

BATTERY ENERGY STORAGE SYSTEMS (BESS) PLANNING CHECKLIST

Address	Land South of Cellarhead Substation, And west of Rownall Road, Wetlet Rocks, Staffordshire	
Prem Id	Rownall Rd Planning application number: SMD/2024/0055 Planning application submitted to Staffordshire Moorlands District Council.	
	Name	Contact details
Agent	Jake Stentiford Surface Planning	jake@suraceplanning.co.uk
Developer	S & C Energy Ltd	
Owner	Land ownership details can be shared if necessary. Please contact the Developer for more information.	
Local Fire and Rescue Service	Mark Wetherill fire engineer , Staffordshire Fire and Rescue Service (Staffordshire FRS)	Mark.Wetherill@staffordshire.gov.uk
Document control		
Date of issue		
Reference and revision	BESS planning checklist for developer – Rownall Road BESS	
Accompanying documents	Site plan 00-ROWNALL RD-104-D-BESS SITE LAYOUT	

NFCC GUIDANCE		PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
INFORMATION REQUIREMENTS			
Robust Emergency Response Plan		There is an ERP within the Battery Storage Management Plan, this will be reviewed and revised in consultation with Staffordshire Fire Service (FRS).	Subject to planning condition

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
	The planning application includes an Outline Battery Safety Management Plan (OBSMP) and ESP.	Noted
SYSTEM DESIGN AND CONSTRUCTION		
Battery chemistries being provided i.e. Lithium-Ion Phosphate LFP or Nickel Manganese Cobalt Oxide NMC.	The design is using lithium-ion Phosphate battery (LFP) cells.	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	battery containers 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 site will be a 400MW facility with 248 battery containers 6.06m x 2.44m x 2.59m with a rating of 3.73MW.	Noted
BESS site layout	See Drawing Site plan 00-ROWNALL RD-104-D-BESS SITE LAYOUT	Updated access plan to be adopted.

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 prevailing wind is westerly / south-westerly hence we have provided the secondary access from the south to facilitate safe access if material is being blown towards the northern site entrance.	Noted

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
Access to and within the site for FRS assets	The site has a principal access and egress route at the north of the site with an alternative emergency access route at the south of the site, there is an internal perimeter road, with access roads allowing access to all containers, the roads will comply with Approved Document 'B' B5 access for firefighting with all roads having a minimum weight bearing capacity of 12.5 tons, perimeter road width of 6 meters with access roads a minimum of 3.7 meters wide.	Updated access plan to be adopted.
Fire-resisting design features	UL 9540A fire testing has been undertaken at cell, module and rack levels. The tests indicate no thermal cascading occurs past an adjacent cell and therefore the fire was confined to a single module. The external walls of the unit are fire-resisting.	Noted

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?]
Fire suppression systems	There is a 2 stage suppression strategy, An Aerosol suppression system for fires other than one involving a battery and a water suppression system based on the FM GLOBAL and NFPA 855 recommendations with a design density of 12mm and can operate for a period of 12 to 48 hours.	Noted- accepted as compliant
On site water supplies	There will be a main water connection to the site to provide unlimited water supply. Water layout plan 504-A will be amended to show the water main connection.	There are 2 tanks supplying 228,000 litres on site. Accepted as compliant
Smoke or fire detection systems	There is Smoke, Heat, Gas and off-gas detection installed.	Noted

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
Gas or specific vapour detection systems	Gas and off gas Lion Tamer detection.	Noted
Temperature management systems	Temperature will be continually monitored and managed by the BMS (battery management system) within each container The BMS monitors temperature, voltage, current, charge, and discharge. It monitors the performance of battery cells in real time and provides early warnings.	Noted
Ventilation systems	Each battery container will include automatic Ventilation	Noted

Exhaust systems and deflagration venting systems	Each battery container is fitted with explosion-proof vents, and deflagration panels.	Noted- detail in Battery Storage Safety Management Plan
Identification of any surrounding communities, sites and infrastructure that may be impacted because of an incident	The initiation of the water suppression system at the gas venting stage will operate the automatic suppression system ensuring that no smoke plume or toxic gases will impact any communities as well as the distances involved.	Noted
TESTING		
Details of any evidence based testing of the system design should be requested; i.e. results of UL 9540A testing.	UL 9540A evidence based testing AT THE CELL/MODULE AND RACK level have been undertaken.	Noted

NFCC GUIDANCE		PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
DESIGN			
Rack layout		There will be 5 racks in each container.	Noted
Thermal barriers and insulation		The walls are lined with rockwool for acoustic and thermal performance.	Noted

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
Container layout and access arrangements	The containers have no internal access access is external through access doors to each rack. The layout of the containers is as per the NFCC guidance and in accordance with NFPA 855 for outdoor installations that have been tested to UL9540A, and in accordance with the FM GLOBAL Research technical report – Development of sprinkler protection Guidance for Lithium Ion Based Energy Storage Systems, a water suppression system has been installed with a design density of 12 mm/min. Then recommended separation distances can be reduced to 900mm. This spacing on this site has been designed around a pack of 4 containers this has a 6m separation between each pack of 4 with a separation distance of 2,5m side to side and 1.5 end to end.	Noted- accepted as compliant due to UL9540A testing
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.	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 from any electric supply.	Noted- no further concerns
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- no further concerns
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- no further concerns
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 container will be fitted with gas detectors and off gas detection.	Noted- no further concerns
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	There will be external sounders and visual warning devices on the external of all containers.	Noted- no further concerns
SUPPRESSION SYSTEMS		
Are suitable fixed suppression systems installed in units in order to prevent or limit propagation between modules	Yes, an aerosol suppression and water suppression system has been installed following the FM GLOBAL recommended design cabinets.	Noted- no further concerns

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.	NA
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 latest research and test evidence using internationally recognized safety standards such as FM Global's <i>Property Loss Prevention Data Sheet 5-33: Lithium-Ion Battery Energy Storage Systems</i> interim revision January 2024,NFPA 855 Standard for the installation of stationary energy storage systems.	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	The water supply calculations are detailed in the BSMP	. Noted- no further concerns
Has water run-off and potential impact on the environment, along with mitigation measures been considered and detailed in the Emergency Response Plan	The site will be sealed, and all water run off contained on site pending disposal.	Noted- no further concerns

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	A mains water supply is to be provided..	Noted- no further concerns
DEFLAGRATION PREVENTION AND VENTING		
Are BESS containers fitted with deflagration venting and explosion protection appropriate to the hazard	Yes.	Noted- no further concerns
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.	Noted- no further concerns
ACCESS		
Have at least 2 separate access points to the site to account for opposite wind conditions/direction.	YES	Noted- no further concerns

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
Are roads/hard standing capable of accommodating fire service vehicles in all weather conditions.	Yes.	Noted
Have perimeter road or roads with passing places suitable for fire service vehicles been provided.	Yes, the perimeter road will be 6m wide.	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.	Not required as there are no dead end conditions.	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.	There is access to all containers.	. Noted- no further concerns

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
---------------	----------------------	---

A standard minimum of 6m between units is suggested.	The 6m recommendation is used when there is no mitigation, These containers have followed the NFCC guidance having undergone fire testing of cells, modules and racks in accordance with UL9540A and are to be fitted with an internal water suppression system in accordance with NFCC guidance (NFPA 855).	Noted- accepted as compliant due to UL9540A testing
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	No reduction distances proposed.	Noted
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	Due to the active fire safety design it is not envisaged that any boundary cooling will be required. There will be a Fire main around the site with a number of fire hydrants. Providing an unlimited supply of 1900LPM.	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	Yes	Noted
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	The tanks if required have been measured and are 10 m away, a dimension will be added to the Plan indicating the distance.	Static water tanks are provided on site and are appropriately spaced.
Outlets and connections should be agreed with the local FRS	Yes will be designed to BS 750	Subject to Planning 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.	Subject to Planning Condition
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.	Subject to Planning Condition

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 not exceed 25 tonnes as per the HSE Guidance.	Noted
EMERGENCY PLANS		
Have site operators developed emergency plans and share these with the Fire and Rescue Service	Our planning application includes an OBSMP and ESP that will be a living document with consultation with SFRS	Subject to Planning Condition
Has a risk management plan been developed that includes the various hazards and risks at and to the facility and their proposed management.	YES	Subject to Planning Condition

NFCC GUIDANCE	PROPOSAL (Developer)	OUTSTANDING ISSUES (Fire and Rescue Service) [Condition wording?]
Any safety issues for firefighters responding to emergencies at the facility		Subject to Planning Condition
Is there safe access to and within the facility for emergency vehicles and responders, including to key site infrastructure and fire protection systems	Yes	Subject to Planning Condition
Is the proposed fire detection and suppression systems (e.g. water supply on site) adequate	Yes.	Subject to Planning Condition
Are there natural and built infrastructure and on-site processes that may impact or delay effective emergency response	No	Noted
Does the Emergency Plan contain how the fire service will be alerted	Yes, the Emergency Response Plan will include this information.	Subject to Planning 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.	Subject to Planning Condition
Is there a site plan depicting key infrastructure: site access points and internal roads; firefighting facilities; drainage; and neighbouring properties	Yes.	Subject to Planning Condition
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.	Subject to Planning 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	This will be established upon commencement of the project.		Subject to Planning Condition
Is there a list of dangerous goods stored on site	A list of any dangerous goods will be provided post-construction.		Subject to Planning Condition
Are there site evacuation procedures	Evacuation procedures are detailed in the Emergency Response Plan.		Subject to Planning Condition
Are there emergency procedures for all credible hazards and risks; including building infrastructure and vehicle fire, grassfire and bushfire	Yes detailed within the ERP.		Subject to Planning Condition
ENVIRONMENTAL IMPACTS			
Have suitable environmental protection measures been provided; this includes systems for containing and managing water runoff.	Yes.		Noted- holding ponds for firefighting effluent have been provided and detail is provided within the Battery Management Safety Plan.
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	Yes.		Subject to Planning Condition