GONDOLIN
Land & Water
Civil Engineering & Environmental Solutions

Project	Cossans Solar and BESS
Client	Trio Power Ltd
Document Title	Technical Appendix 7.2 Firewater Management Plan
Revision	Rev1
Prepared by	Patrick Shields
Checked by	Stephen Donnan
Date	03/04/2025

1. Context

Gondolin Land and Water Ltd (Gondolin) has been appointed by SLR Consulting Limited on behalf of Trio Power Ltd to prepare a Firewater Management Plan (FWMP) to provide support and input to the Environmental Impact Assessment Report (EIAR) submission to support a planning application for a proposed solar farm and battery storage development at land 1.5km west of the A90 Forfar Bypass, Cossans, Angus DD8 1QY. This FWMP has been prepared as a report for planning and Technical Appendix 7.2 to Chapter 7: Hydrology and Flood Risk within the EIAR.

Gondolin Land & Water Ltd (Gondolin) have also prepared a Flood Risk and Drainage Assessment (FRDA) report[1] to accompany the planning application which should be reviewed in conjunction with this letter.

In light of the release of National Fire Chiefs Council (NFCC) guidance[2] for Fire Rescue Services with respect to BESS, Gondolin have prepared this Firewater Management Plan (FWMP) to demonstrate how firewater runoff volume would be controlled and managed at the site.

It is noted that new draft NFCC guidance has recently been released, however this strategy is based on the 2023 adopted guidance. Comparison of both versions of the guidance indicates that the adopted 2023 version is considered more conservative given the updates indicated within the draft guidance in terms of water supply volumes etc.

This FWMP is based on the management and full containment of approximately 10 hours of storage at a rate of 1900 l/minute for a total volume of 1,136m^3 without intervention. This exceeds the minimum requirement for water supply of 2 hours at 1900 l/minute noted in the NFCC Guidance.

[1] Gondolin Land & Water Ltd (2025) Cossans Solar and BESS, FRDA Report Ref: GON.0557.0310, 29th March 2025
[2] National Fire Chiefs Council (2023) Grid Scale Battery Energy Storage System Planning – Guidance for FRS

Gondolin and / or Trio Power Ltd shall liaise with the Scottish Fire and Rescue Service (SFRS) throughout the development and construction phases to ensure the proposed FWMP is in compliance with the latest best practice guidance.

2. Summary of Proposed Strategy

The proposed strategy to manage the firewater runoff generated is for **Full Containment** within the proposed SuDS Attenuation Basin. It is noted that firewater containment measures proposed are for the BESS platform only as the firewater management requirements do not apply to the substation platform.

To achieve the full containment of the firewater runoff, specific control measures are proposed and details are included on Drawings FWMP-001 and FWMP-002 enclosed.

A summary description of the FWMP Strategy Principles and Design Proposals are as follows:

1. The Engineered Formation Layer of the development area (i.e., engineered base beneath the Type 3 stone capping layer) is to be suitably compacted and will be made impermeable. Firewater runoff will follow surface water drainage routes via subsurface perforated pipework and perimeter filter drains and will convey firewater runoff into the attenuation basin. An enhanced network of herringbone drainage has been proposed within the design to ensure no firewater runoff is lost to the surrounding area.
2. Development surfaces will be suitably graded to promote the capture of flow within the proposed herringbone drainage systems.
3. The proposed attenuation basin shall be lined to prevent any uncontrolled discharge of potentially contaminated runoff.
4. The Hydrobrake chamber at the attenuation basin outlet is to be fitted with a manually / remotely operated penstock valve and appropriately signposted as the Firewater Isolation Valve. As the attenuation basin shall be lined, the piped outlet is the only viable pathway for contaminated firewater to enter the water environment.
5. The location and testing of the Firewater Isolation Valve will be duly incorporated into the site Operation and Maintenance (O&M) and Incident Response Plans. In the event of a fire, the Fire Isolation Valve is to be remotely closed as part of the wider site emergency response procedures to a fire being detected.
6. The Client will sign into an agreement with a local emergency waste disposal service who can provide a sealed mobile tanker to the site in a timely manner. This will provide the means to remove contaminated runoff quickly in the event there is also additional rainfall volume to accommodate or the firefighting volume exceeds the minimum volume available of 1,136m^3. It is noted that the attenuation basin has capacity to store a 1-day rainfall event during the 1 in 30 year scenario whilst also being able to store over 7 hours of firewater runoff.
7. Access for a mobile tanker would be achieved via the proposed track adjacent to the attenuation basin. A mobile tanker shall be able to empty the attenuation basin with an extended suction hose able to extend up to 10-30m. If preferred, an accessible manhole chamber for pumping purposes can be installed at a preferred location adjacent to the site access track.

8. It is recommended (if safe to do so) that any retained firewater is regularly tested within the attenuation basin. By undertaking water quality testing of the collected runoff, levels of contamination can be determined. This shall help determine where the collected runoff should be disposed of, which may include (subject to agreement with SEPA) reopening the outlet route if no contamination is present to allow the attenuation basin to drain and discharge as normal. Monitoring and testing would be undertaken at regular intervals to ensure no change to the water quality.
9. Following the fire incident, appropriate inspections of FWMP control measures will be undertaken to ensure integrity is maintained and targeted measures will be drawn up for the Remediation Plan.
10. The Remediation Plan will likely involve continued closure of the Fire Isolation Valve for a period of time until the fire damaged equipment has been removed from site and high pressure targeted cleaning of the drainage system components has been conducted. Tankering of contaminated runoff off-site from the site may be required during this period. Topsoil lining the attenuation basin may need to be stripped and disposed of off-site (i.e. at Landfill or similar). A schedule of soil sampling will be undertaken to determine this.
11. Only once the Topsoil is deemed safe or is replaced, the drainage system has been suitably washed and the water entering the attenuation basin has been suitably tested and satisfies the relevant Environmental Quality Standards (EQS), will the Fire Isolation Valve be re-opened and surface water runoff be allowed to discharge to the watercourse to the west of the site.
12. Following the fire incident, updates to the O&M and Incident Response Plans will be made using site observations, feedback from SFRS and 'lessons learned'.

The above FWMP Summary should be considered provisional and a statement of commitment by the Client to implement the principles of the strategy. The exact final arrangements and details would be written up at the detailed design stages and into the site O&M and Incident Response Plans at the appropriate time.

3. Firefighting Water Supply

NFCC guidance stipulates that a firefighting flow rate of approximately 32l/s is preferential at all BESS sites. At planning stage, Scottish Water do not tend to provide a suitable response in terms of firefighting flow rates which can be provided by their assets for BESS developments. Nevertheless, from review of existing nearby mains, it is considered that none would be suitable to provide the required flow rates.

As such, it is proposed to provide the initial fire fighting volume within the site through the provision of a water storage tank within the site boundary. This storage provision shall be sized to provide the required initial 2-hour water supply for firefighting purposes as per NFCC guidance. The proposed water storage tanks are shown indicatively within the BESS development platform. The water storage tank shall be fitted with a distribution system to provide hydrant access across the site to ensure fire fighting services can readily access the water supply at various location across the site.

4. Closure

We trust the proposed measures and principles to manage firewater runoff at the proposed Cossans BESS are acceptable and provide SFRS the comfort that firewater can be appropriately managed at the site without posing a risk to the environment / human health.

Enc. ***Drawings:***

FWMP-001 – Firewater Management Overview

FWMP-002 – Firewater Management Details

Drawings

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PROPOSED HERRINGBONE DRAINAGE SYSTEM. FINAL GRADING TO CONSIDER HERRINGBONE SYSTEM LAYOUT TO PROMOTE DRAINAGE OF SITE

PROPOSED SUDS / FIREWATER BASIN OUTLINE DETAILS:
- STORAGE AREA = 912.6m²
- STORAGE DEPTH = 2m
- SIDE SLOPES = 1:3
- STORAGE VOLUME = 1136m³

INSPECTION CHAMBERS TO ALLOW FOR INSPECTION OF HERRINGBONE DRAINAGE SYSTEM AND MAINTENANCE PURPOSES (E.G., JETTING)

300m3 WATER TANK 7.5M HEIGHT

WATER TANK TO PROVIDE INITIAL FIREFIGHTING VOLUME

HYDRANTS LOCATED AROUND PERIMETER OF BESS COMPOUND (EXACT LOCATION TO BE DETERMINED AT DETAILED DESIGN STAGE)

HYDROBRAKE CHAMBER TO RESTRICT FLOWS FOR NORMAL STORMWATER OPERATION. CHAMBER FITTED WITH PENSTOCK VALVE TO ALLOW CLOSING OF OUTLET FOR FIREWATER MANAGEMENT PURPOSES

FILTER DRAIN TO CAPTURE ANY RUN-OFF NOT COLLECTED WITH HERRINGBONE DRAINAGE SYSTEM

SURFACE WATER DISCHARGE ROUTE FOR NORMAL OPERATION ONLY

0 4 8 12 16m 24 32 40

Metres 1:400

NOTES

1. DTM DATA TAKEN FROM SCOTTISH REMOTE SENSING PORTAL.
2. SITE LAYOUT TAKEN FROM DRAWING 'DESIGN_CONSTRAINTS_250305' PROVIDED BY SLR.
3. DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER SCHEME DRAWINGS
4. DESIGN SHOULD BE CONSIDERED PROVISIONAL OUTLINE DETAIL TO BE REFINED AT DETAILED DESIGN STAGE.

LEGEND

- PLANNING BOUNDARY
- EXISTING MAJOR CONTOURS (5m INTERVALS)
- EXISTING MINOR CONTOURS (1m INTERVALS)
- PROPOSED FILTER DRAIN
- PROPOSED CONVENTIONAL PIPEWORK
- PROPOSED PERFORATED PIPEWORK
- PROPOSED MANHOLE CHAMBER
- PROPOSED HYDROBRAKE CHAMBER
- PROPOSED SUDS BASIN
- PROPOSED HEADWALL / RIP RAP
- PROPOSED GRADING DIRECTIONS (SUBSURFACE & SURFACE)
- PROPOSED FIREWATER SUPPLY TANK
- INDICATIVE PROPOSED FIRE WATER PIPEWORK
- (H) INDICATIVE PROPOSED FIRE HYDRANT

REV	DATE	DESCRIPTION	BY	CHK
00	04/25	INITIAL ISSUE	GD	SD

CLIENT: TRIO POWER LIMITED

PROJECT: COSSANS SOLAR & BESS

DRAWING TITLE: **FIREWATER MANAGEMENT OVERVIEW PLAN**

SCALE: 1:400 @ A2

DATE: APRIL 2025

DRAWING NUMBER: **FWMP-001**

REV: **00**

DRAWING STATUS: FOR PLANNING

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

GONDOLIN Land & Water

FWMP-001 Overview Plan.dwg

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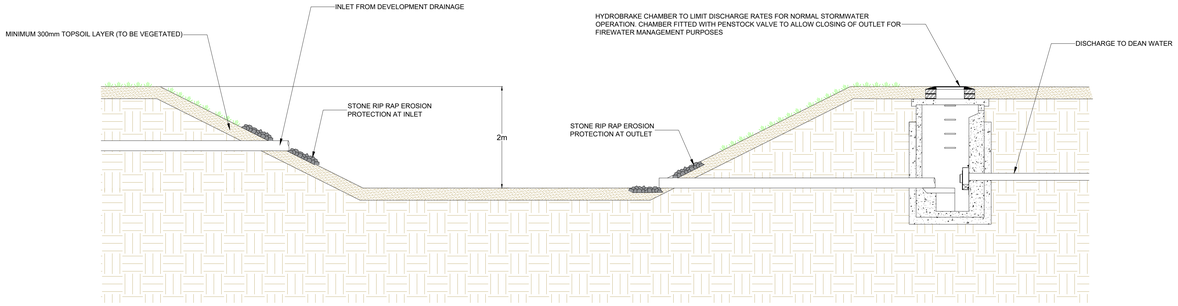
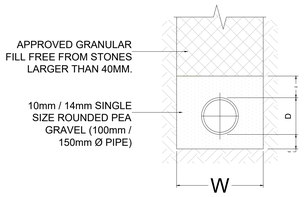
NOTES
1. REFER TO DRAWING FRDA-003 FOR DRAINAGE LAYOUT OVERVIEW.
2. DETAILS SHOWN ARE OUTLINE DETAIL AND SUBJECT TO REVISION AT THE DETAILED DESIGN STAGES



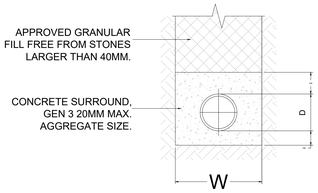
TYPICAL SECTION THROUGH ATTENUATION BASIN
NTS



CLASS 'S' PIPE BEDDING & BACKFILLING DETAIL

NTS

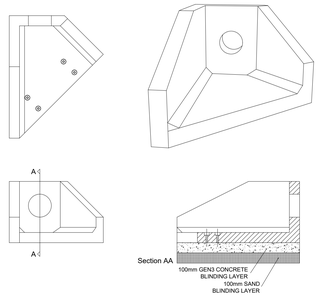
PIPES WHERE COVER TO CROWN IS GREATER THAN 1200MM UNDER ROADS AND FOOTPATHS



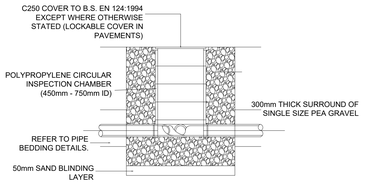
CLASS 'Z' PIPE BEDDING & BACKFILLING DETAIL

NTS

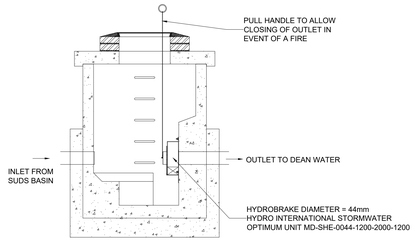
PIPES WHERE COVER TO CROWN IS LESS THAN 1200MM UNDER ROADS AND FOOTPATHS



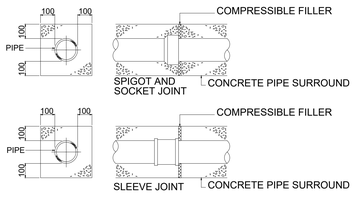
PRECAST CONCRETE ANGLED OUTLET HEADWALL - UP TO 300mm Ø (ALTHON A4CA LH OR SIMILAR)
NTS



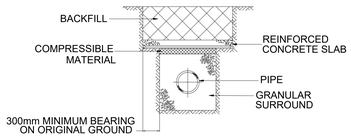
TYPICAL INSPECTION CHAMBER DETAIL (GRAVEL SURROUND - NON-TRAFFICKED AREAS)
NTS



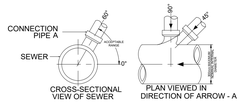
HYDROBRAKE OPTIMUM CHAMBER
NTS



JOINTS FOR CONCRETE ENCASED PIPES
NTS



ALTERNATIVE PIPE PROTECTION DETAIL
NTS



BRANCH SEWER CONNECTION DETAIL
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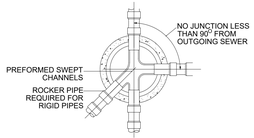
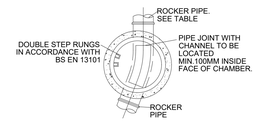
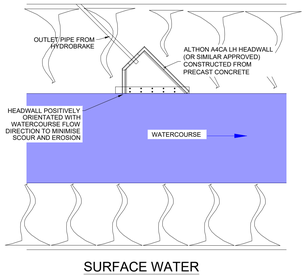


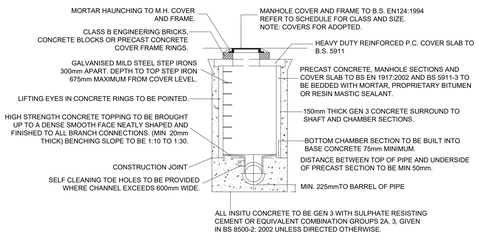
TYPICAL MANHOLE ARRANGEMENT OF PIPE JUNCTIONS
NTS



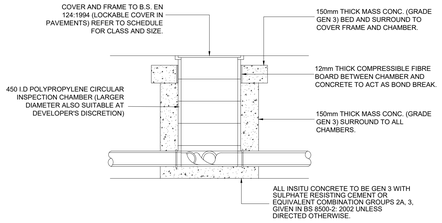
PLAN ON MANHOLE
NTS



SURFACE WATER OUTLET DETAIL
NTS



TYPICAL MANHOLE CHAMBER
NTS



TYPICAL INSPECTION CHAMBER DETAIL
NTS

NOTE: RIGID PIPES BUILT INTO MANHOLES SHALL HAVE A FLEXIBLE JOINT AS CLOSE AS FEASIBLE TO THE EXTERNAL FACE OF THE STRUCTURE AND THE LENGTH OF THE NEXT ROCKER PIPE SHALL BE AS IN THE TABLE BELOW

MIN ROCKER PIPE LENGTH

NOMINAL DIAMETER(mm)	L(mm)
150 to 600	600
over 600 to 750	1000
over 750	1250

INTERNAL DIAMETER OF MANHOLE

DIAMETER OF LARGEST PIPE IN MANHOLE (MM)	INTERNAL DIAMETER OF MANHOLE (MM)
LESS THAN 375	1200
375 to 450	1350
500 to 700	1500
750 to 900	1800
>900	PIPE DIAMETER +900

INTERNAL DIAMETER OF INSPECTION CHAMBERS

DIAMETER OF LARGEST PIPE IN MANHOLE (MM)	DIAMETER OF INSPECTION CHAMBER (MM)
LESS THAN 160	450
160 to 300	600
300 to 450	750

REV	DATE	DESCRIPTION	BY	CHK
00	04/25	INITIAL ISSUE	GD	SD

CLIENT: TRIO POWER LIMITED

PROJECT: COSSANS SOLAR & BESS

DRAWING TITLE: **FIREWATER MANAGEMENT TYPICAL DETAILS**

SCALE: AS STATED @ A0

DATE: APRIL 2025

DRAWING NUMBER: **FWMP-002**

REV: **00**

DRAWING STATUS: FOR PLANNING

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