Outline Battery Safety Management Plan

Newfields BESS Ltd – Newfields Farm

SHF.1807.005.PL.R.001.03 - OBSMP

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Outline Battery Safety Management Plan

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Reviewer:	Robert Gandy – **Principal Planning Consultant**

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1.0 Introduction

1.1 Introduction

1.1.1 This Outline Battery Safety Management Plan (OBSMP) has been prepared by Enzygo Ltd. to support the proposed development of a Battery Energy Storage System (BESS) with ancillary infrastructure, security fence, access, landscaping and biodiversity enhancements, to provide balancing services to the local electricity grid, on land at Newfields Farm, Rownall Road, Wetley Rocks, Staffordshire, ST9 0BS (The development).

1.1.2 Enzygo Ltd have worked closely with Newfields BESS Limited (the Applicant) in collating the technical and safety information used for the detailed design of the BESS.

1.2 Purpose of Document

1.2.1 The OBSMP details the regulatory guidance reviewed by Enzygo Ltd., to ensure that all safety concerns around the BESS element of the development are addressed in so far as is reasonably practicable.

1.2.2 This document provides an overview of the safety related information requirements which will be provided in advance of construction of the BESS. The purpose of this outline BSMP is to identify how the Applicant will incorporate best industry practice to reduce risk to life, property, and the environment from the BESS.

1.2.3 Battery storage technology is continuously evolving as are the regulations and guidance on the safe operation of a BESS. Whilst the current design is based on the latest regulations, Enzygo will continue to review the regulations and the manufacturers' guidelines to ensure that the design continues to meet the best practice for the design and operation of a BESS. It is noted that there is no specific UK legislation for BESS. Prevailing international industry guidance and UK National Fire Chiefs Council guidance has been adopted in the deliberations contained in this OBSMP and in the shaping of the proposed design.

1.2.4 As the construction phase of the project is anticipated to commence in 2026 / 2027, current safety measures and guidelines are referred to. However, it is envisaged a detailed Battery Safety Management Plan shall be produced prior to energisation of the BESS to take account of prevailing guidance.

1.3 Background

1.3.1 Newfields BESS Limited is seeking to develop a 100 MW BESS and associated infrastructure at Newfields Farm.

1.3.2 An application with reference SMD/2022/0180 for a similar BESS development was submitted to Staffordshire Moorlands District Council (SMDC) in April 2022 and withdrawn by the Applicant in December 2022.

1.3.3 A second application for an amended BESS development was submitted to SMDC in January 2024 and refused at planning committee in September 2024 despite having planning officer's recommendation for approval. The application was refused for reasons relating to Green Belt, landscape, noise, and fire service access.

1.3.4 A third application with reference SMD/2024/0556 was submitted to SMDC in December 2024 and is currently being determined. This third application addresses the planning committee's reasons for refusal detailed above.

1.4 Document Structure

1.4.1 This Outline Battery Safety Management Plan includes the following sections:

- Introduction, including purpose of the document, background, document structure, contributors and consultation requirements
- Description of proposed works
- Guidance
- Battery Energy Storage System Detailed Design Stage (this is covered in Section 4.0)
- Conclusions and Summary of Outputs

2.0 Description of Works

2.1 Description of Works

2.1.1 The proposed development is a 100 MW Battery Energy Storage System (BESS) which will comprise of the following:

- 132/33kV switchyard
- DNO Control Building
- DNO Store Building
- Battery Energy Storage Containers
- Transformer Stations
- Customer Switchroom
- Customer Control Building
- Customer Store Building
- Auxiliary Transformer
- Fencing
- 3m high acoustic barrier
- CCTV monitoring system

2.1.2 An extract of the Overall Site Layout (drawing no.: 1105-02-04-NF-SL-27022025), submitted in support of the planning application, is shown below in Figure 1:

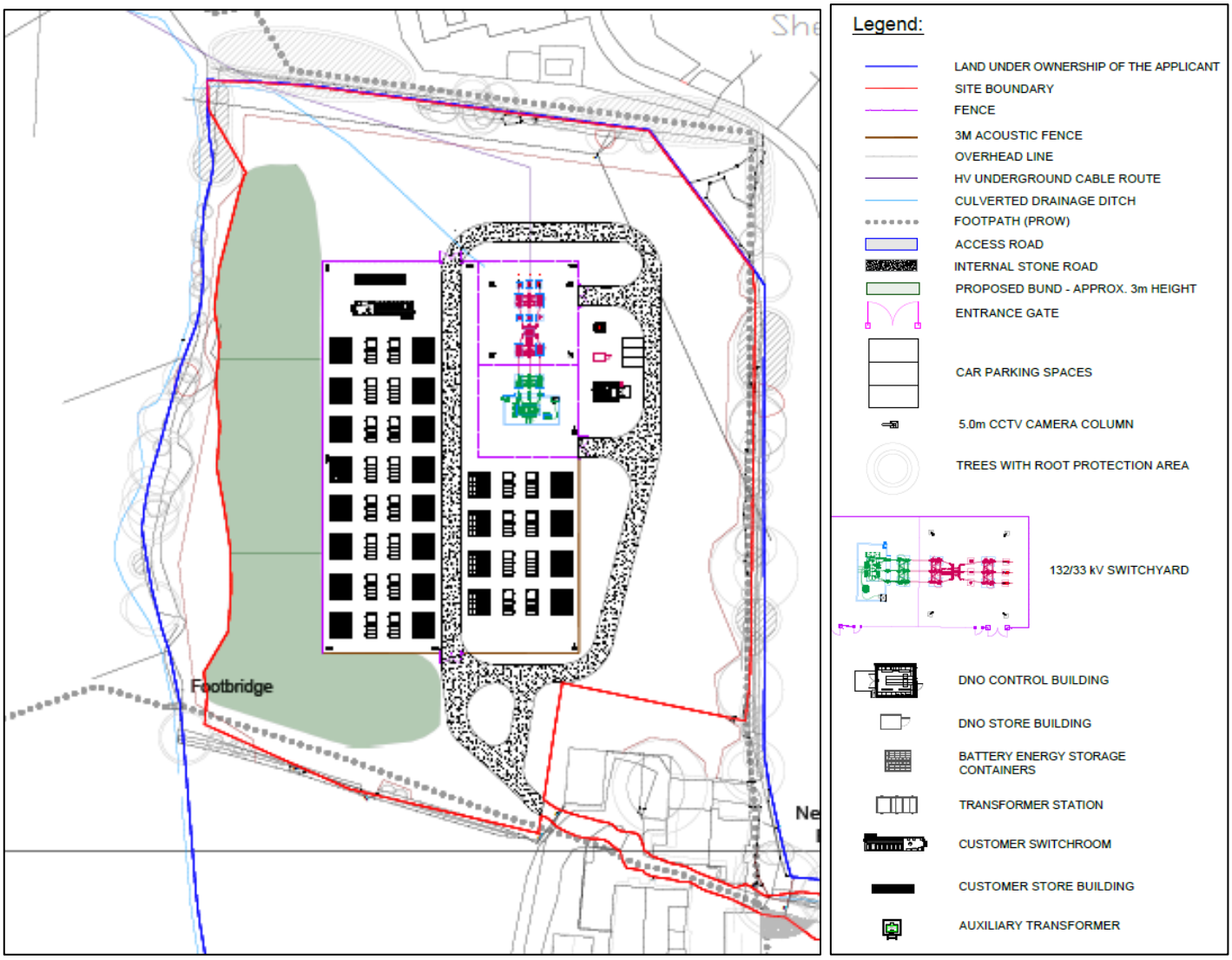

Figure 1 – Extract of Overall Site Layout

2.2 Overview of battery fire safety approach

2.2.1 The proposed BESS is based on a Sungrow PowerTitan 2.0 solution, with the battery cell / the batteries and the Power Conversion System in one container, based upon LFP (Lithium Ferrous Phosphate) lithium-ion battery technology that is currently used on other sites being developed by the Applicant.

2.2.2 Indicative specifications are provided below. This is considered to be a reasonable worst case for the purposes of the assessment in terms of safety and is the best information available at present.

2.2.3 The BESS will be designed in accordance with the UK and internationally recognised good practice guidance available at the time. Prior to energisation, the Applicant shall provide the final system design and construction information as detailed within the National Fire Chiefs Council's guidance.

2.2.4 It should be noted that specific suppliers and technologies will be confirmed by the Applicant during the detailed design and procurement phase which takes place post planning.

PowerTitan 2.0 (Indicative):

Dimensions (H x W x D): 2896 x 6058 x 2438mm

Weight (kg): 4,200

Battery Configuration 416S12P

IP Rating IP55

Operation Ambient Temperature Range -30 ℃ to +50 ℃ (> 45 ℃ Derating)

Operation humidity range 0 % - 100 % (Non-condensing)

Temperature Control Method Intelligent Liquid Cooling

Safety Features FACP, FK5112, Flammable gas detector, Smoke detector, Heat detector, Sounder beacon, Alarm bell, Warning sign, Extinguishant abort button, Ventilation system, Pressure relief port, Manual automatic switching and emergency starting device (Default) Sprinkler, Vent panel, Aerosol (Optional)

2.2.5 The exact BESS unit type has yet to be determined for the development, however the option currently available and under consideration is based on LFP chemistry. This type has been considered as being used for this development, although this is subject to change if an alternative technology of equal or better safety becomes available.

2.2.6 The BESS units follow the principles for Battery Safety as follows:

1) Fire prevention – using battery technology proven to be at low risk of fire.

2) Equipment monitoring – in the event that temperatures increase to unsafe levels, systems will be automatically turned off.

3) Fire suppression – in the event that fire, smoke, or other gases are detected, then systems are in place to supress any ignition to prevent a runaway event.

4) Site layout and design – carefully configured layout such that propagation is prevented and access afforded.

Fire Prevention

2.2.7 It is proposed that the Battery Energy Storage System will use LFP as its chosen form of Lithium-Ion battery technology. LFP batteries are proven to have a lower temperature rise when compared to other types of lithium-ion batteries during thermal runaway events. Thermal runaway is a condition that occurs when the chemical reaction inside a battery cell exceeds its ability to disperse heat.

2.2.8 LFP batteries can deliver a fast recharge and discharge response whilst generating little heat. They require less ventilation or cooling and can withstand higher temperatures without decomposing. Additionally, BESS containers have in-built cooling technology which helps to

further stabilise temperatures, minimise internal temperature differentiation, and increase the service life of the units

2.2.9 As well as LFP batteries having stable characteristics, the prismatic cell has multi-layered protection and are housed in sealed Aluminium casing, offering a further level of protection and most importantly good thermal conductivity and cooling performance.

Equipment Monitoring

2.2.10 The systems have sensors at the cell, module, unit and system level and the necessary software to warn or if necessary, automatically shut down in the event of a problem.

Fire Suppression

2.2.11 The Applicant has been in discussions with Severn Trent regarding the provision of a water connection for a fire hydrant since September 2023. The Applicant received a formal offer for a water connection at the site in October 2023. In addition to the hydrant, a permanent water reservoir below the proposed attenuation tank can be provided to ensure adequate supply of water is available. This strategy is detailed in the NFCC Planning Checklist that SFRS approved in September 2024. The detail of this connection (including the precise point of connection, flow rate, and fire hydrant position) will be determined during detailed design with input and agreement from Severn Trent and Staffordshire FRS.

3.0 Guidance

3.1 Guidance

3.1.1 The main sources of guidance for BESS are from international sources, however, more detailed UK guidance is emerging, a revised version of the NFCC guidance is expected to be issued this year (2025) and it is expected that the regulatory environment will be more developed by the detailed design stage.

3.1.2 The following international guidance has been considered during the preparation of this OBSMP and to inform the design of the scheme:

- Allianz Risk Consulting (ARC): *Battery Energy Storage Systems (BESS) Using Li-ion Batteries*, Tech Talk Volume 26 (2019)[1]
- National Fire Protection Association (NFPA): NFPA 855, Standard for the Installation of Stationary Energy Storage Systems (2023)[2]
- UL 9540A Test Method, Testing the fire safety hazards associated with propagating thermal runaway within battery systems [3]
- Consolidated Edison and New York State Energy Research and Development Authority- *Considerations for ESS Fire Safety* (February 2017)[4].

3.1.3 At the time of writing, the NFPA and UL United States of America standards provide valuable guidance and are referred to in the Allianz Risk Consulting technical note.

3.1.4 The Applicant has incorporated good practice from around the world.

3.1.5 Examples of existing UK guidance include:

- The Energy Operations Forum: *Good Practice Guide* (December 2014)[5]
- Institute of Engineering and Technology - *Code of Practice for Electrical Energy Storage Systems* (August 2017)[6]
- The Energy Institute: Battery Storage Guidance Note 1- Battery Storage Planning (August 2019)[7]
- National Fire Chiefs Council: Grid Scale Battery Energy Storage System planning – Guidance for FRS (April 2023)[8]

[1] https://www.agcs.allianz.com/content/dam/onemarketing/agcs/agcs/pdfs-risk-advisory/tech-talks/ARC-Tech-Talk-Vol-26-BESS.pdf
[2] https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=855
[3] https://www.ul.com/services/ul-9540a-test-method
[4] www.nyserda.ny.gov
[5] https://www.eatechnology.com/engineering-projects/electrical-energy-storage/
[6] https://shop.theiet.org/code-of-practice-for-electrical-energy-storage-systems
[7] https://bit.ly/3LiJ2YP
[8] https://ukfrs.com/sites/default/files/2023-04/Grid%20Scale%20Battery%20Energy%20Storage%20System%20planning%20Guidance%20for%20FRS.pdf

- Battery energy storage systems – Commons Library Research Briefing (19 April 2024)[9]

3.1.6 The National Fire Chiefs Council's guidance makes particular reference to the NFPA 855 document and other international publications on BESS. This guidance has been subject to a public consultation ahead of an update being issued. This is anticipated to occur in 2026. It is noted that the FRS is not a statutory consultee in the planning process.

3.1.7 The UK Government's Planning Practice Guidance (PPG), which advises local Councils in developing policies for renewable and low carbon energy and identifies the planning considerations, was updated on 14th August 2023, with Paragraphs 032 – 036 specific to BESS. The updated guidance encourages Applicants to engage with the relevant local fire and rescue service before submitting an application to the local planning authority, and to consider the NFCC guidance. Both of which the Applicant has done in this regard.

3.2 Li-Ion Battery Transportation Guidance

3.2.1 International guidance for testing and certification for the transportation of Li-Ion batteries exists in the form of UN38.3[10], published by the United Nations as recommendations.

3.2.2 European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR) 2019 [11] includes mandatory rules for signatory states based on UN38.3 recommendations. In the ADR UN 38.3 is mentioned as obligatory. The United Kingdom is a signatory to these rules, so must apply them.

3.2.3 UK guidance on the transport of dangerous goods is available online on the Government's "*Moving dangerous goods, Guidance*" website[12].

3.3 Battery Energy Storage System Design Approach

3.3.1 The NFCC Planning Guidance for BESS (2022) are acknowledged as a starting, it is considered good practice to supply information as early as possible in the scheme from the applicant / developer / designer / manufacturer etc., to allow an initial appraisal of the BESS to be made.

3.3.2 The proposed site layout and construction is compliant with the recommendations detailed in the NFCC Planning Guidance for BESS. Key elements of the NFCC Guidance are listed and responded to in Appendix 1.

[9] https://researchbriefings.files.parliament.uk/documents/CBP-7621/CBP-7621.pdf
[10] https://www.unece.org/fileadmin/DAM/trans/danger/ST_SG_AC.10_11_Rev6_E_WEB_-With_corrections_from_Corr.1.pdf
[11] https://www.unece.org/fileadmin/DAM/trans/danger/ST_SG_AC.10_11_Rev6_E_WEB_-With_corrections_from_Corr.1.pdf
[12] https://www.gov.uk/guidance/moving-dangerous-goods

4.0 Battery Energy Storage System Detailed Design Stage- Pre-construction Information

4.1 Battery and Rack Safety Standards

4.1.1 The batteries that will be installed in the BESS will be Lithium Iron Phosphate (ferrophosphate) type Li-ion battery cells. The cells and modules will be compliant with the following standards:

- UN38.3[13] - International guidance for the transportation of Li-Ion batteries
- UL1973[14] - Batteries for Use in Stationary and Motive Auxiliary Power Applications
- UL9540A[15] - Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems.
- IEC62619[16] - Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries, for use in industrial applications

4.1.2 The primary fire safety standard above is UL9540A, a test method and methodology developed to address safety concerns around lithium-ion batteries and battery energy storage systems to be permanently installed in mixed occupancy or high-rise buildings, identified by the building codes and the fire service in the United States.

4.1.3 All cells, racks, and modules to be installed at the proposed site will have passed the UL9540A evaluations for thermal runaway fire propagation. At the level of the cell the methodology develops cell thermal runaway initiation technique and characteristics including gas composition. At the module level the approach determines propagation behaviour within the module and thermal energy release outside of the module. Both open and closed room scenarios are considered for unit-to-unit fire spread with heat release rate and gas analysis to determine the potential for explosion.

4.1.4 Results from the UL 9540A Test Method addresses the following key issues identified by building codes and the fire service:

- BESS installation instructions
- Installation ventilation requirements
- Effectiveness of fire protection (integral or external)
- Fire service strategy and tactics

4.1.5 The current ICC International Fire Code[17] allows an *individual* BESS unit (in this case the containers) not exceeding 50 kWh and having a maximum quantity of systems totalling 600 kWh of energy per indoor fire area (battery room). The 2018 IFC and the draft NFPA 855

[13] 1520832_E_ST_SG_AC.10_11_Rev6.pdf (unece.org)
[14] https://standardscatalog.ul.com/ProductDetail.aspx?productId=UL1973
[15] https://www.ul.com/services/ul-9540a-test-method
[16] https://webstore.iec.ch/publication/28895
[17] (2018 IFC) Paragraph 1207.5.1 Size and Separation

standard for installation of energy storage systems currently limits the individual BESS unit size for UL 9540 listed units to 250 kWh.

4.1.6 Thes BESS containers are to be installed with a minimum separation distance of 3.5m. NB: The latest IFC and NFPA 855 drafts allow the code official (AHJ) to approve larger individual BESS units, and separation distances less than 3 feet based on large scale fire testing conducted in accordance with the UL 9540A Test Method.

4.1.7 The proposed units (the containers) are well within the unit maximum of 50kWh, and in total comprise 100kWh, which is significantly less than 600 kWh.

4.2 Fire Detection and Suppression

4.2.1 The battery units have an integrated aerosol fire extinguishing system that consists of:

- Smoke detector
- Temperature detector
- Aerosol fire extinguishing device

4.2.2 The BESS Operating System alarms panel includes a hierarchy of warnings and alarms and enables acknowledgement, action logging, and search and sort functions. Alarm classification settings require the operator to acknowledge critical alarms regardless of where they are in the Operating Systems. The visibility of alarms is present throughout fleet view, plant view, and control view, enabling the operator to quickly navigate and respond to warnings and alarms as needed.

Equipment Monitoring

4.2.3 Active temperature monitoring is set up at the following scales in order to minimise the likelihood of propagation across cells, modules, and cabinets:

- The temperature of every cell is monitored, and the temperature should be within the set range. Each cell will be continually monitored to ensure that they stay within this range;
- There is separate temperature monitoring of the battery modules (comprised of the cells); and
- At the top level there is active monitoring of the ambient temperature of each BESS container.

Fire Suppression

4.2.4 In addition to the temperature monitoring of the containers, they are also actively monitored for smoke and other gases. The positive detection of two of the temperature, gas, or smoke monitors will automatically trigger the aerosol fire suppression systems that are sealed within each BESS container.

4.2.5 In the event of fire originating outside of the battery, this would be extinguished by the fire suppression system.

4.2.6 A synthetic ester transformer fluid, such as but not limited to MIDEL 7131, shall be incorporated within the infrastructure, with other BESS schemes already using this kind of product for its fire safety and biodegradable benefits.

4.2.7 When either the smoke or temperature detectors are triggered, it is classified as a first level fire alarm. When this happens the alarm cabinet quits the state of operating and sends a signal to the Battery Management System (BMS).

4.2.8 When both the detectors are triggered, it is classified as a second level fire alarm. When this happens the aerosol of the alarm cabinet is released, with all of the electrical cabinets in the system out of operation and signal reported to the BMS.

4.2.9 The extinguishing agent is composed of ultra-fine potassium salt particles and inert gas. Potassium salt is one of the most effective fire-extinguishing agents impeding the complex chemical chain reaction of combustion or explosion. The combustion chain reaction requires the participation of OH, H and O radicals, and ultrafine potassium salt particles can quickly consume these free radicals and prevent the combustion chain reaction from proceeding.

4.2.10 In the event of the detectors both being triggered a specified concentration of fire extinguishing agent is sprayed to fill the entire protection area, and which will result in total flooding of the area that will extinguish any open flame. This method is effective in combating electrical fires, electrolyte fires and other combustibles fires (A/B/C fires).

4.2.11 The Development will minimise fire risk by:

- Procuring components that comply with all relevant legislation and best practice guidance at the time of design and implementation
- Employment of construction techniques that comply with all relevant legislation and best practice guidance at the time of design and implementation
- Including automatic fire detection systems in the facility design
- Including automatic fire suppression systems in the facility design
- Including redundancy in the system design to provide multiple layers of protection
- Designing the facility to contain and restrict the spread of fire through the use of fire-resistant materials, and adequate separation between elements of the BESS - The separation distance between the battery containers and site boundary shall be in accordance NFPA 855 (2023), which has a guidance of 3m. (NB: These limits may be reduced to 1m where testing to UL9450 has been undertaken)
- Offering to work with the fire and rescue (FRS) service to develop a tactical response that will minimise risk in the event of fire, see further details within Table 1. (The Applicant has been proactively liaising with the Protection (Fire Safety) Department at Staffordshire Fire and Rescue Service by email and telephone since early 2023)
- Production of a dedicated emergency response plan, showing full understanding of hazards, risks, and consequences
- Ensuring that firewater run-off is contained and treated, with measures in place which will be detailed within the Emergency Response Plan, such as the valve to the attenuation tank being turned off to ensure no contaminated fire water gets

into the system and the provision of a gravel sump and oil interceptor underneath the BESS compound to capture pollutants.

4.3 Fire Service Access

4.3.1 The proposed Site access and internal roads will provide unobstructed access to the development areas and will be constructed with suitable materials and constructed to suitable gradients with no obstructions. The relatively short internal access road provides space for vehicles to pass between the Site access and the development area, allowing emergency vehicles to pass safely.

4.3.2 Large turning areas are provided by the entrance within the Site, which can accommodate a large (16.5m) articulated HGV, and as such suitable for emergency vehicles. This shall be used during construction, but once operational, the design of the access road provides a full loop around the site, with two internal access point. Consideration was given to the provision of a secondary access, although one access is appropriate and the Site benefits from two internal access points, and a track that encircles the BESS.

4.3.3 In response to Staffordshire FRS feedback, the Applicant added an additional connecting road in the south of the site. Staffordshire confirmed the access plan as being suitable in August 2024 and that there are no outstanding issues. Please refer to the approved NFCC Planning Checklist appended to this report (approved by Staffordshire FRS in September 2024)

4.3.4 The internal roads that circumnavigate the infrastructure ensure full coverage is available in the unlikely incidence of any fire event. As such, it is not considered two separate access points to the site are required as the emergency vehicles have 360-degree access.

4.3.5 Additionally, a layby by the entrance provides space for any waiting fire trucks, which also serves to provide a passing place.

4.3.6 The suitability of the proposed access arrangement has been demonstrated through the Transport and Access Statement, prepared by Apex Transport (ref: C21133/TS02), which includes swept path analysis using an 8m long fire appliance.

4.4 Safety Information

4.4.1 The operator of the site will develop an Emergency Response Plan which will be developed in consultation with the Fire & Rescue Service.

5.0 Conclusion

5.1 Summary

5.1.1 The OBSMP outlines the proposed development for a proposed 100 MW battery energy storage system and associated works, and how it will be managed from a fire safety risk mitigation perspective.

5.1.2 The OBSMP collates the technical and safety information used for the design of the BESS to ensure that all safety concerns around the facility are addressed in so far as is reasonably practicable.

5.1.3 The OBSMP should be updated once the final detailed design is complete to reflect any technological change and any new regulations and / or guidelines that may be introduced.

5.1.4 This document is provided to demonstrate the Applicant is committed to developing a safe BESS and is willing to consult / has consulted with relevant stakeholders to design and implement a scheme that minimises the risk of an event occurring.

5.1.5 The Applicant shall provide a detailed battery safety management plan via an agreed pre-energisation planning condition, which shall confirm the technology to be utilised, the design of the facility, and provide the relevant up-to-date safety certification.

5.2 Outputs

5.2.1 The applicants are committed to working towards the following Fire Safety outputs:

Tactical Information Record

5.2.2 The Applicant proposes to work with the FRS to develop a Tactical Information Record for the Proposed Development which will facilitate SFRS responders to the Site with technical and tactical information about the Site and best approaches in the event of a fire event. This should be undertaken following final design and technical specifications in collaboration with the EPC specialist and Site operator.

Safety Log

5.2.3 The Applicant (or their successor) will produce a 'Health and Safety File' which will be maintained and updated by the Site operator as part of a best practice approach. A guide to the information to be included in the Health and Safety File is set out in Table 3.

5.2.4 The Health and Safety File will be made available to the SFRS and could be used as the basis for the Tactical Information Record set out above.

Appendix 1

NFCC Recommendations Cross-Referenced to the Site BESS

Criterion	NFCC Recommendation	Status	NFCC 2022 Comment
1	Access - Minimum of two separate access points to the site	Compliant	The site has a single point of access from the public highway, the site access road splits prior to reaching the BESS compound, providing primary access at the southern boundary of the site, Figure 1 refers, and there is a further road, running adjacent to the eastern side of the site compound, leading to a point of entry on the northern side of the BESS compound. The Staffordshire Moorlands Planning Committee Decision [Ref. 3] states that "the development would have only one point of access into the site through the farm buildings, contrary to guidance, which leads to concerns for fire service access and the overall safety of the site". This is incorrect, the NFCC Planning Guidance [Ref.1] recommends two points of access to the site and there is no mention of the design of this access or how it is to be engineered into the design. The Staffordshire FRS in consultation on this Planning Application have made no mention or concerns over the access design arrangements for this site and have confirmed that the design of the site is acceptable for the Staffordshire FRS [Ref. 7]. The turning circle to the south of the site, at the primary point of access into the compound, was added to the design in response to feedback received from the Staffordshire FRS in May 2024.

			Further review of the local metrological data indicates that the prevailing winds are from the southeast to southwest, there are very limited occasions when the wind is from the north to northeast, as such obscuration of the access into the site from the south and north at the same time is not possible, Figure 1 refers.
2	Roads/hard standing capable of accommodating fire service vehicles in all weather conditions. As such there should be no extremes of grade	Compliant	The proposed primary access tracks serving the site will be a crushed stone surface a minimum of 4.5m wide. There is no extreme of grade at the site. Access roads have been subject to vehicle tracking and is considered suitable for FRS vehicles. Swept Path Analysis has been conducted and the roads at the site require to withstand site construction vehicle traffic more than 20 tonne gross vehicle weight. All roads will be maintained throughout the life of the site. All internal services roads have been designed with a 10m radii and are compatible for a DB32 Fire Appliance [Ref. 7].
3	A perimeter road or roads with passing places suitable for fire service vehicles	Compliant	The BESS compound access road is a minimum of 4.5m wide hard surface access running around the perimeter the site allowing access to all BESS units, the perimeter road layout (looping around the site both external and internal to the security fence), Figure 1 refers, allows for FRS vehicles to drive in and drive out using a combination of the two points of access and egress to the BESS compound. In addition, the provision of the turning circle to the south of the site, added to the design as part of the feedback received from Staffordshire FRS, and prior to the southern point of access allows for the FRS Appliance to manoeuvre and pass.

			Section 13.4 of Approved Document B5 states that FRS vehicles should not have to reverse more that 20m from the end of an access road – given the provision of a circular perimeter service road the requirement for FRS vehicles to reverse is minimised to situations in which use of the perimeter service road is not possible, and in these circumstances, reversing more than 20m is not a requirement. Section 13.4 references Table 13.1 of the Approved Document B5 which contains typical FRS vehicle access route specifications – the site meets these specifications.
4	Road networks on sites must enable unobstructed access to all areas of the facility	Compliant	The BESS compound access service roads run around the BESS units, thus allowing access to all BESS units. All junctions and bends have been designed to accommodate FRS Appliances. The site meets the requirements of Approved Document B5 Vol 2 allowing all points on the site to be within 45m of a fire applianc
5	Turning circles, passing places etc. size to be advised by FRS depending on fleet	Compliant	The BESS compound access service roads allow access to all BESS units, Figure 1 refers in two differing directions and allow for FRS vehicles to drive in and drive out without the need to reverse. Liaison and consultation with the FRS will establish if these arrangements are satisfactory. It is proposed, following observations raised by the Planning Committee, that additional passing points on the route to the BESS compound and within the compound are included in the design, this is illustrated in Figure 2. The site is designed such that all routes have the capacity to allow for a Fire Tender (based on DB32 Fire Appliance).

6	Distance from BESS units to occupied buildings & site boundaries. Initial min distance of 25m	Compliant	There are no occupied buildings within 25m of the BESS compound, the nearest residential dwelling is more than 45m distance to the southeast (Newfields Farm).
7	Access between BESS unit – minimum of 6.0m suggested. If reducing distances, a clear, evidence based, case for the reduction should be shown	Compliant	The suggested 6.0m separation is based on a 2017 Issue of the FM Global Loss and Prevention Datasheet 5-33 (footnote 9 in the NFCC Guidance refers). This Datasheet was revised in July 2023 and again in Jan 2024, it now details the following: 1. For containerized LIB-ESS comprised of Lithium iron phosphate (LFP) cells, provide aisle separation of at least 5 ft (1.5 m) on sides that contain access panels, doors, or deflagration vents. 2. F or containerized LIB-ESS comprised of Lithium NMC cells where wall construction is unknown or has an ASTM E119 rating less than 1 hour, provide aisle separation of at least 13 ft (4.0 m) on sides that contain access panels, doors, or deflagration vents. For containerized NMC LIB-ESS where wall construction is documented as having at least a 1-hour rating in accordance with ASTM E119, aisle separation of at least 8 ft (2.4 m) is acceptable. Additionally, the Department for Energy Security and Net Zero published in March 2024 their Health and Safety Guidance for BESS in which it is stated that the separation distance, for sides with access panel, doors or deflagration panels should be a minimum of 1.5m.

			Following this revision to the Datasheet, the BESS containers on site will be compliant with the minimum distances and conformance to ASTM E119 1-hour fire rating will be confirmed on the down select of the BESS units to be procured. Current NFCC Guidance recommends 6.0m, unless deemed acceptable to be closer based on manufacturers UL testing / fire rating qualification. The BESS units on the site are 3.5m apart, which given current FM Global and Department for Energy Security and Net Zero (DESNZ) guidance, is twice the recommended 1.5m spacing. BESS technology is so rapidly changing and at the planning stage, the manufacturer and type of BESS unit is not usually known, and prevalence has been set by the decisions made for the Langford and Cleve Hill BESS sites.
8	Site conditions – areas within 10m of BESS units should be cleared of combustible vegetation	Compliant	Although on a greenfield site the BESS and other installations will be positioned on concrete foundations that forms part of the fire water runoff retention bunding design. There is some landscaping proposed within 10m of BESS units. However, a fence will be between the two. The acoustic fence along the southern and part of the eastern boundary can also be fireproofed. We can do the same for the other fence along the western boundary in front of the bund (currently shown as palisade).
9	Water Supplies	Compliant	The Appellant received a formal offer for a water connection at the site in October 2023. The detail of this connection (including the precise point of connection, flow rate, and fire hydrant position) will

			be determined during detailed design with input and agreement from Severn Trent and Staffordshire FRS.
10	Signage	Compliant	Signage will be positioned at the entrance to the site, including a site layout plan and details of key personnel.
11	Emergency Plans	Compliant	An Emergency Response Plan (ERP) will be developed for the site.
12	Environmental Impacts	Compliant	There have been no environmental impact concerns raised for the site. A Flood Risk Analysis and Surface Water Drainage Strategy has been completed [Ref. 4]. The consultation response from the Staffordshire County Council acknowledges the Flood Risk Analysis and Surface Water Drainage Strategy and imposes a condition no development shall begin until the final detailed surface water drainage design has been submitted to and approved by the Local Planning Authority in consultation with the Lead Local Flood Authority. The design must be in accordance with the principles outlined in the approved Flood Risk and Surface Water Drainage Assessment Document) and must demonstrate: 1. Final detailed design (plans, network details and full hydraulic calculations) of the surface water drainage scheme, the attenuation features (attenuation tank), petrol interceptor and Hydrobrake.Calculations shall demonstrate the performance of the drainage system for the 1-year, 2-year, 30-year and 100-year return periods

			including an allowance for climate change. 2. Final management and maintenance plan for surface water drainage to ensure that surface water drainage systems shall be maintained and managed for the lifetime of the development. To include the named body responsible for management and maintenance of the system. The development shall thereafter proceed in accordance with the approved details.
13	System design, construction, testing and decommissioning	Compliant	Testing and decommissioning will only be available in later stages of the programme. Compliant at this juncture in the planning process.
14	Deflagration Prevention and venting	Compliant	This element will not be apparent up to the point the decision is made as to what BESS is being used. Deflagration Prevention and venting Deflagration venting is possibly most effective when fitted to the roof of the BESS units, deflecting blast upwards and away from FRS personnel. Compliant at this juncture in the planning process.

Appendix 2

BATTERY ENERGY STORAGE SYSTEMS (BESS) PLANNING CHECKLIST

Address	Land at Newfields Farm, Rownall Road, Wetley Rocks, Staffordshire, ST9 0BS	
Prem Id	Newfields BESS Planning application number: **SMD/2024/0019** Planning application submitted to Staffordshire Moorlands District Council in January 2024	
	Name	**Contact details**
Agent	Arthur Griffiths, Pegasus Group	Arthur.Griffiths@pegasusgroup.co.uk
Developer	Milly Bowen, Planning Manager, RE Projects Development Limited	Milly@repd.co.uk Tel: 07805 922989
Owner	Land ownership details can be shared if necessary. Please contact the Developer for more information.	
Local Fire and Rescue Service	Thomas Tait, Fire Safety Advisor, Staffordshire Fire and Rescue Service (Staffordshire FRS)	Thomas.Tait@staffordshirefire.gov.uk Tel: 01785 898584
Document control		
Date of issue	Issue 1: 4 April 2024 Draft issue 2: 3 May 2024 Date of Issue 3: 5 September 2024 Date of Issue 4: 17 September 2024	
Reference and revision	BESS planning checklist for developer – Newfields BESS – Version Issued 18.09.2024	
Accompanying documents	The following application documents accompany the submission of this checklist: • Site location plan with electronic file reference "P23-0415_EN_02D SLP - SITE LOCATION PLAN (Aerial)". • Overall site layout plan with electronic file reference "20240402_Newfields_Farm_BESS-PL-LA-OA". • Drawing titled "Plan and Elevations of BESS Units and MV SKID Solution" with electronic file reference "20240402_Newfields_Farm_BESS-P-PL-EQ-03". • Outline Battery Safety Management Plan with reference SHF.1807.005.PL.R.001.01 dated January 2024. • Transport and Access Statement with reference C21133/TS02 dated 18 December 2023. • Planning, Design, and Access Statement with reference P23-0415 dated January 2024.	

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
INFORMATION REQUIREMENTS		
Robust Emergency Response Plan	We have agreed to work proactively with Staffordshire FRS to share information and develop a robust Emergency Response Plan. Verbal agreement to this collaboration was made by the Developer and FRS during a virtual meeting on 27 October 2023.	To be confirmed prior to commencement of operations

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
	Our planning application includes an Outline Battery Safety Management Plan (OBSMP) prepared by Enzygo (report with reference SHF.1807.005.PL.R.001.01 dated January 2024). The OBSMP identifies how the Developer and Operator will incorporate best industry practice to reduce risk to life, property, and the environment. It is a working document and will be used to inform the Emergency Response Plan. From our discussions with Staffordshire FRS, we understand the FRS would visit and develop a robust tactical plan when the BESS facility is up and running. This can be secured by a suitably worded planning condition attached to the permission. If planning is successful, we expect to start construction in early 2025.	
SYSTEM DESIGN AND CONSTRUCTION		
Battery chemistries being provided i.e. Lithium-Ion Phosphate LFP or Nickel Manganese Cobalt Oxide NMC.	The planning stage design proposes lithium ferrophosphate battery (LFP) cells as its chosen form of Lithium-Ion battery technology.	Noted
The Battery form factor i.e. cylindrical, pouch, prismatic	A prismatic form factor is anticipated.	Noted
Type of BESS i.e. container or cabinet	Bespoke battery cabinets are proposed.	Noted
Number of BESS containers/cabinets	The planning stage design includes 140No. cabinets.	Noted
Size/capacity of each BESS unit (in MWh)	The planning stage design is based on Fluence Gridstack technology. The size / capacity of each cabinet can vary as follows: • Power range: 1415 kVA to 4390 kVA • Medium voltage range: 6.6 kV to 34.5 kV • Low voltage range: 480 V to 690 V • Dimensions: approximately 2.5m long by 2.3m wide by 2.5m high. Dimensions for each cabinet are shown on drawing titled "Plan and Elevations of BESS Units and MV SKID Solution" with reference 88-10-05-P-PL-EQ-03.	Noted
BESS site layout	Please see drawing titled "Overall Site Layout" with reference 88-10-05-PL-LA-OA revision R.10 dated 02/04/2024.	Noted

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
Evidence that site geography has been taken into account i.e. prevailing wind conditions	The site lies adjacent to the National Grid Cellarhead Substation and is influenced by its industrial characteristics. It currently comprises agricultural land used for sheep grazing. It is bound by a spinney to the north and east (a small area of trees and bushes) beyond which is the Cellarhead Substation. Agricultural land and buildings associated with Newfields Farm lie to the south. A drainage ditch, established trees and vegetation, and agricultural fields lie to the west. These features are shown on the accompanying site location plan with electronic file reference "P23-0415_EN_02D SLP - SITE LOCATION PLAN (Aerial)". The topography of the site ranges between 220m Above Ordnance Datum (AOD) to 240m AOD rising from the west towards the east. It is well contained and screened by existing vegetation, hedges, and trees. The site is located in a rural, sparsely populated area. The nearest dwellings are on Greenfields Farm approximately 200m west. The design of the proposed BESS has considered the site geography. The proposed BESS has been positioned away from sensitive receptors such as dwellings / occupied buildings, protected species, flood zones, heritage assets, statutory protected landscapes like AONBs and SSSIs. Geographically, it has convenient access to the local distribution network via the Cellarhead Substation and the local road network via an existing track joining Rownall Road to the east. The prevailing wind direction is likely to be from the west with more frequent south-westerly and southerly winds. Winds from the north, east, and northwest are infrequent. The prevailing south-westerly wind might travel across the site in such a way which disperses any vented gases in the direction of the Cellarhead Substation. Given the proposed design and size of the storage units (cabinet), any gases generated due to a significant failure would be	

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
	minimal[1] and with the distances involved (i.e., between the site and the nearest dwellings) should have greatly dissipated. For more information, please see OBSMP Appendix 1 and the suite of environmental studies that accompany the planning application.	
Access to and within the site for FRS assets	The proposed access and internal roads will provide unobstructed access to the development areas, will be constructed with suitable materials, and will have suitable gradients with no obstructions. The internal access road provides space for emergency vehicles to pass safely. The design of the internal access road provides a full loop around the site with multiple internal access points. For more detail, please refer to: • OBSMP section 4.3 titled "Fire Service Access"; and • The submitted Transport and Access Statement which includes a technical drawing titled "Swept Path Analysis Using 8m Long Fire Appliance" at Appendix E (drawing number C21133-ATP-DR-TP-004 revision P01 dated 23/11/2023).	Updated access plan to be adopted.
Fire-resisting design features	Fire safety and fire-resisting features are paramount and influence all levels of a BESS design. Firstly, the selection of materials (cathode, electrolyte, separators, etc.). Secondly, the way each cell is configured, treated, and sealed. Thirdly, the electrical protection and thermal isolation at pack level. Fourthly, the functional configuration of each bespoke cabinet. Designing and configuring a battery cabinet can be divided broadly into these four levels: (1) Material → (2) Cell → (3) Pack → (4) Cabinet At the first level, materials with the highest thermal stability and strength are screened and selected. Typically, these can include	No outstanding issues, subject to condition.

[1] Gas volumes produced in the unlikely event of an incident are likely to be minimal owing to the proposed cabinet design. Cabinet designs involve smaller individual units which tend to contain a lower number of battery cells compared to other types of design. FM Global datasheet 5-33 (January 2024) explains the volume of gases produced per cell varies by cell chemistry and electrical capacity. Independent research laboratories have reported gas volumes of 2.5ft³ (70 L) and 7.1ft³ (200 L) released per cell.

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
	high thermal stability lithium iron phosphate or lithium ferro-phosphate (LFP), high thermal stability electrolytes, and high strength separator films. The choice of high-purity electrolyte, for example, can optimise the performance and longevity of the cell. Compared to other battery types, LFP is the most suitable material for grid-scale energy storage systems in terms of its stability, lifespan, high energy density, and wider operating temperature range. LFP can remain structurally stable at temperatures as high as 800ºC. LFP batteries are also less prone to fires and thermal runaway. At the second level, the most efficient, safe, and stable cell techniques are selected. Cells are the basic unit of a battery, comprising a cathode, anode, separator, and electrolyte in a casing. Lithium-ion cells tend to utilise prismatic or pouch designs to optimise battery pack packaging, for example. Other cell-level technology considerations include cathode and anode materials. Choosing high-safety separation technologies, for example, can improve thermal stability and reduce flammability. At the third level, battery packs are designed to meet safety certifications such as IEC 62619, UL 1973, and UL 9540A. Battery packs are system-level units, e.g., one of the shelves inside a BESS cabinet. They can comprise multiple battery modules (groups of cells), connectors, protection systems, and battery management system (BMS). When testing a battery pack, the focus is on the engineering design of the system as a whole. High-safety pack designs carefully consider electrical clearance distances and layers of thermal isolation to prevent short circuit and ignition. Packs can be configured with coolant plates and degassing designs to minimise the risk of other cells catching fire. Battery packs are rigorously tested against a suite of international standards. LFP technologies perform favourably in these tests. Available data for tests where multiple cells within a pack are artificially forced into thermal runaway shows they are able to contain smoke, there is no fire, no propagation / spreading, and no	

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
	explosion – all without human intervention. Thermal runaway is contained to the affected cells within one pack within one cabinet. The pack level is also where you will find the BMS (battery management system). A BMS monitors temperature, voltage, current, charge, and discharge. It monitors the performance of battery cells in real time and provides early warnings. At the fifth level, battery packs are carefully configured inside bespoke cabinets. Each cabinet will be configured to include explosion-proof fans, smoke/heat/gas detectors, aerosols, which can be automatically triggered on detector signal, and dry pipe water fire suppression systems. Cabinets are also designed to meet an array of safety certifications and standards. Rigorous testing is undertaken at each of these levels to demonstrate compliance with internationally recognised standards. With robust selection criteria and safety testing at each level, the probability of cell thermal runaway failure is reduced to zero.	
Fire suppression systems	The proposed BESS will be carefully procured, designed, and constructed to include the latest fire suppression systems. The planning stage design includes an integrated aerosol fire extinguishing system built into each cabinet. The system comprises smoke detector, temperature detector, and aerosol fire extinguishing device. For more information, please refer to the OBSMP.	No outstanding issues, subject to condition.
On site water supplies	We have been in discussions with Severn Trent regarding the provision of a water connection for a fire hydrant since September 2023. We received a formal offer for the water connection in October 2023. The detail of this connection (including the precise point of connection, flow rate, and fire hydrant position) will be determined during detailed design.	No outstanding issues, subject to condition.
Smoke or fire detection systems	The planning stage design anticipates a minimum of two types of fire detection system (smoke/heat/gas detectors). We understand additional detection systems can be added such as carbon monoxide detectors and thermal imaging cameras.	No outstanding issues, subject to condition.

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
Gas or specific vapour detection systems	As above.	No outstanding issues, subject to condition.
Temperature management systems	Temperature will be continually monitored and managed by the BMS (battery management system) within each battery pack. A BMS monitors temperature, voltage, current, charge, and discharge. It monitors the performance of battery cells in real time and provides early warnings.	No outstanding issues, subject to condition.
Ventilation systems	Each battery cabinet will include appropriate Heating Ventilation and Air Conditioning (HVAC) equipment.	No outstanding issues, subject to condition.
Exhaust systems and deflagration venting systems	Each battery cabinet will be fitted with explosion-proof fans, deflagration panels, and other protection appropriate to the hazard. The design will be developed by a competent person and will be evidenced; for instance, through compliance with the following British Standards: BS EN 16009:2011 *Flameless Explosion Venting Devices*; BS EN 14373:2021 *Explosion Suppression Systems*; and BS EN 14797:2007 Explosion Venting Devices.	No outstanding issues, subject to condition.
Identification of any surrounding communities, sites and infrastructure that may be impacted because of an incident	The nearest community is the village of Werrington approximately 1.2km south. Cellarhead Substation lies adjacent to the north / northeast. Public footpaths run along adjacent to the east and south of the site boundary.	Noted
TESTING		
Details of any evidence based testing of the system design should be requested; i.e. results of UL 9540A testing.	The battery packs will be designed to meet safety certifications such as IEC (International Electrotechnical Commission) 62619, UL (Underwriters Laboratories) 1973, UL 9540A, and others listed in OBSMP section 4. They will be rigorously tested against a suite of international standards. Available independent test data for the proposed technology reports that UL 9540A Unit Level test demonstrated the container's response to a single cell triggered thermal runway event was benign. No fire or explosion occurred, and only minimal damage to adjacent modules inside the Initiation Cube from electrolyte leakage was observed.	Noted

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
	The equipment supplier upon which the planning stage design is based has developed a Beyond Industry Standards Test to evaluate the effects of an extreme battery failure event to further inform emergency responders, insurance companies, and other stakeholders. The test goes beyond the parameters of UL 9540A and other internationally recognised standards. For example, it involves electrical ceramic furnace heaters 10 times more powerful than the heaters used in UL 9540A Unit Level tests. During the test, four units are arranged as close together as possible (the minimum spacing allowed). One of the units is forced into a large thermal runaway scenario. The test found that, even with a large fire in one unit, the batteries in other units stay well below thermal runaway temperatures. The insulation and speed of the event (relatively slow) helped keep other units safe, even without firefighting intervention. The goal of the test was to characterise how the system behaves in a large-scale failure scenario and communicate this to first responders, so they know what to expect. It demonstrated that active firefighting measures do not need to be taken in order to prevent the spread of a fire, so first responders can stay back at a safe distance. FM Global 2024 notes that evaluating the avoidance of thermal runaway by adequate thermal management is "critical" as it forms the basis of mitigation measures against thermal runaway propagation (FM Global Data Sheet 5-33 2024 page 24). If you would like to see more data about these tests, we would be more than happy to set up a meeting with an equipment manufacturer to discuss information sharing.	
DESIGN		
Rack layout	The planning stage design includes 14No. racks / strings of battery cabinets. Please see drawing titled "Overall Site Layout" with reference 88-10-05-PL-LA-OA revision R.10 dated 02/04/2024.	Noted
Thermal barriers and insultation	The planning stage design does not include thermal barriers or specific insulation measures. Separation between components	No outstanding issues, subject to condition.

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
	both within cabinets and between the cabinets themselves will comply with best practice standards.	
Container layout and access arrangements	The planning stage design uses a separation distance of 3m between cabinets. Areas between and around equipment will be finished with gravel and kept free of vegetation or other material that could act to spread a fire. The site lies near key routes which connect to the strategic road network (SRN). It is located approximately 1.9km north of the A52 and 2.5km west of the A520. The SRN is accessed at the A500 via the A52 and M6 Junction 15 which is located approximately 17km to the west. Access to and from the adopted highway is obtained via an existing farm track / private access road which connects to Rownall Road at a crossroad junction to the east. Access from the existing farm track / private access road will route through an existing farmyard. The approach into the farmyard will be modified to include a new layby and track widening. The route through the farmyard will also be improved to accommodate heavy goods vehicles (HGVs) and fire appliances. The internal access track has been designed to maximise accessibility to each of the components, maximise convenience, and minimise reversing. Four internal entrances will be provided around the internal loop road for optimum convenience. For instance, a Distribution Network Operator (DNO) engineer visiting the DNO facilities in the northeast of the site will not need to drive through the customer area or manoeuvre through multiple gates. For more information about the proposed design and layout, please refer to the OBSMP and the submitted Planning, Design, and Access Statement (PDAS). For more information about access, please refer to the submitted Transport and Access Assessment.	No objection
DETECTION AND MONITORING		

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
Is there early detection of a fault within the batteries with immediate disconnection of the affected battery/batteries; i.e. Provision of an effective Battery Management system and/or a specific electrolyte vapour detection system.	Yes, a BMS (Battery Management System) will be provided. The BMS will continually monitor temperature, voltage, current, charge, and discharge. It will monitor the performance of battery cells in real time and provide early warnings. If a fault is detected, the BMS will force the affected unit(s) to immediately disconnect.	Noted
Should thermal runaway conditions be detected is there a facility in place for the early alerting of emergency services.	The BMS will send early warnings to the Operator who will respond immediately. The Operator will alert emergency services depending on the nature and severity of the risk, ensuring the emergency services are not responding to a false alarm.	Noted
Are detection systems in place for other fires which do not involve thermal runaway i.e. fires involving electrical wiring.	Yes, the BMS will detect other electrical faults and fires.	Noted
Is continuous combustible gas monitoring within units provided. Gas detectors should alarm at the presence of flammable gas, shut down the ESS, and cause the switchover to full exhaust of the ventilation system.	Yes, each cabinet will be fitted with gas detectors.	Noted
Are external audible and visual warning devices such as cabinet level strobe lights linked to the Battery Management System when a thermal runaway event is identified and the detection and suppression system activation	The planning stage design does not specify external audible and visual warning devices. This is something we can consider and incorporate at detailed design as part of the security strategy as well as the fire detection and suppression system.	Noted
SUPPRESSION SYSTEMS		
Are suitable fixed suppression systems installed in units in order to prevent or limit propagation between modules	Yes, suitable suppression systems will be installed. Available test data reports that the in-built suppression systems are effective in preventing propagation between cabinets.	Discussion to be had when suppression system selected. Then, SFRS can comment on whether the 1900L/min is required.

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
Where a suppression system is not required then this decision should be supported by an evidence based justification and Emergency Response Plan that is designed with this approach in mind	Not applicable – suppression systems are proposed.	Noted
The choice of suppression system should be informed by liaison with a competent system designer who can relate the system choice to the risk identified and duration of its required activation; such a choice must be evidence based	The choice of suppression system has been informed by best available technology on the market which exceeds internationally recognised safety standards such as FM Global's *Property Loss Prevention Data Sheet 5-33: Lithium-Ion Battery Energy Storage Systems* interim revision January 2024.	Noted
Any calculations for sufficient water supply for an appropriate suppression system will need to be completed by a competent person considering the appropriate risk and duration of any fire	We will share our water supply calculations post-planning when we are working out the design of the fire hydrant with Severn Trent.	No outstanding issues, subject to condition.
Has water run-off and potential impact on the environment, along with mitigation measures been considered and detailed in the Emergency Response Plan	Yes, the planning stage design considers the potential impact of firewater runoff on the environment. The drainage strategy includes an attenuation tank, control chamber, and headwall. Fire risk and negative effects on the local water environment will be minimised by ensuring that firewater run-off is contained and treated, with measures in place which will be detailed within the Emergency Response Plan, such as the valve to the attenuation tank being turned off to ensure no contaminated fire water gets into the system and the provision of a gravel sump and oil interceptor underneath the BESS compound to capture pollutants. For more information about the proposed surface water drainage strategy, please refer to the submitted Flood Risk & Surface Water Drainage Assessment.	No outstanding issues, subject to condition.

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
Lack of sufficient water supplies at a particular site location should not be considered as the basis for a suppression system choice	Not applicable – a sufficient water supply is proposed.	Noted
DEFLAGATION PREVENTION AND VENTING		
Are BESS containers fitted with deflagration venting and explosion protection appropriate to the hazard	Yes, this is proposed.	Noted
Will flames and materials discharged because of any venting directed outside to a safe location and should not contribute to any further fire propagation beyond the unit involved. Exhaust systems designed to prevent deflagration should keep the environment below 25% of Lower Explosive Limit.	Yes, data available to us at this point in time suggests that the proposed BESS technology performs well when artificially forced into thermal runaway; they are able to contain smoke, there is no fire, no propagation, and no explosion. Future technological advancements are set to improve this even further and make BESS even safer.	Noted
ACCESS		
Have at least 2 separate access points to the site to account for opposite wind conditions/direction.	The proposed design includes multiple points of access and approaches into different areas of the facility. There will be one access in the north, two in the east, and one in the south. The road has been designed like a loop and provides several options for accessing and travelling through the facility. The arrangement of each individual component within the loop road has considered access for maintenance and servicing. The overall layout, including the internal access roads, includes sufficient space for the FRS to establish cordons, keeping crews and responders safe, and enabling them to take up defensive firefighting from a safe distance. The proposed design includes one entrance from the adopted highway via the existing farm track / private access road which is considered suitable and appropriate for the proposed facility. The existing farm track will be upgraded to include a layby just before the farm which will provide a passing place for emergency vehicles.	Subject to condition – B5. Widths of roads, ability to carry a certain amount of tonnage, construction of the roadway, reversing distances (no more than 20m), facility has to be within 45m of a fire engine. No outstanding issues with the overall layout / design, subject to reassurance regarding the road split. Revised site layout issued to FRS on 07.05.2024 incorporating additional connecting road as requested. FRS confirmed access plan is suitable on 05.08.2024. No outstanding issues.

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
	One entrance and more than one internal access point(s) is in line with the most recent version of the State of Victoria's (County Fire Authority) *CFA Design Guidelines and Model Requirements: Renewable Energy Facilities* version 4, August 2023. Please refer to the submitted Transport and Access Statement and site location plans for more detail. We understand the NFCC guidance due to be revised this year (2024) and fire professionals have asked for a clearer definition of 'access' and 'entrance'. We have also been advised by retired fire service officers that an incident may be tackled beyond the boundary of the site and responders may not necessarily enter the site in vehicles (they are more likely to enter on foot).	
Are roads/hard standing capable of accommodating fire service vehicles in all weather conditions.	Yes, this is proposed.	Noted
Have perimeter road or roads with passing places suitable for fire service vehicles been provided.	Yes, this is proposed.	Noted
Road networks on site must enable unobstructed access to all areas of the facility.	Yes, the proposed internal road network will enable unobstructed access to all areas of the facility.	Noted
Turning circles, passing places etc. size to be advised by FRS depending on fleet.	We look forward to Staffordshire FRS' advice.	Noted
Access between BESS units and unit spacing: Suitable access for firefighters to operate unimpeded between units will be required. This should allow for the laying and movement of hose lines and such access should be free of restrictions and obstacles.	Access between BESS cabinets (3m) is addressed in the response below. As explained above, the proposed equipment has been laid out considering the space needed for maintenance and servicing. Space free of restrictions and obstacles will be left around cabinets to allow firefighters to operate unimpeded between units. We understand from specialist fire safety advisors that firefighters are likely to deploy firefighting equipment such as ground monitors as defence firefighting and establish cordons at a safe distance.	No outstanding issues, subject to condition.

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
	We look forward to Staffordshire FRS' feedback on this. Any further advice on how firefighting apparatus such as hoses and pumps will be used in the unlikely event of an incident would be greatly appreciated.	
A standard minimum of 6m between units is suggested.	The planning stage design uses a separation distance of 3m between cabinets. This distance is based on best practice guidance and standards (including National Fire Protection Association (NFPA) 855 Standard), insurance requirements (including FM Global 2024), and the results of safety testing (including UL 9540A and the Beyond Industry Standards Test). As explained above, the results of available safety testing data demonstrate that even when units are arranged as close together as possible active firefighting measures do not need to be taken and thermal runaway does not propagate between units. A 3m separation is at least double the minimum spacing allowed by best practice standards including FM Global 2024 (which requires 1.5m aisle separation).	No outstanding issues, subject to condition.
It is recommended to not stack containers/units on the basis of the level of risk in relation to fire loading, potential fire spread and restrictions on access.	No stacking is proposed.	Noted
Is the distance from BESS units to occupied buildings and site boundaries a minimum of 25 m is proposed prior to any mitigation such as blast walls	Yes.	Noted
Reduction of distances may be possible in areas of lower risk e.g. rural setting	The site is within a rural setting away from built up residential areas and other sensitive land uses. We welcome Staffordshire FRS' thoughts on this.	No reduction in distances proposed.
WATER SUPPLIES		

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
As a minimum hydrant, supplies for boundary cooling purposed should be located close to BESS containers and should be capable of delivering no less than 1900 litres per minute for at least 2 hours	A hydrant is proposed. We received a formal offer from Severn Trent in October 2023 and are working through the details. The hydrant will be designed to meet this capability as much as possible, though we understand Severn Trent cannot guarantee flow rate or pressure. In the event that the fire hydrant pressure is reduced during an emergency event an alternative solution could be incorporated within the surface water drainage attenuation storage tank. This would involve provision of a permanent water reservoir below the proposed attenuation tank. The volume of the reservoir would be calculated to provide sufficient water to maintain the required 1900l/m for 2 hours which equates to nearly 230,000 litres of 230cu.m. The attenuation tank proposed within KRS Environmental Ltd's SW Drainage Layout is 18m x 12m. Incorporating a sump 1.2m deep below the level of the outlet pipe would create a permanent reservoir of water with a volume of 260cu.m. Once filled water would be topped up during rain events. As a secondary means of maintaining the water volume, a permanent connection to the site water supply main with a buoyancy shut-off valve could be incorporated. In order to access the water, a standard access chamber could be incorporated within the tank with a manhole cover at the surface. The fire surface could then use the access chamber to pump out the water from the reservoir at a rate to suit their own requirements. As the volume of water in the reservoir is calculated to provide the total volume of water needed by the Fire Service and this volume is maintained by two alternative sources (rainwater or the water main) the time taken to fill the tank is not relevant. As sufficient clean water will be provided within the reservoir below the attenuation tank there is no need to rely on 're-circulation' of water through the surface water drainage system and, as such, there will not be the risk of contamination.	No outstanding issues, subject to condition.

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
Water supply for any automatic suppression system will be covered by relevant British Standard or equivalent	We will ensure the new hydrant connection is covered by the relevant British Standards or equivalent. We are aware of and will ensure compliance with the British Standards referenced in the NFCC guidance (BS EN 16009:2011 Flameless Explosion Venting Devices; BS EN 14373:2021 Explosion Suppression Systems; and BS EN 14797:2007 Explosion Venting Devices). We welcome Staffordshire FRS' guidance on this and which equivalent standards it expected the Developer / Operator to consider.	No outstanding issues, subject to condition.
Any static water storage tanks designed to be used for firefighting must be located at least 10m away from any BESS container/cabinet and should be clearly marked	In addition to the hydrant a permanent water reservoir below the proposed attenuation tank can be provided to ensure adequate supply of water is available.	No outstanding issues, subject to condition.
Outlets and connections should be agreed with the local FRS	We look forward to working with Staffordshire FRS during the detailed design of the hydrant. Note, we understand hydrants and connections provided for the purposes of firefighting will have a standard instantaneous connection to allow for ease of use by the FRS (according to BS336).	No outstanding issues, subject to condition.
SIGNAGE		
Does signage include details of relevant hazards posed; the type of technology associated with the BESS; any suppression system fitted; 24/7 emergency contact information	Appropriate signage will be provided.	Noted
Has at least one sign legible at night at a distance of 30m or from the site boundary, whichever is closer been provided	Yes, this will be provided.	Noted

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
Has adherence to the Dangerous Substances Regulations 1990 been considered where the total quantity of dangerous substances exceeds 25 tonnes	The site will have suitable signage as per the NFCC guidance which should meet the requirements of The Dangerous Substances (Notification and Marking) Regulations 1990 and NAMOS (Dangerous Substances (Notification and Marking of Sites) Regulations 1990). Under normal operation, the site and its contents should not pose a hazard. In the event of a failure there may be the potential for fire / explosion; however, our discussions with local planning authorities suggest HSE does not state that a BESS site falls under DSEAR (Dangerous Substances and Explosive Atmosphere Regulations 2002). We are advised that the chief aim of the NAMOS regulations is to warn firefighters that hazardous substances are present at a site in the event of an emergency. It is our understanding that the only option for Schedule 3 would be flammable solid as there is nothing stored on site exceeding 25 tonnes other than the solid mass of the battery modules. Any gas (explosive) is the by-product of a failure and not present on site under normal operation. Any advice Staffordshire FRS can offer on adhering to this legislation and on the displaying of warning signs would be appreciated.	Noted
EMERGENCY PLANS		
Have site operators developed emergency plans and share these with the Fire and Rescue Service	Our planning application includes an OBSMP which identifies how the Developer and Operator will incorporate best industry practice to reduce risk to life, property, and the environment. It is a working document and will be used to inform the Emergency Response Plan. We understand Staffordshire FRS would visit and develop a robust tactical plan when the BESS facility is up and running. If planning is successful, we expect to start construction in early 2025. Construction is likely to take up to 12 months.	No outstanding issues, subject to condition.
Has a risk management plan been developed that includes the various hazards and risks at and to the facility and their proposed management.	As above.	No outstanding issues, subject to condition.

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
Any safety issues for firefighters responding to emergencies at the facility		
Is there safe access to and within the facility for emergency vehicles and responders, including to key site infrastructure and fire protection systems	Yes, this is proposed.	Noted
Is the proposed fire detection and suppression systems (e.g. water supply on site) adequate	Yes, the proposed systems are adequate.	Noted
Are there natural and built infrastructure and on-site processes that may impact or delay effective emergency response	The planning stage design includes improvements to existing roads (such as widening) which should make it easier for emergency responders to attend an incident. We look forward to reviewing the proposed planning stage design with Staffordshire FRS.	Noted
Does the Emergency Plan contain how the fire service will be alerted	Yes, the Emergency Response Plan will include this information.	No outstanding issues, subject to condition.
Is there a facility description, including infrastructure details, operations, number of personnel and operating hours	The submitted PDAS (Planning, Design and Access Statement) describes the proposed facility, infrastructure, operations, etc. There will be no full-time personnel on site. The facility will be remotely monitored. Operational staff attendance will be limited to occasional maintenance visits approximately once a month.	No outstanding issues, subject to condition.
Is there a site plan depicting key infrastructure: site access points and internal roads; firefighting facilities; drainage; and neighbouring properties	Yes, please see submitted drawing titled "Overall Site Layout" with reference 88-10-05-PL-LA-OA revision R.10 dated 02/04/2024.	Noted
Are there details of emergency resources, including fire detection and suppression systems and equipment; gas detection; emergency eye-wash and shower facilities; spill containment systems and equipment;	Yes, please refer to the submitted OBSMP. The OBSMP will be developed into an Emergency Response Plan which will include details of emergency facilities, spill kits, PPE, etc. as required.	No outstanding issues, subject to condition.

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
emergency warning systems; communication systems; personal protective equipment; first aid		
Are there up-to-date contact details for facility personnel and any relevant off-site personnel that could provide technical support during an emergency	Contact details for the Developer are provided at the top of this checklist. Contact details for facility personnel will be shared at the appropriate time.	Noted
Is there a list of dangerous goods stored on site	A list of any dangerous goods will be provided post-construction.	Noted
Are there site evacuation procedures	Evacuation procedures will be detailed in the Emergency Response Plan post-planning.	No outstanding issues, subject to condition.
Are there emergency procedures for all credible hazards and risks; including building infrastructure and vehicle fire, grassfire and bushfire	Emergency procedures for all credible hazards will be detailed in the Emergency Response Plan. Given the site location, the risk of building fire, vehicle fire, grassfire, and bushfire are not considered credible hazards at this stage.	No outstanding issues, subject to condition.
ENVIRONMENTAL IMPACTS		
Have suitable environmental protection measures been provided; this includes systems for containing and managing water runoff.	Yes, these are proposed.	No outstanding issues, subject to condition.
Have sites located in flood zones developed details of flood protection or mitigation measures.	Not applicable – the site is located in flood zone 1 with a low annual probability of flooding and from all sources. It is unlikely to flood except in very extreme conditions.	Noted
RECOVERY		
Is there a post-incident recovery plan that addresses the potential for reigniting of ESS and de-energizing the system, as well as removal and disposal of damaged equipment	This will be detailed in the Emergency Response Plan or equivalent post-planning.	No outstanding issues, subject to condition.

Glossary

- ADR - Agreement Concerning the International Carriage of Dangerous Goods by Road
- ARC - Allianz Risk Consulting
- BESS – Battery Energy Storage System
- BMS – Environmental Management System
- CO - Carbon Monoxide
- DNO – Distribution Network Operator
- ESS – Energy Storage System
- FRS – Fire and Rescue Service
- HVAC - Heating Ventilation and Air Conditioning
- LFP - Lithium Iron Phosphate battery cells
- Li-ion - Lithium-ion
- LPA - Local Planning Authority
- MW – Megawatts
- NFPA – National Fire Protection Association
- OBSMP - Outline Battery Safety Management Plan
- SOG - Standard Operating Guidelines
- SOH - State of Health
- SOP - Standard Operating Procedures

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