Environmental Statement: Technical Appendix 2.3 – Outline Battery Safety Management Plan

ES TA 2.3

Development of National Significance

Alaw Môn Solar Farm

Land west of the B5112, 415m south of Llyn Alaw, 500m east of Llantrisant and 1.5km west of Llannerch-y-Medd, Anglesey

February 2024

ARC-1168-004-R1

Alaw Mon Solar Farm Battery Energy Storage System – Safety Management Plan

Issue 2 – October 2023

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Executive Summary

This Safety Management Plan (SMP) is for the proposed Solar Farm and Battery Energy Storage System (BESS) Project for the Alaw Mon site.

This Safety Management Plan ('SMP') is for the Battery Energy Storage System ('BESS') proposed for Alaw Mon Solar Farm, a proposed solar farm that will connect to the National Grid (the 'Development'). The Development comprises the construction, operation, and maintenance, and decommissioning of a solar photovoltaic ('PV') farm with a generating capacity of approximately 160MW and an energy storage facility, together with associated infrastructure, across approximately 268.77ha of land within the administrative boundary of Isle of Anglesey County Council.

The Development exceeds the 10MW threshold for energy generating projects in Wales and therefore constitutes a Development of National Significance ('DNS') under the Planning (Wales) Act 2015. The Planning (Wales) Act of 2015 states that Welsh Ministers are to determine DNS projects and applications should be made directly to them. The framework for applying for a DNS is detailed within the Developments of National Significance (Procedure) (Wales) Order 2016, as amended. The DNS application process is managed by Planning and Environment Decisions Wales ('PEDW') (formerly the Planning Inspectorate Wales ('PINS Wales') on behalf of the Welsh Ministers.

The aim of the SMP, at this early stage of the Development is to define the proposed safety strategy, requirements, and processes necessary to meet agreed safety objectives and to set a level of safety performance that the BESS is to be measured against. It also provides the basis for the safety management processes and procedures required to satisfy the identified safety requirements for the BESS.

A preliminary safety hazard identification and analysis, based on like for like energy storage systems of this type, namely Lithium-Ion Battery technology, has determined the likely hazards associated with the BESS and enabled the initial identification of potential control measures to ameliorate the level of risk posed to an acceptable level.

It is proposed that at this early stage of the Development, the currently foreseeable hazards associated with the technology proposed have been identified. These will form the initial safety foundation going forwards and be actively managed as the Development matures.

The design, development, and manufacture of the BESS requires the development and maintenance of high standards in respect of safety and operational sustainability. It will be the responsibility of all personnel involved in the future development of the Development to strive to reduce the potential for accidents to the lowest practicable level by being 'risk aware' and promoting a supportive environment and safety culture at all stages of the Development.

Abbreviations

ALARP	As Low As Reasonably Practicable
ARC	Abbott Risk Consulting Ltd
BESS	Battery Energy Storage System
BMS	Battery Management System
BoM	Bill of Material
EM	Electro-Magnetic
EMC	Electro-Magnetic Compatibility
EMI	Electro-Magnetic Interference
HSAWA	Health and Safety at Work Act
HSE	Health and Safety Executive
HV	High Voltage
IPS	Independent Protection System
OC	Over Current
OV	Over Voltage
REACH	Registration, Evaluation, Authorisation & Restriction of Chemicals Regulations
RoHS	Restriction of Hazardous Substances Directive
SMP	Safety Management Plan
SME	Subject Matter Expert
SMS	Safety Management System
SQEP	Suitably Qualified and Experienced Person
SRD	System Requirement Document
SWG	Safety Working Group
UK	United Kingdom
US	United States
UV	Under-Voltage

Contents

1.0 Introduction

This SMP has been developed by Abbott Risk Consulting Ltd ('ARC') in the role of the Safety Subject Matter Expert ('SME') and aims to provide the safety requirements (and any additional derived safety requirements) so that safety criteria can be established, targets set and so that the Development can be assessed against a common benchmark.

This SMP is an outline document and has been developed at this early stage of the Development to assess the potential risks associated with the design, construction, operation and maintenance, and decommissioning phases of the BESS. The BESS SMP provides a robust safety case, supported by evidence, and will be built upon throughout the lifecycle of the Development, in the following four phases:

1. **SMP (Concept and Design)** (this report) – Outlines the processes, procedures and means by which the BESS safety management is to be carried out, ensuring BESS design and development, initial construction and operation safety performance can be undertaken with an acceptable level of residual risk.

2. **Part 1 Safety Summary Report (Requirements)** – Identifies the level of risk posed by the design of the BESS to individuals (including operators and third parties), the immediate environment, the asset itself ('BESS'), interfacing / interdependent assets and property / equipment that could be affected by operation of the BESS (such as noise and radiated emissions etc.). This element will develop upon the identified risks in the SMP.

3. **Part 2 Safety Summary Report (Design and Qualification)** – Identifies the processes and procedures used to validate the control measures and models employed in determining the level of risk posed by the design. This element also provides the necessary confidence that the control measures within the design function as intended, most notably the ability to Remote Monitor and Control the BESS.

4. **Part 3 Safety Summary Report (Operation)** – Outlines the risk posed by site specific placements of the BESS and the processes and procedures required to ensure that the risk posed by the design remains within the established bounds i.e., training, provision of Personal Protective Equipment ('PPE'), calibration, scheduled maintenance etc.

As this SMP is further refined throughout the above phases, it will also be informed by consultation with the North Wales Fire and Rescue Service. This consultation will be documented in a separate Fire Liaison Framework document. This early consultation will ensure the latest technology, information, operational and environmental excellence can be integrated into the Development, further supplementing the safety case outlined in this SMP.

2.0 Background

ARC have conducted an initial hazard identification ('HAZID') of the BESS as a conceptual model, based upon experience and expertise of similar BESS systems in use and under development in the UK and overseas. This analysis has provided the necessary foundation for the identification of potential hazards and the development of a formalised Hazard Log, ARC-1168-004-R2 [Ref. 1], which contains:

1. Consolidated list of hazards and hazard descriptions.
2. Associated potential causes driving the hazards with linkage to the relevant hazard(s).
3. Design controls in place that ameliorate the causes.

4. Identification of the potential outcomes or consequence from the hazards.
5. Identification and linkage to mitigating factors that could ameliorate the severity or frequency of occurrence of the outcomes (consequences); and
6. Identification of additional design controls and mitigating factors that will further ameliorate the probability of hazard or consequence frequencies.

3.0 Aim

The overall BESS safety aim is that the levels of risk of accident, death or injury to personnel or other parties, and to the environment due to BESS activities are to be broadly acceptable or tolerable and As Low As Reasonably Practicable ('ALARP'), in accordance with the Health and Safety Executive ('HSE') Reducing Risk, Protecting People [Ref. 2].

4.0 Scope

The scope of the safety management for the proposed BESS concerns the physical and functional aspects of the equipment. The BESS safety management will address activities throughout the construction, operation and maintenance, and decommissioning phases. For avoidance of doubt, it also includes provisions which address design, validation, siting, remote monitoring and control, storage / transportation, and calibration.

5.0 Safety Requirements

5.1 High Level Safety Objective

The primary safety objective for the BESS is to comply with applicable legal requirements and relevant and emerging good practice for large / grid scale battery energy storage systems. These will be distilled into safety requirements that will be detailed in the System Requirement Document (SRD), which in turn will be flowed down to prospective suppliers. Compliance with these safety requirements (by potential suppliers) will be used as part of the safety case, to demonstrate that '***The risk posed to individuals, the environment and property from the BESS programme of work has been reduced to a level that is Broadly Acceptable or Tolerable and ALARP'***. The SRD produced for the BESS development will be used to ensure that all direct and indirect safety requirements for BESS are met and the supplier(s) is safety compliant.

5.2 Legislation and Compliance Requirements

Legislative compliance, specifically safety, for the BESS will be demonstrated by compliance with the UK Health and Safety at Work Act ('HSAWA') 1974 and the appropriate underlying legislation that is enacted through the HSAWA. The following legislation (which is not exhaustive at this stage), has been determined to be applicable to the development of the BESS:

1. Health and Safety at Work etc. Act 1974 – UKSI1974/0037.
2. Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations SI 2009/1348.
3. Chemical Hazard Information & Packaging for Supply Regulations 2009 UKSI – 2009/0716.
4. Control of Noise at Work Regulations 2005 – UKSI 2005/1643.

5. Control of Substances Hazardous to Health Regulations 2002 – UKSI 2002/2677.
6. Control of Vibration at Work Regulations 2005 – UKSI2005/1093.
7. Corporate Manslaughter and Corporate Homicide Act 2007 – UKSI2007/0019.
8. Electrical Equipment (Safety) Regulations SI 1994/3260.
9. Electro-magnetic Compatibility Regulations SI 2006/3418.
10. Lifting Operations and Lifting Equipment Regulations 1998 – UKSI1998/2307.
11. Management of Health and Safety at Work Regulations 1999 – UKSI1999/3242.
12. Manual Handling Operations Regulations 1992 – UKSI1992/2793.
13. Personal Protective Equipment Regulations 2002 – UKSI2002/1144.
14. Provision and Use of Work Equipment Regulations 1998 – UKSI1998/2306.
15. Reporting of Injuries, Diseases and Dangerous Occurrences Regulations SI2013/1471.
16. Supply of Machinery (Safety) Regulations 2008 – UKSI2008/1597.
17. Workplace (Health, Safety and Welfare) Regulations 1992 – UKSI1992/3004.
18. Registration, Evaluation, Authorisation & Restriction of Chemicals Regulations (REACH) – 1907/2006.
19. Restriction of Hazardous Substances Directive (RoHS) – 2011/65/EU.
20. Dangerous Substances and Explosive Substances Regulations 2002 - SI 2002/2776.
21. Construction (Design and Management) Regulations - SI 2015/51.

6.0 Safety Case

6.1 Introduction

A safety case is required to support the design, construction, operation, and maintenance, and decommissioning of the BESS and is required to justify that its safety is at an acceptable level for its role, in its intended operating environment. A safety case is defined as "***a logically stated and convincingly demonstrated reason why safety requirements are met***". The BESS safety case will have the following elements:

1. A Technical Risk Case:
    a. An element that provides the case that articulates the technical aspects of the design which serve to control the identified hazards, through the application of design control measures.
    b. It will identify system hazards and the causes that can contribute to these hazards.
    c. It will specify the risk analysis conducted and risk reduction requirements implemented.
    d. It will provide the evidence to support any risk reduction claimed.
2. A Confidence (Assurance) Case:
    a. This part will focus on arguing that the processes used to design, implement, and verify the product are appropriate to its contribution to overall risk – this being specific to the development of software and provide the required audit trail to validate any claimed safety reliability.

b. The development of the Hazard Log and identification of imbedded physical attributes that help reduce risk.

c. The cross-referencing of these physical attributes (and any supporting qualification data / certification) to the relevant cause(s), providing the evidence of validity of the control measure claimed.

6.2 Safety Integrity Level Requirements

The Safety Integrity Level requirements for the BESS will be driven by the functionality implemented in the final BESS design. As a minimum it is anticipated that the BESS supplier and operator will provide a layered protection approach (from battery cell to container to remote monitoring). The envisaged safety control measures and design features under consideration, and those that will be provided to the prospective suppliers in the SRD, include:

1. Appropriate battery chemistry selection – balancing energy density requirements against available volume and operating parameters. The preferred option under consideration is Lithium Titanate Oxide ('LTO'), which is in use in the public transport sector, including Underground and Overground Rail systems.

2. Cell level control – consideration of the use of battery technology incorporating Current Interrupt Devices ('CID') and Positive Thermal Coefficient ('PTC') protection, enabling the cell to disconnect from the battery in the event of cell failure.

3. Implementation in the design of an approved Battery Management System ('BMS').

4. Implementation in the design of an Independent Protection System ('IPS') and electronic Safety Supervisor Systems.

5. 24/7 Remote Monitoring and Control and automated shut-down.

6. Segregation of Containers.

7. Quench and suppression systems fitted to containers.

8. Site Security and Monitoring.

7.0 Safety Management Strategy and Activities

7.1 Introduction

The BESS will be designed to meet relevant industry standards and legal requirements which contain specific safety requirements (as described in Section 5.2).

7.2 Safety Criteria

The consequence for each potential occurrence involving the BESS is categorised according to classification which accounts for both frequency of occurrence and severity of outcome (risk) as defined in the following:

1. The consequence definitions are defined in Table 7-1.

2. The probability definitions and bands used are detailed in Table 7-2[1].
3. The Risk Class Matrix is shown in Table 7-3.
4. The Risk Class definitions are given in Table 7-4.

The safety criteria used in this document have been adapted from those defined within the US Department of Defence Mil-Spec 882E [Ref. 2] and using safety target and limit benchmarks from the HSE R2P2 [Ref. 2]. This assessment criteria will be flowed to prospective suppliers in the SRD.

Table 7-1 – Consequence Definitions

Risk Category		BESS Description			
		Asset	Capability	Environmental	Human
Catastrophic	**1**	Complete loss of BESS and surrounding 3rd party assets	Capability lost	Irreversible and significant environmental impact	Fatality or permanent life changing disability
Critical	**2**	Complete loss of BESS	Capability seriously affected	Reversible but significant environmental impact (long-term)	Permanent partial disability, injuries, or occupational illness
Marginal	**3**	Partial loss of BESS Not repairable – components retrievable	Capability less seriously affected	Reversible moderate (decontamination possible) environmental impact	Less serious personal injury, illness – A&E / GP assistance required
Negligible	**4**	Minor BESS damage – repairable	Capability impaired but possible	Minimal (self-recoverable) environmental impact	Negligible injury or illness. Treatable without recourse to A&E / GP

Table 7-2 – Frequency Definitions

Accident Frequency	Class	Occurrence rate		Qualitative Definition
		Occurrence rate	Per Annum 8760 hrs (fph)	
Frequent	A	10% < P	1.0E-04 or greater	Likely to occur often (repeatedly) in the Lifetime.
Probable	B	1% < P ≤ 10%	1.0E-03 to 1.0E-04	Will occur several times in the Lifetime
Occasional	C	0.1% < P ≤ 1%	1.0E-04 to 1.0E-05	Likely to occur sometime in the Lifetime
Remote	D	0.01% < P ≤ 0.1%	1.0E-05 to 1.0E-06	Unlikely, but possible to occur in the Lifetime
Improbable	E	P ≤ 0.01%	1.0E-06 to 1.0E-07	So unlikely, it can be assumed occurrence may not be experienced in the Lifetime
Eliminated	F	Incredible (physically impossible) of occurrence within the life of an item. This category is to be used when potential hazards are identified and later eliminated. (Nominally the occurrence rate has been assessed as <1.0E-08)		

[1] These are derivations of quantitative targets.

Table 7-3 – Risk Class Matrix

	Severity			
	Catastrophic	Critical	Marginal	Negligible
Frequency	1	2	3	4
Frequent	A	A	A	B
Probable	A	A	B	C
Occasional	A	B	C	D
Remote	B	C	D	D
Improbable	C	D	D	D
Eliminated	E	E	E	E

Table 7-4 – Risk Class Definitions

Risk Class	Risk Class Definition
(HIGH) *Intolerable*	Intolerable: Risks must be reduced.
(SERIOUS) *Undesirable*	Undesirable: Risks should be reduced.
(MEDIUM) *Limited Tolerable*	Limited Tolerable: Risks can be reduced.
(LOW) *Tolerable*	Tolerable: No action required.
No Risk	

8.0 Components of the Safety Case

8.1 BESS Safety Working Group

A BESS Safety Working Group ('SWG') is proposed to be established, following planning acceptance. This will be the forum for the review and continued validity of key elements which support the safety case. The BESS SWG will comprise Suitably Qualified and Experienced Person ('SQEP') stakeholders who are drawn from various stakeholder communities because of their tacit knowledge and experience.

The BESS SWG will be responsible for the oversight of BESS safety management and supporting safety artefacts to ensure they are reviewed and updated. One of the key tasks is the production of the Hazard Log for the equipment and the management of this throughout operation utilising Hazard Identification and Hazard Analysis techniques. The BESS SWG is also the forum for addressing equipment safety issues.

The overall principal tasks, duties, and responsibilities of the BESS SWG are defined in Section 9.0. The meeting frequency of the BESS SWG will be dependent on the activities required for the prevailing stage of the Development.

8.2 Hazardous Material

Any hazardous materials used in the BESS development will need to be fully justified and captured in the BESS Hazardous Materials Register, a sub-set of the Bill of Materials (BoM). The register is used to highlight the hazardous materials contained within the BESS and provides justification as to why they cannot be eliminated. It will identify exact quantities of hazardous materials that are present to satisfy legislative requirements. The BESS Hazardous Materials Register will be made available to the local emergency services.

8.3 Safety Disposal Considerations

Disposal activities will be considered at the BESS concept stage and will be included within the BESS safety management process. As the Development advances through the development phases, the hazard log will be expanded to cover each phase.

8.4 Forward Plans

This is the initial SMP for BESS and as such the identification of potential hazards, causes and controls is limited to the concept stage, i.e., the BESS concept design and the initial proof of design artefact. Therefore, several of the controls identified are also conceptual and subject to technological assessment, as such no ALARP statements can yet be prepared.

To date, all control measures identified are founded on good practice and based on previous knowledge of BESS systems in use and other associated products using Lithium-Ion electrical storage technology. These mitigations may in some instances require further development and ratification as the Development advances through the development phases. Upon successful implementation, and with suitable evidence available to validate effectiveness, reassessment can be conducted with the aim to consider the reduced the level of risk.

8.5 Emergency Plans

As part of the initial development of the BESS, Emergency Plans will be developed that will outline how the operator will respond to incident and accident scenarios at site. This will include the interfaces with external first responder organisations.

The Emergency Plans will be developed in an iterative manner in parallel to technical safety requirements. This will ensure that the BESS design and Emergency Plans are properly integrated (e.g., that BESS layout ensures access for first responders) and that appropriate information can be provided to first responders (e.g., the type and meaning of external indication on containers) to include in their planning activities.

8.6 BESS Hazard Log

The preliminary BESS Hazard Log is currently managed in the form of an excel spreadsheet and is provided as an example of the risks most commonly present in an energy storage system utilising Lithium-Ion technology. The benefit of using this Hazard Log tool is that it provides an auditable record of all decisions made for the assessment of risk for the BESS Project which can be managed through life on a central repository. The BESS Hazard Log is summarised below in Table 8-1.

Table 8.1: Preliminary BESS Hazard Log Summary

Hazard ID	Hazard Title	Hazard Description	Cause ID	Causes Summary
Haz_BESS_001	Stored chemical energy (functional control)	Uncontrolled release of chemical energy – Thermal Runaway (TR)	Cse_BESS_001	Internal failure of cell
			Cse_BESS_003	Over Temperature
			Cse_BESS_004	Over Current (OC) – Excessive Charge Current
			Cse_BESS_005	OC – Excessive Discharge
			Cse_BESS_006	Over-Voltage (OV) – Continuous Charge
			Cse_BESS_007	Low Temperature Charging
			Cse_BESS_008	Under-Voltage (UV) – Continuous Discharge
Haz_BESS_002A	Potential electrical energy – High Voltage (HV) (AC)	Contact with exposed electrical components – HV AC	Cse_BESS_009	Exposure to electrical source (e.g., contacts, wiring etc.)
			Cse_BESS_010	Effect of high current pulses (Electromagnetic (EM)) introduce a conductive path
			Cse_BESS_011	Internal short to casing provides conductive path
Haz_BESS_002B	Potential electrical energy – High Voltage (DC > 75V)	Contact with exposed electrical components – HV-DC	Cse_BESS_009	Exposure to electrical source (e.g., contacts, wiring etc.)
			Cse_BESS_010	Effect of high current pulses (EM) introduce a conductive path

Hazard ID	Hazard Title	Hazard Description	Cause ID	Causes Summary
			Cse_BESS_011	Internal short to casing provides conductive path
Haz_BESS_002C	Potential electrical energy – Low Voltage (DC < 75V)	Contact with exposed electrical components – LV-DC	Cse_BESS_009	Exposure to electrical source (e.g., contacts, wiring etc.)
			Cse_BESS_011	Internal short to casing provides conductive path
Haz_BESS_003	Electro-magnetic interference	Failure of Electromagnetic Compatibility/ Electromagnetic Interference (EMC/EMI) protection impacts on system functionality	Cse_BESS_012	BESS not EM compatible with environment in which it is located – interferes with surrounding electrical systems…or is interfered with by external systems
Haz_BESS_004	Exposure to Hazardous Substances	Operator / maintainer exposure to Hazardous substances	Cse_BESS_013	Operator/Maintainer accesses internal components of the BESS
Haz_BESS_005	Water ingress leading to major failure	Ingress of water	Cse_BESS_014	Water Ingress into the BESS internals excessive to the degree that it effects the functionality of BESS
Haz_BESS_006	Confined Spaces	Maintainers / first responders required to access in the internals of BESS	Cse_BESS_013	Operator/Maintainer or First Responder accesses internal components of the BESS
Haz_BESS_007	Manual Handling	Maintainer required to lift, move, or carry heavy BESS components (in confined spaces)	Cse_BESS_015	Maintainer or First Responder required to access and remove/refit heavy BESS components
Haz_BESS_008	Toxicity – off-gassing	Gases vented during BESS operation (off-nominal) accumulate within enclosure	Cse_BESS_013	Operator/Maintainer or First Responder accesses internal components of the BESS

Hazard ID	Hazard Title	Hazard Description	Cause ID	Causes Summary
Haz_BESS_009	Sharp Edges	Operation / maintenance of the BESS exposes the user to sharp edges and hard surfaces	Cse_BESS_013	Operator/Maintainer or First Responder accesses internal components of the BESS

9.0 BESS Safety Management Team

9.1 Safety Management System

The Safety Management System ('SMS') provides a system of management that ensures that all safety related aspects are managed in accordance with applicable industry standards and United Kingdom ('UK') legislation. Within the safety context, the BESS SMS ensures that the risks associated with the BESS capability will be managed such that they are ALARP and broadly acceptable or tolerable and will remain so throughout the lifetime of the equipment.

Some of these safety requirements and consequential decisions will need to be balanced against the practicability of implementation for the BESS and an affordability balance against the risk reduction achieved. Likewise, when a hazard occurrence has been reduced to a level whereby it is considered eliminated, further risk reduction will only be implemented because of indirect risk reduction measures implemented for other hazards or causes. The SMS, will, through the application, further facilitate the strong safety culture for the BESS development, including and encompassing sub-contractors, and suppliers and the wider stakeholder community who interface with the BESS capability.

9.2 Safety Management Structure

The BESS safety management structure has yet to be fully defined and will be subject to the safety management strategies and procedures that are in place with the successful supplier and installer of the BESS. At this juncture the minimum requirement is a formal top-down management structure that has the authority and responsibility to ensure safety management and environmental risk is at the forefront of products, procedures, and services.

9.3 Overarching Policy

All BESS development activities shall consider safety and environment as an integrated part of the BESS life cycle and shall be assessed from a safety viewpoint. This safety-focused approach shall span all programme phases. This encourages and develops a safety and environmental culture that spans all levels of the organisation and encompasses all aspects of its working practices. It views safety as a holistic quantity that is owned by the organisation rather than something to be passed by function. This safety culture is supported by training to develop and maintain expertise and awareness for good practice, knowledge of emerging standards and in the understanding of legislation.

9.4 Management Plan

This SMP incorporates the management activities relevant to safety. This includes the planning for Quality, Engineering Development and Configuration Management. These are important disciplines that underpin arguments for safety and environment. This SMP will be periodically revisited and revised to accommodate any changes or enhancements to the programme.

9.5 Staff Competence

The BESS safety and environmental management programme shall ensure that all personnel who have any responsibility for a safety or environmental activity are competent to discharge those responsibilities or are adequately supervised/approved by someone with appropriate competencies.

9.6 Overview

The implementation of safety management and safety activities will be given the highest priority during the BESS programme. It is recognised that the management of safety is an integral part of the safety assurance process, and the observance of the requirements specified in this report will be mandatory for all involved with the BESS Project.

10.0 Conclusions and Recommendations

10.1 Conclusions

In conclusion, as far as reasonably practicable for this stage in the planning process, the currently foreseeable hazards associated with the BESS equipment have been identified. These will be provided, through the mechanism of the SRD, to prospective suppliers. These hazards will be actively managed and added to as the BESS develops and will be reported on at each SWG.

This SMP has been developed using existing knowledge of BESS systems and leans heavily on the subject matter expertise that ARC have in this technological domain. Further development of the BESS design will provide more detailed information that will enhance future safety analysis and management.

10.2 Recommendations

It is recommended that the BESS safety management and criteria (for assessment and analysis) as defined in this SMP, is adhered to throughout the lifecycle of the BESS facility to ensure that safety management is developed throughout the Development construction, operation and maintenance, and decommissioning.

It is recommended that to reduce the level of residual risk to meet the **LOW** 'tolerable' region that all the identified control measures are assessed as the design matures to prompt; applicability, feasibility and the potential enhancement provided. At this early stage of the Development, it is not possible to declare ALARP, however successful implementation of the proposed framework for safety management presented in this SMP will provide the necessary case and supporting evidence to make such a claim.

11.0 References

1. BESS Hazard Log - ARC-1168-004-R2, Draft A, June 2023.

2. Reducing Risk, Protecting People (HSE Publications) - https://www.hse.gov.uk/risk/theory/r2p2.pdf.

3. MIL-STD-882E, Department of Defence Standard Practice: Safety Systems Dated May 2012.