

Balliemeanoch Pumped Storage Hydro

Environmental Impact Assessment
Report

Volume 2: Main Report
Chapter 4: Approach to EIA

ILI (Borders PSH) Ltd

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Quality information

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4. Approach to EIA

4.1 Introduction

This chapter describes the approach to and outlines the scope of the Environmental Impact Assessment (EIA) of the Development. This section provides general information about the EIA process including the key steps taken in the approach to EIA and the terminology used. For a detailed description of topic specific assessment methods reference should be made to the relevant chapter e.g. for a description of the approach to landscape and visual assessment of the Development, see *Chapter 5: Landscape and Visual Amenity*.

4.2 About Environmental Impact Assessment

EIA is the process of identifying, evaluating and mitigating the likely significant environmental effects of a proposed development such as those potentially occurring as a result of the construction and operation of the Development. Through the early identification and evaluation of the likely significant environmental effects of a proposed development, EIA enables appropriate mitigation (that is measures to avoid, reduce or offset significant adverse effects) to be identified and incorporated into the proposed development's design, or commitments to be made to environmentally sensitive construction methods and practices.

The EIA of the Development has been undertaken in parallel with the design process thereby maximising opportunities to mitigate likely significant effects as they have been identified. This approach ensures mitigation is embedded in the Development design and forms an integral component of it.

The results of the EIA also ensure that decision makers, such as the Scottish Ministers, and statutory consultees, such as planning authorities, in this case Argyll and Bute Council (ABC), as well as other interested parties, including local communities, are aware of a proposed development's potential environmental effects. These are then taken into account by the decision-maker prior to determination of an application.

As described in *Chapter 1: Introduction*, in the case of the Development the results of the EIA have been described within this EIAR, which accompanies the application for consent under Section 36 of the Electricity Act 1989 (the "Section 36 Application") to the Energy Consents Unit (ECU).

4.3 Legislative Background

4.3.1 The Need for EIA of the Development

EIAs are required for certain major developments. In the case of Balliemanoach PSH, the relevant EIA Regulations are The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017.

Schedule 1 of the EIA Regulations identifies development types and thresholds for which EIA must always be undertaken. Schedule 2 of the EIA Regulations identifies development which may require EIA to be undertaken, but only where the development is likely to have significant effects by virtue of factors such as its nature, size or location. Developments that require EIA are known as 'EIA development'.

As a generating station of greater than 50 megawatts (MW) and is deemed to have the potential for likely significant effects on the environment, the Development constitutes Schedule 2 development and is considered an EIA development under Regulation 2(1) of the EIA Regulations.

4.3.2 Content of the EIAR

Applications for developments considered to be EIA development must be accompanied by an EIA report (EIAR). In order to comply with Schedule 4 of the EIA Regulations, an EIAR must contain certain prescribed information. *Table 4.1 EIA Regulations: Schedule 4 Requirements*, summarises these requirements and identifies where the relevant information may be found within this EIAR.

Table 4.1 EIA Regulations: Schedule 4 Requirements

Legislative Requirement	Where this information is in the EIAR
<p>1. A description of the development, including in particular:</p> <p>(a) a description of the location of the development;</p> <p>(b) a description of the physical characteristics of the whole development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases;</p> <p>(c) a description of the main characteristics of the operational phase of the development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used;</p> <p>(d) an estimate, by type and quantity, of expected residues and emissions such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced during the construction and operation phases.</p>	<p>The Development location is described in <i>Chapter 2: Project and Site Description</i> and can be viewed on <i>Figure 1.1: Location Plan (Volume 3 Figures)</i>.</p> <p>Details pertaining to requirements b-c are described in <i>Chapter 2: Project and Site Description</i>.</p> <p>Details pertaining to requirement d are set out within Chapters 5-20.</p>
<p>2. A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.</p>	<p>A discussion of reasonable alternatives and reasoning for the selection of the chosen option is presented in <i>Chapter 3: Evolution of Design and Alternatives</i>.</p>
<p>3. A description of the relevant aspects of the current state of the environment (the "baseline scenario") and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of relevant information and scientific knowledge</p>	<p>A description of the current state of the environment is provided in <i>Chapter 2: Project and Site Description</i> with more detailed description available in each topic chapter.</p>
<p>4. A description of the factors specified in regulation 4(3) likely to be significantly affected by the development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.</p>	<p>The results of baseline studies and the environmental factors likely to be significantly affected by the Development (referred to as receptors) have been identified and are reported in chapters 5-20</p>
<p>5. A description of the likely significant effects of the development on the environment resulting from, inter alia:</p> <p>(a) the construction and existence of the development, including, where relevant, demolition works;</p> <p>(b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;</p> <p>(c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste;</p> <p>(d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);</p> <p>(e) the cumulation of effects with other existing and / or approved development, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;</p> <p>(f) the impact of the development on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the development to climate change;</p> <p>(g) the technologies and the substances used.</p> <p>The description of the likely significant effects on the factors specified in regulation 4(3) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development. This description should take into account the environmental protection objectives established at Union level (as they had effect immediately before IP completion day [i.e., 31 December 2020]) or United Kingdom level which are relevant to the development including in particular those established under the law of the United Kingdom that implemented Council Directive 92/43/EEC3 and Directive 2009/147/EC.</p>	<p>The likely significant effects resulting from the Development as required by Schedule 4, paragraph 5 of the EIA Regulations are assessed and reported in Chapters 5 to 20.</p>
<p>6. A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.</p>	<p>Relevant methods and limitations are set out in each of the chapters 5-20.</p>
<p>7. A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.</p>	<p>Embedded mitigation measures are outlined in <i>Section 3.6 of Chapter 3: Evolution of Design and Alternatives</i>. Additional mitigation measures are identified in chapters 5-20.</p>

Legislative Requirement

Where this information is in the EIAR

8. A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and / or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to retained EU law such as any law that implemented Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments may be used for this purpose provided that the requirements of any law that implemented the Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.	The major accidents and / or disasters associated with the Development have been identified and are discussed in Section 4.4 of this chapter.
9. A non-technical summary of the information provided under points 1 to 8.	A non-technical summary (NTS) that sets out the key findings of the EIA is available in <i>Volume 1 NTS</i> of this EIAR
10. A reference list detailing the sources used for the descriptions and assessments included in the EIA report.	Where relevant, reference lists are provided at the end of each EIAR chapter.

4.4 Scope of the EIA

Regulation 4(3) of the EIA Regulations sets out the factors that should be identified, described and assessed within an EIAR where there are likely significant effects on the factors listed and / or the interaction between those factors. These factors are:

- Population and human health;
- Biodiversity, and in particular species and habitats protected under any law that implemented Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (a) and Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds (b);
- Land, soil, water, air and climate; and
- Material assets, cultural heritage and the landscape.

In addition, EIARs are to include the expected effects deriving from the vulnerability of the development to major accidents and disasters.

The factors relevant to the Development and the scope of their assessment within this EIAR have been agreed through consultation with relevant statutory consultees. The statutory consultation discussions are listed in *Table 4.2 Meetings Undertaken*. Further detail on consultation can be found within a separate Pre-Application Consultation Report (PAC) report which accompanies the S36 application.

Table 4.2 Meetings Undertaken

Date	Consultee in Attendance	Discussion
27 th October 2021	Argyll & Bute Council	Introductory meeting to the Applicant and Development
28 th March 2022	Marine Scotland (now Marine Directorate)	Introductory meeting to the Applicant and Development and scope of the EIAR
28 th March 2022	ECU	Introductory meeting to the Applicant and Development and scope of the EIAR
12 th October 2023	Argyll & Bute Council	Meeting to discuss the proposed Temporary Workers Accommodation
16 th March 2023	NatureScot	Meeting to discuss site access for their upcoming site visit and validity of our bird survey data
12 th October 2023	Argyll & Bute Council	Meeting to discuss the proposed Temporary Workers Accommodation and the approach to the s36 application
19 th March 2024	SEPA	Meeting to discuss the potential effects and mitigation required

As part of the consultation process, a pre-scoping meeting was held with ECU and Marine Directorate (formerly Marine Scotland) on 28th March 2022, following on from this meeting the finalised Scoping Report was updated and then submitted to the ECU on 12th July 2022.

The Scoping Report identified those environmental factors considered likely to be significantly affected by the Development and the proposed approach to the identification and assessment of those effects. It scoped out those environmental factors that were considered unlikely to be significantly affected. The Scoping Report was submitted as a request to the Scottish Ministers to provide their Scoping Opinion. The Scoping Opinion set out the information that the Scottish Ministers require to be provided within this EIAR and their comments on the identification of significantly affected environmental factors and scope of assessment. A copy of the Scoping Report is provided in *Appendix 4.1: Balliemeanoch Pumped Storage Hydro Scoping Report (Volume 5 Appendices)* and a copy of the Scoping Opinion received is contained in *Appendix 4.2: Scoping Opinion (Volume 5 Appendices)*.

The Applicant has engaged with the local community and community councils from an early stage. An online community council meeting was held on 13th September 2021 when an introductory presentation was provided by the Applicant, introducing members of the Applicant team and the project team from AECOM.

Post-scoping, further consultation was then conducted including two public exhibitions on Wednesday 19th July at the Inveraray Inn and Monday 7th August 2023 in Dalmally Community Hall. In addition, the Applicant and AECOM were invited to the South Loch Awe-side Community Company (SLACC) Annual General Meeting (AGM) on 26th October 2023 in Portsonachan Village Hall and gave a presentation on the Development akin to that at the public exhibitions.

A full overview of the scoping and other consultation comments (including non-statutory and local community consultees) and where they are addressed within this EIAR is available in *Appendix 4.3: Consultation Tracker (Volume 5 Appendices)*. Targeted consultation on specific matters is presented within the relevant chapter. Comments received through public consultation are included within the PAC Report and within individual chapters where relevant.

The factors identified through the consultation process as being relevant to the Development, and where they are addressed within the EIAR, is set out in *Table 4.3: Summary of Factors by Environmental Topic*.

Table 4.3 Summary of Factors by Environmental Topic

Chapter	Environmental Topic	Factors
5	Landscape and Visual Amenity	Landscape
6	Terrestrial Ecology	Biodiversity
7	Aquatic Ecology	Biodiversity
8	Marine Ecology	Biodiversity
9	Ornithology	Biodiversity
10	Geology and Soils	Land and Soils
11	Water Environment	Water and Human Health
12	Flood Risk and Water Resources	Water, Major Accidents and Disasters, and Human Health
13	Archaeology and Cultural Heritage	Cultural Heritage
14	Access, Traffic & Transport	Material Assets
15	Noise and Vibration	Human Health
16	Socioeconomics, Recreation and Tourism	Population and Material Assets
17	Climate	Climate
18	Marine Physical Environment and Coastal Processes	Biodiversity
19	Shipping and Navigation	Material Assets
20	Commercial Fisheries	Material Assets and Human Health

Given the low population density in and around the Development Site, the population and human health effects of the Development are considered to be adequately addressed within the water quality, flood risk, noise, and socio-economic assessments.

The major accidents and / or disasters associated with the Development have been identified as uncontrolled releases of water either through Embankment overtopping, Embankment breach or pipe breach. A breach is very unlikely due to the requirements of the Reservoirs (Scotland) Act 2011 with which the design, construction, operation and decommissioning of the Development must comply. This includes the appointment of a panel engineer to oversee and approve construction as well as independent inspections, regular safety checks and monitoring during the lifetime of the Development. Details of operational monitoring are provided in *Chapter 2: Project and Site Description*.

Air quality was not considered relevant to the Development as there was limited scope for likely significant effects. No significant air quality effects are anticipated as emissions to air are restricted to construction power and construction dust, which can both be mitigated through good practice measures (e.g. dust management plan). In addition, there is the possibility to connect to local mains electricity, which would minimise the need for on-site electrical generators during construction.

With regards to the technical assessments, a summary of the matters that have been scoped out of the EIA Report are listed in *Table 4.4 Matters scoped out of EIA*.

Table 4.4 Matters scoped out of EIA

Environmental Topic	Element Scoped Out	Reasoning
Cultural Heritage	Physical Cumulative Effects	None of the projects identified as part of the cumulative assessment would result in physical impacts on assets assessed as part of the current assessment, and as such the potential for physical cumulative effects was scoped out. The potential for cumulative effects on the setting of assets was considered as part of the assessment on the setting of heritage assets within 10 km of the Development and can be found within <i>Chapter 13 Cultural Heritage (Volume 2 Main Report)</i>
Geology and Soils	Seismic activity Operational effects	& Seismic activity in the area could have the potential to destabilise the Embankment, however, embedded within the design is the legal requirement that the Embankment will be designed constructed, operated and decommissioned in line with the Reservoirs (Scotland) Act 2011, therefore, this is scoped out. Operational effects are considered unlikely to be significant as any disturbance to or effects on geological or ground condition receptors will have occurred during the construction phase. Operation effects have therefore been scoped out of the Geology and Soils assessment reported in Chapter 10 of this EIAR (<i>Volume 2 Main Report</i>).
Traffic and Transport	Operational effects	Operational effects resulting from traffic and transport have been scoped out of the transport assessment. Under normal operation of the Development, vehicle movements will be limited during a typical working day and as such are considered unlikely to result in a significant effect on road users. During periods of maintenance there may be additional heavy goods vehicle (HGV) and abnormal indivisible loads (AIL) movements, but these are considered likely to be rare. Although operational effects resulting from traffic and transport are not assessed, details of the proposed route to site during operation and traffic management are provided in <i>Chapter 14: Access, Traffic and Transport (Volume 2 Main Report)</i>
Noise and Vibration	Baseline Vibration Survey, Low Frequency Noise and Public Roads.	There are currently no significant sources of vibration in the area. Consequently, ambient vibration monitoring has not been undertaken. It should be noted that annoyance due to vibration is not related to the comparison of pre and post-development vibration levels, and pre-development vibration levels are not usually necessary to assess the likelihood of vibration damage or annoyance from any new vibration sources likely to be introduced into the area. Therefore, consideration of existing vibration levels is excluded from the vibration assessment. In addition, low frequency noise and public roads during operation have been scoped out (see <i>Chapter 15: Noise and Vibration, Volume 2 Main Report</i>).
Terrestrial Ecology	European sites more than 10 km from the Development, National statutory sites, Local designated sites, Woodland	These ecological features have been excluded from further assessment because: a) available data indicates that they are likely absent from the zone of influence of the Development; b) it is clear that no impact from the Development is possible; and/or c) they are features that, although 'important' by the criteria given in this chapter, are sufficiently common

Environmental Topic	Element Scoped Out	Reasoning
	that is neither semi-natural nor long-established plantation, Common habitats that are neither SBL priorities nor Annex I habitats, Wildcat, Badger, Mountain hare and hedgehog, Wild deer, Great crested newt and common amphibians / reptiles & Terrestrial invertebrates	and widespread that their conservation status even locally is clearly not threatened by the Development. Full details can be found within <i>Table 6.5 Ecological Features Scoped out of Further Assessment</i> within <i>Chapter 6 Terrestrial Ecology</i> .
Socio-economics and Tourism	Tourist Accommodation, Businesses within the Development Site & population demographics.	The inclusion of impacts to housing supply and the supply of visitor accommodation in proximity to the Development Site have been scoped out of assessment as a Workers Housing Strategy sets out potential options for workers during construction (<i>Appendix 16.2 Housing Strategy (Volume 5 Appendices)</i>). The Development is therefore not expected to have an impact upon the availability of tourist accommodation for visitors to the region. As stated within the Scoping Report, effects on businesses in proximity of the Development Site and population demographics have also been scoped out. The Socio-economics and Tourism assessment is set out in <i>Chapter 16</i> of this EIAR.
Air Quality	Assessment of adverse effects on air quality	Section 3.3.1 of the Scoping Report outlined the factors to be scoped out, including air quality assessment as no significant air quality effects are anticipated due to emissions to air being restricted to construction power and construction dust, which can both be mitigated through good practice measures (e.g. dust management plan through a Construction Environmental Management Plan). In addition, there is the possibility to connect to local mains electricity, which would minimise the need for on-site electrical generators during construction. It has been identified that there is limited potential for direct significant effects from dust on human and ecological receptors with the implementation of embedded mitigation. Therefore, a formal assessment was not included within the EIA Report. A Dust Management Plan has been prepared and submitted in the Outline CEMP (<i>Appendix 3.1 Outline CEMP (Volume 5 Appendices)</i>). The CEMP provides the general good housekeeping requirements to mitigate diesel emissions and PM10 generation.
Water Resources and Flood Risk	Breach analysis	Due to the high standard of design, management and maintenance required under the Reservoirs (Scotland) Act 2011 and provided by any responsible operator, flooding associated with the Headpond is deemed as a very low risk.
Decommissioning	Decommissioning	As detailed within Section 3.3 Scope of the EIA within the Scoping Report, the decommissioning phase has been scoped out of the assessment. Any life extension, re-use or repowering will be subject to a detailed review of the Development infrastructure, namely the Headpond Embankments, underground powerhouse, tunnels and Waterways, at the time of decommissioning. Should life extension, re-use or repowering not be an option at decommissioning, the scheme will be decommissioned, and the permanent Construction Compounds and Access Tracks may be removed and reinstated to pre-construction condition, in accordance with best practice guidance. Decommissioning has therefore been scoped out of assessment as the decommissioning of large-scale pumped storage hydro projects is extremely rare due to the long operational lifespan of the facility (<i>circa</i> 100 years). Potential decommissioning effects are therefore considered to be similar to, and associated with, the components described in the operational project phase. However, a decommissioning survey and plan would be produced when required along with a separate planning application to decommission the Development. The exception to this is on peat which has been included within <i>Chapter 10: Geology and Soils</i> and flood risk within <i>Chapter 12: Water Resources and Flood Risk</i> .
Three Bridges Access Track / Blarghour wind farm Access Track	Assessment	The Development will not construct an Access Track from Three Bridges (such an Access Track will only be used if already consented and constructed by Blarghour Wind Farm and the necessary land rights secured). Therefore, the Three Bridges Access Track was excluded from assessment of construction effects.

4.5 Approach to Environmental Impact Assessment

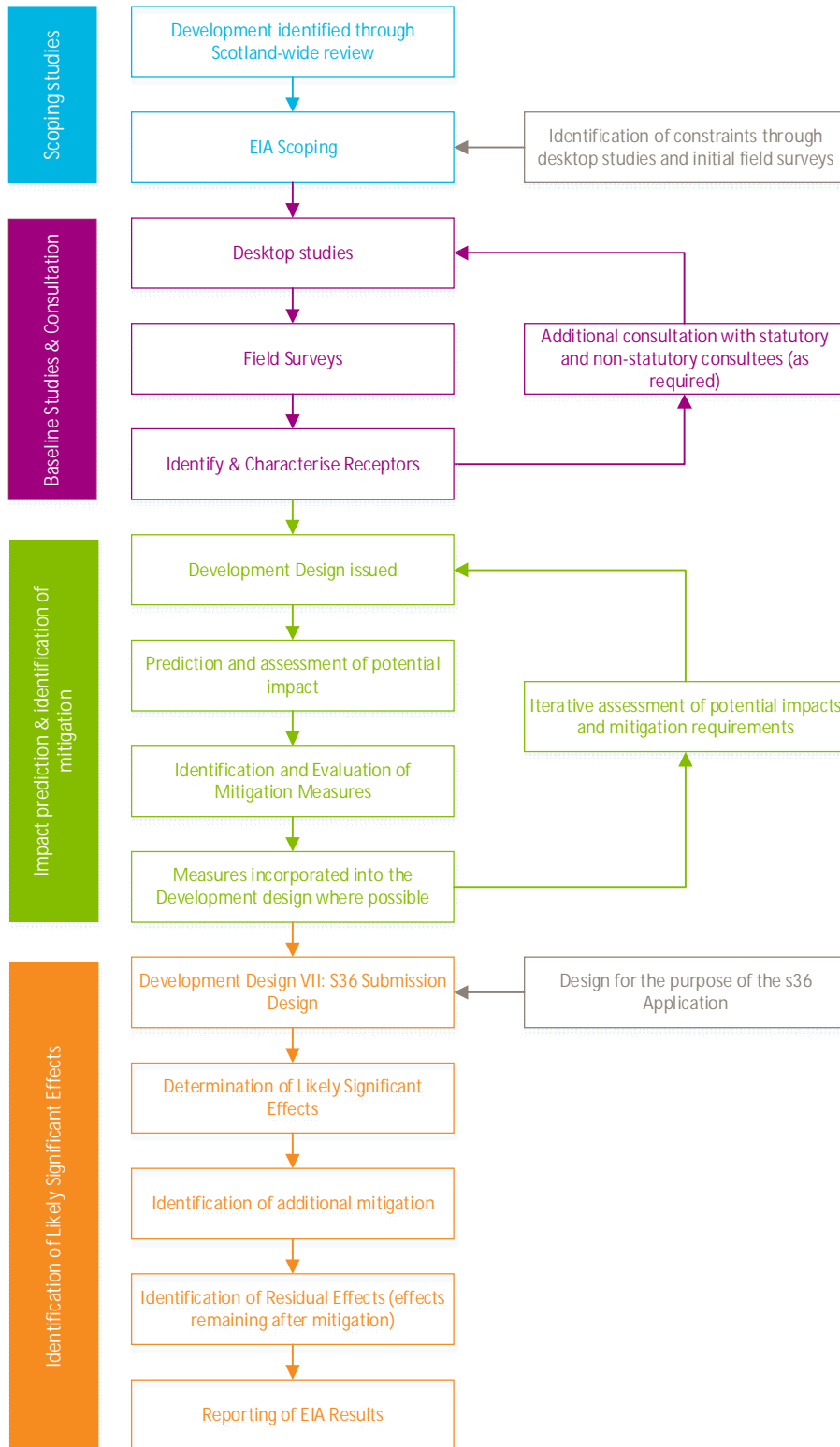
4.5.1 Overview

The primary objective of the EIA of the Development, consistent with the requirements of the EIA Regulations, is to identify, assess and report the Development's likely significant effects. This has been done by following a systematic process through the steps described below and illustrated in *Insert 4.1 EIA Process Schematic*, as shown below. The approach is iterative and has required a close working partnership between those designing the Development and those undertaking the EIA, to ensure that consideration of potential environmental impacts formed an integral part of developing the final design that is described in *Chapter 2: Project and Site Description*.

4.5.2 Key Stages in Environmental Impact Assessment

The key stages in the EIA are:

- **Scoping studies:** Scoping was the first step in the EIA process. Scoping provided an opportunity for the ECU and other consultees to comment on the proposed scope of, and approach to, the EIA of the Development. Subsequent chapters set out comments received in scoping and how they have been addressed in undertaking the EIA.
- **Baseline studies and consultation:** These have comprised a combination of desk-based studies and field surveys to establish an understanding of the existing environmental conditions ('the baseline') within the study area and therefore ensure an accurate assessment of the likely significant effects of the Development. Baseline studies have been ongoing since 2018 informing the design of the Development as well as forming the basis of the EIA. The scope of baseline studies has been agreed with relevant consultees as part of scoping and, where appropriate, additional consultation.
- **Impact prediction and identification of mitigation:** The potential environmental impacts of the Development (both beneficial and adverse) have been predicted and evaluated using a range of specialist methods which are described in subsequent chapters. Through iterative assessment, potential impacts have been predicted and opportunities to mitigate them identified, with the aim of preventing or reducing impacts as much as possible. Where possible mitigation measures have been incorporated into the Development design such that they inform its detailed design and / or how it shall be constructed. This approach provides the opportunity to prevent or reduce adverse effects from the outset. These embedded mitigation measures are set out in *Chapter 3: Evolution of Design and Alternatives*.
- **Identification of likely significant effects:** As stated above, the purpose of the EIA is to determine the likely significant effects of the Development. A detailed description of the general approach to assessing impacts is contained in this chapter, with detailed approaches tailored to individual technical assessments following environmental topic-specific guidance contained in subsequent sections. The EIAR identifies the significance of potential effects, identifies any additional mitigation and then the significance of the residual effect of the Development. Residual effects are those which remain, taking into account proposed additional mitigation. As described above, the approach to the design and EIA of the Development has resulted in much of the mitigation being embedded within the final design. Therefore, design and construction mitigation has been taken into account when evaluating the significance of the potential impacts, meaning that in some instances the significance of residual effects is the same as that reported for potential effects.



Insert 4. 1 EIA Process Schematic

4.5.3 Assessment of Impacts

The determination of the significance of the impacts arising from the Development is a key stage in the EIA process. In order to assess the overall significance of an impact, it is necessary to establish the magnitude of the effect occurring i.e. the change to the existing baseline conditions as a result of the development and the sensitivity or importance of the receiving environment or receptor. Assessment of significance for environmental topics combines professional judgement with consideration of a number of factors including:

- The type of effect, i.e. whether it is adverse, beneficial, neutral or uncertain;
- The probability of the effect occurring based on the scale of certain, likely or unlikely;
- The sensitivity of the resource or receptor under consideration;
- The magnitude of the potential effect in relation to the degree of change which occurs as result; and
- Whether the effect is temporary, permanent, and / or reversible.

4.5.4 Describing the Sensitivity Value or Importance of Receptors

The sensitivity of the baseline conditions is assessed according to the relative importance of existing environmental features on or near to the Development Site, or by the sensitivity of receptors which could potentially be affected by the Development. Criteria for the determination of sensitivity or importance or value of receptors are established based on approved guidance, legislation, statutory designation and / or professional judgement.

The criteria in *Table 4.5: Sensitivity or Value Criteria* provide a general definition for determining the sensitivity, value or importance of receptors.

Table 4. 5 Sensitivity or Value Criteria

Sensitivity or Value	Description
Very high	The receptor has little or no capacity to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance.
High	The receptor has low capacity to absorb change without fundamentally altering its present character, is of high environmental value, or of national importance.
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value, or is of regional importance.
Low	The receptor is tolerant of change without detriment to its character, is low environmental value, or local importance.
Negligible	The receptor is resistant to change and is of little environmental value.

4.5.5 Describing the Magnitude of Impacts

The magnitude of potential effects on environmental baseline conditions is identified through consideration of the Development, taking into account the scale or degree of change from the existing baseline as a result of the effect. Consideration is given to the duration and reversibility of the effect as well as consideration of relevant legislative or policy standards or guidelines.

General criteria for defining the magnitude of an impact are set out in *Table 4.6: Impact Magnitude Criteria*, below. Key factors influencing this include:

- The physical or geographical scale of the impact, (note that this is relative to the scale of the receptor or resource affected).
- The duration of the impact - will it be short term, lasting for a few days or weeks, or long term, lasting for a number of years.
- The frequency of the impact - will it occur hourly, daily, monthly or will it be permanent, lasting for the duration of the development.

- The reversibility of the impact - can it be reversed following completion of construction or decommissioning of the development.

Table 4.6 Impact Magnitude Criteria

Sensitivity or Value	Description
High	Total loss or major alteration to key elements/features of the baseline conditions such that post-development character/composition of baseline condition will be fundamentally changed.
Medium	Loss or alteration to one or more key elements/features of the baseline conditions such that post-development character/composition of the baseline condition will be materially changed.
Low	Minor shift away from baseline conditions. Changes arising from the alteration will be detectable but not material; the underlying character/composition of the baseline condition will be similar to the pre-development situation.
Negligible	Very little change from baseline conditions. Change is barely distinguishable, approximating to a “no change” situation.

4.5.6 Describing the Significance of Effects

The general approach adopted for evaluating the significance of effects is outlined in *Table 4.7 Approach to the Assessment of Significance*, below. A combination of the magnitude of the impact under consideration and the sensitivity of the receiving environment determines the significance of effect. For some specialist topics, additional categories have been added where a greater level of definition is required. It should be noted that this approach provides a general framework but should not be treated as a simple matrix; professional judgement should be applied in all cases.

Table 4.7 Approach to the Assessment of Significance

Magnitude	Sensitivity or Value of Receptors				
	Very High	High	Medium	Low	Negligible
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Negligible
Low	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

The significance of the effects arising from the Development will be reported using a seven-point scale, as follows:

- Major Adverse, Moderate Adverse, Minor Adverse;
- Negligible; and
- Minor Beneficial, Moderate Beneficial, Major Beneficial.

This scale may differ between the specialist chapters but, where this occurs, the variation will be explained clearly and fully.

Effects predicted to be Minor are considered to be manageable and such effects are 'Not Significant'. Effects assessed as Moderate or Major are considered to be 'Significant'. When the significance of effects is assessed, this takes into account mitigation, i.e. the assessment applies to the residual effects of the Development, which can be defined as any effect that would remain following the implementation of proposed mitigation measures.

4.5.7 Approach to Mitigation

Some mitigation measures to avoid, reduce or offset the consequences of the Development are embedded within the Development design, whilst others may require adherence to particular constraints on construction methods or mode of operation. The final assessment of significance will take into account the mitigation measures and

constraints that have been incorporated into the Development – this will be the assessment of residual likely significant environmental effects.

A standard hierarchical approach to the development of mitigation measures has been followed with the aim of 'designing out' adverse effects as much as possible (avoiding, preventing or reducing adverse effects) as well as seeking opportunities to maximise or enhance beneficial effects. The EIA has been undertaken in parallel with the design of the Development providing opportunities to incorporate mitigation measures into its design or how it will be constructed.

The following approach has been used for developing and categorising mitigation:

- **Design Measures:** These are measures embedded in the base design or that inform/constrain the detailed design. Examples could include measures such as the design of the Headpond, or the layout of the Tailpond infrastructure.
- **Construction Measures:** These are measures incorporated into how the Development will be constructed and could include measures in relation to the timing of certain activities or silt control or dust suppression.
- **Other Measures:** These are other measures which have been identified which are neither design nor construction mitigation.
- **Compensation Measures:** These are measures to be implemented in the event that an effect cannot be mitigated and could include measures to offset the loss of an important feature or resource.

The EIAR also identifies where it is considered appropriate to undertake monitoring as part of construction and/or operation of the Development. Monitoring provides a mechanism to take remedial action in the event that unforeseen significant effects occur. For example, this could include monitoring the water quality in discharges to ensure that no contaminated water is being released or monitoring noise emissions to ensure that they comply with agreed limits.

4.5.8 Types of Effects

4.5.8.1 Direct Effects and Indirect Effects

Direct effects are those where there is a physical connection between the Development and the receptor (for example, direct impacts on a sensitive ecological receptor), whereas indirect effects require some additional pathway for the effect to arise (for example, impacts on surface water quality on other watercourses within the catchment from spillage risk).

4.5.8.2 Temporary Effects

Temporary effects mainly occur during the construction phase only and are typically short term. This would include effects resulting from the construction of the Development such as construction traffic, noise and vibration from construction plant and machinery, dust generation and site runoff, as well as effects resulting from temporary loss of agricultural land or other temporary effects resulting from requirements for temporary Access Tracks or Construction Compounds.

4.5.8.3 Longer Term, Operational & Permanent Effects

Longer term, operational and permanent effects are those which would occur as a result of the Development, such as its land take or as a result of its operation. This would include effects which may begin during construction and endure for the lifetime of the Development (for example visual effects from the Headpond) or effects which occur for a period of time following completion of construction or during operation only (for example, changes in water levels within Loch Awe during operation of the Development).

4.5.8.4 Decommissioning Effects

Decommissioning effects would be those which would occur as a result of the dismantling and draining of the Development at the end of its operational life (as outlined in *Chapter 2: Project and Site Description*) and would typically be similar to those assessed for construction. The Development has a design life of 100 years, any life extension, re-use or repowering will be subject to a detailed review of the Development infrastructure, namely the Headpond Embankments, underground powerhouse, tunnels and Waterways, at the time of decommissioning. However, should life extension, re-use or repowering not be an option at decommissioning, the scheme will be decommissioned, the permanent Construction Compounds and Access Tracks may be removed and reinstated to pre-construction condition, in accordance with best practice guidance. Given the lifespan of the development, the effects associated with decommissioning being similar to those of construction and the requirement for a decommissioning plan at the end of its lifespan, decommissioning effects have been scoped out of assessment.

Notwithstanding, where information is deemed appropriate to be included this has been outlined within the relevant specialist assessment chapter as set out within *Table 4.4 Matters Scoped out of the EIA* within *Section 4 Scope of the EIA*, above.

4.5.8.5 Residual Effects

Residual effects are those effects that remain having taken account of mitigation measures. As noted above, the approach taken to the EIA of the Development means that much of the mitigation is an inherent part of the design (design measures) and how it will be constructed (management measures). As a result, the significance of some residual environmental effects may be the same as the significance of the potential environmental effects. It should be noted that this is not because they have not been mitigated, but rather that by incorporating mitigation into the design and construction of the Development from the outset, effects have been mitigated as far as possible. In subsequent chapters, this means that there may be more substantive reporting of the potential effects as opposed to the residual effects.

4.5.8.6 Cumulative Effects

The effects of the Development are assessed in combination with other projects that are either under construction or currently going through planning. Other projects have been identified through a search of ABC's Planning Portal and confirmed with ABC Planning Officers. The final planning portal check was conducted on 12th September 2023. Cumulative effects will be considered for each of the environmental topics, unless stated otherwise within *Chapters 5-20 (Volume 2 Main Report)*. The cumulative assessment will take into account any existing environmental issues and any areas of particular environmental importance such as designated sites and landscapes. The cumulative assessment will also consider effects between the different environmental topics (intra-project effects) for the Development as well as the effects from other projects (inter-project effects).

Cumulative effects will also consider the operational effects related to the water catchments related to other PSH schemes such as Cruachan Hydro Scheme, Cruachan Expansion, Nant Hydro Scheme, Inverawe hydropower station and Beochlich Hydro Scheme as listed within *Table 4.8 Cumulative Developments*, below. Whilst their operation is considered baseline, the cumulative operation in terms of drawdown and discharge on the hydrology and water balance of the receiving catchments will be considered although could be controlled through the conditions of the Controlled Activities Regulations¹ (CAR) and abstraction licence.

Table 4.8: Cumulative Developments, lists other developments that have been identified as either going through screening or scoping, or having been granted planning permission or section 36 consent, or under construction at present.

Table 4.8 Cumulative Developments

Development	Description	Approx. distance to Headpond (km)	Status	Likely Shared Receptors
Beochlich Hydro Scheme	Small-scale 1MW hydropower scheme. Operational since 1998.	0.3	Operational	Water environment and resources, roads and amenity
Cruachan Hydro Scheme	440 MW pumped storage hydro scheme that uses Loch Awe as a tailpond. Operational since 1965	11	Operational	Water
Cruachan Expansion	Increasing the capacity of the existing PSH scheme by up to 600 MW.	11	Consented	Water, noise
Inverawe Hydro Scheme	25 MW hydro scheme on Loch Awe. Operational since 1963	16	Operational	Water
Nant Hydro Scheme	15 MW hydropower scheme that uses Loch Nant as its Headpond. Operational since 1963	8.8	Operational	Landscape, water
Lochan Shira (Reservoir)	Reservoir of the Clachan hydro scheme. Operational since 1950's	12.5	Operational	Landscape, water
Blarghour Wind Farm	Wind farm development comprising 17 turbines with a total installed capacity of 57.8 MW.	0.17	Consented	Landscape, noise
Blarghour Wind Farm variation	S36C scoping for increase in turbine tip height from 136.5m to 180m. Proposed Development still contains	0.17	Scoping	Landscape, noise

¹ Water Environment (Controlled Activities) (Scotland) Regulations 2011

Development	Description	Approx. distance to Headpond (km)	Status	Likely Shared Receptors
	17 turbines as per previous consented Development and will generate 85MW of electricity.			
Blarghour Wind Farm 132kV OHL Connection	Variation will vary consented s36 from 17 x 136.5m to s36c 14 x 180m.	2.01	Screening	Landscape
Beinn Ghlas Wind Farm	Construct and operate a 132 kV overhead line and Underground Cable to connect the proposed Blarghour Wind Farm to the proposed Creag Dhubh Substation. The technology options considered include OHL comprised predominantly of trident H wood pole supports, switching to trident H steel poles or steel lattice towers at altitudes over c. 300 m AOD, and a 500m section of UGC on approach to Creag Dhubh Substation.	9.94	Operational	Landscape
Beinn Ghlas Wind Farm Repowering	Wind farm development comprising 14 turbines with a total installed capacity of 8.4 MW. Operational since 1999.	9.90	Scoping	Landscape
An Suidhe Wind Farm	Wind farm development of up to 18 turbines of up to 180 m to tip, replacing the existing 14 operational turbines of 54.1 m to tip	7.06	Operational	Landscape
Carraig Gheal Wind Farm	Wind farm development comprising 20 turbines with a total installed capacity of 46 MW.	6.22	Operational	Landscape
Ladyfield Wind Farm	Wind farm development comprising 22 turbines, with a total capacity of between 50 and 100 MW.	4.12	Scoping	Landscape, noise & roads
Inveraray to Taynuilt (ITE/ITW) Tie-In to Creag Dhubh Substation	Construction and operation of a Tie-In connection to the proposed Creag Dhubh Substation from the existing 132 kV Taynuilt to Inveraray Overhead Line (OHL), as well as the temporary diversion of the existing 132 kV Taynuilt to Inveraray OHL to facilitate its connection to the substation and associated ancillary works.	3.67	Consented	Landscape & roads
An Suidhe Substation Overhead Line Connection	Install and keep installed approximately 1.34km of realigned 275 kV overhead line supported on six new steel towers to connect the proposed An Suidhe substation (via downloads) to the existing 275 kV Inveraray to Crossaig overhead line	9.76	Consented	Landscape
Creag Dhubh to Dalmally OHL	275kv OHL.	4.20	Consented.	Landscape & roads
Creag Dhubh – Inveraray OHL	Upgrade from existing 132kv to 275kv. (LT194 ref on map)	2.47	Consented	Landscape & roads
An Carr Dubh Wind Farm	Wind Farm (Generating station of >100 <200 MW Capacity) 13 turbines max turbine height 180m.	2.70	Application submitted	Landscape & roads
33kv Overhead Line - ETU 166 - Dalmally	New overhead 33kv line consisting of 1150m of Overhead EHV Conductor in order to connect to a new mast site. The new 33kv line will consist of 15 new poles and two spans of single phase, which will house our plant equipment and transformer. The new overhead line will be installed using poles of a wooden variety and these will be approximately 9.5 metres in height. The total length of the 33kv overhead line will be 1150 metres.	1.92	Consented	Landscape & roads
Barachander Wind Farm	Proposed wind farm and associated Battery Energy Storage System (BESS) facility. 11 turbines each with capacity c.6MW with max tip 180 m and BESS with capacity of 10MW.	7.90	Scoping	Landscape
Creag Dhubh substation	Substation with construction likely to commence 2024	4.04	Consented	Landscape & roads
Eredine Wind Farm	22 turbine wind farm with up to 120 MW generating capacity	10.04	Scoping	Landscape
Inverary to Crossaig OHL	Construction of a new 275kV overhead line, initially operated at 132kV between Inveraray and Crossaig	5	Consented	Landscape & roads

Development	Description	Approx. distance to Headpond (km)	Status	Likely Shared Receptors
An Suidhe Substation	Construction of a new 275kV substation and overhead line, which will connect into the recently completed 275kV overhead line between Inveraray and Crossaig.	9.93	Consented	Landscape & roads

Sources: Argyll & Bute Planning Portal [Accessed: 12th September 2023] ECU Portal [Accessed: 12th September 2023]

It is also acknowledged that a grid connection will be required for the Development (as described in Section 2.14 of *Chapter 2: Project and Site Description*). This is not included as part of this application. The Balliemanoach Grid Connection route is anticipated to be to Creag Dhubh substation, which is located north-east of the Development Site. The exact route of the Balliemanoach Grid Connection from the Development Site to Creag Dhubh is currently unconfirmed, the connection may be via an underground cable however for the purposes of the assessment it has been assessed on a “worst case” scenario that it will be via an OHL. A grid connection agreement has been entered into for the Development between the Applicant and SSEN.

4.6 Limits of Deviation

The matter of design uncertainty has been addressed within this EIA by adopting a precautionary approach to identifying significant environmental effects, through the establishment of a series of maximum development extents known as a ‘Rochdale Envelope’.

The Rochdale Envelope is named after a UK planning law case². It is an established principle that allows a development to be described by broad or alternative parameters. Its adoption allows meaningful EIA to be undertaken by defining a ‘realistic worst case’ scenario that decision-makers can consider when determining the acceptability or otherwise of the environmental effects of a development.

The principle is based on the assumption that as long as the technical and engineering parameters of a development fall within the limits of the envelope, and the EIA has considered the likely significant effects of that envelope, then flexibility within those parameters is deemed to be permissible within the terms of any consent granted for the development.

The realistic worst-case scenario reflects the most environmentally detrimental parameter for assessment within the EIA. Where multiple options, or a range, are provided for a parameter it is assumed that one or other of the parameters will have a more significant adverse effect than the alternatives. The realistic worst case can differ depending on the environmental resource or receptor being assessed, and this has been highlighted where relevant.

In line with this approach, a series of parameters have been established across a number of aspects relating to the design and construction of the Development to manage design uncertainty and provide flexibility for deviation where needed, for example to enable minor design refinements to be made by the Applicant and / or their appointed Construction Contractor within the overall parameters of any consent granted.

These parameters are presented below and include matters such as defining the maximum extent of land required to mitigate environmental effects, and the identification of horizontal and vertical limits of deviation within which the design of the Development can be adjusted, if necessary, for example, in response to local ground conditions.

This approach to managing uncertainty within defined parameters and limits ensures that any design changes that may arise post submission of the Section 36 Application will not be of an order that renders the content of this EIAR inadequate or invalid.

4.6.1 Limits of Deviation – Permanent Access Track

The Permanent Access Tracks are shown on *Figure 2.21 Excavated Access Track Typical Detail* and *Figure 2.22 Floating & Widening Access Track Typical Details (Volume 3 Figures)*. Upgraded forestry Access Tracks will be 10 m wide, plus 0.7 m for swales and 4 m peat / topsoil mounds requiring a total working width of approximately 15 m. Sections of new Access Track will be required to join the existing forestry tracks within the plantation. New sections will be either excavated or floating depending on ground conditions. The permanent Access Tracks will partially incorporate the existing forestry road and so it is proposed to apply a 50 m limit of deviation either side of

² *R v. Rochdale MBC ex parte Milne (No. 1)* [2000] Env. L.R. 1.; *R. v. Rochdale MBC ex parte Tew* [1999] 3 PLR 74 and *R. v. Rochdale MBC ex parte Milne (No. 2)* [2001] Env. L.R. 22.

the existing track. This would allow a 100 m buffer for the proposed 50 m Access Track, and allow for micro-siting for local ground conditions, topography, forestry, and watercourses.

4.6.2 Limits of Deviation – Temporary Access Track

Four sections of Temporary Access Tracks will be required during construction as shown on *Figure 2.3 Above Ground Infrastructure (Sheets 1 & 2) (Volume 3 Figures)*. The construction corridor required for Temporary Access Tracks will be a maximum of 30 m to allow for two-way vehicular traffic, drainage and peat mounds.

The Temporary Access Tracks will typically be unsealed in nature and will be removed following the completion of the construction phase.

The temporary Access Tracks have been minimised as far as reasonably practical, and in places follows the routing of informal existing Access Tracks. However, to account for the topography, watercourses, and tree root protection within the ancient woodland inventory towards Loch Awe, it is proposed to have a 35 m buffer either side of the indicative route of the Temporary Access Track. This would allow for a 70 m buffer for the proposed 30 m Access Track.

4.6.3 Limits of Deviation – Generation and Reuse of Material

The Development will generate 20,010,000 m³ of material that will be excavated during construction. This material will primarily be used to construct the Headpond Embankments, with an excess of excavated material of around 1,630,000 m³. It has been recognised that the material generated from the Development will be excavated using different methods and be sourced from rock of varying quality. Therefore, to provide flexibility and allow for any optimisation during detailed design approximate volumes have been calculated using standard methods, on a reasonable assumption of the likely size required for the infrastructure and then rounded up to the next ten thousand to provide a likely worse case for the purposes of the assessment. This is explained in detail within the Materials Management Appraisal (*Appendix 10.1 Materials Management Appraisal, Volume 5 Appendices*).

