Drainage Strategy Report

Branxton Battery Storage Facility

Client: EastCoastGridServices Ltd.
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East Coast Grid Services Ltd.

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Issue History	Date	Details
V1.0	09/06/2023	Client Issue
V1.1	12/06/2023	Final Draft

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1 Introduction

1.1 Purpose of Report

Green Cat Renewables Ltd. have been commissioned by EastCoastGridServices Ltd. To create a drainage and SuDS strategy for the proposed battery storage facility at Branxton, South of Torness, East Lothian. The development comprises of 278 battery storage units, large hard standings for transformers and substation buildings over an area of 11 hectares. The primary purpose of this document is to ensure that appropriate levels of treatment and safeguards are in place to manage surface water on site in accordance with SEPA and CIRIA guidelines. A Section 36 Planning application has been submitted to The Scottish Government Energy Consents Unit for the Branxton Energy Storage Facility, and if consented, the project would look to commence construction in 2026/2027.

1.2 The Site

The proposed energy storage facility is located approximately 250m Southwest of the A1 to the south of Throntonloch and approx. 1km south of Torness Power Station, East Lothian. Site is bounded to the north, Northeast by an existing railway line and to the South by Harp Law hill.

The existing site is currently in a greenfield state as open fields with no signs of previous development. Centre of site is at grid ref. NT 749 735

Figure 1.1 – Location Plan

1.3 Ground Investigation

Ground investigation was conducted on site from summer 2022 to Feb 2023. The report shows there is nothing to suggest any contaminations on site and no made ground encountered. It is considered that there is no risk to the water environment and there is no risk or concern regarding hazardous gases.

The site is overlain with natural topsoil at depths of 0.10m to 0.40m. The underlying material varies throughout; cohesive and granular glacial tills were recorded. There are considerable areas of the site within the granular glacial till where it may be possible to utilise infiltration drainage. Geotechnical engineers assessed that this granular material would have an infiltration rate of approximately $1x10^{-4}$m/s to $3x10^{-5}$m/s. The preliminary drainage design uses the worst-case figure of $3x10^{-5}$m/s. Infiltration tests in accordance with BRE365 should be conducted for detailed design stage.

It is noted within the GI report that 75% of exploratory holes encountered no ground water, and in others seepage was encountered at depths ranging from 2 - 5.6m depth. Standpipes in BHs were noted as dry during monitoring in December 2022.

2 Drainage Strategy Plan

2.1 Introduction

It should be noted that the site is proposed to have minor personnel presence during the operational phase of the project, so no foul water drainage infrastructure is currently proposed. Only surface water runoff will be managed across site. The site falls within SEPAs GBR10B as stated in WAT-SG-12 "The discharge of water run-off from a surface water drainage system to the water environment from buildings, roads other than water bound roads, yards, or any other built development."

2.2 Existing Site Drainage

An existing site drainage plan is provided in Appendix A - ECGS-GCR-DR-GA-DR-C-0002.

This shows the greenfield with contours, existing surface water flow directions and areas at risk of surface water flooding as modelled on SEPAs flood risk maps.

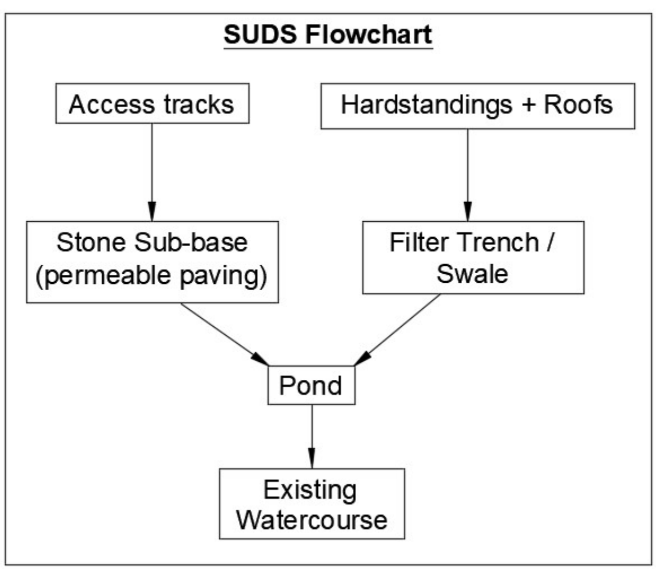
SEPA flood maps identify areas adjacent to the proposed site area where there is risk of surface water flooding. These are shown on both existing and proposed drainage plans. There is no flooding noted within the actual site area.

2.3 Permanent Surface Water Strategy

Site drainage has been designed to manage all surface water in line with the CIRIA C753 'The SUDS Manual' (2015).

The main goal of the drainage design is to mimic the natural greenfield state of the site as best as possible and to provide enough on-site surface water storage and treatment so that the concentrated discharge to existing watercourse has no adverse affects to the natural environment.

The proposed drainage will utilise various SuDS methods to achieve this. Below is the proposed SuDS flow chart, taken from Drainage Plan *ECGS-GCR-DR-GA-DR-P-0001 Appendix B*.



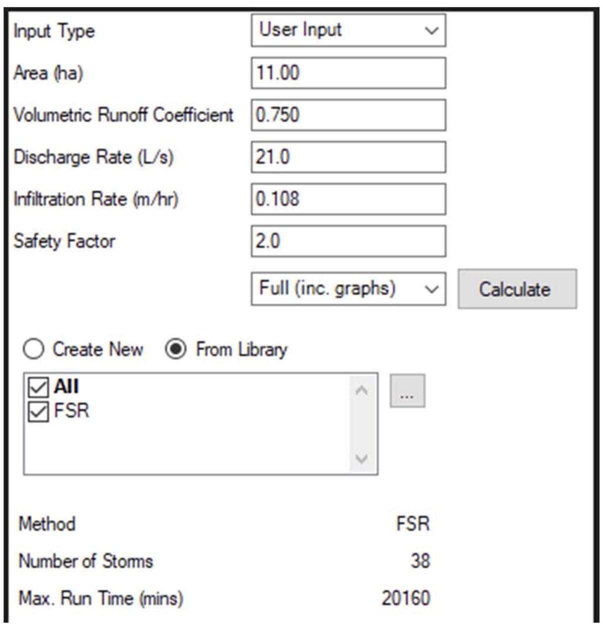
Rainwater falling directly onto access roads will be treated at source via. permeable paving with a free drainage sub-base; type 3 stone or similar, and then collected through underdrains.

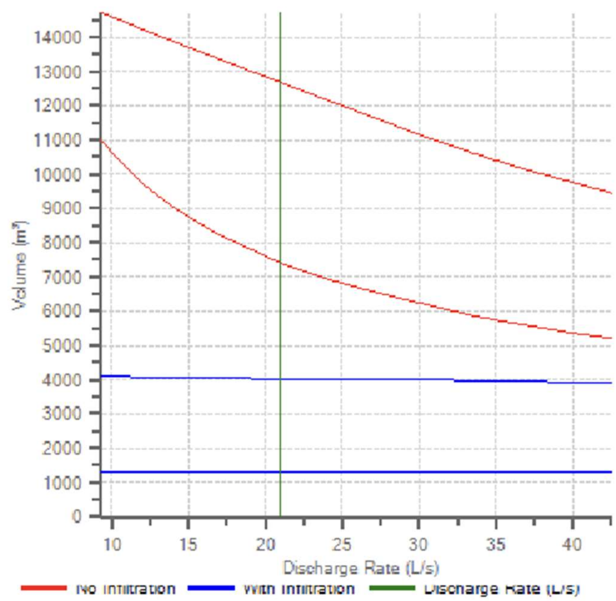
Rainwater falling on battery / substation roofs and hard standings will be treated at source via. filter trenches or swales with perforated pipes, these will connect to the underdrains mentioned above.

Underdrains and other collector pipes will make their way to the SuDS Pond for final treatment / storage and then discharge to the existing watercourse.

<u>Surface Water Storage Estimate</u>

A storage estimate calculation for up to the 30yr critical return period + 39% climate change was undertaken, considering discharge rate and an infiltration rate of $3x10^{-5}$m/s. The results shows that approximately 1300-4000m^3 of surface water storage is required throughout the site. The final storage volume will be refined during detailed design stage. See below output from drainage design software MicroDrainage.

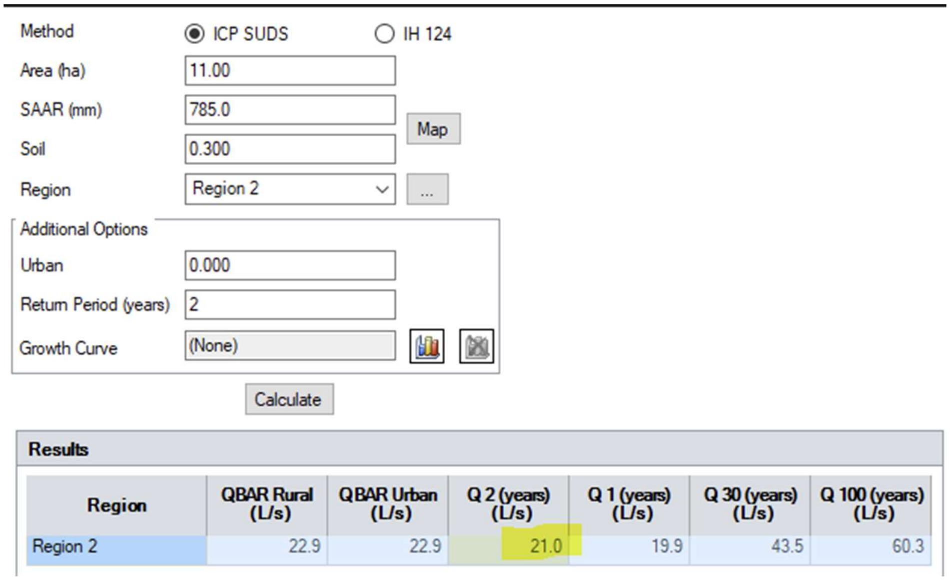




Storage Estimate Input *Storage Estimate Graph*

<u>Surface Water Discharge Rate</u>

The discharge from the Pond to existing watercourse will be restricted to the equivalent 2yr Green Field Runoff rate for storms up to and including the 30yr critical return period + 39% climate change. Calculated to be 21l/s, see below output from MicroDrainage calc. It is also proposed to have an overflow to existing watercourse for storms greater than the 30yr critical return period + 39% climate change. This is proposed so that in the event of an extremely rare storm there is less risk of damage to the electrical equipment held on site – It is unlikely that the overflow will ever be utilised.



Region	QBAR Rural (L/s)	QBAR Urban (L/s)	Q 2 (years) (L/s)	Q 1 (years) (L/s)	Q 30 (years) (L/s)	Q 100 (years) (L/s)
Region 2	22.9	22.9	21.0	19.9	43.5	60.3

Discharge rate calculation MicroDrainage

See Appendix B – Proposed Drainage Strategy for further information.

3 Conclusion

As the discharge rate is mimicking the greenfield state and we are introducing considerable surface water storage throughout the site this should have no adverse affects and actually reduce the risk of any surface water flooding downstream of our discharge point.

The drainage scheme will be implemented as soon as practicable. Post construction, the drainage system will be regularly inspected, and the appropriate maintenance will be carried out to always keep the system under effective operation

Appendix A – Existing Site Drainage

Refer to Surface water drainage existing Drawing (ECGS-GCR-DR-GA-DR-C-0002)

Appendix B – Drainage Layout

Refer to Surface water drainage strategy (ECGS-GCR-DR-GA-DR-C-0001)