Technical Appendix 2.5: Flood Risk & Drainage Impact Assessment

Kirknewton Solar & BESS EIA Report

Trio Power Limited

UK House
5th Floor
164-182 Oxford Street
London
United Kingdom
W1D 1NN

Prepared by:

SLR Consulting Limited

The Tun, 4 Jackson's Entry, Edinburgh, EH8 8PJ

SLR Project No.: 405.065786.00001

27 October 2025

Revision: 02

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
01	29 September 2025	JP, AH	KR	RW
02	27 October 2025	AH	KR	RW
	Click to enter a date.			
	Click to enter a date.			
	Click to enter a date.			

Basis of Report

This document has been prepared by SLR Consulting Limited (SLR) with reasonable skill, care and diligence, and taking account of the timescales and resources devoted to it by agreement with Trio Power Limited(the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

SLR shall not be liable for the use of or reliance on any information, advice, recommendations and opinions in this document for any purpose by any person other than the Client. Reliance may be granted to a third party only in the event that SLR and the third party have executed a reliance agreement or collateral warranty.

Information reported herein may be based on the interpretation of public domain data collected by SLR, and/or information supplied by the Client and/or its other advisors and associates. These data have been accepted in good faith as being accurate and valid.

The copyright and intellectual property in all drawings, reports, specifications, bills of quantities, calculations and other information set out in this report remain vested in SLR unless the terms of appointment state otherwise.

This document may contain information of a specialised and/or highly technical nature and the Client is advised to seek clarification on any elements which may be unclear to it.

Information, advice, recommendations and opinions in this document should only be relied upon in the context of the whole document and any documents referenced explicitly herein and should then only be used within the context of the appointment.

Table of Contents

Tables in Text

Graphics in Text

Annexes

Acronyms and Abbreviations

AEP	Annual Exceedance Probability
AOD	Above Ordnance Datum
CC	Climate Change
CIRIA	Construction Industry Research and Information Association
DTM & DSM	Digital Terrain Model, Digital Surface Model
FEH	Flood Estimation Handbook
FFL	Finished Floor Level
FOI	Freedom of Information
FRA	Flood Risk Assessment
LiDAR	Light Detection and Ranging
NFRA	National Flood Risk Assessment
NPF4	National Planning Framework 4
NGR	National Grid Reference
OS	Ordnance Survey
QA	Quality Assurance
ReFH	Revitalised Flood Hydrograph
RCP	Representative Concentration Pathway
SEPA	Scottish Environment Protection Agency
SPP	Scottish Planning Policy
SRSP	Scottish Remote Sensing Portal
SuDS	Sustainable Drainage Systems
UKCP18	United Kingdom Climate Projections – 2018 dataset

1.0 Introduction

SLR Consulting Ltd (SLR) has been appointed by Trio Power Limited to provide consulting services to support a proposed solar photovoltaic (PV) and Battery Energy Storage System (BESS) development ('the Proposed Development') located 1.5 km south of Kirknewton at Leyden Road, East Calder, West Lothian, EH27 8DQ.

This report addresses the flood risk and outline drainage aspects associated with the Proposed Development.

1.1 Policy and Guidance

This assessment has been completed in accordance with relevant guidance issued by West Lothian Council, The Scottish Government, and the Scottish Environment Protection Agency (SEPA). It takes cognisance of *National Planning Framework 4*[1] and the *Flood Risk Management (Scotland) Act 2009*[2]. This assessment also references and takes due consideration (where appropriate) of the following principal guidance and policy documents:

- British Standards Institution (2017), Assessing and Managing Flood Risk in Development – Code of Practice, Report BS-8533:2017[3], October 2017;
- CIRIA (2004) Development and Flood Risk – Guidance for the construction Industry, Report C624[4];
- SEPA (2022) Technical Flood Risk Guidance for Stakeholders[5] (Reference SS-NFR-P-002), June 2022; and
- SEPA (2024) Flood Risk and Land Use Vulnerability Guidance[6], July 2024;
- SEPA (2025) Climate Change Allowances for Flood Risk Assessment in Land Use Planning[7], Version 6, February 2025;
- West Lothian Council Supplementary Guidance on Flood Risk & Drainage Impact Assessment[8];
- Guidance for Pollution Prevention: Containing major spillages and firewater at industrial sites – GPP18[9]; and
- Sewers for Scotland v4.0[10], October 2018.

[1] National Planning Framework 4, last accessed September 2025

[2] Flood Risk Management (Scotland) Act 2009, last accessed September 2025

[3] BS 8533:2017 Assessing and managing flood risk in development - Code of practice, last accessed September 2025

[4] CIRIA Development and flood risk - guidance for the construction industry (C624), last accessed September 2025

[5] SEPA Technical Flood Risk Guidance for Stakeholders, last accessed September 2025

[6] SEPA Flood Risk and Land Use Vulnerability Guidance, last accessed September 2025

[7] SEPA Climate Change Allowances for Flood Risk Assessment in Land Use Planning, Version 6, last accessed September 2025

[8] WLC Flood Risk & Drainage Impact Assessment: Supplementary Guidance, last accessed September 2025

[9] Guidance for Pollution Prevention: Containing major spillages and firewater at industrial sites - GPP18, last accessed September 2025

[10] Scottish Water Sewers for Scotland v4.0, last accessed September 2025

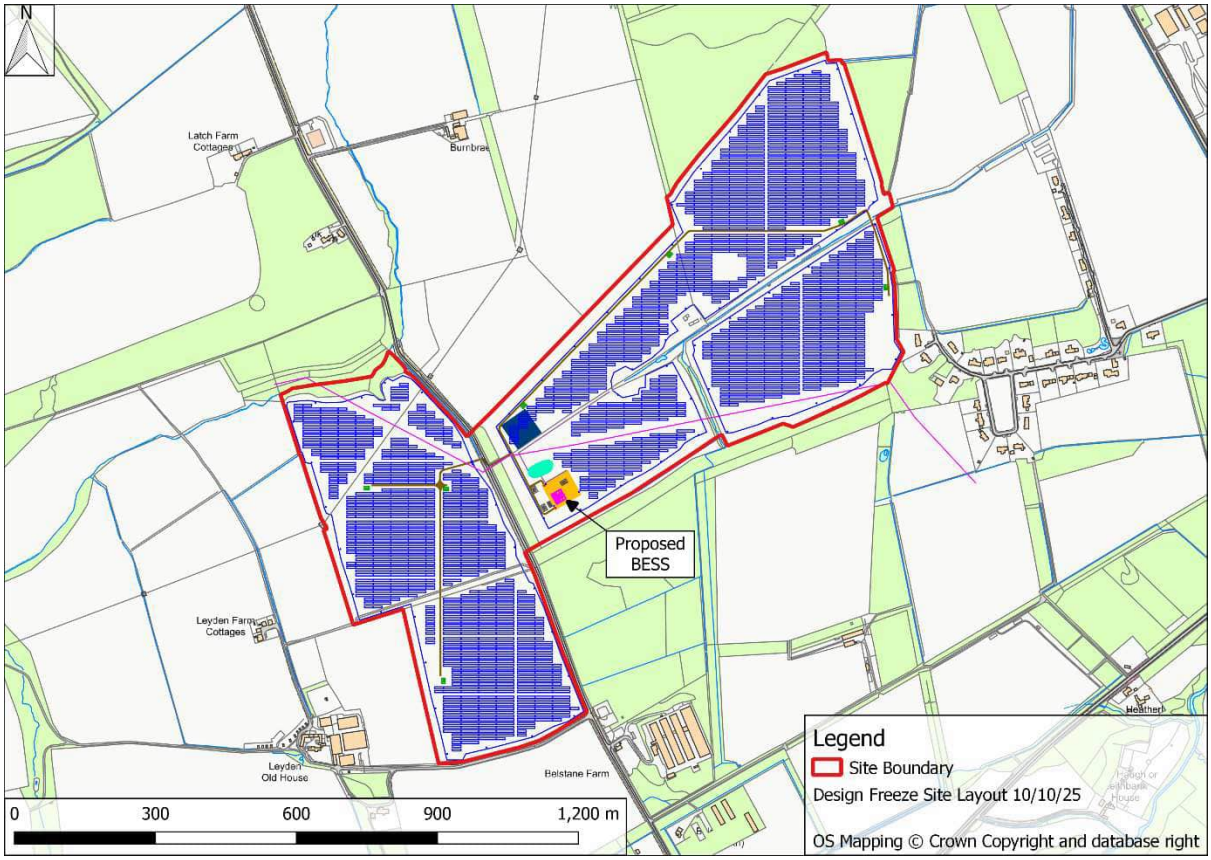
1.2 Site Location

The Site is located on two parcels of land which are approximately 1.5 km south of Kirknewton at Leyden Road, East Calder, West Lothian, EH27 8DQ. The Site is centred on British National Grid NT 10783 65217 and currently comprised of arable farmland.

Access and egress to/from the Site are afforded by the existing Leyden Road accessible via the A71.

A site location plan is provided in **Graphic 1**. A full site layout plan with a key detailing the site components is included as **Annex A**.

Graphic 1 : Site Location



1.3 Proposed Development

The Proposed Development will consist of ground mounted solar PV modules with an export capacity of up to 40 MW and a BESS with an export capacity of up to 9 MW, substation and other associated infrastructure including access tracks. The Site is accessible from Leyden Road which is situated through the centre of the Site.

A layout of the Proposed Development is included as **Annex A** and discussed in full outwith this report in **Chapter 4** of the EIA Report.

1.4 Topography

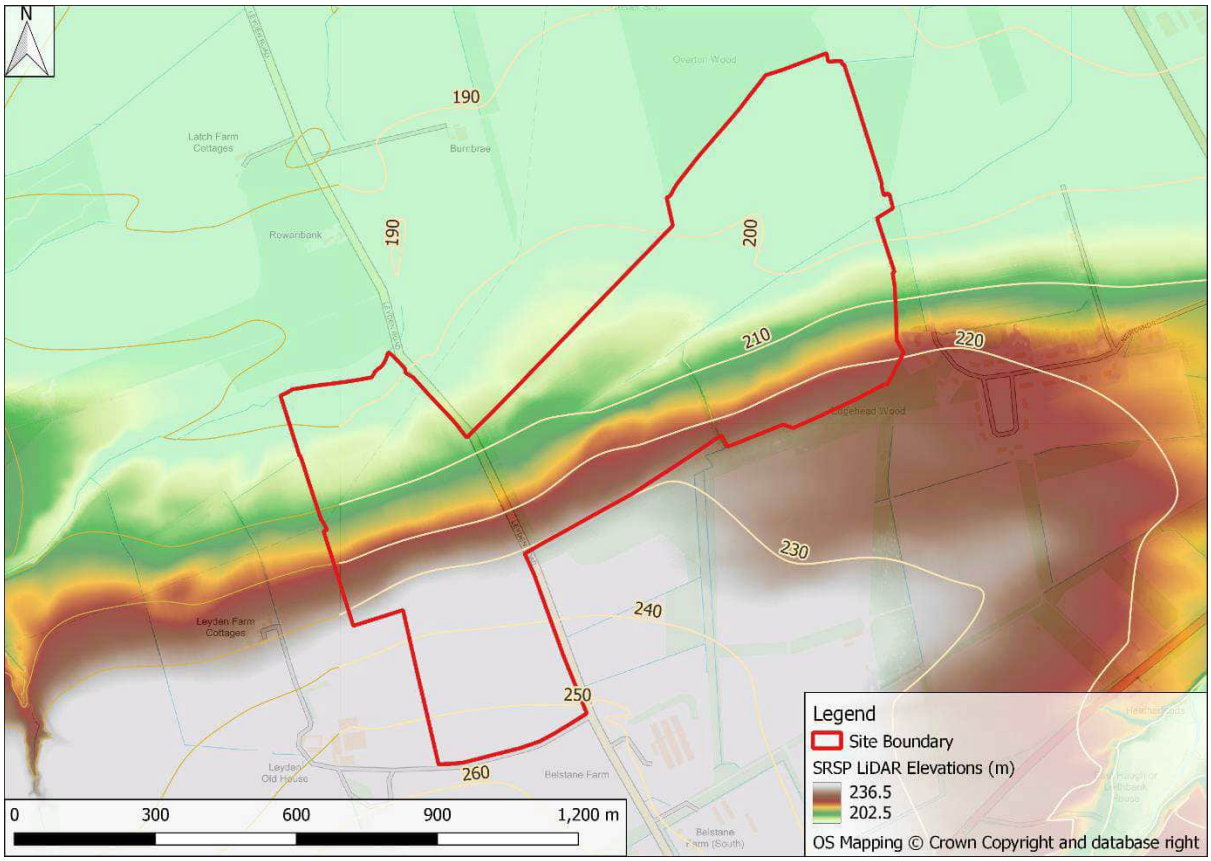
The topography across the Site has been informed by 50cm spatial resolution LiDAR data sourced from the Scottish Remote Sensing Portal (SRSP)[11], as well as Ordnance Survey (OS) 10m contours.

The local topography is shown in **Graphic 2**.

Elevations across the Site generally decrease northwards from a high point of approximately 257m above Ordnance Datum (AOD) in the southwestern corner of the Site to a low of approximately 192m AOD at the northeastern corner of the Site.

In the area of the proposed BESS, levels range from 225m AOD along the southern boundary of the BESS location and 218m AOD along the northern boundary of the BESS location. It is assumed that no land raising is proposed.

Graphic 2 : Local Topography



1.5 Geological Setting

The Soil Map of Scotland[12] indicates that the Site is underlain by mineral gleys.

British Geological Survey (BGS) mapping[13] indicates that the majority of the Site is underlain by glacial till (Devensian). It is noted that some small areas within the centre of the Site are shown to be absent of any superficial deposits. Bedrock deposits vary across the Site, as follows:

[11] Scottish Remote Sensing Portal, last accessed September 2025

[12] Scotland's Soils, last accessed September 2025

[13] BGS GeoIndex Onshore, last accessed September 2025

- bands of sandstone, dolostone, and argillaceous rock of the Ballagan Formation underly the northern and central areas of the Site from southwest to northeast;
- igneous mugearite bedrock of the Arthur's Seat Volcanic Formation underlies the Site from the southwest to northeast generally following the Green Burn; and
- sedimentary rocks of the Gullane Formation in the southeastern and eastern corners of the Site.

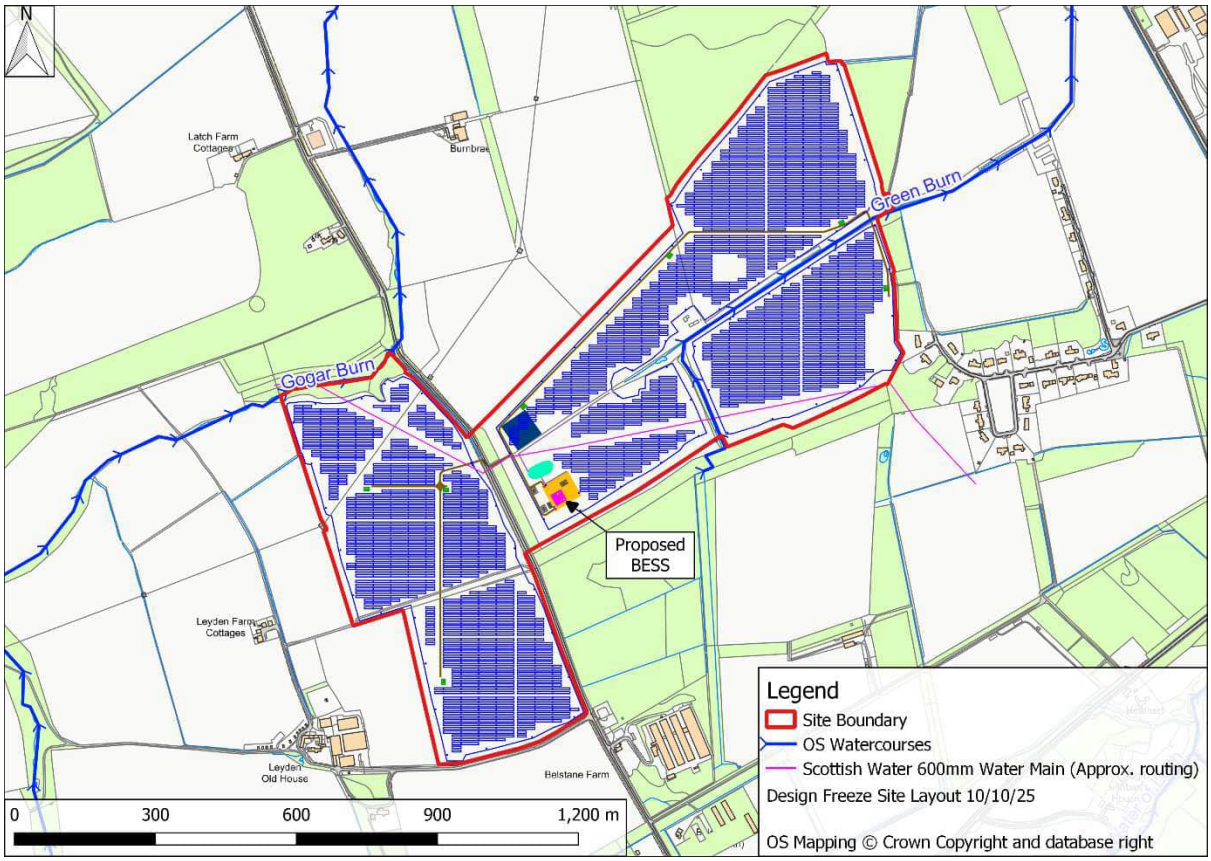
The sedimentary bedrock is classified as a moderately productive aquifer. The igneous bedrock and glacial till superficial deposits are classified as a low productivity aquifer and are not considered a significant aquifer.

1.6 Local Hydrology

The Site is entirely located within the surface water catchment of the Gogar Burn, which is part of the larger River Almond catchment. The Gogar Burn lies immediately north of the Site and flows in a northeasterly direction before discharging into the River Almond approximately 11km northeast of the Site. The Green Burn, a tributary of the Gogar Burn, rises within the Site, and flows in a northeasterly direction before discharging to the Gogar Burn approximately 3.5km northeast of the site.

A 600mm diameter Scottish Water distribution mains pipe is known to cross the site, with further details provided in **Section 2.4.3**. The approximate routing of this asset, as well as the local hydrological context, is shown on **Graphic 3**.

Graphic 3 : Local Hydrology



1.7 Storm and Flood Risk Terminology

Flood risks are typically expressed by the probability of the occurrence of a flood event (maximum flood height or other such indicator) of stated magnitude or greater in any one year – termed the Annual Exceedance Probability (AEP). This may be expressed as a percentage (such as 1%, 0.5%, etc.) or by the equivalent chance of occurrence (1:100, 1:200, etc.).

Where flood events have a climate change factor included, the flood event is denoted in this report by “plus CC”. For example, the 1:200 AEP flood event with climate change included is denoted “0.5% AEP plus CC” or “1:200 AEP plus CC”.

2.0 Flood Risk Review – Sources of Information

2.1 National Floodplain Mapping and Assessment

Strategic-level information regarding the tidal, fluvial and surface water flood risk at the Site has been obtained from SEPA via the online SEPA Flood Maps[14]. Information on potential groundwater flood risk has been obtained from the SEPA Flood Risk Management Maps[15]. Information on flooding from reservoirs has been obtained from the SEPA Reservoirs Map[16].

The SEPA flood mapping for the Site and surrounds is shown in **Graphic 4.** A review of **Graphic 4** indicates that there are no fluvial flood extents noted within 500m of the Proposed Development up to the 0.5 AEP event +CC. The closest fluvial flood extent is noted to arise within the Gogar Burn approximately 600m north of the Proposed Development.

In proximity to the Site, flooding associated with the Gogar Burn is represented in the surface water mapping. This is due to the nationally consistent methodology applied to the SEPA flood mapping[17], where catchments less than 3km^2 in area are not included in the fluvial flood mapping and are instead modelled as surface water and small catchments. The lack of fluvial mapping in this area does not mean that there is no flood risk, but that the surface water flood mapping should be reviewed in place of fluvial mapping for this reach of the Gogar Burn.

In addition, the SEPA flood mapping also indicates several surface water flow paths across the Site for the 0.5% AEP event + CC associated with the Green Burn and other topographic low points.

Graphic 5 shows the surface water flood depths for the 0.5% AEP event + CC. A review of **Graphic 5** shows that surface water flooding across the Site is generally less than 300mm in depth. Areas of flooding of 300mm or greater in depth are indicated to remain confined to the channels of Green Burn and the Gogar Burn.

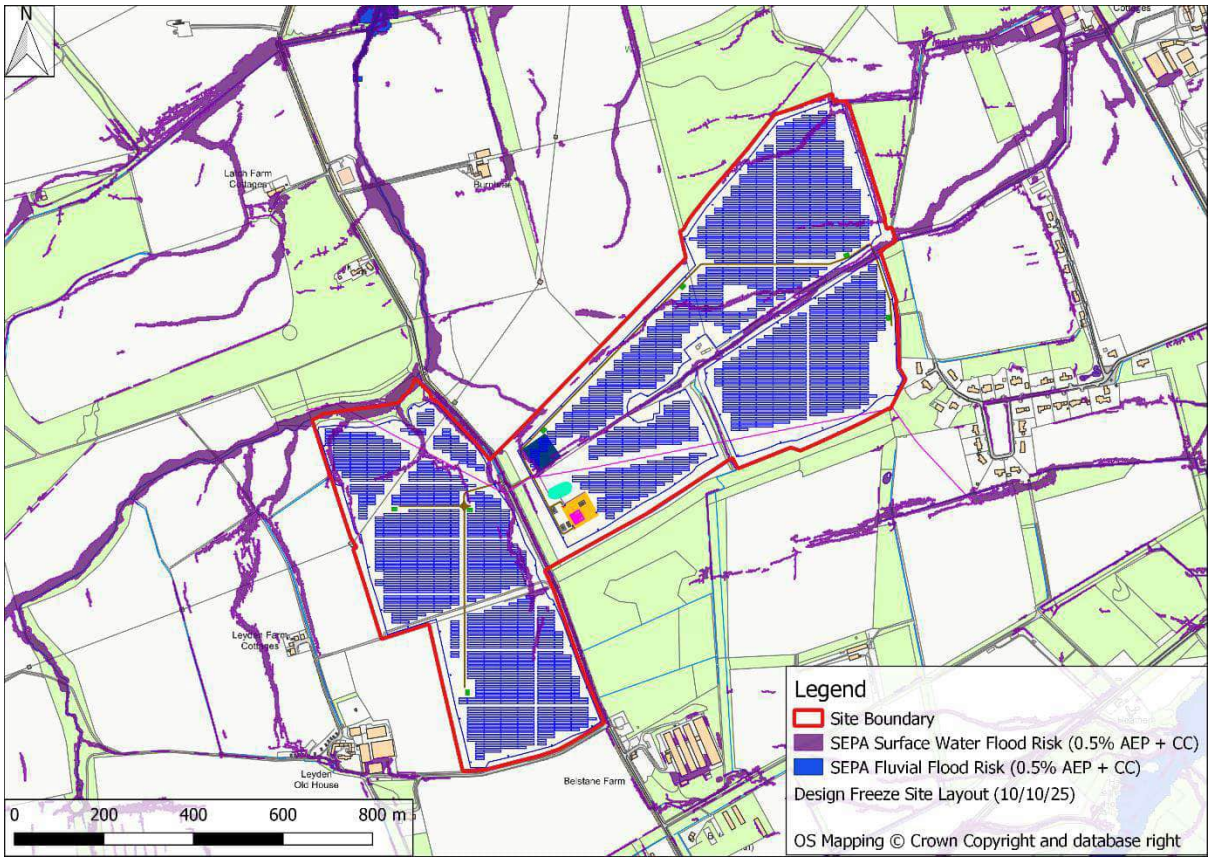
[14] SEPA Flood Maps, last accessed September 2025

[15] SEPA Flood Risk Management Maps last accessed September 2025

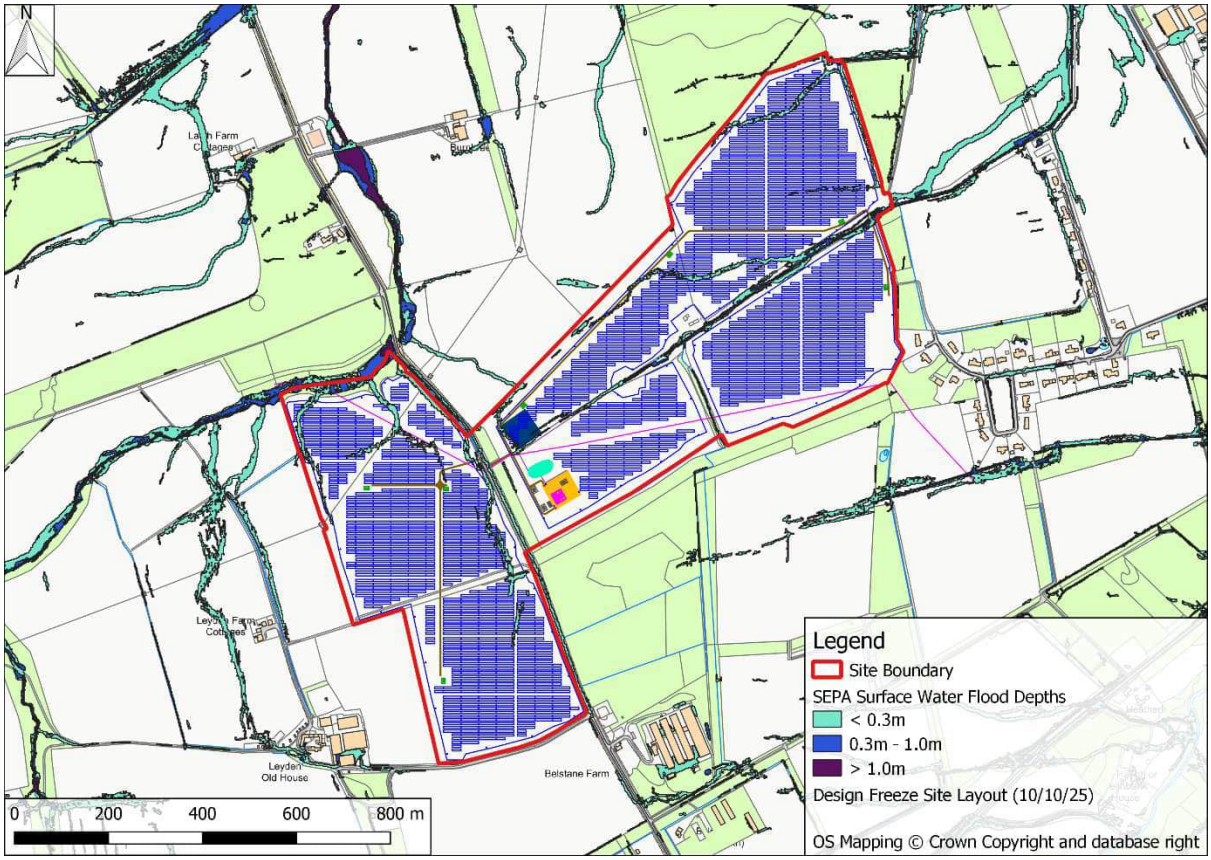
[16] SEPA Reservoirs Flood Map, last accessed September 2025

[17] SEPA River Flooding Summary: Methodology and Mapping, last accessed September 2025

Graphic 4 : SEPA Flood Mapping



Graphic 5 : SEPA Surface Water Flood Depths (0.5% AEP + CC)



2.2 Mapping and Terrain Data

Aerial imagery, SRSP 50cm spatial resolution LiDAR data, and OS contour data (10m intervals) have been used to assess the context of the Site and its immediate surroundings.

2.3 Flood History and Records

The Site is shown to be located within the Cramond Bridge and Outer Edinburgh Potentially Vulnerable Area (PVA) by the SEPA National Flood Risk Assessment (NFRA)[18], which is designated as a PVA due to surface water and fluvial flood risks to Cramond Bridge, Kirkliston, South Gyle, and Edinburgh Airport, however there are no historical flood records for the Site indicated on the SEPA NRFA website. It is also noted that the Site is no longer included as a PVA in the updated SEPA PVAs for 2028-2034[19]. The potential flood risks are set out and addressed within **Section 4.2**.

2.4 Consultation

2.4.1 West Lothian Council

A data request was submitted to West Lothian Council on 18th July 2025 to inquire about historical flooding within 5km of the Site and any other relevant information on the nearby burns. A response was received on 30th July 2025. The response indicated that the nearest historical flood records are for Kirknewton itself, with no flooding indicated to the Site or its immediate surrounds.

2.4.2 SEPA

A data request was submitted to SEPA on 18th July 2025. A response was received on 25th August 2025 (**Annex B**) which confirmed that SEPA hold 46 records of flooding within 5km of the Site between 1864 and 2023. The majority of the records (36) are noted to be due to surface water flooding, with 9 records due to river flooding and 1 record due to an artificial water bearing structure. No further details as to the areas affected by these flood events were provided.

2.4.3 Scottish Water

Scottish Water Asset Plans were received on 25th July 2025 and were reviewed with regard to any assets within the Site. A 600mm diameter public trunk water mains is noted to cross the southeastern extent of the Site. The mains pipe size and location has been confirmed by a utility mapping survey completed by Malcolm Hughes in October 2025. The alignment and depth of the trunk mains will be considered as part of the detailed design stage for the outfall of the SuDS and appropriate consultation will be undertaken with Scottish Water to ensure that the pipework is maintained.

Scottish Water also confirmed required stand-off distances and access distances for the mains. A response was received from Scottish Water on 27th August 2025, which confirmed the following (also see **Annex B**):

The Access Distance for the 600mm trunk main is a minimum of 10m. The Access Distance is to be measured from each extreme edge of the 600mm pipe.

[18] SEPA National Flood Risk Assessment 2018, last accessed September 2025

[19] SEPA Potentially Vulnerable Areas (PVAs) 2028-2034, last accessed July 2025

No building, private gardens suds ponds or other obstruction (including planting and material storage) should be located within the Access Distance to either side of the pipe. Scottish Water will require 24hr unhindered access to this strip.

The Stand-off Distance for the 600mm trunk main is a minimum of 4m. The main has an estimated pressure of 3bar. This Stand-off Distance is the recommended distance to minimise the risk of damage to adjacent properties and structures in the event of a water main failure.

The above information has been incorporated into the design of the development and will be adopted as part of the detailed design to ensure that a sufficient buffer from the Scottish Water main is maintained as required.

3.0 Planning Context

3.1 National Planning Framework 4

National Planning Framework 4 (NPF4)[1] was introduced in February 2023. Flood risk is addressed in Policy 22 of NPF4, which states the following:

a) Development proposals at risk of flooding or in a flood risk area will only be supported if they are for:

i. essential infrastructure where the location is required for operational reasons;

ii. water compatible uses;

iii. redevelopment of an existing building or site for an equal or less vulnerable use; or,

iv. redevelopment of previously used sites in built up areas where the LDP has identified a need to bring these into positive use and where proposals demonstrate that long term safety and resilience can be secured in accordance with relevant SEPA advice.

The protection offered by an existing formal flood protection scheme or one under construction can be taken into account when determining flood risk. In such cases, it will be demonstrated by the applicant that:

- all risks of flooding are understood and addressed;
- there is no reduction in floodplain capacity, increased risk for others, or a need for future flood protection schemes;
- the development remains safe and operational during floods;
- flood resistant and resilient materials and construction methods are used; and,
- future adaptations can be made to accommodate the effects of climate change.

Additionally, for development proposals meeting criteria part iv), where flood risk is managed at the site rather than avoided these will also require:

- the first occupied/utilised floor, and the underside of the development if relevant, to be above the flood risk level and have an additional allowance for freeboard; and,
- that the proposal does not create an island of development and that safe access/ egress can be achieved.

b) Small scale extensions and alterations to existing buildings will only be supported where they will not significantly increase flood risk.

c) Development proposals will:

i. not increase the risk of surface water flooding to others, or itself be at risk.

ii. manage all rain and surface water through sustainable urban drainage systems (SUDS), which should form part of and integrate with proposed and existing blue green infrastructure. All proposals should presume no surface water connection to the combined sewer; and,

iii. seek to minimise the area of impermeable surface.

d) Development proposals will be supported if they can be connected to the public water mains. If connection is not feasible, the applicant will need to demonstrate that water for drinking water purposes will be sourced from a sustainable water source that is resilient to periods of water scarcity.

e) Development proposals which create, expand or enhance opportunities for natural flood risk management, including blue and green infrastructure, will be supported.

NPF4 defines an area at risk of flooding as follows:

For planning purposes, at risk of flooding or in a flood risk area means land or built form with an annual probability of being flooded of greater than 0.5% (1:200 AEP) which must include an appropriate allowance for future climate change.

This risk of flooding is indicated on SEPA's future flood maps or may need to be assessed in a flood risk assessment. An appropriate allowance for climate change should be taken from the latest available guidance and evidence available for application in Scotland. The calculated risk of flooding can take account of any existing, formal flood protection schemes in determining the risk to the site.

Where the risk of flooding is less than this threshold, areas will not be considered 'at risk of flooding' for planning purposes, but this does not mean there is no risk at all, just that the risk is sufficiently low to be acceptable for the purpose of planning. This includes areas where the risk of flooding is reduced below this threshold due to a formal flood protection scheme.

3.2 Local Plan

The West Lothian Council Local Development Plan[20] sets out guidance with regard to flood risk and drainage.

Policy EMG 2 on Flooding states the following:

When considering proposals for development, the council will adopt a precautionary approach to the flood risk from all sources, including coastal, water course (fluvial), surface water (pluvial), groundwater, reservoirs and drainage systems (sewers and culverts), taking account of the predicted impacts of climate change.

Development will specifically not be supported in:

a) *locations identified as being at medium to high flood risk, unless it accords with the flood risk framework set out in SPP 2014; or*

b) *where it would lead to an increase in the probability of flooding elsewhere.*

Developers will be required to submit a full Flood Risk Assessment (FRA) for all developments deemed to be at risk of flooding from any source in medium to high risk areas and developments in low to medium risk areas identified in the risk framework (i.e. developments located in an area at the upper end of the probability scale, essential infrastructure and the most vulnerable land uses). The Flood Risk Assessment should be undertaken in accordance with the relevant and prevailing the Scottish Environment Protection Agency (SEPA) technical guidance.

Development that is proposed in an area that is or will be behind a formal flood protection scheme must be an appropriate and acceptable land use for the location, designed to be resilient. Any such formal flood protection scheme must be designed to an appropriate standard. Developments will be assessed against the flood risk framework contained in SPP which sets out the types of development and locations where it is appropriate to develop.

Policy EMG 3 on Surface Water Drainage states the following:

Developers may be required to submit a Drainage Impact Assessment (DIA) to ensure that surface water flows are properly taken into account in the design of a development.

Developers will be required to ensure that adequate land to accommodate SuDS is incorporated within development proposals and that housing densities take into account the physical space for effective SuDS. The design of the system should meet best current

[20] WLC Local Development Plan 2018, last accessed September 2025

practice. It is expected that surface water drainage systems, including sustainable drainage systems, for most will be vested in Scottish Water as drainage authority and will, as a consequence, be designed and constructed in accord with the most up to date edition of Scottish Water's Construction Standards and Vesting Conditions 'Sewers for Scotland' (3rd Edition) and at the same time comply with the Scottish Environment Protection Agencies (SEPAs) Policy and Supporting Guidance on the provision of Waste Water Drainage in Settlements in promoting connection to the public sewerage system where possible.

Regard should also be had to other Local Development Plan policies in relation to drainage in new developments, SuDS, flood risk and the treatment of watercourses and proposals will require to contribute to the delivery of green infrastructure and the green network where this is considered appropriate.

The Supplementary Guidance on Flood Risk & Drainage[21] sets out the guidance in further detail. This document specifies that the SEPA Checklist and a Compliance Certificate (provided within the guidance document) are required to be submitted with the FRA document. These items are attached as **Annex E and F** respectively.

The guidance also stipulates that a third-party review and certification is required for FRA/DIAs for major developments. A third-party certificate for the combined FRA/DIA is therefore included as **Annex G**.

3.3 SEPA Guidance

The SEPA Flood Risk and Land Use Vulnerability Guidance[22] outlines how SEPA assess vulnerability of flooding of different land use with the following Categories:

- Most Vulnerable Uses;
- Highly Vulnerable Uses;
- Least Vulnerable Uses;
- Essential Infrastructure; and,
- Water Compatible Uses.

With reference to Table 1 (SEPA Land Use Vulnerability Classification) of the guidance, the proposed BESS development is considered to fall under the **Essential Infrastructure** category as *'All forms of renewable, low-carbon and zero emission technologies for electricity generation and distribution and transmission electricity grid networks and primary sub stations'*.

It is noted that SEPA would expect a minimum 600mm freeboard, in line with CIRIA Guidance (CIRIA C624 Development and Flood Risk – Guidance for the Construction Industry 2004) unless a more detailed assessment of freeboard is made.

3.4 Climate Change & Design Event

The relevant SEPA climate change allowances[23] have been assessed for the Site, which lies in the Forth river basin. Based on the small size of the local surface water catchments, the recommended allowance for the assessment of flood risk to the Site from these sources and for the outline drainage design would be a 39% uplift to peak rainfall intensities.

[21] WLC Supplementary Guidance: Flooding and Drainage, last accessed September 2025

[22] SEPA Flood Risk and Land Use Vulnerability Guidance, last accessed September 2025

[23] SEPA Climate change allowances for flood risk assessment in land use planning, last accessed September 2025

4.0 Potential Sources of Flooding

4.1 Methodology and Best Practice

This FRA report has been prepared in accordance with the advice and requirements prescribed in current best practice documents relating to management of flood risk in development outlined in NPF4, SEPA technical guidance, and West Lothian Council guidance.

A screening study has been completed to identify whether there are any potential sources of flooding at the Site which may warrant further consideration. If required, any potential significant flooding issues identified in the screening study are then considered in subsequent sections of this assessment.

4.2 Screening Study

Potential sources of flooding include:

- Flooding from the sea or tidal flooding;
- Flooding from rivers or fluvial flooding;
- Flooding from surface water and overland flow;
- Flooding from groundwater;
- Flooding from sewers;
- Flooding from reservoirs, canals, and other artificial sources; and,
- Flooding from infrastructure failure.

Flood risk definitions within the screening assessment are based on qualitative technical assessment considering the information reviewed, risk to site users and the development itself.

The flood risk from each of these potential sources is assessed in **Table 1**.

Table 1 : Flood Risk Screening

Source of Flood Risk	Description	Flood Risk Assessment
Tidal	The Proposed Development is located approximately 13km south of the coast and is elevated above 215m AOD. It is therefore considered that the Site is not at tidal flood risk.	No flood risk for planning purposes
Fluvial	The Proposed Development is not indicated on the SEPA mapping to be at risk from fluvial flooding up to and including the 0.5% AEP plus CC event. Flood risks from minor watercourses such as the Green Burn and the upstream reach of the Gogar Burn are included in the SEPA small watercourse and surface water mapping as opposed to in the fluvial mapping. It is therefore considered that the Proposed Development is not at fluvial flood risk, and any flood risks from minor watercourses will be assessed as surface water flood risk. Fluvial flooding is not considered to pose a significant flood risk to the Site.	No flood risk for planning purposes
Pluvial (i.e. direct rainfall)	The proposed BESS is to be served by Sustainable Drainage Systems (SuDS) as outlined in **Section 6.0** of this report. The proposed SuDS systems will be designed to attenuate up to and including the 0.5% AEP event + CC with no flooding. It is not expected that direct rainfall will pose a risk to the solar development, as the panels themselves are generally raised a minimum of 1m from ground level. It is therefore considered that the Site is not at pluvial flood risk.	Flood risks mitigated through SuDS design - **Section 6.0**
Surface Water Flows	SEPA mapping indicates several surface water flood flow paths are present across the Site associated with the Green Burn and the Gogar Burn. The Proposed Development is situated upgradient of these watercourses and outwith the main surface water flow paths. Some flood risk is noted to Leyden Road between the two development parcels, as shown in Graphic 4. This flooding is indicated to be less than 300mm in depth for the design event of 0.5% AEP + CC and due to the steep nature of the road in this area it is not expected that water would pond to any significant depth. Some minor areas of ponding of up to 300mm are also indicated on the proposed site tracks for the design event. Similarly to Leyden Road, the local topography would favour runoff towards the watercourses in this area prior to ponding to a significant depth. The Proposed Development will generally be unmanned and therefore the minor areas of surface water flooding indicated to the site access/egress are not considered to pose a significant flood risk for planning purposes.	No flood risk for planning purposes

Source of Flood Risk	Description	Flood Risk Assessment
	Additionally, the SEPA mapping does not indicate that the entire roadway will be subject to surface water flooding for the design event. Any direct rainfall on the BESS would be expected to be intercepted by the proposed surface water drainage systems outlined in **Section 6.0**, and there are no surface water flow paths indicated through the proposed BESS. Minor surface water flood depths of less than 300mm are predicted at the Site for the design event, and given that the solar panels are to be elevated a minimum of 1m above ground levels, a minimum of 700mm freeboard would be expected from any surface water flooding on site based on the SEPA mapping. Surface water flooding is therefore not expected to present a flood risk to the Proposed Development.	
Groundwater	SEPA flood mapping indicates that the Site is not at risk from any wider area groundwater flood risk influences. It is expected that any upwelling groundwater in the local area would drain to the local watercourses. Additionally, the bedrock underlying the Proposed Development is noted to be moderate and low productivity aquifers. As the Proposed Development is situated upslope to where any rising groundwater flows would be expected to drain, it is not expected that this will pose a significant risk to the development. Based on these considerations, there is a negligible risk of groundwater flooding from groundwater rise at the Site.	No flood risk for planning purposes
Sewers and Artificial Drainage Systems, and Water Supply	Scottish Water Asset Plans indicate that there is a 600mm diameter public trunk water main beneath the Proposed Development. In the event of a failure of the mains, it is expected that water will follow natural topographical gradients towards the Green Burn and Gogar Burn without posing a flood risk to the BESS site. It is noted from Scottish Water's response that a water pressure of 3bar is expected from the main in the event of failure. The critical BESS infrastructure is all upgradient from the Scottish Water asset, and it would therefore be expected that any flood risks resulting from a failure of the asset would affect solar panels only and would not impact the wider operation of the development. Based on the absence of any existing formal drainage systems, there is a negligible risk of flooding from drainage systems.	No flood risk for planning purposes

Source of Flood Risk	Description	Flood Risk Assessment
Infrastructure Failure (i.e., reservoirs, canals, culvert blockage, etc.)	The Site is not indicated on the SEPA mapping to lie within the breach extents of any reservoirs. There are no bridges or culverts on the watercourses in the vicinity of the development locations that would be expected to present any flood risk to the development.	No flood risk for planning purposes

5.0 Flood Risk Summary

The NPF4[1] defines an area at risk of flooding as follows:

For planning purposes, at risk of flooding or in a flood risk area means land or built form with an annual probability of being flooded of greater than 0.5% (1:200 AEP) which must include an appropriate allowance for future climate change.

It is considered that the site falls under exception a)i) of NPF4[1] Policy 22, as follows:

a) Development proposals at risk of flooding or in a flood risk area will only be supported if they are for:

i) essential infrastructure where the location is required for operational reasons.

The Proposed Development satisfies this exception as "*all forms of renewable, low-carbon and zero emission technologies for electricity generation and distribution and transmission electricity grid networks and primary sub stations*" and is required to be located at the Site for operational reasons under this exception of Policy 22 of the NPF4[1] and needs to demonstrate that:

- all risks of flooding are understood and addressed;
- there is no reduction in floodplain capacity, increased risk for others, or a need for future flood protection schemes;
- the development remains safe and operational during floods;
- flood resistant and resilient materials and construction methods are used; and
- future adaptations can be made to accommodate the effects of climate change.

5.1 All risks of flooding are understood

The flood risk screening presented in **Table 1** demonstrates that all risks of flooding are understood and addressed in line with NPF4. The SEPA surface water mapping indicates some areas of flooding of up to 300mm in isolated areas of the Site. The panels are to be elevated on plinths a minimum of 1m from ground levels and would therefore have a minimum of 700mm freeboard, which is greater than the SEPA requirement of 600mm.

The screening indicates that the BESS development is not at flood risk from any source and would remain safe and operational during flood events.

It is therefore considered that the requirements of NPF4, SEPA guidance, and the West Lothian Council Local Development Plan are met with regard to flood risks to the development.

5.2 No reduction in floodplain capacity, increase for others

The Proposed Development is not located within the functional fluvial floodplain and as such does not reduce the functional floodplain capacity nor increase the flood risk to others from this source. There is therefore no requirement for compensatory storage as a result of the Proposed Development.

The BESS development will require additional impermeable areas which could, without mitigation, increase surface water runoff rates and volumes downstream of the Proposed Development. An outline SuDS design has been completed (see **Section 6.0**) in order to reduce runoff from the BESS to greenfield rates.

The solar panels allow the runoff of direct rainfall and for existing overland flow paths to be maintained, and as such are not displacing surface water offsite.

It is therefore considered that the requirements of NPF4 and the West Lothian Council Local Development Plan have been met with regard to flood risk to others.

5.3 The development remains safe and operational during floods

SEPA mapping indicates some shallow surface water flooding of less than 300mm to Leyden Road and to the proposed BESS site access track for the design event of 0.5% AEP + CC.

Leyden Road is steeply sloped adjacent to the Site and it is therefore considered unlikely that flooding would reach impassable depths in times of flood. The flooding along the proposed BESS access track is also considered to be minor in area and depth and would not be expected to pond to any significant depth due to the sloped nature of the local topography. The flooding is not suggested to affect the entire width of the roadway in either location, and the duration of flooding due to surface runoff is not expected to be significant.

Additionally, it is understood that the Proposed Development, when operational, will generally be unmanned and therefore risk to staff during a flood is minimised. For a precautionary approach, staff can register for live information provided by SEPA's Floodline[24] service (quick dial code 23200 for Edinburgh and Lothians) to ensure that the Site is not accessed in times of flood and/or is evacuated if heavy rainfall is expected.

It is therefore considered that there is no significant flood risk to the Site access/egress and the Proposed Development would remain operational and safe during floods.

5.4 Flood resistant and resilient materials and construction methods are used

Given that the BESS development is indicated to be flood-free for the design event of 0.5% AEP + CC, it is considered that flood resistant and resilient materials are not required in this case.

The solar panels are inherently flood resilient given their raised position from ground levels and have over 600mm freeboard from any surface water flooding in line with SEPA guidance.

It is therefore considered that this point is addressed.

5.5 Future adaptations can be made to accommodate the effects of climate change

The design of the Proposed Development takes into account of climate change and allows more than the required freeboard from any flood levels on site. Additionally, the SuDS design detailed in **Section 6.0** has been sized with reference to the latest climate change allowances, and could be adapted in the future with regard to outflow and depth to accommodate any increases in rainfall due to the effects of climate change.

The SuDS design detailed in **Section 6.0** will be developed further as part of the detailed design stage of the Proposed Development and would be agreed with West Lothian Council,

[24] SEPA Live Flooding Information, last accessed September 2025

Scottish Water, and SEPA prior to construction. It is anticipated that this will be secured by a planning condition.

6.0 Drainage Impact Assessment

This Drainage Impact Assessment (DIA) sets out high-level principles for managing storm water for the Proposed Development, specifically the proposed BESS, in line with best practice and the requirements of West Lothian Council.

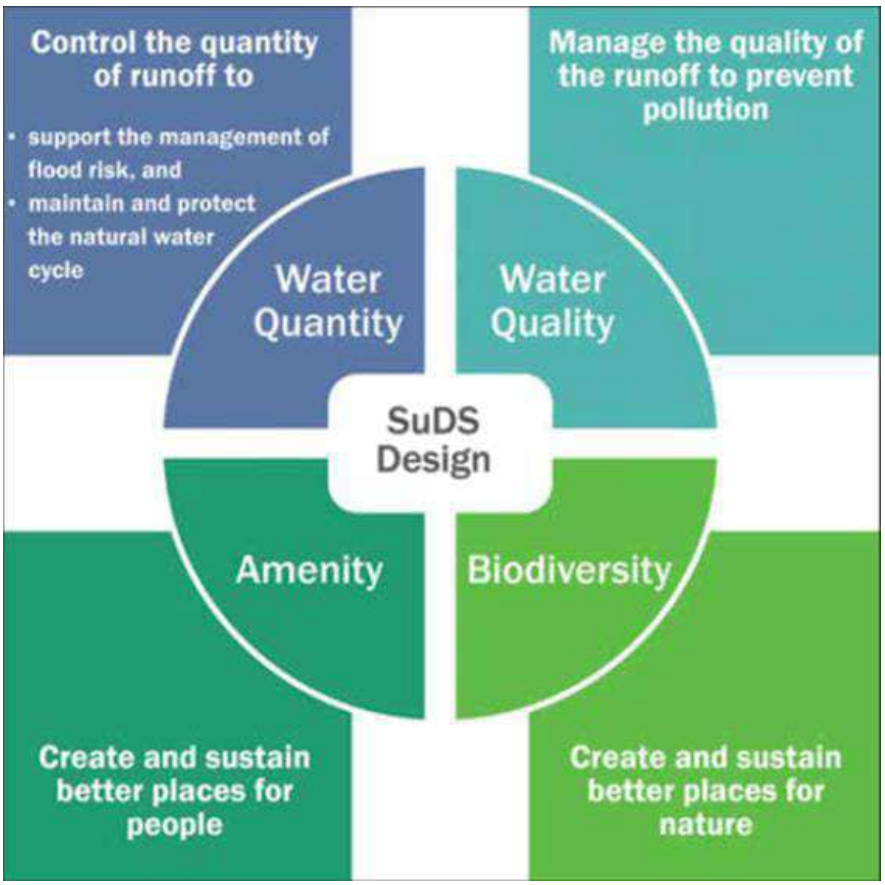
This assessment is intended to demonstrate that, given the nature and quantum of development proposed, it will be feasible to drain the development in line with planning requirements.

The drainage design will be developed further as part of the detailed design stage of the Proposed Development and would be agreed with West Lothian Council and SEPA prior to construction. It is anticipated that this will be secured by a planning condition.

6.1 Key Principles of Surface Water Management

Current best practice document; The Sustainable Drainage System (SuDS) Manual (CIRIA Report C753F)[25], promotes sustainable water management through the use of SuDS. There are four main categories of SuDS which are referred to as the 'four pillars of SuDS design' as depicted in **Graphic 6**.

Graphic 6 : Four Pillars of SuDS (extract from CIRIA Report C753)

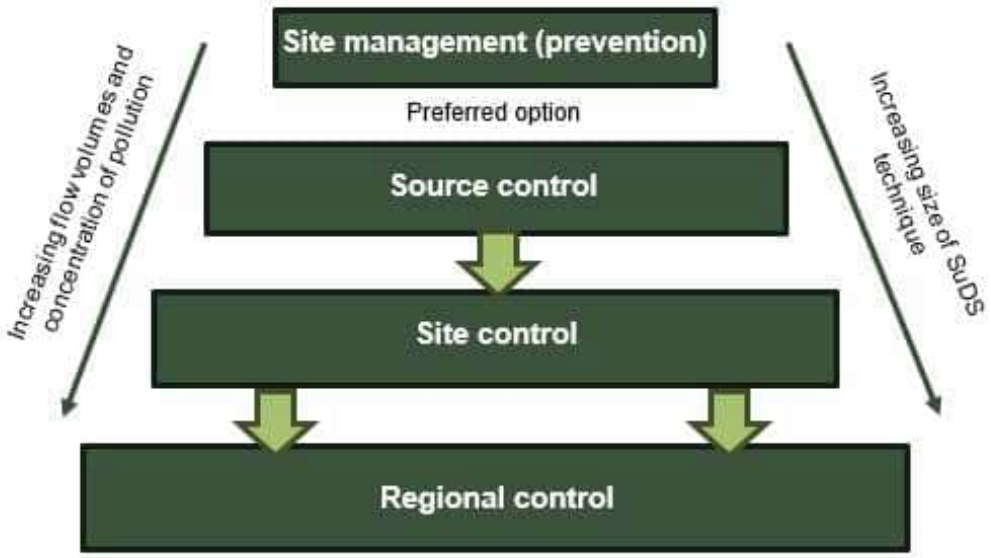


The SuDS Manual identifies a hierarchy of SuDS for managing runoff, which is commonly referred to as a 'management train.' The hierarchy of techniques is identified as:

[25] Report C753, The SuDS Manual; CIRIA (2015). Report C753F, December 2015.

- Prevention – the use of good site design and housekeeping measures on individual sites to prevent runoff and pollution (e.g., minimise areas of hard standing).
- Source Control – control of runoff at or very near its source (such as the use of rainwater harvesting).
- Site Control – management of water from several sub-catchments.
- Regional Control – management of runoff from several sites, typically in a retention pond or wetland.

Graphic 7 : SuDS Management Train



It is generally accepted that the implementation of SuDS, as opposed to conventional drainage systems, provides a number of benefits by:

- reducing peak flows to watercourses or sewers and potentially reducing the risk of flooding downstream;
- reducing the volumes and frequency of water flowing directly to watercourses or sewers from developed sites;
- improving water quality over conventional surface water sewers by removing pollutants from diffuse pollutant sources;
- reducing potable water demand through rainwater harvesting; and,
- improving amenity through the provision of public open spaces and wildlife habitat; and replicating natural drainage patterns, including the recharge of groundwater so that base flows are maintained.

6.2 Existing Surface Water Drainage Regime

The proposed BESS is located on existing undeveloped agricultural land that presently drains via natural surface water pathways to the Green Burn. There are no existing drainage provisions at the area where the BESS is proposed.

6.3 Pre-Development Runoff Rates (Greenfield)

Greenfield runoff rates for the area equivalent to the proposed impermeable area resulting from the development were estimated using industry-standard ReFH2 methodology[26], with the application of the latest FEH22 rainfall data and hydrological descriptors from the Flood Estimation Handbook (FEH) Web Service[27]. At the time of writing the updated FEH 2025 catchment descriptors[28] were not available for use in ReFH2, and as such rates were calculated using the 2008 descriptors.

The impermeable area of the proposed BESS was determined by calculating the total compound area of 0.42ha for a conservative approach to the greenfield runoff estimation.

It is understood that some areas within the BESS development location will comprise gravelled surfacing, and areas outwith these locations will remain undeveloped greenfield land. These changes will be incorporated at the detailed design stage.

The greenfield runoff rates for the assumed impermeable areas of the proposed development resulting from the ReFH2 analysis are summarised below in **Table 2**. Full ReFH2 calculations and results for the key events of 1:1 and 1:200 AEP + CC are included in **Annex C**.

Table 2 : Greenfield Runoff Rates

Annual Exceedance Probability	Greenfield Runoff Rate (l/s)*	Greenfield Runoff Rate (l/s/ha)
1:1	1.44	3.42
1:2	1.59	3.78
1:30	3.11	7.40
1:30 + 39%CC	4.42	10.52
1:200	4.53	10.79
1:200 + 39%CC	6.55	15.59

**Based on an impermeable area of 0.42ha.*

6.4 Proposed Discharge Arrangement

With reference to the SuDS Manual, the hierarchy of preferred disposal options for surface water runoff from development sites in decreasing order of sustainability is as follows:

- infiltration to ground;
- discharge to surface waters; or,
- discharge to sewer.

Table 3 summarises the suitability of disposal methods in the context of the Site and the Proposed Development. Based on this, runoff from the Site is proposed to drain to a watercourse.

[26] Wallingford Hydro Solutions - ReFH2, last accessed September 2025

[27] Flood Estimation Handbook Web Service, last accessed September 2025

[28] FEH Catchment Descriptors for 2025, accessed September 2025

Table 3 : Suitability of Surface Water Disposal Methods

Surface Water Disposal Method (in order of preference)	Suitability Description	Method Suitable (Y / N)
Infiltration to Ground	Given that the SuDS feature is required to store firewater without discharge to the environment, infiltration methods are not appropriate from a water quality perspective.	N
Surface Water Discharge	The Green Burn, a minor watercourse and tributary of the Gogar Burn, is located some 225m northeast of the proposed BESS. There are no existing connections to the Green Burn at the Site, and a new connection would therefore be required. The proposed method of drainage for the BESS would be drainage to a detention basin with limited outflow via a piped network to the Green Burn. Any exceedance of the proposed detention basin would be expected to follow the natural/existing drainage regime to ultimately discharge to the burn.	Y
Sewer Discharge	There are no formal sewers serving the site.	N

6.5 Conceptual Surface Water Drainage Strategy

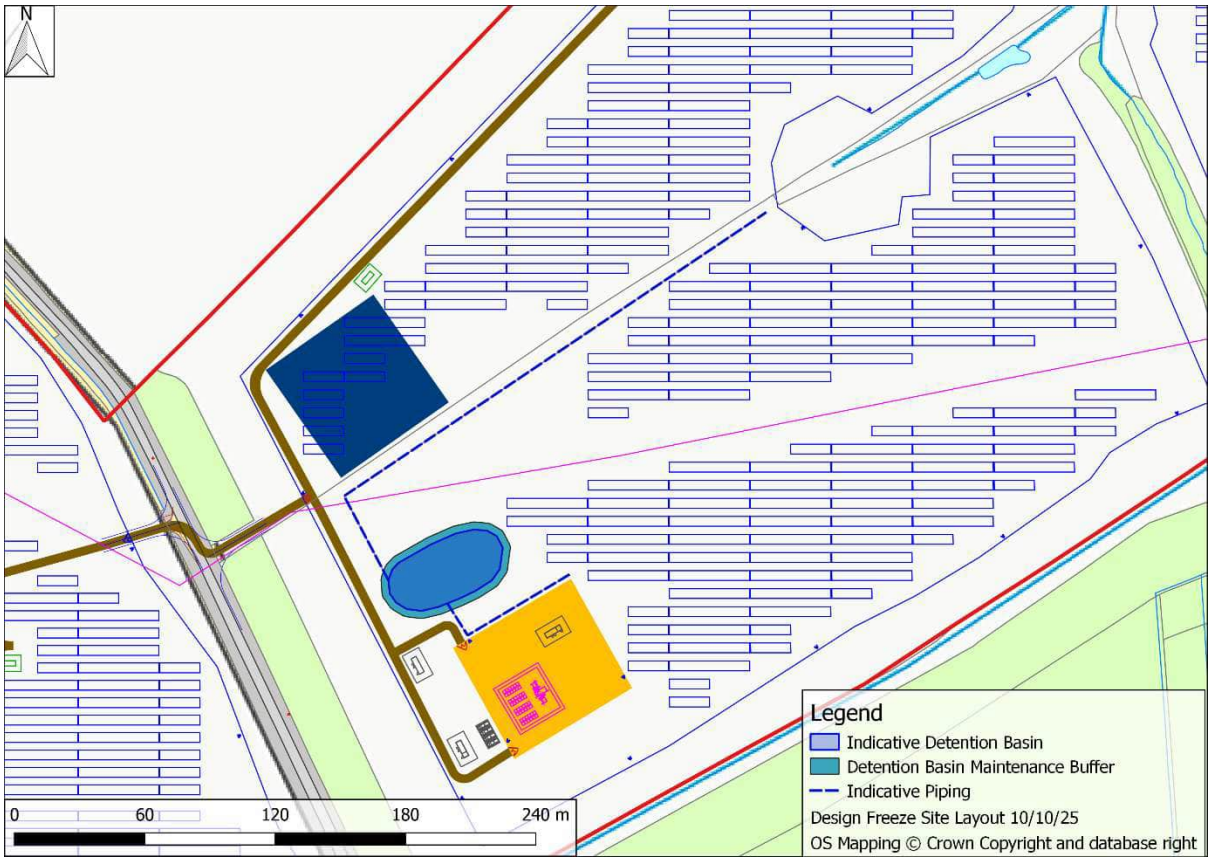
The proposed drainage strategy detailed below will manage surface water runoff as close to the source as possible, seeking to mimic the existing runoff regimes and ensuring that there are no increases in peak discharge from the proposed impermeable areas on Site. The analysis has been carried out using Causeway Flow v15.0 software.

The final routing and details of the surface water drainage strategy which could be applied at the Site are to be determined at detailed design stage. This would normally be undertaken during the post-planning stage or via an appropriately worded planning condition, in which individual hydraulic design parameters would be detailed as required. Notwithstanding, the following sections provide details of the intended system concept.

The proposed BESS is understood to have no existing surface water drainage network. For a conservative approach to the drainage provisions at this initial stage, it is assumed that the full 0.42ha compound area is to be of impermeable surfacing.

The proposed surface water drainage strategy in this area will require the installation of interceptor drains/ditches to capture water and feed into a detention basin. The flows would then be discharged at a limited rate via a piped network to the nearby Green Burn. The conceptual drainage strategy is shown in **Graphic 8**.

Graphic 8 : BESS Conceptual Drainage Strategy



It is noted that the detention basin at the BESS would be required to store firewater in the event of a fire, and as such would be lined and a penstock would be provided at the outfall to prevent contaminated fire water entering the Green Burn system or wider environment. It would also be recommended that the interceptor drains/ditches directing flows to the basin are lined. Further details on the assessment of firewater are provided in **Section 6.12**.

6.6 SuDS Attenuation Storage

It is proposed that the required surface water attenuation is provided by a detention basin, which will be situated to the northwest of the compound, ensuring that surface water runoff can drain to the basin via gravity through interceptor drains. The proposed basin would be located outwith the BESS fencing but within the red line boundary and is proposed to be privately operated and maintained.

The parameters outlined in **Table 4** have been incorporated in the modelling of the proposed detention basin, however, the exact dimensions will be determined at the detailed design stage.

Table 4 : Preliminary Drainage Model Parameters

Attribute	Detention Basin
Impermeable area	0.42ha (+ 0.2ha basin area which includes an associated 3.5m maintenance access buffer area in line with Sewers for Scotland v4)
Side slopes	1:3

Attribute	Detention Basin
Cover Level	217 m AOD (indicative level for modelling purposes - based on ground level immediately downstream of BESS site)
Depth	1.85m
Dimensions	650m^2 at the base 949.4m^2 at 1m from the base 1248.4m^2 at 1.85m from the base

The discharge rate from the detention basin to the Green Burn would be restricted to the 1:1 AEP greenfield runoff rate of 1.4l/s for all events up to and including the 0.5% AEP + CC event. The volume of storage required for the 0.5% AEP + CC event with this discharge rate would be 772.8m^3. The basin dimensions are oversized for this event, allowing for a total attenuation volume of 1,746.2m^3 in order to fully accommodate fire water in the event of a fire, as detailed in **Section 6.12**. Given that the basin will be lined and fitted with a penstock, the estimated area of the detention basin has been added to the impermeable area for sizing purposes.

Attenuation calculations demonstrating the performance of the proposed detention basin is included in **Annex D**.

6.7 SuDS Performance Assessment: Water Levels

It is proposed that attenuation will be provided by a detention basin for the proposed BESS. In line with NPF4 and West Lothian Council guidance, the proposed SuDS systems accommodate up to and including the 0.5% AEP event plus an allowance for climate change with no flooding.

Full results for the critical events are presented in **Annex D**, and the 3.33% AEP + CC and 0.5% AEP + CC events are summarised in **Table 5**. The final volume required for the detention basin is detailed in **Section 6.12**.

Table 5 : Summary of SuDS Performance – Attenuation Volume

SuDS Feature	AEP Event	Peak Water Depth (m)	Peak Water Volume (m^3)	Flood Volume (m^3)
Detention Basin (BESS)	3.33% AEP + 39%CC	0.68	515.3	0
	0.5% AEP + 39%CC	0.97	772.8	0

6.8 SuDS Performance Assessment – Water Quality

The simple index method, as outlined within the SuDS Manual, provides a way of quantifying the benefit to water quality of the SuDS Management Train. The pollution hazard from the land use and the mitigation from the SuDS component are each assigned an index. The total mitigation index must be greater than the pollution hazard index for adequate treatment to be delivered.

Total SuDS mitigation index ≥ pollution hazard index

(for each contaminant type) (for each containment type)

The total SuDS mitigation is the summation of the first components mitigation index and half the mitigation index of any subsequent component.

With reference to the SuDS Manual, post-development surface water runoff generated from each of the developments is considered to have a 'Low' Pollution Hazard Level respectively as presented in **Table 6**.

Table 6 : Pollution Hazard Potential for the Proposed Development

Land Use	Pollution Hazard Level	Pollution Hazard Indices		
		Total Suspended Solids (TSS)	Metals	Hydro-Carbons
Other Roofs (typically commercial/industrial roofs)	Low	0.3	0.2	0.05
Low Traffic Surfaces with Infrequent Change	Low	0.5	0.4	0.4

The proposed surface water drainage system is required to provide sufficient treatment to mitigate the Pollution Hazard Indices indicated in the above table. The SuDS Mitigation Indices are therefore indicated in **Table 7**.

Table 7 : SuDS Mitigation Indices for Proposed Development

SuDS Component	Pollution Hazard Indices		
	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Detention Basin	0.5	0.5	0.6

Table 8 compares the SuDS Mitigation Indices, provided by the proposed 'Source Control', 'Conveyance' and 'Site Control' measures, against the Pollution Hazard Indices for the SuDS feature.

Table 8 : SuDS Performance: Water Quality Indices Assessment – Detention Basin

Land Use	Pollution Hazard Level	Pollution Hazard and SuDS Mitigation Indices Comparison					
		Total Suspended Solids (TSS)		Metals		Hydrocarbons	
		Pollution Index	SuDS Mitigation Index	Pollution Index	SuDS Mitigation Index	Pollution Index	SuDS Mitigation Index
Other Roofs (typically commercial/industrial roofs)	Low	0.3	0.5	0.2	0.5	0.05	0.6

Land Use	Pollution Hazard Level	Pollution Hazard and SuDS Mitigation Indices Comparison					
		Total Suspended Solids (TSS)		Metals		Hydrocarbons	
		Pollution Index	SuDS Mitigation Index	Pollution Index	SuDS Mitigation Index	Pollution Index	SuDS Mitigation Index
Low Traffic Surfaces with Infrequent Change	Low	0.5	0.5	0.4	0.5	0.4	0.6

As the SuDS Mitigation Index provided by the proposed SuDS measures are greater than or equal to the Pollution Hazard Index, the water quality assessment criteria are satisfied for all Land Use criteria.

6.9 SuDS Operational Maintenance Requirements

A full SuDS maintenance plan would be produced as part of the detailed drainage design post-development and the precise requirement would depend on manufacture specification of the final design.

A recommended operation and maintenance plan for the detention basin is summarised in **Table 9**.

Table 9 : Detention Basin Operation and Maintenance Requirements

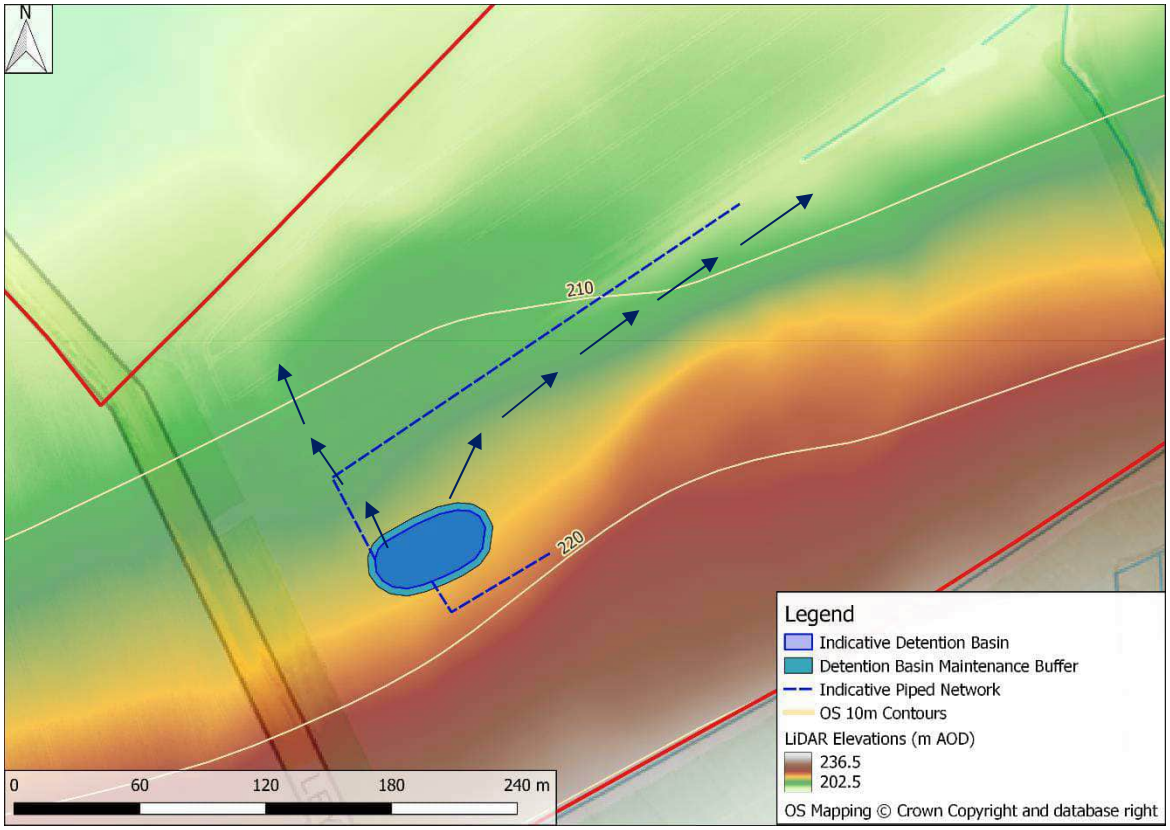
Maintenance Schedule	Required Action	Minimum Frequency
Regular maintenance	Remove litter and debris	Monthly, or as required
	Cut grass – for spillways and access routes	Monthly (during growing season), or as required
	Cut grass – meadow grass in and around basin	Half yearly (spring – before nesting season, and autumn)
	Manage vegetation/remove nuisance plants	Monthly at start, then as required
	Inspect inlets, outlets, and overflows for blockages, and clear if required	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Monthly (for first year), then annually or as required
	Check any penstocks and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlet and forebay	Annually (or as required)
	Manage wetland plants in outlet pool – where provided	Annually

Maintenance Schedule	Required Action	Minimum Frequency
Occasional maintenance	Reseed areas of poor vegetation growth	As required if bare soil is exposed within 10% or more of the basin treatment area
	Prune and trim any trees and remove cuttings	Every 2 years, or as required
	Remove sediment from inlets, outlets, forebay, and main basin when required	Every 5 years, or as required
Remedial actions	Repair erosion or other damage by re-turfing or reseeding	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Repair/rehabilitation of inlets, outlets and overflows	As required
	Relevel uneven surfaces and reinstate design levels	As required

6.10 Exceedance

In the low probability event of exceedance of the detention basin, flows would be expected to follow natural topographical gradients towards the Green Burn or via existing overland flow paths. The exceedance flow paths are demonstrated in **Graphic 9**.

Graphic 9 : Proposed BESS - Drainage Exceedance



6.11 Foul Water Drainage Strategy

The proposed BESS is to be unmanned during normal operation. As such, no provision for foul drainage is required. There is therefore no requirement for a foul water drainage strategy for this Proposed Development.

6.12 Fire Water Management

Notwithstanding the SuDS mitigation index, provision will be made for firewater containment at the BESS. This is proposed to be provided by lining the proposed detention basin with a low permeability liner and provision of a penstock/shutoff valve on the outfall which can be used in the unlikely event of a fire to contain firewater in the basin, thus preventing a discharge from Site.

With reference to GPP18[9], it is understood that the capacity of the basin must be sufficient to store the following

- 10-year return period, 8 days rainfall prior to the incident;
- 10-year return, 24 hour rainfall;
- An allowance for rain falling directly on to remote containment and areas of the site draining into it, immediately after the incident;
- Fire-fighting and cooling water;
- Foam – a freeboard of not less than 100mm; and
- Dynamic effects – allow 250 mm for surge of liquid and for wind-blown waves.

An outline estimation of the required volume of each of these GPP18 components and the total volume of the proposed basin are shown in **Table 10**. Full details of this will be provided during the detailed design stage of the Proposed Development.

The Proposed Development is to include two water tanks and an associated pump house for the storage of fire water. The tanks each have a capacity of 115,000 litres (combined capacity 230,000 litres). The proposed SuDS feature would therefore be required to store the full 230m^3 of water in the event of a fire.

In order to allow for rain falling directly on remote containment as well as on maintenance access areas following the incident, an additional area of 2,000m^2 has been added to the drainage area calculations. No outflow has been allowed for the 10% AEP 24-hour event, assuming activation of the penstock. It is noted that 230m^3 of firewater is to be stored onsite for use in the event of a fire.

Table 10 : GPP18 Required Volumes

Event	Volume (m^3)
10% AEP + CC, 8 days rainfall* (winter)	432.4
Fire-fighting and cooling water;	230.0
10% AEP + CC, 24-hour rainfall (winter) – no discharge due to penstock	434.2
Total Required Volume	**1096.6**
Total Basin Capacity including freeboard	**1746.2**

**Consecutive 10% AEP + CC 1-day rainfall event followed by 10% AEP + CC 7-day rainfall event (the maximum duration in Causeway Flow) modelled to account for the 8-day event.*

Modelling the total required volume in Causeway Flow indicates that there will be approximately 350mm freeboard, sufficient for the required allowance for foam and dynamic effects.

An additional check was carried out on the 0.5% AEP event plus climate change followed by a fire-fighting incident. The resulting volume required is shown in **Table 11**.

Table 11 : 0.5% AEP event + CC and Subsequent Fire Incident Volumes

Event	Volume (m^3)
0.5% AEP + 39% (winter)	772.8
Fire-fighting and cooling water	230.0
Total Required Volume	**1000.8**
Total Basin Capacity including freeboard	**1746.2**

7.0 Conclusions

7.1 Flood Risk

It is considered that the Proposed Development falls under exception a)i) of NPF4[1] Policy 22 as *"all forms of renewable, low-carbon and zero emission technologies for electricity generation and distribution and transmission electricity grid networks and primary sub stations".*

The flood risk summary in **Section 5.0** demonstrates compliance with the NPF4, WLC, and SEPA requirements relating to flood risk for this exception.

It is understood, based on SEPA mapping, that flood risk to Leyden Road and any proposed tracks for the design event of 0.5% AEP + CC is minimal (less than 300mm in depth and does not cover the whole roadway). Additionally, it is understood that the BESS will generally be unmanned and will remain operational in times of flood, and as such the minor flood risk to the access/egress is not considered to be a risk to the Proposed Development.

The proposed BESS is located outwith any area of flood risk shown on the SEPA mapping, and the solar panels have a minimum of 700mm freeboard from any isolated areas of surface water flooding on the SEPA mapping.

Any direct rainfall on the BESS will be managed through the SuDS design and direct rainfall on the solar panels would be expected to run off to existing surface water flow paths as per the pre-development scenario.

Given the above, it is considered that the requirements of NPF4, the West Lothian Council Local Development Plan, and SEPA guidance have been met.

7.2 Surface Water Drainage Strategy

It is proposed that surface water runoff from the impermeable areas associated with the proposed BESS is captured, attenuated, and drained via SuDS.

A detention basin is proposed for the BESS, discharging surface water at a restricted (greenfield) rate of 1.4l/s to the Green Burn. The detention basin would also be designed for the retention of firewater and would be lined and fitted with a penstock. The total volume of the proposed detention basin is 1,746.2m^3 with a total required surface area of approximately 2,000m^2 which includes a 3.5m maintenance buffer in line with Scottish Water guidance.

The proposed surface water drainage designs are indicative only and exact dimensions, levels and routing will be determined at the detailed design stage. The detailed drainage design would be agreed with West Lothian Council, Scottish Water, and SEPA prior to construction. It is anticipated that this will be secured by a planning condition.

Annex A Proposed Site Layout

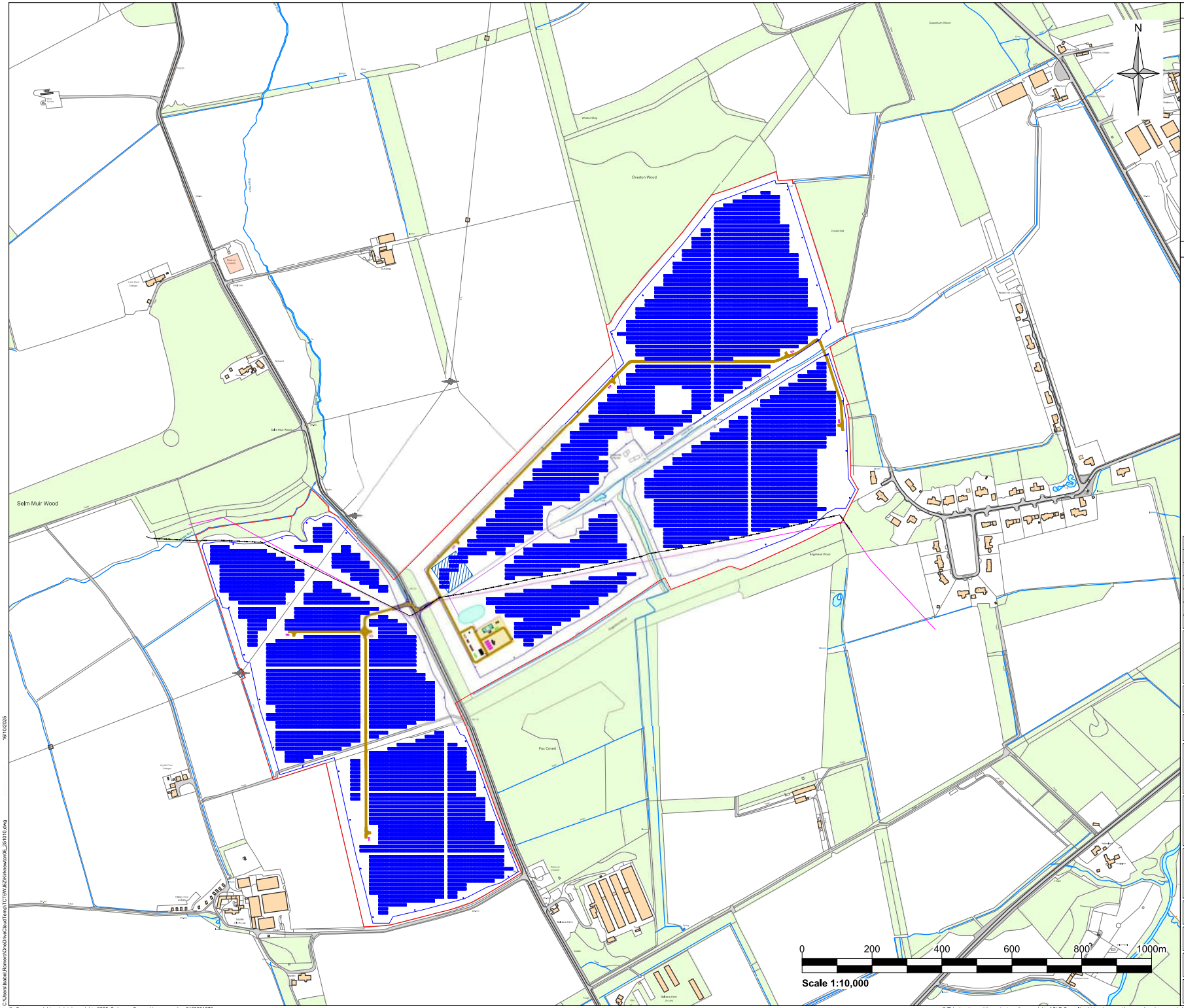
Technical Appendix 2.5: Flood Risk & Drainage Impact Assessment

Kirknewton Solar & BESS EIA Report

Trio Power Limited

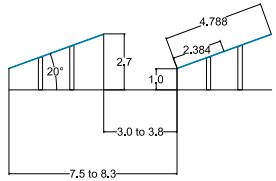
SLR Project No.: 405.065786.00001

27 October 2025



Notes:

1. Development Area: 76.12 Ha
2. Installed Capacity: 53.9 MWp
3. System TIC: 40.00 MVA
4. Trina Solar TSM-NEG21C.20 - 700Wp
5. Modules: 76,944
6. Inverters: 267
7. Tx: 7
8. Tilt Angle: 20°
9. Azimuth: 0°
10. Orientation: 2 in Portrait



Legend:

- Site boundary
- Solar fence
- BESS fence
- PV modules
- BESS
- Gate
- Internal tracks
- SuDS pond
- SuDS indicative pipeline
- Temp. Construction comp.
- SW sewer main
- CCTV
- Aux transformer
- Transformer station

Rev	Amendments	Date	By	Chk	Auth
06	Indicative SuDS pipeline	10/10/25	IR	AA	SC
05	Ecology and BESS amendment	29/09/25	IR	AA	JK
04	Water tank amendment	26/09/25	IR	AA	JK
03	Constraints input	09/09/25	IR	AA	SC
02	Revised layout	29/07/25	IR	AA	SC
01	Initial Issue	23/05/25	IR	AA	SC

SLR

www.slrconsulting.com

Drawing Status & Suitability Code
PLANNING

Client
Trio Power Ltd

Project
Kirknewton Solar Farm

Drawing Title
Site Layout

Scale	SLR Project No.
1:10,000 @ A3	405.065786.00001

Designed	Drawn	Checked	Authorised
N/A	IR	AA	SC
Date: N/A	Date: 10/10/2025	Date: 09/09/2025	Date: 10/10/2025

Drawing Number: **065786-SLR-XX-XX-D-EA-000001** Rev. **06**

16/10/2025

C:\Users\Isabel.Romero\OneDrive\Documents\Temp\TC7ERVUBZK\Kirknewton\06_251015.dwg

Annex B Consultation Responses

Technical Appendix 2.5: Flood Risk & Drainage Impact Assessment

Kirknewton Solar & BESS EIA Report

Trio Power Limited

SLR Project No.: 405.065786.00001

27 October 2025

Wednesday, 27 August 2025

Development Operations
The Bridge
Buchanan Gate Business Park
Cumbernauld Road
Stepps
Glasgow
G33 6FB

Development Operations
Free phone Number - 0800 389 0379
E-Mail -
developmentoperations@scottishwater.co.uk
www.scottishwater.co.uk

Follow Us

Katrina Riches
4/5 Lochside View
Edinburgh
EH12 9DH

Dear Customer,

Land off Leyton Road, , EH27 8DQ
Asset Impact Assessments – Existing Water Apparatus
Our Reference: DSCAS-0137301-9VR
Your Reference:

Thank you for contacting Scottish Waters 'Asset Impact Team' regarding the proposed development at the above site address.

Please note our reference number above, which should be quoted on all future correspondence

I have reviewed your proposals alongside Scottish Water's records and Google maps to gain a better understanding of the project.

As you may be aware there are the following Scottish Water assets in the development area:

- 600mm Ductile Iron (DI) Trunk Main (1991) – running west to east
- 12in uPVC Trunk Main (1979) – running along the road
- 6in Cast Iron (CI) Distribution Main (1924) – running along the road
- Valve arrangement – within the road

Please note that Scottish Water records are only indicative and a detailed site survey with trial excavations will be required to determine the exact location, depth and material of the pipe.

Any work near potable water mains (*this includes any trial holes, road construction etc*.) requires permission under Scottish Water's DOMS[1] procedures and you will require written approval from Scottish Water signed by the local Scottish Water operations personnel before carrying out any works.

[1] Distribution Operation and Maintenance Strategy – Scottish Water's process to safeguard the potable water supply to its customers

There are two critical issues relating to how close you can build to the above water mains: -

1. Access Distance

The Access Distance is the legally supported distance, required to facilitate future SW access to allow repair, maintenance or renewal of the water main in every direction (e.g. at the end of a water main or at changes of direction). The Access Distance will be measured from the extreme edge of the pipe. No development that will restrict our access or put at risk the integrity of our assets is permitted within the Access Distance. The Access Distance is measured in both directions from the extreme outside edge of the pipe.

The Access Distances for the assets are as follows:

- 600mm Ductile Iron (DI) Trunk Main (1991) – minimum 10m Access Distance required
- 12in uPVC Trunk Main (1979) – minimum 4.5m Access Distance required
- 6in Cast Iron (CI) Distribution Main (1924) – minimum 3m Access Distance required
- Valve arrangement – minimum 4.5m Access Distance required

No building, private gardens suds ponds or other obstruction (including planting and material storage) should be located within the Access Distance to either side of the pipe. Scottish Water will require 24hr unhindered access to this strip.

2. Stand-off Distance

a. This is the recommended distance to minimise the risk of damage to adjacent properties and structures in the event of a water main failure.
b. It is suggested that this distance may include garden areas but should not include inhabited or temporary structures or garages.

With respect to the Stand-off distance as described above Scottish Water requires developers to seriously consider the consequences of a possible mains failure. The Stand-off distance is calculated using WSSC[2] guidelines and is dependent on the water pressure in the main.

The estimated pressures and calculated Stand-off distance for the assets are as follows:

- 600mm Ductile Iron (DI) Trunk Main (1991) – estimated pressure of 3bar with a calculated Stand-off Distance of 4m, which in this case is less than the Access Distance
- 12in uPVC Trunk Main (1979) – estimated pressure of 4 bar with a calculated Stand-off Distance of 5m, which is 0.5m greater than the Access Distance
- 6in Cast Iron (CI) Distribution Main (1924) - estimated pressure of 4 bar with a calculated Stand-off Distance of 5m, which is 2m greater than the Access Distance
- Valve arrangement - estimated pressure of 8 bar with a calculated Stand-off Distance of 10m, which is 5.5m greater than the Access Distance

Details of any planting and landscaping within the vicinity of the water mains must be agreed with Scottish Water in advance. Guidance on planting restrictions can be found in Water for Scotland 4th Edition Section 2.3.10.3.

[2] Washington Suburban Sanitary Commission

I trust this is of assistance and helps you progress your project however you should not commence work until you receive written acceptance from Scottish Water. If you require any further information regarding this matter, please do not hesitate to contact me.

Yours sincerely

Amy Reid
HAUC Diversions Team
developmentoperations@scottishwater.co.uk

Scottish Water Disclaimer:

"It is important to note that the information on any such plan provided on Scottish Water's infrastructure, is for indicative purposes only and its accuracy cannot be relied upon. When the exact location and the nature of the infrastructure on the plan is a material requirement then you should undertake an appropriate site investigation to confirm its actual position in the ground and to determine if it is suitable for its intended purpose. By using the plan, you agree that Scottish Water will not be liable for any loss, damage or costs caused by relying upon it or from carrying out any such site investigation."

Scottish Environment Protection Agency
Buidheann Dìon Àrainneachd na h-Alba

RESPONSE TO F0199680

Request Timeline

Date	Status
18/07/2025	EIR Request received [statutory deadline 18/08/2025]
18/08/2025	Late request update email sent
25/08/2025	EIR Response issued

Requested Information

[…] hydrological assessment near Kirknewton, West Lothian. The required search area is shown in the figure attached and a shapefile has been provided of this area for reference. The requested search area extends 5km outwith the previously indicated location and is shown on the figure attached with shapefiles provided for reference. The search area is centred at:

Grid reference: NT 10824 64978.

Easting and Northing: 310824 , 664978

What3words: relating.noisy.liquid

As part of our assessment, we are interested in any information SEPA holds regarding the following:

1. Controlled Activity Regulation Authorisations

Please could you advise if there are any CAR authorisations (e.g. abstraction, discharges) within the search area and if so can the following information be provided:

- CAR Licence Number and activity detail
- National Grid References of associated activities
- Name and address of licence holder

2. Groundwater Quality and Levels

Please could you supply any groundwater quality and level information for SEPA boreholes within the search area.

3. Surface Water Flow

We are interested in obtaining any flow information for the watercourses in the area of the site. Please provide time series data for the past 4 years, where available, and identify current pressures on watercourses for the stations within the search area.

4. Surface Water Quality

Please could you supply water quality information for any watercourses and lochs in the search area.

5. Rainfall Data

Please provide summary statistics for the SEPA rainfall gauges at Stirling S Wks or any closer gauges, as daily rainfall totals for the past four years.

6. Flood Risk Information

- A plan at appropriate scale (e.g. 1:5,000) confirming the extent of flood zones.
- Details of flood water levels for a range of events up to and including the 0.5% annual probability flood event.
- Any information held on historic flood events in this area, including date, extent of flooding and flood water levels.
- Details of any existing and proposed flood defence measures in the area and information regarding the impact of these defences on flood water levels.
- Any information on the risk of groundwater flooding and surface water drainage flooding in this area.

Response

We confirm that we have handled your request under the terms of the Environmental Information (Scotland) Regulations 2004 (EIRs).

We apologise for the delay in providing this response.

Q	Response	Data Reuse
[1]	**Controlled Activity Regulation Authorisations** **Please could you advise if there are any CAR authorisations (e.g. abstraction, discharges) within the search area and if so can the following information be provided:** • **CAR Licence Number and activity detail** • **National Grid References of associated activities** • **Name and address of licence holder** For Controlled Activity Regulation licences within the search area including CAR Licence number, activity detail, National Grid Reference and name of licence holder please refer to spreadsheet: • **F0199680 – 5KM Radius Search** Please note that private drinking water supply abstractions of 10m^3 or less are covered by a General Binding Rule (GBR). As compliance with the GBR is mandatory and no formal SEPA authorisation or registration is required, we do not hold a record of these. It is the responsibility of the local authority to maintain a register of private drinking water supplies and we suggest you contact West Lothian Council for this information. Contact details are provided in 'Application of Regulation and Exceptions' section below.	**Re-using this data:** There are no restrictions, including commercial, to the reuse of this data.

Q	Response	Data Reuse
	Please also note, in the interest of public safety, we cannot disclose the locations of public drinking water supply abstractions. This does not include details (if any) of discharge consents determined pre-2006 and not yet transferred into CAR (Controlled Activities Regulations). These consents are only searchable by house or street name. As a result of losing access to much of our Public Register documentation in December 2020, documentation from before 1 January 2021 is not always complete or verified. We are providing you with the best available information. Any use you make of this information will be at your own risk. The Site National Grid Reference (NGR) shown in the attachment is not necessarily the location of an abstraction or discharge point. Instead, it refers to the authorised site location only. Abstraction and discharge points are not currently held on a central database but may be found in the licence documents (an exception to this is some discharge authorisations for existing sewage systems or construction sites). You may wish to check find-authorisation-information.sepa.org.uk/ for published authorisation documents. If there is a licence you are interested in, and it is not available online please contact foi@sepa.org.uk.	

Q	Response	Data Reuse
	Exceptions/Regulations Applied: **Regulation 10(5)(a) – public safety** **Regulation 11(2) – Personal Data** **Regulation 14(1)(b) – Other Authority**	
[2]	**Groundwater Quality and Levels** **Please could you supply any groundwater quality and level information for SEPA boreholes within the search area.** There are no SEPA groundwater monitoring sites for quality or levels at the site of interest or within the search radius. Exceptions/Regulations Applied: **Regulation 10(4)(a) – Information not held**	In cases where no information is held, data reuse does not apply.
[3]	**Surface Water Flow** **We are interested in obtaining any flow information for the watercourses in the area of the site. Please provide time series data for**	Please see the **NRFA** page for more information about data use and licencing: eidc.ceh.ac.uk/licences/nrfa-data-terms-

Q	Response	Data Reuse
	the past 4 years, where available, and identify current pressures on watercourses for the stations within the search area. Please find attached 15-minute flow data from Almondell Station which sits within the 5km search radius. The spreadsheet attached has the past 4 hydrological years from 01 October 2020 to 21 July 2025: • **Almondell - NGR NT 08623 68601** For flood studies, we recommend you refer to the industry standard methods for flood estimation outlined in the Flood Estimation Handbook: (FEH) available as a Web Service of the UK Centre for Ecology & Hydrology (CEH) and from Wallingford Hydrosolutions. ceh.ac.uk/data/software-models/flood-estimation-handbook-feh-web-service hydrosolutions.co.uk/software/flood_estimation_handbook/ SEPA gauging stations that are calibrated to flood levels produce the Peak Flow dataset that underpins the Flood Estimation Handbook methodology. These datasets and supporting information are published on the National River Flow Archive (NRFA) website and in the WINFAP (Windows Frequency	and-conditions-for-api-access-to-time-series-data-and-metadata/ **WHS:** please refer to their terms and conditions www.hydrosolutions.co.uk/terms/ This data is licenced under the current Open Government Licence: www.nationalarchives.gov.uk/doc/o pen-government-licence/version/3/

Q	Response	Data Reuse
	Analysis Package) software available at Wallingford Hydro Solutions (WHS). NRFA: nrfa.ceh.ac.uk/data/search WHS: hydrosolutions.co.uk/ Exceptions/Regulations Applied: **Regulation 9 – Advice and Assistance**	
[4]	**Surface Water Quality** **Please could you supply water quality information for any watercourses and lochs in the search area.** Please refer to attached spreadsheet for surface water quality data we hold at the site of interest and search radius: • **F0199680**	**Water Classification Hub Re-using this data**: Before replicating and sharing any copied versions of this map tool and data views, please ensure you have read and fully understand all data licence and use information. You can find this by clicking on 'Terms and conditions' at the top of the opening page. And visit SEPA's Terms and Conditions of use of data page: www.sepa.org.uk/media/219134/sepa-general-data-reuse-statement-v31.pdf

Q	Response	Data Reuse
	This information can also be found - www.sepa.org.uk/data-visualisation/water-classification-hub/ showing classification across Scotland but also specific waterbodies of interest ○ Guide to using the hub www.sepa.org.uk/media/330145/classification-hub-quick-guide.pdf General information on SEPA Water Framework Directive (WFD) classification - www.sepa.org.uk/environment/water/aquatic-classification/ Information on River Basin Management Plans (RBMP) and specific pressures and measures under RBMP3 can be found at informatics.sepa.org.uk/RBMP3/ Exceptions/Regulations Applied: **Regulation 9 – Advice and Assistance**	This data is licenced under the current Open Government Licence: www.nationalarchives.gov.uk/doc/o pen-government-licence/version/3/
[5]	**Rainfall Data** **Please provide summary statistics for the SEPA rainfall gauges at Stirling S Wks or any closer gauges, as daily rainfall totals for the past four years.**	This data is licenced under the current Open Government Licence: www.nationalarchives.gov.uk/doc/o pen-government-licence/version/3/

Q	Response	Data Reuse
	As Harperrig station is within the search radius, please refer to the attached spreadsheet for data on daily rainfall totals for the past 4 hydrological years from 01 October 2020 to 21 July 2025: • **Harperrig.RE.Day.Totals** Exceptions/Regulations Applied: **N/A**	
[6]	**Flood Risk Information** **A plan at appropriate scale (e.g. 1:5,000) confirming the extent of flood zones.** In Autumn 2022, SEPA made available the following spatial datasets under Open Government Licence (OGL): www.nationalarchives.gov.uk/doc/open-government-licence/version/3/ o River, Coastal, and the Surface Water and Small Watercourses Flood Maps (current version 3.0, February 2025) o Flood Risk Management (FRM) Plan District Boundaries o Potentially Vulnerable Areas	The user shall acknowledge the copyright in the data and any derived data by including the attribution statement "Contains SEPA data © Scottish Environment Protection Agency 2024. All rights reserved."

Q	Response	Data Reuse
	○ Flood Risk Management (FRM) Target Areas ○ Flood Warning Areas ○ Flood Alert Areas SEPA's flood hazard maps (current version 2.1, November 2023) show the risk of flooding from rivers, the sea and surface water, and can be accessed in two ways: • Via the flood map viewer: map.sepa.org.uk/floodmaps • Data for use in Geographic Information Systems (GIS) can be downloaded from the Data publication page: www.sepa.org.uk/environment/environmental-data/ These datasets are now available for anyone to view, use and download for free. Please refer to the frequently asked questions (FAQs) for further information: www.sepa.org.uk/environment/water/flooding/faqs/#floodmaps The flood map viewer has been updated to support decision making in the land use planning process and allow the public to view their flood risk at a greater scale.	

Q	Response	Data Reuse
	The increased zoom function increases the scale of the flood maps to make it easier for users to see if their site, or property, sits within an area that is at risk of flooding. Guidance is available on how the maps should be used for land use planning: www.sepa.org.uk/media/591421/guidance-using-sepa-flood-maps-for-land-use-planning.pdf **Details of flood water levels for a range of events up to and including the 0.5% annual probability flood event.** We are unable to provide modelled flood levels, depths or flows from the models which underly our Flood Maps, as our maps are developed using licensed data supplied to SEPA by many providers. Whilst the published maps are available under the Open Government Licence, this is not the case for the underlying data and models used to generate the mapping due to our obligations to these data licensors. Where a Local Authority has undertaken a flood study, they may be able to provide this information.	

Q	Response	Data Reuse
	We recommend that you contact West Lothian Council who, as Flood Prevention Authority, should be able to provide further information regarding flooding and flood alleviation in the area. **Any information held on historic flood events in this area, including date, extent of flooding and flood water levels.** SEPA's Observed Flood Event database currently holds 46 records of flooding within 5 km of your point of interest (NT 10824 64978). These occur at various locations between October 1864 and January 2023: • 36 records are flooding from surface water (heavy rainfall). • 9 records are due to river flooding. • 1 record is flooding due to artificial water bearing infrastructure. Please note SEPA's Observed Flood Event database is a collection of flood event records known to SEPA at this time and does not constitute a complete record of all flooding that may have occurred in the area. This information	

Q	Response	Data Reuse
	was correct at the time of this request to the best of SEPA's knowledge. If we do not hold any records of flooding for an area, this does not mean it has never flooded, simply that we do not have a record of it. We recommend that you contact West Lothian Council who, as Flood Prevention Authority, should be able to provide further information regarding flooding and flood alleviation in the area. **Details of any existing and proposed flood defence measures in the area and information regarding the impact of these defences on flood water levels.** Some information on flood defences in Scotland can be accessed via the SEPA website which is available here: map.sepa.org.uk/floodmap/map.htm The Flood Defences layer may show you where flood defences are located, but we may not have the most up to date information.	

Q	Response	Data Reuse
	We suggest that you contact the Flood Risk Management team West Lothian Council, who are the local flood risk management authority and are responsible for flood defences for that area. They should be able to provide further details on flooding and flood alleviation in this area. Contact details can be found in the Application of Regulations and Exceptions section below. From the Flood Defences layer, we are aware of the Water of Leith (Threipmuir Reservoir) FPS 2006 and Broxburn Flood Prevention Scheme 2007 Flood Protection Scheme in the general area, however is outwith the 5km radius provided. As we may not hold the latest information on flood defences or have detailed information on schemes that have been completed recently, I would recommend that you contact the Flood Risk Management team at West Lothian Council, who are the local flood risk management authority and are responsible for flood defences for that area. They may be able to provide further details on flooding and flood alleviation in this area.	

Q	Response	Data Reuse
	Any information on the risk of groundwater flooding and surface water drainage flooding in this area. The site of interest and the 5km radius is located within a river catchment where we have identified that groundwater can be a contributory factor to flooding. This information can be viewed on our website: map.sepa.org.uk/floodmap/map.htm, by selecting the Groundwater option under Other Maps. Scottish Water is responsible for the drainage of rainwater runoff (surface water) from roofs and paved areas, from within the curtilage of premises, on connection to the public sewer. They can also help protect homes from flooding caused by sewers overflowing or becoming blocked. You may wish to contact Scottish Water regarding the drainage related parts of your enquiry. The SEPA surface water and small watercourses flood map was developed using a nationally consistent approach based on a two-dimensional (2D) flood modelling method. To access the map please refer to: map.sepa.org.uk/floodmaps.	

Q	Response	Data Reuse
	The map provides indicative flood hazard information and identifies communities at risk from surface water flooding and from small watercourses with a catchment area smaller than 10km^2. It does not show flood hazard associated with sewer flooding. Further information on the methodology used to develop the map can be found in the non-technical summary available on our website: www.sepa.org.uk/media/33hahn4b/surface-water-and-small-watercourses-flooding-summary_v4.pdf Exceptions/Regulations Applied: **Regulation 6(1)(b) - Publicly Available** **Regulation 9 – Advice and Assistance** **Regulation 10(4)(a) – Information not held** **Regulation 14(1)(b) – Other Authority** **Regulation 10(5)(c) – Intellectual property rights**	

Application of Regulations and Exceptions

Section 39(2)

The information you are requesting is environmental information. We have applied Section 39(2) of the Freedom of Information (Scotland) Act 2002 (FOISA). We are therefore handling your request under the Environmental Information (Scotland) Regulations 2004 (EIRs).

Regulation 9 – Advice and assistance

As we have issued additional information, advice, or assistance we have applied Regulation 9(1) of the EIRs, the text of which is reproduced below.

9(1) A Scottish public authority shall provide advice and assistance, so far as it would be reasonable to expect the authority to do so, to applicants and prospective applicants.

Regulation 10(4)(a) – Information not held

Where we have advised that we do not hold information we have applied Regulation 10(4)(a) of the EIRs, the text of which is reproduced below.

10 (4) A Scottish public authority may refuse to make environmental information available to the extent that;- (a) it does not hold that information when an applicant's request is received.

The exception in Regulation 10(4)(a) is subject to the public interest test in Regulation 10(1)(b) of the EIRs. As SEPA does not hold the information in question there is no conceivable public interest in requiring that the information be made available.

Regulation 10(5)(a) – public safety

The locations of public drinking water supply abstractions are withheld from release under the terms of Regulation 10(5)(a) of the EIRs, the text of which is reproduced below.

10 (5) A Scottish public authority may refuse to make environmental information available to the extent that its disclosure would, or would be likely to, prejudice substantially, (a) international relations, defence, national security or public safety;

A public interest test was carried out in relation to this exemption. We acknowledge that there is a presumption in favour of disclosure under Regulation 10(2)(b) of the EIRs and that SEPA is a taxpayer funded public body with a duty to be open and transparent.

It is not in the public interest, however, for SEPA to release information, such as the location of public drinking water supplies, which would be likely to prejudice substantially public safety.

On balance, we consider that the public interest in releasing the information is outweighed by the public interest in maintaining the exception and therefore the information is withheld under Regulation 10(5)(a) of the EIRs.

Regulation 10(5)(c) – Intellectual property rights - Flood level information and/or models which underly Flood Maps

Flood level information and/or models which underly our Flood Maps is withheld under Regulation 10(5)(c) of the EIRs, the text of which is reproduced below.

(5) A Scottish public authority may refuse to make environmental information available to the extent that its disclosure would, or would be likely to, prejudice substantially;- (c) Intellectual property rights;

A public interest test was carried out in relation to this exemption. We acknowledge that there is a presumption in favour of disclosure under Regulation 10(2)(b) of the EIRs and that SEPA is a taxpayer funded public body with a duty to be open and transparent. We also acknowledge providing underlying modelling could support others to make decisions/ understand and apply to their own flood modelling, providing consistency across projects.

The release of the flood level information and/or models which underly our Flood Maps would be likely to prejudice substantially the intellectual property rights of the license holders, as well as the relationship between SEPA and the license holders. While it is in the public interest for SEPA to be open and transparent, it is not in the public interest for SEPA to compromise its access to datasets that are crucial for it to fulfil its statutory duty with regards to flood risk and forecasting.

On balance, we consider that the public interest in releasing the information is outweighed by the public interest in maintaining the exception and therefore the information is withheld under Regulation 10(5)(c) of the EIRs.

Regulation 14(1)(b) – Other authority

As we do not hold the information requested, but believe that another organisation may, Regulation 14(1)(b) of the EIRs applies. The text of which is reproduced below.

14(1) Where a Scottish public authority has received a request to make environmental information available and does not hold that information but believes that another public authority holds the information requested then it shall (b) supply the applicant with the name and address of that other authority,

Contact details:

Customer Services

West Lothian Council

West Lothian Civic Centre

Howden South Road

Livingston

West Lothian

EH54 6FF

Email: customer.service@westlothian.gov.uk

Website: www.westlothian.gov.uk/freedom-of-information

What to expect when making a Request for Information

Each request for information, under The Environmental Information (Scotland) Regulations 2004 or the Freedom of Information (Scotland) Act 2002, is formally logged by the authority. The request falls within a process that has two internal stages carried out by the authority; a right of appeal to the Scottish Information Commissioner followed by an appeal to the Court of Session on a point of law only.

•Stage 1 – Request for information
•Stage 2 – Formal Review
•Stage 3 – Appeal for decision by Scottish Information Commissioner (OSIC)
•Stage 4 – Appeal to the Court of Session on a point of law only.

Each enquiry will have a unique Reference Number which should be quoted when you contact us.

How you will be kept informed

You will receive an acknowledgement for your request and Formal Review. We aim to reply to all enquiries promptly, within 20 working days. You will receive a response along with the requested information and/or an explanation regarding any withheld information. We may also contact you if we require clarification or if we are issuing a fees notice.

What happens once your enquiry has been responded to?

If you are not happy with the response or have failed to receive a response, you have the right to request a Formal Review from SEPA.

Guidance on your rights and how to ask for a review is on the Scottish Information Commissioner's website; www.foi.scot/asking-for-a-review

We will ensure that all personal data is processed, recorded and retained in accordance with the requirements of the Data Protection Act 2018 throughout the handling of each request. You have a right to see information about yourself via submitting a Subject Access Request under the Data Protection Act 2018.

What to do if you are not happy with how your enquiry and review were handled

If you are unsatisfied with our Formal Review response or have failed to receive a response, you can then appeal to the Scottish Information Commissioner via the links below.

www.foi.scot/appeal
www.foi.scot/contact-us

Should you wish to appeal against the Scottish Information Commissioner's decision, you have the right to appeal to the Court of Session on a point of law only. Any such appeal must be made within 42 days after the date of intimation of the decision.

Annex C Greenfield ReFH2 Outputs

Technical Appendix 2.5: Flood Risk & Drainage Impact Assessment

Kirknewton Solar & BESS EIA Report

Trio Power Limited

SLR Project No.: 405.065786.00001

27 October 2025

UK Design Flood Estimation

Generated on 25 September 2025 16:29:41 by ahay
Printed from the ReFH2 Flood Modelling software package, version 4.1.8985.14298

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details Checksum: 3E24-C9F2

Site name: FEH_Point_Descriptors_310461_664806_v5_0_1

Easting: 310461

Northing: 664806

Country: Scotland

Catchment Area (km²): 0 [0.5]*

Using plot scale calculations: Yes

Model: 2.3

Site description: None

Model run: 1 year

Summary of results

Rainfall - FEH22 (mm):	21.92	Total runoff (ML):	0.03
Total Rainfall (mm):	16.53	Total flow (ML):	0.06
Peak Rainfall (mm):	3.22	Peak flow (m³/s):	0.00

Parameters

Where the user has overriden a system-generated value, this original value is shown in square brackets after the value used.
** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH22)

Name	Value	User-defined?
Duration (hh:mm:ss)	06:30:00	No
Timestep (hh:mm:ss)	00:30:00	No
SCF (Seasonal correction factor)	0.75	No
ARF (Areal reduction factor)	1 [1]	Yes
Seasonality	Winter	No

Loss model parameters

Name	Value	User-defined?
Cini (mm)	146.07	No
Cmax (mm)	302.74	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	3.7 [3.51]	Yes
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m^3/s)	0	No
BL (hr)	23.67 [12.03]	Yes
BR	0.96	No

Urbanisation parameters

Name	Value	User-defined?
Sewer capacity (m^3/s)	0	No
Exporting drained area (km^2)	0	No
Urban area (km^2)	0	No
Effective URBEXT2000	0	n/a
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m^3/s)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
00:00:00	0.2943	0.0000	0.1421	0.0000	0.00017	0.00017
00:30:00	0.4556	0.0000	0.2206	0.0000	0.000166	0.000168
01:00:00	0.7031	0.0000	0.3418	0.0000	0.000163	0.000171
01:30:00	1.0800	0.0000	0.5282	0.0000	0.00016	0.00018
02:00:00	1.6471	0.0000	0.8130	0.0000	0.000157	0.0002
02:30:00	2.4753	0.0000	1.2386	0.0001	0.000155	0.000237
03:00:00	3.2239	0.0000	1.6435	0.0001	0.000154	0.0003
03:30:00	2.4753	0.0000	1.2852	0.0002	0.000155	0.000398
04:00:00	1.6471	0.0000	0.8664	0.0004	0.000158	0.000533
04:30:00	1.0800	0.0000	0.5730	0.0005	0.000164	0.00069
05:00:00	0.7031	0.0000	0.3751	0.0007	0.000172	0.000859
05:30:00	0.4556	0.0000	0.2439	0.0008	0.000184	0.00103
06:00:00	0.2943	0.0000	0.1579	0.0010	0.000199	0.00119
06:30:00	0.0000	0.0000	0.0000	0.0011	0.000215	0.00132
07:00:00	0.0000	0.0000	0.0000	0.0012	0.000234	0.00141
07:30:00	0.0000	0.0000	0.0000	0.0012	0.000253	0.00144
08:00:00	0.0000	0.0000	0.0000	0.0011	0.000271	0.00142
08:30:00	0.0000	0.0000	0.0000	0.0011	0.000288	0.00137
09:00:00	0.0000	0.0000	0.0000	0.0010	0.000302	0.0013
09:30:00	0.0000	0.0000	0.0000	0.0009	0.000315	0.00122
10:00:00	0.0000	0.0000	0.0000	0.0008	0.000326	0.00113
10:30:00	0.0000	0.0000	0.0000	0.0007	0.000334	0.00105
11:00:00	0.0000	0.0000	0.0000	0.0006	0.000341	0.000971
11:30:00	0.0000	0.0000	0.0000	0.0006	0.000346	0.000903
12:00:00	0.0000	0.0000	0.0000	0.0005	0.000349	0.000842
12:30:00	0.0000	0.0000	0.0000	0.0004	0.000351	0.000784
13:00:00	0.0000	0.0000	0.0000	0.0004	0.000352	0.000729
13:30:00	0.0000	0.0000	0.0000	0.0003	0.000352	0.000675
14:00:00	0.0000	0.0000	0.0000	0.0003	0.00035	0.000622
14:30:00	0.0000	0.0000	0.0000	0.0002	0.000348	0.00057
15:00:00	0.0000	0.0000	0.0000	0.0002	0.000344	0.000518
15:30:00	0.0000	0.0000	0.0000	0.0001	0.00034	0.000469
16:00:00	0.0000	0.0000	0.0000	0.0001	0.000335	0.000425
16:30:00	0.0000	0.0000	0.0000	0.0001	0.00033	0.000387

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m^3/s)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
17:00:00	0.0000	0.0000	0.0000	0.0000	0.000324	0.000357
17:30:00	0.0000	0.0000	0.0000	0.0000	0.000318	0.000336
18:00:00	0.0000	0.0000	0.0000	0.0000	0.000311	0.000321
18:30:00	0.0000	0.0000	0.0000	0.0000	0.000305	0.000309
19:00:00	0.0000	0.0000	0.0000	0.0000	0.000299	0.0003
19:30:00	0.0000	0.0000	0.0000	0.0000	0.000292	0.000293
20:00:00	0.0000	0.0000	0.0000	0.0000	0.000286	0.000286
20:30:00	0.0000	0.0000	0.0000	0.0000	0.00028	0.00028
21:00:00	0.0000	0.0000	0.0000	0.0000	0.000274	0.000274
21:30:00	0.0000	0.0000	0.0000	0.0000	0.000269	0.000269
22:00:00	0.0000	0.0000	0.0000	0.0000	0.000263	0.000263
22:30:00	0.0000	0.0000	0.0000	0.0000	0.000258	0.000258
23:00:00	0.0000	0.0000	0.0000	0.0000	0.000252	0.000252
23:30:00	0.0000	0.0000	0.0000	0.0000	0.000247	0.000247
24:00:00	0.0000	0.0000	0.0000	0.0000	0.000242	0.000242
24:30:00	0.0000	0.0000	0.0000	0.0000	0.000237	0.000237
25:00:00	0.0000	0.0000	0.0000	0.0000	0.000232	0.000232
25:30:00	0.0000	0.0000	0.0000	0.0000	0.000227	0.000227
26:00:00	0.0000	0.0000	0.0000	0.0000	0.000222	0.000222
26:30:00	0.0000	0.0000	0.0000	0.0000	0.000218	0.000218
27:00:00	0.0000	0.0000	0.0000	0.0000	0.000213	0.000213
27:30:00	0.0000	0.0000	0.0000	0.0000	0.000209	0.000209
28:00:00	0.0000	0.0000	0.0000	0.0000	0.000204	0.000204
28:30:00	0.0000	0.0000	0.0000	0.0000	0.0002	0.0002
29:00:00	0.0000	0.0000	0.0000	0.0000	0.000196	0.000196
29:30:00	0.0000	0.0000	0.0000	0.0000	0.000192	0.000192
30:00:00	0.0000	0.0000	0.0000	0.0000	0.000188	0.000188
30:30:00	0.0000	0.0000	0.0000	0.0000	0.000184	0.000184
31:00:00	0.0000	0.0000	0.0000	0.0000	0.00018	0.00018
31:30:00	0.0000	0.0000	0.0000	0.0000	0.000176	0.000176
32:00:00	0.0000	0.0000	0.0000	0.0000	0.000172	0.000172

Appendix

Catchment descriptors *

Name	Value	User-defined value used?
BFIHOST	0.32	No
BFIHOST19	0.34	No
PROPWET	0.49	No
SAAR (mm)	877	No

Values in square brackets are the original values loaded from the FEH Web Service or FEH CD-ROM

Printed from the ReFH2 Flood Modelling software package, version 4.1.8985.14298

UK Design Flood Estimation

Generated on 25 September 2025 16:28:07 by ahay
Printed from the ReFH2 Flood Modelling software package, version 4.1.8985.14298

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details Checksum: 3E24-C9F2

Site name: FEH_Point_Descriptors_310461_664806_v5_0_1

Easting: 310461

Northing: 664806

Country: Scotland

Catchment Area (km²): 0 [0.5]*

Using plot scale calculations: Yes

Model: 2.3

Site description: None

Model run: 200 year 1.39 CC

Summary of results

Rainfall - FEH22 (mm):	94.00	Total runoff (ML):	0.15
Total Rainfall (mm):	70.90	Total flow (ML):	0.26
Peak Rainfall (mm):	13.82	Peak flow (m³/s):	0.01

Parameters

Where the user has overriden a system-generated value, this original value is shown in square brackets after the value used.
** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH22)

Name	Value	User-defined?
Duration (hh:mm:ss)	06:30:00	No
Timestep (hh:mm:ss)	00:30:00	No
SCF (Seasonal correction factor)	0.75	No
ARF (Areal reduction factor)	1 [1]	Yes
Seasonality	Winter	No
Climate change factor	1.39	Yes

Loss model parameters

Name	Value	User-defined?
Cini (mm)	146.07	No
Cmax (mm)	302.74	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	3.7 [3.51]	Yes
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m^3/s)	0	No
BL (hr)	23.67 [12.03]	Yes
BR	0.67	No

Urbanisation parameters

Name	Value	User-defined?
Sewer capacity (m^3/s)	0	No
Exporting drained area (km^2)	0	No
Urban area (km^2)	0	No
Effective URBEXT2000	0	n/a
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m^3/s)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
00:00:00	1.2617	0.0000	0.6114	0.0000	0.00017	0.00017
00:30:00	1.9537	0.0000	0.9571	0.0000	0.000166	0.000174
01:00:00	3.0149	0.0000	1.5017	0.0000	0.000163	0.000196
01:30:00	4.6310	0.0000	2.3652	0.0001	0.000161	0.000249
02:00:00	7.0624	0.0000	3.7434	0.0002	0.000159	0.000349
02:30:00	10.6137	0.0000	5.9355	0.0004	0.00016	0.000523
03:00:00	13.8234	0.0000	8.2884	0.0007	0.000163	0.000815
03:30:00	10.6137	0.0000	6.7922	0.0011	0.000172	0.00128
04:00:00	7.0624	0.0000	4.7258	0.0017	0.000189	0.00193
04:30:00	4.6310	0.0000	3.1882	0.0025	0.000214	0.0027
05:00:00	3.0149	0.0000	2.1137	0.0033	0.00025	0.00354
05:30:00	1.9537	0.0000	1.3857	0.0041	0.000296	0.00439
06:00:00	1.2617	0.0000	0.9016	0.0048	0.000353	0.0052
06:30:00	0.0000	0.0000	0.0000	0.0055	0.000417	0.00589
07:00:00	0.0000	0.0000	0.0000	0.0059	0.000488	0.00636
07:30:00	0.0000	0.0000	0.0000	0.0060	0.00056	0.00655
08:00:00	0.0000	0.0000	0.0000	0.0059	0.000631	0.00648
08:30:00	0.0000	0.0000	0.0000	0.0055	0.000698	0.00625
09:00:00	0.0000	0.0000	0.0000	0.0051	0.000758	0.0059
09:30:00	0.0000	0.0000	0.0000	0.0047	0.00081	0.00548
10:00:00	0.0000	0.0000	0.0000	0.0042	0.000855	0.00503
10:30:00	0.0000	0.0000	0.0000	0.0037	0.000892	0.00458
11:00:00	0.0000	0.0000	0.0000	0.0033	0.000922	0.00418
11:30:00	0.0000	0.0000	0.0000	0.0029	0.000945	0.00382
12:00:00	0.0000	0.0000	0.0000	0.0025	0.000963	0.00351
12:30:00	0.0000	0.0000	0.0000	0.0022	0.000977	0.00322
13:00:00	0.0000	0.0000	0.0000	0.0020	0.000985	0.00294
13:30:00	0.0000	0.0000	0.0000	0.0017	0.00099	0.00267
14:00:00	0.0000	0.0000	0.0000	0.0014	0.000991	0.00241
14:30:00	0.0000	0.0000	0.0000	0.0012	0.000989	0.00216
15:00:00	0.0000	0.0000	0.0000	0.0009	0.000982	0.00191
15:30:00	0.0000	0.0000	0.0000	0.0007	0.000973	0.00167
16:00:00	0.0000	0.0000	0.0000	0.0005	0.000961	0.00145
16:30:00	0.0000	0.0000	0.0000	0.0003	0.000947	0.00126

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m^3/s)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
17:00:00	0.0000	0.0000	0.0000	0.0002	0.00093	0.00112
17:30:00	0.0000	0.0000	0.0000	0.0001	0.000913	0.00102
18:00:00	0.0000	0.0000	0.0000	0.0001	0.000895	0.000949
18:30:00	0.0000	0.0000	0.0000	0.0000	0.000877	0.000901
19:00:00	0.0000	0.0000	0.0000	0.0000	0.000859	0.000867
19:30:00	0.0000	0.0000	0.0000	0.0000	0.000841	0.000842
20:00:00	0.0000	0.0000	0.0000	0.0000	0.000823	0.000823
20:30:00	0.0000	0.0000	0.0000	0.0000	0.000806	0.000806
21:00:00	0.0000	0.0000	0.0000	0.0000	0.000789	0.000789
21:30:00	0.0000	0.0000	0.0000	0.0000	0.000773	0.000773
22:00:00	0.0000	0.0000	0.0000	0.0000	0.000757	0.000757
22:30:00	0.0000	0.0000	0.0000	0.0000	0.000741	0.000741
23:00:00	0.0000	0.0000	0.0000	0.0000	0.000725	0.000725
23:30:00	0.0000	0.0000	0.0000	0.0000	0.00071	0.00071
24:00:00	0.0000	0.0000	0.0000	0.0000	0.000695	0.000695
24:30:00	0.0000	0.0000	0.0000	0.0000	0.000681	0.000681
25:00:00	0.0000	0.0000	0.0000	0.0000	0.000667	0.000667
25:30:00	0.0000	0.0000	0.0000	0.0000	0.000653	0.000653
26:00:00	0.0000	0.0000	0.0000	0.0000	0.000639	0.000639
26:30:00	0.0000	0.0000	0.0000	0.0000	0.000626	0.000626
27:00:00	0.0000	0.0000	0.0000	0.0000	0.000613	0.000613
27:30:00	0.0000	0.0000	0.0000	0.0000	0.0006	0.0006
28:00:00	0.0000	0.0000	0.0000	0.0000	0.000587	0.000587
28:30:00	0.0000	0.0000	0.0000	0.0000	0.000575	0.000575
29:00:00	0.0000	0.0000	0.0000	0.0000	0.000563	0.000563
29:30:00	0.0000	0.0000	0.0000	0.0000	0.000551	0.000551
30:00:00	0.0000	0.0000	0.0000	0.0000	0.00054	0.00054
30:30:00	0.0000	0.0000	0.0000	0.0000	0.000528	0.000528
31:00:00	0.0000	0.0000	0.0000	0.0000	0.000517	0.000517
31:30:00	0.0000	0.0000	0.0000	0.0000	0.000506	0.000506
32:00:00	0.0000	0.0000	0.0000	0.0000	0.000496	0.000496
32:30:00	0.0000	0.0000	0.0000	0.0000	0.000486	0.000486
33:00:00	0.0000	0.0000	0.0000	0.0000	0.000475	0.000475
33:30:00	0.0000	0.0000	0.0000	0.0000	0.000465	0.000465
34:00:00	0.0000	0.0000	0.0000	0.0000	0.000456	0.000456

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m^3/s)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
34:30:00	0.0000	0.0000	0.0000	0.0000	0.000446	0.000446
35:00:00	0.0000	0.0000	0.0000	0.0000	0.000437	0.000437
35:30:00	0.0000	0.0000	0.0000	0.0000	0.000428	0.000428
36:00:00	0.0000	0.0000	0.0000	0.0000	0.000419	0.000419
36:30:00	0.0000	0.0000	0.0000	0.0000	0.00041	0.00041
37:00:00	0.0000	0.0000	0.0000	0.0000	0.000401	0.000401
37:30:00	0.0000	0.0000	0.0000	0.0000	0.000393	0.000393
38:00:00	0.0000	0.0000	0.0000	0.0000	0.000385	0.000385
38:30:00	0.0000	0.0000	0.0000	0.0000	0.000377	0.000377
39:00:00	0.0000	0.0000	0.0000	0.0000	0.000369	0.000369
39:30:00	0.0000	0.0000	0.0000	0.0000	0.000361	0.000361
40:00:00	0.0000	0.0000	0.0000	0.0000	0.000354	0.000354
40:30:00	0.0000	0.0000	0.0000	0.0000	0.000346	0.000346
41:00:00	0.0000	0.0000	0.0000	0.0000	0.000339	0.000339
41:30:00	0.0000	0.0000	0.0000	0.0000	0.000332	0.000332
42:00:00	0.0000	0.0000	0.0000	0.0000	0.000325	0.000325
42:30:00	0.0000	0.0000	0.0000	0.0000	0.000318	0.000318
43:00:00	0.0000	0.0000	0.0000	0.0000	0.000312	0.000312
43:30:00	0.0000	0.0000	0.0000	0.0000	0.000305	0.000305
44:00:00	0.0000	0.0000	0.0000	0.0000	0.000299	0.000299
44:30:00	0.0000	0.0000	0.0000	0.0000	0.000292	0.000292
45:00:00	0.0000	0.0000	0.0000	0.0000	0.000286	0.000286
45:30:00	0.0000	0.0000	0.0000	0.0000	0.00028	0.00028
46:00:00	0.0000	0.0000	0.0000	0.0000	0.000275	0.000275
46:30:00	0.0000	0.0000	0.0000	0.0000	0.000269	0.000269
47:00:00	0.0000	0.0000	0.0000	0.0000	0.000263	0.000263
47:30:00	0.0000	0.0000	0.0000	0.0000	0.000258	0.000258
48:00:00	0.0000	0.0000	0.0000	0.0000	0.000252	0.000252
48:30:00	0.0000	0.0000	0.0000	0.0000	0.000247	0.000247
49:00:00	0.0000	0.0000	0.0000	0.0000	0.000242	0.000242
49:30:00	0.0000	0.0000	0.0000	0.0000	0.000237	0.000237
50:00:00	0.0000	0.0000	0.0000	0.0000	0.000232	0.000232
50:30:00	0.0000	0.0000	0.0000	0.0000	0.000227	0.000227
51:00:00	0.0000	0.0000	0.0000	0.0000	0.000222	0.000222
51:30:00	0.0000	0.0000	0.0000	0.0000	0.000218	0.000218

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (m^3/s)	Net Rain (mm)	Runoff (m^3/s)	Baseflow (m^3/s)	Total Flow (m^3/s)
52:00:00	0.0000	0.0000	0.0000	0.0000	0.000213	0.000213
52:30:00	0.0000	0.0000	0.0000	0.0000	0.000209	0.000209
53:00:00	0.0000	0.0000	0.0000	0.0000	0.000204	0.000204
53:30:00	0.0000	0.0000	0.0000	0.0000	0.0002	0.0002
54:00:00	0.0000	0.0000	0.0000	0.0000	0.000196	0.000196
54:30:00	0.0000	0.0000	0.0000	0.0000	0.000192	0.000192
55:00:00	0.0000	0.0000	0.0000	0.0000	0.000188	0.000188
55:30:00	0.0000	0.0000	0.0000	0.0000	0.000184	0.000184
56:00:00	0.0000	0.0000	0.0000	0.0000	0.00018	0.00018
56:30:00	0.0000	0.0000	0.0000	0.0000	0.000176	0.000176
57:00:00	0.0000	0.0000	0.0000	0.0000	0.000172	0.000172

Appendix

Catchment descriptors *

Name	Value	User-defined value used?
BFIHOST	0.32	No
BFIHOST19	0.34	No
PROPWET	0.49	No
SAAR (mm)	877	No

Values in square brackets are the original values loaded from the FEH Web Service or FEH CD-ROM

Annex D Causeway Flow Results – BESS Detention Basin

Technical Appendix 2.5: Flood Risk & Drainage Impact Assessment

Kirknewton Solar & BESS EIA Report

Trio Power Limited

SLR Project No.: 405.065786.00001

27 October 2025

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	30	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	3.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	Cover Level (m)	Easting (m)	Northing (m)	Depth (m)
Detention Basin	0.620	217.000	32.618	30.702	1.850

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	0.750	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	0.840	Additional Storage (m³/ha)	20.0		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
10	0	0	0
10	39	0	0
30	0	0	0
30	39	0	0
200	0	0	0
200	39	0	0
1000	0	0	0
1000	25	0	0
1000	39	0	0
1000	45	0	0
1000	50	0	0
1000	100	0	80

Node Detention Basin Offline Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Loop to Node		Sump Available	✓
Invert Level (m)	215.150	Product Number	CTL-SHE-0056-1400-1000-1400
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.4	Min Node Diameter (mm)	1200

Node Detention Basin Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	215.150
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	