

SMDC Planning Reference –	DOC/2025/0091
Site Name –	Cellarhead Sub-Station Access Road BESS
Summary of proposals -	BESS Development adjacent to Cellarhead Sub-Station
Consultation Note Subject –	Materials Management Plan (MMP)
Planning Case Officer –	Lisa Li
Landscape Comments Prepared By –	Stuart Ryder of Ryder Landscape Consultants
Date of site visit —	No visit necessary as attended Site on previous occasions
Note Revision	No Rev – Original note dated 15/2/26
Summary of comments –	
From a landscape perspective: • The principle of re-using site-won material is supported. • The bund form and gabion strategy are acceptable in concept but remain visually engineered. • Soil handling and reinstatement detail requires further definition to ensure long-term landscape quality by keeping good quality topsoil for the bunds. • Drainage–geology relationships require clarification to avoid landscape management issues. • Gabion stone importation and traffic implications should be explicitly confirmed with the Applicant as there is a conflict between drawing and MMP information.	

Cellarhead Access Rd BESS – Materials Management Plan Discharge Application

Purpose of this note

Ryder Landscape Consultants (RLC) have been appointed by Staffordshire Moorlands District Council (SMDC) to review the materials and gabions proposals associated with the Cellarhead Sub-station BESS that was approved under application SMD/2022/0548, issued 27 June 2023

The review has been requested by SMDC to confirm that the materials management works are appropriate to the delivery of the proposals with the minimum of disturbance at and around Site. Based on this review the adequacy of the material to discharge Condition 15 will be decided by the SMDC Case Officer.

Exclusions

This is not a geotechnical review of the materials management details submitted as that is beyond my professional expertise as a Landscape Architect and lies solely with the Applicant and their specialist advisors. I have reviewed the proposals with regards to their effects on the appearance and management of the external realm in which they are placed.

To satisfy themselves of the ongoing geotechnical aspects of the proposals the Applicant should appoint a suitably competent and experienced Geotechnical Engineer to advise them. It is also recommended that their services are retained for the duration of the construction period and through the initial Contractual Defect's Period to address site generated changes.

Document(s) Reviewed

The following document has been submitted to SMDC to discharge the materials management conditions No.15 associated with the BESS consent:

- Sirius Planning – Materials Management Plan Cellarhead BESS

This report due to its size is loaded to the SMDC Planning Portal in seven parts and I am grateful to the Applicant for forwarding it direct as a complete document.

Overview of submitted document

The reason for the documents size that runs to 219 pages of text, figures and test results is that it contains a considerable amount of test results but only a limited amount of interpretive reporting. Typically with geotechnical reporting there are associated interpretive sections prepared by Geotechnical Engineers discussing the properties of material and their suitability for the works in hand.

The submitted MMP as it stands is predominantly volumetric and sequencing-based, not procedural. Landscape-related operational safeguards and soil management methodology are still to be fully detailed or committed to.

The document functions more as an earthworks quantity statement and geotechnical reference than a comprehensive Materials Management Plan in construction and landscape implementation terms.

Phasing of earthworks

The first piece of information reviewed were the six phasing drawings to understand the planned process of excavating, storing and positioning of excavated material. Eight phasing drawings are shown from pdf pages 19 to 26.

Existing Levels – showing the starting position of what the current site topography is at the moment using contour lines. The placing of spot heights at the corners of the fields and on a 50m grid would be helpful to understand changes and to assist in future restoration.

Phase 1 – illustrates the working into the main Site phase with the topsoil strip of the access track from the Cellarhead Access Road to the southern field and a laydown area within the southern field for the receipt of materials and presumably a compound and site management area. The stripped

topsoil is shown as a mound in the southern field. A figure of 1288m³ is given for topsoil excavation and placement in the southern mound. No maximum height of mound is given and it should not be more than 2m high to maintain the aerobic condition of the soil and to reduce the risk of souring.

Phase 2 – illustrates the creation of the bund footprint and working into the northern field including the strip of the sub-station area and digging of the attenuation basin. The latter is shown as generating 340m³ of glacial till which is the type of drift geology on Site that is deemed as poor draining. Is it the intention to excavate until a point the lagoon sits on the sandstone deposits that appear to be better draining material? This topsoil stripped in this phase will be placed in the original topsoil mound and a second one will be created in the northern field. Again maximum heights for these should be stated.

Phase 3 – shows the excavation of more challenging materials in the form of the glacial till and sandstone at the sub-station. The sandstone quantity is indicated on the drawing schedule as 2,295 m³ but it is not totalled in the schedule. It does however correlate with sandstone excavation in Phase 6 to give the overall 5,400 m³ of sandstone excavated. The arrows on this drawing indicate that this excavated material is to be placed as part of the bund build up. There is no indication of whether it is to be kept separate or used as different layers in the bund e.g. stone base, glacial till above. The arrows indicated it is all coming from the sub station area and being moved directly to the bund base which will save stockpiling and double handling but stockpiling may be required to allow separation to be maintained e.g. stockpiling the glacial till to allow access to the sandstone.

Phase 4 – indicates the movement of the topsoil material in both stockpiles to continue the formation of the bunds.

Phase 5 – sees the topsoil strip of the main battery yards and direct placement of the topsoil into the surrounding bunds without any stockpiling. Presumably this is the upper part of the bunds soil build up and will form the main planting media for the trees and scrub planted on the bunds. There is no description of how this soil resource is protected from overrun or disturbance in the previous four phases to keep it as a positive resource for the Site.

Phase 6 – is the final indicated phase where a further 3,105 m³ of sandstone is excavated from the sub-station area and deposited on the battery yard. There is no indication as to whether the material is crushed or suitable for use as part of the base for the yard. The base is indicated as Type 3 material for drainage purposes given the poor drainage qualities of the glacial till. Is the sandstone strong enough for use as base material, is it friable and could it block the porous structure of the Type 3 base or lead to subsidence under loading and dips and undulations in the battery yard.

Completed to finished levels – is the final plan and summarises all the Site won material and indicates a neutral balance i.e. all material excavated on Site will be used on Site. This will save material movement off Site and associated traffic impacts. The plan would be more useful if it could

show a series of spot heights around the crest and base of the bunds say at 25m intervals and at the corners and mid-way points of the battery yards rather than relying on contours. This will allow for easier confirmation of levels and checking that the bunds have been built to correct heights.

Omitted Phases – the importation of material whether it is the Type 3 stone for the yard’s surfacing or appropriate stone for the gabion baskets should be included in the phasing. The Type 3 is presumably as a Phase 7 towards the end of the groundworks but the gabion filling and management will be throughout the construction of the bund. Please see my comments on the gabion filling material below.

Drainage Results

The infiltration testing outlined at Report paragraph 2.7.3 on pdf pages 45 & 46 of the combined document does not appear helpful to allowing water to permeate into the groundwater table. Digital snips of the report are set below for ease of reference.

Infiltration rates were generally considered poor in TP01 and TP02 ($5.4 - 9.5 \times 10^{-6}$ m/sec), and negligible in TP03 (no water level fall recorded during the test).

It was concluded within the FRA report that it will be necessary to ensure that infiltration features are placed in areas of the site underlain by Chester Formation strata, and where glacial till is absent. For the proposed sub-station, an infiltration basin was proposed in the northwest of the site, for the proposed access road in the south of the site, infiltration trenches adjacent to the road were proposed. For the remainder of the site, it was noted that new surfacing surrounding proposed structures such as battery storage containers, power conversion system (PCS) units, switch gear, etc. will be permeable, and will therefore not require formal infiltration structures.

From pdf page 57 the following extract indicates that infiltration on the Chester Formation strata was rapid. However it also identified that ‘significant’ groundwater outflow would be expected within excavations which intersected the groundwater table. This could be an issue at the sub-station area.

4.7 Infiltration Testing

Falling head infiltration testing was carried out in the three deep boreholes (BH01 to BH03), with each of these having a well response zone screened within the sandstone bedrock. Water was added to the monitoring wells, and the fall in water level recorded over time. In all cases, the fall in water level to the original standing level occurred too quickly to be able to calculate an accurate infiltration rate (i.e. the water level fell to original either immediately or within 1 to 2 minutes). Overall, however, this indicates that the Chester Formation sandstone has a relatively high infiltration rate (and conversely, significant groundwater outflow would be expected within excavations which intersected this groundwater table).

The clear recommendation is that any infiltration features need to be over the Chester Formation strata, this is the sandstone rock found on part of the Site. The SuDS basin excavated for the sub-

station in the NW of the Site is shown to be underlaid by glacial till (see Phase 2 of the earthworks diagram). Will this infiltration feature work?

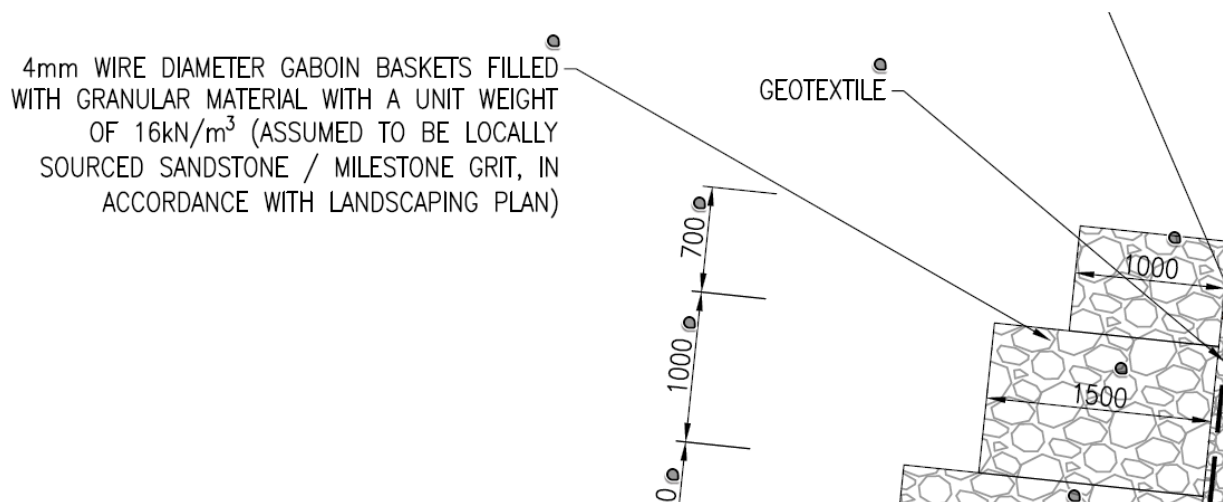
A similar question is posed with regards to the linear ditches set either side of the access track. Looking at Trial Pit information 17 to 19 there is a mix of materials but at the typical depth of a ditch – say 1.0m there is a predominance of clay. Also at this point it is worth considering the difference between a ditch and a swale. A ditch which is typically deeper than a swale will draw down water from groundwater in a field as well as drain surface water run-off. The swale as a shallower, broader feature has limited effect on groundwater within an area but provides storage in periods of higher precipitation and run-off. I am also uncertain about outfall connections and draining directions from the information I have seen or are the ditches proposed simply as isolated water holding features and not connected to any discharges? If they are simple water holding features do they have sufficient capacity to hold run off from the track and any part of the field that falls towards them?

Coal Mining Implications

There is a separate Coal Authority Report held with Appendix 2 that reports limited risk of past, present or future coal mining issues. The recommendations of this report should be followed in the detailed design and delivery of the works.

Materials for gabions

Having previously reviewed the gabion proposals drawing I was under the impression that site won material was going to be used to fill the baskets. Please see the snipped drawing note below from the Retaining Wall General Arrangement Drawing SRE1165/02/02 Rev 0



I looked with interest at the strength ratings of the sandstone to confirm it was suitable material for gabion filling. I did not find a statement given as to the suitability of the sandstone and have presumed the mudstone has been totally disregarded as a fill material.

There is a reference at Paragraph 2.1.5 on pdf page 9 that addresses bund design and clearly states in line three that gabion basket fill will comprise imported stone.

Bund Design

- 2.1.5 Details of the construction of the bund and gabion basket retaining structure are provided on Drawing No. **SRE1165/02/01** which has been submitted to the LPA pursuant to Condition 9 of Planning Permission SMD/2022/0548. The gabion basket fill will comprise imported stone, whilst the bund will be formed of material excavated from the excavation of the substation area and soils stripped from across the development footprint.

As there is no reference to sandstone being used as fill on the earthworks phasing plan it appears to indicate the importation of gabion stone is the preferred method of forming the retention.

In conducting a quick calculation of the amount of stone that would need to be imported the following estimate is made based upon the gabion dimensions shown on SRE1165/02/02 Rev 0.

- Volume of stone to fill 1m length of a 3m high wall calculated from stack of gabions = 5.1m³
- Volume of stone to fill 1m length of a 4m high wall calculated from stack of gabions = 9.7m³

Estimated Length of wall at Site

- Southern bund – 180m
- Easter bund – 330m
- Northern bund – 75m (small section to west of access point)
- Total bund length – 585m

Assuming half the bund is built with 3m high gabions and half with 4m high gabions this generates a stone volume of:

- $292 \times 5.1\text{m}^3 = 1,489 \text{ m}^3$
- $292 \times 9.7\text{m}^3 = 2,832 \text{ m}^3$
- Overall = 4321m³ of imported gabion stone – say 4300 m³ as a round number

In terms of lorry movements assuming that an 8 wheel tipper lorry would carry 11m³ per load and an articulated bulk tipper would carry 16m³ per load the following quantities of stone lorry deliveries would be expected.

- 8-wheel tipper – 4300m³ divided by 11m³ per trip estimates to 390 deliveries or 780 lorry movements.
- Articulated bulk tipper – 4300m³ divided by 16m³ per trip estimates to 269 deliveries or 538 lorry movements.

I do not know on what basis the traffic impact assessment has been made and whether it has taken account of the gabion stone delivery or was calculated based on site won material but it could be confirmed with the Applicant along with their intention to import material. I do not know which delivery route would be followed by stone lorries as there may be weight limitations to reach the Site.

Bund Design

I am grateful for the point by point responses to comments I had previously made about the bund design set at MMP pages 9 to 11 and which had been referenced in Condition 15.

Following the same order my response to the 11 No. comments are:

1. The curves in the gabion walling and embankment are welcome.
2. Symmetrical gradients to the embankments is no longer applicable as they are being retained by gabion baskets on one side. It is the uniformity of slope that will mark them as artificial features within the landscape.
3. Shallower gradients from 1:3 to 1:5 are managed in a small number of locations with the southern part of the north fields' eastern bund being the most recognisable variation. However for the most part the bunds remain at a uniform 1:3 slope with straight bottom lines tight up to the field boundaries to maximise space within the battery yards. The planting on the bunds is anticipated to hide this artificial landform within 8 to 10 years depending on the success of establishment and ongoing aftercare.
4. The geo-technical material provided does not explicitly state that the 1:3 slope will work without additional stabilising techniques.
5. The 4m height of the southern bund is achieved through gabion retention.
6. Top line variation will be achieved by placing soil over the top of the gabions and this should be shown on the drawing submitted for approval as currently it is not included. I agree that within the 8 to 10 years the top line would be masked by the proposed planting.
7. The majority of the bund interface to ground line is still a straight line hard up to the field boundary but hedging will assist in hiding this uniform interface until planting on the bund establishes.
8. A reference is made to Section 2.2 to explain how the bund is formed and this is useful for establishing phasing and quantities of material but not the actual layering of material or creation of suitable planting bed over its face.
9. Archaeological impacts are covered by the submitted Written Scheme of Investigation.
10. Planting establishment are covered by the Landscape Maintenance and Management Plan commented upon in a separate note.
11. Planting under overhead powerlines is to be managed by careful species selection and ongoing management is noted and a lower species mix is marked on the Landscape

Mitigation Softworks Planting Plan who's number is corrupted on the pdf version but with Revision letter 'n'.

Omissions in MMP

The following matters appear to be absent in the submitted material and which are typical in an earthworks scheme of this scale:

Site constraints to material management – explanation of what restrictions are placed on the site set-up, excavation, movement, deposition and delivery of materials from the adjacency to power transmission infrastructure and any known ecological features such as root protection areas, protected species e.g. badgers and to prevent overrun damage.

Topsoil stripping – How is this achieved, pre-herbicide treatment of grass or not, type of plant, type of bucket (bladed / toothed), plasticity limits for works.

Topsoil storage – maximum height, run-off control, ley seeding, weed control, turning if necessary, anticipated duration of storage.

Soil placement and reinstatement methodology – predominately on the bunds but also to cover ancillary areas on the flat that have been subject to construction disturbance.

Storage and laydown areas – noting the single large lay down area are others required to either work, store or keep different materials separate across the Site.

Importation strategy – confirmation of what bulk materials will be imported and how they will be stored or used on Site.

Exportation strategy – there is confirmation that site generated material is in balance with the bund construction but a simple stated strategy for managing areas of unsuitable ground or contaminated materials is beneficial.

Environmental protection measures – related to stripping, storage and movement of material and how any run-off or material migration from Site is controlled.

Monitoring, review and reporting – explanation of all three elements in terms of who will undertake it, what competencies do they require and how is reported to client and if necessary SMDC as the Local Planning Authority or statutory authorities such as the Environment Agency or Coal Authority.

I am aware that the Applicant has access to NBS Landscape Specification software given its use to describe planting and much of the soil handling matters can be detailed through that.

Overall discharge recommendation for Condition 15

The submitted MMP is acceptable in principle subject to clarification and additional detail regarding:

1. Topsoil stripping, storage (max 2m height) and reinstatement methodology.
2. Bund layering sequence and confirmation of soil profile depth for planting.
3. Spot heights for bund crest and within the battery yards.
4. Confirmation of infiltration feasibility for the basin and road side ditches relative to geological strata.
5. Clarification of gabion stone importation and traffic assessment implications.
6. Environmental protection and monitoring framework.

Subject to the above matters being addressed in writing and, where necessary, updated drawings submitted for approval, the discharge of Condition 15 could be supported from a landscape perspective.

Stuart Ryder

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15/2/26