Annex 6 Flood Risk and Drainage Assessment

Mey BESS

Flood Risk & Drainage Assessment Report

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1. Introduction

1.1 Preamble

Gondolin Land and Water Ltd (Gondolin) has been appointed by ITP Energised on behalf of Simec Atlantis Energy (the Client) to undertake a Flood Risk and Drainage Assessment (FRDA) to support a planning application for a Battery Energy Storage Site (BESS) near the village of Mey, Caithness at a site known as Mey BESS.

The site was visited by an experienced Hydrologist and Civil Engineer in July 2023 in to inform this assessment.

This report addresses any potential flood risk to the proposed developments from all possible sources in accordance with best practice and in accordance with guidance presented within the National Planning Framework for Scotland 4 (NPF4)[1].

This report provides the relevant design information for the proposed site surface water drainage / SuDS scheme taking due cognisance of local / national drainage design guidance (CIRIA Report C753) and The Highland Council (THC) specific guidance[2].

Competed THC compliance certificate and SEPA flood risk assessment checklist are included as Appendix C to this report.

1.2 Site Context

The site is located approximately 1km southeast of the village Mey at approximate National Grid Reference (NGR): ND 29603 72351.

Access to the site is via an unnamed road to the immediate north of the site boundary, which ultimately connects to the A836.

The site comprises agricultural / rough grazing land, bound by woodland to the west. The site is predominately surrounded by further agricultural / rough grazing land.

A site location planning is included as Drawing FRDA-001.

1.3 Development Details

The proposed development is for up to 300 MW containerised battery units, c. 2.6 m high with a total site area of approximately 10 ha. In addition, a proposed building c. 6 m high which will house a 132 kV transformer, security fencing and landscaping works to include Biodiversity Net Gain.

The proposed development will connect to the national grid at the recently consented Gills Bay switching station which is located directly adjacent to the site.

The proposed development plan is included in Appendix A.

1.4 Topography

OS Terrain 5 data has been review and included within the relevant drawings appended to this report. The site falls in a predominantly northern direction with maximum elevations located within the southern site area at approximately 44.5mAOD. The lowest elevations are within the northern site area at approximately 41.0mAOD.

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[1] The Scottish Government (2023) National Planning Framework 4, February 2023
[2] The Highland Council (2013) Flood Risk & Drainage Impact Supplementary Guidance

1.5 Geology and Hydrogeology

1.5.1 Geology

1.5.1.1 Superficial

Review of the British Geological Survey (BGS) online geology maps[3] indicates the site is located within an area of Devensian age Till, comprising Diamicton (poorly sorted sediments ranging from clay to boulders in size). There are records of Peat and localised Hummocky (moundy) Glacial Deposits of Diamiction, sand and gravel in the surrounding area. There are no nearby BGS borehole logs to confirm the local geology underlying the site.

1.5.1.2 Bedrock

Review of the BGS online geology maps indicates that the bedrock geology underlying the site is encompassed by the sedimentary Mey Flagstone Formation, comprising sandstone, siltstone and mudstone of Devonian age. There are no nearby BGS borehole logs to confirm the local geology underlying the site.

1.5.2 Hydrogeology

Review of the BGS online hydrogeology maps indicates that the underlying bedrock geology is a moderately productive aquifer characterised by sandstones, in places flaggy, with siltstones, mudstones and conglomerates as well as interbedded lavas, locally yielding small amounts of groundwater with the flow mechanism predominantly being through fractures and other discontinuities.

1.6 Local Hydrology

Review of the Flood Estimation Handbook (FEH) Web Service[4] and other available mapping shows there are no major watercourses within the development area. Several minor drains are noted along the site boundary in addition to a minor drain running through the site from southwest to northeast.

The local minor drain network drains the existing land towards the northeast into a main drain along the unnamed road which conveys flows to the northeast and eventually discharging to the Pentland Firth.

Drawing FRDA-002 provides hydrological overview for the site and immediate surroundings.

2. Planning & Policy Context

2.1 Overview

This assessment has been completed in accordance with guidance presented within NPF4 and taking cognisance of the Flood Risk Management (Scotland) Act 2009.

The assessment also references and takes due consideration (where appropriate) of the following principal guidance and policy documents:

- CIRIA (2004) Development and Flood Risk – Guidance for the Construction Industry, Report C624;
- Local Flood Risk Management Plan (Cycle 1 2016-2022), Highland & Argyll Local Plan District, June 2016;
- Highland and Argyll Local Flood Risk Management Plan (2022 – 2028);
- British Standards Institution (2017) Assessing and Managing Flood Risk in Development – Code of Practice, Report BS-8533:2017;

[3] British Geological Survey (2023) Natural Environment Research Council – GeoIndex (onshore) online BGS Map Viewers, available at: https://www.bgs.ac.uk/map-viewers/geoindex-onshore/ (accessed on 24th September 2023)
[4] UK Centre for Ecology and Hydrology (2022) Flood Estimation handbook Web Service, available at: https://fehweb.ceh.ac.uk/ (accessed on 27th September 2023)

- Scottish Environment Protection Agency (2018) Flood Risk and Land Use Vulnerability Guidance (Reference: LUPS-GU24), Version 4, July 2018;
- Scottish Environment Protection Agency (2018) SEPA Development Plan Guidance Note 2a: Development Management Guidance: Flood Risk (Reference: LUPS-DM-GU2a), Version 2, July 2018;
- Scottish Environment Protection Agency (2023) Climate Change Allowances for Flood Risk Assessment in Land Use Planning (Reference: LUPS-CC1), Version 3, April 2023;
- Scottish Environment Protection Agency Flood Risk Management Plan Highland and Argyll Local Plan District (2021); and
- Scottish Environment Protection Agency (2022) Technical Flood Risk Guidance for Stakeholders (Reference: SS-NFR-P-002) June 2022.

It is noted that the recent release of NP4 has resulted in potential incompatibility of current SEPA and other stakeholder guidance documents with regards to flood risk assessment in particular. SEPA have acknowledged that their current guidance documents are currently being reviewed / updated to align with NPF4 and information contained within their documents may no longer be valid.

2.2 National Planning Framework

This report has been prepared in accordance with NPF4 Policy 22 relating to Flood Risk and Water Management, which states:

*"**Policy Intent:***

To strengthen resilience to flood risk by promoting avoidance as a first principle and reducing the vulnerability of existing and future development to flooding.

Policy Outcomes:

- *Places are resilient to current and future flood risk.*
- *Water resources are used efficiently and sustainably.*
- *Wider use of natural flood risk management benefits people and nature."*

Furthermore, NP4 states that development proposals at risk of flooding or in a flood risk area will only be supported if they are for:

- *"Essential infrastructure where the location is required for operational reasons;*
- *Water compatible uses;*
- *Redevelopment of an existing building or site for an equal or less vulnerable use; or.*
- *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 longterm safety and resilience can be secured in accordance with relevant SEPA advice".*

2.3 SEPA Flood Risk and Land Use Vulnerability Guidance

2.3.1 Context

This guidance outlines how SEPA assess the vulnerability to flooding of different land use with the following categories:

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

The following paragraphs are extracted from the guidance for context:

"This guidance classifies land uses according to how they are impacted by flooding, i.e. their relative susceptibility and resilience to flooding, and any wider community impacts caused by their damage or loss.

The classification recognises that certain types of development, and the people who use and live in them, are more at risk from flooding than others (e.g. children, the elderly and people with mobility problems that may have more difficulty in escaping fast flowing water).

The term 'land use vulnerability' is used in this guidance to differentiate between a range of land uses, taking account of flooding impacts on land uses in terms of their relative susceptibility and resilience to flooding. It also reflects wider community impacts caused by their damage or loss. For example, a police station is not more likely to suffer damage (be susceptible) or less able to recover (be resilient) than a comparable office building. However, it is in a more vulnerable category than an office use because a higher value is placed upon the wider community impacts that would be caused by its potential loss or damage during a flood event. Similar considerations apply to the inclusion of hazardous waste facilities within the highly vulnerable category and other waste treatment facilities being within the less vulnerable category."

2.3.2 Proposed Development Suitability

With reference to Table 1 (SEPA Land Use Vulnerability Classification)[5] of the guidance the proposed developed is considered **Essential Infrastructure** category.

With reference to Table 2 (SEPA Matrix of Flood Risk) of the guidance, the proposed **Essential Infrastructure** development is suitable within any fluvial flood risk zone, however, for sites located in 'medium' to 'high' risk (i.e. >0.5% AEP) within sparsely developed and / or undeveloped areas the following criteria applies:

- *"Generally suitable where a flood risk location is required for operational reasons and an alternative lower-risk location, is not available – development should be designed and constructed to be operational during floods (i.e. 0.5% AEP), and not impede water flow."*

3. Flood Risk Assessment

3.1 Screening Assessment of Potential Source of Flood Risk

3.1.1 Overview

There are a number of potential sources of flooding which should be evaluated in accordance with best practice and NPF4 such as:

- Flooding from rivers or fluvial flooding;
- Flooding from the sea or tidal / coastal flooding;
- Flooding from land;
- Flooding from groundwater;
- Flooding from sewers; and
- Flooding from reservoirs, canals, and other artificial sources.

The flood risk from each of these potential sources is discussed in the following sections and a 'screening assessment' is presented in Section 3.1.8 which confirms any potential flood risk sources requiring a more detailed analysis and specification of bespoke mitigation measures.

Flood 'risk' definitions within the screening exercise are based on a qualitative technical assessment taking into account the information reviewed, risk to site users and the Proposed Development itself.

5 Scottish Environment Protection Agency (2018): Flood Risk and Land Use Vulnerability Guidance

3.1.2 Fluvial Flooding

Review of SEPA's Online Flood Map[6] for Fluvial Flooding at the site indicates that the site does not fall within an area susceptible to flooding from this source. SEPA's river flood maps do not include modelling of flooding from smaller watercourses with a catchment area of less than 3km². As the local minor drains are below this threshold, no fluvial flood risk is identified for these watercourses. These minor drains all readily convey flow away from site, following the topography of the local area.

Taking this into account it is considered that there is '**Low Risk**' of fluvial flooding to the site and therefore will not considered further in the assessment.

3.1.3 Tidal/Coastal Flooding

Review of SEPA's Coastal Flooding Map for the site indicates that the site is located sufficiently inland from tidally influenced waters and the coast, thus is not subject to tidal or coastal flood risk and designated as **'Low Risk'** to the site.

Flooding from this source is therefore not considered further in the assessment.

3.1.4 Flooding from Land (Pluvial or Surface Water Flooding)

Review of SEPA Surface Water Flood Map shows no area of significant surface water accumulation within or upgradient of the site boundary. Due to the topography of the site sloping generally to the north, any surface water run-off would readily flow off site or be intercepted by one of the existing minor drains and conveyed downgradient of the site.

Taking the above into account it is considered that there is '**Low Risk'** of surface water flooding to the site and is therefore not considered further.

3.1.5 Groundwater Flooding

Review of SEPA's Groundwater Flood Map shows that the site and surrounding area are not located in an area identified to be at risk of groundwater flooding.

Taking the above into account it is considered that the development site is at **'Low Risk'** of groundwater flooding and therefore this source is not considered further in the assessment.

3.1.6 Flooding from Sewers / Drainage Systems

Given the rural nature of the development, no public sewers are located within the immediate vicinity.

Taking the above into account it is considered that there is **'No Risk'** of flooding to the site from sewers and drainage systems and therefore this source is not considered further in the assessment.

3.1.7 Flooding from Infrastructure Failure / Blockage

Review of SEPA's Reservoir Flood Mapping indicates that there are no significant impoundments of water immediately upgradient and in hydraulic continuity with the site which would pose a flood risk to the site in the event of failure.

There are no other known water infrastructure features at / in proximity to the site which would pose a material flood risk in the event of failure.

As such it is considered that the development site is at **'No Risk'** of flooding from this source and therefore is not considered further in the assessment.

3.1.8 Flood Risk Screening Assessment Review

A summary of the potential flood risk to the site from the sources reviewed in presented in Table 1 below.

[6] SEPA Flood Maps (2023), available at: https://www.sepa.org.uk/environment/water/flooding/flood-maps/ (accessed on 24th July 2023)

This 'Screening Assessment' is used to identify if any sources of flood risk are required to be investigated in more detail i.e., a 'Technical' more detailed assessment which would include consideration / specification of bespoke flood mitigation measures for the site development.

Table 1 Flood Risk Screening Assessment

Potential Flood Source	Screening Assessment of Flood Risk at Site[1]	Requiring Further Consideration i.e. Technical Assessment?
Fluvial flooding	Low Risk	No
Tidal flooding	Low Risk	No
Flooding from land	Low Risk	No
Groundwater flooding	Low Risk	No
Flooding from sewers / artificial drains	No Risk	No
Flooding due to infrastructure failure / blockage	No Risk	No

Notes: [1]only Flood Risks designated as being 'Medium' or 'High' warrant further investigation

The Screening Assessment confirms that all potential sources of flooding are considered to have 'No' or 'Low' risk of flooding to the site and therefore no further assessment is required.

3.2 Climate Change

3.2.1 Context

The most recent Climate Change (CC) projections published by The UK Climate Impacts Programme are presented in report 'UKCP18'. Central estimates published in UKCP18 indicate marked increases in winter rainfall and decrease in summer rainfall but with more intense storms under all CO2 emissions scenarios across the majority of the country.

SEPA's most recent climate change allowances were published in April 2023[7] and are based on UKCP18 findings in conjunction with The Centre for Ecology and Hydrology's (CEH) 2020 study[8].

A climate change allowance in drainage and flood risk assessment terms is a prediction of anticipated change in peak river flow, peak rainfall intensity and sea level rise caused by future climate change.

The allowances applied for sea level rise, peak river flow and peak rainfall intensity are determined by river basin regions across Scotland. SEPA have developed a web map[9] to allow any location in Scotland to be identified for its applicable river basin region and respective climate change uplift allowances.

3.2.2 Peak River Flow

With reference to SEPA's online map service, the site is located within the North Highland basin region. The peak river flow allowance until 2100 for this region is a 40% uplift.

This increase in peak river flows will not increase the fluvial flood risk to the site due to the absence of larger watercourses within the area (to which the peak river flow uplifts are applied to).

3.2.3 Peak Rainfall Intensity

Using SEPA's online map service, the site is located within the North Highland Basin region of Scotland. The peak rainfall intensity allowance until 2100 for this region is a 42% uplift.

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[7] Scottish Environment Protection Agency (2019) Climate change allowances for flood risk assessment in land use planning
[8] Centre for Ecology & Hydrology (2021) Climate change impacts on peak river flows: Combining national-scale hydrological modelling and probabilistic projections
[9] SEPA Climate Change Allowances for Flood Risk Assessment in Land Use Planning: https://scottishepa.maps.arcgis.com/apps/webappviewer/index.html?id=2ddf84e295334f6b93bd0dbbb9ad7417 (accessed on 24th July 2023)

This increased rainfall intensity is appropriately factored into the proposed SuDS strategy / drainage design.

3.2.4 Sea Level Rise

Using SEPA's online map service, the site is located within the North Highland basin region. The cumulative sea level rise allowance until 2100 for this region is a 0.89m uplift.

This increase in predicted Sea Level rise will not increase the coastal flood risk to the site due to the distance from the site to the closest tidally influenced waters.

4. Proposed Surface Water Drainage Design

4.1 Sustainable Drainage Systems (SuDS)

To satisfy the requirements of current best national / local flood risk and surface water management guidance, SuDS are required to be incorporated into the design proposals to manage, attenuate, and treat surface water runoff before discharging from the site.

Current best practice guidance relating to sustainable surface water management is outlined in the SuDS Manual (CIRIA Report C753) which provides details on the use of SuDS for managing surface water runoff.

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

- 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, permeable paving and green roofs).
- Site Control – management of water from several sub-catchments (including routing water from roofs and car parks to one / several soakaways or attenuation ponds for the whole site).
- Regional Control – management of runoff from several sites, typically in a retention pond or wetland.

It is generally accepted that the implementation of SuDS as opposed to conventional drainage systems, provides several 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;
- improving amenity through the provision of public open spaces and providing biodiversity and wildlife habitat enhancements; and
- replicating natural drainage patterns, including the recharge of groundwater so that base flows are maintained.

4.2 Design Overview

The proposed drainage / SuDS scheme for the proposed development will comprise the management of surface water runoff from the proposed infrastructure areas and site tracks.

The proposed development will be drained via a herringbone drainage system conveying flows to a SuDS attenuation basin. The development area and site tracks will be constructed with semi-permeable materials to allow rainwater to infiltrate into the underlying makeup where it will be intercepted by the perforated pipework. The attenuation basin will provide suitable treatment and attenuation prior to discharge to the adjacent minor drain at the northeast corner of the site.

Given the siting of the proposed development, there is a risk of runoff from the upgradient undeveloped catchment impacting the development. As such it is proposed to capture these flows via an upgradient cut-off ditch that will discharge to the minor drain to the northeast of the site boundary. This approach mimics the existing hydrological regime of the site area albeit in a more formalised manner.

Drawing FRDA-003 provides an overview of the proposed drainage layout.

4.2.1 Drainage Discharge Locations

The hierarchy for favoured disposal options of surface water runoff from development sites is as follows:

1. Infiltration to Ground;
2. Discharge to Surface Waters; or
3. Discharge to Sewer.

Table 2 below discusses the disposal method suitability in the context of the site and proposed development.

Table 2 Suitability of Surface Water Disposal Methods

Surface Water Disposal Method	Suitability Description	Method Suitable? (Y/N)
Infiltration to Ground	Review of the site geology indicates that superficial deposits at the site are predominantly clay based and are likely to have limited infiltration potential. In addition, the wider local area is known to have peat deposits and local land is generally poorly draining as demonstrated by the presence of minor drains networks in the local area. Therefore, this site is deemed unsuitable for infiltration-based SuDS measures.	N
Surface Water Discharge	A minor drain network is located adjacent to the site boundary and downgradient, thus allowing for a gravity connection to be made.	Y
Sewer Discharge	No public sewers are located in the proximity and downgradient of the site to enable a connection to be made.	N

Taking the above into account it is proposed that surface water runoff from the development is discharged to the minor drain at along the site boundary to the northeast, replicating the existing site (natural) hydrological regime albeit in a more formalised manner.

4.2.2 Water Quantity Review

Greenfield runoff rates have been estimated through application of methodology outlined in IH R124[10] as set out within the Interim Code of Practice for SuDS (ICP).

The IH R124 method can be used to estimate Greenfield runoff release rates for a range of AEP events, or return periods, by applying regional growth curve factors to the mean annual peak runoff (i.e. QBAR).

The UK hydrological region for the local area is Region 1 therefore the appropriate growth curve factors for this region have been incorporated into the analysis undertaken in the MicroDrainage (2020) software suite[11].

[10] Institute of Hydrology Report No. 124 (1994) (IH R124), Flood estimation for small catchments, June 1994
[11] MicroDrainage (2020). WinDes Drainage Design and Modelling Software (Version 2020.1.3)

The catchment hydrological characteristics shown in below have been incorporated into the runoff modelling and results are presented below in Table 3 for a range of AEP storm events.

- Average Annual Rainfall (SAAR): 816mm/year
- Soil Index: 0.500
- UK Hydrological Region No. 1

Table 3 Estimation of the Greenfield (Pre-Development) Rate of Runoff

AEP (%)	Return Period (1 in X Years)	Unit Greenfield Runoff Rate (l/s/Ha)
50	2	6.0
QBAR		6.6
3.3	30	12.5
1	100	16.4
0.5	200	18.6
0.1	1000	25.0

In accordance with CIRIA Report C753 (the SuDS Manual) it is proposed to limit surface water discharge from the proposed development to QBAR greenfield rates for all design events up to and including the 0.5 % AEP plus 42% climate change uplift.

The total impermeable area for the proposed development is **6.06 ha**. Accordingly, a **40 l/s** discharge rate has been applied to the proposed discharge strategy. This is based on a runoff coefficient (CV) of 0.70 being applied for the development area resulting in an equivalent drained area of 4.24 ha.

4.2.3 Water Quality Review (Simple Index Approach)

In accordance with CIRIA Report C753 it is necessary to undertake a 'Water Quality Risk Management' assessment to determine the suitability of SuDS methods from a water quality perspective. The approach outlined below is based on the 'Simple Index Approach' for discharge to surface waters as detailed in the SuDS Manual (Section 26.7, Tables 26.2 and 26.3).

Table 4 below compares the SuDS Mitigation Indices against the Pollution Hazard Indices for the proposed development. This is based on the application of a detention basin (attenuation basin).

Table 4 SuDS Water Quality Design Criteria: Index Approach Review

Land Use	Pollution Hazard and SuDS Mitigation Indices Comparison					
	Total Suspended Solids (TSS)		*Metals*		*Hydro-Carbons*	
	Pollution Index	Mitigation Index	Pollution Index	Mitigation Index	Pollution Index	Mitigation Index
Other Roofs (industrial / commercial)	0.3	0.5	0.2	0.5	0.05	0.6
Low traffic roads	0.5		0.4		0.4	

The *SuDS Mitigation Index* offered by the proposed SuDS is ≥ *Pollution Hazard Index for each Land Use type and* therefore the water quality assessment criteria is satisfied. In addition, further pollution mitigation would be provided from the infiltration process through the site makeup into the herringbone drainage system.

4.3 SuDS Performance Review

4.3.1 Key Design Details

The SuDS attenuation basin has been sized to accommodate the 0.5% AEP plus 42% climate change event. The key design parameters / geometry are summarised in Table 5 below.

Table 5 SuDS Attenuation Basin Summary Design Details

Parameter	Unit	Value	Notes
Depth	m	1.25	*As measured from AutoCAD design*
Storage Area	m^2	2,782	*As measured from AutoCAD design*
Total Storage Volume	m^3	3,086	*As measured from MicroDrianage SourceControl*
Limiting Discharge Rate	l/s	40.0	*To be provided by Hydrobrake Optimum (or similar)*
Side Slopes	1 in X	2	*Typical basin side slope*

At the client's discretion, the geometry and final design of the SuDS basin may be revised at later design stages to provide additional amenity, habitat and biodiversity value by inclusions of a permanent water depth below the inlet and outlet pipes. In any case, the proposed provisional design parameters / geometry above will be provided as a minimum and the discharge rate maintained.

4.3.2 Hydraulic Analysis

The SuDS system has been modelled using the industry standard MicroDrainage software suite and a summary of the modelling results is included as Table 6 below.

Table 6 SuDS Attenuation Basin - Hydraulic Modelling Summary

AEP (%)	Max. Water Depth (m)	Freeboard Allowance (mm)	Max Outflow Rate (l/s)	Storage Volume (m^3)	Critical Storm Duration (hours)
50	0.224	1026	31.7	496.4	10
10	0.302	948	39.0	676.0	8
3.3	0.387	863	39.9	875.1	10
1	0.517	733	40.0	1184.3	10
0.5	0.612	638	40.0	1414.6	10
0.5 + 37% CC	0.951	299	40.0	2276.4	16

The results above confirm that the increased runoff from the development can be adequately contained within the SuDS attenuation basin and limits the discharge to less than the equivalent QBAR (40.0 l/s) for all modelled events. As additional contingency and in accordance with CIRIA Report C753, a suitable freeboard depth from the maximum water level to the basin crest level has been factored into the design.

Full copies of the hydraulic modelling and model details are enclosed as Appendix B.

4.3.3 Exceedance Flow Considerations

The SuDS attenuation basin will be designed to provide an exceedance flow route for storm events larger than the design event and available freeboard. The basin design will incorporate a downgradient notch in the functional crest to channel overflow safely from the structure. A discrete short section of drainage ditch will be incorporated into the terrain which will route any overflow down to the minor drain to the immediate north of the SuDS basin.

4.4 Upgradient Interception Drainage

4.4.1 Overview

An effective strategy to intercept, manage and direct overland flow from the upgradient areas of proposed development is the incorporation of a cut-off ditch. This would be in the form of open ditch situated perpendicular to the overland flow (upslope) as indicated on Drawing FRDA-003. As the overland flow onto the development areas is 'clean' runoff, no formal treatment of the runoff intercepted is required.

The upgradient cut-off ditch will be routed to the northeast of the development area to discharge to the exiting minor drain to the northeast of the site. This approach mimics the existing hydrological regime of the site area albeit in a more formalised manner.

Drawing FRDA-003 provides an overview of the proposed upgradient cut-off ditch as part of the wider proposed drainage strategy.

4.4.2 Catchment Runoff Analysis

Hydrological modelling of the upslope catchment has been undertaken to determine the design 0.5% AEP plus 42% climate change event catchment runoff rate by applying the ReFH2 methodology.

As indicated on Drawing FRDA-003, a cut-off ditch is required to intercept flows along the south eastern extents of the development area. Runoff analysis has been undertaken and the contributing catchment has been calculated using OS Terrain 5 data.

The total upgradient catchment area has been estimated to be approximately 14ha. This catchment area has been applied to the ReFH2 methodology using point descriptor data obtained from the FEH Web Service to determine the design flow with the ditches.

The estimated design flow within the cut-off ditch is approximately **0.31 m^3/s**.

4.4.3 Cut-off Ditch Outline Sizing

Specification of minimum sizing of the cut-off ditches is necessary to ensure sufficient hydraulic capacity to convey anticipated overland flows for the design storm event. The channel geometry required to convey the anticipated peak flow has been determined through application of Manning's Equation:

$$Q = \frac{1}{n}\frac{A^{5/3}}{P^{2/3}}{S_O}^{1/2}$$

Where	*Q*	=	*Flow (m^3/s)*
	n	=	*Manning's coefficient*
	A	=	*Flow area (mm/hr)*
	P	=	*Wetted perimeter (m)*
	S_O	=	*Slope*

The Manning's 'n' coefficient of the proposed ditch, established from experience and referenced to respected literature[12], has been estimated to be 0.033.

Taking the above into account the minimum required dimensions of the ditch to intercept and convey overland flow around the development have been calculated.

The cut-off ditch will have a minimum bed width and channel depth of 1m with a bank slope gradient of 1:1. Table 7 summarises the peak flow to be conveyed for within the ditches and the corresponding conveyance capacity for the above ditch dimensions.

[12] Chow, V.T. (1959). Open Channel Hydraulics

Table 7 Ditch Capacity for Overland Flow Conveyance

Parameter	Unit	Value	*Notes*
Channel Gradient	-	0.001	*As measured from AutoCAD design adopting minimum gradient along northern ditch as a conservative approach*
Design Flow	m^3/s	0.32	*From ReFH2 analysis, 0.5% plus 42% climate change*
Hydraulic Conveyance Capacity	m^3/s	1.24	*From Manning's equation*

The above analysis confirms that the proposed ditch dimensions have sufficient capacity to convey the estimated design flows from upgradient catchment runoff.

4.5 Drainage Maintenance Strategy

4.5.1 Overview

To ensure efficient operation of the proposed surface water management / SuDS scheme, drainage components should be inspected and maintained throughout the life of the development. Regular inspection / maintenance will ensure efficient operation and prevent potential failure / blockage of drainage components.

The following provisional maintenance plan has been developed from best practice guidance, professional experience and information provided in CIRIA Report C753 (The SuDS Manual).

All drainage components will be retained under private ownership, with the Developer remaining responsible for ongoing maintenance. This maintenance schedule will be integrated into the overall site operating and maintenance strategy and tailored / refined over time as required.

The following sections provide maintenance actions for specific drainage elements.

4.5.2 SuDS Attenuation Basin

Table 8 below provides the inspection and maintenance recommendations set out in Table 22.1 of CIRIA Report C753.

Table 8 SuDS Basin Maintenance Requirements

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Remove litter and debris	Monthly
	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 other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect banksides, structures, pipework etc. for evidence of physical damage	Monthly

Maintenance Schedule	Required Action	Typical Frequency
	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, outlets and forebay	Annually (or as required)
	Manage wetland plants in outlet pool - where provided	Annually (as set out in Chapter 23)
Occasional maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every 2 years, or as required
	Remove sediment from inlets, outlets, forebay and main basin where required	Every 5 years, or as required (likely to be minimal requirements where effective upstream source control is provided)
Remedial actions	Repair erosion or other damage by reseeding or re-turfing	As required
	Realignment of rip-rap	As required
	Repair/rehabilitation of inlets, outlets and overflows	As required
	Relevel uneven surfaces and reinstate design levels	As required

4.5.3 Cut-off Ditches

Table 9 below provides the inspection and maintenance recommendations for the upgradient cut-off ditches.

Table 9 Cut-off Ditch Maintenance Requirements

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove litter and debris	Monthly
	Manage vegetation and remove nuisance plants	Monthly at start, then as required
	Inspect inlets, outlets and overflows for blockage and clear if required	Monthly
Occasional Maintenance	Reseed areas of poor vegetation growth	As required
Remedial Actions	Repair erosion or other damage	As required

Maintenance Schedule	Required Action	Typical Frequency
	Remove any build-up of sediment	As required

4.5.4 Inspection Chambers and Manholes

It is recommended that inspection chamber and manhole covers are lifted at least yearly to check for debris / silt accumulations and check the drainage runs are flowing freely.

Any silt / debris accumulations should be manually removed, and jet washed where required.

5. Closure

Gondolin Land and Water Ltd (Gondolin) has been appointed by ITP Energised on behalf of Simec Atlantis Energy to undertake a Flood Risk and Drainage Assessment (FRDA) to support an planning application for a Battery Energy Storage Site (BESS) near the village of Mey, Caithness at a Site known as Mey BESS.

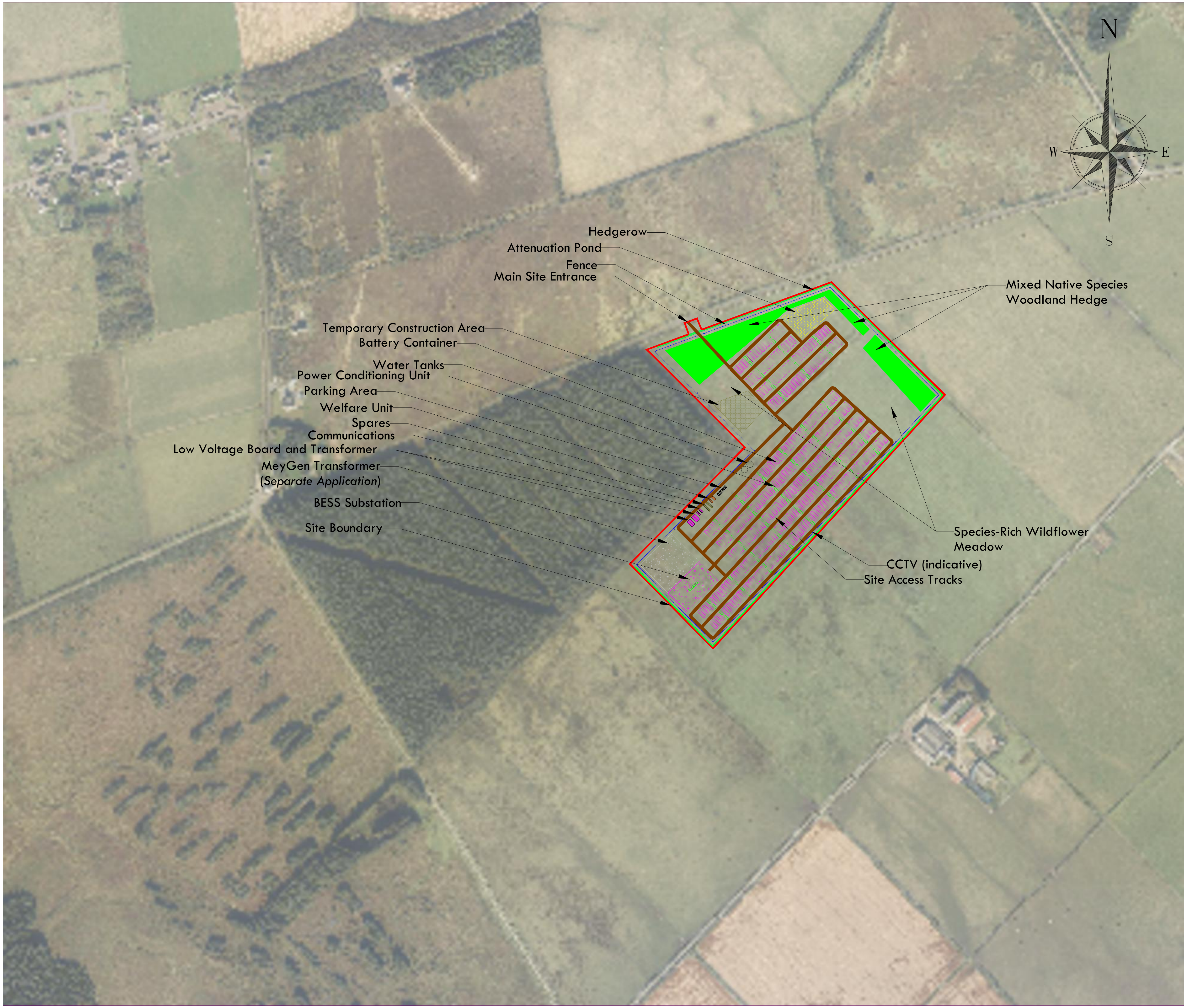
In accordance with national planning policy and guidance, all potential sources of flooding to the site have been considered. The Flood Risk Screening confirms that the site is overall of 'low risk' or lower from flooding from all sources and thus no bespoke flood mitigation measures are required.

This report assesses the potential increase in surface water runoff attributed to the proposed development and proposes a surface water management strategy to manage this. The strategy is in accordance with sustainable drainage principles and allows the site to remain free of flooding during design storm events, whilst ensuring no increase of flood risk to offsite receptors and ensures no deterioration of the water environment.

Taking all of the above into account it is considered there is no impediment to the development proposals being granted planning permission on the grounds of flood risk and drainage provision.

Appendix A

Proposed Development Plan



NOTES

DO NOT SCALE. Use annotated measurements only

SITE STATS

Development Area	10.65 Ha
BESS System Size	300 MW
Total No. of PCU Units	88
Total No. of Battery	352
Discharge Hrs	4

LEGEND

Issue	Date	Comments
09	28/10/23	Layout Revised
08	23/10/23	Layout Revised
07	28/09/23	Layout Revised
06	12/06/23	Layout Revised
05	06/06/23	Layout Revised
04	30/05/23	Layout Revised
03	19/05/23	Layout note updated
02	18/05/23	Layout revised, hedgerow screening added
01	18/05/23	Initial issue

Drawn: AA | Approve: DF | Date: 28/07/23

Drawing Status

Planning

Project: Mey BESS

Address: Phillips Mains farm, KW14 8XH

Client: Simec Atlantis Energy

Title

BESS Site Layout

Issue : 07 | Scale 1:2000 @A3

SImec Atlantis
Energy

SIMEC ATLANTIS ENERGY

ITPEnergised Offices
Bristol
33 Colston Avenue
BS1 4UA

ITPENERGISED

ONLY PRINT THIS DRAWING IF YOU REALLY NEED TO!

Appendix B

MicroDrainage Modelling Extracts

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	200	Cv (Summer)	0.750
Region	Scotland and Ireland	Cv (Winter)	0.840
M5-60 (mm)	12.000	Shortest Storm (mins)	15
Ratio R	0.234	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+42

Time Area Diagram

Total Area (ha) 4.240

Time From:	**(mins) To:**	**Area (ha)**
0	4	4.240

Model Details

Storage is Online Cover Level (m) 1.250

Tank or Pond Structure

Invert Level (m) 0.000

Depth (m)	**Area (m²)**	**Depth (m)**	**Area (m²)**
0.000	2168.0	1.250	2782.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0265-4000-1250-4000
Design Head (m)	1.250
Design Flow (l/s)	40.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	265
Invert Level (m)	0.000
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1800

Control Points	**Head (m)**	**Flow (l/s)**
Design Point (Calculated)	1.250	40.0
Flush-Flo™	0.441	40.0
Kick-Flo®	0.908	34.3
Mean Flow over Head Range	-	33.5

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
0.100	8.4	1.200	39.2	3.000	61.0	7.000	92.1
0.200	27.2	1.400	42.2	3.500	65.8	7.500	95.3
0.300	39.0	1.600	45.0	4.000	70.2	8.000	98.3
0.400	39.9	1.800	47.7	4.500	74.3	8.500	101.3
0.500	39.9	2.000	50.2	5.000	78.2	9.000	104.1
0.600	39.4	2.200	52.5	5.500	81.9	9.500	106.9
0.800	37.3	2.400	54.8	6.000	85.4		
1.000	35.9	2.600	56.9	6.500	88.8		

Summary of Results for 2 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	0.075	0.075	4.9	163.7	O K
30 min Summer	0.102	0.102	8.8	224.1	O K
60 min Summer	0.133	0.133	14.0	291.6	O K
120 min Summer	0.161	0.161	19.4	354.9	O K
180 min Summer	0.176	0.176	22.4	388.7	O K
240 min Summer	0.187	0.187	24.6	413.2	O K
360 min Summer	0.200	0.200	27.3	443.2	O K
480 min Summer	0.208	0.208	28.9	462.1	O K
600 min Summer	0.213	0.213	29.8	473.2	O K
720 min Summer	0.216	0.216	30.3	478.3	O K
960 min Summer	0.216	0.216	30.4	480.0	O K
1440 min Summer	0.211	0.211	29.4	468.6	O K
2160 min Summer	0.200	0.200	27.3	443.9	O K
2880 min Summer	0.190	0.190	25.2	419.8	O K
4320 min Summer	0.173	0.173	21.8	381.3	O K
5760 min Summer	0.160	0.160	19.3	353.3	O K
7200 min Summer	0.151	0.151	17.4	331.8	O K
8640 min Summer	0.143	0.143	15.9	313.8	O K
10080 min Summer	0.136	0.136	14.7	299.6	O K
15 min Winter	0.084	0.084	6.1	183.1	O K
30 min Winter	0.114	0.114	10.8	250.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	20.890	0.0	122.2	19
30 min Summer	14.564	0.0	183.5	33
60 min Summer	9.888	0.0	287.1	62
120 min Summer	6.625	0.0	392.9	120
180 min Summer	5.222	0.0	468.9	142
240 min Summer	4.397	0.0	529.4	172
360 min Summer	3.432	0.0	623.6	238
480 min Summer	2.892	0.0	703.5	306
600 min Summer	2.536	0.0	772.8	372
720 min Summer	2.273	0.0	832.3	438
960 min Summer	1.912	0.0	934.6	568
1440 min Summer	1.498	0.0	1097.6	822
2160 min Summer	1.176	0.0	1325.5	1188
2880 min Summer	0.987	0.0	1482.9	1556
4320 min Summer	0.771	0.0	1726.9	2288
5760 min Summer	0.648	0.0	1964.2	3000
7200 min Summer	0.565	0.0	2140.2	3744
8640 min Summer	0.505	0.0	2289.2	4488
10080 min Summer	0.459	0.0	2416.1	5152
15 min Winter	20.890	0.0	140.7	19
30 min Winter	14.564	0.0	210.0	33

Summary of Results for 2 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	0.148	0.148	16.9	325.6	O K
120 min Winter	0.180	0.180	23.2	397.0	O K
180 min Winter	0.195	0.195	26.3	432.3	O K
240 min Winter	0.206	0.206	28.5	456.7	O K
360 min Winter	0.217	0.217	30.5	481.1	O K
480 min Winter	0.222	0.222	31.4	492.7	O K
600 min Winter	0.224	0.224	31.7	496.4	O K
720 min Winter	0.223	0.223	31.5	494.4	O K
960 min Winter	0.218	0.218	30.7	483.8	O K
1440 min Winter	0.205	0.205	28.3	455.2	O K
2160 min Winter	0.188	0.188	24.8	415.8	O K
2880 min Winter	0.174	0.174	22.0	383.9	O K
4320 min Winter	0.154	0.154	18.1	339.4	O K
5760 min Winter	0.141	0.141	15.5	309.5	O K
7200 min Winter	0.131	0.131	13.7	287.7	O K
8640 min Winter	0.123	0.123	12.3	270.8	O K
10080 min Winter	0.117	0.117	11.3	257.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	9.888	0.0	324.5	60
120 min Winter	6.625	0.0	443.1	116
180 min Winter	5.222	0.0	528.4	144
240 min Winter	4.397	0.0	596.2	180
360 min Winter	3.432	0.0	701.9	254
480 min Winter	2.892	0.0	791.4	328
600 min Winter	2.536	0.0	869.2	398
720 min Winter	2.273	0.0	936.0	464
960 min Winter	1.912	0.0	1050.9	598
1440 min Winter	1.498	0.0	1234.3	852
2160 min Winter	1.176	0.0	1486.9	1232
2880 min Winter	0.987	0.0	1663.6	1588
4320 min Winter	0.771	0.0	1938.9	2332
5760 min Winter	0.648	0.0	2201.5	3056
7200 min Winter	0.565	0.0	2399.1	3816
8640 min Winter	0.505	0.0	2566.9	4496
10080 min Winter	0.459	0.0	2711.5	5240

Summary of Results for 10 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	0.107	0.107	9.5	234.2	O K
30 min Summer	0.146	0.146	16.5	321.4	O K
60 min Summer	0.187	0.187	24.7	414.1	O K
120 min Summer	0.222	0.222	31.4	493.4	O K
180 min Summer	0.242	0.242	34.7	537.3	O K
240 min Summer	0.255	0.255	36.8	568.2	O K
360 min Summer	0.272	0.272	38.4	606.2	O K
480 min Summer	0.281	0.281	38.6	626.9	O K
600 min Summer	0.285	0.285	38.7	636.6	O K
720 min Summer	0.286	0.286	38.7	639.5	O K
960 min Summer	0.283	0.283	38.7	633.3	O K
1440 min Summer	0.270	0.270	38.4	601.6	O K
2160 min Summer	0.249	0.249	35.9	554.6	O K
2880 min Summer	0.232	0.232	33.2	515.6	O K
4320 min Summer	0.207	0.207	28.6	458.2	O K
5760 min Summer	0.190	0.190	25.2	419.2	O K
7200 min Summer	0.177	0.177	22.6	390.1	O K
8640 min Summer	0.166	0.166	20.5	366.6	O K
10080 min Summer	0.158	0.158	18.9	348.9	O K
15 min Winter	0.119	0.119	11.6	262.0	O K
30 min Winter	0.163	0.163	19.8	359.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	30.043	0.0	190.6	19
30 min Summer	21.101	0.0	283.4	33
60 min Summer	14.328	0.0	427.3	62
120 min Summer	9.489	0.0	574.1	108
180 min Summer	7.407	0.0	676.4	138
240 min Summer	6.202	0.0	758.0	170
360 min Summer	4.818	0.0	887.2	238
480 min Summer	4.025	0.0	990.6	308
600 min Summer	3.499	0.0	1078.0	376
720 min Summer	3.120	0.0	1154.4	442
960 min Summer	2.602	0.0	1285.0	576
1440 min Summer	2.014	0.0	1489.8	824
2160 min Summer	1.559	0.0	1763.9	1192
2880 min Summer	1.299	0.0	1958.7	1556
4320 min Summer	1.005	0.0	2259.9	2288
5760 min Summer	0.837	0.0	2542.3	3000
7200 min Summer	0.726	0.0	2755.0	3744
8640 min Summer	0.647	0.0	2938.7	4416
10080 min Summer	0.586	0.0	3095.5	5152
15 min Winter	30.043	0.0	218.1	18
30 min Winter	21.101	0.0	322.5	32

Summary of Results for 10 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	0.209	0.209	29.1	463.2	O K
120 min Winter	0.249	0.249	35.9	554.4	O K
180 min Winter	0.269	0.269	38.4	599.6	O K
240 min Winter	0.283	0.283	38.7	631.6	O K
360 min Winter	0.297	0.297	38.9	664.9	O K
480 min Winter	0.302	0.302	39.0	676.0	O K
600 min Winter	0.302	0.302	39.0	674.8	O K
720 min Winter	0.298	0.298	38.9	666.5	O K
960 min Winter	0.286	0.286	38.7	639.1	O K
1440 min Winter	0.260	0.260	37.5	579.1	O K
2160 min Winter	0.231	0.231	32.9	512.3	O K
2880 min Winter	0.210	0.210	29.2	464.4	O K
4320 min Winter	0.182	0.182	23.7	402.3	O K
5760 min Winter	0.164	0.164	20.1	362.7	O K
7200 min Winter	0.152	0.152	17.6	334.5	O K
8640 min Winter	0.142	0.142	15.8	313.4	O K
10080 min Winter	0.135	0.135	14.4	296.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	14.328	0.0	481.7	60
120 min Winter	9.489	0.0	646.2	114
180 min Winter	7.407	0.0	760.9	142
240 min Winter	6.202	0.0	852.3	182
360 min Winter	4.818	0.0	997.1	260
480 min Winter	4.025	0.0	1113.0	334
600 min Winter	3.499	0.0	1211.0	406
720 min Winter	3.120	0.0	1296.8	476
960 min Winter	2.602	0.0	1443.4	608
1440 min Winter	2.014	0.0	1673.7	854
2160 min Winter	1.559	0.0	1977.9	1232
2880 min Winter	1.299	0.0	2196.7	1588
4320 min Winter	1.005	0.0	2536.2	2332
5760 min Winter	0.837	0.0	2848.9	3056
7200 min Winter	0.726	0.0	3087.7	3752
8640 min Winter	0.647	0.0	3294.5	4496
10080 min Winter	0.586	0.0	3472.9	5240

Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	0.133	0.133	14.0	292.4	O K
30 min Summer	0.183	0.183	23.8	404.1	O K
60 min Summer	0.235	0.235	33.7	522.3	O K
120 min Summer	0.280	0.280	38.6	624.3	O K
180 min Summer	0.305	0.305	39.1	682.8	O K
240 min Summer	0.322	0.322	39.3	723.1	O K
360 min Summer	0.344	0.344	39.6	772.5	O K
480 min Summer	0.355	0.355	39.7	798.4	O K
600 min Summer	0.360	0.360	39.7	810.4	O K
720 min Summer	0.361	0.361	39.7	813.5	O K
960 min Summer	0.357	0.357	39.7	803.7	O K
1440 min Summer	0.337	0.337	39.5	756.6	O K
2160 min Summer	0.301	0.301	39.0	673.9	O K
2880 min Summer	0.271	0.271	38.4	605.5	O K
4320 min Summer	0.237	0.237	33.9	525.9	O K
5760 min Summer	0.214	0.214	29.9	473.9	O K
7200 min Summer	0.198	0.198	26.8	437.3	O K
8640 min Summer	0.185	0.185	24.2	408.6	O K
10080 min Summer	0.175	0.175	22.3	386.8	O K
15 min Winter	0.149	0.149	17.0	327.3	O K
30 min Winter	0.204	0.204	28.1	452.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	37.652	0.0	248.7	18
30 min Summer	26.716	0.0	370.3	33
60 min Summer	18.262	0.0	551.8	62
120 min Summer	12.059	0.0	736.9	112
180 min Summer	9.374	0.0	863.4	144
240 min Summer	7.821	0.0	963.2	178
360 min Summer	6.040	0.0	1119.2	248
480 min Summer	5.023	0.0	1243.2	318
600 min Summer	4.349	0.0	1347.2	386
720 min Summer	3.866	0.0	1437.8	456
960 min Summer	3.208	0.0	1591.6	588
1440 min Summer	2.464	0.0	1831.3	852
2160 min Summer	1.892	0.0	2144.9	1212
2880 min Summer	1.568	0.0	2368.9	1560
4320 min Summer	1.203	0.0	2712.1	2292
5760 min Summer	0.996	0.0	3026.6	3000
7200 min Summer	0.860	0.0	3263.6	3744
8640 min Summer	0.762	0.0	3467.2	4416
10080 min Summer	0.688	0.0	3640.4	5152
15 min Winter	37.652	0.0	283.4	18
30 min Winter	26.716	0.0	420.2	32

Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	0.263	0.263	38.0	586.1	O K
120 min Winter	0.318	0.318	39.2	712.1	O K
180 min Winter	0.344	0.344	39.6	772.9	O K
240 min Winter	0.361	0.361	39.7	813.3	O K
360 min Winter	0.380	0.380	39.8	858.4	O K
480 min Winter	0.387	0.387	39.9	874.9	O K
600 min Winter	0.387	0.387	39.9	875.1	O K
720 min Winter	0.383	0.383	39.9	865.2	O K
960 min Winter	0.368	0.368	39.8	829.2	O K
1440 min Winter	0.327	0.327	39.4	734.3	O K
2160 min Winter	0.272	0.272	38.4	607.5	O K
2880 min Winter	0.242	0.242	34.7	538.2	O K
4320 min Winter	0.205	0.205	28.3	455.3	O K
5760 min Winter	0.184	0.184	24.0	405.8	O K
7200 min Winter	0.168	0.168	20.9	371.7	O K
8640 min Winter	0.157	0.157	18.7	346.4	O K
10080 min Winter	0.148	0.148	17.0	326.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	18.262	0.0	621.2	60
120 min Winter	12.059	0.0	828.6	116
180 min Winter	9.374	0.0	970.2	166
240 min Winter	7.821	0.0	1082.0	190
360 min Winter	6.040	0.0	1256.9	268
480 min Winter	5.023	0.0	1395.8	346
600 min Winter	4.349	0.0	1512.4	422
720 min Winter	3.866	0.0	1614.0	494
960 min Winter	3.208	0.0	1786.6	636
1440 min Winter	2.464	0.0	2056.3	896
2160 min Winter	1.892	0.0	2404.7	1252
2880 min Winter	1.568	0.0	2656.2	1612
4320 min Winter	1.203	0.0	3042.9	2332
5760 min Winter	0.996	0.0	3391.4	3048
7200 min Winter	0.860	0.0	3657.4	3752
8640 min Winter	0.762	0.0	3886.6	4496
10080 min Winter	0.688	0.0	4083.5	5240

Summary of Results for 100 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	0.169	0.169	21.1	373.0	O K
30 min Summer	0.234	0.234	33.5	520.0	O K
60 min Summer	0.305	0.305	39.1	682.9	O K
120 min Summer	0.371	0.371	39.8	837.0	O K
180 min Summer	0.403	0.403	39.9	912.0	O K
240 min Summer	0.424	0.424	40.0	962.2	O K
360 min Summer	0.450	0.450	40.0	1023.3	O K
480 min Summer	0.464	0.464	40.0	1056.5	O K
600 min Summer	0.471	0.471	40.0	1072.1	O K
720 min Summer	0.472	0.472	40.0	1076.6	O K
960 min Summer	0.468	0.468	40.0	1065.7	O K
1440 min Summer	0.443	0.443	40.0	1005.7	O K
2160 min Summer	0.395	0.395	39.9	892.1	O K
2880 min Summer	0.350	0.350	39.6	787.0	O K
4320 min Summer	0.282	0.282	38.6	630.7	O K
5760 min Summer	0.247	0.247	35.6	550.6	O K
7200 min Summer	0.225	0.225	32.0	500.5	O K
8640 min Summer	0.209	0.209	29.0	462.9	O K
10080 min Summer	0.197	0.197	26.6	435.6	O K
15 min Winter	0.189	0.189	25.0	417.5	O K
30 min Winter	0.262	0.262	37.8	582.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	48.221	0.0	330.2	18
30 min Summer	34.598	0.0	493.2	33
60 min Summer	23.826	0.0	728.0	62
120 min Summer	15.683	0.0	966.4	120
180 min Summer	12.136	0.0	1125.6	164
240 min Summer	10.086	0.0	1249.8	196
360 min Summer	7.736	0.0	1441.3	262
480 min Summer	6.402	0.0	1592.1	332
600 min Summer	5.521	0.0	1717.5	404
720 min Summer	4.889	0.0	1826.0	472
960 min Summer	4.034	0.0	2009.2	608
1440 min Summer	3.072	0.0	2293.0	880
2160 min Summer	2.339	0.0	2656.5	1256
2880 min Summer	1.927	0.0	2916.6	1616
4320 min Summer	1.465	0.0	3310.9	2332
5760 min Summer	1.204	0.0	3663.5	3000
7200 min Summer	1.034	0.0	3928.9	3744
8640 min Summer	0.913	0.0	4155.5	4416
10080 min Summer	0.821	0.0	4347.6	5152
15 min Winter	48.221	0.0	375.1	18
30 min Winter	34.598	0.0	558.0	32

Summary of Results for 100 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	0.343	0.343	39.6	771.2	O K
120 min Winter	0.420	0.420	40.0	952.5	O K
180 min Winter	0.458	0.458	40.0	1042.9	O K
240 min Winter	0.480	0.480	40.0	1094.3	O K
360 min Winter	0.504	0.504	40.0	1151.1	O K
480 min Winter	0.515	0.515	40.0	1178.6	O K
600 min Winter	0.517	0.517	40.0	1184.3	O K
720 min Winter	0.514	0.514	40.0	1176.4	O K
960 min Winter	0.498	0.498	40.0	1137.0	O K
1440 min Winter	0.447	0.447	40.0	1016.8	O K
2160 min Winter	0.367	0.367	39.8	827.1	O K
2880 min Winter	0.302	0.302	39.0	675.0	O K
4320 min Winter	0.239	0.239	34.2	530.4	O K
5760 min Winter	0.209	0.209	29.0	462.8	O K
7200 min Winter	0.190	0.190	25.2	419.6	O K
8640 min Winter	0.176	0.176	22.4	388.1	O K
10080 min Winter	0.165	0.165	20.2	364.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	23.826	0.0	818.5	60
120 min Winter	15.683	0.0	1085.5	118
180 min Winter	12.136	0.0	1263.9	174
240 min Winter	10.086	0.0	1403.0	226
360 min Winter	7.736	0.0	1617.5	284
480 min Winter	6.402	0.0	1786.5	362
600 min Winter	5.521	0.0	1926.9	440
720 min Winter	4.889	0.0	2048.6	516
960 min Winter	4.034	0.0	2253.9	664
1440 min Winter	3.072	0.0	2572.9	938
2160 min Winter	2.339	0.0	2977.8	1320
2880 min Winter	1.927	0.0	3269.7	1672
4320 min Winter	1.465	0.0	3713.9	2332
5760 min Winter	1.204	0.0	4104.7	3056
7200 min Winter	1.034	0.0	4402.6	3752
8640 min Winter	0.913	0.0	4657.6	4496
10080 min Winter	0.821	0.0	4875.9	5240

Summary of Results for 200 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	0.194	0.194	26.0	429.2	O K
30 min Summer	0.270	0.270	38.4	602.5	O K
60 min Summer	0.357	0.357	39.7	803.2	O K
120 min Summer	0.437	0.437	40.0	992.0	O K
180 min Summer	0.476	0.476	40.0	1084.9	O K
240 min Summer	0.499	0.499	40.0	1140.7	O K
360 min Summer	0.527	0.527	40.0	1208.8	O K
480 min Summer	0.543	0.543	40.0	1246.8	O K
600 min Summer	0.551	0.551	40.0	1265.3	O K
720 min Summer	0.553	0.553	40.0	1271.2	O K
960 min Summer	0.549	0.549	40.0	1260.5	O K
1440 min Summer	0.522	0.522	40.0	1195.1	O K
2160 min Summer	0.468	0.468	40.0	1065.2	O K
2880 min Summer	0.415	0.415	40.0	938.8	O K
4320 min Summer	0.329	0.329	39.4	737.8	O K
5760 min Summer	0.273	0.273	38.4	609.1	O K
7200 min Summer	0.245	0.245	35.3	545.8	O K
8640 min Summer	0.225	0.225	32.0	500.3	O K
10080 min Summer	0.211	0.211	29.4	467.8	O K
15 min Winter	0.217	0.217	30.5	480.5	O K
30 min Winter	0.303	0.303	39.0	677.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	55.603	0.0	387.5	18
30 min Summer	40.151	0.0	579.9	33
60 min Summer	27.768	0.0	852.8	62
120 min Summer	18.245	0.0	1128.5	120
180 min Summer	14.081	0.0	1310.2	180
240 min Summer	11.676	0.0	1450.9	210
360 min Summer	8.922	0.0	1666.0	278
480 min Summer	7.362	0.0	1834.7	346
600 min Summer	6.333	0.0	1974.0	416
720 min Summer	5.597	0.0	2094.2	484
960 min Summer	4.602	0.0	2296.2	624
1440 min Summer	3.489	0.0	2607.8	894
2160 min Summer	2.643	0.0	3004.2	1280
2880 min Summer	2.170	0.0	3287.2	1648
4320 min Summer	1.641	0.0	3713.2	2376
5760 min Summer	1.344	0.0	4089.0	3048
7200 min Summer	1.150	0.0	4371.5	3744
8640 min Summer	1.012	0.0	4611.9	4488
10080 min Summer	0.909	0.0	4815.0	5152
15 min Winter	55.603	0.0	439.5	18
30 min Winter	40.151	0.0	655.2	32

Summary of Results for 200 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	0.401	0.401	39.9	906.2	O K
120 min Winter	0.493	0.493	40.0	1126.8	O K
180 min Winter	0.540	0.540	40.0	1239.5	O K
240 min Winter	0.568	0.568	40.0	1306.2	O K
360 min Winter	0.593	0.593	40.0	1368.3	O K
480 min Winter	0.607	0.607	40.0	1403.6	O K
600 min Winter	0.612	0.612	40.0	1414.6	O K
720 min Winter	0.610	0.610	40.0	1409.8	O K
960 min Winter	0.594	0.594	40.0	1371.8	O K
1440 min Winter	0.541	0.541	40.0	1242.2	O K
2160 min Winter	0.449	0.449	40.0	1020.6	O K
2880 min Winter	0.367	0.367	39.8	826.8	O K
4320 min Winter	0.263	0.263	38.1	586.5	O K
5760 min Winter	0.227	0.227	32.2	503.3	O K
7200 min Winter	0.204	0.204	28.0	451.6	O K
8640 min Winter	0.188	0.188	24.9	415.8	O K
10080 min Winter	0.176	0.176	22.4	388.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	27.768	0.0	958.3	62
120 min Winter	18.245	0.0	1267.1	118
180 min Winter	14.081	0.0	1470.5	176
240 min Winter	11.676	0.0	1628.2	230
360 min Winter	8.922	0.0	1869.1	304
480 min Winter	7.362	0.0	2058.0	374
600 min Winter	6.333	0.0	2214.1	452
720 min Winter	5.597	0.0	2348.7	528
960 min Winter	4.602	0.0	2575.0	682
1440 min Winter	3.489	0.0	2924.5	968
2160 min Winter	2.643	0.0	3367.2	1364
2880 min Winter	2.170	0.0	3684.7	1728
4320 min Winter	1.641	0.0	4164.7	2336
5760 min Winter	1.344	0.0	4581.3	3056
7200 min Winter	1.150	0.0	4898.4	3752
8640 min Winter	1.012	0.0	5168.8	4496
10080 min Winter	0.909	0.0	5399.7	5240

Summary of Results for 200 year Return Period (+42%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	0.272	0.272	38.4	607.5	O K
30 min Summer	0.383	0.383	39.9	863.6	O K
60 min Summer	0.509	0.509	40.0	1164.9	O K
120 min Summer	0.633	0.633	40.0	1465.7	O K
180 min Summer	0.699	0.699	40.0	1630.1	O K
240 min Summer	0.741	0.741	40.0	1735.7	O K
360 min Summer	0.787	0.787	40.0	1852.2	O K
480 min Summer	0.812	0.812	40.0	1917.9	O K
600 min Summer	0.828	0.828	40.0	1957.9	O K
720 min Summer	0.837	0.837	40.0	1981.0	O K
960 min Summer	0.843	0.843	40.0	1996.0	O K
1440 min Summer	0.827	0.827	40.0	1955.1	O K
2160 min Summer	0.776	0.776	40.0	1825.5	O K
2880 min Summer	0.716	0.716	40.0	1672.4	O K
4320 min Summer	0.592	0.592	40.0	1365.1	O K
5760 min Summer	0.483	0.483	40.0	1101.6	O K
7200 min Summer	0.397	0.397	39.9	897.2	O K
8640 min Summer	0.334	0.334	39.5	749.2	O K
10080 min Summer	0.289	0.289	38.8	645.9	O K
15 min Winter	0.304	0.304	39.0	681.7	O K
30 min Winter	0.428	0.428	40.0	970.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	78.956	0.0	569.7	18
30 min Summer	57.015	0.0	843.2	33
60 min Summer	39.431	0.0	1221.9	62
120 min Summer	25.908	0.0	1613.2	122
180 min Summer	19.995	0.0	1871.0	182
240 min Summer	16.580	0.0	2070.6	240
360 min Summer	12.669	0.0	2375.6	352
480 min Summer	10.453	0.0	2614.6	412
600 min Summer	8.993	0.0	2811.9	478
720 min Summer	7.948	0.0	2981.9	546
960 min Summer	6.535	0.0	3267.2	682
1440 min Summer	4.954	0.0	3705.5	964
2160 min Summer	3.753	0.0	4273.0	1364
2880 min Summer	3.082	0.0	4677.2	1760
4320 min Summer	2.330	0.0	5288.9	2512
5760 min Summer	1.908	0.0	5811.6	3232
7200 min Summer	1.633	0.0	6214.3	3896
8640 min Summer	1.437	0.0	6558.0	4584
10080 min Summer	1.290	0.0	6851.4	5248
15 min Winter	78.956	0.0	643.8	18
30 min Winter	57.015	0.0	949.8	33

Summary of Results for 200 year Return Period (+42%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	0.570	0.570	40.0	1312.8	O K
120 min Winter	0.710	0.710	40.0	1658.5	O K
180 min Winter	0.787	0.787	40.0	1853.2	O K
240 min Winter	0.838	0.838	40.0	1983.3	O K
360 min Winter	0.899	0.899	40.0	2141.8	O K
480 min Winter	0.932	0.932	40.0	2227.1	O K
600 min Winter	0.945	0.945	40.0	2262.5	O K
720 min Winter	0.949	0.949	40.0	2271.7	O K
960 min Winter	0.951	0.951	40.0	2276.4	O K
1440 min Winter	0.919	0.919	40.0	2192.4	O K
2160 min Winter	0.823	0.823	40.0	1945.8	O K
2880 min Winter	0.717	0.717	40.0	1675.0	O K
4320 min Winter	0.515	0.515	40.0	1179.5	O K
5760 min Winter	0.364	0.364	39.7	820.4	O K
7200 min Winter	0.275	0.275	38.5	613.5	O K
8640 min Winter	0.244	0.244	35.0	542.3	O K
10080 min Winter	0.224	0.224	31.7	496.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	39.431	0.0	1371.6	62
120 min Winter	25.908	0.0	1809.7	120
180 min Winter	19.995	0.0	2098.3	178
240 min Winter	16.580	0.0	2321.7	236
360 min Winter	12.669	0.0	2662.9	348
480 min Winter	10.453	0.0	2930.1	458
600 min Winter	8.993	0.0	3150.5	562
720 min Winter	7.948	0.0	3340.5	608
960 min Winter	6.535	0.0	3658.6	742
1440 min Winter	4.954	0.0	4145.2	1056
2160 min Winter	3.753	0.0	4787.5	1492
2880 min Winter	3.082	0.0	5241.0	1900
4320 min Winter	2.330	0.0	5929.9	2636
5760 min Winter	1.908	0.0	6510.8	3288
7200 min Winter	1.633	0.0	6962.4	3888
8640 min Winter	1.437	0.0	7348.6	4496
10080 min Winter	1.290	0.0	7681.2	5240

Appendix C

The Highland Council Compliance Certificates and SEPA FRA Checklist

APPENDIX C: SELF CERTIFICATION (overleaf)

The Highland Council Comhairle na Gàidhealtachd	FRA and DIA Guidance Assessment Compliance Certificate

I certify that all reasonable skill, care and attention to be expected of a qualified and experienced professional in this field have been exercised in carrying out the attached Assessment. I also confirm that I maintain the required Professional Indemnity Insurance*. The report has been prepared in support of the below named development in accordance with the reporting requirements issued by The Highland Council.

Please select Assessment type:

Flood Risk Assessment ☑ Drainage Impact Assessment ☑

Additional Information

Assessment Ref No:

Assessment Revision: First Issue

Assessment Date: 02/11/2023

Planning Application No:

Name of Development: Mey BESS

Address of Development: Land 500m West of Phillips Mains Mey

Name of Developer: Simec Atlantis Energy

Name and Address of Organisation preparing this Assessment: Gondolin Land & Water Ltd - Quayside Street, Edinburgh, EH6 6EJ

Name of Approver: Zak Ritchie

Date: 02/11/2023

Signed:

Position Held: Managing Director

Qualification of person responsible for signing off this Assessment** C.WEM, C.Eng

* Please attach appropriate evidence of Professional Indemnity Insurance

** A chartered member of a relevant professional institution

Flood Risk Assessment (FRA) Checklist

(SS-NFR-F-001 - Version 16 - Last updated 27/08/2019)

This document must be attached within the front cover of any Flood Risk Assessments issued to Local Planning Authorities (LPA) in support of a development proposal which may be at risk of flooding. The document will take only a few minutes to complete and will assist SEPA in reviewing FRAs, when consulted by LPAs. This document should not be a substitute for a FRA.

Development Proposal Summary

Site Name:		Mey BESS		
Grid Reference:	Easting:	329600	Northing:	972473
Local Authority:		Highland Council		
Planning Reference number (if known):				
Nature of the development:		Infrastructure	If residential, state type:	
Size of the development site:		10	Ha	
Identified Flood Risk:	Source:	Other	Source name:	None

Land Use Planning

Is any of the site within the functional floodplain? (refer to SPP para 255)	No	If yes, what is the net loss of storage?		m^3
Is the site identified within the local development plan?	No	Local Development Plan Name:		Year of Publication:
		Allocation Number / Reference:		
If yes, what is the proposed use for the site as identified in the local plan?	Select from List	If Other please specify:		
Does the local development plan and/or any pre-application advice, identify any flood risk issues with or requirements for the site.	No	If so, please specify:		
What is the proposed land use vulnerability?	Essential Infrastructure	Do the proposals represent an increase in land use vulnerability?	No	

Supporting Information

Have clear maps / plans been provided within the FRA (including topographic and flood inundation plans)?	Yes		
Has sufficient supporting information, in line with our Technical Guidance, been provided? For example: site plans, photos, topographic information, structure information and other site specific information.	Yes		
Has a historic flood search been undertaken?	Yes	If flood records in vicinity of the site please provide details:	
Is a formal flood prevention scheme present?	No	If known, state the standard of protection offered:	
Current / historical site use:	Agricultural / rough grazing		
Is the site considered vacant or derelict?	No		

Development Requirements

Freeboard on design water level:		n/a	m			
Is safe / dry access and egress available?		Vehicular and Pedestrian		Min access/egress level:		m AOD
Design levels:	Ground level:	n/a	m AOD	Min FFL:		mAOD

Mitigation

Can development be designed to avoid all areas at risk of flooding?	Yes
Is mitigation proposed?	No
If yes, is compenstory storage necessary?	No
Demonstration of compensatory storage on a "like for like" basis?	Select from List
Should water resistant materials and forms of construction be used?	No

Flood Risk Assessment (FRA) Checklist

(SS-NFR-F-001 - Version 16 - Last updated 27/08/2019)

Hydrology

Is there a requirement to consider fluvial flooding?	No			
Area of catchment:		km²	Is a map of catchment area included in FRA?	Yes
Estimation method(s) used (please select all that apply):	Pooled Analysis ☐		If Pooled analysis have group details been included?	Select from List
	Single Site Analysis ☐			
	Enhanced Single Site ☐			
	ReFH2 ☐			
	FEH RRM ☐			
	Other ☐		If other (please specify methodology used):	
Estimate of 200 year design flood flow:		m^3/s		
Qmed estimate:		m^3/s	Method:	N/A
Statistical Distribution Selected:	Select from List		Reasons for selection:	

Hydraulics

Hydraulic modelling method:	Manning		Software used:	Select from List
			If other please specify:	
Number of cross sections:	1			
Source of data (i.e. topographic survey, LiDAR etc):	topographic survey		Date obtained / surveyed:	Novmember 2022
Modelled reach length:		m		
Any changes to default simulation parameters?			If yes please provide details:	
Model timestep:				
Model grid size:				
Any structures within the modelled length?	Select from List		Specify, if combination:	
Maximum observed velocity:		m/s		
Brief summary of sensitivity tests, and range:				
variation on flow (%)		%	Please specify climate change scenario considered:	1000-year plus 40% climate change
variation on channel roughness (%)		%		
blockage of structure (range of % blocked)		%		
boundary conditions:	**Upstream**			**Downstream**
(1) type	Flow			Select from List
	Specify if other		Specify if other:	
(2) does it influence water levels at the site?	Select from List			Select from List
Has model been calibrated (gauge data / flood records)?	Select from List			
Is the hydraulic model available to SEPA?	Select from List			
Design flood levels:	200 year N/A	m AOD	200 year plus climate change	N/A m AOD
Cross section results provided?	Select from List			
Long section results provided?	Select from List			
Cross section ratings provided?	Select from List			
Tabular output provided (i.e. levels, velocities)?				
Mass balance error:		%		

Coastal

Is there a requirement to consider coastal / tidal flooding?	No			
Estimate of 200 year design flood level:		m AOD		
Estimation method(s) used:	Select from List		If other please specify methodology used:	
Allowance for climate change (m):		m		
Allowance for wave action etc (m):		m		
Overall design flood level:		m AOD		

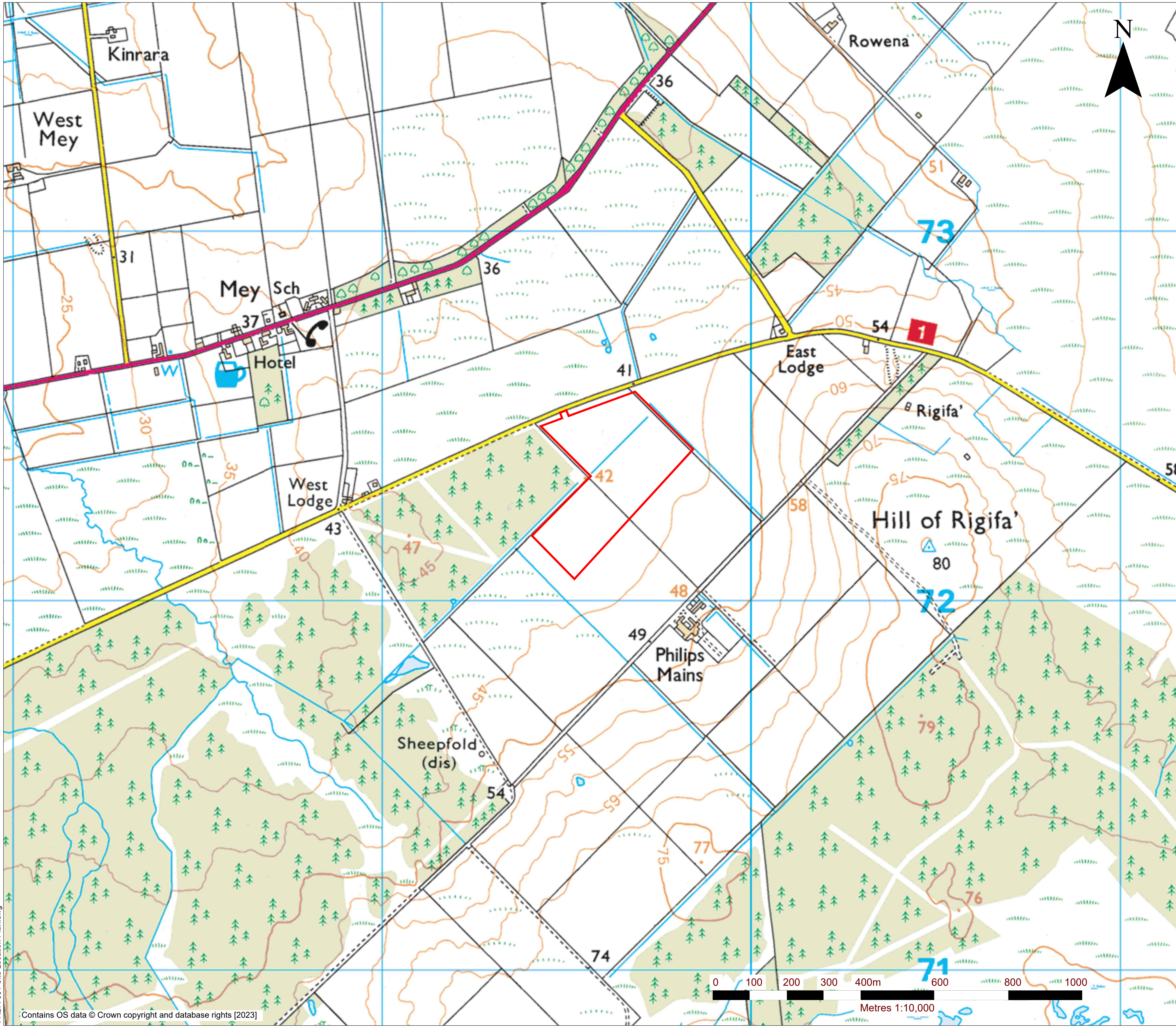
Comments

Any additional comments:

Approved by: **Stephen Donnan**
Organisation: **Gondolin Land & Water Ltd**
Date: **02/11/2023**

Note: Further details and guidance is provided in 'Technical Flood Risk Guidance for Stakeholders' which can be accesssed here:- CLICK HERE

Drawings



LEGEND

SITE BOUNDARY

REV	DATE	DESCRIPTION	BY	CHK
00	11/23	INITIAL ISSUE	GD	SD

CLIENT:
SIMEC ATLANTIS ENERGY

PROJECT:
Mey BESS

DRAWING TITLE:
SITE LOCATION PLAN

SCALE: 1:10,000 @ A3

DATE: NOVEMBER 2023

DRAWING NUMBER: **FRDA-001**

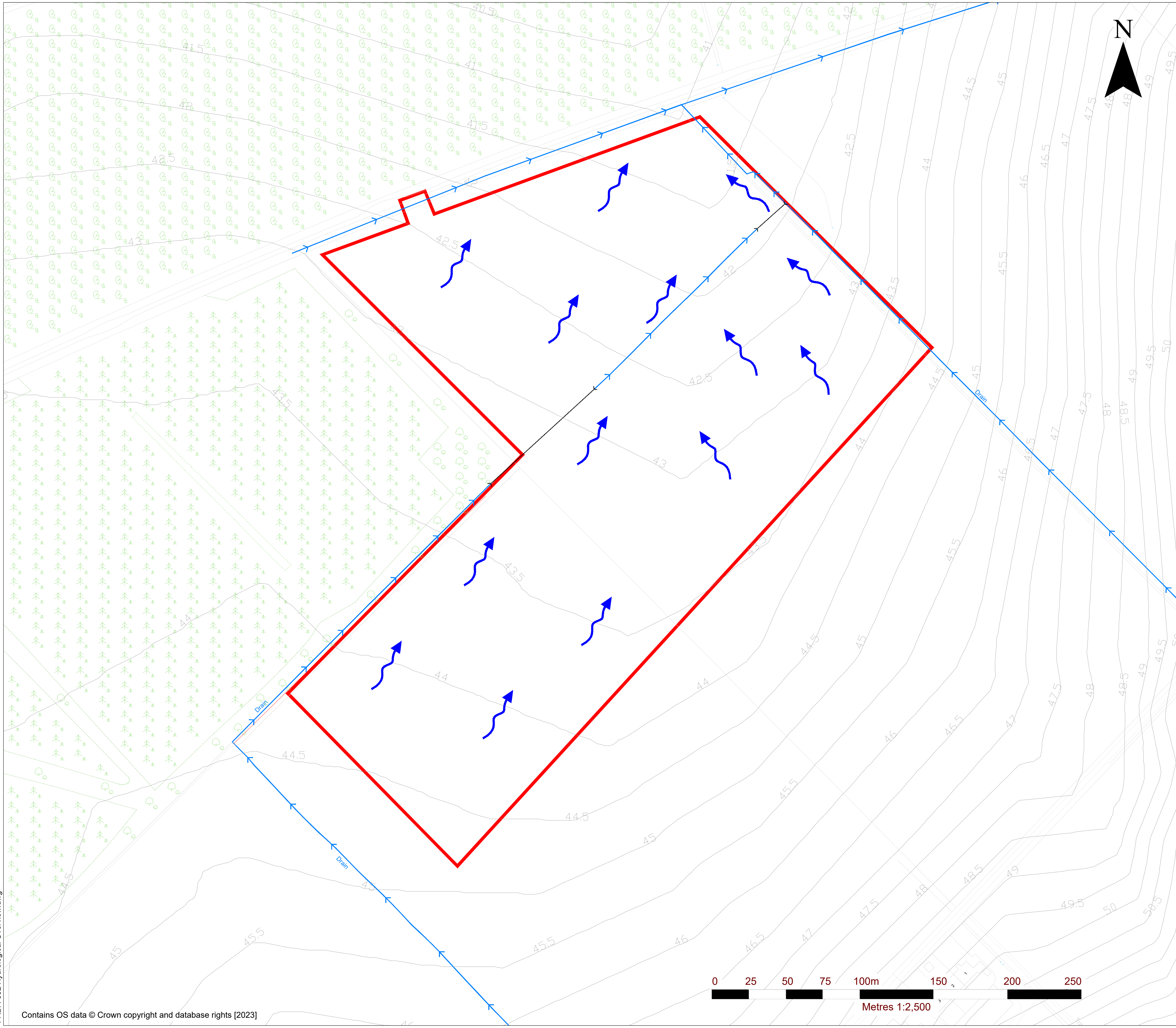
REV: **00**

DRAWING STATUS: FOR PLANNING

GONDOLIN LAND & WATER LTD
15 Quayside Street
Edinburgh
EH6 6EJ
Registered Company No. SC706920

GONDOLIN Land & Water

FRDA-001 Site Location Plan.dwg



FRDA-002 Hydrological Overview.dwg

NOTES

1. CONTOURS OBTAINED OS TERRAIN 5 DATA.

LEGEND

- SITE BOUNDARY
- EXISTING CONTOURS (0.5m INTERVALS)
- EXISTING WATERCOURSE / DRAIN
- EXISTING CULVERT
- OVERLAND FLOWPATH

REV	DATE	DESCRIPTION	BY	CHK
00	11/23	INITIAL ISSUE	GD	SD

CLIENT:
SIMEC ATLANTIS ENERGY

PROJECT:
Mey BESS

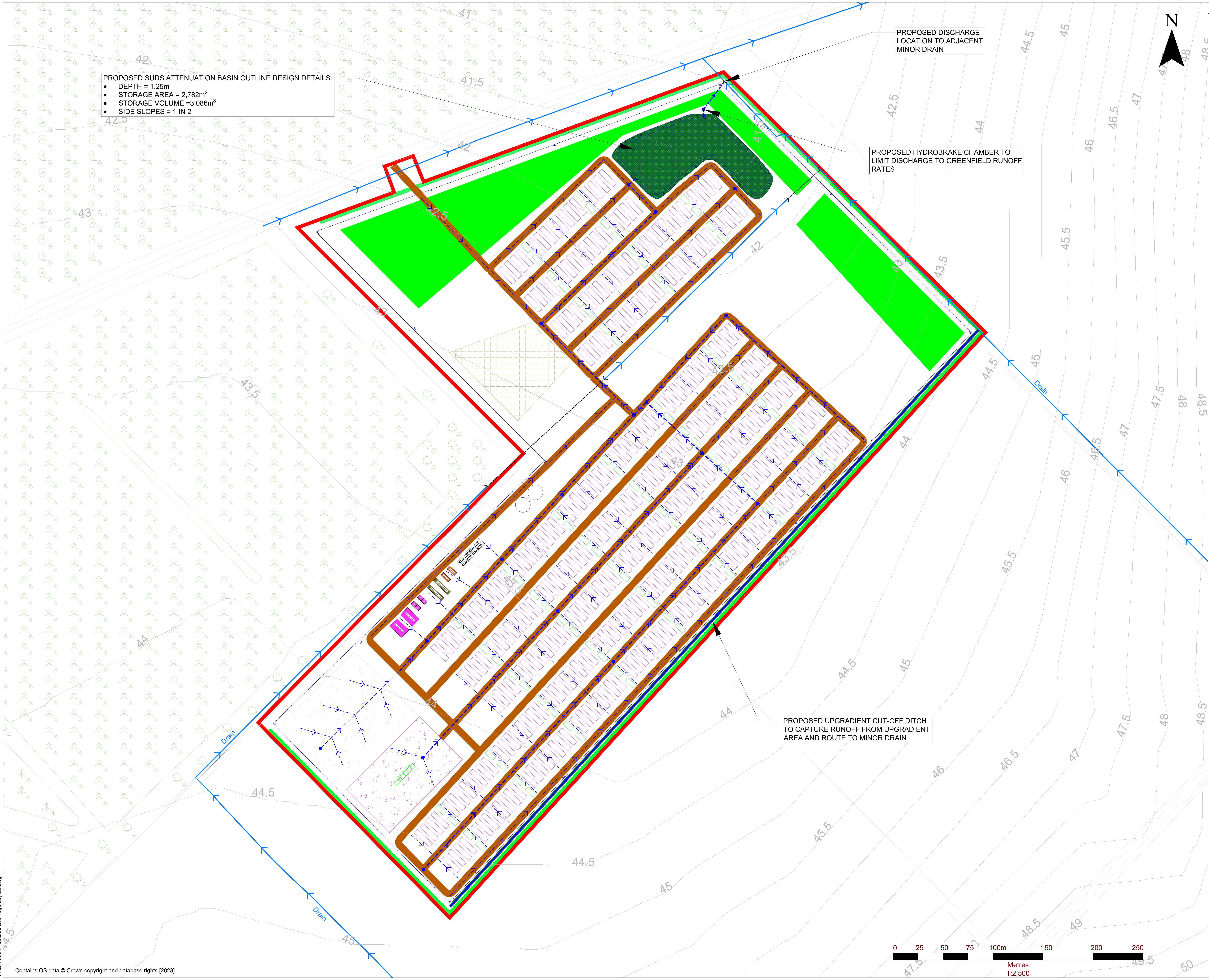
DRAWING TITLE:
HYDROLOGICAL OVERVIEW

SCALE:	DATE:
1:2,500 @ A3	NOVMEBER 2023

DRAWING NUMBER:	REV:
FRDA-002	**00**

DRAWING STATUS:
FOR PLANNING

GONDOLIN LAND & WATER LTD
15 Quayside Street
Edinburgh
EH6 6EJ
Registered Company No. SC706920
GONDOLIN Land & Water



FRDA-003 Proposed Drainage Layout.dwg

NOTES

1. DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS.
2. SITE LAYOUT OBTAINED FROM DRAWING "BESS SITE LAYOUT 9 V5" PROVIDED BY SIMEC ATLANTIS ENERGY.
3. REFER TO ABOVE DRAWING FOR PROPOSED INFRASTRUCTURE LEGEND DETAILS.
4. DESIGN SHOULD BE CONSIDERED PROVISIONAL OUTLINE DETAIL. FINAL LEVELS, GRADIENTS, EXACT ALIGNMENTS AND DETAILS TO BE CONFIRMED AT LATER DESIGN STAGES.

LEGEND

- SITE BOUNDARY
- EXISTING CONTOURS (0.5m INTERVALS)
- EXISTING WATERCOURSE / DRAIN
- EXISTING CULVERT
- PROPOSED 160mm PERFORATED PIPEWORK
- PROPOSED 2 x 160mm PERFORATED PIPEWORK
- PROPOSED INSPECTION / MANHOLE CHAMBER
- PROPOSED SUDS ATTENUATION BASIN
- PROPOSED CONVENTIONAL PIPEWORK
- PROPOSED HYDROBRAKE CHAMBER
- PROPOSED UPGRADIENT CUT OFF DITCH

REV	DATE	DESCRIPTION	BY	CHK
00	11/23	INITIAL ISSUE	GD	SD

CLIENT:
SIMEC ATLANTIS ENERGY

PROJECT:
Mey BESS

DRAWING TITLE:
PROPOSED DRAINAGE LAYOUT

SCALE: 1:1,500 @ A3

DATE: NOVEMBER 2023

DRAWING NUMBER: 003

REV: 00

DRAWING STATUS: FOR PLANNING

GONDOLIN LAND & WATER LTD
15 Quayside Street
Edinburgh
EH6 6EJ
Registered Company No. SC706920

GONDOLIN Land & Water

GONDOLIN
Land & Water

Civil Engineering and Environmental Solutions

Gondolin Land and Water Ltd is a small, client friendly environmental and civil engineering consultancy business based in Scotland with coverage throughout the UK.

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