Technical Appendix

Lairdmannoch Energy Park

Technical Appendix 8-7: Firewater Management Plan

Lairdmannoch Energy Park Limited

May 2025

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Glossary of Terms

Term	Definition
The Applicant	Lairdmannoch Energy Park Limited
The Agent	Atmos Consulting Limited
Environmental Advisors and Planning Consultants	Atmos Consulting Limited
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of carrying out, in a systematic way, an assessment of the likely significant environmental effects from a development.
Environmental Impact Assessment Regulations	Electricity Works (Environmental Impact Assessment)(Scotland) Regulations 2017 ('the EIA Regulations')
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the EIA Regulations.
The Proposed Development	Lairdmannoch Energy Park
The Proposed Development Site	The full application boundary as per Figure 1-1

List of Abbreviations

Abbreviation	Description
BESS	Battery Energy Storage System
EQS	Environmental Quality Standards
FWMP	Firewater Management Plan
NFCC	National Fire Chiefs Council
O&M	Operation and Maintenance
SEPA	Scottish Environmental Protection Agency
SFRS	Scottish Fire and Rescue Service
SuDS	Sustainable Drainage System

1 Introduction

1.1 Context

Gondolin Land and Water Ltd ('Gondolin') has been appointed by Atmos Consulting Ltd ('Atmos') on behalf of Lairdmannoch Energy Park Limited ('the Applicant') to prepare a Firewater Management Plan for the Battery Energy Storage Site (BESS) element of an application for consent under Section 36 of the Electricity Act (Scotland) 1989 (as amended) to develop an energy park consisting of 9 wind turbines at up to 180 m to tip height, ground mounted solar panels, battery energy storage systems (BESS) and associated infrastructure including electrical transformers, hardstandings, access roads, cabling, borrow pit and electrical substation (the 'Proposed Development').

In light of the release of National Fire Chiefs Council (NFCC) guidance for Fire Rescue Services with respect to BESS, Gondolin have been instructed to prepare a 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 (but not officially adopted) 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 the proposed firewater suppression system, based on a supply of 230m^3 from static tanks, which exceeds the requirement for water supply of 2 hours at 1900 l/minute noted in the NFCC guidance. The Applicant would liaise with 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 where appropriate.

2 Proposed Strategy

2.1 Summary

The proposed strategy to manage the firewater runoff generated is for **Full Containment** within the proposed SuDS Attenuation pond which has an available storage volume of 406m^3. The storage capacity is equivalent to more than 3 and a half hours of firewater storage without intervention.

To achieve the full containment of the firewater runoff, specific control measures are proposed, and details are included on Figure 8-7-1 and Figure 8-7-2.

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) would be suitably compacted and would be made impermeable. Firewater runoff would follow surface water drainage routes via subsurface perforated pipework and perimeter filter drains and would convey firewater runoff into the attenuation pond. An enhanced network of herringbone drainage is proposed within the design to ensure no firewater runoff is lost to the surrounding area.
2. Development surfaces would be suitably graded to promote the capture of flow within the proposed herringbone drainage system.
3. The proposed attenuation pond would be lined to prevent discharge to ground of potentially contaminated runoff.
4. The Hydrobrake chamber at the attenuation pond outlet would be fitted with a remote operated penstock valve and appropriately signposted as the Firewater Isolation Valve. The valve would be designed to also allow for manual operation. As the attenuation pond would be lined, the piped outlet would be the only viable pathway for contaminated firewater to enter the water environment.
5. The location and testing of the Firewater Isolation Valve would be duly incorporated into the site Operation and Maintenance (O&M) and Incident Response Plans. In the event of a fire, the Firewater Isolation Valve would be remotely closed as part of the wider site emergency response procedures to a fire being detected. Manual operation of the valve as a backup would also be possible.
6. The Applicant would 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 would 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 maximum volume available of 406 m^3. It is noted that the SuDS pond would have capacity to store a 10hr rainfall event during the 10-year scenario whilst maintaining an available volume of approximately 233m^3 (equivalent to over approximately 2 hours of firewater runoff storage). This demonstrates that the attenuation pond is suitably sized to accommodate both rainfall and firewater runoff simultaneously.
7. Access for a mobile tanker would be achieved from the site tracks. A mobile tanker would be able to empty the attenuation pond with an extended suction hose able to extend 10-30m.

8. It is recommended (if safe to do so) that any retained firewater is regularly tested within the attenuation pond. By undertaking water quality testing of the collected runoff, levels of contamination can be determined. This would 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 pond 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 any fire incident, appropriate inspections of FWMP control measures would be undertaken to ensure integrity is maintained and targeted measures would be drawn up for the Remediation Plan.
10. The Remediation Plan would 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 away from the site may be required during this period. Topsoil lining the attenuation pond 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 pond has been suitably tested and satisfies the relevant Environmental Quality Standards (EQS), would the Fire Isolation Valve be re-opened and surface water runoff be allowed to discharge to the adjacent drainage ditch.
12. Following any 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 Applicant 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.

2.2 Firefighting Water Supply

Given the remote location of the proposed BESS, it would not be possible to maintain a suitable connection to the local water mains to provide the fire-fighting flow rates required as stipulated by NFCC guidance (approximately 32 l/s).

It is therefore proposed that a water supply tank is provided within the site to provide 230m^3 of water, which exceeds the minimum of 228m^3 of supply required by NFCC guidance. A proposed supply pipe network and indicative hydrant locations are included on Figure 8-7-1 to provide sufficient water supply access points throughout the site.

3 Closure

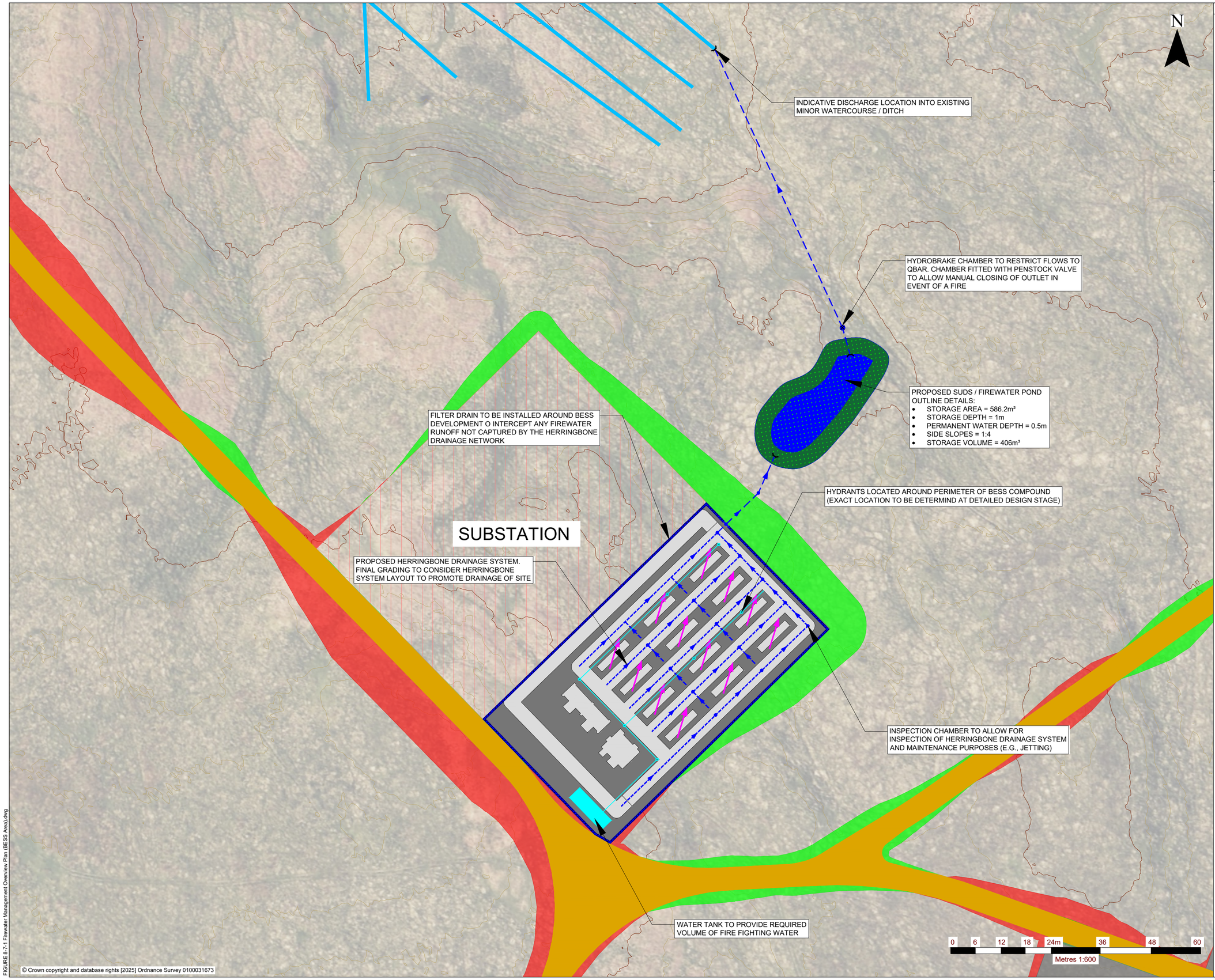
Gondolin Land and Water Ltd ('Gondolin') has been appointed by Atmos Consulting Ltd ('Atmos') on behalf of Lairdmannoch Energy Park Limited ('the Applicant') to prepare a Firewater Management Plan for the Battery Energy Storage Site (BESS) element of an application for consent under Section 36 of the Electricity Act (Scotland) 1989 (as amended) to develop an energy park consisting of 9 wind turbines at up to 180 m to tip height, ground mounted solar panels, battery energy storage systems (BESS) and associated infrastructure including electrical transformers, hardstandings, access roads, cabling, borrow pit and electrical substation (the 'Proposed Development').

In light of the release of National Fire Chiefs Council (NFCC) guidance for Fire Rescue Services with respect to BESS, Gondolin have been instructed to prepare a FWMP to demonstrate how firewater runoff volume would be controlled and managed at the site.

The proposed measures and principles to manage firewater runoff at the BESS element of the Proposed Development demonstrate that firewater can be appropriately managed at the site without posing a risk to the environment / human health.

4 References

National Fire Chiefs Council (2023). Grid Scale Battery Energy Storage System Planning – Guidance for FRS



NOTES

1. DTM DATA TAKEN FROM SCOTTISH REMOTE SENSING PORTAL.
2. ALL DRAINAGE TO BE CONSTRUCTED IN ACCORDANCE WITH SEWERS FOR SCOTLAND AND / OR THE SCOTTISH TECHNICAL HANDBOOK WHERE APPLICABLE.
3. FINAL COVER AND INVERT LEVELS TO BE CONFIRMED DURING DETAILED DESIGN STAGE.
4. DRAINAGE DESIGN SHOULD BE CONSIDERED PROVISIONAL OUTLINE DETAIL AND NOT FOR CONSTRUCTION.
5. SITE POST DEVELOPMENT FLOW PATHS TO REMAIN AS PER THE EXISTING SITE PROFILE.
6. BESS AREA INTERNAL LAYOUT PROVIDED BY ATMOS CONSULTING LTD ON 04/03/25.

LEGEND

- EXISTING MAJOR CONTOURS (5m INTERVALS)
- EXISTING MINOR CONTOURS (1m INTERVALS)
- EXISTING MINOR WATERCOURSE / DITCH (NOT ALL SHOWN)
- PROPOSED SURFACE WATER CONVENTIONAL PIPEWORK
- PROPOSED SURFACE WATER PERFORATED PIPEWORK
- PROPOSED FILTER DRAIN
- PROPOSED SURFACE WATER MANHOLE / INSPECTION CHAMBER
- PROPOSED HYDROBRAKE CHAMBER
- PROPOSED SUDS POND
- PROPOSED HEADWALL
- PROPOSED GRADING DIRECTIONS (SUBSURFACE & SURFACE)
- PROPOSED FILL EXTENTS
- PROPOSED CUT EXTENTS
- PROPOSED TRACK
- PROPOSED FIREWATER STORAGE TANK
- PROPOSED FIREWATER HYDRANT
- PROPOSED FIREWATER DISTRIBUTION PIPEWORK

REV	DATE	DESCRIPTION	BY	CHK
01	04/25	DISCHARGE LOCATION UPDATED	GD	RL
00	03/25	INITIAL ISSUE	GD	SD

CLIENT: LAIRDMANNOCH ENERGY PARK

PROJECT: LAIRDMANNOCH

DRAWING TITLE: **FIREWATER MANAGEMENT OVERVIEW PLAN (BESS AREA)**

SCALE: 1:600 @ A2

DATE: APRIL 2025

DRAWING NUMBER: **FIGURE 8-7-1**

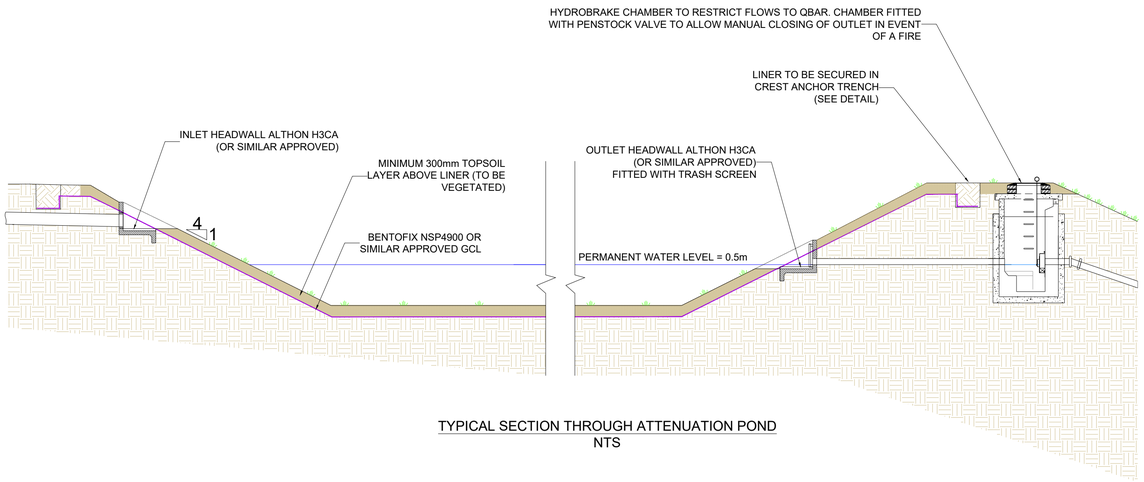
REV: **01**

DRAWING STATUS: EIA

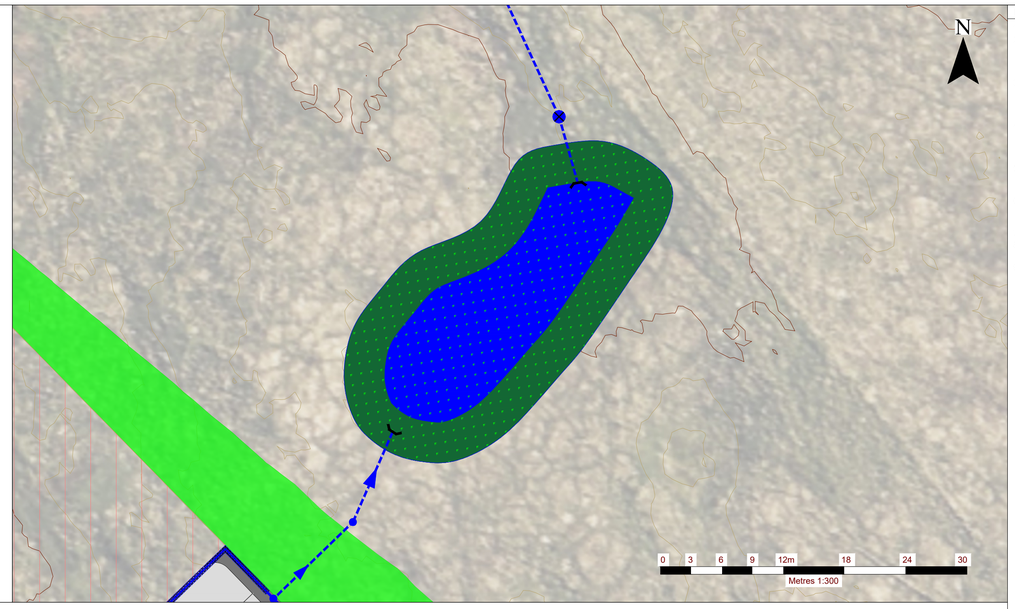
GONDOLIN LAND & WATER LTD
15 Quayside Street
Edinburgh
EH6 6EJ
Registered Company No. SC706920

GONDOLIN Land & Water

FIGURE 8-7-1 Firewater Management Overview Plan (BESS Area).dwg

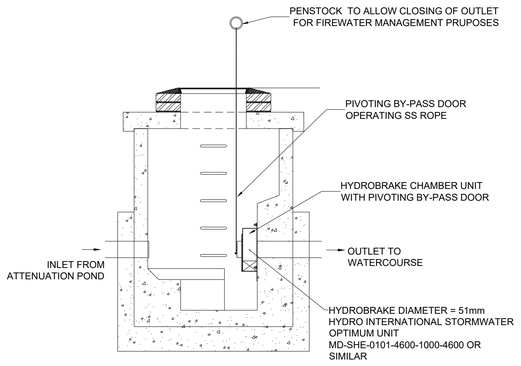


TYPICAL SECTION THROUGH ATTENUATION POND
NTS

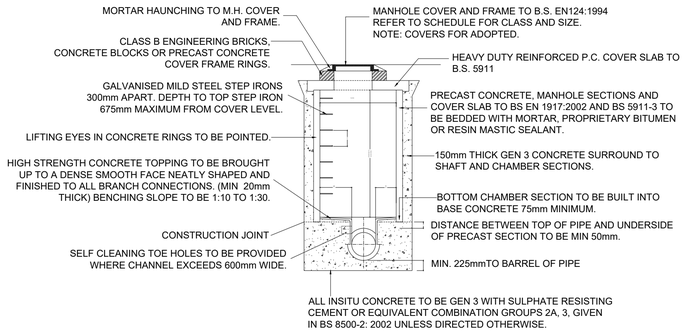


NOTES

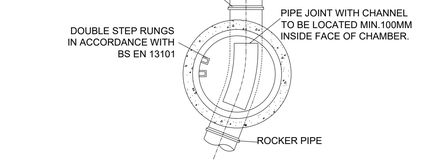
1. DO NOT SCALE THIS DRAWING.
2. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT MANUFACTURER'S DRAWINGS AND SPECIFICATIONS.
3. ALL PIPEWORK TO BE UPVC TO BS 4660 AND BS EN 1401-1, CLASS SN4 WITH FLEXIBLE JOINTS AND KITEMARK CERTIFIED (OR SIMILAR APPROVED).
4. THE CONTRACTOR IS TO REMAIN RESPONSIBLE FOR THE TEMPORARY STABILITY OF THE SURROUNDING GROUND THROUGHOUT THE CONSTRUCTION.
5. BEDDING CLASSES REFER TO THOSE GIVEN IN DMRB VOLUME 4, SECTION 2, PART 5, HA40/01, APPENDIX B.
6. ALL RELEVANT DRAINAGE ITEMS TO BE INSTALLED IN ACCORDANCE WITH LATEST EDITION OF 'SEWERS FOR ADOPTION'.
7. FOR DRAINAGE LAYOUT SEE 'FIGURE 8-6-2'
8. MANHOLE COVERS IN TRAFFICKED AREAS TO BE D400 LOAD CLASSIFICATION
9. MANHOLE COVERS ON NON-TRAFFICKED AREAS CAN BE B125 OR C250 LOAD CLASSIFICATION (AT CONTRACTORS DISCRETION).



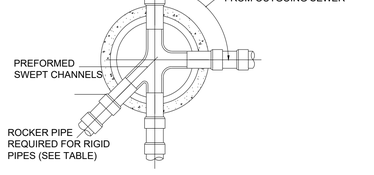
HYDROBRAKE OPTIMUM CHAMBER
NTS



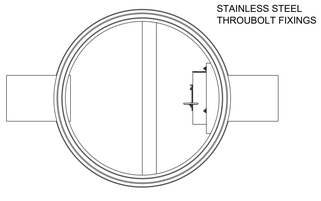
TYPICAL MANHOLE CHAMBER
NTS



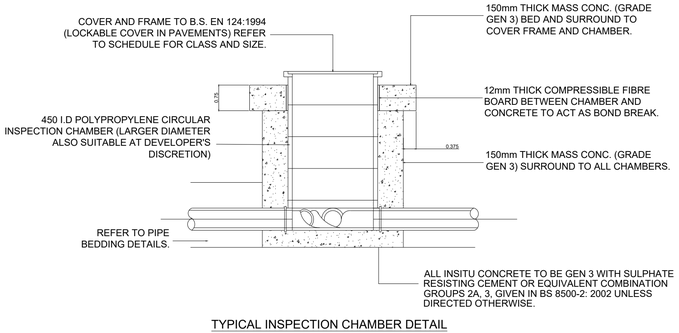
PLAN ON MANHOLE
NTS



TYPICAL MANHOLE ARRANGEMENT OF PIPE JUNCTIONS
NTS

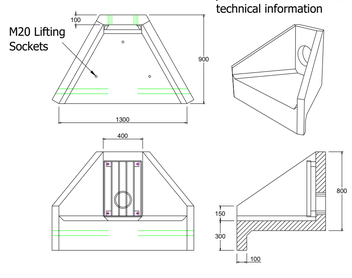


PLAN



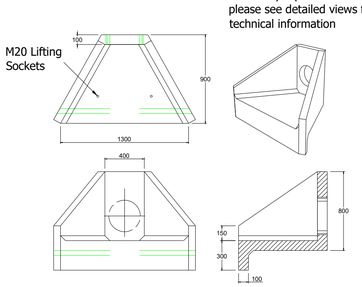
TYPICAL INSPECTION CHAMBER DETAIL
NTS

Note: Isometric drawing is for reference only, details may not accurately represent actual design - please see detailed views for technical information



PRECAST CONCRETE OUTLET HEADWALL WITH TRASH SCREEN (ATHLON H3CA OR SIMILAR) - FITTED TO SUDS POND OUTFLOW

Note: Isometric drawing is for reference only, details may not accurately represent actual design - please see detailed views for technical information



PRECAST CONCRETE INLET HEADWALL (ATHLON H3CA OR SIMILAR) - FITTED TO SUDS POND INFLOW

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
01	04/25	DISCHARGE LOCATION UPDATED	GD	RL
00	03/25	INITIAL ISSUE	GD	RL

CLIENT:
LAIRDMANNOCH ENERGY PARK

PROJECT:
LAIRDMANNOCH EP

DRAWING TITLE:
FIREWATER MANAGEMENT TYPICAL DRAINAGE DETAILS (BESS AREA)

SCALE: 1:300 @ A2 (PLAN)
DATE: APRIL 2025

DRAWING NUMBER: **FIGURE 8-7-2**
REV: **01**

DRAWING STATUS: EIA

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

GONDOLIN Land & Water

FIGURE 8-7-2 Typical Drainage Details (BESS Area).dwg