

Environmental Impact Assessment Report

Beinneun 2 Wind Farm

Volume 1

Chapter 8: Archaeology and Cultural Heritage

Document prepared by Wessex Archaeology Ltd and Envams Ltd for
Beinneun 2 Ltd.

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8 ARCHAEOLOGY AND CULTURAL HERITAGE

8.1 INTRODUCTION

This Chapter of the Environmental Impact Assessment Report (EIA Report) identifies and assesses the potential effects on archaeology and cultural heritage as a result of the proposed Beinneun 2 Wind Farm (the Development). The Development is situated approximately 5.4 kilometres (km) northwest of Invergarry, and approximately 11.3 km southwest of Fort Augustus (the Site).

The Historic Environment Desk-based Assessment ('the HEDBA') presents an assessment of the known and potential historic environment baseline (which captures both archaeology and built/cultural heritage) and includes a setting assessment.

The Site is solely within the planning authority area of The Highland Council. The wind turbines and the associated infrastructure are collectively known as the Beinneun 2 Wind Farm ("the Development"). The Site and turbine layout are shown on Figure 4.1, and the Development is described in Chapter 4, Development Description.

8.1.1 Assessment scenarios

The key elements of the Development relevant to this Chapter are as follows:

- Up to 19 wind turbines (maximum tip height of up to 200 m). Each turbine will require a small transformer located either inside the tower or adjacent to it. The turbines will be light grey in colour to match the existing turbines. Transformers will likely be up to c. 2.5 m in height.
- Foundations and crane hardstanding at each wind turbine location. The location of foundations will be determined by the results of ground investigations (GI) to be undertaken during enabling works. Each hardstanding area will be c. 115 m by 70 m and consist of crushed stone. There will be a smaller hardstanding area as well as additional flattened areas for the crane assist and blade finger areas.
- Access tracks linking the turbine locations comprising of 17.5 km of new tracks. The tracks will be constructed of a grade stone. Access tracks will be c. 5 m in running width.
- Battery Energy Storage System (BESS) compound containing approximately 27 battery containers with up to approximately 160 MW export capacity. The BESS will measure c. 100 m by 100 m. The units will be supported by Power Control System (PCS) units (comprising inverters and transformers).
- One meteorological mast of a height of up to 149.9 m to be secured with guy wires.
- Network of underground cabling to be laid underground alongside or within the access tracks to a depth of c. 1 m below ground level.
- New substation compound measuring c. 100 m by 100 m. This will also allow for a Distribution Network Operator to facilitate the grid connection.
- Construction and storage compound, forming an area of hardstanding for temporary cabins, parking and lay down areas. Estimate measurements are c. 130 m by 60 m. A second compound will be set up on the site of the BESS compound. The details of compounds will be finalised following consent to allow flexibility in selecting manufacturing and models for construction, however, their indicative locations are shown on Figure 4.1.
- Borrow pits are proposed to be used to source stone for construction of the Development. Designs will be provided at detailed design stage, post-consent, when actual required stone volumes are known, with areas of search shown on Figure 4.1.

It is currently anticipated that the construction period will last between 18 months starting in 2030. A micro-siting allowance of up to 50 m has been assumed for the purposes of this assessment.

The Development will have an operational lifespan of up to 40 years.

8.1.2 Supporting Information

The following supporting Technical Appendix (TA) has been prepared and provided in Volume 3 of this EIA Report:

- TA A8.1: Historic Environment Desk-based Assessment (HEDBA).

The following figure is presented in Volume 2 of this EIA Report:

- Figure 8.1: The Site, Turbine Locations and Identified Receptors.

8.1.3 Competence

This assessment has been carried out by Principal Consultant Sarah Generalski-Sparling. Sarah is an Associate member of the Chartered Institute for Archaeologists (ACIfA) with 9 years of experience as a heritage consultant. Over the past five years Sarah has been focusing on renewable energy projects including solar schemes and both onshore and offshore wind projects including in Scotland.

This assessment has been reviewed by Mark Turner, Head of EIA at Wessex Archaeology. Mark has over 30 years' worth of experience in both fieldwork and heritage consultancy. Mark is a Member of CIfA (MCIfA) and oversees and leads on EIA work. He has considerable experience in large scale and contentious development, especially in the renewable energy field. Mark has also acted as Expert Witness for a number of renewable energy schemes including for onshore wind projects in Scotland.

8.1.4 Consultation

8.1.4.1 Scoping Opinion

The EIA Scoping Report for the Development was submitted to the Scottish Government Energy Consents Unit in November 2023. Archaeology and Cultural Heritage was addressed in section 5 of the Scoping Report. A summary of the Scoping Opinion (which is included in this EIA Report as TA A2.1) received in regard to archaeological and cultural heritage are presented in Table 8.1 below. Where text has been copied verbatim, this is denoted by quotation marks.

Table 8.1: Summary of Scoping Opinion in relation to archaeology and cultural heritage

Consultee	Comment	Response
The Highland Council, Historic Environment Team (Scoping response)	<i>"The EIAR needs to identify all designated sites which may be affected by the development."</i>	The HEDBA (TA A8.1) presents an assessment of the known historic environment baseline which includes consideration of designated heritage assets, as well as non-designated heritage assets.
	The Historic Environment Team would <i>"expect any assessment to contain a full appreciation of the setting of identified historic environment assets and the likely impact on their setting"</i> . Where significant impacts are likely, appropriate visualisations such as photomontages and wireframe views in relation to the sites and their settings could be provided.	Section 7 of the HEDBA (TA A8.1) includes a settings assessment. No significant settings impacts have been identified in either the HEDBA or this Chapter, however, visualisations produced for the LVIA are discussed in the HEDBA and this Chapter where appropriate.
	The Historic Environment Team <i>"is generally satisfied that the information presented in the Scoping Report will adequately address an impact assessment"</i> and the methodology proposed is <i>"acceptable and will allow and assessment of the predicted impacts to be made"</i> . The effects scoped out are reasonable.	This Chapter has taken forward the proposed methodology as presented in the Scoping Report (see Section 8.3).
	<i>"Although no sites are currently recorded on the HER within the application boundary, this may not be an accurate representation of what survives in the area. Upstanding remains should be identified by survey and the potential for buried features of deposits to be present should be stated in the report."</i>	At the time of the heritage walkover survey in December 2024, it was not possible to gain access to the Site for a full walkover survey. An additional walkover survey by the project team was undertaken in March

Consultee	Comment	Response
		<p>2025. The results of this, and of the original walkover survey undertaken to inform the planning application of the existing Beinneun Wind Farm are included in the HEDBA (TA A8.1). While there are no known recorded heritage assets within the Site, the as yet unknown buried archaeological resource has been scoped into this Chapter as a receptor (see Section 8.6).</p>
<p>Historic Environment Scotland (HES) Scottish Government Energy Consents Unit, dated 13th December 2023</p>	<p>Scoping in cultural heritage effects is welcomed, however, <i>“the proposed scope of assessment is not sufficient for our needs as it is unclear if the applicant proposes to scope out direct impacts on the setting of designated cultural heritage assets.”</i></p>	<p>The HEDBA (TA A8.1) and this Chapter include an assessment of setting impacts. A settings assessment is included in Section 7 of the HEDBA.</p>
	<p>HES welcome references to Managing Change in the Historic Environment: Setting but note that advice as presented in the HES/NatureScot EIA Handbook should also be referred to.</p>	<p>The HEDBA and this Chapter has taken into consideration HES guidance document on setting as well as the 2018 EIA Handbook which has been used to develop the methodology employed for the assessment (see Section 8.3).</p>
	<p>The following heritage assets have been identified as potentially experiencing impacts:</p> <ul style="list-style-type: none"> • Fort Augustus-Bernera Military Road (SM11483 and SM11484) • Tir nan Og cairn (SM11494) • Balnacam township (SM11482) • Blar na Leine (BTL29) <p>In addition, the following should also be considered:</p> <ul style="list-style-type: none"> • Caledonian Canal (SM3614, SM5293, SM6496, SM5291, SM6497, SM5295, SM6494, SM6495) • Corrieyairack Pass (SM6141, SM6142, SM6143) • Cherry Island (SM9762) • Torr Dhuin (SM794) • Invergarry castle (SM5481) • Dundreggan Farm (SM11875) <p>The assessment <i>“should provide an evidential base for the sieving of assets from any subsequent detailed assessment.”</i></p>	<p>The settings assessment presented in Section 7 of the HEDBA (TA A8.1) has assessed all the designated heritage assets identified in HES’ response. The selection of heritage assets taken forward for the walkover survey and for subsequent detailed assessment was informed by a combination of a desk-based review of the known historic environment resource, the results of a Zone of Theoretical Visibility (ZTV) assessment produced for Chapter 5: LVIA and the results of the settings walkover survey. Based on the results of the ZTV, a 15 km Study Area was deemed to be appropriate, however, assets outside of this and those which could be associated with those within this study area were considered on a case-by-case basis. Visualisations produced for the LVIA inform the settings assessment as required. The use of the ZTV in combination with the 15 km Study Area has shown that no significant effects are predicted within this range. As such, this demonstrates that the study area has been effective in identifying heritage assets that could experience significant effects.</p>
	<p>There are no designated heritage assets that could experience direct physical impacts.</p>	<p>This is noted.</p>

Consultee	Comment	Response
	<p>“...setting is described as an indirect impact in section 5.5.1”, but indirect impact applies to indirect physical impacts only. Setting impacts should be considered separately. The EIA Handbook should be consulted “to the discussion of direct, indirect and setting impacts”.</p>	<p>The HEDBA and this Chapter have corrected the reference to setting impacts being indirect impacts (as previously stated in the Scoping Report) and assess setting impact separately to be in line with the 2018 EIA Handbook</p>
	<p>“Careful consideration should be given to reducing and avoiding impacts on the setting of cultural heritage assets during the design process.” A 15 km study area is proposed to identify the potential for setting impacts. “We do not consider that a study area based on a simple distance is an appropriate methodology for identifying assets for assessment as this risks the omission of assets at further distances which have particularly sensitive settings.” Risk of impact should be identified via a Zone of Theoretical Visibility (ZTV).</p>	<p>A 15 km Study Area was considered to be appropriate following a review of a ZTV produced for Chapter 5: LVIA. Assets outside of the study area were considered on a case-by-case basis.</p>
	<p>In regard to cumulative impacts, there may be developments at scoping stage adjacent to the Site which should also be considered.</p>	<p>A cumulative assessment is presented in Section 8.8 of this Chapter. This includes a list of schemes which are currently at the Scoping stage, however, only schemes which have sufficient information available to accurately assess cumulative impacts have been assessed in detail.</p>
	<p>Visualisations should be provided where a significant effect is identified. Where initial assessment identifies potential for significant impact, wireframe visualisations should be produced. Where a significant impact is subsequently identified, photomontages should be prepared. “If wireframes can be provided at an early stage this would assist both with the identification of significant effects and the scoping out of any assets where significant effects are not likely, as well as identifying if potential mitigation by design is possible. It would also assist with identifying whether wireframes will be sufficient for the detailed assessment of impacts or whether photomontages would be required.”</p>	<p>No significant setting impacts to any designated heritage assets have been identified either in the HEDBA or this Chapter. However, whilst no significant effects have been identified, visualisations produced for the LVIA have been considered where required and are referred to in Section 7 of the HEDBA (TA A8.1) and this Chapter (see Section 8.6) where applicable.</p>
	<p>Visualisation will likely be required for Balnacarn (SM11482), the scheduled military road (SM11484).</p>	<p>Balnacarn scheduled township (SM11482) was visited as part of the walkover survey. The findings of this indicated that there would unlikely be any setting impacts to the asset, and as such, no visualisation was produced. Similarly, no setting impact is predicted to the Fort Augustus military road (SM11484) and as such no visualisation was produced. The details of this can be found in Section 7 of the HEDBA (TA A8.1).</p>
	<p>HES is content that direct physical effects on assets during construction and operation can be scoped out of assessment. “It is not clear if this includes the setting impacts on designated assets [...] We are content that direct physical impacts on assets [...] can be scoped out, however, we request that impacts on the setting of designated assets are scoped into the EIA report.”</p>	<p>A detailed assessment of setting impacts is presented in Section 7 of the HEDBA (TA A8.1). Only one heritage asset has been taken forward into this Chapter for further assessment which is presented in Section 8.6.2.</p>

Consultee	Comment	Response
	Screening and mature vegetation is not considered an appropriate form of mitigation as these are vulnerable to change. Mitigation through design is considered to be more appropriate.	No screening and mature vegetation is proposed in regard to cultural heritage.

8.14.2 Post Scoping Opinion Consultations

Following the receipt of the Scoping Opinion, additional consultations with the Highland Council were carried out in 2024, with a written response received dated 4th December 2024. A summary of relevant comments is provided in Table 8.2.

Table 8.2: Summary of Post-Scoping Consultations in relation to archaeology and cultural heritage

Consultee	Comment	Response
The Highland Council, Historic Environment Team Pre-application advice (ref: 24/03327/PREMAJ), dated 4 th December 2024	In 'Supporting Information Requirements' included as part of the response, 'Archaeological Site Investigations' are identified as a required. An 'Assessment of Impact on Historic Environment' is not identified.	An archaeological investigation has not been undertaken to inform this Chapter. This is because the potential for as yet unknown buried archaeological remains is considered to be low and there are no recorded heritage assets within the Site. The proposed footprint where groundworks will occur is relatively limited at c. 27 ha when compared to the total size of the Site (at c. 1,150 ha). Furthermore, no archaeological remains were identified during the construction of the existing Beinneun Wind Farm.
	In 'National Planning Framework 4 (NPF4) (2023)' the response states that <i>"There are a number of historic assets in the vicinity of the proposal. Effects on these should be considered, including where appropriate the effects on setting."</i>	The HEDBA (TA A8.1) and this Chapter include an assessment of impacts, including setting impacts, to heritage assets within the 1 km and 15 km Study Areas. The settings assessment is included in Section 7 of the HEDBA.
	In 'Built and Cultural Heritage' the Historic Environment Team notes that there are no historic environment assets within the development area and that potential for unrecorded assets is considered to be low. However, a walkover survey would be recommended to confirm this. <i>"Overall, direct impacts to cultural heritage are not envisaged to be a significant constraint in this case, though detailed mitigation should be proposed where these are identified in the ES"</i> .	The HEDBA (TA A8.1) presents an assessment of the known historic environment resource and considers the potential for as yet unknown buried remains within the Site. As noted in the response to the Historic Environment Team in the Scoping Opinion, the potential for as yet unknown buried archaeological resource to be encountered has been scoped into this Chapter as a receptor (see 8.7).

Consultee	Comment	Response
	<i>“The ES Chapter should consider the potential indirect impacts of the proposed development on designated assets in the wider area. The indirect impact assessment must include a study of cumulative impacts. Where indirect impacts are predicted, these will be illustrated using visualisations. The list of designated assets noted in the HES response should be included as a minimum.”</i>	The settings assessment presented in Section 7 of the HEDBA (TA A8.1) has assessed all the designated heritage assets identified in HES’ response.
Historic Environment Scotland (HES) As above	The comments received from HES are the same as per those provided in the Scoping opinion presented in Table 8.1.	The responses are provided in Table 8.1.

8.2 LEGISLATION, POLICY AND GUIDANCE

The following provides a summary of legislation, policy and guidance pertinent to archaeology and cultural heritage. Further details on this can also be found in Annex 2 of the HEDBA.

8.2.1 Legislation

- Ancient Monuments and Archaeological Areas Act 1979 (United Kingdom (UK) Parliament, 1979).
- Planning (Listed Buildings and Conservation Areas) Act 1997 as amended by the Historic Environment (Amendment) (Scotland) Act 2011.
- The Historic Environment Scotland Act 2014 (Scottish Parliament).
- The Planning (Listed Building Consent and Conservation Area Consent Procedure) (Scotland) Regulations 2015 (Scottish Parliament).
- Protection of Military Remains Act 1986.

8.2.2 Policy

- Scottish Government, 2023. National Planning Framework 4 (NPF4). Policy 7.
- Highland-wide Local Development Plan (adopted 2012), Policy 57 Natural, Built & Cultural Heritage.
- Highland Council Supplementary Guidance: Highland Historic Environment Strategy (adopted January 2013).
- Scottish Government, 2011. Planning Advice Note 2/2011: Planning and Archaeology.

8.2.3 Guidance

- Chartered Institute for Archaeologists (CIfA 2014, rev. 2020). Standards and guidance for Historic Environment Desk-based Assessment.
- Historic Environment Scotland, 2016. Managing Change in the Historic Environment: Setting.
- Scottish Natural Heritage and Historic Environment Scotland, 2018. Environmental Impact Assessment Handbook: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland (The ‘2018 EIA Handbook’).
- Historic Environment Scotland, 2019. Historic Environment Policy for Scotland (HEPS).
- Historic Environment Scotland, 2019. Historic Environment Circular.
- Historic Environment Scotland, 2023. Our Past, Our Future: The Historic Environment Strategy for Scotland.

8.3 ASSESSMENT METHODOLOGY

8.3.1 Study Areas

Section 5.3.1 of the Scoping Report proposed the following study areas:

- A 1 km Study Area around the Site to provide adequate context to sufficiently assess the potential for impacts to archaeological remains (known and unknown) during the construction of the Development; and
- A 15 km buffer around the Site to capture designated heritage assets for which there is a potential for setting impacts.

A 15 km Study Area was considered to be appropriate for the purposes of determining setting impacts as the results of the ZTV produced for Chapter 5: LVIA indicated that the greatest levels of visibility would be within this range. No significant setting impacts are anticipated to occur beyond this study area. Heritage assets falling outside of the study area were considered on a case-by-case basis where considered appropriate, for example, where they fall just outside of the study area, where they might be directly associated with those within the study area or where the ZTV suggested significant visibility beyond 15 km. Where this applies, this is reported in section 7 of the HEDBA (TA A8.1).

The study area captures all of the heritage assets identified by HES in their consultation responses (presented in Tables 8.1 and 8.2).

Based on the results of the setting assessment presented in the HEDBA (TA A8.1), significant effects are unlikely beyond approximately 5 km from the Site.

8.3.2 Assessment methodology

The assessment methodology presented below is based on the 2018 EIA Handbook. The assessment has been undertaken in line with that and professional judgement.

8.3.2.1 Cultural significance and sensitivity

In general, the sensitivity of an asset can be categorised as Very High, High, Medium, Low and Negligible (see Table 8.3 below). The designation status of a heritage asset is used as a proxy for sensitivity, as designation implies a degree of cultural significance which is sensitive to change. This determination is further justified through the legal protection afforded to the designations and their meaning in terms of the application of planning policy.

‘Cultural significance’ in relation to the value of a heritage asset is described in national policy as:

“...aesthetic, historic, scientific or social value for past, present or future generations. Cultural significance can be embodied in a place itself, its fabric, setting, use, associations, meanings, records, related places and related objects.”

Table 8.3 details the framework for determining the sensitivity of receptors.

Table 8.3 Framework for determining sensitivity

Sensitivity of Receptor	Definition
Very High	World Heritage Sites and Category A and B Listed Buildings which can be demonstrated have exceptional qualities in their fabric or historical association which elevates their cultural significance to be potentially internationally important.
High	Scheduled Monuments, Category A and B Listed Buildings, Category C Listed Buildings which can be shown to have exceptional qualities in their fabric or historical association. Historic Battlefields, Inventoried Gardens and designed landscapes, and non-designated assets, including archaeological remains, of equivalent cultural significance which are considered to be potentially nationally important.
Medium	Category C Listed Buildings, other than those listed above, regionally important archaeological features and areas (as defined in the HER) and Conservation Areas, which are considered regionally important.
Low	Sites and features noted as locally important in the HER, other non-designated features of cultural significance.

Sensitivity of Receptor	Definition
Negligible	Assets compromised by poor preservation and/or poor contextual association, or very common archaeological features/buildings of little or no value at local or other scale

While the categorisation of Listed Buildings by HES implies different levels of cultural significance and/or sensitivity, all Listed Buildings are afforded the same level of legal protection.

Table 8.3 sets out sensitivity levels nominally; professional judgement will be used in determining actual sensitivity. Where assets are placed in a different category to those set out above, a rationale and justification will be made explicit in the assessment text, where relevant.

8.3.2.2 **Determining magnitude of impact**

The magnitude of potential effects will be identified through consideration of the Development, the degree of change to baseline conditions predicted as a result of the Development, the duration and reversibility of an effect and professional judgement, best practice guidance and legislation.

Consideration is given to scale, duration of impact (e.g., for construction, short term for c. 1-2 years, medium term for c. 3-5 years and long term for any period beyond that) and physical extent and height of the Development.

The criteria for assessing the magnitude of an effect are presented in Table 8.4.

Table 8.4: Framework for determining magnitude of impact

Magnitude of impact	Definition
High	Total loss of or major physical damage to or significant alteration to a site, building or other feature. Extensive change (e.g. loss of dominance, intrusion on key view or sightline) to the setting of a Scheduled Monument, Listed Building or other feature registered as nationally important, which may lead to a major reduction in the contribution of that setting to the cultural significance of the asset so that the asset loses cultural significance, and a major reduction in the ability to experience and/or appreciate that cultural significance.
Medium	Damage or alteration to a site, building or other feature. Encroachment on an area considered to have a high archaeological potential. Change in setting (e.g. intrusion on designed sight-lines and vistas) to monuments / buildings and other features, which may lead to a moderate reduction in the contribution of that setting to the cultural significance of the asset. Change/reduction in the ability to experience/appreciate that cultural significance.
Low	Changes to the elements of the fabric or setting of the heritage asset that contribute to its cultural significance such that this is substantially altered.
Limited	Limited damage or alteration to a site, building or other feature. Encroachment on an area where it is considered to have limited archaeological potential. Limited change in setting (e.g. above historic skylines or in designed vistas) of Monuments, Listed Buildings, sites and other features, which may lead to a very small reduction in the contribution the setting makes to the cultural significance of the heritage asset, and limited loss of cultural significance. Very small reduction of the ability to experience or appreciate the cultural significance of an asset.
Negligible	No Physical Effect. No change in setting with no change in the contribution that setting makes to the cultural significance of the asset. No change in the ability to experience or appreciate the cultural significance of the asset.

The magnitude of impact can either be adverse or beneficial. In general, impacts could be direct physical impacts, indirect physical impacts or setting impacts (which specifically relate to the change in setting of a heritage asset and the impact that this could have on the cultural significance of an asset).

8.3.23 Determining significance of effect

The sensitivity of the asset and the magnitude of the predicted impacts will be used as a guide, in addition to professional judgement, to predict the significance of the likely effects. Table 8.5 summarises guideline criteria for assessing the significance of effects.

Table 8.5 Framework for assessment of the significance of effects

Magnitude of impact	Sensitivity of receptor				
	Very High	High	Medium	Low	Negligible
High	Major	Major	Moderate	Minor	Negligible
Medium	Major	Moderate	Moderate	Minor	Negligible
Low	Moderate	Moderate	Minor	Negligible	Negligible
Limited	Minor	Minor	Negligible	Negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

Effects can be temporary or permanent, short term or long term and in some cases are reversible. Effects predicted to be of major or moderate significance are considered to be 'significant' in the context of the EIA Regulations, and are shaded in light grey in the above table.

8.3.3 Data Sources

The following data sources have been consulted as part of the assessment presented in the HEDBA (TA A8.1) and this Chapter:

- The Highland Council Historic Environment Record (HER);
- HES database/online portal on designated heritage assets;
- Satellite imagery available online;
- LiDAR; and
- Historic maps.

The results of the walkover survey are presented in section 7 of the HEDBA (TA A8.1). While it was initially proposed in the Scoping Report (section 5.6.2) that this Chapter would be supported by an Archaeological Desk-based Assessment and a separate Settings Assessment, both of these assessments have been combined in the HEDBA.

During the preparation of the HEDBA it was found that no suitable freely accessible LiDAR data coverage of the Site was available for consideration in this assessment. Data covering the Site were reviewed, and no evidence was found suggesting unknown buried archaeology.

8.3.4 Assumptions and limitations

Data used to compile the assessment consists of information derived from a variety of sources, only some of which can be directly examined for the purposes of the assessment. The assumption is made that this data, as well as that derived from other secondary sources, is reasonably accurate.

The HER is not a record of all surviving heritage assets, but a record of the discovery of a wide range of archaeological and historic components of the historic environment. The information held within it is not complete and does not preclude the subsequent discovery of further elements of the historic environment that are, at present, unknown.

The data available for the assessment, as supported by the surveys carried out, are sufficient to inform a robust assessment of likely significant effects on heritage and archaeological resources for the purposes of this EIA and informing a decision on the Section 36 Consent.

8.4 HISTORIC ENVIRONMENT BASELINE

A detailed description of the historic environment baseline is presented in sections 4 and 7 of the HEDBA (TA A8.1). A summary is provided below to provide context for this Chapter.

8.4.1 Summary of historic environment baseline

There are no designated heritage assets within the Site or within the 1 km Study Area. Within the 15 km Study Area there are:

- 21 Scheduled Monuments,
- 78 Listed Buildings (five Category A, 45 Category B and 28 Category C); and
- One Battlefield (Blar na Leine).

Following a desk-based review of these assets in combination with a review of the ZTV, only 3 Scheduled Monuments, 3 Listed Buildings and one Battlefield were included in the scope of the walkover survey as they fell within the ZTV and an initial review indicated that they had the potential for setting impacts. These included:

- Balnacarn township Scheduled Monument (SM11482);
- Fort Augustus-Bernera Military Road Scheduled Monument (SM11484);
- Corrieyairack Pass military road Scheduled Monument (SM6143, SM6142, SM6141, SM6140);
- Category B Listed Building Ceannacroc Bridge (LB14994);
- Category C Listed Building Greenfield Farm (LB50834);
- Category C Listed Building Suspension Footbridge over River Garry (LB6828); and
- Blar Na Leine Battlefield (BTL29).

After taking observation of these assets in a walkover survey and undertaking the initial settings assessment presented in section 7 of the HEDBA (TA A8.1), only Greenfield Farm (LB50834) was taken forward for further assessment in this Chapter.

There are no heritage assets recorded on the HER within the Site, however, there are six within the 1 km Study Area. They broadly represent post-medieval to modern activity. The location of two former farms are recorded at Loch Loyne (MHG23108, MHG23109) which is also where a modern bridge and dam (MHG22158, MHG58693) associated with a hydroelectric scheme from the 1950s can be found. A modern commemorative cairn is located at the A87 (MHG58926) near the area of the proposed access point for the Development. The site of a former post-medieval settlement known as Daingean (MHG22989) is located c. 800 m to the south of the Site to the west of Invergarry.

Three non-designated heritage assets, Loyne Bridge (MHG22158) and associated dam (MHG58693) and a commemorative cairn (MHG58926) were also scoped into the walkover survey, however, these were subsequently scoped out of further assessment.

A walkover survey undertaken in October 2010 to inform the application for the existing Beinneun Wind Farm only recorded the presence of a post-medieval to modern fence line (recorded at location NH 25488 07675) with piles of stone (NH 24783 07590) and a circular area of unknown origin (NH23080 06869). None of these fall within the Development footprint as they are broadly located within the north-eastern extent of the existing Beinneun Wind Farm. No features of archaeological interest were found during the construction of that wind farm.

Overall, the archaeological potential of the Site is considered to be low, however, should remains be present, these will likely consist of evidence of post-medieval agricultural activity (likely to be of local importance/value). This is based on known evidence of the landscape within this area historically having been used for upland grazing.

8.4.2 Identified receptors

Based on the above (and the detailed assessment presented in the HEDBA), the following receptors have been identified and will be assessed in this Chapter:

- As yet unknown buried archaeological remains; and
- Category C listed Greenfield Farm (LB50834).

8.5 LIKELY EFFECTS AND EMBEDDED MITIGATION

8.5.1 Potential effects scoped in

The key issues for the assessment of potential effects arising to the historic environment resource are likely to be:

Construction:

- Direct effects arising during the construction phase on known heritage assets (archaeological remains) within the footprint of the Development; and
- Direct effects arising during the construction phase on as yet unknown archaeological remains within the footprint of the Development.

Operation:

- Setting impacts to heritage assets during the operation phase of the Development based on the final built form.

8.5.2 Potential effects scoped out

The following issues will not occur or are not likely significant:

- Setting impacts to heritage assets during the construction phase. These may relate to increases in air pollution, traffic, noise and vibration. These are typically short term, reversible and temporary and may occur at any stage of the Development's lifespan.
- Direct physical impacts to the archaeological resource during the operation phase will not occur as there will be no further ground disturbance.
- All impacts to the historic environment resource during the decommissioning phase. This is based on the assumption that no additional land take will be required as part of this process, and that the landscape would be restored to its current condition. The decommissioning phase may lead to temporary changes in the environment, for example, in relation to air pollution, noise, vibration and traffic. Any such changes will be temporary and short term, so they are not considered to lead to a lasting setting impact. Decommissioning will involve the removal of all above ground infrastructure except for elements that the landowner intends to re-use for land management purposes.

8.5.3 Embedded mitigation

Embedded mitigation built into the design of the Development to reduce effects is set out in Chapter 3: Site Selection and Design Evolution and Chapter 4: Development Description. As there are no known heritage assets within the Site, and no setting impacts are predicted to occur, no specific design changes have been proposed in relation to cultural heritage assets.

8.6 ASSESSMENT OF EFFECTS

8.6.1 Construction

8.6.1.1 *As yet unknown buried archaeological remains*

Description of the asset

The HEDBA (TA A8.1) has found that there are no non-designated heritage assets from any period within the Site. Based on those assets that are present within the 1 km Study Area and general consideration of historic activity within the area surrounding the Site, it is anticipated that activity within the Site would have been limited, especially considering the nature of the peat uplands.

It is understood that the site of a post-medieval settlement is present within the 1 km Study Area. The township of Daingean (MHG22989) is recorded c. 800 m south of the Site by the HER. There is a small possibility that agricultural features (banks, ditches and other boundary features) associated with this township may have extended into the Site. The potential is considered to be limited considering the distance and lack of evidence on the ground (as recorded in the HER). Such features, if present, may be associated with land and stock management and are likely to be of no more than low, local sensitivity.

Overall, the potential for as yet unknown buried archaeological remains to be encountered within the Site is considered to be low, especially for those remains predating the post-medieval period.

Should archaeological remains be present, they would likely be of local importance depending on their nature, fragility, extent, condition and state of preservation, especially if they date to the post-medieval period. Any assets of an earlier date, especially those of prehistoric date, could be of local to regional importance.

Should archaeological remains be present, there is potential for direct and indirect physical impacts to such a resource as a result of construction activities.

Sensitivity of the asset

The sensitivity of the receptor would mainly be defined by its scientific value, in particular its archaeological interest. The sensitivity of the receptor where this is tied to possible post-medieval activity is considered to be low.

In the unlikely event that remains of earlier periods were present, especially considering that no such features of archaeological features were identified during the construction of the existing Beinneun Wind Farm, these might be of higher sensitivity depending on their nature, fragility, extent, condition and state of preservation.

Assessment of effects

The Development has the potential to partially truncate or entirely remove evidence of as yet unknown buried archaeological remains should these survive within the Development footprint. Considering that the elements of the Development where ground intrusive works will be required are fairly focused (in that only 2.3% of the Site will be subject to construction works), it is considered highly unlikely that there would be a total loss of this overall archaeological resource (if present). However, individual assets (where present) may be lost during construction works.

Should archaeological remains relating to post-medieval activity be present, which would be of low sensitivity, assuming a worst case scenario of complete loss, there would be a high magnitude of impact which would result in an effect of minor significance which would be not significant under the EIA Regulations.

In the unlikely event that remains of an earlier period are present, they may be of low to medium sensitivity. Assuming the worst case scenario of complete loss, there would be a high magnitude of impact, thereby resulting in an effect of minor to moderate significance (depending on the nature, fragility, extent, condition and state of preservation of the archaeological resource). A minor significance of effect would be not significant under the EIA Regulations, while a moderate significance of effect would be significant.

Mitigation to reduce an effect (where possible) is available in the form of archaeological investigations which is set out in Section 8.7.

8.6.2 Operation

Greenfield Farm (LB50834)

Description of the asset

Greenfield Farm is a Category C listed barn located at Greenfield which lies c. 3.5 km south of the Site. It is of late 18th century date and is a rubble based structure with a later corrugated iron roof.

The building is situated on agricultural land south of Loch Garry and set within an existing farm complex.

Sensitivity of the asset

On account of its Category C listed status and regional importance, it is considered to be of medium sensitivity.

The sensitivity/cultural significance of this asset is primarily shaped by its architectural value, however, its historic value also makes some, but arguably less, contribution to its overall significance.

The barn is a good example of traditional Scottish agricultural vernacular architecture prior to the wider pre-improvement period when many such buildings were upgraded and the style changed. While some later additions at the barn have been recorded, there appear to be good levels of surviving original historic fabric.

The building's historic value is mainly tied to the former township of Greenfield at this location. Once a substantial township, it was largely abandoned by the 1790s. It was then resettled in the 1840s to 1850s before once again dwindling in size, leaving only the existing farm complex active within the area. The Listed Building once formed part of a tenanted farm on the Glengarry estate once owned by the MacDonnells of Glengarry, however, today, it appears to be in private ownership and management.

Setting and contribution to cultural significance

The immediate setting of the asset is shaped by the farm complex which is divided by a road. The barn is located south of the road in a small group of two other barns. A more modern agricultural building sits to the south/south-east of this group. To the north of the road appears to be another small barn and the farmhouse (which is set back from the agricultural buildings). The farm complex is surrounded by fields with scattered areas of woodland.

Its wider setting comprises of the remains of the former township, however, this is difficult to appreciate as little remains of this survive. Although the remnants of what appear to be walls or former land division seems to survive based on aerial satellite imagery (especially to the east of the barn), it is unclear as to what extent this can be appreciated and/or understood from the ground level.

Outside of this setting, the barn is set within a wider agricultural background, which, according to the ZTV, allows for long distance views north, despite woodland cover, on account of the elevated position of the farm complex. It is within these long distance views that the Site is located.

The setting that makes the greatest contribution to the significance/sensitivity of the asset is considered to be the farm complex as the ability to interpret, appreciate and understand the building's architectural interest and historic part in Greenfield is best achieved from within the farm complex.

It is unlikely that the Development will be visible from the immediate location of the barn, however, Viewpoint 15 shows that distant visibility from the open ground to the north-west/west of the Listed Building is possible. Even if such views would be possible from the barn or from within the farm complex itself, such visibility would be incidental.

Assessment of effects

Viewpoint 15, produced in the visualisations in Volume 2b of this EIA Report, has been taken from land to the west of the Listed Building and provides an indication of likely visibility of the Development from the asset. The viewpoint shows that the existing wind farms (Beinneun and Millennium) are visible from the area of Greenfield to the west of the Listed Building and that the addition of the Development would lead to further turbines being visible in this view.

Whilst it is assumed that the turbines would be visible from the Listed Building, this visibility is incidental. The barn was not built with the intention of wide ranging northern views; instead, it was purposely constructed as an agricultural building serving the farm. Wide ranging views to the north are not considered to be part of its setting.

The barn's original setting has been compromised by the addition of modern agricultural buildings. It is now understood within the context of this modern active working farm.

While traces of the former township that would have also once formed part of its setting are still visible in the form of land divisions (especially from aerial imagery), this context has also somewhat been lost.

It is the farm complex and its surrounding agricultural setting that contributes to the cultural significance of the Listed Building, as it is from here that is architectural value, and to some extent its historic value (in relation to the township), can be best understood.

Based on the above, the Development will therefore not lead to a setting impact to this asset. The setting as described above will remain unaltered meaning that the way in which

the architectural and historic values are appreciated and understood from within the farm complex and its immediately surrounding agricultural landscape will not be changed.

The importance/value of the receptor is considered to be medium. Based on the above, the magnitude of impact of the Development is considered to be negligible, thereby resulting in an effect of negligible significance which would be not significant under the EIA Regulations.

8.7 MITIGATION

As mentioned in Section 8.5, no specific embedded mitigation has been designed in relation to cultural heritage as there are no known heritage assets within the Site and as initial assessment presented in the HEDBA (TA A8.1) indicated that there is no likelihood of significant effects to cultural heritage (in terms of setting impacts). Therefore, in regard to setting, no mitigation is considered necessary.

However, this Chapter has identified that there is potential for impacts to as yet unknown buried archaeological remains. It is proposed that a phased programme of archaeological works is implemented.

Archaeological monitoring (a watching brief) will be carried out during preliminary site investigation if deemed appropriate. Should this identify the potential for archaeological remains, an archaeological trial trench evaluation will be implemented. Further mitigation depends on the archaeological resource encountered during trial trenching. Preservation by record is likely to be sufficient, although, this depends on the archaeological resource discovered, preservation in situ may be appropriate. The scope of any archaeological works will need to be agreed with the Historic Environment Team at The Highland Council.

The scope of any archaeological works would be set out within a Written Scheme of Investigation (WSI) based on the above, to be submitted to The Highland Council. It is assumed that the implementation of this would be secured via an appropriately worded planning condition.

8.8 CUMULATIVE ASSESSMENT

A total of 15 cumulative schemes were identified for the purposes of this EIA Report. These include operational developments and consented development where there is sufficient information in regard to the final proposed form, as well as those at the Scoping and early planning stages as follows:

Operational

- Beinneun – 32 turbines of up to 136 m tip height (0.4 km, north);
- Millennium – 26 turbines of up to 125 m tip height (0.6 km, north);
- Stronelairg – 66 turbines of up to 135 m tip height (21.9 km, east);
- Bhlaraidh – 32 turbines of up to 135 m tip height (15.4 km, north-east); and
- Corrimony – 5 turbines of up to 100 m tip height (19.6 km, north-east).

Consented

- Bunloinn – 10 turbines of up to 200 m tip height (2.9 km, west);
- Tomchrasky – 14 turbines of up to 185 m tip height (6.5 km, north);
- Bhlaraidh Extension – 15 turbines of up to 180 m tip height (18.6 km, north-east);
- Cloiche – 29 turbines of up to 149.9 m tip height (20.0 km, east); and
- Chrathaich – 13 turbines of up to 149.9 m tip height (17.1 km, north-east).

Scoping

- Millennium East (in scoping) – 8 turbines of up to 200 m tip height (2.5 km, north);
- Beinn Bheag (in scoping) – 28 turbines of up to 230 m tip height (11.4 km, south-west); and
- Fiodhag (in scoping) – 46 turbines of up to 149.9 m tip height (14.6 km, north).

Planning

- Culachy (in planning) – 8 turbines of up to 200 m tip height (11.6 km, south-east);
- Loch Liath (in planning) – 13 turbines of up to 200 m tip height (19.8 km, north-east); and
- Dell 2 (in planning) – 9 turbines of up to 200 m tip height (22.2 km, east).

The locations of these cumulative schemes can be seen in Figure 5.9 of Chapter 5: LVIA. They are based on an approximate 20km radius surrounding the Site.

8.8.1 Identified receptors for cumulative assessment

This Chapter has not identified significant effects resulting from the Development. However, upon review of the cumulative schemes, it was considered that the two scheduled military roads located within the 15 km Study Area should be considered for cumulative assessment. These are:

- The Fort Augustus-Benera Military Road (SM11484); and
- Corrieyairack Pass military road (SM6143, SM6142, SM6141, SM6140).

The above does not include the smaller section of the Fort Augustus to Bernera military road located south of the River Moriston (SM6143) as that shares no intervisibility with the Development and unlikely has the potential for intervisibility with other cumulative schemes on account of its wooded location.

They were selected for cumulative assessment as, although the Development in isolation is not considered to lead to setting impact, they are located on either side of an extensive wider wind farm landscape with Beinneun Windfarm and Millenium Wind Farm located between them, which is also where Millenium East Wind Farm is proposed. Furthermore, Culachy is proposed to the immediate west of Corrieyairack Pass military road (SM6143, SM6142, SM6141, SM6140) and would thus bring this landscape closer to this asset.

As the military roads are described in further detail in section 7 of the HEDBA (TA A8.1), the following sections should be read in conjunction with TA A8.1.

Viewpoints 5B and 9 prepared for Chapter 5: LVIA, presented in EIA Report Volume 2b, are referred to where required and should also be consulted as they relate to the discussion of the Scheduled Monuments.

Viewpoint 5B was taken from a high point c. 2 km north-west of the military road (where it meets the A87) at c. 957 aOD. The military road is located on lower ground between roughly 280 to 300 m aOD. While not taken directly from the Scheduled Monument, this viewpoint does provide an overall indication of views towards the Site as it lies within the same views/orientation towards the Development.

Viewpoint 9 was taken directly at a section of the Corrieyairack Pass.

The military roads are c. 16 km apart with Beinneun Forest, Invergarry and Aberchalder between them. While they are both of mid-18th century date constructed for the purposes of suppressing the Jacobite Rebellion by providing suitable transport links and connections between areas, there is no indication that there was a designed and intended visual link between them. They form part of a wider network of military roads, with one ending at and the other starting at Fort Augustus.

8.8.2 Wind farms in scoping

Millenium East, Beinn Bheag and Fiodhag are all at the scoping stage. For the purpose of this assessment, they are scoped out of the cumulative assessment presented here, primarily because their details are not yet defined. Fiodhag is unlikely to come forward and currently has no available details that would provide accurate material for assessment. Millenium East would see an extension to Millenium, which would not significantly increase the wider turbine landscape, and Beinn Bheag is at such a distance to the south-west of both military roads as to unlikely give rise to any cumulative effects.

8.8.3 Wind farms in planning

Loch Liath, Dell 2 and Culachy are currently at the planning stage and not yet consented. Loch Liath is located to the northern edge of the 20 km cumulative study area while Dell 2 sits just outside it to the east. Loch Liath has not been picked up/illustrated in either of the relevant viewpoints (Viewpoint 5B and Viewpoint 9) and therefore does not apply to the discussion of the military roads. As such, it is not considered further.

In regard to Dell 2, no cumulative effects are anticipated in relation to Corrieyairack Pass military road (SM6143, SM6142, SM6141, SM6140) as that scheme sits c. 9 km to the north-east on higher ground suggesting no intervisibility.

In relation to the Fort Augustus-Bernera Military Road (SM11484), the blade tips of Dell 2 may be visible at a great distance just over the mountain ridge (see Viewpoint 5B). As visibility would be limited to a day of very good visibility, and the development would effectively be seen as sitting behind the wider ridgeline, no cumulative effects are anticipated.

In regard to Culachy, this will be visible in limited long distance views from the Fort Augustus-Bernera Military Road (SM11484) while it would effectively appear as sitting almost in front of the Corrieyairack Pass military road (SM6143, SM6142, SM6141, SM6140) (see Viewpoints 5 and 9).

In regard to the Augustus-Bernera Military Road (SM11484), Culachy would likely be seen in context with Beinneun and the Development, although it would appear at a greater distance. As discussed in the settings assessment presented in section 7 of the HEDBA (TA A8.1), it is views along the road and its immediate environs which are of more interest here rather than very distant background views to the east and south-east (i.e., towards the Site). The combination of Culachy and the Development is not considered to harm the cultural significance of this asset which is mainly tied to its scientific value (that is, its archaeological interest) and its historic value (which is informed by its military use, intent and connection to Major William Caulfield).

Looking at Viewpoint 9, Culachy will essentially sit in the foreground of Corrieyairack Pass military road (SM6143, SM6142, SM6141, SM6140) with the Development appearing as sitting behind it, but at a greater distance. While Culachy is indicated to be quite prominent with the Development in its background, it is not considered that the combination would impede our ability to understand its cultural significance (which is similar to that of the other road). Views across the military road and its immediate environs will be retained.

Based on the above, a combination of Culachy and the Development are not considered to lead to significant cumulative effects.

8.8.4 Consented wind farms

The consented wind farms include Bunloinn, Tomchrasky, Bhlaraidh Extension, Cloiche and Chrathaich. Of these, Bhlaraidh Extension and Chrathaich have not been identified in cumulative views shown on Viewpoints 5B and 9 and are therefore scoped out of further assessment.

Cloiche, much like Dell 2 and Stronelairg, only applies to the Fort Augustus-Bernera Military Road (SM11484) and Viewpoint 5B as this would be experienced as part of wider views towards these other wind farms. While the blade tips would likely be visible, they would be seen as sitting behind the ridgeline further to the north-east from the Development. Again, due to distance and a high dependability on very good visibility, it is not considered that this scheme together with the Development would lead to any cumulative effects.

As indicated by Viewpoint 5B, Bunloinn would sit in views to the south/south-west of the Fort Augustus-Bernera Military Road (SM11484). Based on its location and orientation it sits in a completely different landscape to the Development (which lies more in views to the east). Considering that the military road is located on lower ground to Viewpoint 5B, it is possible that views towards Bunloinn are even more restricted from the road. The Development and Bunloinn would unlikely be visible in the same views from the military road. Despite this, it is considered that there would be no setting impacts to this asset as a result of the combination of these schemes.

Viewpoint 9 shows that Bunloinn and Tomchrasky would be seen in long distance views to the north-west and south-west from Corrieyairack Pass military road (SM6143, SM6142, SM6141, SM6140). Both of these would be at greater distances to the Development, almost forming the most eastern and western extent of this wider renewable energy landscape. The turbines at Tomchrasky would almost entirely be hidden by the topography on account of them sitting on lower ground (behind Millenium). On account of this, it is highly unlikely that they would even be distinguishable in wider long-distance views to the north-west. Due to this, no cumulative effects are anticipated.

It is possible that views towards Bunloinn will be intermittent when walking along the military road. On account of its location further north-west from the Development (to the north of Loch Loyne in the Bunloinn Forest), it would sit quite separately from the ridge of turbines created by the Development and Beinneun and Millenium which sit adjacent to it. It is also

located at a greater distance with c. 1 km between Bunloinn Forest and Beinneun Forest. While Bunloinn would essentially increase the turbine landscape, this is considered to be at such a distance to the military road as not leading to setting impacts. As mentioned above, there is no known intended or designed visual link between the two military roads, and even if this were the case, Bunloinn itself would not sit within this.

Based on the above, it is not expected for cumulative effects to arise from a combination of the Development and Bunloinn in regard to either of the scheduled military roads.

Tomchrasky does not apply to Viewpoint 5B and the Fort Augustus-Bernera Military Road (SM11484) and therefore would not give rise to any cumulative effects in regard to this asset.

8.8.5 Operational wind farms

Beinneun, Millenium and Stronelairg are the only operational wind farms scoped into this assessment as these are the only ones identified in the cumulative views for Viewpoints 5 and 9. As such, Bhlaraidh and Corrimony have been scoped out of further assessment.

In regard to the Augustus-Bernera Military Road (SM11484), Viewpoint 5B shows that Stronelairg sits in long distance views to the east/north-east and, similarly to Dell 2, it is only a very small amount of the blade tips that are visible. Indeed, these are barely identifiable on the baseline photography for Viewpoint 5B. This very limited view of Stronelairg is also in a different direction to the Development. Much like Dell 2, it is located as such a distance as to not lead to any cumulative effect.

Viewpoint 5B also shows that Millenium and Beinneun are noticeable from this location, with Beinneun sitting closer in the foreground to due the topography. Millenium sits behind Meal Dubh which rises between the two existing wind farms.

Similar views of Millenium and Beinneun are possible from Corrieyairack Pass military road (SM6143, SM6142, SM6141, SM6140) as shown on Viewpoint 9. Here, Millennium appears closer while Beinneun is sat further in the background.

The Development will essentially be seen as filling in a gap between the two existing windfarms and will likely be seen as doing such from both military roads. Combined with the existing wind farms, the Development would add to the number of turbines within these long-distance views, but it is not considered that this addition would harm the respective cultural significances or lead to setting impacts to the two military roads.

As stated above, it is highly unlikely that the two roads would have had an intentional and designed visual connection. As such, the Development and the existing wind farms do not lie in any key views between the assets. Even if such views were intended, the addition of the turbines would not obstruct views between the two mountain ranges where the roads are located.

Based on the above, it is considered that the Development in combination to operational wind farms would not lead to cumulative effects.

8.9 RESIDUAL EFFECTS

After the application of mitigation measures, it is considered that anticipated effects on unknown buried archaeology could be reduced. The mitigation measures would allow for preservation in situ or preservation by record depending on the archaeological resource encountered. Preservation in situ would mean no further truncation or total loss, while preservation by record would ensure that a record of the archaeological resource is established prior to loss.

In regard to the operational phase, as no significant effects have been identified, no change to the effects is anticipated.

8.10 SUMMARY AND STATEMENT OF SIGNIFICANCE

A summary of the likely significance of effects is presented in Table 8.6 below. No significant effects were identified in this assessment.

Table 8.6: Summary of archaeology and cultural heritage assessment

Receptor	Impact	Sensitivity	Magnitude of impact	Significance of effect	Mitigation	Residual effect
Construction						
Potential as yet unknown/buried archaeological remains	Direct physical impact during construction	Low (in regard to post-medieval archaeology)	High	Minor (in regard to post-medieval archaeology)	Implementation of archaeological mitigation	Negligible
	Indirect impact during construction	Low to medium (in regard to prehistoric to medieval archaeology)		Minor to moderate (in regard to prehistoric to medieval archaeology)		
Operation						
Greenfield Farm (LB50834)	Setting impact	Medium	Negligible	Negligible	No mitigation required	Negligible