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Agricultural Assessment Report
MURCHS CORNER BESS

Prepared: J Shovelton

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Meridian Agriculture Pty Limited
ABN 69 093 095 875 ACN 093 095 875
96 Harbours Rd Yendon VIC 5323

Agricultural Assessment Report
Murchs Corner BESS

Executive Summary

This Agricultural Assessment Report examines the impact of the installation of a Battery Energy Storage System (BESS) at Murchs Corner, Darlington, on a range of agricultural factors.

A Project Area of 169 hectares is being considered for the establishment of the BESS which will cover approximately 31 hectares. The study area has been used predominantly for grazing with some cropping. The soils in this location are representative of an extensive area of the district. The soils are of moderate fertility, with a tendency for waterlogging which limits their ability to be highly productive.

The proposed BESS would have no long - term detrimental effects on the productive capacity of the soil, nor would it have a significant impact on the overall productivity of the region or State, nor impact on the ability of neighbouring businesses to operate.

The loss of agricultural productivity due to the construction of the BESS will have a negligible impact on the turnover of local service providers.

The ability to diversify income from non-farming activities has the potential to significantly improve the viability of farming operations as income streams from energy infrastructure are not influenced by adverse seasonal or market conditions.

Background

An agricultural assessment of the site for the Murchs Corner BESS has been requested by Robert Luxmoore Pty Ltd on behalf of EBARE Pty Ltd.

The proposed BESS will have a capacity of up to 500MW/2,000MWh, with associated infrastructure including an on-site terminal station that will 'cut in' to the existing overhead 500kV transmission line, and associated works including access point and tracks, an operations & maintenance building, security fencing, fire protection equipment, earthworks and landscape planting.

A 169 ha area adjacent to the Darlington-Terang Rd, incorporating sections of two titles, is being investigated for the project which is expected to cover approximately 31 hectares. The two titles are: 2~10\PP2492 and 1~20\PP2492. (see Figure 3, below)

The site is located the Farming Zone of the Moyne Shire. The strategies for solar facility developments including Battery Energy Storage Systems in this zone, outlined in the Moyne Shire Planning Scheme, and relevant documents are listed below.

19.01-2S Renewable Energy Strategies

- Facilitate renewable energy development in appropriate locations.
- Protect renewable energy infrastructure against competing and incompatible uses.
- Set aside suitable land for future renewable energy infrastructure.
- Consider the economic, social and environmental benefits to the broader community of

renewable energy generation while also considering the need to minimise the effects of a proposal on the local community and environment.
- Support wind energy facilities in locations with consistently strong winds over the year.

Policy documents
The planning scheme requires that the provisions of the following document should be considered where relevant:
- *Solar Energy Facilities Design and Development Guideline* Department of Environment, Land, Water and Planning, October 2022.

This document requires the following considerations for solar energy facilities:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.

Further, the report also considers aspects including:
- the impact on the loss of the site if it has high quality soils, particularly soils that are niche to a type of crop or other agricultural activity
- the potential loss of reliable, accessible water (such as irrigated areas) and its impact at a local or regional scale.
- the impact of fragmentation and a change of land use to non-agriculture activity on local and regional productivity and output.
- the impact of a change of land use on recent and/or current efforts to modernise and reform agricultural activity in the area.
- whether the land has specifically been set aside or defined for agricultural use and development in a planning scheme or other strategic document.
- whether the change in land use is to the detriment of a government's previous or existing investment and support for the site or the area.
- whether the proposed battery energy storage facility can co-locate with other agricultural activity, to help diversify farm income without reducing productivity.

Information was sought from the owners of the land parcels regarding soil types, soil characteristics and historical agricultural productivity. Historical satellite imagery was examined. A site inspection was not undertaken.

Site Location

The study site is located at Murchs Corner, on the eastern edge of the Moyne Local Government Area (LGA), and adjacent to the western edge of the Corangamite LGA. The site is adjacent to the eastern edge of the proposed Darlington Wind Farm. (Figure 1)

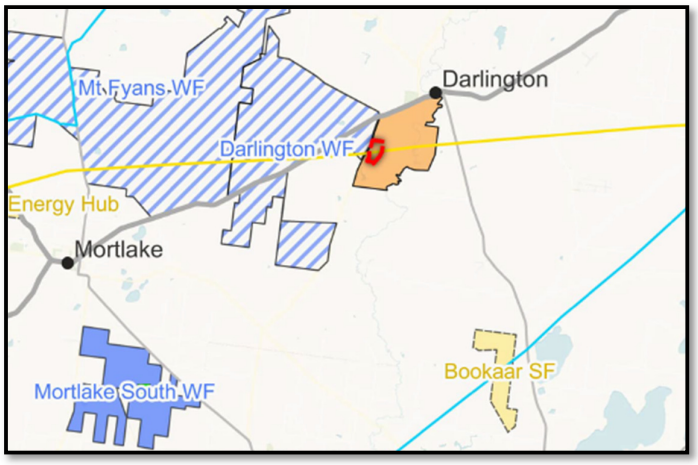

Figure 1 Murchs Corner BESS site (circled).

The proposed BESS will occupy approximately 31 hectares. A number of potential sites were considered within the project envelope, with a location north of the existing transmission line selected. (Figure 2)

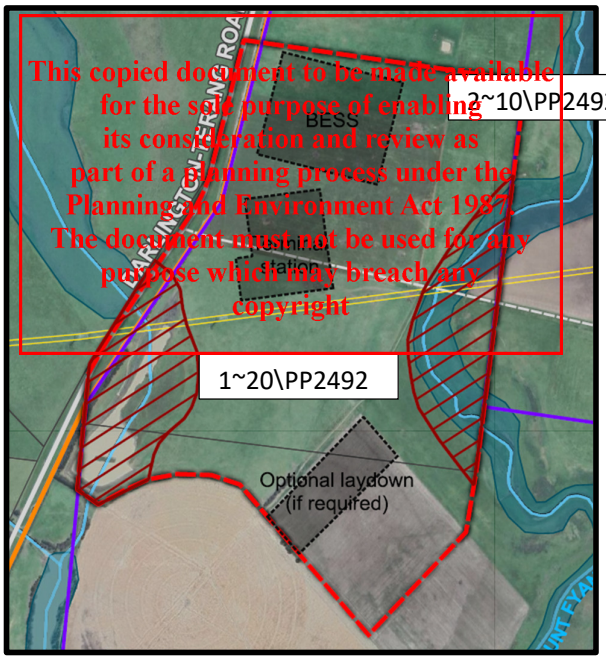

Figure 2 Site location of the BESS and associated infrastructure

Site Characteristics

Topography

The topography of the site is shown in Figure 3. The centre of the site is flat with a fall to the Mt Fyan drain to the east and another drainage line to the west.

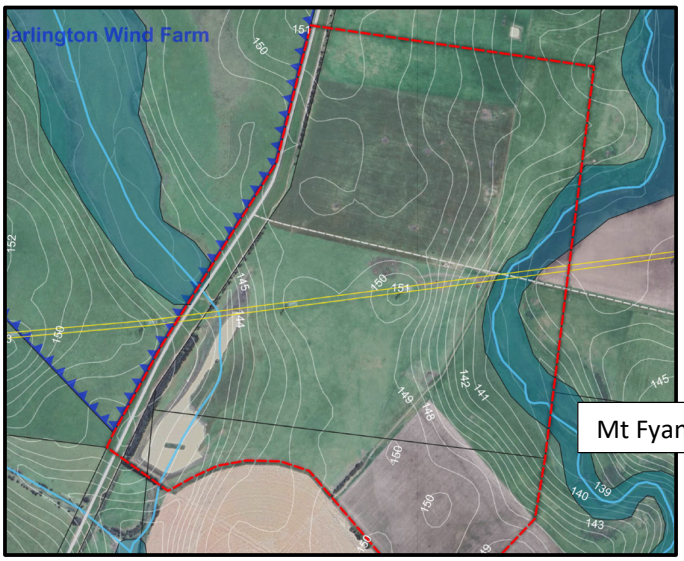

Figure 3 Murchs Corner site allotments and topography.

Geology, and Soils

The soil and landform associations for the Murchs Corner area are shown in Figure 4.

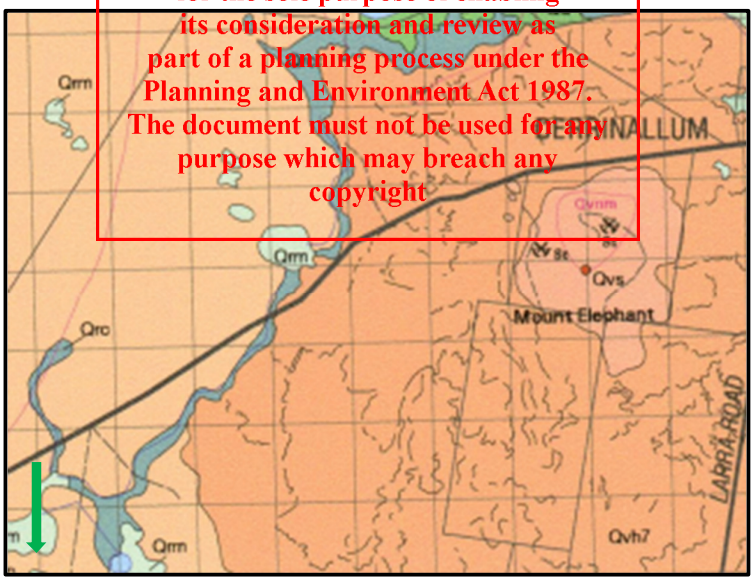

Figure 4. Geology of Project Area[1]. (Project Area arrowed)

The soils on the site are derived from olivine basalt (Qcn). Qrc refers to colluvium, which are soils developed along drainage lines. There are small areas of swamp and lagoonal deposits (Qrm). Soils derived from the olivine basalt are common in this region.

[1] https:// Thost, D. & Stuart-Smith, P.G., 2000. Skipton 1:100,000 geological map. Australian Geological Survey Organisation.

No detailed soil surveys have been undertaken in the Murchs Corner area. According to the owners, there are heavy clays along the drainage lines (such as the Mt Fyan's Drain) while the remainder of the soils are clay loams over clay. The generalised soil types for the area described in Atlas of Australian Soils[2] are consistent with the owners' description and are described as:

> *"hard alkaline and neutral yellow mottled duplex soils in association with small areas of cracking grey clays which may be dominant locally; dark cracking clays on terraces and some flood-plains along stream valleys."*

Yellow mottling is an indicator of poor internal drainage.

Grid soil sampling was undertaken in May 2025 on the northern allotment (Figure 5). It is likely that the soil characteristics of the southern allotment will be similar to the grid sampled area.

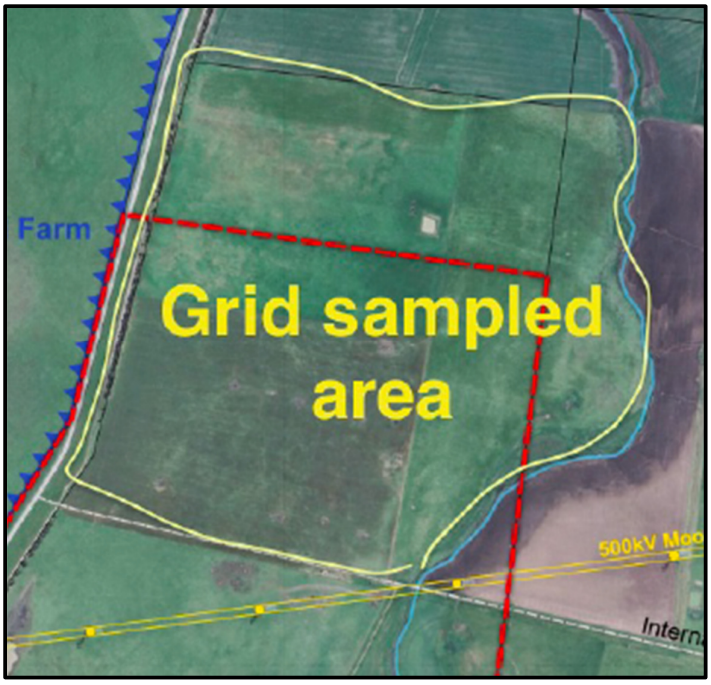

Figure 5 Location of precision sampled area.

The soils were analysed for pH($CaCl_2$), electrical conductivity (salinity), available phosphorus and potassium and exchangeable cations. The results for pH are shown in Figure 6, phosphorus in Figure 7, potassium in Figure 8 and exchangeable sodium percentage in Figure 9. The blue outline in the figures corresponds to the potential location in the northern allotment.

2 https://data.csiro.au/collection/csiro:40340?tab=data

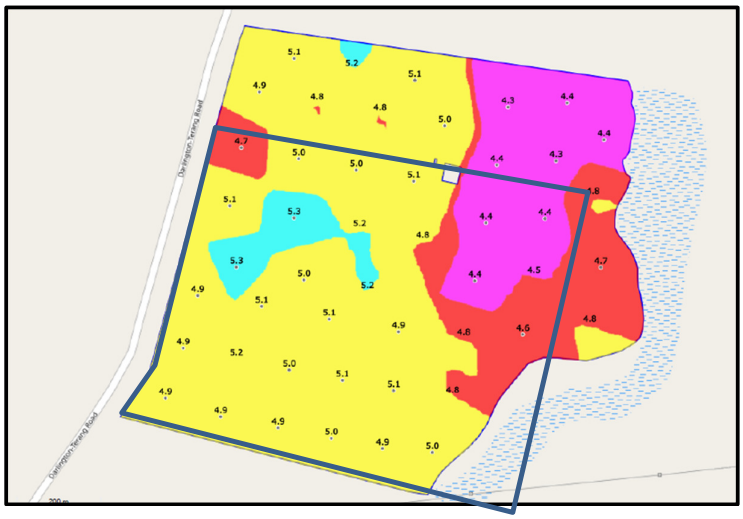

Figure 6. Soil pH(CaCl2) distribution

pH levels above 5 are considered satisfactory for the growth of acid sensitive plants. Most of the soils sit above this level, however there are some soils on the north-eastern corner which are strongly acidic, and which would require liming for optimum plant growth.

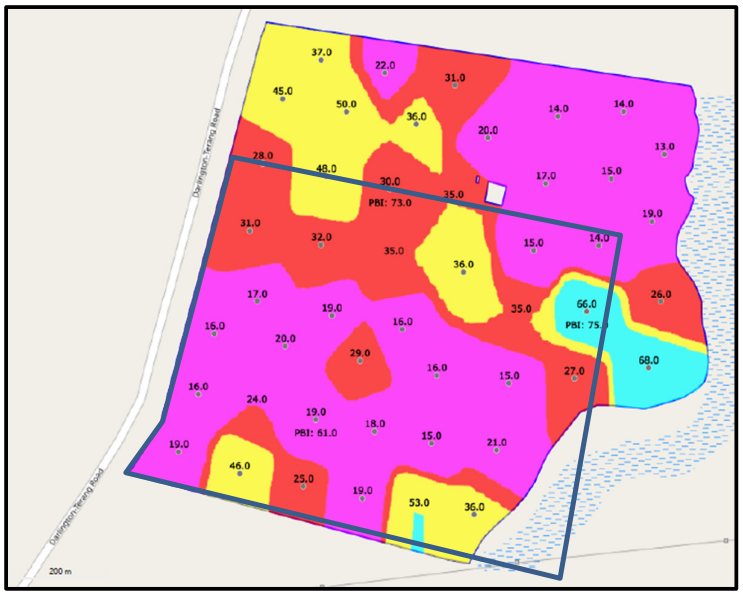

Figure 7. Available soil phosphorus (Colwell) distribution

For this soil type, soil phosphorus levels of above 22mg/kg are ideal for crop growth whereas optimum pasture growth requires a phosphorus level of 35mg/kg. The analysis show that there is a section in the middle of the paddock which requires phosphorus application for optimum pasture and crop growth.

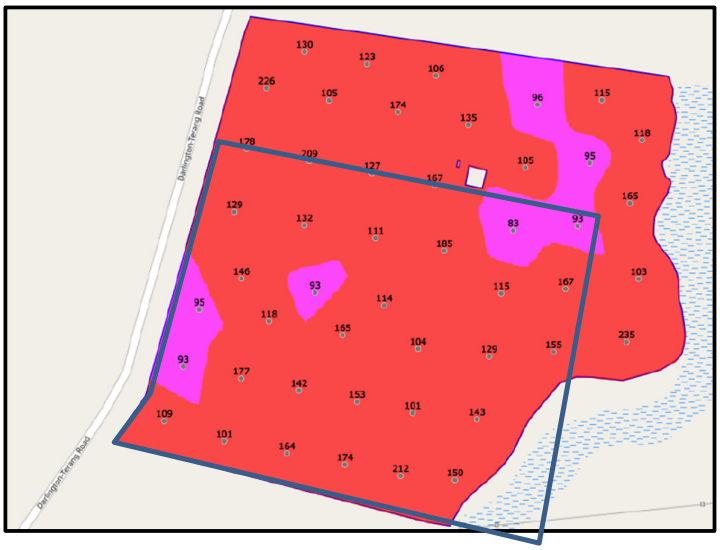

Figure 8. Available soil potassium (Colwell) distribution

The paddock is marginal or deficient for potassium for both crops and pastures and requires applications of potassium for maximum growth.

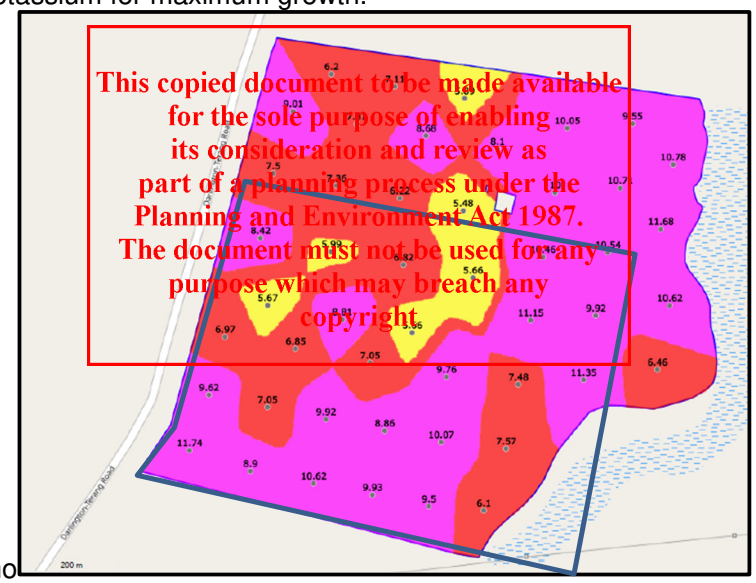

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Figure 9. Exchangeable Sodium Percentage distribution

Exchangeable sodium percentages indicate the likely response to gypsum. Responses to gypsum generally do not occur at exchangeable sodium percentages below 6%. The data (Figure 9) shows that most of the paddock has levels greater than 6%. Gypsum responsive soils are hard setting in summer and have a tendency to become waterlogged in winter. This characteristic would be associated with the mottling reported for these soils.

These soils are reasonable quality soils with the potential for good crop and pasture yields with adequate management (see later) and are typical of large swathes of similar soils in the region.

Agricultural Use

The Project Area has been used mainly for grazing although cropping is undertaken on other sections of the property.

It is not relevant consider the loss in value of production to the Shire as or the Region *per se,* because neither the Shire nor the Region directly benefit from this production. They do however benefit from the turnover of businesses servicing agricultural industries. Both these aspects are discussed below.

Crop Productivity

Potential crop yields can be inferred from the growing season rainfall (GSR). The GSR formula combines a 50% discount of the rain falling from February to April with the rainfall from the following May to October period. This GSR figure is multiplied by a factor of 20 to give the potential yield of wheat and barley and by 10 to give the potential yield for canola.

Rainfall data for this location[3] indicates that the average growing season rainfall for the last 25 years has been approximately 423 mm.

If the crop yield factors are applied to the GSR the average potential yield for wheat is 8 t/ha and for canola, 4.2 t/ha. These figures assume excellent agronomy and the absence of subsoil impediments and in high yielding seasons, a high level of stored soil moisture. It is generally accepted that 75% of maximum yield would be achieved in most commercial situations. However, as indicated above, there are waterlogging constraints caused by the high exchangeable sodium percentage which would limit the ability to achieve maximum yield in wet years.

According to the owner, wheat yields average 4.5t/ha and canola 2.5t/ha. These are reasonable yields upon which to assess crop losses from the construction of the BESS.

The BESS will occupy approximately 31 ha. The annual potential loss of crop yield would be 112.5 t wheat or 62.5 t canola, from 31 hectares.

These levels are insignificant when compared to the annual Victorian wheat production of approximately 4.3 million tonnes and approximately1.3 million tonnes for canola.[4]

Stock Productivity

The potential loss of productivity from the installation of a BESS can be calculated from the predicted carrying capacity and the area affected.

The length of growing season can be used to provide an estimate of potential stock carrying capacity[5] of an area. The growing season is a function of amount of rain and its distribution. Realisation of this potential depends on the consistent good agronomy and husbandry and the absence of inherent soil constraints.

[3] https://www.longpaddock.qld.gov.au/silo/point-data/ - -38.30 147.05

[4] ABARES 2021-22

[5] Saul G.R and Kearney, G.A (2003) Potential carrying capacity of grazed pastures in southern Australia, Department of Natural Resources and Environment, Victoria.

Based on the rainfall data for the area, the likely average growing season is around seven to eight months for the property. This equates to a potential stocking rate of between 16 -17 Dry Sheep Equivalents[6] (DSE)/ha.

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The grazing enterprise on the farm is a merino ewe flock joined to Coopworth or Romney rams. According to the owner, the stocking rate is around 14 DSE/ha. This lower stocking rate than potential is reasonable as it accounts for risks associated with adverse seasonal conditions. Merino ewes are rated at 1.8 DSE/head. Consequently, if the site was not available to run sheep it would result in a reduction in carrying capacity across 31 ha of 241 ewes.

Victoria's total sheep numbers for mid-2023 were approximately 11.7 million head[7]. Again, the reduction in sheep numbers from the establishment of a BESS on 31 ha, is insignificant in relation to the State's flock.

Impact on regional economy

The small reduction in production volume has no direct effect on the local economy. The impact will be on service industries and be reflected in a reduction of the retail margin of those businesses.

Retail margin for cropping

On average, input costs for moderate crop production levels are $575/ha, of which fertilizer constitutes 30% of input costs. Other inputs contribute 70% of input costs.

The margin on fertilizer sales to retailers is 2.5% and 30% for other input costs.

The retail margin on fertilizer/ha is therefore:

$575 * 2.5% * 30% = $4.31/ha

The retail margin on other inputs/ha is therefore:

$575 * 20% * 70% = $47.6/ha

Total **$80.2/ha**

Therefore, the lost retail margin associated with a reduction in 31 ha of crop would be $2,846.

Retail margin for sheep (14 DSE/ha at 31 ha = 434 DSE)

Benchmarking data indicates that, on average, sheep input costs are $37/DSE[8]. Fertilizer inputs are $8/DSE and other inputs are $29/DSE

The retail margin on fertilizer is therefore:

$8 * 2.5% = $0.2/DSE

The retail margin on other inputs is therefore:

$37 * 20% = $7.4/DSE

Total **$7.6/DSE**

[6] Dry Sheep Equivalent is a standard animal (non lactating/non pregnant 50 kg sheep) that is used to compare carrying capacity, profitability, etc., between different stock types. For example, one breeding ewe is equivalent to two DSE over a year and a cow and calf is equivalent to 17 DSE over a year.

[7] Meat and Livestock Australia, Fast Facts 2024, mla.com.au

[8] https://agriculture.vic.gov.au/__data/assets/pdf_file/0007/1103983/2023-24-GHG-FMP-report.pdf

Therefore, the lost retail margin associated with the reduction in 350 DSE would be $3,298.

These amounts are not material, and it is likely that these losses in retail margin would be spread over several suppliers.

Irrigation

The site is not in a defined irrigation district. There is a centre pivot to the south of the study area which accesses ground water.

Agrovoltaic considerations

There will be no opportunity for agrovoltaic activities at the BESS.

Impact on agricultural use of land

At decommissioning of the BESS, there will be no residual detrimental impact on the productivity of the site. Soil fertility will decline over time, but this decline can be corrected through the addition of suitable amendments, as required.

Cumulative impacts.

There are unlikely to be any cumulative effects on agriculture from the establishment of a BESS at this scale of infrastructure development.

Conclusions

The proposed Murch Corner BESS, 5.5 km southwest of Darlington will cover an area of approximately 31 ha.

The site has no strategic importance. It is in the Farming Zone (FZ) of the Moyne Shire and is not specifically mentioned in any planning scheme as being of high value agricultural land, nor has the land been subject to government programs that would limit the ability of the facility to proceed.

The site has been used grazing with occasional cropping and its removal from agriculture will have an insignificant impact on the Region's and the State's agricultural production and is unlikely to impact on the activities of surrounding farming properties. There will be a very small loss of retail margin to providers from the loss of sales associated with the construction of the BESS.

The soils are of moderate quality, and the construction of a BESS will have no long-term detrimental impact on soil properties.

J Shovelton
Senior Consultant
Meridian Agriculture

25 November, 2025