CONTENTS

TABLES

FIGURES

Introduction

10.1 This Chapter presents the findings of the likely significant effects of the Proposed Development on hydrology, hydrogeology, and geology (including soils and peat).

10.2 The objectives of this Chapter are to:

- describe the assessment methodology and significance criteria used in completing the impact assessment;
- describe the geological, hydrological, hydrogeological and peat baseline established from desk studies, site-specific surveys and feedback obtained during technical engagement with stakeholders;
- describe the potential effects, including direct, indirect and cumulative effects;
- describe the mitigation measures proposed to address the likely significant effects; and
- assess any residual effects following the implementation of any additional mitigation measures.

10.3 The assessment uses information and findings presented in **Chapter 8**: **Ecology** to inform the assessment of potential effects of possible areas of Groundwater Dependent Terrestrial Ecosystems (GWDTEs), which are presented in this Chapter.

10.4 This Chapter is supported by the following Figures and Technical Appendices:

- Figures
  - **Figure 10.1: Local Hydrology;**
  - **Figure 10.2: Soils;**
  - **Figure 10.3: Superficial Geology;**
  - **Figure 10.4: Peatland Classification;**
  - **Figure 10.5: Peat Depth Plan;**
  - **Figure 10.6: Bedrock Geology;**
  - **Figure 10.7: Regional Hydrogeology;**
  - **Figure 10.8: Aquifer Classification and Groundwater Vulnerability; and**
  - **Figure 10.9: Areas of Potential Groundwater Dependent Terrestrial Ecosystems (GWDTE).**
- Technical Appendices
  - **Technical Appendix 10.1: Peat Survey Data;**
  - **Technical Appendix 10.2: Schedule of Watercourse Crossing; and**
  - **Technical Appendix 10.3: Flood Risk Assessment (FRA).**

10.5 Legislation, guidance and policy relevant to this assessment is detailed in **Technical Appendix 4.1: Legislation, Guidance and Policy**.

Scope and Consultation

10.6 Data requests were issued to SEPA, Dumfries and Galloway Council (D&GC) and Scottish Water to obtain information relating to water quality data, groundwater level and flow data, private water supplies, licenced water abstractions and discharges and details on nearby Scottish Water assets.

10.7 Consultation for the Proposed Development was undertaken with statutory and non-statutory bodies. The outcome of the relevant consultations with regards to hydrology, hydrogeology and geology (including soils and peat) are summarised in **Table 10-1**.

Table 10-1: Scoping Responses

Consultee and Date	Issue Raised	Response / Action Taken
SEPA Scoping Response 24 April 2025	To avoid delay and potential objection the EIA submission must contain a series of scale drawings of sensitivities, for example peat depth, peat condition, Groundwater Dependent Terrestrial Ecosystems (GWDTE), proximity to waterbodies, overlain with proposed permanent and temporary development. This is necessary to ensure the EIA process has informed the layout of the development to firstly avoid, then reduce and then mitigate significant impacts on the environment. We request that the issues covered in Appendix 1 of the response, which provides details of our standard information requirements for EIA development and the form in which they must be submitted, be addressed to our satisfaction in the EIA process.	**Figures 10.1** to **10.8** show the Proposed Development in context of the geological, hydrological and hydrogeological setting. Areas of potential GWDTE are shown on **Figure 10.9** and potential impacts on GWDTE are discussed in this Chapter. It is confirmed that the Proposed Development has avoided areas of peat >1m deep (see **Figure 10.5**). Potential impacts on peat are discussed further in this Chapter (see Baseline Conditions and Assessment of Effects sections).
	We note that phase 1 peat probing was undertaken in 2014 in support of a previous planning application which was subsequently withdrawn. We welcome the verification of the previous peat probing and preparation of an outline peat management plan, peatland condition assessment and borrow pit appraisal. Further advice on the information we expect to be submitted as part of the EIAR with respect to peat / carbon-rich soils is contained in section 2 of Appendix 1 to this letter.	A phase 1 peat depth probing programme has been completed which confirms that much of the Site is underlain by mineral soils or peat soils (peat depths <0.5m). It is confirmed that the Proposed Development has avoided areas of peat >1m deep. Potential impacts on peat are discussed further in this Chapter (see Baseline Conditions and Assessment of Effects sections).
	The applicant intends to undertake an updated NVC survey which we encourage as this is necessary to assist in the determination as to whether any groundwater dependent terrestrial ecosystems are present on the Site.	Details of the methodology and results of the NVC survey are presented in **Chapter 8.** Areas of potential GWDTE are presented on **Figure 10.9** and potential impacts on GWDTE are discussed in full within this Chapter (see Baseline Conditions section).

	We note in paragraph 9.2.4 that it seems unlikely that any development will take place within 250 m of a groundwater supply source; if this is the case it would be helpful if the EIA report provides evidence to confirm this. Section 4 of Appendix 1 to this letter contains further guidance on assessing the impacts of development on groundwater abstractions.	A private water supply survey has been undertaken, details of which are outlined in this Chapter (see Baseline Conditions section).
	In terms of flood risk, provided watercourse crossings are designed to accommodate the 1 in 200 year event plus climate change and other infrastructure is located well away from watercourses we do not foresee from current information a need for detailed information on flood risk.	It is confirmed that watercourse crossings will be sized to accommodate the 1 in 200-year event with an appropriate allowance for climate change. A schedule of the watercourse crossing is presented in **Technical Appendix 10.2**. In accordance with good practice and SEPA requirements a 10m and 50m buffer to all watercourses and waterbodies shown on the OS 1:10,000 scale mapping has been applied (see **Figure 10.1**). No development, except for proposed watercourse crossings and small sections of access tracks, are proposed within 50m watercourse buffer (see Embedded Mitigation section). A site-specific flood risk assessment is also presented in **Technical Appendix 10.3**.
SEPA Additional Consultation 05 January 2025	I would submit this information to the local authority who ultimately decide whether aspects of the proposal should be scoped out of the EIA process. They may wish to consult with SEPA as part of this but will leave that to them. Since our scoping response was sent, we have published two further guidance documents which deal with peat / peaty soils which may be of interest. These are all available on our website and I have linked below for ease: • SEPA Planning Advice Note: Assessing the impact of developments on peatland and carbon rich soils • SEPA Standing Advice on peaty soil	Potential impacts on peat summarised in this Chapter (see Baseline Conditions and Assessment of Effects sections).
Scottish Water Scoping Response 7 May 2025	Scottish Water has no objection to this proposal.	Noted.
	A review of our records indicates that there are no Scottish Water drinking water catchments or water abstraction sources, which are designated as Drinking Water Protected Areas under the Water Framework Directive, in the area that may be affected by the proposed activity.	Noted.

	For reasons of sustainability and to protect our customers from potential future sewer flooding, Scottish Water will not accept any surface water connections into our combined sewer system. There may be limited exceptional circumstances where we would allow such a connection for brownfield sites only, however this will require significant justification from the customer taking account of various factors including legal, physical, and technical challenges.	Noted.
NatureScot Scoping Response 3 June 2025	The current proposal is to situate the potential solar array over a large proportion of White Moss, which may comprise peatland habitat. The impacts of this would need to be considered to determine if interruption of the natural hydrology could be detrimental to the habitat and whether reduced light levels due to the presence of panels could cause further deterioration. We would advise reference to the NatureScot preapplication guidance for solar farms, which might help to inform the assessment process.	It is confirmed that the Proposed Development has avoided areas of peat >1m deep. Potential impacts on peat and hydrology within the Site are discussed further in this Chapter (see Baseline Condition and Assessment of Effects sections). Potential impacts on peatland habitat and other habitats as a result of the Proposed Development is discussed further in **Chapter 8**.
Galloway Fisheries Trust Scoping Response 16 May 2025	The Kirtle Water is an important watercourse supporting a number of protected fish species and is covered by the Annan DSFB working area. A few small watercourses drain the proposed development site and into the Kirtle Water. We are content with the proposed fish habitat surveys suggested to be undertaken i.e. 'should the results of the fish habitat walkover suggest that electrofishing may be necessary, this will be undertaken'. It is important to ensure the surveys consider whether lamprey species, European eel and salmonids could be supported. If the habitat is suitable to support juvenile or adult life-stages of these species then we would request that an electrofishing survey is undertaken to inform the EIA.	Noted. Fishery impacts are discussed further in **Chapter 8**.
Dumfries and Galloway Council Flood Risk Management Team Leader Scoping Response 2 May 2025	With reference to the planning application 25/0591/SCO after reviewing the information provided and held, the Flood Risk Management Team (FRMT) provide the following observations: a) DGi indicates open watercourses on the southern portion of the proposed development site and SEPA indicative surface water and small watercourses flood maps would suggest that the proposed site may be partially susceptible to surface water flooding / flooding from small watercourses. b) Under National Planning Framework 4, new development must avoid the floodplain associated with the 1 in 200 year event with an allowance for climate change.	Noted. The local hydrological setting is shown on **Figure 10.1**. A detailed FRA is provided in **Technical Appendix 10.3** which confirms all risk of flooding are understood and addressed in line with NPF4.

	The Flood Risk Management Team (FRMT) would request the additional information below prior to commenting further: a) Developer to provide a Drainage Impact Assessment for review b) This may be sufficient information depending on the content of the DIA; however, a site specific FRA may also be required c) Developer to provide hydrologic assessments of all culverts that form part of the development against peak flow e.g. 1 in 200 year storm events (with an allowance for climate change).	As discussed with D&GC FRMT drainage principals which will be adopted as part of the detailed drainage design, and form part of the final Construction Environment Management Plan (CEMP) are outlined in this Chapter (see Assessment of Effects section). An outline CEMP is presented as **Technical Appendix 3.1**. A site-specific FRA is provided as **Technical Appendix 10.3.** A schedule of the watercourse crossing is presented in **Technical Appendix 10.2.** A commitment has been made to ensure that the watercourse crossing will be sized to accommodate the 1 in 200-year event with an appropriate allowance for climate change.
Dumfries and Galloway Council Flood Risk Management Team Leader Further Consultation 22 August 2025	I expected the solar panels to be raised from the ground level and had read the proposal to provide a Site Specific Flood Risk Assessment. The only red flag that I see in your proposal below is the use of SEPA mapping as a basis. Please note that SEPA mapping is indicative and is in no way a suitable replacement for actual site-specific data (i.e. ground level / river bed level etc) information, and would expect the works to provide neutral or betterment on flood risk to the site (inc surface runoff).	A site-specific FRA is provided as **Technical Appendix 10.3** which has been informed by site walkover and available topographic information to verify SEPA flood mapping, particularly within the proposed solar PV array areas**.**

Effects Assessed in Full

10.8 The following potential effects have been assessed in full in relation to the Proposed Development:

- disturbance and loss of carbon rich soils and peat deposits during construction;
- generation of pollution from fuel, oil, concrete or other hazardous substances, including potential effects on surface water and groundwater quality and private water supplies during construction and operation;
- increased erosion and sedimentation, which could give rise to potential effects on surface water and groundwater quality and private water supplies during construction and operation;
- increased flood risk to downstream receptors during construction and as a result of the introduction of new permanent hardstanding areas associated with the operational development;
- potential effects on groundwater levels and groundwater movement during construction and operation;

- potential effects on groundwater levels and surface water flow paths which may affect water contribution to areas of peat and GWDTE during construction and operation;
- disturbance of watercourse bed and banks from the construction of culverts; and
- potential cumulative effects during construction and operation.

Effects Scoped Out

10.9 On the basis of the desk based review and survey work undertaken, policy, guidance and standards, the professional judgement of the Environmental Impact Assessment (EIA) team, feedback from consultees and experience from other relevant projects, the following effects and detailed assessments have been scoped out of the assessment:

- Potential effects on geology. With the exception of peat, there are no protected geological features within the Site or study area. Furthermore, the nature of the activities during construction and operation of the Proposed Development would not alter regional or solid geology. Potential effects on peat and carbon-rich soils are not scoped out of the assessment and are considered in full.
- Following review of the peat depth surveys the Proposed Development design has typically avoided areas of peat >1m (see **Figure 10.5**). Based on the avoidance of peat, an outline peat management plan, peat landslide hazard and risk assessment and peat condition assessment has not been prepared in accordance with best practice guidance. Good practice and principals of management of carbon rich soils and shallow peat deposits have been outlined in this Chapter (see Baseline Conditions and Assessment of Effects sections) and would form part of the final Construction Environmental Management Plan (CEMP). An outline CEMP is presented as **Technical Appendix 3.1**.
- Potential effects on water dependent designated sites, Drinking Water Protected Areas (DWPAs), licenced water abstractions and private water supplies receptors. The baseline assessment (see Baseline Conditions section and **Table 10.7**) has confirmed that these receptors are not at risk from the Proposed Development.
- A site-specific Drainage Impact Assessment. Principles for the design of any watercourse crossings and for the control of surface water runoff from the Proposed Development during construction and operation have been outlined in this Chapter. It is expected that these would be developed as part of the detailed site design, should the Proposed Development be granted planning permission, and a detailed site-specific drainage plan, including firewater provisions for a Battery Energy Storage System (BESS) would be secured by a pre-development planning condition and would form part of the final CEMP. An outline CEMP is presented as **Technical Appendix 3.1**.
- Decommissioning effects. Potential decommissioning effects are expected to be similar or less to potential construction effects. Decommissioning the Proposed Development will be carried out in accordance with an approved decommissioning plan which will be expected to include the same safeguards as those provided during the construction stage of the Proposed Development. Methods for decommissioning and mitigation measures to be employed at decommissioning stage will follow best practice measures and guidance at that time.

Approach and Methods

10.10 The potential impacts associated with the Proposed Development on hydrology, hydrogeology and geology (including soils and peat) have been assessed by completing an initial desk study followed by an impact assessment. Characterisation of baseline conditions and the impact assessment have been informed by a programme of field surveys.

Study Area

10.11 The study area for this assessment is shown on **Figure 10.1**. The study area encompasses the areas over which all desk based, and field data were gathered to inform the assessment and includes a 500m buffer to the application boundary. Beyond this distance, any effect is considered to be so diminished as to be undetectable and therefore not significant.

10.12 The assessment for potential cumulative effects uses the hydrological and hydrogeological catchments within the study area, with a maximum downstream distance of 5km from the application boundary.

Desk Based Research and Data Sources

10.13 An initial desk study has been undertaken to determine and confirm the baseline characteristics by reviewing available information relating to hydrology, hydrogeology and geology (including soils and peat).

10.14 The following sources of information have been used to characterise and assess baseline conditions within the study area:

- Ordnance Survey (OS) 1:50,000, 1:25,000 and 1:10,000 scale mapping;
- LiDAR from the Scottish Remote Sensing portal;
- NatureScot SiteLink;
- Scottish Natural Heritage (now NatureScot) Carbon and Peatland 2016 map;
- James Hutton Institute, National Soil Map of Scotland (1:250,000);
- British Geological Survey (BGS) Onshore GeoIndex (1:50,000);
- BGS Hydrogeological maps of Scotland (1,100,000 scale Aquifer Productivity and Groundwater Vulnerability datasets);
- SEPA rainfall data, flood maps, reservoir flooding map and environmental data; and
- Fisheries Management Scotland (FMS) District Salmon Fishery Board and River/Fisheries Trust information.

Field Surveys

10.15 Detailed site visits and walkover surveys have been undertaken by SLR on the following dates:

- February 2025 to complete phase 1 peat and soil depth probing; and

- September 2025 to complete additional peat and soil depth probing, a hydrological walkover, conduct watercourse crossing survey, review areas of potential GWDTE, and complete a private water supply survey.

10.16 The field work has been undertaken in order to:

- verify the information collected during the desk and baseline study;
- allow the assessment authors to obtain a first- hand appreciation of the Site setting;
- undertake a visual assessment of the main surface water features and identify and verify private water supplies;
- identify drainage patterns, areas vulnerable to erosion or sediment deposition, and any pollution risks;
- visit any identified potential GWDTE (in consultation with the project ecologist);
- visit any potential watercourse crossings and prepare a schedule of potential watercourse crossings;
- inspect rock exposures and establish by probing, an estimate of overburden thicknesses, peat depth and stability;
- confirm underlying substrate, based on the type of refusal of a peat probe and by coring; assess peatland condition; and
- allow appreciation of the Site, determine gradients, access routes, ground conditions, etc., and to assess the relative location of all the components of the Proposed Development.

10.17 The desk study and field surveys have been used to identify potential development constraints and have been used as part of the iterative design process. Further details on the design process and evolution of the Proposed Development are found in **Chapter 2: Site Layout and Design Evolution**.

10.18 The data obtained as part of the desk study and collected as part of the field work has been processed and interpreted to complete the impact assessment and recommended mitigation measures where appropriate.

Assessment Methods

10.19 The significance of potential effects as a result of the Proposed Development has been assessed by considering two factors: the sensitivity of the receiving environment and the potential magnitude of change.

10.20 This approach provides a mechanism for identifying the areas where mitigation measures are required and for identifying mitigation measures appropriate to the significance of likely effects presented by the Proposed Development.

10.21 The assessment methodology has also been informed by experience of carrying out such assessments for a range of wind farms, and other renewable energy developments, knowledge of the geology and water environment characteristics in Scotland and cognisance of good practice.

10.22 The criteria for determining the significance of effect are provided in **Table 10-2**, **Table 10-3**, and **Table 10-4**.

Sensitivity of Receptor

10.23 The sensitivity of the receiving environment (i.e. the baseline quality of the receiving environment) is defined as its ability to absorb an effect without a detectable change and can be considered through a combination of professional judgement and a set of pre-defined criteria which is set out in **Table 10-2**.

10.24 Receptors in the receiving environment only need to meet one of the defined criteria to be categorised at the associated level of sensitivity.

Table 10-2: Criteria for Assessing Sensitivity of Receptor

Sensitivity	Definition
High	• soil type and associated land use is highly sensitive (e.g. unmodified blanket bog or peatland, prime agricultural land); • SEPA WFD water body classification: high-good or is close to the boundary of a classification: moderate to good or good to high; • receptor is of high ecological importance or national or international value (e.g. Site of Special Scientific interest (SSSI), Special Area of Conservation (SAC), habitat for protected species) which may be dependent upon the hydrology of the Site; • receptor is at risk from flooding in the future (2080s) and/or water body acts as an active floodplain or flood defence; • receptor is used for public and/or private water supply (including Drinking Water Protected Areas (DWPAs)); • groundwater vulnerability is classified as high; and/or • if a GWDTE is present and identified as being of high sensitivity.
Medium	• soil type and associated land use moderately sensitive (e.g. arable (not considered prime agricultural land) or commercial forestry or modified peatland, e.g. by drainage or forestry); • SEPA WFD water body classification: poor to moderate; and/or • moderate classification of groundwater aquifer vulnerability.
Low	• soil type and associated land use not sensitive to change in hydrological regime and associated land use e.g. intensive grazing of sheep and cattle; • SEPA WFD water body classification: poor or bad; • receptor is not at risk of flooding in the future (2080s) and • receptor not used for water supplies (public or private).
Not Sensitive	• receptor would not be affected by the Proposed Development e.g. lies within a different and unconnected hydrological / hydrogeological catchment.

Magnitude of Change

10.25 The potential magnitude of change would depend upon whether the potential impact would cause a fundamental, material or detectable change. In addition, the timing, scale, size and duration of the potential impact resulting from the Proposed Development are also determining factors.

10.26 The criteria that have been used to assess the magnitude of change are defined in **Table 10-3**. The characteristics of the impacts are described as direct / indirect, temporary

(reversible) or permanent (irreversible), together with timescales (short, medium and long term).

Table 10-3: Criteria for Assessing Magnitude of Change

Magnitude	Criteria	Definition
High	Results in the loss of an attribute	Long term or permanent changes to the baseline hydrology, hydrogeology and geology (including soils and peat) such as: • permanent degradation and total loss of soils or peatland habitat; • loss of important geological structure/features; • wholesale changes to watercourse channel, route, hydrology or hydrodynamics; • changes to the baseline environment resulting in an increase in surface water runoff with flood potential and also significant changes to erosion and sedimentation patterns; • major changes to the water chemistry; and • major changes to groundwater levels, flow regime and risk of groundwater flooding.
Medium	Results in an impact on integrity of attribute or loss of part of an attribute	Material but non-fundamental and short to medium term changes to the baseline hydrology, hydrogeology and geology (including soils and peat) such as: • loss of extensive areas of soils or peat habitat, damage to important geological structures/features; • some fundamental changes to watercourses, hydrology or hydrodynamics; • changes to baseline environment resulting in an increase in surface water runoff within system capacity; • moderate changes to erosion and sedimentation patterns; • moderate changes to the water chemistry of surface runoff and groundwater; and • moderate changes to groundwater levels, flow regime and risk of groundwater flooding.
Low	Results in minor impact on an attribute	Detectable but non-material and transitory changes to the baseline hydrology, hydrogeology and geology (including soils and peat) such as: • minor or slight loss of soils or peatland or slight damage to geological structures/features; • minor or slight changes to the watercourse, hydrology or hydrodynamics; • changes to baseline environment resulting in slight increase in surface water runoff within the drainage system capacity; • minor changes to erosion and sedimentation patterns; • minor changes to the water chemistry of surface runoff and groundwater; and • minor changes to groundwater levels, flow regime and risk of groundwater flooding.

Negligible	Results in an impact on attribute but of insufficient magnitude to affect the use or integrity	No perceptible changes to the baseline hydrology, hydrogeology and geology (including soils and peat) such as: • no impact or alteration to existing important soils, peatland or geological environs; • no alteration or very minor changes with no impact to watercourses, hydrology, hydrodynamics, erosion and sedimentation patterns; • no pollution or change in water chemistry to either groundwater or surface water; and • no alteration to groundwater recharge or flow mechanisms

Significance of Effect

10.27 The sensitivity of a receptor together with the magnitude of the change determines the significance of the effect, which can be categorised into level of significance as identified in **Table 10-4** which provides a guide to assist in decision making. The likelihood of the significance of the effect is also considered at this qualitative assessment stage.

10.28 In some cases, the potential sensitivity of the receiving environment or the magnitude of change cannot be quantified with certainty and, therefore, professional judgement remains the most robust method for identifying the predicted significance of a potential effect.

Table 10-4: Significance of Effect Criteria

Magnitude of Change	Sensitivity of Receptor			
	High	**Medium**	**Low**	**Not Sensitive**
High	***Major***	***Major***	***Moderate***	Negligible
Medium	***Major***	***Moderate***	Minor	Negligible
Low	***Moderate***	Minor	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Potential Cumulative Effects

10.29 The assessment also considers potential cumulative effects associated with other developments within 5km of the Site and in the same surface water catchments as the Proposed Development. A cumulative effect is considered to be the effect on a hydrological, hydrogeological or geological receptor arising from the Proposed Development in combination with other developments within the cumulative study area which are likely to affect soils or geology, surface water and groundwater.

Approach to Mitigation

10.30 Any potential effects of the Proposed Development on hydrology, hydrogeology, and geology (including soils and peat) identified by the assessment have been addressed and mitigated by the design and the application of good practice guidance to be implemented as standard during construction and operation, to prevent, reduce or offset effects where possible. As such, a number of measures would form an integral part of the construction process, and these have been considered prior to assessing the likely effects of the Proposed Development (embedded mitigation).

10.31 Good practice measures would be applied in relation to pollution risk, sediment management, peat management and management of flood risk and surface runoff rates and volumes. These would form part of the final CEMP to be implemented for the Proposed Development which would be prepared during detailed design and secured by a planning condition prior to construction commencing. An outline CEMP is provided as **Technical Appendix 3.1**.

10.32 The final CEMP would also include details and responsibilities for environmental management onsite for environmental aspects and would outline the necessary surface water management, oil and chemical delivery and storage requirements, waste management, traffic and transport management and would specify monitoring requirements for wastewater, water supply and all appropriate method statements and risk assessments for the construction of the Proposed Development.

10.33 Where appropriate, tailored mitigation measures have been identified prior to determining the likely significance of residual effects.

Identification of Residual Significant Effects

10.34 A statement of residual effects, following consideration of any further specific mitigation measures where identified, is then given.

Statement of Significance

10.35 A Statement of Significance is provided in the assessment. Effects of 'major' and 'moderate' significance, as outlined in **Table 10-4**, are considered to be 'significant' in terms of the EIA Regulations.

Assumptions, Limitations and Confidence

10.36 The assessment uses survey data obtained within the Site and publicly available data sources, including but not limited to SEPA, BGS, NatureScot, and D&GC, as well as additional information supplied from stakeholders during the scoping and consultation stages. It is considered that the data and information used to complete this assessment is robust and that there are no significant data gaps or limitations.

Baseline Conditions

Current Baseline

10.37 This section outlines the baseline hydrology, hydrogeology and geology (including soils and peat) conditions within the study area.

Site Setting

10.38 The Site, centred on NGR NY 26967 67591, is located at West Scales Farm, immediately north of the A75 as it passes between Gretna in the east and Annan in the west. The Site is located wholly within the D&GC administrative area.

10.39 Regionally, elevations decrease eastwards and southwards towards the Kirtle Water and Solway Estuary. Elevations across the Site range from 31.4m Above Ordinance Datum (AOD) in the north western extent of the Site, to approximately 19.6m AOD in the south eastern extent of the Site.

10.40 SEPA precipitation data for Kinmount House rain gauge (station number 115596), which is located approximately 13km north west from the Site. In 2024 a precipitation total of 1,142.2mm was recorded.

Statutory Designated Areas

10.41 Review of NatureScot's SiteLink webpage confirms that there are no designated sites within the study area.

10.42 The River Esk estuary, located approximately 2.5km south of the Site, has been designated as part of the Upper Solway Flats and Marshes Site of Special Scientific Interest (SSSI) and Solway Firth Special Protection Area (SPA), Special Area of Conservation (SAC) and RAMSAR sites. The SSSI, SPA, SAC and RAMSAR sites have been designated for non-breeding and breeding bird assemblage, natterjack toads, vascular plant assemblage, several coastal and marine habitats and coastal geomorphological outcrops.

10.43 The entire Site drains towards the River Esk estuary, however, the distance between the Proposed Development and the estuary is such that there are significant dilution effects, meaning that any potential effect to the designated sites would be unlikely to be discernible. Therefore, potential hydrological and hydrogeological effects on the Upper Solway Flats Marshes SSSI and Solway Firth SPA, SAC and RAMSAR sites are not considered further in this assessment. Potential effects as a consequence of the Proposed Development on the designated sites are also considered in **Chapter 8** and **Chapter 9.**

Geology and Soils

Soils

10.44 An extract of the 1:250,000 Scotland's Soils mapping is presented as **Figure 10.2** which shows that the centre and eastern extent of the Site is underlain by brown earths soils, whilst the northern and southern extent of the Site is underlain by peat.

Peat and Superficial Geology

10.45 An extract of BGS superficial mapping is presented as **Figure 10.3** and indicates that majority of the Site is underlain by the Gretna Till Formation comprising diamicton. Areas of the southern extent of the Site and parts of the north eastern and north western boundaries of the Site are shown to be underlain by peat.

10.46 There are small areas in the southern and north eastern extents of the Site where no superficial deposits are present.

10.47 Peatland classification mapping (see **Figure 10.4**) shows that the majority of the Site to be underlain by mineral soils (Class 0), which are not considered representative of peatland habitats or areas of carbon rich soils or deep peat. The peat within the northern and southern extent of the Site have been classified as Class 1 and Class 5 peatland.

10.48 Class 1 peatland is considered nationally important priority peatland with carbon rich soils and areas of deep peat which are likely to be considered of high conservation value whilst Class 5 peatland areas are not considered priority peatland habitats however soils may be carbon-rich and deep peat may be present.

10.49 As part of the baseline assessment, a phase 1 peat probing exercise has been conducted. The results of the peat probing survey are shown on **Figure 10.5** and presented in full in

Technical Appendix 10.1. A review of **Figure 10.5** shows that the majority of the Site is underlain by mineral soils or peaty soils, where peat depths are <0.5m deep. A small, isolated area of deeper peat was recorded within the south western extent of the Site which recorded peat depths of up to 2.8m deep. Peat cores were also undertaken across the Site (see **Figure 10.5**) which confirmed that the peat is fibrous, which is further discussed in **Technical Appendix 10.1**.

Bedrock Geology and Linear Features

10.50 An extract of the BGS regional bedrock geological and linear features mapping is presented as **Figure 10.5** which shows that the entire Site is underlain by Triassic age sandstones of the St Bees Sandstone Member. BGS describe the lithology as being a red-brown, very fine to medium grained sandstone, that is generally cross bedded with some parallel lamination.

10.51 Several glacier meltwater channels are present across the Site. No inferred faults are recorded within the Site.

Hydrogeology

Aquifer Characteristics and Groundwater Vulnerability

10.52 Extracts of the BGS 1:625,000 scale Hydrogeology of Scotland map and 1:100,000 scale Aquifer Productivity and Groundwater Vulnerability datasets are presented in **Figure 10.6** and **Figure 10.7**, respectively.

10.53 **Figure 10.6** confirms that the bedrock is classified by BGS as a highly productive aquifer with significant intergranular flow. The sandstone aquifer is described by BGS to be up to 600m thick and yielding up to 125l/s. The aquifer is noted to have generally good quality which can become saline beneath confining Mercia Mudstone.

10.54 The Aquifer Productivity and Groundwater Vulnerability dataset shown in **Figure 10.7** classify the underlying aquifer (superficial and bedrock) according to the predominant groundwater flow mechanism (fracture or intergranular) and the estimated groundwater productivity. Groundwater vulnerability is divided into five classes (1 to 5) with 1 being least vulnerable and 5 being most vulnerable.

10.55 It is shown that the peat, and glacial till superficial deposits at the Site are not considered a significant aquifer. The bedrock aquifer is classed as a high productivity aquifer with intergranular movement.

10.56 The potential groundwater vulnerability in the uppermost aquifer within the Site generally has a vulnerability of Class 2 to 3. Small areas of higher vulnerability (Class 4a to 5) are shown within north eastern and southern extent of the Site where little or no superficial deposits are recorded, and thus where there is little attenuation of potential pollutants prior to entry to shallow groundwater.

Groundwater Levels and Quality

10.57 In response to a data request SEPA has confirmed that they do not hold any specific groundwater level data within the study area. It is noted that groundwater recharge at the Site would be limited by the peat and glacial till deposits which inhibit infiltration capacity owing to their generally low bulk permeability.

10.58 All of Scotland's groundwater bodies have been designated as Drinking Water Protected Areas under the Water Environment (Drinking Water Protected Area) (Scotland) Order

2013 and require protection for their current use or future potential as drinking water resources.

10.59 The current status of groundwater bodies in Scotland has been classified by SEPA in accordance with the requirements of the WFD. SEPA have identified that the Site is underlain by the Annan groundwater body (SEPA ID: 150623). The groundwater body has been classified in 2024 (the latest reporting cycle) with an overall Good classification and no pressures identified.

Ground Water Dependent Terrestrial Ecosystems (GWDTE)

10.60 A National Vegetation Classification (NVC) habitat mapping exercise has been conducted as part of the ecology baseline assessment, and this has been used to identify potential areas of GWDTE within the Site. The methodology and results of the NVC habitat mapping exercise are discussed in detail within **Chapter 8**. With reference to SEPA guidance, areas of potential GWDTE are shown on **Figure 10.8**. An assessment of potential areas of GWDTE, and in particular whether the habitats are sustained by groundwater or surface water is presented in **Table 10-5**.

Table 10-5: Site Specific Groundwater Dependent Terrestrial Ecosystem Assessment

NVC Community	Location and Distribution of potential GWDTE within the Site and Likely Groundwater Dependency
M9	M9 habitat is recorded in a small area within the southern extent of the Site. The habitat is recorded approximately 25m north of a mapped watercourse and partially within an area of surface water flooding as shown by SEPA mapping. The habitat is also shown to be underlain by low permeability peat deposits which are not considered a significant aquifer. In addition, no evidence of groundwater emergence was recorded during the hydrological walkover in this area. It is therefore considered that the M9 habitat within the Site is predominately sustained by surface water runoff and waterlogging of soils adjacent to watercourses and / or above the low permeability deposits, rather than by emergent groundwater. No further assessment is required.
M23	M23 habitats are recorded within the north eastern, north western and southern extents of the Site which generally coincide with areas of mapped superficial peat deposits. Limited groundwater is expected within the peat deposits. A small area of M23 habitat is shown to be directly underlain by sedimentary bedrock, which is considered a highly productive aquifer, however, no evidence of groundwater emergence was recorded within this area during the hydrological walkover. The habitat is also shown to be located within an area of surface water flood risk as shown by SEPA mapping. It is therefore considered that the M23 habitats are predominately sustained by surface water runoff, waterlogging of soils and / or above the low permeability deposits, rather than by emergent groundwater. No further assessment is required.
MG9	MG9 habitats are located the southern extent of the Site and to the south east of the Site. The habitats are generally shown to be underlain by low permeability peat deposits where limited groundwater is expected. The habitat is also shown to be located within a flat area adjacent to the watercourses within the southern extent of the Site and is partially located within an area of surface water flooding as shown by SEPA mapping. Part of the MG9 habitat is shown to be directly underlain by sedimentary bedrock, which is considered a highly productive aquifer, however, no evidence of groundwater emergence was recorded within these areas during the hydrological walkover. It is therefore considered that the MG9 habitats are predominately sustained by surface water runoff and waterlogging of soils adjacent

	to watercourses and / or above the low permeability deposits, rather than by emergent groundwater. No further assessment is required.
MG10	MG10 habitats are located within the centre of the Site, to the north east of the Site and to the south west of the Site. The habitats within 250m of the Proposed Development are shown to be underlain by low permeability peat and glacial till deposits. Limited groundwater is expected within these deposits. The habitats are also shown to be adjacent to mapped watercourses and within areas of surface water flooding as shown by SEPA flood maps. It is therefore considered that the MG10 habitats within 250m of the Proposed Development are predominately sustained by surface water runoff and waterlogging of soils adjacent to watercourses and above the low permeability deposits, rather than by emergent groundwater. No further assessment is required.
W4	W4 habitats are located within the south western extent of the Site, along the northern boundary of the Site and to the north east of the Site. The habitat within 250m of the Proposed Development is shown to be underlain by low permeability peat deposits where limited groundwater is expected. The habitat is also located within the banks and adjacent to mapped watercourses and other smaller drainage ditches were recorded within the mapped area. No evidence of groundwater emergence was recorded within the hydrological walkover within these areas. It is therefore considered that the W4 habitats are predominately sustained by surface water runoff and waterlogging of soils adjacent to watercourses and above the low permeability deposits, rather than by emergent groundwater. No further assessment is required.
W7	W7 habitats are located within the northern extent of the Site and to the north east of the Site, adjacent to the Site boundary. No development is proposed within 250m of the habitat to the north west and therefore no further assessment is required. The habitat within the northern extent of the Site is shown to be underlain by low permeability peat and glacial till deposits where limited groundwater is expected. No groundwater emergence was recorded within the area during the hydrological walkover. It is therefore considered that the W4 habitats are predominately sustained by surface water runoff and waterlogging of soils above the low permeability deposits, rather than by emergent groundwater. No further assessment is required.

10.61 Review of **Table 10-5** shows that the areas of potential GWDTE are all located on ground adjacent to watercourses, within existing surface water flow routes and generally underlain by low permeability peat or glacial till deposits. This distribution is not typical of that which is sustained by emerging groundwater, such as springs or seepage lines but rather it is likely to be supported by rainfall, surface water ponding and water logging of soils adjacent to watercourses and / or above the low permeability deposits.

10.62 It is therefore considered that the potential GWDTE habitats are not predominantly sustained by groundwater, but safeguards to maintain these habitats, and the surface water flow paths to these habitats will need to be maintained during construction and operation of the Proposed Development.

Hydrology

Local Hydrology

10.63 The local hydrology is shown on **Figure 10.1**.

10.64 The entire Site drains towards the River Esk estuary which is located approximately 2.5km south of the Site.

10.65 The majority of the Site (approximately 95% of the Site) is located within the Kirtle Water surface water catchment which flows south eastwards approximately 1.6km east of the Site before discharging into the River Esk estuary approximately 3.9km south east of the Site. One unnamed tributary of the Kirtle Water flows eastwards through the southern extent of the Site and several drains within southern extent of the Site and along the western boundary of the Site drain towards this tributary. As discussed in **Table 10-1**, the Kirtle Water is considered an important watercourse supporting a number of protected fish species.

10.66 The north eastern extent of the Site is shown to be located within the Saugh-hope Burn surface water catchment. The Saugh-hope Burn flows south east approximately 2km south west of the Site before discharging into the River Esk estuary 2.7km south west of the Site. Following the hydrological walkover, it is confirmed that no elements of the development are located within the Saugh-hope Burn catchment.

10.67 None of the surface water catchments which drain the Site have been designated as a DWPA.

Surface Water Flow and Quality

10.68 SEPA has provided surface water flow records from the Mossknowe gauging station (station number 133169) which is located on the Kirtle Water approximately 2km upstream of the Site. Mean surface water flows for 2024 are recorded to be 2.24 m^3/s.

10.69 SEPA classify the larger watercourses within the study area as part of its responsibility under the WFD. The quality of watercourses relevant to the Site are presented in **Table 10-6.** Smaller watercourses and land drains within the study area are not monitored or classified by SEPA.

Table 10-6: Surface Water Quality

Watercourse (and ID)	Overall Status	Overall Ecology	Physio-Chemical Status	Hydro-morphology	Water Quality	Pressures
Kirtle Water – d/s Waterbeck (10666)	Poor	Poor	Good	Good	Moderate	None
Solway Estuary (200515)	Moderate	Moderate	Good	High	Moderate	None

Fisheries

10.70 Fisheries within the study area are managed by the Annan District Salmon Fishery Board and the River Annan Trust. Fishery interests are discussed in **Chapter 8**.

Flood Risk

10.71 A site-specific FRA is included as a Technical Appendix (see **Technical Appendix 10.3**), which assesses the risk of flooding to the Proposed Development. The FRA confirms that the majority of the Proposed Development is not at risk of flooding for the NPF4 design event of 1 in 200-year plus an allowance for climate change except for some small areas of surface water flooding. It is understood that flood-free access/egress is afforded to and

from the Site for the design event. Surface water flood risk areas are discussed further in **Technical Appendix 10.3**.

Private Water Supplies and Licensed Sites

Private Water Supplies

10.72 Consultation with D&GC has been undertaken to gather details on registered private water supplies (PWS) within the study area. In addition, PWS survey has been undertaken to confirm the location of PWS sources. The locations of the PWS sources assessed are shown on **Figure 10.1**.

10.73 The risk the Proposed Development poses to PWS has been considered as part of this assessment in accordance with SEPA guidance for assessing the impact from developments on groundwater abstractions and is presented in **Table 10-7**.

Table 10-7: PWS Details and Risk Assessment

PWS ID (Figure 10.1)	Property Name	Location of PWS	Details	PWS Risk Assessment (Step 1 of the SEPA Guidance)
PWS01	West Scales Farm	E 327324 / N 567612	The supply is confirmed to be from a borehole located at the field boundary approximately 80m west of the farm. Water is pumped directly from the borehole to a pressure vessel in the closest shed and then distributed to fields. This source is only for agricultural use. No development is proposed within 250m within the borehole. It is therefore considered that the PWS will not be at risk from the Proposed Development. The development is also unlikely to cross any distribution pipework from the PWS source to the property. Therefore, PWS source and distribution pipework is not considered to be at risk from the Proposed Development.	PWS source and pipework not considered to be at risk. No further assessment, monitoring or mitigation required.
M1	West Scales Farm Cottage 1	N/A	Property confirmed to be supplied by mains.	No further assessment, monitoring or mitigation required.
M2	West Scales Farm Cottage 2	N/A	Property confirmed to be supplied by mains.	No further assessment, monitoring or mitigation required.
M3	West Scales Farm House	N/A	Property confirmed to be supplied by mains.	No further assessment, monitoring or mitigation required.

M4	Redwood House	N/A	Property confirmed to be supplied by mains.	No further assessment, monitoring or mitigation required.
M5	Hazeldean	N/A	Property assumed to be on mains supply from viewing Scottish Water asset plans. This should be confirmed prior to construction.	No further assessment, monitoring or mitigation required.

Licensed Sites

10.74 Consultation with SEPA has been undertaken to gather details of licenced activities and water abstractions within the study area. SEPA has provided details of Controlled Activity Regulation (CAR) authorisations within the study area which show that there are five CAR authorisations as set out in **Figure 10.1**, the details of which include:

- two discharges for private sewage disposal;
- one registration for agricultural activities other than irrigation;
- one waste exemption licence; and
- one authorisation near Hazeldean property (approximately 560m south east of the Site) with an unknown activity.

10.75 No licenced abstractions are recorded within the study area.

Summary of Sensitive Receptors

10.76 **Table 10-8** below outlines the receptors identified as part of baseline studies, and their sensitivity based on previously detailed criteria contained in **Table 10-2**. These receptors form the basis of the assessment and in combination of magnitude of change are used to determine significance of potential effects.

Table 10-8: Summary of Identified Receptor Sensitivity and Justification

Receptor	Sensitivity	Justification for Sensitivity	Scoped In or Out of Assessment following Baseline
Water dependent and geological statutory designated sites	Not Sensitive	There are no designated areas within the study area. The River Esk estuary has been designated as part of the Upper Solway Flats Marshes SSSI and Solway Firth SPA, SAC and RAMSAR sites however the distance is such that any potential hydrological and hydrogeological effects to the designated sites would be discernible.	Scoped Out
Peat and carbon rich soils	High	Areas of nationally important Class 1 peatland are recorded within the Site and areas of peat and carbon rich soils have been confirmed by site-specific peat probing surveys.	Scoped In

Superficial and bedrock geology	Not Sensitive	The superficial and bedrock geology are common regionally and have no rarity value. No designated geological sites are also recorded within the study area.	Scoped Out
Groundwater	High	Groundwater beneath the Site has been classified as Good and vulnerability is classified as Class 2 to 3 with discrete areas of higher vulnerability (Class 4a to 5).	Scoped In
GWDTE	High	Areas of potential GWDTE have been identified within the NVC mapping. It is noted that it has been shown that these areas are likely to be predominantly supported by surface water rather than groundwater.	Scoped In
Surface water	Medium	Watercourses within the study area and downstream of the Proposed Development have been classified by SEPA with a Moderate to Poor status. The Kirtle Water is considered an important fishery supporting a number of protected fish species.	Scoped In
Flood risk receptors downstream of the Proposed Development	Medium	Limited areas of flood risk (limited to discrete areas of surface water flooding and flooding along existing watercourse corridors) have been recorded onsite. The Proposed Development however has the potential to alter surface water flow paths which could increase flood risk downstream of the Site.	Scoped In
DWPAs	Not Sensitive	None of the surface water catchments which drain the Site have been designated as a DWPA.	Scoped Out
PWS	Not Sensitive	One PWS source has been identified within the study area, however it is not considered to be at risk from the Proposed Development.	Scoped Out
Licensed abstractions	Not Sensitive	No licenced abstractions have been recorded within the study area.	Scoped Out

Future Baseline

10.77 Climate change studies predict a decrease in summer precipitation and an increase in winter precipitation alongside slightly higher average temperatures. This suggests that there is likely to be greater pressures on water supplies and lower water levels in summer months in the future. Additionally, summer storms are predicted to be of greater intensity.

10.78 Peak fluvial and surface water (pluvial) flows associated with extreme storm events may also increase in volume and velocity. Whilst not relevant to this Site, further sea rise is also anticipated.

10.79 These potential changes are considered in the assessment of effects. Whilst there is uncertainty surrounding the future baseline environment, there are no other anticipated changes on the soils, geology, hydrological or hydrogeological environment throughout the anticipated lifetime of development other than climate change.

Assessment of Effects

Embedded Measures

10.80 The Proposed Development has been designed, as far as possible, to avoid and minimise impacts and effects to hydrology, hydrogeology, and geology (including soils and peat) through the process of design development, and by embedding mitigation measures into the design.

Design Iterations

10.81 The Proposed Development has undergone extensive design iterations and evolution in response to the constraints identified as part of the baseline studies and field studies, to avoid and/or minimise potential effects on receptors where possible. This has included avoiding areas of peat and carbon-rich soils, areas of potential flooding, PWS sources and GWDTEs, minimising development within riparian corridors and maintaining a buffer to watercourses where practically possible.

10.82 The design iterations have also taken into account the scoping advice provided by consultees.

Peat Identification and Avoidance

10.83 The presence of peat within the Site was a key consideration in shaping the layout of the Proposed Development. Informed by the Site-specific peat probing across the Site, the design has sought to avoid areas of deeper peat wherever possible (see **Figure 10.5** and the detailed results in **Technical Appendix 10.1**). In accordance with the mitigation hierarchy set out NPF4 and detailed in SEPA's and NatureScot's guidance, the Proposed Development has entirely avoided areas of deeper peat (>1m).

10.84 The majority of the Proposed Development is located within peaty soils (<0.5m deep) except for very small extents of the proposed access track within the southern extent of the Site and a small extent of the proposed solar PV array within the north western extent of the Site.

Buffer to Watercourses

10.85 In accordance with wind farm construction best practice guidance and SEPA consultation advice, generally a 50m buffer has been applied to all watercourses (as shown on OS 1:10,000 mapping). A 10m to 15m buffer has also been applied to minor watercourses identified within the Site in accordance with SEPA's riparian corridor guidance. The layout of the access track was also designed to minimise the requirement for additional watercourse crossings.

10.86 It is confirmed that no development, except for the proposed watercourse crossing, is located within 10m of any of the mapped watercourses.

10.87 The majority of the Proposed Development has been located outwith the 50m watercourse buffer, as shown on **Figure 10.1**, with the exception of the following areas;

- approximately 350m of proposed access track within the southern extent of the Site;
- approximately 150m of perimeter fencing around the solar areas within the western extent of the Site; and

- approximately 70m of proposed solar track and a very small area of solar PV arrays within the north western extent of the Site.

10.88 It is noted that no development with excavations >1m deep is located within the 50m watercourse buffer, however, it is recognised that during construction there is a need for increased monitoring and management of the works which are located within the 50m buffer. This is discussed further in this Chapter (see Good Practice Measures section).

Private Water Supplies

10.89 In accordance with SEPA guidance, a 250m buffer has been applied to PWS01 which is located within study area (see **Figure 10.1**), and it is confirmed that no development or construction activities are proposed within 250m of the PWS source.

Watercourse Crossings

10.90 The Proposed Development has sought to utilise existing tracks and access routes where possible. There is one new permanent watercourse crossing scheduled to facilitate the Proposed Development.

10.91 The location of the proposed crossing is shown on **Figure 10.1**, and a schedule of this crossing point, including photographs and dimensions of the crossing is shown in **Technical Appendix 10.2**.

Good Practice Measures

10.92 The Proposed Development will be undertaken in accordance with industry good practice guidance. Good practice measures would be applied in relation to management of soils and shallow peat deposits, pollution risk, sediment management and management of surface runoff rates and volumes. These would form part of the final CEMP and measures would also be adopted through a longer-term operational management plan where required. An outline CEMP is presented as **Technical Appendix 3.1**.

10.93 In undertaking the assessment of potential effects of the Proposed Development on hydrology, hydrogeology and geology, it is assumed that good practice measures are incorporated as embedded mitigation.

10.94 Any further specific mitigation which may be required to reduce the significance of a potential effect is identified in the assessment of likely effects during the construction and operational phases.

General Measures

10.95 As a principle, preventing the release of any pollution/sediment is preferable to dealing with the consequences of any release. There are several general measures which cover all effects assed within this Chapter and the details are given below.

10.96 Prior to construction, site-specific drainage plans would be produced. These would consider any existing local drainage which may not be mapped and incorporate any site-specific mitigation measures identified during the assessment.

10.97 Measures would be included in the final CEMP and adopted through a longer-term operational management plan where required. These would include measures for dealing with potential pollution, sedimentation and flood risk incidents and would be developed

prior to construction. This would be adhered to should any incident occur, reducing the effect as far as practicable.

10.98 The final CEMP would contain details on the location of spill kits, would identify 'hotspots' where pollution may be more likely to originate from; provide details to site personnel on how to identify the source of any spill and state procedures to be adopted in the case of a spill event. A specialist spill response contractor would be identified to deal with any major environment incidents.

10.99 A wet weather protocol would be developed. This would detail the procedures to be adopted by all staff during periods of heavy rainfall. Toolbox talks would be given to engineering, construction and supervising personnel. Roles would be assigned to site staff, and the inspection and maintenance regimes of sediment and runoff control measures would be adopted during these periods. In extreme cases, this protocol will dictate that work on-site may have to be temporarily suspended until weather or ground conditions allow.

Ecological/Environmental Clerk of Works

10.100 To ensure all reasonable precautions are taken to avoid negative effects on the water environment, a suitably qualified ECoW/EnvCoW would be appointed prior to the commencement of construction to advise the Applicant and the Principal Contractor on ecological and hydrological matters.

10.101 The ECoW/EnvCoW would be required to be present on-site during the construction phase and will carry out monitoring of works and briefings with regards to any ecological and hydrological sensitivities on the Site to the relevant staff of the Principal Contractor and subcontractors.

10.102 With respect to the water environment, the ECoW/EnvCoW would also have responsibility for ensuring that water flow paths and the quality of water supporting water dependent habitats are sustained and protected during all phases of construction of the Proposed Development.

Safeguarding of Peat and Carbon Rich Soils

10.103 The peat depth probing data has confirmed that the Proposed Development is underlain by mineral soils or peaty soils (where peat depths are <0.5m) and the Proposed Development has avoided areas of deeper peat (>1m deep).

10.104 A soils management plan, which will outline the required mitigation measures regarding the handling and safeguarding of soils would be prepared as part of the final CEMP and would be secured as a pre-development planning condition and agreed with D&GC.

10.105 Where micrositing allowances exist, any movements of infrastructure would ensure the avoidance of peat if encountered, supported by intrusive ground investigations which will be undertaken post consent, prior to construction.

Water Quality Monitoring

10.106 Water quality monitoring before, during construction and post construction will be undertaken at the watercourses which drain the Site to ensure that none of the watercourses are carrying pollutants or suspended solids. Monitoring would be carried out at a specified frequency (depending upon the construction phase) as agreed with D&GC.

10.107 Monitoring frequency would increase during the construction phase if remedial measures to improve water quality were implemented. The performance of the good practice measures would be kept under constant review by the water monitoring schedule, based on a comparison of data taken during construction with a baseline data set, sampled prior to the construction period.

10.108 The monitoring programme would be secured by a pre-development planning condition to be agreed with D&GC.

Works Within Watercourse Buffers

10.109 As discussed, small areas of the Proposed Development (limited to section of access tracks, perimeter fencing and solar PV array area) encroach within the 50m watercourse buffer. At these locations, additional safeguards would be deployed and included in the final CEMP and would be subject to agreement with D&GC. These would include, but are not limited to the following:

- increased induction and training for staff highlighting sensitivities;
- a wet weather working protocol and provision to cease works during prolonged rainfall or periods of high runoff (pluvial or fluvial);
- reduction in extent of working area to minimise the potential to disturb ground;
- additional passive water quality control measures, such as temporary water diversion ditches, silt fences, and silt traps to control and treat runoff from working areas;
- daily inspection of works and watercourses and full time supervision of construction and restoration and works;
- deployment of real-time water quality monitoring telemetry with predetermined water quality trigger levels based on baseline water quality data (e.g. for pH, dissolved oxygen and electrical conductivity): and
- documentation that clearly identifies responsibilities and actions and contact details should a pollution event be recorded.

Pollution Risk

10.110 Good practice measures in relation to pollution prevention would include the following:

- refuelling would take place at least 50m from watercourses and where possible it would not occur when there is risk that oil or fuel from a spill could directly enter the water environment;
- foul water generated onsite would be managed in accordance with best practice and be drained to a sealed tank and routinely removed from Site;
- a vehicle management plan and speed limit would be strictly enforced onsite to minimise the potential for accidents to occur;
- drip trays would be placed under stationary vehicles which could potentially leak fuel/oils;
- areas which would be designated for washout of vehicles are a minimum distance of 50m from a watercourse;
- washout water would also be stored in the washout area before being treated and disposed of;

- no direct or indirect discharges to watercourses without prior treatment in buffer zones or adjacent to proposed infrastructure using appropriate SuDS measures. These measures would be included in the drainage plans to be outlined in the final CEMP;
- water would be prevented as far as possible, from entering excavations;
- procedures would be adhered to for storage of fuels and other potentially contaminative materials in line with the EASR, to minimise the potential for accidental spillage; and
- a plan for dealing with spillage incidents would be designed prior to construction, and this would be adhered to should any incident occur, reducing the effect as far as practicable. This would be included in the final CEMP.

10.111 Site investigation (e.g., trial pitting and/or boreholes) will be undertaken at the detailed design stage, prior to any construction works, where excavation will be required to construct the Proposed Development. The site investigation would inform detailed design and construction methods of the Proposed Development to ensure pollution risk is further considered and minimised prior to construction.

Erosion and Sedimentation

10.112 Good practice measures for the management of erosion and sedimentation would include the following:

- all stockpiled materials would be located outwith a 50m buffer from watercourses, including on up gradient sides of tracks, and stockpiles would be battered to limit instability and erosion;
- where possible, stockpiled material would either be seeded or appropriately covered, minimising the area of exposed bare ground;
- monitoring of stockpiles/excavation areas would take place during and immediately following extreme rainfall events;
- water would be prevented as far as possible, from entering excavations through the use of appropriate cut-off drainage;
- where this is not possible, water that enters excavations would pass through a number of settlement lagoons and silt/sediment traps to remove silt prior to indirect discharge into the surrounding drainage system. Detailed assessment of ground conditions would be required to identify locations where settlement lagoons would be feasible;
- clean and dirty water onsite would be separated and dirty water would be filtered before entering the water environment;
- if the material is stockpiled on a slope, silt fences would be located at the toe of the slope to reduce sediment transport;
- the amount of ground exposed, and time period during which it is exposed, would be kept to a minimum and appropriate drainage would be in place to prevent surface water entering deep excavations;
- a design of drainage systems and associated measures to minimise sedimentation into natural watercourses would be developed - this may include silt traps, check dams and/or diffuse drainage;

- silt/sediment traps, single size aggregate, geotextiles or straw bales would be used to filter any coarse material and prevent increased levels of sediment. Further to this, activities involving the movement or use of fine sediment would avoid periods of heavy rainfall where possible; and
- construction personnel, the Principal Contractor and ECoW would carry out regular visual inspections of watercourses to check for suspended solids in watercourses downstream of work areas.

Sustainable Drainage Systems (SuDS)

10.113 SuDS will be incorporated as part of the Proposed Development and included as part of the detailed drainage design for the Proposed Development.

10.114 SuDS techniques aim to mimic pre-development surface water runoff conditions and balance or throttle flows to the rate of surface water runoff that might have been experienced at the Site prior to development. Good practice in relation to the management of surface water runoff rates and volumes and potential for localised surface water flood risk would include the following:

- drainage systems would be designed to ensure that any sediment, pollutants or foreign materials which may cause blockages are removed before water is discharged into a watercourse;
- onsite drainage would be subject to routine checks to ensure that there is no build-up of sediment or foreign materials which may reduce the efficiency of the original drainage design causing localised flooding;
- drainage systems deployed would attenuate runoff rates and reduce runoff volumes to mitigate potential increase in downstream flood risk;
- where necessary, check dams would be used to reduce the flow velocity and attenuate the rate of runoff shed from Site; and
- as per good practice for pollution and sediment management, prior to construction, site-specific drainage plans would be developed and construction personnel made familiar with the implementation of these.

10.115 Further information on ground conditions and drainage designs would be provided in the final CEMP.

Water Abstractions

10.116 If water abstraction for construction activities is required, a potential source will be identified at the detailed design stage of the project and following site investigation. An application for a EASR authorisation would then be made to SEPA and managed through the regulation of the EASR. Should a suitable source not be identified, a water bowser would be used.

10.117 Good practice that would be followed in addition to the EASR regulations includes:

- planning of water use so as to minimise abstraction volumes;
- reuse of water where possible;
- recording of abstraction volumes; and
- control of abstraction rates to prevent significant water depletion in a source.

Watercourse Crossings

10.118 Review of 1:10,000 scale watercourse mapping confirms that one new permanent watercourse crossing is required to establish the Proposed Development, as shown on **Figure 10.1** and detailed further in **Technical Appendix 10.2.**

10.119 The crossing will be designed to pass the 1 in 200-year flood event, including an allowance for climate change, and the design and construction details would be agreed with SEPA and D&GC as part of the final CEMP.

Solar PV Arrays

10.120 It is typically assumed that solar photovoltaic (PV) modules would intercept precipitation and shed this onto the ground along the lower edge of each array (the 'dripline'). Runoff from each solar PV module would continue to infiltrate into the underlying soils locally, in much the same way as existing conditions. It is therefore considered that solar PV modules will generally not impact floodplain storage or increase peak runoff rates and volumes. Dripline planting will be used to manage surface water runoff from the solar PV arrays, preventing channelisation, and mimicking the natural rainfall-runoff regime.

10.121 As discussed in **Technical Appendix 10.3**, the lower edge of the solar PV modules would be set at 1m above the ground level within the areas of surface water flood risk shown to be >0.3m deep on the SEPA flood mapping, to ensure that there is sufficient freeboard between the solar PV modules and maximum surface water flood depths in these areas.

Battery Energy Storage System (BESS)

10.122 The final design of the proposed BESS and the provision of fire water and its collection would be agreed with D&GC in consultation with SEPA, as part of the detailed design phase (should the Proposed Development receive consent). This would allow the final design to reflect best practice and relevant design standards applicable at that time. This is typically secured by a pre-construction planning condition.

10.123 The drainage system at the proposed BESS should be sized to manage firewater should, in the unlikely event of a fire, water be used to extinguish the fire. The drainage system would be sized in accordance with good practice measures, particularly GPP18.

10.124 Details of the proposed firewater management strategy associated within the proposed BESS will be developed as part of the detailed drainage design for the Proposed Development, and sizing for the detention basin will accommodate flows. It is anticipated that this will be secured by a planning condition and will be outlined in a longer-term operational management plan. Mitigation measures will include:

- lining of the drainage system with a low permeability liner;
- provision of a penstock/shut off valve on the outfall which will be used to ensure firewater is contained at or close to the source; and
- an emergency plan to be followed in the event of a fire. This plan would be developed in consultation with local fire service and appropriate treatment and disposal of the polluted waters, which would include, if required, the tankering from Site of any water collected by the drainage system.

Concrete Pouring

10.125 As part of the investigation works, the ground conditions would be assessed to inform the concrete design which will be used to facilitate the Proposed Development in accordance with best practice. The design of the concrete will ensure that the concrete specification used is appropriate for the environment to minimise degradation and leaching into the surrounding soil and water environment. If necessary, the excavations would incorporate an adequate barrier to prevent the movement of any on-site pollutants to the underlying soils, groundwater and surface water environment.

10.126 These methods will be specified in the final CEMP, and the proposed concrete design will be agreed with SEPA prior to construction.

Potential Construction Effects

Peat and Carbon Rich Soils

10.127 It has been shown that the Proposed Development will avoid peat deposits >1m deep. With appropriate mitigation, including a soil management plan which would form part of the final CEMP, the disturbance of carbon-rich soils and shallow peat deposits can be minimised, and these deposits can be safeguarded.

10.128 Peat and carbon-rich soils are considered high sensitivity receptors. With the implementation of recommended best practice measures to be outlined in the final CEMP, the potential impact on these deposits is assessed as negligible. Consequently, the overall significance of the effect is also negligible and therefore **not significant**.

Pollution Risk

10.129 During the construction phase there is potential for a pollution event to affect surface water catchments and groundwater bodies impacting their quality. This would have an adverse, potentially leading to effects on any aquatic life downstream, and GWDTE areas listed in the SEPA guidance.

10.130 Pollution may occur from excavated and stockpiled materials during Site preparation. Contamination of surface water runoff from machinery, leakage, and spills of chemicals from vehicle use and the construction of access tracks and turbine hardstandings also have the potential to affect surface and groundwater bodies. Potential pollutants include sediment, oil, fuels, and cement.

10.131 The risk of a pollution incident occurring would be managed using industry standard good practice measures. Many of these practices are concerned with undertaking construction activities away from watercourses, sensitive peat and vegetation habitats and identifying safe areas for stockpiling or storage of materials that could otherwise lead to pollution.

10.132 The baseline assessment has shown that the watercourses within study area and groundwater beneath the Proposed Development are considered a medium to high sensitivity receptors. GWDTE habitats are also considered high sensitivity receptors.

10.133 The good practice measures would also be set out in the final CEMP, and these would minimise the risk of a pollution event occurring. These measures would also include an emergency response plan which would be triggered in the case of an accident occurring to minimise pollution risk. The magnitude of the change associated with a pollution event during construction is therefore predicted to be negligible and the significance of effect is considered negligible and **not significant**.

Erosion and Sedimentation

10.134 Site traffic during the construction phase has the potential to cause erosion and increase sediment loads in receiving watercourses. This has the potential to adversely impact water quality, increase turbidity levels, reducing light and oxygen levels and affect aquatic ecology including fish populations.

10.135 Material stockpiles, construction of access tracks, watercourse crossings, and hardstanding areas associated with the Proposed Development are the key sources of erosion and sediment generation. Adherence to good practice measures would ensure that any material generated is not transported into nearby watercourses or onto areas of peat or GWDTE. Location specific good practice measures will form part of the final CEMP and would be used to minimise the potential for erosion and sedimentation.

10.136 After consideration of good practice measures, the magnitude of change associated with erosion and sedimentation is assessed as negligible. Surface water and groundwater receptors, including peat and GWDTE, are considered medium to high sensitivity receptors. The significance of effect is therefore assessed as negligible and **not significant**.

Flood Risk

10.137 It is proposed that any rainwater and groundwater ingress which collects in the excavations during construction would be stored and attenuated prior to controlled discharge to ground or the adjacent water network. Attenuation of runoff generated by any excavations will allow settlement of suspended solids within the runoff prior to discharge in accordance with 'Site control' component of the SuDS 'management train'.

10.138 The magnitude of the increase in the impermeable area is not sufficient to have a measurable effect on groundwater levels, as the extent of the impermeable area is insignificant compared to the extent of the underlying geology and groundwater.

10.139 The significance of effect on flood risk receptors downstream of the Proposed Development, which are considered to have a medium sensitivity, is therefore assessed as negligible and **not significant**.

Surface Water and Groundwater Level and Flow

10.140 Excavations associated with construction works (e.g. turbine bases, foundations, cable trenches etc.) can result in local lowering of the water table without mitigation. The proposed solar panels would be secured to the ground with steel piles, minimising the need for significant excavations.

10.141 The design of the Proposed Development has avoided areas of high ecological or habitat interest, including peat, PWS sources and GWDTE. It is noted that the superficial deposits have little groundwater and therefore limited or little dewatering is likely to be required. The bedrock geology, however, does contain groundwater and it is expected that local dewatering would be required for any excavations which encroach into the bedrock deposits. It is noted that excavations required during construction of the Proposed Development are small compared to the overall groundwater catchments and no catchment scale impact on groundwater levels or flows is anticipated.

10.142 Dewatering associated with construction is temporary and would not be required post construction. Location specific good practice measures will form part of the final CEMP and will be used to minimise the potential for drainage and dewatering effects. Any

temporary dewatering will also be undertaken in accordance with the appropriate EASR general binding rule (GBR).

10.143 Taking into consideration of the embedded mitigation and good practice measures, the magnitude of change is assessed as negligible and therefore the significance of effect of changing groundwater levels and flow due to dewatering is considered negligible and **not significant**.

10.144 During the construction of the Proposed Development, water may be abstracted for uses such as dust suppression, vehicle washing, batching plant activities and welfare facilities. Without mitigation this could result in local lowering of the water table, affecting local peat deposits, and reducing flows in the local surface water network which support water dependent habitats.

10.145 The volume of water and mitigation required would be regulated through a EASR abstraction licence which would be agreed with SEPA. With this safeguard, the magnitude of change on groundwater-surface water interactions, which are considered medium to high sensitivity receptors is considered negligible. The significance of effect is therefore negligible, and **not significant**.

Potential Operational Effects

10.146 It is acknowledged that the potential effects are expected to be similar to those arising from construction activities; however, they are anticipated to occur on a smaller and more localised scale.

10.147 Should any maintenance be required onsite during the operational life of the Proposed Development which would involve construction type activities, mitigation measures similar to those in the final CEMP will be employed to avoid potential effects. These would be adopted through a longer-term operational management plan to avoid potential significant effects.

Peat and Carbon Rich Soils

10.148 No excavation, movement or storage of peat or carbon rich soils is anticipated during the operational life of the Proposed Development. Should any maintenance be required which involves the movement of shallow peat and carbon-rich soils, the good practice measures (to be set out in the final CEMP and will be adopted through a longer-term operational management plan) will be adopted to safeguard these deposits.

10.149 Peat and carbon-rich soils are high sensitivity receptors. The magnitude of change on deposits of peat and carbon-rich soils is assessed as negligible and thus the significance of effect is negligible and **not significant**.

Pollution Risk

10.150 The possibility of a pollution event occurring during operation is very unlikely. There would be a limited number of vehicles required on-site for routine maintenance and for the operation of the Proposed Development. Storage of fuels/oils onsite would be limited to the hydraulic oil required in turbine gearboxes. The good practice measures (to be set out in the final CEMP and will be adopted through a longer-term operational management plan) will minimise the risk of a pollution event occurring. Measures will also be put in place in the case of an accident occurring to contain pollutants and minimise the impacts of a spill.

10.151 Storage and handling of potential pollutants will be handled in accordance with good practice and regulated in accordance with the EASR.

10.152 The solar PV modules would be cleaned infrequently and when they are cleaned it would be with clean water only. This will be confirmed and stipulated in an adopted through a longer-term operational management plan which will be agreed with D&GC via a planning condition, should the development be consented.

10.153 The drainage system at the BESS should be sized to manage firewater, should, in the unlikely event of a fire, water and fire retardants be used to extinguish a fire. Details of the proposed firewater management strategy associated within the proposed BESS will be developed as part of the detailed drainage design for the Proposed Development.

10.154 The good practice measures will provide suitable safeguards to manage firewater such that local water resources are protected.

10.155 The baseline assessment has shown that the watercourses within study area and groundwater beneath the Proposed Development are considered a medium to high sensitivity receptors. GWDTE habitats are also considered high sensitivity receptors. The magnitude of change of a pollution event during the operational phase of the Proposed Development is assessed as negligible. Therefore, the significance of effect for a pollution event during the operational phase of the Proposed Development is predicted to be negligible for all receptors and **not significant**.

Erosion and Sedimentation

10.156 During the operational phase of the Proposed Development, significant excavation or stockpiling of material is not anticipated, aside from routine maintenance activities. As a result, the potential for erosion and sedimentation effects is expected to be minimal.

10.157 Immediately post-construction, newly excavated drains and track dressings may be prone to erosion as any vegetation will not have matured. Appropriate design of the drainage system, incorporating sediment traps, will reduce the potential for the increased delivery of sediment to natural watercourses. Immediately post-construction, flow attenuation measures will remain and be maintained to slow runoff velocities and prevent erosion until vegetation becomes established.

10.158 Should any non-routine maintenance be required at sections of track crossing wet areas (defined visually onsite by a contractor or operational personnel) there will be potential for erosion and sedimentation effects to occur due to the existence of disturbed material. Should this type of activity be required, then the good practice measures as detailed for the construction phase will be required on a case by case basis. Extensive work at water crossings or adjacent to the water environment may require approval from SEPA under the EASR (depending upon the nature of the activity).

10.159 The likelihood, magnitude and duration of a potential erosion and sedimentation event occurring would be negligible following adherence to good practice measures. The magnitude of change is therefore considered negligible and thus the significance of effect on identified receptors (which are all considered as medium to high sensitivity receptors) is negligible and **not significant**.

Flood Risk

10.160 It has been shown (see **Technical Appendix 10.3**) that the Proposed Development is not considered to be at risk of flooding, subject to the lower edge of the solar PV arrays being

set at 1m above the ground level in areas where surface water flood depths exceed 0.3m on the SEPA flood mapping.

10.161 The Proposed Development has the potential to increase surface water runoff due to the addition of increased hardstanding area associated with the turbine crane pads and the proposed construction compounds. A drainage strategy will be developed further as part of the detailed design stage of the project and would be agreed with D&GC and SEPA prior to construction.

10.162 The risk of an adverse effect on flood risk receptors during operation also arises as a result of a potential restriction of flow at a permanent watercourse crossing following intense rainfall. In accordance with good practice, routine inspection and clearing of the watercourse crossing at the Proposed Development will be undertaken, reducing the likelihood of a blockage occurring. The new watercourse crossing will also be sized to pass the 200-year flood with an allowance for predicted climate change uplifts. The design of the watercourses will also be agreed with SEPA prior to construction and will be cognisant of industry good practice.

10.163 The magnitude of change to flood risk receptors during operation is therefore assessed as negligible on a receptor with medium sensitivity. The significance of effect is assessed as negligible and **not significant**.

Surface Water and Groundwater Level and Flow

10.164 Operation of the Proposed Development will require limited or no activities that have the potential to impair surface water or groundwater levels and flow, relative to the construction phases. No permanent groundwater dewatering is required during the operation phase of the Proposed Development, and the use of SuDS will be adopted to ensure that existing surface water flow paths are maintained.

10.165 The magnitude of a potential change is limited by the small scale of the Proposed Development compared to the surface water and groundwater catchments in which it is located.

10.166 The magnitude of change is therefore assessed as negligible on receptors with medium to high sensitivity. The significance of effect is therefore negligible and **not significant**.

Potential Cumulative Effects

10.167 The assessment also considers potential cumulative effects associated with other developments within 5km of the Site and in the same surface water catchments as the Proposed Development. A cumulative effect is considered to be the effect on a geological, hydrological, hydrogeological or peat receptors arising from the Site in combination with any other developments which are likely to affect soils, geology, surface water and or groundwater.

10.168 It is confirmed that no developments are located within 5km and in the same surface water catchments as the Proposed Development.

10.169 No cumulative effects on geology, hydrology, hydrogeology and peat are therefore expected as a result of the Proposed Development.

Further Survey Requirements and Monitoring

10.170 As all the predicted effects are negligible and therefore not significant in the context of the EIA Regulations, no additional mitigation during construction or operation is required other

than the embedded good practice measures that the Applicant will implement as standard. The good practice measures will be adopted through the final CEMP and a longer-term operational management plan.

10.171 It has been recognised in this assessment that a programme of water monitoring would be required prior to any construction activity, during construction and immediately post construction of the Proposed Development. The monitoring programme would be agreed with statutory consultees and is expected to include monitoring of the watercourses which drain from the Site to ensure there are no effects to the water environment.

Statement of Significance

10.172 As a consequence of the Site design and the embedded mitigation that affords, and subject to adoption of good practice measures, no significant effects on hydrology, hydrogeology, and geology (including soils and peat) are anticipated as a result of the Proposed Development.

Summary

10.173 An assessment of the potential effects of the Proposed Development on hydrology, geology and hydrogeology within a defined study area (comprising land within 500m of the application boundary) has been undertaken. The assessment has considered the construction and operation phases of the Proposed Development.

10.174 The Proposed Development design has been informed by site-specific surveys that have been used to verify the findings of a comprehensive desk study and identify key receptors.

10.175 Embedded mitigation and good practice measures have been identified that afford protection to the water environment. In addition, a site-specific CEMP has been committed.

10.176 It has been shown, as a consequence of the Proposed Development design and with the adoption of industry standard good practice, delivered through a skilled team of competent workers, with mitigation and compliance monitored in collaboration with SEPA, D&GC and other engaged stakeholders, the significance of effects on all identified receptors is considered to be negligible and are not defined as significant in the context of the EIA Regulations.

10.177 A summary of the assessed receptors and identified mitigation measures required to reduce the potential effects to acceptable levels is identified in **Table 10-9**.

Table 10-9: Summary Table

Description of Effect	Mitigation Measures	Residual Effect (With Mitigation)
Construction		
Degradation of peat and carbon rich soils.	• Mitigation by design by avoiding areas of peat >1m deep and adherence to good practice measures. • Adoption of a soil management plan which will be outlined in the final CEMP, with written approval of D&GC.	Not significant.

Generation of pollution impairing water quality of surface water catchments and groundwater bodies.	• Mitigation by design including a 10m and 50m buffer to watercourses and adherence to good practice measures. • Final CEMP to be submitted with written approval of D&GC. • Confirmatory water quality monitoring, the scope and frequency of which will be agreed with D&GC prior to construction commencing.	Not significant.
Increased erosion and sediment load in receiving watercourses.	• Mitigation by design including a 10m and 50m buffer to watercourses and adherence to good practice measures. • Final CEMP to be submitted with written approval of D&GC. • Confirmatory water quality monitoring, the scope and frequency of which will be agreed with D&GC prior to construction commencing.	Not significant.
Increased flood risk to downstream receptors during construction.	• Commitment to deploy SuDS during construction which will form part of the final CEMP. • Commitment to ensure all watercourse crossings are designed in accordance with good practice and construction details are agreed with SEPA prior to construction.	Not significant.
Potential effects on surface water and groundwater levels and flow.	• Adherence to good practice measures. • Final CEMP to be submitted with written approval from D&GC. • Commitment to manage any required water abstractions or temporary dewatering during construction in accordance with EASR.	Not significant.
Operation		
Degradation of peat and carbon rich soils.	• Adherence to good practice measures outlined in the final CEMP and adopted through a longer-term operational management plan.	Not significant.
Generation of pollution impairing water quality of surface water catchments and groundwater bodies.	• Adherence to good practice measures including incorporating appropriate storage and handling of potential pollutants in accordance with EASR. • Commitment to adopt an appropriate drainage design at the BESS including firewater management.	Not significant.
Increased erosion and sedimentation in receiving watercourses.	• Commitment to adopt an appropriate drainage design that incorporates sediment management measures. Adopted through a longer-term operational management plan.	Not significant.
Increased flood risk to downstream receptors during operation.	• Commitment to set lower panel edge of the solar PV array at 1m above ground level in deeper areas shown at surface water flood risk (>0.3m deep), as outlined in **Technical Appendix 10.3**.	Not significant.

	• Inspection of the operational drainage system and maintenance of the drainage system agreed with D&GC at the detailed design stage. • Commitment to regularly remove blockages from watercourse crossings.	
Potential effects on surface water and groundwater levels and flow.	• Adherence to good practice measures outlined in the final CEMP and adopted through a longer-term operational management plan.	Not significant.
Cumulative		
No cumulative effects are anticipated as a result of the Proposed Development.		

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