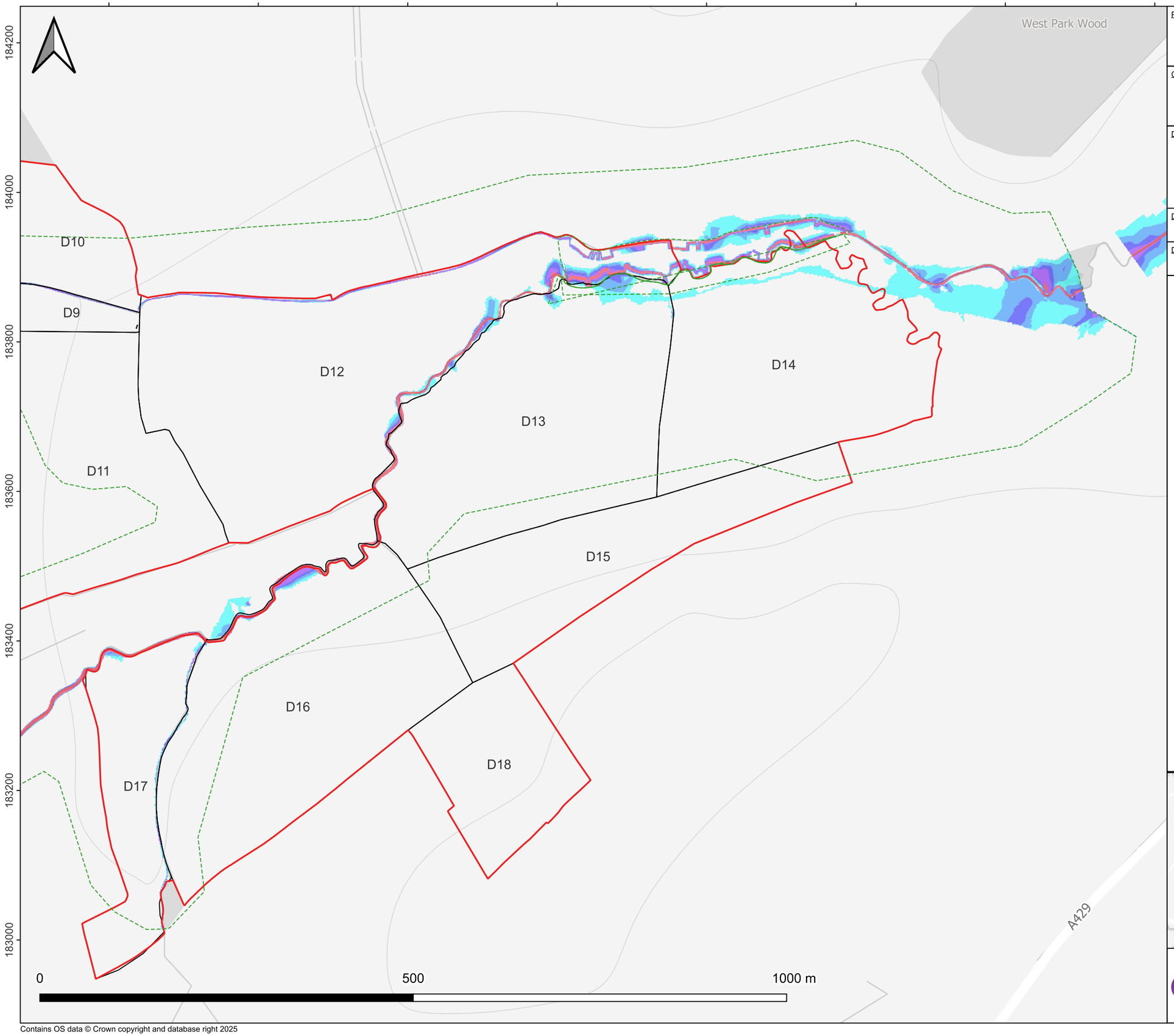
Maximum Flood Depth (mm)

- <= 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.6
- > 0.6



Arthian

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Project Reference:

317212 | Lime Down

Client:

Island Green Power UK Ltd

Drawing Title:

Maximum Flood Depth
50% AEP Fluvial Event
Existing Site Layout

Drawing Name:	Revision:	Date:
317212-ENG-DAT-01	1	04 Jul 2025

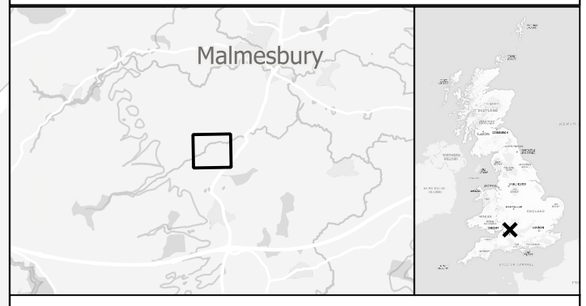
Drawing Scale (A3):	Drawing Status:	Drawn:	Checked:	Approved:
1:5000	Final	GO	DH	JR

Legend

- Solar PV Site
- Individual Field Boundaries
- 2D Model Extent

Maximum Flood Depth (mm)

- <= 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.6
- > 0.6



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390400 390600 390800 391000 391200 391400 391600 391800

184200 184000 183800 183600 183400 183200 183000

West Park Wood

D10 D9 D12 D13 D14 D11 D15 D16 D17 D18

A429

0 500 1000 m

Project Reference:
317212 | Lime Down

Client:
Island Green Power UK Ltd

Drawing Title:
Maximum Flood Depth
5% AEP Fluvial Event
Existing Site Layout

Drawing Name:	Revision:	Date:
317212-ENG-DAT-02	1	04 Jul 2025

Drawing Scale (A3):	Drawing Status:	Drawn:	Checked:	Approved:
1:5000	Final	GO	DH	JR

Legend

- Solar PV Site
- Individual Field Boundaries
- 2D Model Extent

Maximum Flood Depth (mm)

Band 1 (Gray)

- <= 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.6
- > 0.6



Arthian

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Annex C – Manning's Open Channel Flow Mapping

317212 Lime Down Solar D

Manning's Open Channel Flow Calculation

Methodology

Cross-sections through the floodplain were extracted from Environment Agency (EA) LiDAR DTM data (flown March 2020) at the locations shown in Figure 1. These cross-sections can be considered representative of the channel and general floodplain adjacent to the site and at the location of the proposed development. The cross-sections were imported into Flood Modeller and the "tabulate cross section properties" tool was utilised to establish the level-flow relationship for the channel and wider floodplain. This tool utilises the Manning's open channel flow equation. Manning's 'n' roughness was set to 0.03s/m$^{1/3}$ for the channel and 0.04s/m$^{1/3}$ for the floodplain. These values were chosen based on Chow (1959)* and aerial imagery. The channel slope was set for each cross-section based on underlying LiDAR.

In the absence of detailed flood extent data covering the site, the extents of the EA surface water flood map (0.1% AEP event, present day) have been compared to underlying LiDAR data to provide an estimate of water levels. The surface water flood map has been used as a proxy for fluvial flooding given the similarity to the EA Flood Zone 2 extent and the additional detail it affords. The EA has since released the NaFRA2 mapping, however, a review of the flood extents indicates they are smaller across much of the study area. As such, the calculations presented here can be considered conservative.

Within this excel workbook, the xlookup function has been used along with the Flood Modeller level-flow relationship for the cross-sections to determine the equivalent flow for each estimated water level, rounding up where a direct match is not found. The appropriate climate change uplifts have then been applied to these flows and a second xlookup used to determine the equivalent level for the increased flow.

Cross-sections have been located at suitable locations throughtout the proposed development. Whilst it is acknowledged that the Manning's open channel flow equation used to determine the level-flow relationship does not constitute detailed hydraulic modelling, the calculation can still be considered suitable to demonstrate the scale of the changes in water level that can be expected when considering a +71% uplift in flows (Avon Bristol and North Somerset Streams Management Catchment, 2080's higher allowance).

Detailed hydraulic modelling of Gauze Brook is being undertaken by Arthian to provide a site-specific assessment of fluvial flood risk to the site from Gauze Brook and its main tributaries. The anticipated extent of this model is shown in Figure 2.

*Chow, V.T. (1959). Open-Channel Hydraulics. New York, NY: McGraw-Hill.

Cross-Section Locations

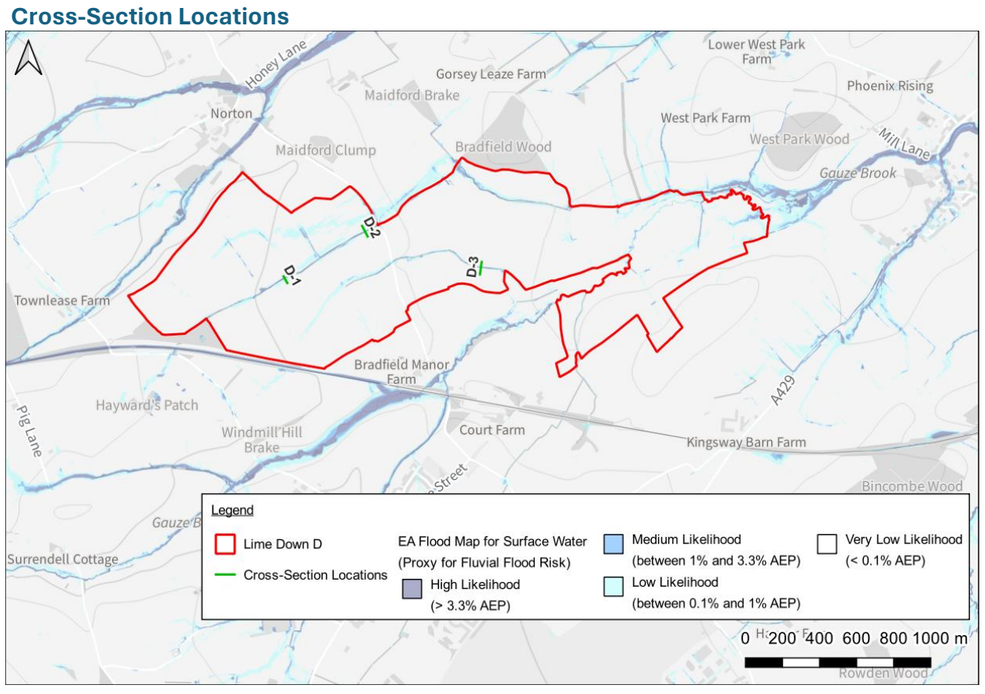


Figure 1: Cross-section locations and EA surface water flood map (data accessed October 2024)

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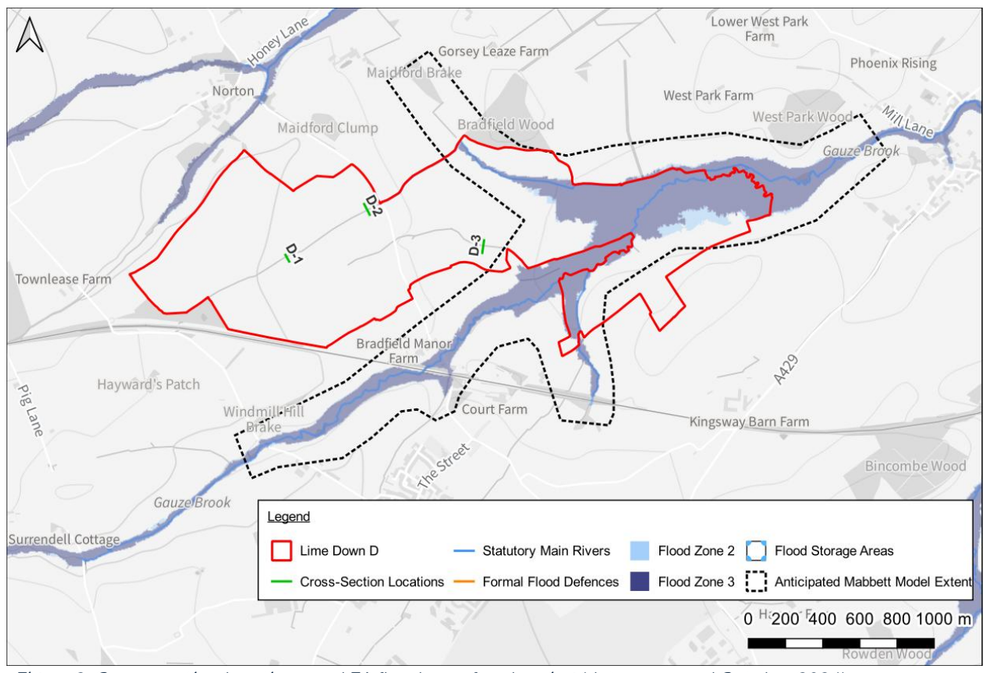


Figure 2: Cross-section locations and EA flood map for planning (data accessed October 2024)

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Calculated Flows and Levels

Cross-Section	Level Description	Estimated Flood Level (m AOD)	Estimated Equivalent Flow (m^3/s)	Flow +71% CC Uplift (m^3/s)	Equivalent Flood Level (m AOD)
D-1	0.1% AEP EA FMfSW water level	97.80	1.9	3.2	97.86 (+58mm)
D-2	0.1% AEP EA FMfSW water level	91.70	0.5	0.9	91.75 (+49mm)
D-3	0.1% AEP EA FMfSW water level	83.80	8.3	14.2	83.90 (+103mm)

Tabulated Cross-Section Properties // D-1

(Calculated by Flood Modeller)

Node	Flow (m^3/s)	Stage (m AOD)	Depth (m)	Velocity (m/s)	Froude no.	Area (m^2)	Conveyance (m^3/s)	Width (m)	W Perim. (m)	Slope
D-1	0.000	97.270	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0076
D-1	0.000	97.286	0.016	0.085	0.306	0.001	0.001	0.152	0.155	0.0076
D-1	0.001	97.301	0.031	0.134	0.344	0.005	0.007	0.303	0.310	0.0076
D-1	0.002	97.317	0.047	0.176	0.368	0.011	0.021	0.455	0.465	0.0076
D-1	0.004	97.332	0.062	0.213	0.386	0.019	0.046	0.607	0.620	0.0076
D-1	0.007	97.348	0.078	0.248	0.400	0.030	0.084	0.759	0.775	0.0076
D-1	0.012	97.364	0.094	0.280	0.413	0.043	0.136	0.911	0.930	0.0076
D-1	0.018	97.379	0.109	0.310	0.423	0.058	0.206	1.062	1.085	0.0076
D-1	0.026	97.395	0.125	0.339	0.433	0.076	0.294	1.214	1.240	0.0076
D-1	0.035	97.410	0.140	0.366	0.442	0.096	0.402	1.366	1.394	0.0076
D-1	0.047	97.426	0.156	0.393	0.449	0.118	0.533	1.518	1.549	0.0076
D-1	0.060	97.442	0.172	0.419	0.457	0.143	0.687	1.669	1.704	0.0076
D-1	0.076	97.457	0.187	0.444	0.463	0.170	0.866	1.821	1.859	0.0076
D-1	0.094	97.473	0.203	0.468	0.469	0.200	1.073	1.973	2.014	0.0076
D-1	0.114	97.488	0.218	0.492	0.475	0.232	1.307	2.125	2.169	0.0076
D-1	0.137	97.504	0.234	0.515	0.481	0.266	1.571	2.276	2.324	0.0076
D-1	0.160	97.517	0.247	0.539	0.486	0.297	1.829	2.369	2.420	0.0076
D-1	0.189	97.532	0.262	0.566	0.492	0.334	2.163	2.474	2.531	0.0076
D-1	0.221	97.548	0.278	0.592	0.497	0.373	2.526	2.580	2.641	0.0076
D-1	0.255	97.563	0.293	0.617	0.502	0.413	2.920	2.685	2.751	0.0076
D-1	0.292	97.579	0.309	0.641	0.507	0.455	3.344	2.791	2.862	0.0076
D-1	0.332	97.594	0.324	0.665	0.511	0.499	3.800	2.896	2.972	0.0076
D-1	0.374	97.609	0.339	0.687	0.515	0.545	4.288	3.002	3.082	0.0076
D-1	0.420	97.625	0.355	0.710	0.519	0.592	4.809	3.107	3.193	0.0076
D-1	0.468	97.640	0.370	0.731	0.523	0.640	5.363	3.213	3.303	0.0076
D-1	0.520	97.656	0.386	0.752	0.527	0.691	5.951	3.318	3.413	0.0076
D-1	0.574	97.671	0.401	0.773	0.530	0.743	6.575	3.424	3.523	0.0076
D-1	0.604	97.679	0.409	0.779	0.620	0.776	6.917	4.824	4.927	0.0076
D-1	0.616	97.682	0.412	0.778	0.688	0.792	7.051	6.080	6.183	0.0076
D-1	0.684	97.697	0.427	0.767	0.692	0.891	7.829	7.098	7.207	0.0076
D-1	0.764	97.712	0.442	0.760	0.690	1.005	8.751	8.116	8.230	0.0076

Node	Flow (m^3/s)	Stage (m AOD)	Depth (m)	Velocity (m/s)	Froude no.	Area (m^2)	Conveyance (m^3/s)	Width (m)	W Perim. (m)	Slope
D-1	0.764	97.712	0.442	0.760	0.690	1.005	8.751	8.116	8.230	0.0076
D-1	0.784	97.716	0.446	0.753	0.752	1.042	8.981	10.203	10.319	0.0076
D-1	0.822	97.722	0.452	0.742	0.788	1.109	9.418	12.280	12.397	0.0076
D-1	0.836	97.724	0.454	0.737	0.792	1.134	9.575	12.840	12.958	0.0076
D-1	0.850	97.726	0.456	0.733	0.796	1.160	9.736	13.439	13.558	0.0076
D-1	0.920	97.735	0.465	0.716	0.763	1.285	10.539	14.333	14.455	0.0076
D-1	1.005	97.744	0.474	0.708	0.741	1.418	11.506	15.228	15.352	0.0076
D-1	1.015	97.745	0.475	0.708	0.740	1.434	11.620	15.383	15.509	0.0076
D-1	1.087	97.752	0.482	0.703	0.736	1.546	12.444	16.631	16.759	0.0076
D-1	1.189	97.761	0.491	0.698	0.730	1.703	13.613	18.266	18.397	0.0076
D-1	1.307	97.770	0.500	0.698	0.719	1.873	14.966	19.498	19.633	0.0076
D-1	1.392	97.776	0.506	0.699	0.715	1.993	15.945	20.488	20.625	0.0076
D-1	1.422	97.778	0.508	0.699	0.714	2.034	16.284	20.823	20.961	0.0076
D-1	1.577	97.787	0.517	0.708	0.709	2.226	18.062	21.884	22.025	0.0076
D-1	1.746	97.796	0.526	0.717	0.728	2.436	19.995	24.667	24.811	0.0076
D-1	1.868	97.802	0.532	0.722	0.729	2.587	21.388	25.920	26.066	0.0076
D-1	1.924	97.806	0.536	0.715	0.717	2.692	22.039	26.559	26.707	0.0076
D-1	2.184	97.818	0.549	0.721	0.691	3.029	25.011	27.303	27.454	0.0076
D-1	2.513	97.831	0.561	0.745	0.685	3.375	28.783	28.047	28.202	0.0076
D-1	2.653	97.836	0.566	0.755	0.684	3.516	30.385	28.301	28.458	0.0076
D-1	2.884	97.845	0.575	0.764	0.683	3.777	33.027	29.663	29.823	0.0076
D-1	3.307	97.858	0.588	0.792	0.681	4.177	37.876	30.341	30.505	0.0076
D-1	3.764	97.872	0.602	0.821	0.682	4.586	43.102	31.019	31.187	0.0076
D-1	4.253	97.885	0.615	0.850	0.683	5.004	48.705	31.697	31.870	0.0076
D-1	4.710	97.898	0.628	0.868	0.685	5.425	53.940	33.147	33.324	0.0076
D-1	4.909	97.904	0.634	0.872	0.686	5.627	56.213	34.153	34.332	0.0076
D-1	4.976	97.906	0.636	0.874	0.686	5.696	56.989	34.496	34.676	0.0076
D-1	5.530	97.918	0.648	0.905	0.689	6.112	63.326	34.802	34.985	0.0076
D-1	6.112	97.930	0.660	0.936	0.693	6.531	69.998	35.108	35.294	0.0076
D-1	6.724	97.942	0.672	0.967	0.697	6.954	76.998	35.413	35.603	0.0076
D-1	7.543	97.958	0.688	1.004	0.704	7.510	86.380	36.230	36.423	0.0076
D-1	8.413	97.973	0.703	1.042	0.712	8.077	96.344	37.045	37.243	0.0076
D-1	9.129	97.985	0.715	1.071	0.717	8.524	104.544	37.455	37.656	0.0076
D-1	9.874	97.997	0.727	1.100	0.721	8.976	113.073	37.864	38.068	0.0076
D-1	10.687	98.009	0.739	1.132	0.726	9.445	122.385	38.100	38.305	0.0076
D-1	11.530	98.022	0.752	1.163	0.730	9.916	132.043	38.337	38.542	0.0076
D-1	12.402	98.034	0.764	1.194	0.734	10.390	142.031	38.573	38.778	0.0076
D-1	13.409	98.048	0.778	1.226	0.741	10.934	153.562	39.158	39.363	0.0076
D-1	14.456	98.062	0.792	1.259	0.747	11.487	165.548	39.742	39.947	0.0076
D-1	15.365	98.074	0.804	1.285	0.752	11.952	175.956	40.132	40.337	0.0076
D-1	16.301	98.085	0.815	1.312	0.757	12.423	186.678	40.521	40.727	0.0076
D-1	17.263	98.097	0.827	1.338	0.761	12.898	197.700	40.911	41.117	0.0076

Tabulated Cross-Section Properties // D-2

(Calculated by Flood Modeller)

Node	Flow (m^3/s)	Stage (m AOD)	Depth (m)	Velocity (m/s)	Froude no.	Area (m^2)	Conveyance (m^3/s)	Width (m)	W Perim. (m)	Slope
D-2	0.000	91.404	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0162
D-2	0.000	91.415	0.011	0.100	0.425	0.001	0.001	0.215	0.217	0.0162
D-2	0.001	91.427	0.023	0.159	0.477	0.005	0.006	0.429	0.435	0.0162
D-2	0.002	91.438	0.034	0.209	0.511	0.011	0.018	0.644	0.652	0.0162
D-2	0.005	91.449	0.045	0.253	0.536	0.019	0.039	0.859	0.870	0.0162
D-2	0.009	91.461	0.057	0.293	0.556	0.030	0.070	1.073	1.087	0.0162
D-2	0.014	91.472	0.068	0.331	0.573	0.044	0.114	1.288	1.305	0.0162
D-2	0.023	91.484	0.080	0.392	0.597	0.060	0.184	1.359	1.380	0.0162
D-2	0.034	91.496	0.092	0.446	0.616	0.076	0.268	1.429	1.455	0.0162
D-2	0.047	91.508	0.104	0.495	0.632	0.094	0.366	1.500	1.530	0.0162
D-2	0.061	91.520	0.116	0.541	0.645	0.112	0.477	1.571	1.604	0.0162
D-2	0.077	91.532	0.128	0.583	0.657	0.132	0.603	1.641	1.679	0.0162
D-2	0.094	91.544	0.140	0.622	0.667	0.152	0.742	1.712	1.754	0.0162
D-2	0.114	91.556	0.152	0.660	0.677	0.173	0.896	1.783	1.829	0.0162
D-2	0.135	91.568	0.164	0.696	0.685	0.195	1.063	1.853	1.904	0.0162
D-2	0.158	91.580	0.176	0.730	0.693	0.217	1.245	1.924	1.979	0.0162
D-2	0.183	91.592	0.188	0.762	0.700	0.241	1.441	1.995	2.054	0.0162
D-2	0.210	91.604	0.200	0.794	0.707	0.265	1.653	2.065	2.129	0.0162
D-2	0.239	91.616	0.212	0.824	0.714	0.290	1.879	2.136	2.203	0.0162
D-2	0.270	91.628	0.224	0.853	0.719	0.316	2.121	2.207	2.278	0.0162
D-2	0.303	91.640	0.236	0.882	0.725	0.343	2.378	2.277	2.353	0.0162
D-2	0.337	91.652	0.248	0.909	0.730	0.371	2.651	2.348	2.428	0.0162
D-2	0.374	91.664	0.260	0.936	0.736	0.400	2.940	2.419	2.503	0.0162
D-2	0.413	91.676	0.272	0.963	0.740	0.429	3.246	2.489	2.578	0.0162
D-2	0.454	91.688	0.284	0.989	0.745	0.459	3.568	2.560	2.653	0.0162
D-2	0.497	91.700	0.296	1.014	0.750	0.490	3.907	2.631	2.728	0.0162
D-2	0.501	91.701	0.297	1.015	0.900	0.494	3.936	3.814	3.912	0.0162
D-2	0.517	91.705	0.301	1.011	0.985	0.511	4.059	4.751	4.849	0.0162
D-2	0.525	91.707	0.303	1.007	1.060	0.521	4.124	5.671	5.771	0.0162
D-2	0.543	91.711	0.307	0.993	1.145	0.547	4.265	7.134	7.235	0.0162
D-2	0.558	91.714	0.310	0.979	1.177	0.570	4.381	8.087	8.190	0.0162
D-2	0.568	91.716	0.312	0.968	1.223	0.587	4.465	9.191	9.294	0.0162
D-2	0.586	91.719	0.315	0.948	1.291	0.618	4.600	11.241	11.345	0.0162
D-2	0.592	91.720	0.316	0.940	1.294	0.629	4.648	11.686	11.791	0.0162
D-2	0.669	91.730	0.326	0.877	1.244	0.763	5.256	15.063	15.171	0.0162
D-2	0.705	91.734	0.330	0.854	1.199	0.825	5.538	15.935	16.045	0.0162
D-2	0.725	91.736	0.332	0.846	1.190	0.857	5.696	16.664	16.775	0.0162
D-2	0.746	91.738	0.334	0.837	1.180	0.891	5.864	17.373	17.485	0.0162
D-2	0.746	91.738	0.334	0.837	1.180	0.891	5.864	17.373	17.485	0.0162
D-2	0.758	91.739	0.335	0.833	1.214	0.910	5.952	18.945	19.057	0.0162
D-2	0.780	91.741	0.337	0.823	1.187	0.948	6.130	19.353	19.466	0.0162
D-2	0.889	91.749	0.345	0.800	1.118	1.110	6.984	21.257	21.374	0.0162
D-2	0.889	91.749	0.345	0.800	1.148	1.110	6.984	22.397	22.514	0.0162
D-2	0.966	91.754	0.350	0.789	1.098	1.225	7.588	23.287	23.406	0.0162
D-2	1.000	91.756	0.352	0.786	1.086	1.272	7.856	23.784	23.903	0.0162
D-2	1.171	91.765	0.361	0.783	1.040	1.495	9.198	25.907	26.030	0.0162
D-2	1.369	91.774	0.370	0.787	1.010	1.738	10.753	28.030	28.157	0.0162
D-2	1.392	91.775	0.371	0.788	1.007	1.766	10.939	28.262	28.390	0.0162
D-2	1.487	91.779	0.375	0.791	0.988	1.880	11.685	28.799	28.929	0.0162
D-2	1.570	91.782	0.378	0.798	0.980	1.967	12.337	29.111	29.242	0.0162
D-2	1.681	91.786	0.382	0.806	0.972	2.085	13.207	29.710	29.841	0.0162

Node	Flow (m^3/s)	Stage (m AOD)	Depth (m)	Velocity (m/s)	Froude no.	Area (m^2)	Conveyance (m^3/s)	Width (m)	W Perim. (m)	Slope
D-2	1.710	91.787	0.383	0.808	0.990	2.115	13.431	31.113	31.245	0.0162
D-2	1.889	91.793	0.389	0.818	0.993	2.308	14.842	33.315	33.448	0.0162
D-2	1.986	91.796	0.392	0.824	0.993	2.410	15.603	34.312	34.446	0.0162
D-2	2.053	91.798	0.394	0.828	0.996	2.479	16.127	35.204	35.339	0.0162
D-2	2.068	91.801	0.397	0.800	0.953	2.586	16.250	36.020	36.155	0.0162
D-2	2.160	91.804	0.400	0.801	0.951	2.696	16.967	37.290	37.427	0.0162
D-2	2.599	91.814	0.410	0.841	0.941	3.092	20.420	38.019	38.159	0.0162
D-2	3.083	91.825	0.421	0.882	0.938	3.495	24.225	38.749	38.891	0.0162
D-2	3.641	91.836	0.432	0.928	0.939	3.925	28.604	39.425	39.571	0.0162
D-2	3.747	91.838	0.434	0.936	0.945	4.004	29.440	40.086	40.233	0.0162
D-2	3.785	91.839	0.435	0.936	0.949	4.044	29.741	40.770	40.917	0.0162
D-2	3.865	91.841	0.437	0.936	0.960	4.128	30.368	42.544	42.691	0.0162
D-2	4.029	91.844	0.440	0.946	0.974	4.258	31.656	44.247	44.395	0.0162
D-2	4.085	91.845	0.441	0.949	0.978	4.303	32.093	44.815	44.964	0.0162
D-2	4.197	91.847	0.443	0.955	0.992	4.394	32.978	46.457	46.607	0.0162
D-2	4.255	91.848	0.444	0.958	0.997	4.441	33.427	47.207	47.357	0.0162
D-2	4.303	91.852	0.448	0.929	0.961	4.632	33.810	48.584	48.735	0.0162
D-2	4.756	91.859	0.455	0.955	0.967	4.977	37.363	49.997	50.150	0.0162
D-2	4.854	91.862	0.458	0.947	0.946	5.128	38.134	50.241	50.396	0.0162
D-2	4.923	91.863	0.459	0.951	0.948	5.178	38.680	50.518	50.672	0.0162
D-2	4.923	91.863	0.459	0.951	0.948	5.178	38.680	50.518	50.672	0.0162
D-2	5.345	91.869	0.465	0.973	0.973	5.491	41.997	53.774	53.930	0.0162
D-2	5.788	91.875	0.471	0.995	0.976	5.817	45.477	54.911	55.069	0.0162
D-2	6.587	91.885	0.481	1.033	0.982	6.374	51.749	56.529	56.690	0.0162
D-2	6.835	91.888	0.484	1.044	0.992	6.546	53.698	57.998	58.160	0.0162
D-2	7.004	91.890	0.486	1.051	0.997	6.663	55.027	58.788	58.951	0.0162
D-2	7.175	91.892	0.488	1.058	1.004	6.781	56.376	59.903	60.066	0.0162
D-2	7.409	91.897	0.493	1.046	0.979	7.084	58.208	60.932	61.097	0.0162
D-2	8.389	91.907	0.503	1.088	0.977	7.714	65.913	61.038	61.206	0.0162
D-2	9.482	91.918	0.514	1.136	0.982	8.345	74.495	61.144	61.315	0.0162
D-2	10.633	91.928	0.524	1.184	0.988	8.977	83.541	61.250	61.423	0.0162
D-2	11.717	91.938	0.534	1.226	0.992	9.560	92.058	61.426	61.601	0.0162
D-2	12.851	91.947	0.543	1.267	0.997	10.145	100.970	61.602	61.778	0.0162
D-2	14.033	91.957	0.553	1.308	1.002	10.731	110.255	61.778	61.955	0.0162
D-2	15.262	91.966	0.562	1.348	1.007	11.318	119.911	61.954	62.132	0.0162
D-2	16.847	91.978	0.574	1.398	1.014	12.053	132.361	62.268	62.447	0.0162
D-2	18.502	91.990	0.586	1.446	1.021	12.792	145.365	62.582	62.762	0.0162
D-2	20.226	92.002	0.598	1.494	1.029	13.534	158.914	62.896	63.076	0.0162
D-2	22.019	92.013	0.609	1.542	1.036	14.281	172.999	63.209	63.391	0.0162
D-2	23.879	92.025	0.621	1.589	1.043	15.030	187.613	63.523	63.706	0.0162
D-2	25.806	92.037	0.633	1.635	1.050	15.784	202.750	63.837	64.020	0.0162

Tabulated Cross-Section Properties // D-3

(Calculated by Flood Modeller)

Node	Flow (m^3/s)	Stage (m AOD)	Depth (m)	Velocity (m/s)	Froude no.	Area (m^2)	Conveyance (m^3/s)	Width (m)	W Perim. (m)	Slope
D-3	0.000	82.743	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0155
D-3	0.001	82.777	0.034	0.201	0.491	0.005	0.007	0.272	0.283	0.0155
D-3	0.006	82.811	0.068	0.318	0.551	0.019	0.047	0.544	0.566	0.0155
D-3	0.017	82.845	0.102	0.417	0.590	0.042	0.139	0.816	0.849	0.0155
D-3	0.037	82.879	0.136	0.505	0.619	0.074	0.300	1.088	1.132	0.0155
D-3	0.068	82.913	0.170	0.586	0.642	0.116	0.544	1.360	1.415	0.0155
D-3	0.120	82.951	0.208	0.707	0.669	0.169	0.963	1.489	1.564	0.0155
D-3	0.185	82.989	0.246	0.811	0.690	0.228	1.487	1.618	1.714	0.0155
D-3	0.264	83.026	0.283	0.904	0.706	0.292	2.118	1.747	1.864	0.0155
D-3	0.356	83.064	0.321	0.988	0.720	0.360	2.858	1.876	2.014	0.0155
D-3	0.462	83.102	0.359	1.066	0.732	0.434	3.710	2.005	2.164	0.0155
D-3	0.582	83.140	0.397	1.138	0.742	0.512	4.678	2.134	2.314	0.0155
D-3	0.718	83.177	0.434	1.207	0.752	0.595	5.764	2.263	2.464	0.0155
D-3	0.868	83.215	0.472	1.272	0.760	0.683	6.973	2.392	2.614	0.0155
D-3	1.035	83.253	0.510	1.334	0.768	0.776	8.309	2.521	2.764	0.0155
D-3	1.203	83.288	0.545	1.391	0.775	0.865	9.662	2.631	2.894	0.0155
D-3	1.385	83.322	0.579	1.446	0.781	0.958	11.125	2.741	3.024	0.0155
D-3	1.581	83.357	0.614	1.499	0.787	1.055	12.700	2.851	3.154	0.0155
D-3	1.792	83.391	0.648	1.551	0.793	1.155	14.390	2.961	3.284	0.0155
D-3	2.017	83.426	0.683	1.601	0.798	1.260	16.198	3.071	3.414	0.0155
D-3	2.257	83.461	0.718	1.650	0.803	1.368	18.126	3.181	3.544	0.0155
D-3	2.512	83.495	0.752	1.697	0.808	1.480	20.177	3.291	3.674	0.0155
D-3	2.783	83.530	0.787	1.744	0.813	1.596	22.353	3.401	3.804	0.0155
D-3	2.882	83.542	0.799	1.750	0.981	1.647	23.148	5.071	5.482	0.0155
D-3	2.943	83.549	0.806	1.745	1.091	1.687	23.638	6.470	6.885	0.0155
D-3	2.952	83.550	0.807	1.743	1.093	1.693	23.711	6.534	6.950	0.0155
D-3	3.319	83.585	0.842	1.704	1.103	1.948	26.658	8.017	8.455	0.0155
D-3	3.383	83.591	0.848	1.692	1.153	1.999	27.172	9.116	9.558	0.0155
D-3	3.721	83.616	0.873	1.658	1.143	2.244	29.887	10.465	10.924	0.0155
D-3	4.023	83.635	0.892	1.643	1.118	2.449	32.317	11.138	11.608	0.0155
D-3	4.270	83.651	0.908	1.622	1.095	2.633	34.295	11.768	12.246	0.0155
D-3	4.456	83.662	0.919	1.612	1.079	2.764	35.792	12.154	12.637	0.0155
D-3	4.723	83.678	0.935	1.591	1.078	2.969	37.934	13.379	13.869	0.0155
D-3	5.068	83.696	0.953	1.574	1.071	3.221	40.706	14.631	15.129	0.0155
D-3	5.562	83.718	0.975	1.564	1.055	3.556	44.673	15.889	16.397	0.0155
D-3	5.586	83.719	0.976	1.563	1.089	3.573	44.866	17.007	17.515	0.0155
D-3	6.054	83.739	0.996	1.543	1.057	3.923	48.631	18.048	18.566	0.0155
D-3	6.198	83.744	1.001	1.543	1.065	4.015	49.781	18.757	19.277	0.0155
D-3	6.609	83.757	1.014	1.548	1.079	4.270	53.083	20.338	20.865	0.0155
D-3	6.642	83.758	1.015	1.548	1.079	4.290	53.347	20.440	20.967	0.0155
D-3	7.051	83.770	1.027	1.550	1.112	4.550	56.637	22.983	23.516	0.0155
D-3	7.121	83.772	1.029	1.549	1.138	4.598	57.195	24.364	24.898	0.0155
D-3	7.612	83.785	1.042	1.546	1.129	4.924	61.140	25.746	26.286	0.0155
D-3	7.612	83.785	1.042	1.546	1.129	4.924	61.140	25.746	26.286	0.0155
D-3	8.101	83.797	1.054	1.546	1.124	5.241	65.067	27.182	27.729	0.0155
D-3	8.309	83.802	1.059	1.545	1.122	5.379	66.740	27.831	28.380	0.0155
D-3	8.606	83.809	1.066	1.543	1.130	5.579	69.126	29.338	29.891	0.0155
D-3	8.687	83.811	1.068	1.541	1.144	5.638	69.774	30.497	31.051	0.0155
D-3	9.206	83.822	1.079	1.540	1.127	5.979	73.944	31.433	31.992	0.0155
D-3	9.747	83.832	1.089	1.548	1.114	6.296	78.291	31.954	32.517	0.0155
D-3	9.747	83.832	1.089	1.548	1.114	6.296	78.291	31.954	32.517	0.0155
D-3	11.034	83.853	1.110	1.582	1.095	6.976	88.626	32.788	33.352	0.0155

Node	Flow (m^3/s)	Stage (m AOD)	Depth (m)	Velocity (m/s)	Froude no.	Area (m^2)	Conveyance (m^3/s)	Width (m)	W Perim. (m)	Slope
D-3	12.437	83.874	1.131	1.621	1.083	7.673	99.894	33.623	34.188	0.0155
D-3	12.649	83.877	1.134	1.627	1.082	7.774	101.596	33.730	34.296	0.0155
D-3	14.550	83.903	1.160	1.678	1.081	8.671	116.871	35.282	35.848	0.0155
D-3	16.228	83.924	1.181	1.722	1.079	9.423	130.344	36.322	36.889	0.0155
D-3	17.418	83.938	1.195	1.753	1.080	9.936	139.905	36.981	37.548	0.0155
D-3	19.213	83.958	1.215	1.798	1.081	10.685	154.321	37.848	38.417	0.0155
D-3	21.111	83.978	1.235	1.844	1.082	11.450	169.566	38.716	39.286	0.0155
D-3	21.400	83.981	1.238	1.850	1.083	11.567	171.889	38.884	39.454	0.0155
D-3	23.746	84.005	1.262	1.897	1.088	12.517	190.736	40.361	40.931	0.0155
D-3	25.719	84.024	1.281	1.934	1.091	13.295	206.581	41.504	42.076	0.0155
D-3	26.707	84.033	1.290	1.954	1.093	13.671	214.518	41.996	42.568	0.0155
D-3	30.555	84.066	1.323	2.026	1.100	15.084	245.423	43.617	44.190	0.0155
D-3	32.299	84.080	1.337	2.057	1.102	15.698	259.430	44.204	44.778	0.0155
D-3	35.997	84.109	1.366	2.117	1.107	17.001	289.137	45.596	46.171	0.0155
D-3	37.568	84.122	1.379	2.134	1.112	17.602	301.757	46.860	47.436	0.0155
D-3	37.687	84.123	1.380	2.135	1.112	17.648	302.709	46.966	47.541	0.0155
D-3	41.729	84.153	1.410	2.186	1.117	19.086	335.174	48.854	49.430	0.0155
D-3	42.306	84.157	1.414	2.194	1.118	19.281	339.806	49.076	49.653	0.0155
D-3	46.752	84.187	1.444	2.250	1.124	20.780	375.524	50.861	51.438	0.0155
D-3	47.697	84.193	1.450	2.262	1.125	21.087	383.115	51.153	51.731	0.0155
D-3	54.101	84.231	1.488	2.346	1.133	23.061	434.553	52.740	53.319	0.0155
D-3	57.108	84.248	1.505	2.383	1.136	23.963	458.702	53.449	54.030	0.0155
D-3	62.152	84.275	1.532	2.445	1.143	25.420	499.216	54.458	55.040	0.0155
D-3	68.928	84.310	1.567	2.520	1.151	27.352	553.640	55.973	56.557	0.0155
D-3	70.950	84.320	1.577	2.542	1.153	27.914	569.881	56.377	56.961	0.0155
D-3	76.796	84.349	1.606	2.597	1.159	29.569	616.842	57.765	58.351	0.0155
D-3	80.595	84.367	1.624	2.632	1.162	30.616	647.355	58.564	59.151	0.0155
D-3	86.299	84.394	1.651	2.679	1.167	32.216	693.173	59.964	60.551	0.0155
D-3	88.023	84.402	1.659	2.692	1.168	32.698	707.016	60.401	60.989	0.0155
D-3	95.383	84.434	1.691	2.752	1.174	34.654	766.131	61.897	62.486	0.0155
D-3	99.478	84.450	1.707	2.791	1.177	35.647	799.023	62.237	62.827	0.0155
D-3	106.685	84.479	1.736	2.847	1.181	37.467	856.912	63.258	63.848	0.0155
D-3	116.026	84.514	1.771	2.923	1.187	39.699	931.943	64.278	64.869	0.0155
D-3	121.641	84.534	1.791	2.968	1.191	40.990	977.040	64.788	65.379	0.0155
D-3	127.395	84.554	1.811	3.012	1.195	42.291	1023.262	65.298	65.889	0.0155
D-3	136.931	84.585	1.842	3.089	1.202	44.323	1099.858	65.808	66.400	0.0155
D-3	146.787	84.616	1.873	3.166	1.209	46.371	1179.025	66.318	66.911	0.0155
D-3	156.976	84.649	1.906	3.232	1.215	48.576	1260.859	67.339	67.933	0.0155
D-2	23.879	92.025	0.621	1.589	1.043	15.030	187.613	63.523	63.706	0.0162
D-2	25.806	92.037	0.633	1.635	1.050	15.784	202.750	63.837	64.020	0.0162

Annex D - EA Product Data

[redacted]

[redacted]

- Lime Down C2: SPZ2c and SPZ3
- Lime Down D: SPZ1c and SPZ2c and SPZ3
- Lime Down E1: SPZ1c and SPZ2c
- Lime Down E2: SPZ1c and SPZ2c

The aquifer designations in the areas given are,

- Alluvium – Secondary A Aquifer with Medium to High Vulnerability
- Forest Marble limestone member - Principal Aquifer with High Vulnerability
- Forest Marble mudstone member - Secondary A Aquifer with High Vulnerability
- Cornbrash - Secondary A Aquifer with High Vulnerability
- Kellaways Clay – Unproductive Strata

Provision of FRA Product 4

Thank you for your recent request to use Environment Agency flood data. The information is attached.

If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of Environment Agency Information for Flood Risk Assessments and our attached advisory text.
https://www.gov.uk/planning-applications-assessing-flood-risk
https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion

Further details about the Environment Agency information supplied and the permitted use of this information can be found on the GOV.UK website:
https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather
http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3

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

If you are not satisfied with our response to your request for information you can contact us within 2 calendar months to ask for our decision to be reviewed.

We really value your thoughts on how we are doing and will always make changes where we can to improve our service. Please click on the link below and fill in our survey.
http://www.smartsurvey.co.uk/s/EnvironmentAgencyCustomerSurvey/?a=DC *Thank you.*

Kind regards

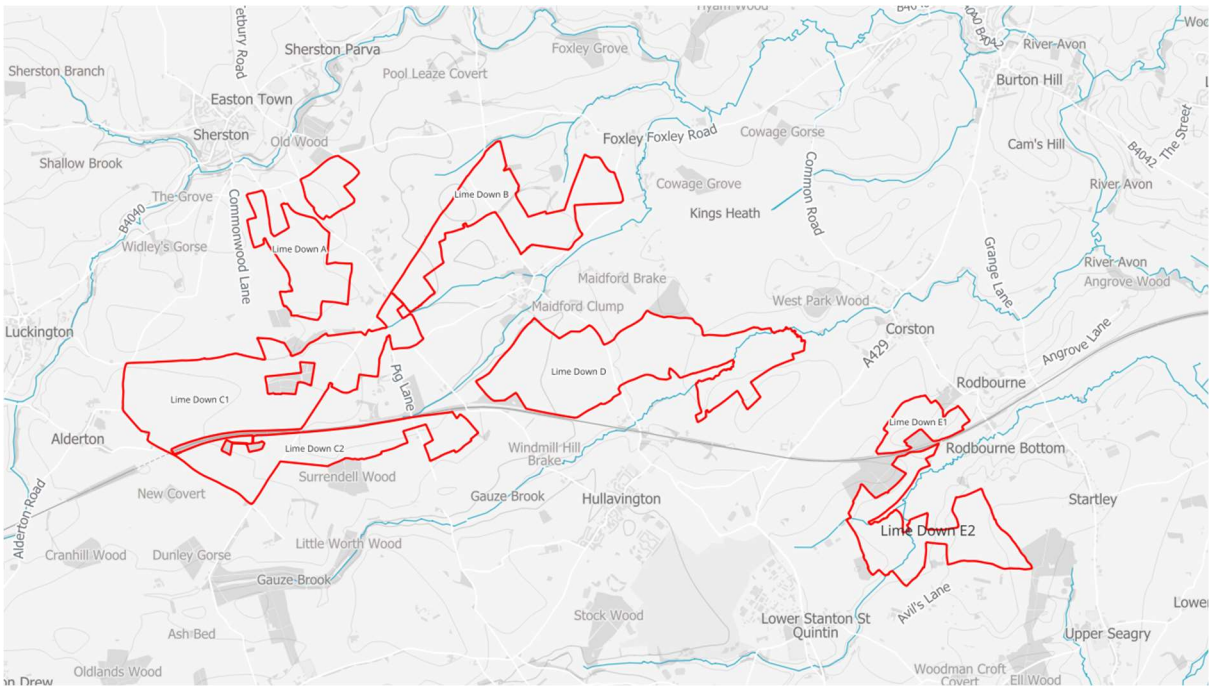
[redacted]ency, Wessex Enquiries, Customer & Engagement Team

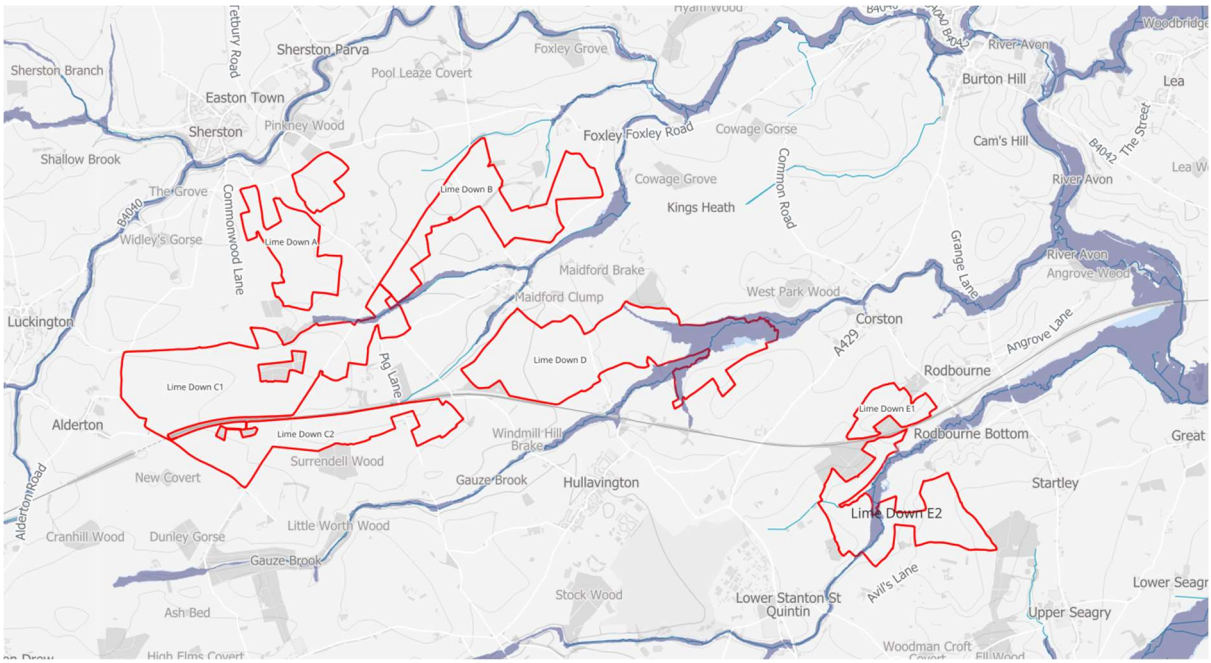
[redacted]Wessex Enquiries

[redacted] mabbett.eu>
Sent: 15 October 2024 14:01
To: Enquiries, Unit <enquiries@environment-agency.gov.uk>
Subject: 317212 Lime Down Data Request

To whom it may concern,

Mabbett & Associates Ltd have been instructed to undertake a Flood Risk Assessment and Drainage Strategy in support of a proposed solar site in Wiltshire, known as the site hereon. I attach a site location plan and the site details below. The site has been split into parcels which can be seen below (Lime Down A, B, C1, C2, D, E1 and E2).





According to the EA online Flood M Planning, the Site is shown to be located within Flood Zones 1, 2 and 3, however we would be grateful if you could provide **any nearby modelled flood level data** in order to inform our assessment of the Site.

It would therefore be useful if you are able to confirm/provide the followiap forng where available:

Site Details

Site Name	Lime Down SOlar
Address	Lime Down A: SN16 0PU (NGR: 385982, 184814) Lime Down B: SN16 0JS (NGR: 388179, 185419) Lime Down C1: SN14 6NL (NGR: 385300, 183486) Lime Down C2: SN16 0JZ (NGR: 386684, 182717) Lime Down D: SN14 6EU (NGR: 389526, 183654) Lime Down E1: SN16 0EX (NGR: 392655, 183066) Lime Down E2: SN14 6DA (NGR: 393123, 181766)

Data Request

Please provide any of the following information to enable us to complete our assessment:

Historical Flooding Information

· Any records, photographs, flood extents from known historic events in the area

Technical Data

· Any hydraulic models covering the site

· Raw and processed results for the model(s) above

- Hydraulic modelling report for the model(s) above
- Modelled floodplain levels and flows for node points within and in the immediate vicinity of the Site taking into account the most recent climate change allowances (where these have been modelled);

· Hydrology report and/or flood estimation calculation records for the model(s) above

· Survey data used to build the model or inform nearby studies

Supporting Data

- Flood/coastal defence survey data
- Operational procedures for hydraulic structures
- Section 19 flood investigation reports
- The date and type of modelling that flood levels have been derived from;
- The technical report summarising the modelling methodology;
- Confirmation that the data is appropriate/relevant to inform flood risk within the Site;
- Details of any flood defences within the vicinity of the Site (i.e type, crest levels, Standard of Protection, condition, etc) and any associated breach and/or overtopping flood extents and depths;
- Hazard mapping detailing the depth, velocity and associated hazard rating for the Site;
- Any information in relation to surface water flooding including confirmation is located within or outside of a Critical Drainage Area;
- Any information in relation to on-Site drainage;
- Any information in relation to groundwater flooding in the area. Where possible, please provide borehole locations and ground water levels;
- Details of sensitive aquifers and known contamination issues;
- Any information/mapping of historical flooding events on Site from all sources of flooding (i.e fluvial, tidal, surface water, groundwater, sewer, reservoir, canal, etc).

Where available please can you provide flood levels, estimated return periods, photographs and other such data that may be relevant to our assessment;

We trust this request is acceptable but please do not hesitate to contact us if you require any further information to assist with your response or wish to discuss the Site in further detail.

We look forward to hearing from you.

Thanks,

[redacted]

Consultant | Water Environment Team

[redacted]







IOSH & IEMA Training Course Provider

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creating a better place

Environment Agency

[redacted]

Our ref: 381197-WX
Date: 4th November 2024

Thank you for your enquiry which was received on 15th October 2024. We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

Abstract

Name	Product 4
Description	Flood Risk Information for land at **Lime Down** NGR: ST9009082825
Licence	Open Government Licence
Information Warnings	*The mapping of features provided as a background in this product is © Ordnance Survey. It is provided to give context to this product. The Open Government Licence does not apply.*
Attribution	Contains Environment Agency information © Environment Agency and/or database rights. Contains Ordnance Survey data © Crown copyright 2023 Ordnance Survey *AC0000807064*.

Open Data

The following Environment Agency published datasets are now available on the weblink below as part of the Government's 'Open Data' project and are available for you to download free of charge.

Environment Agency published datasets: https://data.gov.uk/data/search?publisher=environment-agency&unpublished=false

You will need to search and select the name of the following datasets to take you directly to the weblink to enable you to download the data:

- Flood Map for Planning (Rivers and the Sea) – Flood Zones 2 and 3
- Flood Map for Planning (Rivers and Sea) – Areas Benefiting from Defences
- Flood Map for Planning (Rivers and Sea) Spatial Flood Defences
- Flood Map for Planning (Rivers and Sea) Flood Storage Areas
- Recorded Flood Outlines
- Historic Flood Map
- Risk of Flooding from Surface Water Extent for:
  - → 3 percent annual chance
  - → 1 percent annual chance
  - → 0.5 percent annual chance

You can also access the Flood Map for Planning here: https://flood-map-for-planning.service.gov.uk/

Customer & Engagement, Wessex
Rivers House, East Quay, Bridgwater, Somerset, TA6 4YS
Email: wessexenquiries@environment-agency.gov.uk
www.environment-agency.gov.uk

You can also access the Risk of Flooding from Surface Water maps and Risk of Flooding from Reservoirs information here: https://flood-warning-information.service.gov.uk/long-term-flood-risk/map

Recorded Historic Flood Events

We no longer produce pdf copies of the Historic Flood Map. This information is available to search, select, and download free of charge as part of the Government's 'open data' as

- Recorded Flood Outlines
- the Historic Flood Map

Our historic records indicate that there was flooding in the area in **1925** (fluvial), **1932** (fluvial), **1954** (fluvial), **1979** (fluvial), **1999** (fluvial/unconfirmed source), **2007** (fluvial), **2009** (fluvial), **2012** (fluvial/unconfirmed source) and **2013** (fluvial).

Additionally, our historic records show a record of possible flooding pre 2012 for the area, however we are currently unable to confirm the date and source of this.

Please note - we cannot guarantee that this is an exhaustive list of all past flood events in this location. All reasonable care has been taken to ensure that the historical flood event data is as accurate as possible. The Environment Agency will update its records if new evidence emerges.

Modelled Fluvial Water Levels

We have not carried out any detailed fluvial flood risk modelling in this location.

The fluvial Flood Map in this area has been produced using our National Generalised Model (JFLOW). This modelling is fit for the purpose of the Flood Zones. However, it is not based on a specific channel survey. Neither water depths nor water levels were outputs specified when we commissioned this generalised modelling for the Flood Zones. Whilst the modelling process does provide some information on depth of water, it would have been possible to produce the flood extents without storing the water depth values, since water depth is only a 'by-product' of the calculation process. As this type of modelling was developed, tested and reviewed for production of the Flood Zone extents only, we have no information on the accuracy of the water depth data. Water depth or level outputs from this model are only suitable to be used for decision making at a broad catchment scale and is not fit for the purpose of a site-specific flood risk assessment.

For your information we have supplied maps showing the water depths derived from JFLOW for the 1% AEP (100yr) and 0.1% AEP (1000yr) fluvial modelled flood scenarios.

Please note - The Environment Agency is currently carrying out a project to update the National Generalised model (JFLOW). The New National Model outputs are expected in Spring 2025. Our published flood risk information for this area will be updated using outputs from the New National Model and this is expected to take place in late 2025 (current programme which may change). This will be carried out as part of the National project to update our National flood risk mapping and modelling information across England and will incorporate outputs from detailed local models together with updated National modelling.
New National Model Details.

The New National Modelling (NNM) is a set of models for rivers, surface water and the sea covering the whole of England. The NNM has been created to fill in gaps where we don't have local

hydraulic models, our local models require updating or we need additional model scenarios such as climate change runs.

Please also note - we are currently carrying out a National project to update our flood risk information for the whole of England. We will be updating our flood risk information in 2025 as part of the new National Flood Risk Assessment (NaFRA2). This will include the data displayed on the Check Your Long-Term Flood Risk service and the data displayed in the Flood Map for Planning (Rivers and Sea).

This should result in improvements to our mapping products, especially where we do not currently have any detailed local modelling. This means there will be some changes to our flood risk information in many areas when the new data is published.

You can find further information on the NaFRA2 project here: https://www.gov.uk/guidance/updates-to-national-flood-and-coastal-erosion-risk-information

For more information on climate change allowances please see the guidance on the Gov.UK website here: Flood risk assessments: climate change allowances - GOV.UK. **Please be aware that this information is subject to change, please check the guidance regularly.**

Environmental Permit for Flood Risk Activities

In addition to any other permission(s) that you may have already obtained e.g. planning permission, you may need an environmental permit for flood risk activities (formerly known as Flood Defence Consent prior to 06 April 2016) if you want to do work:

- in, under, over or near a main river (including where the river is in a culvert)
- on or near a flood defence on a main river
- in the flood plain of a main river
- on or near a sea defence

For further information and to check whether a permit is required please visit: https://www.gov.uk/guidance/flood-risk-activities-environmental-permits.

For any further advice, please email Blandford.frap@environment-agency.gov.uk.

Ordinary Watercourse

Some of the watercourses adjoining this site are classed as an “Ordinary Watercourse” not a “Main River” under our control. Works to ordinary watercourses may require consent from either the Lead Local Flood Authorities or the Local Drainage Board.

Flood Asset Information

Please find enclosed details of Flood Assets within the area. This information has been taken from our Asset Information Management System database (AIMS).

Please note that flood defences can increase water levels elsewhere eg through channels being restricted by defences, or because defences prevent flood water flowing back into the river channel.

Planning

If you have questions regarding the planning nature of your enquiry, or require advice on floor levels, please contact our Sustainable Places team on wx.sp@environment-agency.gov.uk. Please be aware that we now charge for planning advice when consulted on pre-application enquiries. This new approach provides advice to developers in two ways. Firstly, there is the provision of ‘free’

advice available to everyone where we give a preliminary opinion on a proposed development. This sets out the environmental constraints together with any issues this raises for us. Should you wish us to review in detail any of these issues then we can do this through a chargeable scheme aimed at recovering our costs.

Strategic Flood Risk Assessment (SFRA)

When preparing a FRA to support a development proposal in this location you should refer to Wiltshire Council's SFRA Reports Level 1 which is available to download via the following link: https://www.wiltshire.gov.uk/media/5691/Strategic-Flood-Risk-Assessment-Level-1/pdf/Wiltshire_Council_Level_1_SFRA_v5.0.pdf?m=637459765054370000

The Wiltshire Council Local Plan is available via this link: https://www.wiltshire.gov.uk/planning-policy-local-plan-review-consultation

Further Information

We advise that you also contact the drainage engineer/ flood risk management team at Wiltshire Council by email: drainage@wiltshire.gov.uk, or by phone: 0300 456 0105, based at: Bythesea Road, Trowbridge, Wiltshire, BA14 8JN, as they may be able to provide further advice with respect to localised flooding and drainage issues.

Further details about the Environment Agency information supplied can be found on our website: https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather

We hope you find this information helpful. It is provided subject to the attached notice 'Use of Environment Agency Information for Flood Risk Assessments', which we strongly recommend you read.

Yours sincerely

[redacted]

Customer & Engagement, Wessex
Rivers House, East Quay, Bridgwater, Somerset, TA6 4YS
Email: wessexenquiries@environment-agency.gov.uk

Enc: Use of Environment Agency Information for Flood Risk Assessments (below)
381197-WX 100yr JFLOW Depth Map (1%AEP)
381197-WX 1000yr JFLOW Depth Map (0.1%AEP)
381197-WX Defence Map
381197-WX Defence Data

Use of Environment Agency Information for Flood Risk Assessments (FRAs)

Important
Use of Environment Agency data: you should note that

1. Information supplied by the Environment Agency may be used to assist in producing a Flood Risk Assessment (FRA) where one is required, but the use of Environment Agency information does not constitute such an assessment on its own.

2. As part of your data request, we have provided all of the modelled data we hold for your location. Please note that some of our modelled information may have been produced for purposes other than for flood zone generation. This may mean that some of the modelled data you have been provided with has a lower confidence level, and has not been used in producing our flood map, nor definitively reflects the predicted flood water level at the property/development site scale. To check the suitability of the use of this information in your FRA please contact your local Partnership & Strategic Overview (PSO) team.

3. This information covers flood risk from main rivers and the sea, and you will need to consider other potential sources of flooding, such as groundwater or surface water runoff. The information produced by the Local Planning Authority and the Lead Local Flood Authority (LLFA) may assist in assessing other sources of flood risk.

4. Where a planning application requires a FRA and this is not submitted or deficient, the Environment Agency may well raise an objection.

5. For more significant proposals in higher flood risk areas, we would be pleased to discuss details with you ahead of making any planning application, and you should also discuss the matter with your Local Planning Authority.

Pre-Planning Advice from the Environment Agency
If you have requested this information to help inform a development proposal, then we recommend that you undertake a formal pre-application enquiry using the form available from our website:

Pre-application Preliminary Opinion:
https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion

Pre-application Charged Service:
https://www.gov.uk/government/publications/planning-advice-environment-agency-standard-terms-and-conditions

Depending on the enquiry we may also provide advice on other issues related to our responsibilities, including flooding, waste, land contamination, water quality, biodiversity, navigation, pollution, water resources, foul drainage or Environmental Impact Assessment.

Flood Risk Assessment (FRA) Guidance
You should refer to the Planning Practice Guidance of the National Planning Policy Framework (NPPF) and the Environment Agency's Flood Risk Standing Advice for information about Flood Risk Assessment (FRA) for new development in the different Flood Zones. These documents can be accessed via:

National Planning Policy Framework Planning Practice Guidance:
http://planningguidance.planningportal.gov.uk/

Environment Agency advice on FRAs:

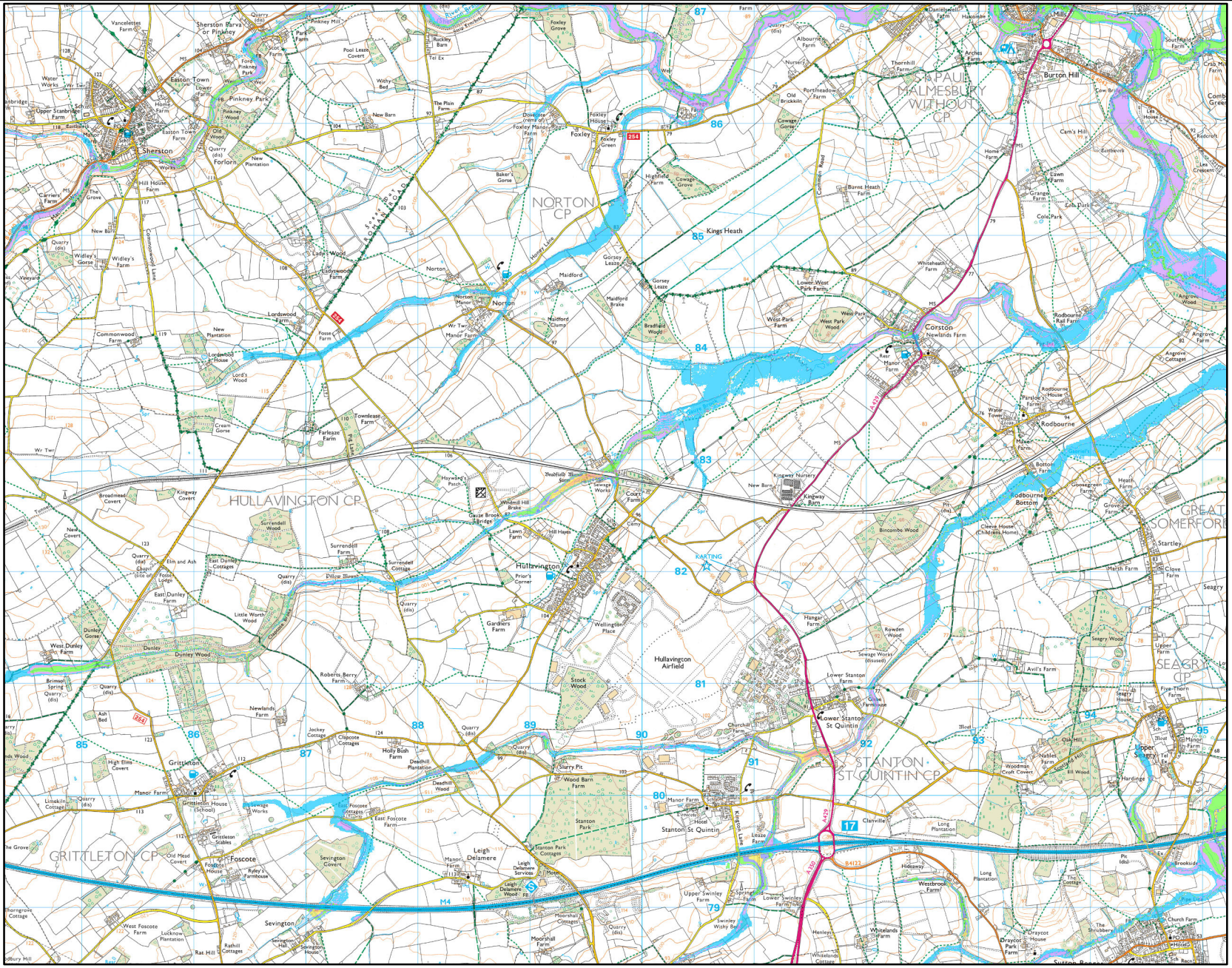
Customer & Engagement, Wessex
Rivers House, East Quay, Bridgwater, Somerset, TA6 4YS
Email: wessexenquiries@environment-agency.gov.uk
www.environment-agency.gov.uk

https://www.gov.uk/flood-risk-assessment-for-planning-applications#when-to-follow-standing-advice

https://www.gov.uk/government/publications/planning-applications-assessing-flood-risk

Customer & Engagement, Wessex
Rivers House, East Quay, Bridgwater, Somerset, TA6 4YS
Email: wessexenquiries@environment-agency.gov.uk
www.environment-agency.gov.uk

381197-WX - JFLOW Fluvial Water depths (m) Without Flood Defences. 100 year (1% AEP) centred on land at Lime Down [390090,182825].
Created 01.11.2024



Environment Agency

Scale 1:50,000

N
W E
S

Legend

100yr JFLOW Depth

Metres

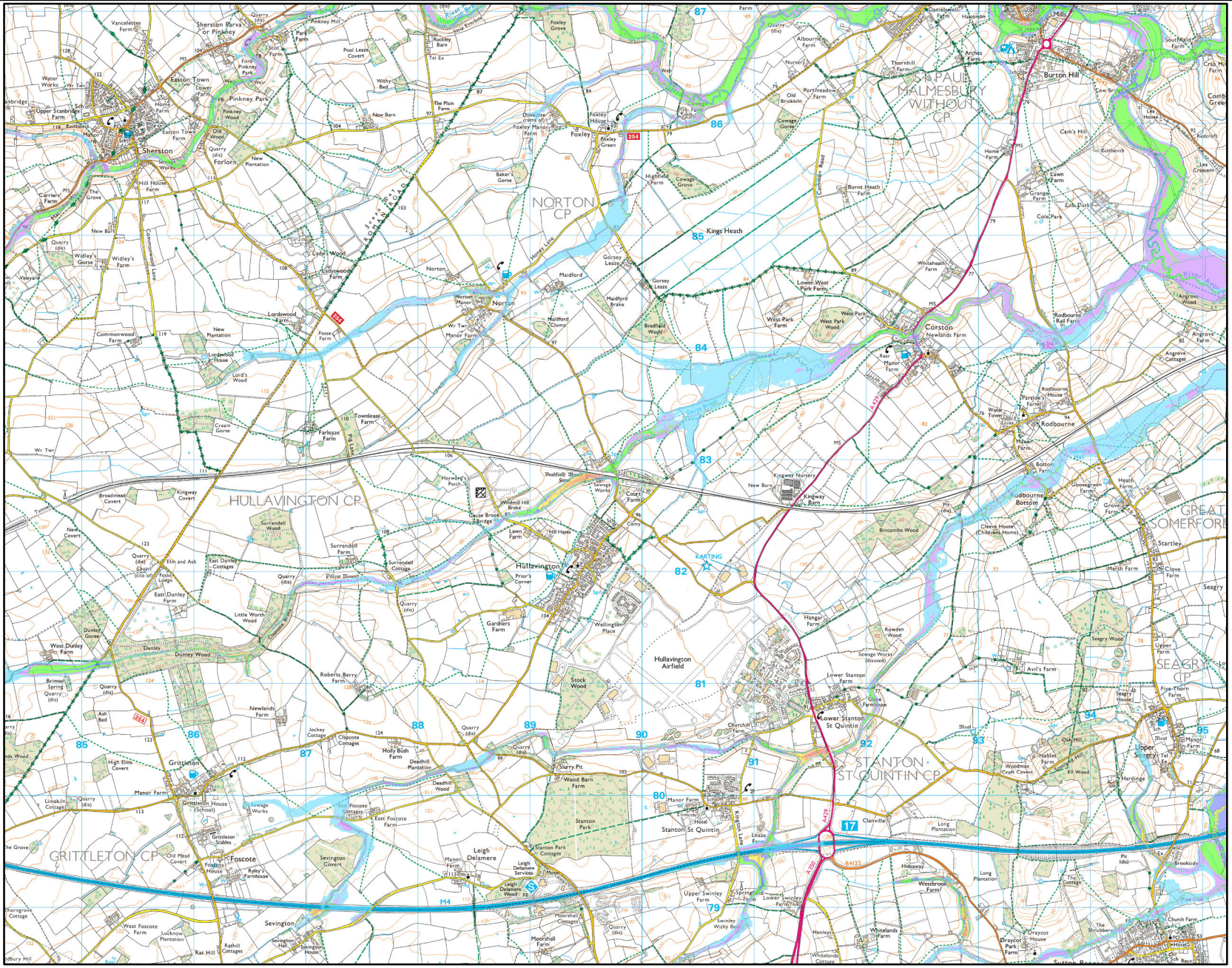
- 0 - 0.5
- 0.500000000 - 1
- 1.000000001 - 2
- 2.000000001 - 3
- 3.000000001 - 4
- 4.000000001 - 5
- 5.000000001 - 10
- 10.00000001 - 100

Information Warning
We do not recommend the use of water depths/levels derived from JFLOW for site specific investigations such as Flood Risk Assessments.

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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

381197-WX - JFLOW Fluvial Water depths (m) Without Flood Defences. 1000 year (0.1% AEP) centred on land at Lime Down [390090,182825].
Created 01.11.2024



Environment Agency

Scale 1:50,000

N
W E
S

Legend

1000yr JFLOW Depth

Metres

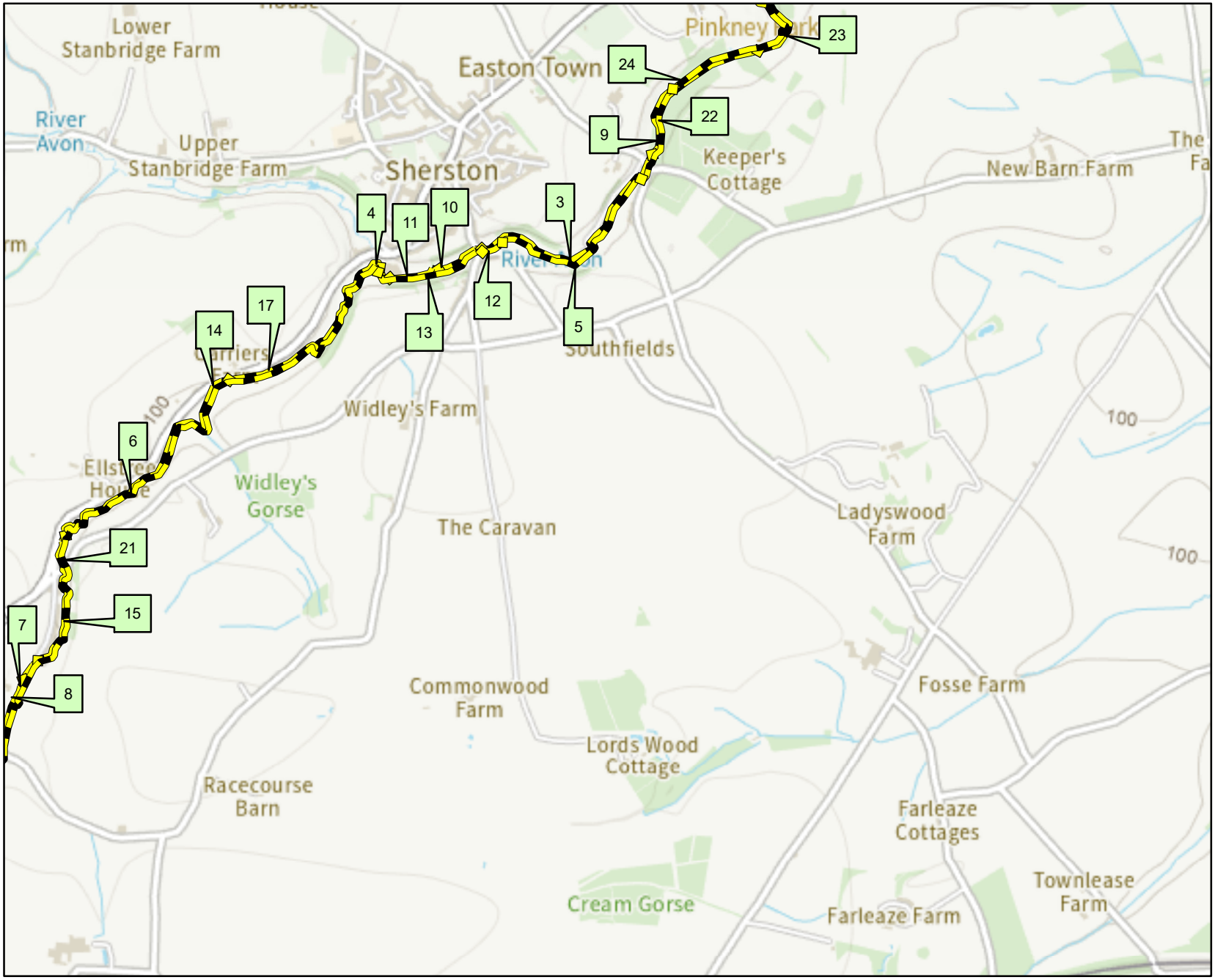
- 0 - 0.5
- 0.500000000 - 1
- 1.000000001 - 2
- 2.000000001 - 3
- 3.000000001 - 4
- 4.000000001 - 5
- 5.000000001 - 10
- 10.00000001 - 100

Information Warning
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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

Current Flood Defences centered on NGR ST 85982 84814 Created 22/10/2024 Ref: 381197-WX



Environment Agency

Scale: 1:20,000

N W E S

Legend

Defences

- Barrier Beach
- Beach
- Bridge Abutment
- Cliff
- Demountable Defence
- Dunes
- Embankment
- Engineered High Ground
- Flood Gate
- Natural High Ground
- Promenade
- Quay
- Spillway
- Wall

This data has been extracted from the Asset Information Management System (AIMS OM) which was created to draw various data sources into one database and has been populated with information of varying quality.

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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

Product 4 - AIMS Information **381197-WX** **Date:** **22/10/2024**

Map Ref	Asset ID	Asset Type	Right or left bank	Asset Description	Approx length (m)	Actual fluvial downstream crest level (mAOD)	Actual fluvial downstream crest level accuracy	Actual fluvial upstream crest level (mAOD)	Actual fluvial upstream crest level accuracy	Actual fluvial coastal crest level (mAOD)	Actual fluvial coastal crest level accuracy	NGR	Most recent inspection	Overall condition
3	40115	Natural High Ground	Left	Natural Bank	878.51	DNR	DNR	DNR	DNR	DNR	DNR	ST8592785717	07/04/2009	2 - Good
4	40116	Natural High Ground	Left	Stone wall	63.60	DNR	DNR	DNR	DNR	DNR	DNR	ST85158562	07/04/2009	2 - Good
5	40419	Natural High Ground	Right	Natural Bank	714.43	DNR	DNR	DNR	DNR	DNR	DNR	ST85898565	07/04/2009	2 - Good
6	40420	Natural High Ground	Left	Natural Bank	959.72	DNR	DNR	DNR	DNR	DNR	DNR	ST84218478	19/12/2007	3 - Fair
7	4605	Natural High Ground	Left	Natural channel with masonry retaining wall	89.38	DNR	DNR	DNR	DNR	DNR	DNR	ST8389484163	23/10/1996	3 - Fair
8	4606	Natural High Ground	Left	Natural Bank	1229.01	DNR	DNR	DNR	DNR	DNR	DNR	ST83618359	19/12/2007	3 - Fair
9	4730	Natural High Ground	Left	Natural Bank	275.81	DNR	DNR	DNR	DNR	DNR	DNR	ST8615986133	07/04/2009	3 - Fair
10	4731	Natural High Ground	Left	Natural channel with stone retaining wall	181.67	DNR	DNR	DNR	DNR	DNR	DNR	ST85438562	07/04/2009	2 - Good
11	4849	Natural High Ground	Left	Natural Bank	189.57	DNR	DNR	DNR	DNR	DNR	DNR	ST8525585581	07/04/2009	2 - Good
12	4851	Natural High Ground	Right	Stone Wall	83.61	DNR	DNR	DNR	DNR	DNR	DNR	ST85568567	07/04/2009	2 - Good
13	4852	Natural High Ground	Right	Natural Bank	425.87	DNR	DNR	DNR	DNR	DNR	DNR	ST85348558	07/04/2009	2 - Good
14	4853	Natural High Ground	Left	Natural channel with gabion retaining wall	35.34	DNR	DNR	DNR	DNR	DNR	DNR	ST8458185202	23/10/1996	2 - Good
15	4854	Natural High Ground	Left	Masonry Wall	537.87	DNR	DNR	DNR	DNR	DNR	DNR	ST84028445	23/10/1996	3 - Fair
17	88456	Natural High Ground	Left	Natural Bank	825.00	DNR	DNR	DNR	DNR	DNR	DNR	ST8491285333	19/12/2007	3 - Fair
21	89868	Natural High Ground	Right	Natural Bank	3685.06	DNR	DNR	DNR	DNR	DNR	DNR	ST8404084431	19/12/2007	3 - Fair
22	98384	Natural High Ground	Right	Natural Bank	708.60	DNR	DNR	DNR	DNR	DNR	DNR	ST8619186219	07/04/2009	3 - Fair
23	98385	Natural High Ground	Right	Natural channel with stone retaining wall	561.70	DNR	DNR	DNR	DNR	DNR	DNR	ST86538659	07/04/2009	3 - Fair
24	98386	Natural High Ground	Left	Natural channel with masonry retaining wall	1001.16	DNR	DNR	DNR	DNR	DNR	DNR	ST8650586598	07/04/2009	2 - Good

Notes

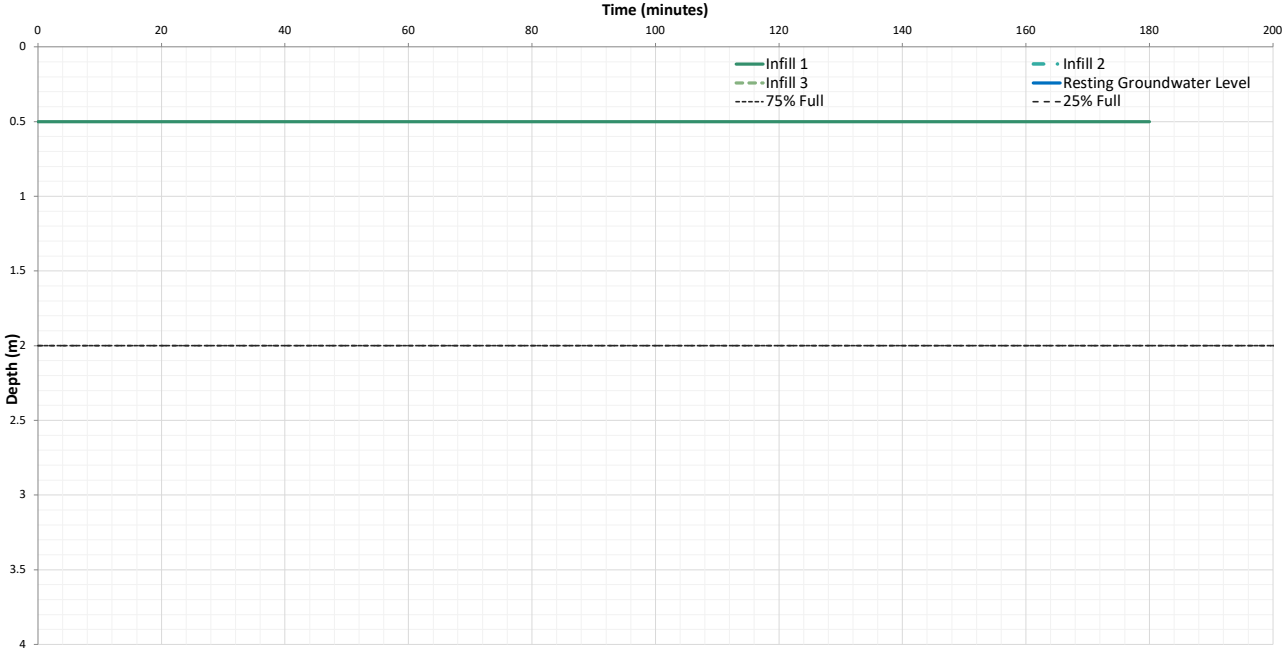
* Overall Condition has been taken from the most recent inspection
* Inspections are of a purely visual nature and do not necessarily reflect the true condition of the asset
* Condition: 1 = very good, Condtion 2 = good, Condition 3 = fair, Condition 4 = poor, Condition 5 = very poor
* Crest level accuracy: 1 = ± 0.01 to 0.05m, 2 = ± 0.05 to 0.15m, 3 = ± 0.15 to 0.75m, 4 = ± 0.75 or greater
* DNR = data not recorded

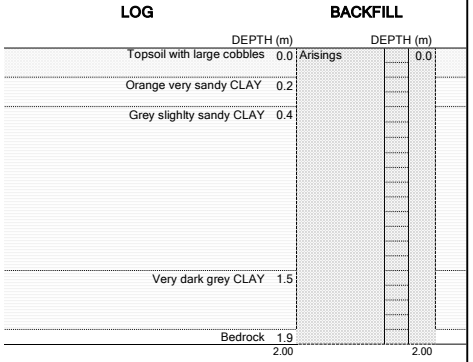
Annex E – Infiltration Testing

	units	Infill 1	Infill 2	Infill 3
Length	m		2.60	
Width	m		0.60	
Depth	m		2.00	
Gravel type			No gravel	
Voids ratio			1.00	
Resting groundwater level at time of testing	m		5.00	
Depth of first reading	m	0.50	0.00	0.00
Depth of final reading	m	0.50	0.00	0.00
Did soakage test reach 25% of maximum fill depth?		No	No	No
Did soakage test reach near empty?		No	No	No
Depth at 75% full/effective depth	m	0.50	0.00	0.00
Depth at 25% full/effective depth	m	0.50	0.00	0.00
Time at 75% full/effective depth	mins	#DIV/0!	#N/A	#N/A
Time at 25% full/effective depth	mins	#DIV/0!	#N/A	#N/A
Vp75 - 25 (volume outflowing between 75% and 25% full/effective depth)	m^3	0.00	0.00	0.00
Mean surface area for outflow (50% full/effective depth)	m^2	1.56	1.56	1.56
tp75 (time for the water level to fall from 75% to 25% full/effective depth)	mins	#DIV/0!	#N/A	#N/A
Soil infiltration rate, f =	m/s	Failed Test	Failed Test	Failed Test
or	m/s	Failed Test	Failed Test	Failed Test

Recommended soil infiltration rate	
Failed Test	m/s

Note:
Where water level reaches nearly empty (5% full), soil infiltration based on 'Full' depth. Where water level did not reach nearly empty (5% full), soil infiltration rate is based on 'Effective' drainage achieved only. Where water level did not fall below 25% of the maximum fill level, this is considered to be a 'Failed' test.





TITLE: Soakaway Test Results
Lime Down
Island Green Power

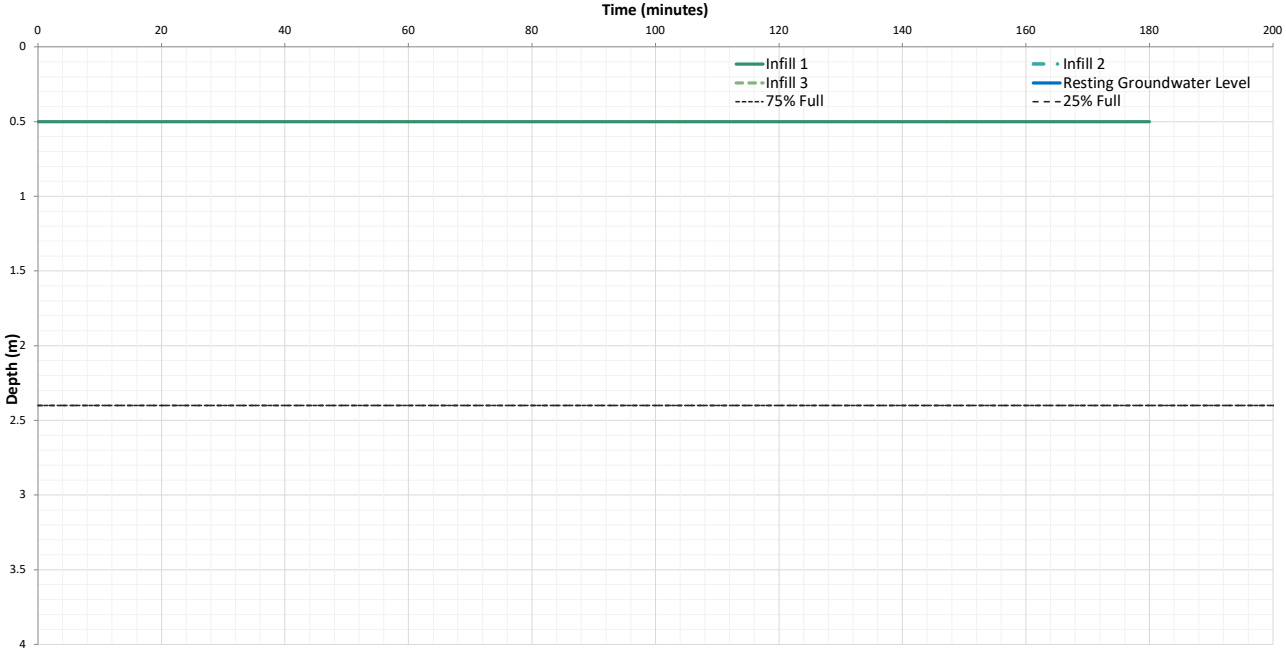
In general accordance with BRE Digest 365 (2016)

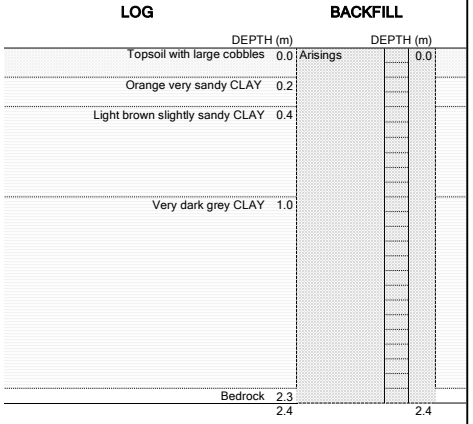
DRAWN BY: GH	SCALE: Not to Scale	PROJECT NUMBER: 317212.00
CHECKED BY: JR	REVISION: 1	SOAKAWAY NUMBER: D1-01
DATE: 23/01/2025		

	units	Infill 1	Infill 2	Infill 3
Length	m		2.20	
Width	m		0.60	
Depth	m		2.40	
Gravel type			No gravel	
Voids ratio			1.00	
Resting groundwater level at time of testing	m		5.00	
Depth of first reading	m	0.50	0.00	0.00
Depth of final reading	m	0.50	0.00	0.00
Did soakage test reach 25% of maximum fill depth?		No	No	No
Did soakage test reach near empty?		No	No	No
Depth at 75% full/effective depth	m	0.50	0.00	0.00
Depth at 25% full/effective depth	m	0.50	0.00	0.00
Time at 75% full/effective depth	mins	#DIV/0!	#N/A	#N/A
Time at 25% full/effective depth	mins	#DIV/0!	#N/A	#N/A
Vp75 - 25 (volume outflowing between 75% and 25% full/effective depth)	m^3	0.00	0.00	0.00
Mean surface area for outflow (50% full/effective depth)	m^2	1.32	1.32	1.32
tp75 (time for the water level to fall from 75% to 25% full/effective depth)	mins	#DIV/0!	#N/A	#N/A
Soil infiltration rate, f =	m/s	Failed Test	Failed Test	Failed Test
or	m/s	Failed Test	Failed Test	Failed Test

Recommended soil infiltration rate	
Failed Test	m/s

Note:
Where water level reaches nearly empty (5% full), soil infiltration based on 'Full' depth. Where water level did not reach nearly empty (5% full), soil infiltration rate is based on 'Effective' drainage achieved only. Where water level did not fall below 25% of the maximum fill level, this is considered to be a 'Failed' test.





TITLE: Soakaway Test Results
Lime Down
Island Green Power

In general accordance with BRE Digest 365 (2016)

DRAWN BY: GH	SCALE: Not to Scale	PROJECT NUMBER: 317212.00
CHECKED BY: JR	REVISION: 1	SOAKAWAY NUMBER: D1-09
DATE: 23/01/2025		

Annex F – ~~Causeway Flow~~Greenfield Calculations

Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

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.

Project details

Date	23/06/2026
Calculated by	GH
Reference	317212
Model version	2.2.3

Location

Site name	Lime Down D
Site location	



Site easting (British National Grid)	391292
Site northing (British National Grid)	183113

Site details

Total site area (ha)	0.9 ha

Greenfield runoff

Method

Method	FEH statistical (2025)

FEH statistical (2025)

	My value		Map value
SAAR9120 (mm)	828 mm		
BFIHOST19scaled	0.595		
QMed-QBar conversion	1.075		1.075
QMed (l/s)	2.5 l/s		
QBar (FEH statistical 2025) (l/s)	2.7 l/s		

Growth curve factors

	My value		Map value
Hydrological region	8		8
1 year growth factor	0.78		
2 year growth factor	0.93		
10 year growth factor	1.49		
30 year growth factor	1.95		
100 year growth factor	2.43		
200 year growth factor	2.78		

Results

Method	FEH statistical (2025)
Flow rate 1 year (l/s)	2.1 l/s
Flow rate 2 year (l/s)	2.5 l/s
Flow rate 10 years (l/s)	4.0 l/s
Flow rate 30 years (l/s)	5.3 l/s
Flow rate 100 years (l/s)	6.6 l/s
Flow rate 200 years (l/s)	7.5 l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) developed by HR Wallingford and available at uksuds.com (https://www.uksuds.com/). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (https://www.uksuds.com/terms-conditions). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

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Project details

Date	23/06/2026
Calculated by	GH
Reference	317212
Model version	2.2.3

Location

Site name	Lime Down D
Site location	



Site easting (British National Grid)	391292
Site northing (British National Grid)	183113

Site details

Total site area (ha)	4.1 ha

Greenfield runoff

Method

Method	FEH statistical (2025)

FEH statistical (2025)

	My value		Map value
SAAR9120 (mm)	828 mm		
BFIHOST19scaled	0.595		
QMed-QBar conversion	1.075		1.075
QMed (l/s)	11.4 l/s		
QBar (FEH statistical 2025) (l/s)	12.3 l/s		

Growth curve factors

	My value		Map value
Hydrological region	8		8
1 year growth factor	0.78		
2 year growth factor	0.93		
10 year growth factor	1.49		
30 year growth factor	1.95		
100 year growth factor	2.43		
200 year growth factor	2.78		

Results

Method	FEH statistical (2025)
Flow rate 1 year (l/s)	9.6 l/s
Flow rate 2 year (l/s)	11.4 l/s
Flow rate 10 years (l/s)	18.3 l/s
Flow rate 30 years (l/s)	24.0 l/s
Flow rate 100 years (l/s)	29.9 l/s
Flow rate 200 years (l/s)	34.2 l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

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Project details

Date	23/06/2026
Calculated by	GH
Reference	317212
Model version	2.2.3

Location

Site name	Lime Down D
Site location	



Site easting (British National Grid)	391292
Site northing (British National Grid)	183113

Site details

Total site area (ha)	3.7 ha

Greenfield runoff

Method

Method	FEH statistical (2025)

FEH statistical (2025)

	My value		Map value
SAAR9120 (mm)	828 mm		
BFIHOST19scaled	0.595		
QMed-QBar conversion	1.075		1.075
QMed (l/s)	10.3 l/s		
QBar (FEH statistical 2025) (l/s)	11.1 l/s		

Growth curve factors

	My value		Map value
Hydrological region	8		8
1 year growth factor	0.78		
2 year growth factor	0.93		
10 year growth factor	1.49		
30 year growth factor	1.95		
100 year growth factor	2.43		
200 year growth factor	2.78		

Results

Method	FEH statistical (2025)
Flow rate 1 year (l/s)	8.6 l/s
Flow rate 2 year (l/s)	10.3 l/s
Flow rate 10 years (l/s)	16.5 l/s
Flow rate 30 years (l/s)	21.6 l/s
Flow rate 100 years (l/s)	26.9 l/s
Flow rate 200 years (l/s)	30.8 l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

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Greenfield runoff rate estimation tool

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Project details

Date	23/06/2026
Calculated by	GH
Reference	317212
Model version	2.2.3

Location

Site name	Lime Down D
Site location	



Site easting (British National Grid)	391292
Site northing (British National Grid)	183113

Site details

Total site area (ha)	0.21 ha

Greenfield runoff

Method

Method	FEH statistical (2025)

FEH statistical (2025)

	My value		Map value
SAAR9120 (mm)	828 mm		
BFIHOST19scaled	0.595		
QMed-QBar conversion	1.075		1.075
QMed (l/s)	0.6 l/s		
QBar (FEH statistical 2025) (l/s)	0.6 l/s		

Growth curve factors

	My value		Map value
Hydrological region	8		8
1 year growth factor	0.78		
2 year growth factor	0.93		
10 year growth factor	1.49		
30 year growth factor	1.95		
100 year growth factor	2.43		
200 year growth factor	2.78		

Results

Method	FEH statistical (2025)
Flow rate 1 year (l/s)	0.5 l/s
Flow rate 2 year (l/s)	0.6 l/s
Flow rate 10 years (l/s)	0.9 l/s
Flow rate 30 years (l/s)	1.2 l/s
Flow rate 100 years (l/s)	1.5 l/s
Flow rate 200 years (l/s)	1.7 l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

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Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

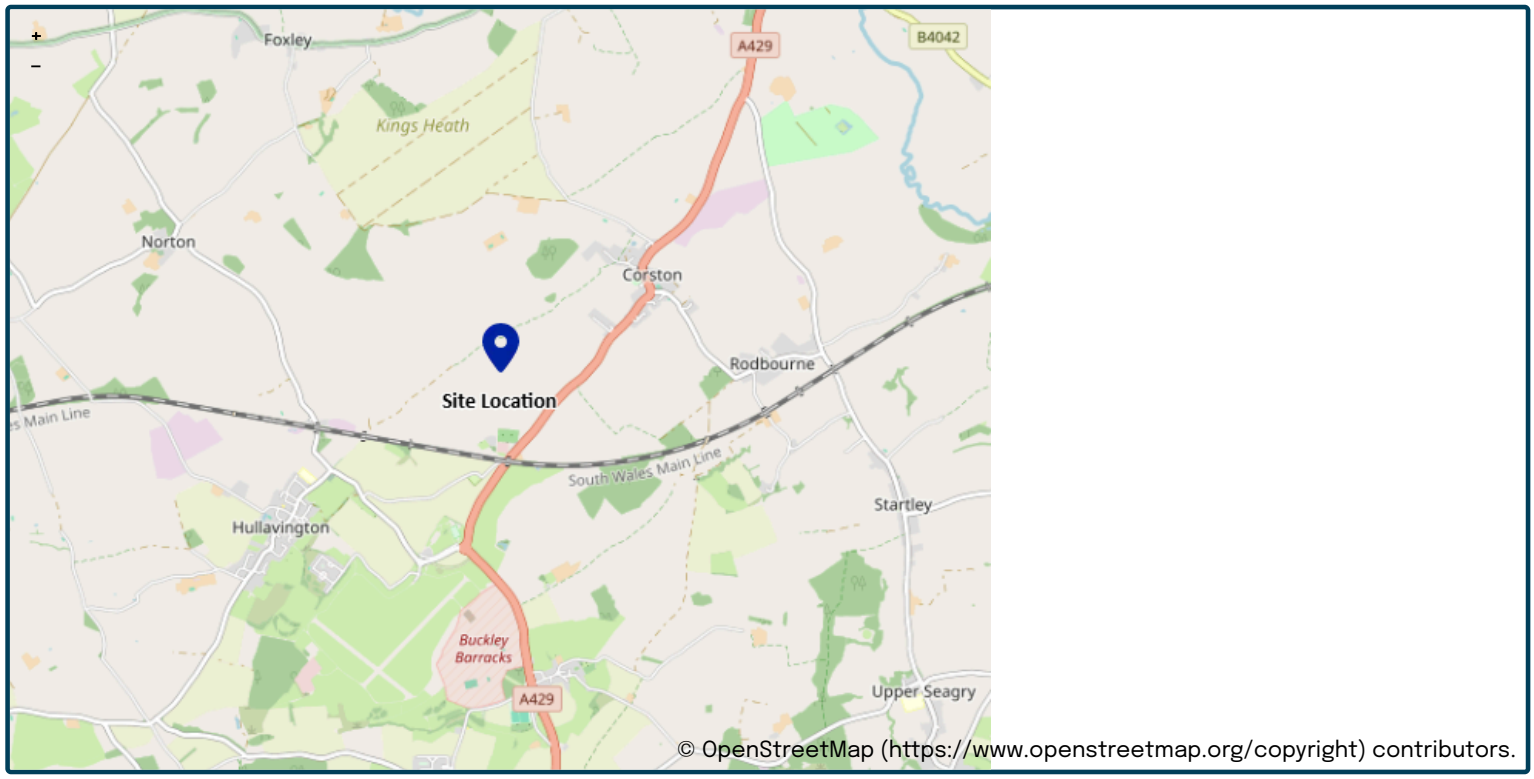
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015).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

Project details

Date	08/07/2026
Calculated by	GH
Reference	317212
Model version	2.2.3

Location

Site name	Lime Down D
Site location	



Site easting (British National Grid)	391271
Site northing (British National Grid)	183116

Site details

Total site area (ha)	1.0226 ha

Greenfield runoff

Method

Method	FEH statistical (2025)

FEH statistical (2025)

	My value		Map value
SAAR9120 (mm)	828 mm		
BFIHOST19scaled	0.595		
QMed-QBar conversion	1.075		1.075
QMed (l/s)	2.9 l/s		
QBar (FEH statistical 2025) (l/s)	3.1 l/s		

Growth curve factors

	My value		Map value
Hydrological region	8		8
1 year growth factor	0.78		
2 year growth factor	0.93		
10 year growth factor	1.49		
30 year growth factor	1.95		
100 year growth factor	2.43		
200 year growth factor	2.78		

Results

Method	FEH statistical (2025)
Flow rate 1 year (l/s)	2.4 l/s
Flow rate 2 year (l/s)	2.9 l/s
Flow rate 10 years (l/s)	4.6 l/s
Flow rate 30 years (l/s)	6.0 l/s
Flow rate 100 years (l/s)	7.4 l/s
Flow rate 200 years (l/s)	8.5 l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) developed by HR Wallingford and available at uksuds.com (https://www.uksuds.com/). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (https://www.uksuds.com/terms-conditions). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Annex G ~~- Maintenance Schedules–~~ Hydraulic Calculations

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
Storage	0.900	5.00	100.000	1200	0.000	0.000	1.000	99.000

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	Check Discharge Rate(s)	x
Rainfall Events	Singular	Drain Down Time (mins)	1440	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		
Analysis Speed	Normal	Starting Level (m)			

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	45	0	0

Node Storage Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	99.000	Product Number	CTL-SHE-0091-3700-1000-3700
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	3.7	Min Node Diameter (mm)	1200

Node Storage Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	99.000
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	1000.0	1000.0	1.000	1364.6	1384.3

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Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	Storage	1410	99.842	0.842	35.1	970.6047	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
1440 minute winter	Storage	Hydro-Brake®	3.7	516.1

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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
Storage	4.190	5.00	100.000	1200	0.000	0.000	1.000	99.000

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	Check Discharge Rate(s)	x
Rainfall Events	Singular	Drain Down Time (mins)	1440	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		
Analysis Speed	Normal	Starting Level (m)			

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	45	0	0

Node Storage Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	99.000	Product Number	CTL-SHE-0132-8000-1000-8000
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	8.0	Min Node Diameter (mm)	1200

Node Storage Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	99.000
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	5000.0	5000.0	1.000	5780.3	5822.5

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Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	Storage	1440	99.952	0.952	163.5	5112.3150	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
1440 minute winter	Storage	Hydro-Brake®	8.0	1169.1

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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
Storage	3.700	5.00	100.000	1200	0.000	0.000	1.000	99.000

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	Check Discharge Rate(s)	x
Rainfall Events	Singular	Drain Down Time (mins)	1440	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		
Analysis Speed	Normal	Starting Level (m)			

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	45	0	0

Node Storage Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	99.000	Product Number	CTL-SHE-0125-7200-1000-7200
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	7.2	Min Node Diameter (mm)	1200

Node Storage Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	99.000
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	4500.0	4500.0	1.000	5241.7	5281.8

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Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	Storage	1440	99.930	0.930	144.4	4507.7770	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
1440 minute winter	Storage	Hydro-Brake®	7.2	1043.9

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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
Storage	0.008	5.00	100.000	1200	0.000	0.000	0.750	99.250

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	Check Discharge Rate(s)	x
Rainfall Events	Singular	Drain Down Time (mins)	1440	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		
Analysis Speed	Normal	Starting Level (m)			

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	45	0	0

Node Storage Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	99.250	Product Number	CTL-SHE-0031-4000-0750-4000
Design Depth (m)	0.750	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	0.4	Min Node Diameter (mm)	1200

Node Storage Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	99.250
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	79

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	1.0	1.0	0.750	24.9	26.2

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Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	Storage	60	99.667	0.417	2.9	3.1930	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
60 minute winter	Storage	Hydro-Brake®	0.3	4.2

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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
Storage	1.023	5.00	100.000	1200	0.000	0.000	0.750	99.250

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	Check Discharge Rate(s)	x
Rainfall Events	Singular	Drain Down Time (mins)	1440	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		
Analysis Speed	Normal	Starting Level (m)			

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	45	0	0

Node Storage Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	99.250	Product Number	CTL-SHE-0071-2000-0750-2000
Design Depth (m)	0.750	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node Storage Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	99.250
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	1500.0	1500.0	0.750	1824.8	1842.4

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Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	Storage	1440	99.995	0.745	39.9	1238.3930	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
1440 minute winter	Storage	Hydro-Brake®	2.0	301.9

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Annex H - Maintenance Schedules

[i] [redacted]

[iii] https://magic.defra.gov.uk/

[iv] https://flood-map-for-planning.service.gov.uk/

[v] https://check-long-term-flood-risk.service.gov.uk/postcode

[redacted]

[vii] https://nfcc.org.uk/wp-content/uploads/2023/10/Grid-Scale-Battery-Energy-Storage-System-planning-Guidance-for-FRS.pdf

Pervious Pavements Maintenance Schedule

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphospate applied directly into the weeds by an applicator rather than spraying	As required - once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth - if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 20.15

Attenuation Storage Tanks Maintenance Schedule

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 21.3