From:	[redacted]
To:	One Earth Solar; [redacted]
Subject:	Submissions for deadline 5 and my view on Issues Specific 3 Agenda
Date:	11 November 2025 19:57:12
Attachments:	The Volumetric and Procedural Crisis.docx The ExA"s Imperative Mandating Scientific Standards and Financial Surety for One Earth Amidst Institutional Advice Failure and Resource Deficits.docx

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Stephen Fox

Resident of North Clifton

Interested Party Reference number: [redacted]

To The Examining Authority

One Earth Solar Farm (Scheme Ref: EN010159)

The Planning Inspectorate, Temple Quay House, Temple Quay, Bristol BS1 6PN

11.11.25

Dear Sirs

Submissions for deadline 5 and my view on Issues Specific 3 Agenda

Reservation of Rights (Litigant in Person)

This submission is made under **explicit protest** and strictly **without prejudice** to the Interested Party's right to challenge the lawfulness and procedural integrity of the Examination.

The Interested Party's continued participation is legally **compelled** by the statutory process (Planning Act 2008) to maintain standing, but this action does **not** constitute a waiver, acceptance, or validation of any alleged procedural impropriety, ExA bias, unlawful censorship, or fundamental flaws in the Administrative Record.

All rights to seek Statutory Appeal and Judicial Review against the final Development Consent Order decision are fully reserved.

I attach **two submissions for submission at deadline 5**

The Volumetric and Procedural Crisis: A Forensic Appraisal of Scientific Defect, Regulatory Failure, and Flood Risk Inadequacy in the One Earth Solar Farm DCO Application

and

The EXA's Imperative: Mandating Scientific Standards and Financial Surety for One Earth Amidst Institutional Advice Failure and Resource Deficits

These are new submissions for the examination.

They also serve as my response to all the issues raised under the hydrology , flood risk , sequential test and Exceptional test elements items on the agenda at Issues Specific meeting 3 along with

Forensic Rebuttal to Applicant's Response on Hydrology, Flood Risk, and Governance:

EN010159/APP/9.31 Section 5 **AS057**

A Multi-Disciplinary Synthesis: Reconciling Two Hydrologic Perspectives on Solar Panel Runoff **Rep4-071**

Submission of a Critical Analysis of Flood Risk Assessments for the One Earth, Tilbridge, and Great North Road NSIP Solar Proposal **REP4 -074**

CRITICAL SUBMISSION & POLICY OVERRIDE (17 September 2025): Immediate Requirement to Review Sequential Test Compliance of One Earth Solar Farm (OEP) DCO (Reference EN010159). **Rep4-075**

Request for Formal Challenge and Requisition of Evidence from the Lead Local Flood Authority (LLFA) and Applicant Regarding Flawed Surface Water Hydrology Modelling **Rep4 -076**

Technical Report and Formal Request for a Mandatory Joint Commission on Cumulative Flood Risk Assessment: One Earth Solar Farm Development Consent Order (DCO) NSIP (EN010159 **Rep4-077**

The Planning Case for Rejection Speculative Site Selection **Rep4-078**

Request for Robust Consideration of Alternative Site Constellations, In Light of New Technical and Financial Evidence **Rep4-079**

Analysis of Deferred Flood Risk Assessment and Procedural Propriety Concerns in the One Earth Solar Farm DCO Examination **Rep4-080**

Technical Assessment of Flood Plain Storage Compromise in Nationally Significant Infrastructure Project **Rep4-082**

With regard to the cumulative effects - my views are summarised expressed

Submission of a Critical Analysis of Flood Risk Assessments for the One Earth, Tilbridge, and Great North Road NSIP Solar Proposal **REP4 -074**

Yours faithfully

Stephen Fox

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Regards

Stephen

The Volumetric and Procedural Crisis: A Forensic Appraisal of Scientific Defect, Regulatory Failure, and Flood Risk Inadequacy in the One Earth Solar Farm DCO Application

Contents

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I. Executive Summary: Diagnosis of Statutory and Procedural Crisis

1.1. Synthesis of Foundational Failures

The forensic appraisal of the One Earth Solar Farm Development Consent Order (DCO) application reveals systemic and irremediable defects across technical, regulatory, and procedural domains. The submission is fundamentally unsound, failing both the mandatory non-derogation principle for static flood risk management1 and the Exception Test requirement for dynamic, lifetime flood safety. The core issues stem from a calculated strategy of policy circumvention designed to externalise flood risk and minimise required engineering costs.

First, a Static Volumetric Failure is confirmed. The Applicant's segmented methodology masked a minimum cumulative flood depth displacement of 5.7 mm, which is the additive consequence of the development footprint across the hydraulically connected River Trent floodplain (2.2 mm West and 3.5 mm East)2. This displacement objectively exceeds the arbitrary 5 mm tolerance threshold accepted by the Environment Agency (EA)13 and results in an uncompensated material flood storage loss of at least 39,900 m^3 across the estimated 700 ha of Flood Zones 2 and 34.

Second, a Dynamic Hydrological Failure exists because the Flood Risk Assessment (FRA) is scientifically defective. It relies on generic, outdated modelling inputs that fail to incorporate contemporary empirical data on utility-scale solar arrays. Academic research demonstrates that PV arrays drastically alter surface hydrology, increasing peak discharge by factors up to 11 times and runoff kinetic energy by up to 10 times5, thereby guaranteeing that the calculated mitigation measures are undersized and incapable of ensuring lifetime safety.

Third, a severe case of Regulatory Impropriety has been identified. The EA’s formal agreement within the Statement of Common Ground (SoCG) to accept the arbitrary 5 mm tolerance constitutes an act of ultra vires1. This action compromises the EA's statutory role and technical independence by contradicting its own binding technical guidance3 that explicitly rejects such

numerical tolerances and fails to recognise the fundamental change in hydrological dynamics caused by the extensive solar arrays, thereby sanctioning a scientifically defective FRA.

Finally, the Applicant's strategy is characterised by Procedural Culpability. The systemic pattern of non-engagement and strategic late submission of critical documents (revisions to the FRA deferred until Deadline 5 or 6) is designed to deny transparent scrutiny under the fixed statutory timetable. This failure is compounded by the Applicant's sustained refusal to engage on critical technical issues since August 2024, a situation the Examination was aware of but failed to resolve through early use of its statutory powers. The concurrent attempt to utilise a Deferred Approval Mechanism (DAM) to confirm storage loss compensation is unlawful6, as it seeks to reverse the statutory burden of proof required for the grant of consent.

1.2. Analysis of the Manufactured Policy Evasion Strategy

The Applicant's chosen approach demonstrates a high degree of calculation intended to evade two primary, costly policy challenges: the mandatory requirement to quantify and compensate for permanent volumetric storage loss (the static issue) and the necessity of designing resilient mitigation for the unique PV array hydrology (the dynamic issue).

The strategy of Volumetric Evasion was achieved by employing two calculated steps: the segmentation of flood impacts across the River Trent floodplain to keep the individual figures below the 5 mm cap, and the simultaneous campaign to secure the EA's ultra vires acceptance of this arbitrary tolerance1. This dual action successfully circumvented the mandatory trigger for Level-for-Level (LFL) compensation for the resulting 39,900 m^3 loss4.

Concurrently, the strategy of Dynamic Evasion utilised outdated, generic modelling that ignores the empirically proven 11x peak discharge risk and 10x kinetic energy risk5. By treating the site hydrologically as conventional grassland, the Applicant avoided the necessity of costly, complex engineering and land-take required to mitigate the actual flow and erosion risks posed by the high-density PV array structure7. This calculated avoidance was designed purely to minimise engineering costs by circumventing the mandatory trigger points for robust mitigation, transforming a known, quantifiable technical risk into a systemic environmental liability.

1.3. The Regulatory Collusion and Compromise Risk

The persistent failure of the Environment Agency to enforce its own mandatory technical policy concerning the 5 mm tolerance suggests that regulatory independence was significantly compromised under pressure exerted by the Applicant's high-powered consultants1. The EA's consistent pattern of concession, despite its binding guidance requiring raw model results3, grants the Applicant an illegitimate policy exemption. This compromise effectively shifts the enormous financial and environmental burden—associated with compensating the minimum 39,900 m^3 storage deficit and managing the 11x peak flow failure—onto the surrounding vulnerable communities and the public sector, fundamentally compromising the stringency of the NSIP protective regime, and increasing the risk of downstream flooding and inundation.

II. The Policy Foundation: The Non-Derogation Principle and Statutory Mandate

2.1. The Absolute Requirement for "No Net Loss"

The governance of flood risk for Nationally Significant Infrastructure Projects (NSIPs) is strictly defined by the Overarching National Policy Statement for Energy (NPS EN-1)8. This document establishes a non-derogation principle: the Secretary of State must be assured that the scheme will not result in flooding elsewhere, and there must be "no net loss of floodplain storage" throughout the lifetime of the development.

This requirement is absolute, particularly for projects like the One Earth Solar Farm, where an estimated 700 ha, or approximately half, of the 1,409 ha Order Limits is situated within Flood Zones 2 and 349. The location of the scheme within these high-risk areas—which are responsible for flood attenuation in the River Trent catchment—elevates any loss of storage volume to a critical, material concern that demands rigorous offset through mitigation.

2.2. The Requirement for Level-for-Level (LFL) Compensation

Where floodplain storage loss is quantified, the mandatory policy remedy is Level-for-Level (LFL) compensation10. LFL mandates the reorientation of land through lowering ground levels to ensure that the same volume of flood storage is available at all critical levels of flooding.

This remedy requires specific, technical compliance that the current segmented assessment fundamentally violates:

- Compensation must be provided using narrow horizontal layers, generally ranging from 100 mm to 300 mm in thickness.
- The required cut volume must be greater than or equal to the fill volume for each slice to account for efficiency and ensure storage effectiveness.
- The compensation area must be hydraulically linked to the fill area, meaning it must flood from the same watercourse as the area of permanent fill. The segmented approach, by artificially separating the hydraulic effects, violates this core requirement.

2.3. The Environment Agency's Binding Technical Standard

The Environment Agency’s own technical guidance on flood risk modelling rigorously defines the standard for presenting and utilising hydraulic model results3. This guidance explicitly prohibits the methodology adopted by the Applicant and accepted by the EA in the SoCG, deeming it scientifically unsound and legally unjustifiable.

The Rejection of Arbitrary Tolerances

The EA guidance explicitly rejects the practice of applying arbitrary numerical values to discount calculated impacts. A figure such as ±10 mm, and by extension 5 mm, is stated to be "not supported by any evidence" and must not be uniformly applied to analyses. Crucially, the guidance mandates that analysis must be conducted using "raw results, without including any allowance for model calculation error (‘modelling tolerance’)".

The scientific basis for this mandate rests on the principle that the calculation of flood displacement is a relative comparison between the pre-development and post-development scenarios. Since both scenarios utilise the identical hydraulic model inputs, the inherent uncertainty or tolerance relating to the absolute flood levels has no bearing on the relative difference between the two scenarios3.

Therefore, if the model calculates a displacement of +2.2 mm plus +3.5 mm, 5.7mm represents the valid, measurable consequence of the development footprint itself. To subtract an arbitrary 5 mm tolerance from this calculated change is not an appropriate allowance for model

uncertainty, but rather a deliberate post-facto mathematical manipulation designed solely to negate the calculated consequence. This procedure effectively nullifies the calculated displacement volume, externalising the corresponding flood risk onto surrounding receptors, a clear breach of the scientific rigour mandated by the EA's own technical standards.

Policy Erosion through Tolerance Negotiation

Allowing the negotiation and formalisation of an arbitrary numerical tolerance, such as 5 mm, into a formal regulatory document like the SoCG fundamentally compromises the non-derogation principle. This transforms mandatory environmental safeguards—designed to ensure no net loss—into negotiable, arbitrary caps, severely eroding the stringency and public trust in the flood risk examination process for NSIPs.

III. Technical Deconstruction: The Material and Uncompensated Volumetric Deficit

3.1. Forensic Analysis of the Fatal Flaw: Segmentation

The Applicant's methodology segmented the flood displacement analysis into two independent measures: 2.2 mm west of the River Trent and 3.5 mm east of the River Trent2. This segmentation is hydraulically unsound and constitutes a deliberate methodology to mask the true consequence of the development.

The River Trent bisects the 1,409 ha site7, and during any significant flood event, the floodplain acts as a single, contiguous hydraulic system. Displacement of water volume caused by permanent fill on the Western Bank (2.2 mm) inevitably contributes to the overall peak water level in the main channel, which directly dictates the inundation depth and extent on the Eastern Bank (3.5 mm). The assertion that these two effects are isolated is scientifically inaccurate, especially given that hydraulically connected tributaries are within the application area.

The required additive consequence must treat the impacts as the result of a single, continuous flood event affecting a unified system:

Minimum Total Cumulative Loss Depth = 2.2 mm + 3.5 mm = 5.7 mm

This minimum sum of 5.7 mm objectively exceeds the 5 mm tolerance threshold accepted by the Applicant and the EA to negate the requirement for compensatory storage13. The segmentation methodology was thus calculated to present two figures, each safely below the arbitrary cap, thereby avoiding the significant engineering and cost requirements associated with LFL compensation. This approach violates the statutory obligation under the National Planning Policy Framework (NPPF) to assess cumulative impacts within a hydraulically connected system11.

3.2. Quantification of Material Uncompensated Flood Storage Loss and Dynamic Effects

The volumetric consequence of this cumulative breach across the estimated 700 ha of affected Flood Zones 2 and 3 remains a minimum of 39,900 m^3 (calculated as 7,000,000 m^2 × 0.0057 m). This represents a critical, material uncompensated volumetric loss that directly violates the NPS EN-1 mandate for "no net loss" of floodplain storage.

Furthermore, the Applicant's own detailed cut-and-fill analysis, conducted in support of the application, confirms a gross volume of flood storage permanently lost (Fill) totalling 14,149 m^3 across the two identified hydraulically assessed cells. While this figure represents the volume the Applicant targeted for mitigation (incorrectly), a forensic review of their Level-for-Level (LFL) compensation tables reveals a fundamental failure within the highest, most critical elevation band (the Design Flood Level layer, 10.2–10.4 mAOD).

The LFL standard mandates that compensation must be provided in precise horizontal layers (100 mm to 300 mm slices) and that the cut volume must be greater than or equal to the fill volume for each slice, to ensure effective attenuation of the flood peak. The Applicant's own data confirms a specific, uncompensated volumetric deficit in this highest, most sensitive layer: a 10 m^3 shortage in Flood Cell A and a 14 m^3 shortage in Flood Cell B. These precise deficits demonstrate unequivocal non-compliance with the LFL functional requirement at the critical flood elevation, thereby violating the non-worsening criteria and directly resulting in the reported localised surcharges of 2.2 mm and 3.5 mm.

Metric	Input Value / Calculated Loss	Source / Rationale	Policy Consequence
Calculated Displacement (West Trent)	2.2 mm (0.0022 m)	Applicant's Flood Volume Assessment	Segmentation violates unified hydraulic system assessment.
Calculated Displacement (East Trent)	3.5 mm (0.0035 m)	Applicant's Flood Volume Assessment	Segmentation violates unified hydraulic system assessment.
Minimum Cumulative Loss Depth	5.7 mm (0.005m)	Required additive consequence	Objectively exceeds the 5 mm tolerance threshold.
Estimated FZ 2/3 Area Affected	700 ha (7,000,000 m^2)	Application Document Estimate	Area requiring Level-for-Level (LFL) compensation.
Minimum Uncompensated Volume	39,900 m	Calculation: 7,000,000 m^2 × 0.0057 m	Direct breach of NPS EN-1 mandate for "no net loss

Under-Assessment of Permanent Volumetric Fill

Furthermore, this calculated 39,900 m^3 figure represents only the volumetric fill narrowly relied upon by the Applicant and fails to account for all permanent infill. The model omits or inadequately quantifies the displacement caused by essential ancillary infrastructure, which is permanent fill within the floodplain:

- Perimeter and Internal Fencing Foundations: The cumulative volume of thousands of security fence posts and their associated solid concrete or driven foundations constitutes permanent fill within the floodplain12. The solid displacement volume of

these permanent posts and foundations remains unaccounted for in the 5.7 mm calculation.

- Inverter/BESS Solid Bases: Numerous associated inverter and transformer units within the PV array area require permanent, solid bases, corner blocks, or anchoring mechanisms to secure them. These solid bases permanently displace flood volume at ground level, constituting infill that requires LFL compensation12.

The cumulative volume of these numerous ancillary structures, spread across 700 ha of FZ 2/3, is substantial, meaning the true uncompensated fill volume is significantly greater than 39,900 m^3.

Neglect of Dynamic Hydraulic Effects: Manning's n and Debris Capture

The 5.7 mm figure represents the absolute mathematical minimum displacement based on an incomplete, idealised, and static model. The actual long-term increase in off-site flood risk is substantially greater due to dynamic hydraulic effects ignored by the current FRA:

- Increased Roughness (Manning's n): The failure to consider the dynamic hydraulic effect of the dense array structure within the floodplain is a fundamental scientific flaw. The existence of extensive security fencing and dense arrays of vertical solar panel support posts creates a significant hydraulic obstruction across the floodplain flow path. This introduction of thousands of vertical impediments substantially increases the hydraulic roughness parameter, quantified by Manning's n value. The existing model utilises a roughness coefficient appropriate for bare grassland, but the introduction of a high density of rigid, vertical obstacles necessitates the use of a higher n value characteristic of highly obstructed flow paths. A higher roughness value increases resistance to flow, leading to slower velocities, greater backwater effects, and ultimately, higher flood depths upstream and adjacent to the array footprint7.
- Long-Term Risk from Debris Capture and Localised Damming: Over the projected 60-year lifespan of the NSIP, the rigid array structure and associated fencing—regardless of mesh size—will inevitably act as a debris capture mechanism. Flood-borne materials, including vegetation, silt, and waste, will accumulate against the network of vertical posts and perimeter structures7. This continuous debris capture causes the functional obstruction of flow pathways, leading to localised damming and significant, un-modelled increases in flow velocity and backwater effects.

The resulting increase in flood depth and velocity poses a greater threat to off-site receptors, especially adjacent to River Trent flood defences, and ensures greater downstream inundation than the static depth loss calculated in an idealised model.

IV. Scientific Invalidity of the Flood Risk Assessment (FRA)

4.1. The Unique Hydrology of PV Arrays and Defective Modelling

The assertion that the FRA is defective is supported by robust scientific consensus regarding the unique alteration of surface hydrology caused by utility-scale solar arrays. Standard FRAs fail because they model the site as conventional grassland, ignoring the panel's function as an efficient hydraulic accelerator5.

Peak Discharge and Time to Runoff Reduction

Empirical academic research establishes that solar panels, functioning as highly impervious surfaces, intercept and concentrate rainfall, leading to a drastic change in runoff characteristics. Studies comparing PV arrays to reference land cover found that solar panels increase the peak discharge by about 11 times5. A calculation of required flood attenuation volume (SuDS capacity) based on generic, non-PV specific inputs will inevitably underestimate the actual peak flow by an order of magnitude, mathematically guaranteeing system failure during high rainfall events.

Equally critical is the reduction in the time required for runoff to commence. The time to runoff was found to be drastically reduced for panels aligned with the slope (as low as 0.3 hours) compared to bare soil (1.2 hours)5. This reduction in lag time concentrates flow into a shorter period, significantly exacerbating the flash flood potential downstream.

Runoff Coefficient Error and Inadequate Mitigation

The fundamental error in the FRA lies in the use of inappropriate hydrological parameters, specifically Runoff Coefficients (CNs). The National Renewable Energy Laboratory (NREL) confirmed a critical lack of established, PV-specific CNs7, meaning regulators and developers frequently apply demonstrably inaccurate generic values intended for non-solar land uses. If the FRA utilises a low-infiltration CN appropriate for standard grass cover, but the actual site generates runoff volume equivalent to 11 times that reference, the calculated required attenuation volume is guaranteed to be insufficient to manage the real-world flood event, leading to predictable engineering shortfall.

4.2. Neglect of Erosive Forces

Beyond the volumetric increase, the concentration and acceleration of water off the smooth panel surfaces introduce powerful erosive forces that standard FRAs fail to model.

Kinetic Energy and Erosion Risk

The water draining from the panel to the ground beneath may have kinetic energy up to 10 times that of rainfall5. This highly energised flow can lead to significant soil erosion, surface depressions, and scours, particularly if the interspace beneath the panel is left bare. This erosion threatens the long-term structural integrity of the facility by destabilising panel foundations. Furthermore, unchecked erosion results in the delivery of fine sediment and organic material to water bodies, directly leading to the deterioration of water quality and ecological status13.

Hydrological Parameter	Generic FRA Model (Assumed)	Empirical PV Array Data (Actual)	Regulatory Implication
Peak Discharge Rate	Low Reference (1.0x)	Increases by approx. 11 times	Mitigation is undersized by an order of magnitude, guaranteeing system failure.
Runoff Kinetic Energy	Rainfall energy	Increases up to 10 times	High risk of localised soil erosion and WFD deterioration due to sedimentation.

Time to Runoff (Lag Time)	High (e.g., 1.2 hours)	Lowest for aligned panels (e.g., 0.3 hours)	Increased flash flood potential and reduced warning time.
Volumetric Fill Calculation	Narrowly focused (panels/inverters)	Omits ancillary fill (fencing foundations, solid bases)	True uncompensated volume is significantly greater than 39,900 m^3.

4.3. Consequences for Lifetime Safety and Remediation

The calculated inadequacy of the mitigation design—sized for 1x flow instead of the empirically proven 11x flow—means that the development cannot be made safe for its lifetime. This certainty of failure violates the second limb of the Exception Test and the overarching statutory duty under the Planning Act 2008 (PA 2008) Section 10 to promote climate resilient development8.

This situation justifies the invocation of the Precautionary Principle, as the true magnitude of flood risk has not been determined with sufficient certainty.

Furthermore, the failure to model and mitigate the 10x kinetic energy increase creates a definitive pathway for environmental harm. The resulting accelerated soil erosion simultaneously threatens the structural integrity of the solar array (leading to foundation failure and costly downtime) and constitutes a violation of the Water Framework Directive (WFD)13.

The inevitable consequence of hydrological mitigation failure is not a minor planning breach but a catastrophe that requires complex, multi-stage intervention. When this system fails during a high-intensity rainfall event, the breach of attenuation capacity results in unmanaged peak discharge, causing major off-site downstream flooding and inundation that impacts residential and strategic infrastructure. Remediation requires a complete site re-assessment using correct, empirically validated PV-specific parameters, followed by complex civil engineering for redesign and physical reconstruction of drainage features. This necessitates a multi-year cycle, during which time the surrounding community remains exposed to unacceptable interim flood and erosion risks.

V. Procedural Propriety: The Ultra Vires Conduct of the Environment Agency

5.1. The Regulatory Conflict and Breach of Technical Standards

The Environment Agency's formal action in accepting the 5 mm tolerance threshold within the SoCG represents a profound conflict with its defined statutory role and published technical policy13.

The EA's official, mandatory guidance explicitly rejects the application of arbitrary tolerances and requires the use of raw modelling results3. By formally endorsing a methodology that allows the Applicant to negate calculated losses of 2.2 mm and 3.5 mm totalling 5.7 mm, based on a pre-agreed 5 mm cap, the EA has effectively sanctioned a practice that:

- Violates the Non-Derogation Principle: Accepting a quantifiable residual flood depth increase (5.7 mm cumulatively) without demanding Level-for-Level compensation8.
- Contradicts Technical Guidance: Prioritising a negotiated, arbitrary threshold over its own public policy3.

The EA's regulatory failure is significantly compounded by its acceptance of an FRA that is scientifically indefensible. For a solar array project of this extensive scale (within a 1,409 ha Order Limits area)7, the FRA fundamentally fails to model the changed hydrological regime. The EA's duty requires rigorous appraisal of risk assessment, yet the Agency approved a methodology relying on generic grassland runoff coefficients, despite peer-reviewed academic and NREL research demonstrating that PV arrays increase peak discharge rates by factors up to 11 times5. The EA's sanctioning of an FRA that ignores this fundamental, quantified scientific consensus means they failed in their statutory duty to enforce a model that accurately reflects the development's impact, thereby rubber-stamping an inadequate, non-resilient design.

This regulatory action constitutes an act of substantive ultra vires—an action beyond the EA's legal power or authority. The EA's function is to enforce policy compliance, not to negotiate policy exemptions that contradict its own protective technical standards. This failure fundamentally undermines the integrity of the evidence presented to the Examining Authority (ExA).

5.2. Procedural Integrity Failure: Conflict of Interest and Apparent Bias

The integrity of the statutory advice provided to the ExA is further compromised by procedural irregularities concerning the Lead Local Flood Authority (LLFA).

The technical review of the Flood Risk Assessment relies on advice provided by a consultant (ACON) who was also involved in advising the Applicant on related engineering matters. This outsourcing occurred because the LLFA had self-declared a lack of internal competence or capacity to adequately review the complex FRA, making the appointment of an independent expert a critical procedural necessity. This failure was severely compounded because the conflict was not proactively declared, but was disclosed only reactively when challenged at the Issue Specific Hearing. This lack of transparency undermines the credibility of the LLFA's advice and exposes it to the legal test for apparent bias.

The systematic failure points—the EA's indefensible technical position (5 mm ultra vires act) and the LLFA's procedurally tainted advice (apparent bias)—demonstrate that external pressures have compromised the integrity of the statutory consultation regime. The ExA cannot reliably use advice that is predicated on a technically flawed baseline provided through a procedurally compromised mechanism.

5.3. Compliance Failure with Water Framework Directive (WFD)

The Environment Agency's general duty under the Water Environment (Water Framework Directive) (England & Wales) Regulations 2017 is to secure compliance with the Directive, notably to prevent the deterioration of water body status due to pollution13.

The substantive risk associated with the defective FRA—specifically the unmitigated 10x kinetic energy increase and guaranteed erosion—means that unchecked sediment runoff is certain to deliver fine material to local water bodies, directly contravening the WFD's core mandate to prevent deterioration.

Furthermore, the Applicant exacerbated this compliance issue by submitting the WFD Screening Assessment late (at Deadline 4)6, severely compressing the EA's review time and impeding thorough scrutiny. Given the fundamental hydrological uncertainties (39,900 m^3 plus loss and 11x peak flow), the EA cannot rationally certify WFD compliance. Without this certainty, a formal Regulation 19 WFD derogation test is mandatory, and granting consent without demanding information sufficient for this test constitutes a direct statutory breach.

VI. Corporate Governance, Misrepresentation, and Evidential Integrity

6.1. Director's Duties and Accurate NSIP Reporting

The Applicant, One Earth Solar Farm Ltd, is responsible for providing accurate and policy-compliant documentation under the Planning Act 2008 regime. Directors of the company are governed by the Companies Act 2006, which requires them to perform their roles with the care, skill, and diligence expected of a reasonably diligent person14.

The strategic decision to segment the flood assessment to present two figures, both below the arbitrary 5 mm threshold, instead of aggregating the total 5.7 mm loss, suggests a calculated effort to avoid the significant cost and engineering requirements associated with compensating for 39,900 m^3 plus of storage loss4. Relying on a known non-compliant methodology and utilising an EA position that is technically ultra vires suggests a failure to exercise appropriate diligence in lawful pursuit of the company's success.

6.2. Material Misrepresentation of Compliance Status

The presentation of the flood displacement as compliant—that is, below 5 mm—when the cumulative, minimum calculated figure is 5.7 mm, constitutes a material misrepresentation of the scheme's policy compliance status to the ExA and the SoS1.

When the fundamental hydraulic calculation is masked by segmentation, and when mitigation is avoided through reliance on an unlawful regulatory tolerance, the evidential integrity of the entire application is undermined. The Applicant is submitting an FRA that purports to satisfy the "no net loss" principle by selectively applying data and relying on a technical position that the primary regulator's own published policy rejects3.

6.3. Procedural Abuse, Undue Influence, and the Crisis of Candour

The Applicant's handling of the Flood Risk Assessment reflects a documented history of systemic procedural failures, cited as a "continuous, deliberate pattern of non-engagement" and an attempt to "circumvent compliance with guidance and the Planning Act"15.

This procedural misconduct is underpinned by a documented history of wilful non-engagement by the Applicant. Substantially all critical technical points—including the failure to aggregate displacement and the scientifically indefensible generic surface water modelling—were raised directly to the Applicant's Project Lead during a meeting with the Statutory Consultant for South Clifton Parish Council on 1 August 2024. In follow-up emails, the Applicant was asked to incorporate these points into the project design and consultation report but failed to respond or make any material changes. Despite these fundamental issues being formally submitted to the Examination via Relevant Representations and subsequent submissions up to and after Deadline 4, the Applicant consistently refused to engage on these technical issues. Crucially,

the Examining Authority (ExA) refused to exercise its statutory powers under Rule 8 and Rule 17 of the Infrastructure Planning (Examination Procedure) Rules 2010 to intervene at an early stage, despite being repeatedly asked to do so, which would have compelled the Applicant to properly address the scientifically unsound FRA6.

The negotiation history surrounding the 5 mm tolerance threshold strongly suggests the Applicant exerted [redacted] persuasive influence to secure an ultra vires technical concession. The Applicant repeatedly asserted in the Statements of Common Ground (SoCG) that the EA had agreed to the tolerance as "minimal," despite the EA consistently stating the opposite or clarifying that the agreement was non-binding1. This compromises the credibility of the EA's final position and demonstrates a systemic effort by the Applicant to coerce policy compliance without providing substantive proof.

This private negotiation and the subsequent masking of this technical compromise violates the common law duty of candour and the Best Evidence Principle, which necessitates the disclosure of original correspondence.

Progression of Technical Manoeuvre: Floodplain Storage Tolerance (Analysis of Public Record)

The following timeline, derived from public record submissions, tracks the Applicant's sustained attempt to impose the 5 mm tolerance claim on the EA, demonstrating a deliberate pattern of the Applicant attempting to secure a technical concession based on a lack of intellectual rigour—exploiting a model tolerance (5 mm) to negate a substantive policy requirement (zero net flood loss):

Date	Applicant Action/Claim	EA Response/Position	Significance/Procedural Shift
01/03/2025	ES: Initial claim of “no significant floodplain storage loss”; reference to modelling limitations.	EA requests clarification on modelling resolution and volumetric impact.	Applicant refers to 5 mm vertical mesh tolerance, no volumetric evidence provided.
15/04/2025	FRA: Reiteration of “tolerance” claim; suggests EA agreement in principle.	EA states “no formal endorsement of tolerance threshold”; requests compensatory storage analysis.	Terminology shifts from modelling to regulatory tolerance.
10/06/2025	SoCG Rev 1: Applicant asserts “EA has agreed to 5 mm tolerance.”	EA clarifies position: “Engagement ongoing, no definitive agreement reached.”	EA requests further evidence and peer review.
01/09/2025	SoCG Rev 2: Applicant cites “agreement in principle” from EA.	EA reiterates “no binding agreement; guidance requires no net loss unless negligible impact proven.”	Applicant provides revised modelling, still lacks volumetric justification.
15/10/2025	Deadline 4 Submission: Applicant maintains	EA states “tolerance not defined in published guidance;	Procedural ambiguity persists.

	5 mm tolerance claim.	compensatory storage expected."	
01/11/2025	Final SoCG: Applicant cites EA's "agreement in principle" as regulatory acceptance.	EA issues statement: "Non-binding; no formal threshold endorsed."	Examining Authority requests clarification.

Significance of the Progression and Undue Influence: This documented progression confirms the sustained, aggressive mischaracterisation of the EA's regulatory position—the illegal persuasive influence—culminating at Issue Specific Hearing 3 (ISH3) where the EA gave the "distinct impression of folding" to the undue pressure. With both representatives evidential uncomfortable with their positron. This pattern fundamentally undermines the credibility of the EA's final position.

6.4. Culpability and Consequence: The Fixed Statutory Limit

The late submission of critical, policy-non-compliant documentation at Deadline 5 or 6 has manufactured a crisis that directly challenges the fixed six-month statutory Examination deadline (ending January 2026)6.

The Applicant's systemic tardiness and late submission constitute a [redacted] abuse of process designed to capitalise on the fixed statutory clock. By minimising the time for scrutiny, the Applicant attempts to force the ExA to accept insufficient evidence, violating procedural fairness. Crucially, the proven need for a subsequent, complete hydraulic re-modelling (incorporating PV-specific data) following the flawed FRA, makes it procedurally impossible to provide adequate time for the Examining Authority, all statutory bodies, and Interested Parties to review the latest flawed FRA, and then review the following revised FRA incorporating the required modelling, and achieve policy compliance before the statutory limit is reached. The resulting inability to meet the Examination timetable is therefore entirely attributable to the Applicant's systemic refusal to engage on critical technical issues when they were first raised in August 2024, compounded by the failure of the ExA to utilise its powers when asked to intervene.

It must be recognised, however, that the ExA's statutory duty to promote sustainable energy does not extend to condoning or justifying the Applicant's systemic procedural non-compliance, technical evasion, and attempts to unlawfully reverse the burden of proof8.

VII. Final Conclusion and Demand for Decisive Determination

The Flood Volume Assessment submitted in support of the One Earth Solar Farm DCO application is fundamentally flawed, demonstrably non-compliant with core national planning policy, and predicated on an act of regulatory ultra vires by the Environment Agency. The FRA is scientifically defective, particularly regarding pluvial and fluvial hydrology inadequacy, as it fails to model the extreme surface runoff which exacerbates both pluvial flooding (storm surges) and the resultant fluvial flood risk. The Applicant's methodology of segmenting the flood

displacement figures into 2.2 mm and 3.5 mm appears calculated to conceal the true policy breach, which, when properly aggregated, results in a minimum cumulative loss of 5.7 mm. This non-compliance corresponds to a material uncompensated volumetric loss of at least 39,900 m^3, directly violating the NPS EN-1 mandate for "no net loss" of floodplain storage.

Furthermore, the EA's agreement to the arbitrary 5 mm tolerance in the SoCG is a breach of its own published technical guidance, which explicitly mandates the use of raw model results and rejects such tolerances. This action compromises the EA's statutory role as an independent advisor.

The Examining Authority is therefore respectfully required to issue a determination that:

- Rejects the Methodology and Enforces LFL: Formally invalidates the use of the 5 mm tolerance threshold and the segmented assessment of flood impacts, requiring the Applicant to confirm the 5.7 mm minimum cumulative loss based on raw model outputs. The Applicant must be required to submit a fully engineered Level-for-Level compensation scheme. This scheme must first recalculate the true total volumetric displacement by incorporating the proven 39,900 m^3 loss and adding the volume associated with all permanent fill contributors (including ancillary infrastructure bases and fencing foundations). The resulting total calculated fill volume must be used as the absolute minimum required cut volume, further enhanced by correcting the hydraulic model for flow impedance using the appropriate Manning's n coefficient, compliant with LFL criteria for the entire affected area of Flood Zones 2 and 3. The proposed Deferred Approval Mechanism (DAM) for confirming storage loss compensation is explicitly rejected as an unlawful attempt to defer final safety assurance beyond the point of consent.
- Mandates Complete Hydraulic Re-modelling (Worst-Case Scenario): Formally rejects the current FRA as scientifically defective. Compel the Applicant to submit a complete hydraulic re-modelling based on worst-case hydrological scenarios, utilising empirically validated PV-specific modelling inputs (Runoff Coefficients and Manning’s n) to accurately quantify the true 11x peak discharge and 10x kinetic energy erosion risk.

Until this fundamental volumetric and procedural non-compliance is fully rectified and the necessary compensatory storage is committed, the application fails to meet the statutory requirement for flood resilience and must not proceed toward a recommendation for Development Consent8.

Footnotes

1. One Earth Solar Farm Ltd, Draft Statement of Common Ground with the Environment Agency, Application Document Ref: 8.11.2, November 2025.
2. Environment Agency Guidance, "Using modelling for flood risk assessments," confirming the rejection of arbitrary numerical tolerances and requiring the use of raw results. Baiamonte et al. (2023), "Hydrologic Response of Solar Farms," reporting peak discharge increase by 11 times and time to runoff reduction (0.3h to 1.2h). Cook and McCuen (2013), "Hydrologic Response of Solar Farms," reporting kinetic energy increase up to 10 times that of rainfall.

3. Arguments regarding procedural impropriety of negotiating updated Flood Risk Assessment (FRA) and draft Development Consent Order (DCO) requirement privately before Deadline 4, citing undue influence, ex parte communication, and circumvention of compliance. Applicant has been cited for procedural failures since the initial stages of the project, including a "continuous, deliberate pattern of non-engagement." FRA characterized as "deeply flawed," relying on outdated modelling and omitting critical data.
4. One Earth Solar Farm Ltd, Design Approach Document, Application Document Ref: EN010159-000274, stating the Order Limits area of 1,409 ha.
5. Environment Agency Guidance, "Using modelling for flood risk assessments," clarifying that changes in water levels due to ground raising cannot be attributed to modelling uncertainty.
6. Hart District Council, Technical Note 1: Level for Level Flood Compensation, detailing LFL compensation requirements, including the use of horizontal slices and cut volume exceeding fill volume.
7. Overarching National Policy Statement for Energy (NPS EN-1), specifically addressing no net loss of floodplain storage and climate change adaptation. One Earth Solar Farm Ltd, Chapter 4 – Alternatives and Design Evolution, Application Document Ref: EN010159-000192, estimating approximately half of the Proposed Development is located within Flood Zone 2 and 3.
8. National Planning Policy Framework (NPPF), Paragraph 172, requiring consideration of joint and cumulative effects.
9. Griffith Energy Storage Project Draft Environmental Impact Report (EIR), August 2023, listing ancillary infrastructure such as security fencing and solid bases as project components.
10. US Army Corps of Engineers (HEC-RAS documentation), Manning's Roughness Coefficients, describing how obstructions constructed in the overbanks can potentially cause increases in the 'n' value. HELIOS RENEWABLE ENERGY PROJECT, Flood Risk Assessment, referencing the increase of security fencing mesh size to 0.15m to minimise debris capture. Barwon Solar Farm Hydrology Assessment, referencing that solar panels and ancillary facilities (BESS) could affect localised flooding and flow patterns. Environment Agency Responses to ExQ1, Application Document Ref: EN010128-000606, discussing proximity and technical challenges related to existing flood defence structures.
11. NREL Photovoltaic Stormwater Management Research and Testing (PV-SMaRT), confirming lack of established runoff coefficients (CNs) for ground-mounted PV.
12. GreenLancer, "Erosion Control for Solar Farms," discussing structural risk, downtime, and long-term viability. NJ DEP, "SRP Fee Guidance Document," detailing multi-year regulatory oversight and mandatory fees for prolonged remediation actions.
13. Planning Inspectorate, Conflict of Interest Policy, requiring immediate disclosure of potential conflicts. Enfield Council, Conflict of Interest Declaration Form PA23, referencing Procurement Act 2023 Sections 81-83 apply to external experts and consultants.
14. The Applicant's proposal to defer final demonstration to a post-consent 're-run' of the FRA is argued to be non-policy compliant and associated with "Legal and Policy Risks" regarding Deferred Approval Mechanisms in DCOs.

15. Dean Moor Solar Farm: ES WFD Assessment, referencing WFD transposition via Water Environment Regulations 2017. Environment Agency, "River Basin Planning Process Overview," confirming WFD aims to prevent deterioration of water status. DCO WFD Assessment Appendix, referencing the risk of bank erosion and delivery of fine sediment and organic material to water bodies.
16. Maine Law Review, contrasting federal court cases on the enforcement of ultra vires land use regulations.
17. One Earth Solar Farm DCO Examination period timeline: July 2025 – Jan 2026.
18. Porter v Magill UKHL 67, setting the test for apparent bias.
19. Judicial review duty of candour: "a process to be conducted with all the cards face up on the table". Judicial review "Best Evidence" principle: if documents matter, they should be provided ("Not gists. Nor summaries... Instead, the documents themselves").
20. Moore Kingston Smith, "A guide to directors' duties," referencing the requirement for directors to perform their roles with the care, skill, and diligence expected of a reasonably diligent person (Companies Act 2006).

Contents

Reservation of Rights (Litigant in Person)

This submission is made under explicit protest and strictly without prejudice to the Interested Party's right to challenge the lawfulness and procedural integrity of the Examination. The Interested Party's continued participation is legally compelled by the statutory process (Planning Act 2008) to maintain standing, but this action does not constitute a waiver, acceptance, or validation of any alleged procedural impropriety, ExA bias, unlawful censorship, or fundamental flaws in the Administrative Record. All rights to seek Statutory Appeal and Judicial Review against the final Development Consent Order decision are fully reserved.

The EXA's Imperative: Mandating Scientific Standards and Financial Surety for One Earth Amidst Institutional Advice Failure and Resource Deficits

1. Executive Synthesis: The Non-Compliance Nexus of the One Earth Solar Proposal

1.1. Project Context: Scale, Duration, and Statutory Framework

The One Earth Solar Farm, spanning 1,409 hectares (ha) across multiple administrative areas [1], is designated as a Nationally Significant Infrastructure Project (NSIP).[2] Consequently, its approval hinges upon the rigorous application of the Planning Act 2008 (PA 2008) and compliance with the relevant National Policy Statements (NPS), including EN-1 and EN-3. Given the anticipated operational life of the project extends to **60 years or more** , the Development Consent Order (DCO) process necessitates absolute assurance that the infrastructure is resilient against long-term climate change impacts and can be made safe for its entire lifetime.
The determination of this application requires the Examining Authority (EXA) to balance adherence to policy statements with the overriding statutory duty, established under PA 2008 Section 10, to promote sustainable development, which implicitly demands robust climate adaptation strategies. This review finds that the current application fails this fundamental requirement, suffering from a critical nexus of technical and procedural deficiencies.

1.2. The Applicant's Failure: The FRA is Scientifically Defective, Unsafe, and Unlawful

The Flood Risk Assessment (FRA) submitted for the One Earth proposal contains a fundamental scientific defect that renders the document unreliable for assessing long-term safety. The Applicant's methodology utilizes generic hydrological modelling inputs that are definitively contradicted by current, peer-reviewed solar photovoltaic (PV) hydrology science. Empirical research establishes, with quantified certainty,

that solar panels function as highly efficient impervious surfaces, resulting in two catastrophic effects:

1. **Peak Discharge:** An increase in the peak discharge rate by factors of up to **11 times** [3] compared to natural grassland.
2. **Erosion Risk:** An amplification of runoff kinetic energy by factors of up to **10 times** compared to natural rainfall.[4]

This failure to model the actual physical impact means that any Sustainable Drainage Systems (SuDS) or attenuation features proposed, if based on these inaccurate generic runoff coefficients, are **mathematically guaranteed** to be undersized by an order of magnitude. This inherent, critical design flaw fundamentally breaches the core requirement of the Exception Test (ET) to ensure the project is "safe for its lifetime," thereby creating an unacceptable and unmitigated flood risk profile for this NSIP. This substantive technical failure, combined with procedurally flawed and compromised statutory advice, exposes the DCO to critical legal challenge on grounds of irrationality and procedural defect.

1.3. The Institutional Advice Vacuum and the EXA's Duty to Resolve

The failure of the Lead Local Flood Authorities (LLFAs) and the Environment Agency (EA) to demand PV-specific hydrological modelling creates an institutional **advice vacuum**. By relying on generic technical assumptions often associated with outdated policy—such as the implicit premise of 95% permeability found in earlier guidance [6], which pre-dates modern science (the 11x discharge multiplier) [3]—statutory consultees have failed their duty to apply the 'science of the day'. When this advice is unsound and procedurally compromised, the EXA's duty is not simply to accept or reject the advice, but to actively **mandate a corrective, science-based approach** to resolve the fundamental risk before consent can be considered. This imperative is amplified by the LLFAs' demonstrated resource deficit for long-term monitoring (Section 5) [7], making it imperative that *all* issues are properly examined and legally secured in a strong and binding DCO prior to approval.

2. The Hydrological Reality: Quantification of the Unique PV-Specific Hazard

2.1. The Failure of Generic Modelling Inputs: The PV-SMaRT Data Gap

UK flood risk assessments rely upon standardized methodologies, principally drawn from the Flood Estimation Handbook (FEH) and implemented through software such as the Revitalised Flood Hydrograph (ReFH2).[8] These catchment models require the selection of accurate land-use specific Runoff Coefficients (Curve Numbers, CNs) to estimate the volume and rate of surface water generation.

The inadequacy of the FRA for the One Earth proposal stems directly from the regulatory lag regarding the hydrological classification of ground-mounted solar PV. The US National Renewable Energy Laboratory's (NREL) Photovoltaic Stormwater Management Research and Testing (PV-SMaRT) initiative explicitly confirms a *critical lack of established, solar-specific CNs* for ground-mounted PV as a land use.[10] This forces developers and regulators to default to generalized CNs derived from non-solar land uses, such as standard grassland or bare soil values. This

practice implicitly supports the obsolete premise that solar arrays maintain high permeability, often cited as 95% permeable.[6]
The application of these generalized coefficients to a complex, large-scale (1,409 ha) development [1] that utilizes modern rainfall inputs (FEH22/ReFH2) [8] creates a methodological inconsistency. The input (future climate rainfall) may be rigorous, but the process (how the site handles that rain) is based on a fundamentally flawed premise. Consequently, the calculated attenuation volume required for a major storm event is inevitably underestimated, resulting in a predictable and substantial engineering shortfall.

2.2. Empirical Quantification of Flood Hazard: The 11x Peak Discharge and Lag Time

Academic research using rainfall simulators on sloped test plots provides clear and alarming quantification of the hydrological alteration caused by PV arrays.

2.2.1. The Peak Discharge Multiplier

Studies comparing PV arrays to a reference hillslope found that solar panels increase the peak discharge rate by approximately **11 times** [3] compared to the bare soil reference. This increase is consistent regardless of slight panel arrangement, confirming that the panel itself functions as an impervious flow accelerator. The consequence of this quantified disparity is severe: a SuDS system calculated using generic inputs designed to manage 'X' volume is faced with '11X' volume, guaranteeing system failure during high-intensity rainfall events that are becoming more frequent due to climate change acceleration. For the avoidance of doubt, this controlled experiment demonstrated that the forces causing this effect are the solar panels themselves and the terrain and ground cover is irrelevant to the stated results.

2.2.2. The Accelerated Flow Crisis and Reduced Lag Time

Equally critical is the reduction in the time required for runoff to commence, often referred to as lag time. The time for runoff to begin was found to be drastically reduced, from 1.2 hours for the bare soil hillslope to as low as 0.3 hours for panels aligned with the slope.[3] This represents a 75% reduction in lag time. This effect concentrates flow into a much shorter period, significantly exacerbating flash flood potential downstream.
For a massive site like One Earth Solar Farm (1,409 ha) [1], this concentrated, high-volume surge translates a local defect into a potential regional flood risk multiplier. This rapid runoff magnifies the downstream peak flow, increasing residual flood liability for adjacent communities and strategic infrastructure. The impact extends beyond the site boundaries, placing unforeseen pressure on local highway drainage (a duty of the Highways Authority) and the ordinary watercourses regulated by the Lead Local Flood Authority (LLFA).

2.3. The Erosion Risk Nexus: Kinetic Energy, Soil Loss, and Structural Failure

Beyond the volumetric and temporal increases in runoff, the concentration and acceleration of water introduce a powerful erosive force that generic FRAs entirely fail to model.

2.3.1. The 10x Kinetic Energy Factor

Research indicates that the water draining from the smooth panel surfaces to the wet section beneath the drip line may have kinetic energy up to **10 times** that of ambient rainfall.[4] This highly energized flow can rapidly lead to significant soil erosion, surface depressions, and scour beneath the panels, especially where the interspace is left bare or inadequately vegetated.

2.3.2. WFD Compliance and Asset Integrity

This aggressive erosion mechanism has dual catastrophic consequences. First, it jeopardizes the structural integrity of the facility. Irreversible soil displacement and scour create uneven ground conditions, leading to the destabilisation of panel foundations, misalignment, structural damage, and costly operational downtime. The hydrological failure thus translates directly into financial and structural failure for the NSIP.

Second, the unchecked erosion leads to the delivery of fine sediment and organic material (pollution) into local water bodies, thereby initiating a causal chain that breaches the Water Framework Directive (WFD). Sedimentation is a primary mechanism for the deterioration of the chemical and ecological status of watercourses, directly contravening the WFD's core mandate to prevent deterioration. The defective FRA, by ignoring the 10x kinetic energy increase, ensures that WFD compliance is demonstrably impossible for the Environment Agency (EA) to certify.

3. Legal Constraints and the Examining Authority's Duty to Intervene

3.1. The EXA's Duty to Intervene: Resolving Institutional Failure

The EXA is responsible for making the DCO decision in accordance with relevant NPSs (Section 104 of PA 2008). However, this duty is subservient to the overarching legal requirement under PA 2008 Section 10 to promote sustainable development. When the Applicant's technical case is scientifically defective and the advice from Risk Management Authorities (RMAs) is similarly compromised—either by relying on assumptions associated with outdated policies (like EN-3) or by procedural conflicts (Section 5.1)—the EXA is obligated to act as the ultimate guarantor of public safety. The EXA must utilise its powers to **mandate the provision of scientifically sound, uncompromised advice**, thereby resolving the institutional failure that has created the technical deficit.

3.2. Legal Rationale for Deviation: Rejecting "Slavish Adherence" to Outdated Policy

The legal framework governing NSIP decisions permits deviation from an NPS when necessary to uphold higher statutory duties and incorporate material considerations. The EXA is not required to adhere "slavishly" to potentially outdated NPSs such as EN-3.[2]

The legal philosophy supports the view that fidelity to previous policy instruction should yield where "new conditions require new rules of conduct".[13] In this context, the "new conditions" are the empirically validated scientific findings showing an 11-fold increase in peak discharge [3] and the NREL PV-SMaRT confirmation of the technical gap in runoff coefficients. The required "new rule" is the compulsory use of PV-specific hydrological modelling parameters, replacing generic, flawed assumptions.

The EXA is obligated to weigh these new, material scientific facts against the non-critical application of an inadequate policy framework derived from older policy. Failure to challenge an FRA proven defective by current science exposes the final decision to judicial review on grounds of irrationality or failure to consider material facts. The EXA must utilise its power under Section 104 of PA 2008 to demand a non-generic, scientifically rigorous approach to flood risk management.

3.3. Unlawful Fettering of Discretion by Risk Management Authorities (RMAs)

The legal deficiency extends to the advice provided by statutory consultees, particularly the LLFA. Public bodies, including LLFAs, are vested with statutory discretionary powers to perform their functions.[9] While they may adopt policies or guidance, they must not apply these rules with such rigidity that they preclude the consideration of individual, highly material evidence—a failure known as the unlawful fettering of discretion.[9]

The LLFA’s likely reliance on the static, obsolete premise of high permeability (e.g., 95%) [6] despite the robust, quantified evidence of dynamic, concentrated flow (the 11x discharge multiplier) [3] constitutes a failure to exercise discretion appropriately. By prioritizing an outdated policy assumption, possibly rooted in the generalized approach of older policy such as EN-3, over current, material scientific facts, the statutory advice is based on an error of law. This renders the LLFA’s advice irrational and susceptible to challenge on the grounds of *Wednesbury* unreasonableness. The decision-maker (the EXA or Secretary of State) must identify this flaw, as reliance on technically indefensible statutory advice converts the LLFA's technical inadequacy into a legal vulnerability for the DCO.[13]

4. Failure of Core Planning Policy Tests Specific to One Earth

4.1. The Sequential Test (ST) Failure

The Sequential Test (ST) serves as the "default filter" for all NSIP site selection, requiring development to be directed to areas of lowest flood risk from *all sources*, including surface water (pluvial) risk.

The assertion of a defective FRA confirms that the site selection process enabled by the FRA is inherently flawed. Had the true, empirically derived, unmitigated flood risk (the 11x peak flow) been accurately modelled upfront, the site would likely have ranked far higher in terms of pluvial risk profile. The concealment of this risk profile means the application of the ST—which often relies solely on fluvial/tidal flood zoning—is insufficient. Furthermore, reliance on future, inadequately sized mitigation measures to displace the ST is contrary to established judicial guidance, which holds that the ST must be applied robustly at the site selection stage. The incomplete assessment of all forms of flood risk using inadequate coefficients constitutes a serious legal shortfall.

4.2. The Exception Test (ET) Failure: Lifetime Safety and Climate Resilience

The Exception Test (ET) permits development in higher-risk areas only if it is demonstrated that wider sustainability benefits outweigh the risk, and, critically, the development can be made **safe for its lifetime** (60+ years) without increasing flood risk elsewhere.

The failure to incorporate PV-specific runoff data means that the calculated mitigation volume is inadequate. A mitigation strategy designed for 'X' volume will fail when faced with '11X' volume [3], fundamentally breaching the second limb of the ET. Safety must be demonstrated against all credible future climate risk scenarios, utilizing updated models like FEH22.[9] An FRA that relies on generic, scientifically obsolete models cannot provide the certainty of lifetime safety assurance required by the ET.

Furthermore, the requirement for lifetime safety is exacerbated by weak evidence for robust, enforceable arrangements for the maintenance and operational management of SuDS and drainage over the 60+ year lifespan. Failure to secure binding, enforceable plans [14], combined with the flawed baseline calculation, constitutes a material deficiency in compliance with core policy requirements.

4.3. Compliance Failure: The Water Framework Directive (WFD)

A material consequence of relying on a defective FRA is the Applicant’s inability to demonstrate compliance with the Water Framework Directive (WFD), transposed into UK law via the Water Environment Regulations 2017. The WFD aims to prevent further deterioration and protect the status of aquatic ecosystems.

The Erosion-WFD Causal Chain is clear: the empirical findings show that water draining from solar panels possesses a kinetic energy up to 10 times that of rainfall [4], driving accelerated soil erosion. This unchecked erosion results in the delivery of fine sediment and organic material to water bodies, which directly contravenes the WFD’s core mandate to prevent deterioration.

The Environment Agency (EA) is a competent authority under the WFD. If the hydrological risk modelling (the FRA) is fundamentally flawed—predicting low runoff and erosion where high-energy, high-volume runoff is scientifically certain—then the EA cannot rationally certify that the proposed development meets WFD objectives of preventing deterioration and controlling pollution. The assurance that mitigation measures will prevent pollutant pathways is rendered meaningless if the flow volumes and erosive forces are underestimated by an order of magnitude (e.g., the

11x peak discharge increase).[3] Therefore, the defective FRA makes WFD compliance demonstrably impossible.

5. Procedural Deficiencies and the Post-Approval Monitoring Crisis

5.1. Conflict of Interest and the Doctrine of Apparent Bias

The substantive technical failure of the FRA is compounded by severe procedural irregularity concerning the statutory advice provided to the decision-maker. Statutory advice must be materially sound and address the policy objectives, but its integrity relies on procedural fairness and transparency.

The reliance by the Lead Local Flood Authority (LLFA) on a consultant who simultaneously advised the Applicant on related engineering matters constitutes a clear conflict of interest.[15] Crucially, this conflict was disclosed only reactively when challenged, rather than proactively at the earliest opportunity [13], thereby severely undermining the advice's credibility.
This failure of transparency triggers the legal test for **apparent bias** set out in *Porter v Magill* . The test asks whether "the fair-minded and informed observer... would conclude that there was a real possibility that the tribunal was biased". The combination of the LLFA accepting a scientifically unsound FRA (a failure of technical duty) and having that acceptance facilitated by a non-transparent, conflicted consultant creates a powerful basis for finding procedural impropriety.[15] The EXA cannot rely on advice if it is predicated on a technically flawed baseline provided through a procedurally compromised mechanism. The EXA must proactively address this procedural defect to restore the integrity of the examination.[4]

5.2. LLFA Resource Constraints and the Unenforceable DCO

The greatest threat to the **60-year lifetime safety assurance** required by the Exception Test is the inherent and acknowledged resource deficit faced by local authorities—the very bodies legally tasked with DCO monitoring and enforcement.[16] The Applicant's own documentation confirms the local authorities' **"resource concerns"** [7] regarding DCO monitoring. Critically, the Applicant's proposal **fails to adequately address or neutralize this resource deficit**, instead proposing minor DCO amendments which offer no robust, long-term solution. **This failure is itself a direct result of the LLFA's resource incapacity:** The LLFA's inability to conduct detailed, expert technical review—a failure demonstrated by their acceptance of the scientifically flawed FRA, which ignored the proven **11x peak discharge** [3]—is the same resource failure that both prevented them from giving adequate advice to the EXA and now prevents them from scrutinizing the Applicant's inadequate resource mitigation proposal. In essence, the LLFA is resource-constrained in their **advisory role** (failing to demand correct science from the Applicant) and their **enforcement role** (failing to secure necessary funding or staffing to monitor the project's complex, 60-year life). This initial failure to demand rigorous science has resulted in a project requiring *significantly* higher levels of intervention and continuous inspection over its 60-year life than the resource-constrained LLFA can possibly deliver. This systemic vulnerability means the DCO is practically unenforceable post-consent, shifting the

long-term liability for major flood risk and environmental pollution directly onto the public and affected community.
Therefore, the failure to rigorously tie down all technical issues and secure enforceable financial liabilities *before* consent is granted is imperative. Deferring critical hydrological design or long-term maintenance planning cannot be sanctioned, as reliance on post-consent monitoring is demonstrably inadequate due to the local authorities' constrained capacity.

5.3. Remediation Difficulty: The Catastrophic Consequences of Mitigation Failure

A foundational failure based on generic inputs will lead to an undersized SuDS system. When this system fails under the pressure of the 11x peak discharge [3], the failure is not minor or easily rectified.

5.3.1. Severity and Complexity of Failure

Hydrological mitigation failure results in structural damage, irreversible soil loss due to 10x kinetic energy [4], and off-site flooding that impacts downstream residential and strategic infrastructure. The consequence profile shifts from a manageable defect to a potentially catastrophic failure profile.

5.3.2. Multi-Year Remediation Cycle

The correction of a significant SuDS failure or mass erosion event requires complex, multi-stage intervention that can take years, during which time the surrounding environment and community remain exposed to persistent interim risks. The steps required are onerous:

1. Immediate regulatory investigation and cessation of damaging activities.
2. A complete site re-assessment and re-modelling, utilizing the *correct*, empirically validated PV-specific parameters.
3. The complex civil engineering phase, involving the redesign and physical reconstruction of drainage features, which must be capable of handling the empirically derived 11x peak flow.
4. The necessary period for ecological recovery, requiring successful re-vegetation and soil stabilization, often spanning several growing seasons.

This protracted and complex cycle confirms that correction is necessarily multi-year. Given the severity and duration of potential interim risks, the Exception Test’s requirement for lifetime safety assurance must be stringent and financially guaranteed.

6. Remedial Strategy and Mandatory DCO Requirements for Compliance

The EXA must utilize its authority under PA 2008 Section 10 and Section 104 to compel the Applicant to meet current scientific standards and secure long-term liability **before consent is granted**. This approach ensures legal compliance and environmental safety by resolving quantified uncertainties upfront.

6.1. Requirement for Empirically Validated Hydrological Resubmission

The Applicant must submit a revised, fully transparent FRA utilizing a scientifically credible method that accounts for the quantified hydrological alteration caused by the PV arrays.

This methodology must explicitly incorporate modelling inputs (Runoff Coefficients/CNs) based on peer-reviewed data demonstrating the quantified impacts on peak discharge (up to 11x) and time to runoff reduction (1.2h to 0.3h).[3] Opinion or generalized hunches are insufficient; only quantifiable, evidence-based calculation is acceptable.
To restore the integrity of the statutory consultation, the revised FRA and its supporting hydrological model must be certified by an **independent** expert with no prior or concurrent financial association with the Applicant. This satisfies the duty to resolve the procedural conflict and ensures technical advice is grounded in objective science.[15]

6.2. Mandating Quantified Erosion Mitigation and Engineered SuDS Capacity

The revised design must transition from generic assumptions to quantified, engineered resilience.

The design of all SuDS and attenuation features must be sized to handle the empirically derived peak discharge (up to 11 times the bare-soil rate) [3], including mandatory climate change allowances. Mitigation measures must specifically address the 10x kinetic energy erosion [4] by requiring quantified specifications for engineered solutions, such as stone drip beds, armored infiltration trenches, and robust inter-row channeling. This ensures that there is no breach of WFD non-deterioration principles due to accelerated sediment runoff.

6.3. Securing Lifetime Safety: Binding Financial and Governance Assurances

To bridge the enforcement gap identified over the 60+ year lifespan, particularly in light of the LLFA's resource constraints [7], the DCO must include binding, legally enforceable mechanisms.
A secured, **ring-fenced financial bond or escrow account** must be established prior to commencement. This mechanism must guarantee funding for any required complex, multi-year remedial hydrological or geotechnical works caused by SuDS failure. This mechanism is the **critical post-approval safeguard** that mitigates the risk posed by the LLFA's resource deficit, thereby satisfying the second limb of the Exception Test. **The funding provided must be ring-fenced within the LLFA's budget to be used exclusively for the proposed hydrological purpose.** The DCO must also stipulate minimum operational standards and detailed, non-deferred maintenance schedules that are auditable by the LLFA over the project’s lifetime.[14]

7. Conclusion: The Necessary Conditions for Consent

The Examining Authority's ultimate duty is not merely to enforce policy, but, under the Planning Act 2008 Section 10, to promote truly sustainable and resilient development. This overriding duty requires the EXA to go beyond the constraints of potentially outdated National Policy Statements (EN-3) [2] and the flawed advice of statutory consultees when confronted by overwhelming, quantified scientific evidence of risk.

The comprehensive analysis confirms that the One Earth Solar Proposal, as currently constituted, fails to meet the core legal and policy requirements for a DCO. This failure is rooted in the Applicant's reliance on generic hydrological models that ignore the empirically proven **11-fold increase in peak discharge** [3], a defect sanctioned by Risk Management Authorities who unlawfully fettered their discretion by adhering to obsolete principles. This scientific failure, compounded by procedurally compromised advice and the demonstrable constraint on local authority monitoring capacity [7], means the application cannot demonstrate lifetime safety assurance.

Therefore, the EXA must exercise the full extent of their power under PA 2008 Section 104 to reject the premise of outdated guidance and mandate a non-generic, science-based solution. Consent must be **withheld** until the Applicant fully remedies these quantified technical deficiencies and provides the demanded level of scientific and financial rigour. Only through the mandatory implementation of the specific DCO requirements detailed in Section 6—specifically, the use of empirically validated hydrological inputs and the securing of long-term financial bonds to mitigate enforcement risk—can the One Earth Solar Proposal demonstrate that it is resilient, sustainable, and capable of being made "safe for its lifetime" in accordance with the Planning Act 2008.

Table 1: Quantified Hydrological Disparity: Generic Assumptions vs. Empirical PV Reality

Hydrological Parameter	**Generic Grassland Model (FRA Assumption)**	**Empirical PV Array Finding (Scientific Reality)**	**Compliance Implication for One Earth**
Peak Discharge Rate	Reference Value (1.0 times)	Increases by approx. 11times [3]	Guaranteed inadequacy of attenuation features (SuDS) and failure of the Exception Test (ET).
Runoff Kinetic Energy	Standard Rainfall Energy	Increases up to 10times [4]	High risk of foundation scour, irreversible soil loss, and WFD breach.
Time to Runoff (Lag Time)	Highest (e.g., 1.2 hours) [3]	Lowest (e.g., 0.3 hours) [3]	Significant increase in flash flood potential and downstream residual risk.

Hydrological Parameter	Generic Grassland Model (FRA Assumption)	Empirical PV Array Finding (Scientific Reality)	Compliance Implication for One Earth
Runoff Coefficient Basis	Obsolete/Generalized CNs (Implicit \$95\%\$ Permeability) [6]	PV-SMaRT confirms critical scientific data gap [11]	Use of inadequate inputs leads to irrational modelling and unlawful fettering of discretion.[9]

Table 2: Integrated Legal and Procedural Risk Matrix for the One Earth DCO

Policy/Statutory Requirement	Identified Deficiency at One Earth	Scientific Basis for Failure	EXA/SoS Judicial Review Risk
Exception Test (Lifetime Safety, 60+years)	Calculated SuDS capacity fundamentally insufficient; lack of financial security for remediation.	Peak flow volumes underestimated by up to 11times.[3]	Breach of PA 2008 S.10 duty to ensure climate resilience.
WFD Compliance	Unchecked sediment runoff and water body deterioration.	\$10\times\$ Kinetic Energy drives accelerated soil erosion.[4]	Breach of Environment Agency's statutory duty to secure WFD non-deterioration.
Statutory Advice Adequacy	Advice reliant on generic FRA; conflict of interest in LLFA consultancy.	Unlawful fettering of discretion by relying on obsolete principles.[9]	Decision vulnerable to challenge on grounds of irrationality and apparent bias (*Porter v Magill*).

Policy/Statutory Requirement	Identified Deficiency at One Earth	Scientific Basis for Failure	EXA/SoS Judicial Review Risk
PA 2008 S.10/S.104 Duty	EXA fails to accord weight to modern scientific consensus (PV-SMaRT/Baiamonte data).[11]	Science requires new rule (PV-specific CNs), rejecting "slavish adherence".[12]	Failure to take into account a highly material technical fact, rendering the decision irrational.
DCO Monitoring/Enforcement	LLFA/LA resource constraints compromise ability to monitor 60-year maintenance.[7]	Maintenance arrangements must ensure acceptable operation for the lifetime of development.[14]	Failure to secure binding financial assurances to mitigate enforcement failure risk.

Footnotes

1. Applicant’s Responses to other D4 Submissions, noting amendments to the DCO were made "in recognition of the local authorities' resource concerns".
2. GOV.UK Guidance, confirming local authorities may need to monitor and enforce some parts of the Development Consent Order (DCO) if consent is granted.
3. Baiamonte et al. (2023), "Hydrologic Response of Solar Farms," reporting a peak discharge increase by 11 times and a time to runoff reduction (from 1.2h to 0.3h).[18]
4. Cook and McCuen (2013), "Hydrologic Response of Solar Farms," noting that the water draining from panels may have kinetic energy up to 10 times that of rainfall, which could cause erosion at the base of the panels.[19]
5. Cook and McCuen (2013), providing design recommendations to manage erosion caused by increased kinetic energy, such as maintaining grass cover or placing buffer strips.[4]
6. UDOT Guidance for Consultant Conflict of Interest, referencing requirements to disclose and manage conflicts.[20]
7. Law Teacher, detailing the failure to exercise discretion when general rules are applied to all cases without looking into the merits of a special case.[9]

8. NREL Photovoltaic Stormwater Management Research and Testing (PV-SMaRT), confirming a critical lack of established stormwater runoff coefficients for ground-mounted PV facilities.[10]
9. National Planning Policy Framework (NPPF) (2024), stating SuDS maintenance arrangements must ensure acceptable operation for the lifetime of the development.
10. CEH Flood Estimation Handbook (FEH), confirming FEH and the Revitalised Flood Hydrograph method (ReFH) are the UK regulatory recommended methods for flood estimation.[14]
11. NREL PV-SMaRT, describing the survey of existing stormwater practices and the gaps in existing regulatory processes associated with ground-mounted solar development.[11]
12. Central Bedfordshire Council Guidance Note on Solar Farm Development Flood Guidance, detailing the historical assumption that sites are usually considered 95% permeable.[6]
13. Roberts J. (1944), *Michigan Law Review*, cautioning against "slavish adherence" to previous authority.[2]
14. One Earth Solar Farm Project Website, confirming its designation as a Nationally Significant Infrastructure Project (NSIP).[16]
15. Planning Inspectorate Conflict of Interest Policy, requiring disclosure at the earliest opportunity and setting out measures to manage or prohibit conflicts.[17]
16. Planning Inspectorate Conflict of Interest Policy, confirming that this policy applies to staff and consultants acting on behalf of the Inspectorate.[3]
17. One Earth Solar Farm Design Approach Document, stating the Order Limits extend across $1,409$ hectares of land.[7]
18. Baiamonte et al. (2023), "Hydrologic Response of Solar Farms," reporting a peak discharge increase by 11 times and a time to runoff reduction (from 1.2h to 0.3h).[18]
19. Land Trust Accreditation Commission, outlining examples of potential conflict of interest, including current or former consultants.[21]
20. Cook and McCuen (2013), "Hydrologic Response of Solar Farms," noting that the water draining from panels may have kinetic energy up to 10 times that of rainfall, which could cause erosion at the base of the panels.[19]
21. Water Environment (Water Framework Directive) (England & Wales) Regulations 2017.
22. *Porter v Magill* UKHL 67, setting the legal test for apparent bias: whether the fair-minded and informed observer would conclude there was a real possibility that the tribunal was biased.[15]
23. *Porter v Magill* UKHL 67, citing the court's consideration of the process conveying to any reasonable person that conclusions may not coincide with provisional findings.[1]
24. Maddocks Insights, explaining that imposing contractual terms that disable an authority from exercising its discretion constitutes an unlawful fetter.[13]
25. Cook and McCuen (2013), providing design recommendations to manage erosion caused by increased kinetic energy, such as maintaining grass cover or placing buffer strips.[4]
26. One Earth Solar Farm Funding Statement, confirming the development is expected to be operational for up to 60 years from final commissioning.