Appendix 12.1 – Heritage Baseline

HERITAGE BASELINE

Cruachan Expansion Project

JAC26900
Cruachan DBA
1
March 2022

rpsgroup.com

Quality Management

Version	Status	Authored by	Reviewed by	Approved by	Review date
1	Draft	AB	RJC	[Text]	[Text]

Approval for issue

[Name]	[Signature]	[Date]

File/Model Location

Document location:	\\edin-op-03\CGMS\Jobs Directory\26000-26999\26900_Cruachan\Reports\DBA

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Prepared for:

Drax Cruachan Expansion Ltd

EXECUTIVE SUMMARY

This heritage baseline assessment has been prepared by RPS on behalf of Drax. It considers land approximately 275ha in extent, divided into two areas. The western site area occupies an area of c.227ha and the eastern area c.48h. The study site is located on the northern banks of Loch Awe, Argyll and Bute.

In keeping with relevant policy and guidance, this report provides a description of the baseline situation and identifies the heritage assets potentially affected by the proposed development of the site and addresses.

The proposed development will affect the fabric of the Cruachan Turbine Hall, which is a Category A Listed Building and the setting of the associated dam, which is a Category B Listed Building, but forms a Category A group with the turbine hall. No potential impacts upon other designated heritage assets have been identified.

The archaeological potential of the development site and the significance of heritage assets within the site has been assessed through desk-based review of existing archaeological information, including previous archaeological work undertaken on and in the vicinity of the study site, supported by site visits. These programmes allow robust assessment of the development site's archaeological potential and enable an informed planning decision.

The HER records ten heritage assets to be located within the study site, all of which are dated to the Post-Medieval/Modern period (an old military road, a footbridge, railway halt, bank/earthwork, Cruachan Reservoir and, tunnels) or are of unknown, though probably, Post-Medieval or later origin (numerous charcoal burning platforms, clearance cairn, an enclosure and rig and furrow).

Based on the available archaeological and LiDAR data for the site and surrounding area, the study site is considered to have a negligible to low potential for hitherto unknown/unrecorded archaeological remains from all periods.

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1 INTRODUCTION AND SCOPE OF STUDY

1.1 This report has been prepared by RPS on behalf of Drax Cruachan Expansion Ltd (the 'Client'). The Client is proposing to build an extension to the existing Cruachan Power Station, Argyll and Bute. It presents the baseline information that underpins the Cultural Heritage Impact Assessment (presented separately).

1.2 The subject of this baseline assessment, henceforth referred to as the study site, falls into two parts. The western part (centred on NGR 208000 727000) takes in Cruachan Reservoir, the land between it and Loch Awe, the access track leading to Cruachan Reservoir from Lochawe and land adjacent. It occupies approximately 227ha. The eastern part (centred on NGR 213160 728500) takes in land between Lochawe in the west and Allt Mhoille in the east. It occupies approximately 48ha.

1.3 This assessment has been prepared in accordance with relevant policy and guidance and considers the potential effects of the proposed development upon heritage assets, both during the construction and operation phases. It draws upon the following data sources:

- Historic Environment Scotland designations downloads;
- National Record of the Historic Environment (NRHE);
- West of Scotland Archaeology Service (WoSAS) Historic Environment Records (HER);
- Maps held by the National Library of Scotland;
- Satellite imagery; and
- Readily available published sources.

1.4 The desk-based work was augmented and verified through a site visit. The study provides an assessment of the archaeological potential of the study site and, where relevant, the significance of heritage assets within and around the study site, and identifies the potential impacts of the proposed development upon these. The consideration of potential impacts upon designated heritage assets (Figure 2) in the surrounding area has been undertaken in accordance with the guidance provided in Managing Change in the Historic Environment: Setting (HES 2020), which advocates the use of a three-stage process:

- Stage 1: Identify the historic assets that may be affected by the proposed development.
- Stage 2: define and analyse the setting by establishing how the surroundings contribute to the ways in which the historic asset or place is understood, appreciated and experienced.
- Stage 3: evaluate the potential impact of the proposed changes on the setting, and the extent to which any negative impacts can be mitigated

Only Stage 1 is contained in this baseline. Where it is identified that assets may be affected, Stages 2 and 3 are presented in the EIAR Cultural Heritage chapter.

2 PLANNING BACKGROUND AND DEVELOPMENT PLAN FRAMEWORK

Legislation

2.1 The Ancient Monuments and Archaeological Areas Act 1979 and the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 provide the legislative basis for the protection of the historic environment. These were amended by the Historic Environment (Amendment) (Scotland) Act 2011.

2.2 Of particular relevance in the current context is Section 59 of the 1997 Act:

General duty as respects listed buildings in exercise of planning functions.

(1) In considering whether to grant planning permission for development which affects a listed building or its setting, a planning authority or the Secretary of State, as the case may be, shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses.

(2) Without prejudice to section 64, in the exercise of the powers of disposal and development conferred by the provisions of sections 191 and 193 of the principal Act, a planning authority shall have regard to the desirability of preserving features of special architectural or historic interest and, in particular, listed buildings.

(3) In this section, "preserving", in relation to a building, means preserving it either in its existing state or subject only to such alterations or extensions as can be carried out without serious detriment to its character, and "development" includes redevelopment.

National Planning Policy

2.3 Scottish Planning Policy (SPP; June 2014) provides national policy for dealing with the historic environment in the planning process in paragraphs 135-151. SPP stresses that the planning system should promote the care and protection of the historic environment and that change should be sensitively managed to avoid or minimise adverse impacts on assets. Additional policy in relation to the historic environment is provided in Historic Environment Policy for Scotland (HEPS, 2019) and a strategy has been set out in 'Our Place in Time - the Historic Environment Strategy for Scotland' (2014).

2.4 In July 2011, the government published the Planning Advice Note PAN 2/2011: Planning and Archaeology. It provides advice and technical information alongside SPP, HEPS and the Managing Change in the Historic Environment Guidance Notes, which together set out the Scottish Ministers' policies and guidance for planning and the historic environment.

2.5 Sections 4-9 of the PAN, entitled Archaeology and Planning provides guidance for planning authorities, property owners, developers and others on the policy of the Scottish Government relating to archaeological sites and monuments. Overall, the guidance can be summarised:

- Policy is to protect and preserve sites and monuments and their settings in situ where feasible. Where this is not possible planning authorities should consider applying conditions to consents to ensure that an appropriate level of excavation, recording, analysis, publication and archiving is carried out before and/or during development.
- In consideration of applications, planning authorities should take into account the relative importance of archaeological sites. Not all sites and monuments are of equal importance. In

determining planning applications that may impact on archaeological features or their setting, planning authorities may balance the benefits of development against the importance of archaeological features.

2.6 Section 12 of the PAN notes that when determining a planning application, the desirability of preserving a monument (whether scheduled or not) and its setting is a material consideration. It reiterates that preservation in situ should be the objective but where not possible an alternative approach is recording and/or excavation followed by analysis and publication of the results.

2.7 Sections 13 and 14 note that prospective developers should undertake assessment to determine whether a property or area contains, or is likely to contain, archaeological remains as part of their pre-planning application research into development potential. Where it is known, or there is good reason to believe, that significant remains exist developers should be open to modifying their plans in order to preserve remains.

2.8 Section 17 notes that in many cases a desk-based assessment (this document) may be sufficient to allow authorities to make a planning decision. Where the judgement of the authority's archaeological advisor indicates that significant remains may exist, it is reasonable for the planning authority to request an archaeological evaluation before the application is determined. Planning authorities should require only the information necessary for them to make an informed decision on the proposal, and this should be proportionate to the importance of the potential resource.

2.9 Section 19 notes that developers should supply the results of desk-based assessments and evaluations as part of their planning applications.

Local Planning Policy

2.10 The Argyll and Bute Local Development Plan was adopted in 2015. Detailed policy is presented in Supplementary Guidance (adopted 2016) and contains the following policy relating to the historic environment that are relevant in the current context:

Argyll and Bute Local Development Plan

Policy LDP 3 – Supporting the Protection, Conservation and Enhancement of our Environment

In all development management zones, Argyll and Bute Council will assess applications for planning permission with the aim of protecting conserving and where possible enhancing the built, human and natural environment.

A development proposal will not be supported when it:

[…]

(C) does not protect, conserve or where possible enhance the established character of the built environment in terms of its location, scale, form and design.

(D) has not been ascertained that it will avoid adverse effects, including cumulative effects, on the integrity or special qualities of international or nationally designated natural and built environment sites.

Further information and detail on matters relating to the natural environment, landscape, and the historic environment will be provided in Supplementary Guidance.

(E) has significant adverse effects, including cumulative effects, on the special qualities or integrity of locally designated natural and built environment sites.

Where there is significant uncertainty concerning the potential impact of a Proposed Development on the built, human or natural environment, consideration will be given to the appropriate application of the precautionary principle, consistent with Scottish Planning Policy.

2.11 The above policy is supported by supplementary guidance; SG LDP ENV 15-21 relate to the historic built environment and archaeology and the policies are cited below:

SG LDP ENV 15 – Development Impact on Historic Gardens and Designed Landscapes

1. *"Where development would affect a heritage asset or its setting the developer will be expected to demonstrate that the impact of the development upon that asset has been assessed and that adequate measures will be taken to preserve and enhance the special interest of the asset. Measures of assessment will be expected to follow the principles set out in the joint guidance "New Design in Historic Settings" produced by Historic Environment Scotland, Architecture and Place, Architecture and Design Scotland. Guidance provided in Scottish Historic Environment Policy and Managing Change in the Historic Environment Guidance Notes, which are available to download from Historic Environment Scotland's website, is also expected to be followed.*

2. *Measures to mitigate against impact are likely to include enhanced physical access, interpretation and the provision of an open space or landscaped buffer zone, as appropriate.*

3. *In assessing proposals for development in, or adjacent to, gardens or designed landscapes particular attention will be paid to the impact of the proposal on:*

4. *(A) The archaeological, historical or botanical interest of the site;*

5. *(B) The site's original design concept, overall quality and setting;*

6. *(C) Trees and Woodland and the site's contribution to local landscape character within the site including the boundary walls, pathways, garden terraces or water features; AND,*

   (D) Planned or significant historic views of, or from, the site or buildings within it."

SG LDP ENV 16(a) – Development Impact on Listed Buildings

7. *"Development affecting a listed building or its setting shall preserve the building or its setting, and any features of special architectural or historic interest that it possesses.*

8. *All developments that affect listed buildings or their settings must*

9. *1) be of the highest quality, and respect the original structure in terms of setting, scale, design and materials,*

10. *2) the Proposed Development is essential to securing the best viable use of the listed building without undermining its architectural or historic character, or its setting.*

11. *3) the Proposed Development conforms to Scottish Historic Environment Policy 2011 and the accompanying Managing Change Guidance Notes,*

    Where development would affect a heritage asset or its setting the developer will be expected to satisfactorily demonstrate that the impact of the development upon that asset has been assessed and that measures will be taken to preserve and enhance the special interest of the

asset. The use of appropriate design statements and conservation plans are expected to facilitate this assessment. Where the development may have a significant impact, measures of assessment will be expected to follow, the principles set out in the joint guidance "New Design in Historic Settings" produced by Historic Environment Scotland, Architecture and Place, Architecture and Design Scotland.

[…]"

SG LDP ENV 19 – Development Impact on Scheduled Monuments

12. *"There will be a presumption in favour of retaining, protecting and preserving Scheduled Monuments and the integrity of their settings. Developments that have an adverse impact on Scheduled Monuments and their settings will not be permitted unless there are exceptional circumstances.*

Where development could affect adversely a heritage asset or its setting the developer will be expected to satisfactorily demonstrate that the impact of the development upon that asset has been assessed and that measures will be taken to preserve and protect the special interest of the asset. The use of appropriate archaeological assessment, setting analysis, design statements, conservation plans, character appraisals etc. are expected facilitate this assessment."

SG LDP ENV 20 – Development Impact on Sites of Archaeological Importance

13. *"1. There is a presumption in favour of retaining, protecting, preserving and enhancing the existing archaeological heritage and any future discoveries found in Argyll and Bute. When development is proposed that would affect a site of archaeological significance, the following will apply:*

14. *(a) The prospective developer will be advised to consult the Council and its advisers the West of Scotland Archaeology Service at the earliest possible stage in the conception of the proposal; AND,*

15. *(b) An assessment of the importance of the site will be provided by the prospective developer as part of the application for planning permission or (preferably) as part of the pre-application discussions.*

16. *2. When development that will affect a site of archaeological significance is to be carried out, the following will apply:*

17. *(a) Developers will be expected to make provision for the protection and preservation of archaeological deposits in situ within their developments, where possible by designing foundations that minimise the impact of the development on the remains; AND,*

18. *(b) Where the Planning Authority deems that the protection and preservation of archaeological deposits in situ is not warranted for whatever reason, it shall satisfy itself that the developer has made appropriate and satisfactory provision for the excavation, recording, analysis and publication of the remains.*

19. *3. Where archaeological remains are discovered after a development has commenced, the following will apply:*

20. *(a) The developer will notify the West of Scotland Archaeology Service and the Council immediately, to enable an assessment of the importance of the remains to be made; AND,*

(b) Developers should make appropriate and satisfactory provision for the excavation, recording, analysis and publication of the remains. (Developers may see fit to insure against the unexpected discovery of archaeological remains during work).

2.12 The Proposed Local Development Plan 2 is currently under review and contains policies 15-21. These are the relevant policies regarding the historic environment and are cited below:

Argyll and Bute PROPOSED LOCAL DEVELOPMENT PLAN 2

Policy 15 – Supporting the Protection, Conservation and Enhancement of Our Historic Built Environment

Development proposals will not be acceptable where they fail to:

- *protect, preserve, conserve or enhance the established character of the historic built environment in terms of its location, scale, form, design or proposed use; or*
- *avoid any cumulative effect upon the integrity or special qualities of designated built environment sites.*

When there is significant uncertainty concerning the potential impact of a proposed development on a designated site, consideration will be given to the appropriate application of the precautionary principle.

Policy 16 – Listed Buildings

A. Development

A development proposal which affects a Listed Building, its curtilage or its wider setting will only be supported when it meets ALL of the following criteria:

- *It respects the original structure in terms of setting, scale, design, materials and proposed use, AND*
- *the proposal is essential to securing an appropriate use of the Listed Building without undermining its architectural or historic character, or its setting, AND*
- *It conforms to national policy and guidance, including but not limited to those set out in the section above 'Related Documents'.*

The developer is expected to demonstrate to the planning authority's satisfaction, that the effect of a proposed development on a Listed Building, its curtilage and wider setting has been assessed and that measures will be taken to protect, conserve and where appropriate enhance the special interest of the asset. The use of appropriate access statements, design statements and conservation plans are expected to facilitate this assessment.

B. Demolition

Proposals for the total or partial demolition of a listed building (or any ancillary structure within its curtilage) will be supported ONLY where it is demonstrated to the satisfaction of the planning authority that every effort has been exerted by all concerned to find practical ways of keeping it. This will be demonstrated by inclusion of evidence to the planning authority that the building meets one or more of the following criteria:

- *Written evidence can be provided that it has been actively marketed at a reasonable price reflecting its location, condition, redevelopment costs and possible viable uses for a period of not less than 12 months without finding a purchaser, OR*

- *Is beyond economic repair and incapable of re-use for modern purposes through the submission and verification of a thorough structural condition report prepared by a conservation accredited professional and a detailed and verifiable breakdown of costs in line with guidance provided in Historic Environment Scotland's Managing Change Guidance Note "Demolition" , OR*

- *The demolition is considered to be essential for wider community economic benefits. This would only be considered if the proposed redevelopment was of regional or national significance and that clear evidence shows that every effort was made to incorporate the listed building into the new development or that every effort to place the new development in an alternative location was made.*

Prior to the approval of demolition the planning authority may require to have approved detailed proposals submitted by the developer for the restoration and reuse of the site, including any replacement buildings or other structures in order to preserve the integrity of the site, and may require that a contract be let for redevelopment in advance of demolition in appropriate cases.

The planning authority will also consider attaching conditions in respect of one or more of the following:

- *The recording of the building to be demolished, in addition to the requirement to formally notify Historic Environment Scotland*

- *Methods of demolition to be employed*

- *The conservation, retention or salvaging of architectural or other features, artefacts or other materials.*

Policy 17 – Conservation Areas

A. Development

There is a presumption against development that does not protect, conserve or enhance the character or appearance of an existing or proposed conservation area or its setting. New development within these areas and on sites affecting their settings must respect the architectural, historic and other special qualities that give rise to their actual or proposed designation and conform to the following national policies and guidance including, but not limited to, section above 'Related Documents' and the area's Conservation Area Appraisal and Management Plan (if in place).

The developer is expected to satisfactorily demonstrate to the planning authority that the effect of a proposed development on a conservation area and its wider setting has been assessed and that measures will be taken to protect, conserve and where appropriate enhance the special interest of the area. The use of appropriate design statements, character appraisals and conservation plans are expected to facilitate this assessment.

Applications for planning permission in principle will not normally be considered appropriate for proposed development in conservation areas.

The contribution which trees make towards the character or appearance of a conservation area will be taken into account when considering development proposals.

B. Demolition

Proposals for the total or substantial demolition of a building within or affecting the character or appearance of a conservation area or its setting will be considered as if the structure was listed – as set out in Policy 16 – Listed Buildings (B).

Policy 18 – Enabling Development

Enabling development proposals which have not already been identified in the Local Development Plan 2, subject to other policies, will be considered in the following circumstances:

- *the building is Listed and/or on the Building at Risk Register, or in exceptional circumstance unlisted but considered worthy of conservation and reuse by the Council, AND*
- *all other possibilities of development funding to secure the conservation and reuse of the building have been exhausted. This includes exploring grant aid and determining if any other group, such as a Building Preservation Trust, is willing to undertake the project; and putting the building on the open market for a period of time (not less than 12 months) and price (reflecting condition and redevelopment costs) which can be considered reasonable to achieve a sale in the context of prevailing market conditions, AND*
- *it is demonstrated that the amount of enabling development is the minimum required to meet a verifiable conservation deficit that would achieve conservation and reuse and, if required, this has been confirmed through an independent professional survey by an agency chosen by the council and paid for by the applicant, AND*
- *the wider public benefits of securing the conservation and reuse of the building through enabling development significantly outweigh any disadvantages of breaching normal policy presumptions, AND*
- *it will not materially harm the heritage value of the listed building or its setting, AND*
- *it will secure the long-term future of the asset and avoid detrimental fragmentation of management of the asset.*

For proposals associated with listed building restoration and reuse, the physical separation of the restored or reused listed building from the enabling development is normally preferred.

Policy 19 – Scheduled Monuments

There will be a presumption against development that does not retain, protect, conserve or enhance a Scheduled Monument and the integrity of its settings. Developments that have an adverse impact on Scheduled Monuments or their settings will not be permitted unless there are exceptional circumstances. New development on sites affecting the settings of scheduled monuments must respect their architectural, historic and other special qualities and conform to the national policies and guidance including but not limited to the 'Related Documents'.

The developer is expected to satisfactorily demonstrate to the planning authority that the effect of a proposed development on a scheduled monument and its wider setting has been assessed

and that measures will be taken to protect, conserve and where appropriate enhance the special interest of the asset. The use of appropriate setting analysis, design statements, character appraisals and conservation plans are expected to facilitate this assessment.

Policy 20 – Gardens and Designed Landscapes

There will be a presumption in favour of retaining, protecting, conserving and enhancing gardens and designed landscapes, either listed in the inventory of gardens and designed landscapes, or otherwise deemed to be of significant value.

Where development would affect a garden and designed landscape the developer will be expected to demonstrate to the planning authority that such an effect has been assessed and that adequate measures will be taken to protect, conserve and where possible enhance the special interest of the asset. Measures of assessment will be expected to follow the principles set out in the 'Related Documents'.

In assessing proposals for development in or adjacent to gardens and designed landscapes particular attention will be paid to the impact of the proposal on all of the following:

- *The archaeological, historical or botanical interest of the site, AND*
- *The site's original design concept, overall quality and setting, AND*
- *Trees and woodlands and the site's contribution to local landscape character within the site including the boundary walls, pathways, garden terraces or water features, AND*
- *Planned or significant views of, or from, the site or buildings within it.*

Policy 21 – Sites of Archaeological Importance

There is a presumption in favour of retaining, protecting, conserving and enhancing the existing archaeological heritage and any future discoveries found in Argyll and Bute. When a proposed development would affect a site of archaeological significance, ALL of the following will apply:

- *The prospective developer will be advised to consult the planning authority and its advisors the West of Scotland Archaeology Service (WOSAS) at the earliest possible stage in the conception of the proposal, AND*
- *An assessment of the importance of the site will be provided by the prospective developer as part of the application for planning permission or (preferably) as part of the pre-application discussions, AND*
- *Relevant policies and guidance including but not limited to the 'Related Documents' must be conformed to.*

When development that will affect a site of archaeological significance is to be carried out, both of the following will apply:

- *Developers will be expected to make provision for the protection and preservation of archaeological deposits in situ within their developments, OR*
- *Where the planning authority deems that the protection and preservation of archaeological deposits in situ is not warranted for whatever reason, it shall satisfy itself*

that the developer has made appropriate and satisfactory provision for the excavation, recording, analysis and publication and, if appropriate preservation of, the remains.

Where archaeological remains are discovered after a development has commenced both of the following will apply:

- *The developer will stop work and notify the WOSAS and the council immediately to enable an assessment of the importance of the remains to be made, AND*
- *Developers should make appropriate and satisfactory provision for the excavation, recording, analysis and publication of the remains. (Developers may see fit to insure against the unexpected discovery of archaeological remains during work).*

2.13 In line with relevant planning policy and guidance, this desk-based assessment seeks to clarify the site's archaeological potential and the likely importance of that potential and the cultural heritage significance of assets potentially affected.

3 GEOLOGY AND TOPOGRAPHY

Geology

3.1 The western part of the study site is surrounding and to the south of Cruachan Reservoir is mainly underlain by (roughly north to south):

- Quartz-Monzodiorite of the Cruachan Intrusion
- Monzogranite of the Meall Odhar Intrusion
- Andesite and Basalt of the Lorn Plateau Volcanic Formation
- Diorite of the Quarry Intrusion
- Quartzite, Metalimestone and Phyllitic Semipelite of the Ardrishaig Phyllite Formation

3.2 The road in the south is mainly underlain by (roughly west to east):

- Quartzite, Metalimestone and Phyllitic Semipelite of the Ardrishaig Phyllite Formation
- Pelite and Graphite of the Easdale Slate Formation
- Quartzite of the Carn Mairg Quartzite Formation
- Semipelite by Islay Quartzite

3.3 The eastern part of the site is underlain by Quartzite of the Glen Coe Quartzite Member. Superficial deposits are largely absent, with the exception of the eastern part of the site as well as a small area to the north of the reservoir. These are areas are recorded to contain superficial deposits of diamicton, sand and gravel belonging to the Hummocky Glacial Deposits (www.bgs.co.uk – accessed 03.03.2022).

Topography

3.4 The study site comprises two separate areas.

3.5 The western area takes in the steep-sided Coire Cruachan, much of which is occupied by Cruachan Reservoir, and the steep slopes between the corrie and northern shore of Loch Awe. Flowing from the corrie into the loch is Allt Cruachan. The shore of the loch lies at approximately 42m AOD, the reservoir is at approximately 400m AOD. The landscape is generally craggy.

3.6 The eastern area takes in more gently sloping ground between the foot of Monadh Driseig and Loch Awe and Allt Mhoille. It lies at around 55m AOD.

Site Conditions

3.7 The site is primarily occupied by unimproved grazing. The slopes north of Loch Awe are, however, wooded.

Review of available LiDAR data

3.8 A review of LiDAR data was conducted, using the Open Survey Data 1m spatial resolution dataset for the site (Figures 4a and 4b).

3.9 The LiDAR imagery shows the sloping/mountainous topography of the site. Figure 4a shows the location of numerous charcoal burning platforms (HER ref. 21219; see also Figure 3) above Loch Awe the power station. These are well preserved, circular, dry stone platforms on which stacked wooden poles were carefully burnt to make charcoal.

4 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND WITH ASSESSMENT OF SIGNIFICANCE

Timescales used in this report

Prehistoric

Palaeolithic	450,000	-	10,000 BC
Mesolithic	10,000	-	4,000 BC
Neolithic	4,000	-	1,800 BC
Bronze Age	1,800	-	600 BC
Iron Age	600	-	AD 410

Historic

Early Medieval	AD 410	-	1100
Medieval	AD 1100	-	1560
Post Medieval	AD 1560	-	1745
Modern	AD 1745	-	Present

Introduction

4.1 This chapter reviews the available archaeological evidence for the study site and the archaeological/historical background of the general area, and, in accordance with SPP, considers the potential for any as yet to be discovered archaeological evidence on the study site.

4.2 What follows comprises a review of known archaeological assets within a 1km radius of the study site (Figures 2 & 3), also referred to as the study area, held on the WoSAS Historic Environment Record (HER) and National Record of the Historic Environment (NRHE), together with a historic map regression exercise charting the development of the study area from the 18th century.

4.3 Chapter 5 subsequently considers whether the proposed development will impact the theoretical archaeological potential identified below.

Designated Heritage Assets

4.4 There are three designated heritage assets within the site are three Listed Buildings:

- Falls of Cruachan Railway Viaduct (LB50811 – Category A) – within the southern part of the western site area
- Turbine Hall, Ben Cruach Hydro Electric Scheme (LB51688 – Category A) – in the western site area, south of Cruachan Reservoir
- Cruachan Dam, Ben Cruachan Hydro Electric Scheme (LB51687 – Category B/Group Category A) – within the central part of the western site area.

4.5 The supplementary information attached to the listing, including the Statements of Special Interest are appended (Appendix 2).

4.6 Within the study area there are:

- Three Scheduled Monuments:
  - Kilchurn Castle, Dalmally (SM90179) – c.500m to the south-east of the eastern site area;
  - Dun 60m NNW of Castles Farm (SM3772) – c.550m to the north-east of the eastern site area;
  - Crannog 600m SE of Lochawe (SM4194) – c.620 to the south-east of the western site area.
- Two Listed Buildings:
  - St Conan's Church, Lochawe (LB4700 – Category A) – adjacent to the east of the western site area;
  - Loch Awe Hotel, Loch Awe (LB4701 – Category C) – c.400m to the south-west of the eastern site area.
- One Garden and Designated Landscape:
  - Ardanaiseig House (GDL00018) – c.500m south of the western site area.

4.7 There are no Conservation or Battlefields within the study area.

4.8 There is no intervisibility between the study site and these assets and it is considered that there is no potential for them to be affected.

Non-Designated Heritage Assets

4.9 There are 10 heritage assets located within the study site, all of which are dated to the Post-Medieval/Modern period or are of unknown origin. Records comprise:

Post-Medieval:

- 18th century military road (21749 and 21761)
- bank/earthwork (67517)

Modern:

- Railway halt (44646)
- Allt Cruachan Footbridge (67511)
- Cruachan Reservoir (46108)
- Tunnels associated with Cruachan Poser Station (46104, 46406 and 51863)

Unknown:

- charcoal burning platforms (21219)
- clearance cairn (67518)
- enclosure (67521)
- rig and furrow (67515 and 67520)

4.10 A sheepfold (67513) recorded by the HER within the site was destroyed by the construction of the Cruachan access road. A gazetteer of HER records is included in Appendix 1. Their locations are shown on Figure 3.

Previous Archaeological Work

4.11 The HER records two previous programmes of work undertaken within the study site.

4.12 A walk over survey (5149 and 5580) and archaeological excavation (5580) along the edges of previously constructed tracks in advance of the replacement of overhead lines recorded a bank/earthwork (67517). This was bisected and truncated by a track and, after partial excavation, interpreted to be a Post-Medieval field boundary.

4.13 Furthermore, the walk-over survey recorded two small possible cairns (67518 within the study site and 67519 c.650m to the east of the eastern site area) likely associated with field clearance activity as well as an extensive area of rig and furrow (67515 and 67520) and a large drystone enclosure (67521).

4.14 A gazetteer of HER records is included in Appendix 1. Their locations are shown on Figure 3.

Prehistoric

4.15 The HER contains no records of Prehistoric date located within the study site. There are two records within the 1km search area, a dun and crannog (both Scheduled Monuments, see above), which may be of Prehistoric date, but may also be later. They are located c.550m and c.620m away from the study site and have no bearing on the assessment of the site's archaeological potential.

4.16 The HER identifies a cairn (1762) located c.800m south-east of the eastern site area on the opposite site of Loch Awe. However, the interpretation of this is uncertain; the Ordnance Survey could not locate it in 1973.

4.17 There are no other known records dating to the Prehistoric periods within the search area.

4.18 It is concluded, given the background and the steep topography, that the western area has negligible potential to contain previously unrecorded archaeology of this period. The potential in the eastern area is considered to be low.

Early Medieval and Medieval

4.19 There are no records of confirmed Early Medieval or Medieval date within the study site or search area. Therefore, the site's potential to contain remains from these periods is assessed to be negligible.

Post Medieval & Modern (including map regression)

4.20 Post-Medieval assets within the study site include parts of the 18th century Dalmally to Bonawe Military Road (21749 and 21761) along the northern banks of Loch Awe.

4.21 A bank/earth work (67517) was recorded during a walkover survey (5580) and, after partial excavation, interpreted as a Post-Medieval boundary.

4.22 The assets located within the study site dating to the Modern period are mainly associated with the Cruachan Hydro-electric scheme and comprise the tunnel (51863, 4104, 46106), the reservoir (46108), the dam (46107) as well as electricity generating stations (46105 and 46109). Furthermore, the HER records Allt Cruachan footbridge known from historic mapping (67511) crossing a stream c.600m south of the reservoir and an intermediate railway halt (44646) on the Crianlarich - Oban line of the former Caledonian railway, also located on the northern banks of Loch Awe in the southern part of the western site area.

Historic map regression

4.23 Historic mapping was reviewed digitally from the National Library of Scotland[1].

4.24 The earliest available mapping to show the surrounding of the site geographically correct is the Roy Military Survey of Scotland from 1747-1755[2]. Ben Cruachan is shown (annotated *Ben Cruachan*) as is Allt Cruachan (unnamed) and the military road to Bonawe is shown skirting the loch. It depicts the northern shore of Loch Awe and the lower slopes of Ben Cruachan as wooded. Areas of settlement and cultivation are sparse on the north side of the loch. One area is shown on the shore opposite Innis Chonain, and positively lies outwith the site. A second settlement is shown annotated *Drishag*. This can be identified with present day Drishaig, which lies outwitrh the site, but the area of cultivation is likely to have extended into the eastern area.

4.25 Aaron Arrowsmith's map from 1807[3] also shows the road along the northern shore of Loch Awe, connecting settlements dotted along the banks such as *Leatters, Drishaig* and *Corry*.

4.26 Ordnance Survey mapping from 1843-1882[4] onwards show the surrounding landscape in more accurate detail with numerous streams draining from the mountain into Loch Awe. This is also the first map to show the location of the Allt Cruachan Footbridge (67511), crossing a stream annotated as *Allt Cruachan*. Furthermore, it shows the sheepfold (67513), which is also recorded on the HER and located within the study site.

4.27 The Callander to Oban Railway line was opened in stages in the second half of the 19th century and is first shown on the 1857-1889 Ordnance Survey map[5] along the northern shore of Loch Awe. OS mapping from the following decades depicts the area in much the same way. Construction of Cruachan Power Station and the dam creating the reservoir began in 1959, transforming the landscape into how it appears today. The construction of the access track removed the sheepfold (67513)

4.28 The site is known to contain Post-Medieval and Modern records identified as non-designated assets by the HER. The potential for as of yet unknown remains from these periods is assessed to be negligible.

Unknown

4.29 The southern part of the western site area as well as the eastern site area contain a number of assets of unknown date, including numerous charcoal burning platforms (21219; their location is clearly visible on the LiDAR data on Figure 4a), a sheepfold (67513), a bank/earthwork (67515), a clearance cairn (67518), an enclosure (67521) and remains of rig and furrow (67515 and 67520). The charcoal burning platforms are highly likely to have served the Bonawe Iron Furnace, near Taynuilt, which was built in 1753.

[1] https://maps.nls.uk/geo/find/marker/#zoom=5&lat=56.0000&lon=-4.0000&f=0&z=1&marker=56.0,-4.0&from=1550&to=1971

[2] https://maps.nls.uk/geo/explore/#zoom=13&lat=56.41206&lon=-5.07907&layers=3&b=1

[3] https://maps.nls.uk/geo/explore/#zoom=13&lat=56.41613&lon=-5.07662&layers=123969245&b=1

[4] https://maps.nls.uk/geo/explore/#zoom=14&lat=56.39931&lon=-5.08316&layers=5&b=1

[5] https://maps.nls.uk/geo/explore/#zoom=13&lat=56.40131&lon=-5.08786&layers=205&b=1

Assessment of Cultural Significance and Importance (Designated Heritage Assets)

4.30 Three designated Heritage assets lie within the site:

- Falls of Cruachan Railway Viaduct (LB50811 – Category A)
- Turbine Hall, Ben Cruach Hydro Electric Scheme (LB51688 – Category A)
- Cruachan Dam, Ben Cruachan Hydro Electric Scheme (LB51687 – Category B/Group Category A).

4.31 Ben Cruachan Hydro Scheme opened in 1965. Its design by James Williamson responded to the challenge of developing a nationally significant power station in an area renowned for scenic beauty with two monumental and pioneering pieces of civil engineering. The turbine hall is concealed deep underground, minimising the visual impact of the scheme, whilst the buttressed dam, sitting back from the entrance to Coire Cruachan, appears almost a part of the landscape, the angle of the buttresses being close to that of the adjacent slopes (Plates 1-9). All the operational equipment is contained within the dam to negate the need for towers and hence to provide a clean, sweeping line (Fleetwood 2009).

4.32 The concern for aesthetics was not restricted to the dam. The turbine hall (Plates 10-15) includes a large mural by Elizabeth Faulkner, depicting a mythologised retelling of the history of the area and the coming of hydro power, and careful attention has been paid to the lighting and acoustic design and the overall appearance of the turbines and control equipment. The clean lines of the equipment in the turbine hall are juxtaposed with bare unfinished rock at its ends. The overall quality of the design reflects the pride in this nationally important project, which played and continues to play an important role in the UK's power supply and helped finance the supply of electricity to remote areas.

4.33 The design also deployed a highly innovative solution to one of the key brakes on the adoption of pumped hydro. This was the use of reversible turbines, which negated the need for separate pumping equipment which added greatly to the cost of such facilities at the time. In the context of the Cruachan scheme, this also allowed the pumping/generation element to be substantially more compact, reducing the volume of material that had to be excavated. The four 100MW Francis turbines were world firsts and their success paved the way for the construction of similar schemes elsewhere.

4.34 The cultural significance of the turbine hall and dam reside primarily in their historic, technical and architectural interest and hence resides primarily in their fabric. However, a key element of the design of the scheme is the visual relationship of the dam with the surrounding landscape. The architects' success in incorporating a huge structure into the rugged Highland landscape is an exceptional achievement and is of great aesthetic value.

4.35 The viaduct was constructed in 1880 to carry the Glasgow to Oban railway over the gorge of the Falls of Cruachan. It is listed owing to its being the first viaduct on a British railway to feature arches constructed using mass concrete.

4.36 On the basis of their designations all are considered to be of national importance. Cruachan Power Station may be considered to be of international importance and has been recognised by Docomomo as one of 60 key post-war monuments of Scottish architecture.

Assessment of Cultural Significance and Importance (Non-Designated Heritage Assets)

4.37 There are no designated heritage assets on the study site.

4.38 The HER records ten non-designated heritage assets within or partially within the study site:

Post-Medieval:

- 18th century military road (21749 and 21761)
- bank/earthwork (67517)

Modern:

- Allt Cruachan Footbridge (67511)
- Railway halt (44646)
- Cruachan Reservoir (46108)
- Tunnels associated with Cruachan Power Station (46104, 46406 and 51863)

Unknown:

- charcoal burning platforms (21219)
- clearance cairn (67518)
- enclosure (67521)
- rig and furrow (67515 and 67520)

4.39 These remains are significant for their evidential value and their potential to contribute to local research agendas.

4.40 As identified by desk-based work, archaeological potential of any hitherto unknown/unrecorded archaeological remains for all periods is assessed to be negligible. If any such remains were present, they would most likely be of local importance.

5 THE PROPOSED DEVELOPMENT & REVIEW OF POTENTIAL DEVELOPMENT IMPACTS ON HERITAGE ASSETS

Proposed Development

5.1 The Proposed Development seeks to optimise use of the existing Cruachan Reservoir and Dam through development of a new underground power station and associated infrastructure adjacent to Cruachan 1 to provide up to 600MW new generating capacity. The Proposed Development may be variously referred to as the Cruachan Expansion Project or Cruachan 2 pump storage scheme and will be operated independently of the existing 440 MW Cruachan 1 Power Station. Both power stations will use Loch Awe as the lower reservoir and Cruachan Reservoir as the upper reservoir.

5.2 The Proposed Development will comprise the following main elements:

- Upper Control Works – An additional intake structure including tower, screens, gates, gate hoisting arrangement, etc. would be located within or adjacent to Cruachan reservoir to direct water into a new headrace tunnel and surge shaft underground waterway system;
- Underground Waterway System – A series of underground shafts and tunnels carrying water between the upper reservoir and lower reservoir, through the underground cavern powerhouse;
- Cavern Powerhouse - A series of underground caverns containing reversible pump-turbines and motor-generators together with associated equipment such as transformers and switchgear. The construction process will require various interconnecting tunnels to allow construction;
- Substation –an above ground substation to provide the connection to the existing 275KV circuit that connects to Dalmally sub-station.
- Ventilation Shaft – A ventilation shaft will be required to circulate fresh air through the underground access tunnel and cavern power station complex. It is noted that this may also include a cable shaft for the 400kV oil filled cable from the transformers to cable sealing ends/sub-station;
- Tailrace Tunnel – A downstream surge shaft and concrete-lined low-pressure tunnel will conduct water between the reversible pump-turbines and Loch Awe, the lower reservoir. At the upstream of the lower control works, the tailrace tunnel is proposed with an underground gate chamber and gate shaft, housing tailrace tunnel gate.
- Lower Control Works – Comprising screened inlet / outlet structure and stop logs, positioned in Loch Awe at the end of the tailrace tunnel below minimum water level. These structures would channel water in and out of Loch Awe;
- Quayside – Constructed on the shore of Loch Awe to facilitate use of the Loch for the transport of heavy equipment and materials, and the temporary storage of tunnel spoil prior to its off-site removal;

- Administration building - above ground administration and workshop buildings required for day to day operational and maintenance tasks – located close to the upper reservoir;
- Access Tunnels – A main access tunnel would be provided for accessing the underground power plant, close to the shore of Loch Awe. This will cross connect to the existing Cruachan 1 power station to allow personnel to easily move between the plants and provide a further means of access/egress; and
- Existing service roads will be used as far as possible to facilitate the long-term operation of the generation station. Some upgrades of these roads may be required to facilitate access by heavy machinery and the removal of spoil.

5.3 The following temporary works will also be required for the Proposed Development:

- An upper site compound would be established in the vicinity of the existing dam. Once construction work for the Upper Control Works and sub-station is complete, this compound would be removed and the land restored;
- A lower site compound including workers welfare and accommodation will be established to the North East of Lochawe village, with access from the Stronmilchan Road. Once construction work is complete, this compound would be removed and the land restored;
- A section of the proposed Quayside may be temporary in nature depending on the final scheme design. If so, any temporary sections of the jetty will be removed following completion of construction works and the loch shore reinstated;
- A temporary diversion of the A85 onto the quayside may be required in order to facilitate construction of the initial sections of the main access tunnel and lower control works, although work is being undertaken to avoid this need. The A85 would revert to its current alignment once the initial access tunnel works at Loch Awe are complete;
- A railhead or rail sidings may be established in the vicinity of Lochawe Village in order to facilitate removal of spoil by rail. Location and required land take are currently being considered and the temporary or permanent nature of such works would be finalised following discussion with Network Rail.

Review of Potential Development Impacts

5.4 The proposed development will entail alterations to the fabric of the Cruachan Turbine Hall, which is a Category A Listed Building and the construction of a new intake structure adjacent to the Cruachan Dam, which is a Category B Listed Building. The construction and operation phases may result in effects relating to these. This potential is considered in the Cultural Heritage Impact Assessment (presented separately).

5.5 The proposed development is for the most part subterranean. It is therefore considered that there is no potential for the development in its operational phase to affect the setting of any other designated assets in the area.

5.6 With regard to any non-designated assets within the study site itself, any archaeological remains now present within the development footprint of the development would likely not survive the development process. Remains elsewhere within the study site will not be impacted by the

construction process. However, as discussed above, the site is considered to have a negligible to low potential for significant (i.e. non-agricultural) hitherto unknown/unrecorded remains of all periods.

6 SUMMARY AND CONCLUSIONS

6.1 This heritage baseline assessment has been prepared by RPS on behalf of Drax. It considers land approximately 275ha in extent, divided into two areas. The western site area occupies an area of c.227ha and the eastern area c.48h. The study site is located on the northern banks of Loch Awe, Argyll and Bute.

6.2 In keeping with relevant policy and guidance, this report provides a description of the baseline situation and identifies the heritage assets potentially affected by the proposed development of the site and addresses.

6.3 The proposed development will affect the fabric of the Cruachan Turbine Hall, which is a Category A Listed Building and the setting of the associated dam, which is a Category B Listed Building, but forms a Category A group with the turbine hall. No potential impacts upon other designated heritage assets have been identified.

6.4 The archaeological potential of the development site and the significance of heritage assets within the site has been assessed through desk-based review of existing archaeological information, including previous archaeological work undertaken on and in the vicinity of the study site, supported by site visits. These programmes allow robust assessment of the development site's archaeological potential and enable an informed planning decision.

6.5 The HER records ten heritage assets to be located within the study site, all of which are dated to the Post-Medieval/Modern period (an old military road, a footbridge, railway halt, bank/earthwork, Cruachan Reservoir and, tunnels) or are of unknown, though probably, Post-Medieval or later origin (numerous charcoal burning platforms, clearance cairn, an enclosure and rig and furrow).

6.6 Based on the available archaeological and LiDAR data for the site and surrounding area, the study site is assessed to have a negligible to low potential for hitherto unknown/unrecorded archaeological remains from all periods.

Sources Consulted

General

National Library of Scotland

WoSAS Historic Environment Record

Internet

British Geological Survey – http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html

CANMORE – https://canmore.org.uk/

National Library of Scotland Map Finder – https://maps.nls.uk/geo/find/marker/#zoom=5&lat=56.0000&lon=-4.0000&f=0&z=1&marker=56.0,-4.0&from=1550&to=1971

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Fleetwood, D 2009 'Ben Cruachan's Hidden Giant' in *Context* (109, 23-4). IHBC. Available at: http://www.ihbconline.co.uk/context/109/index.html#26/z.

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Cartographic

Roy, W 1747-55 Military Survey

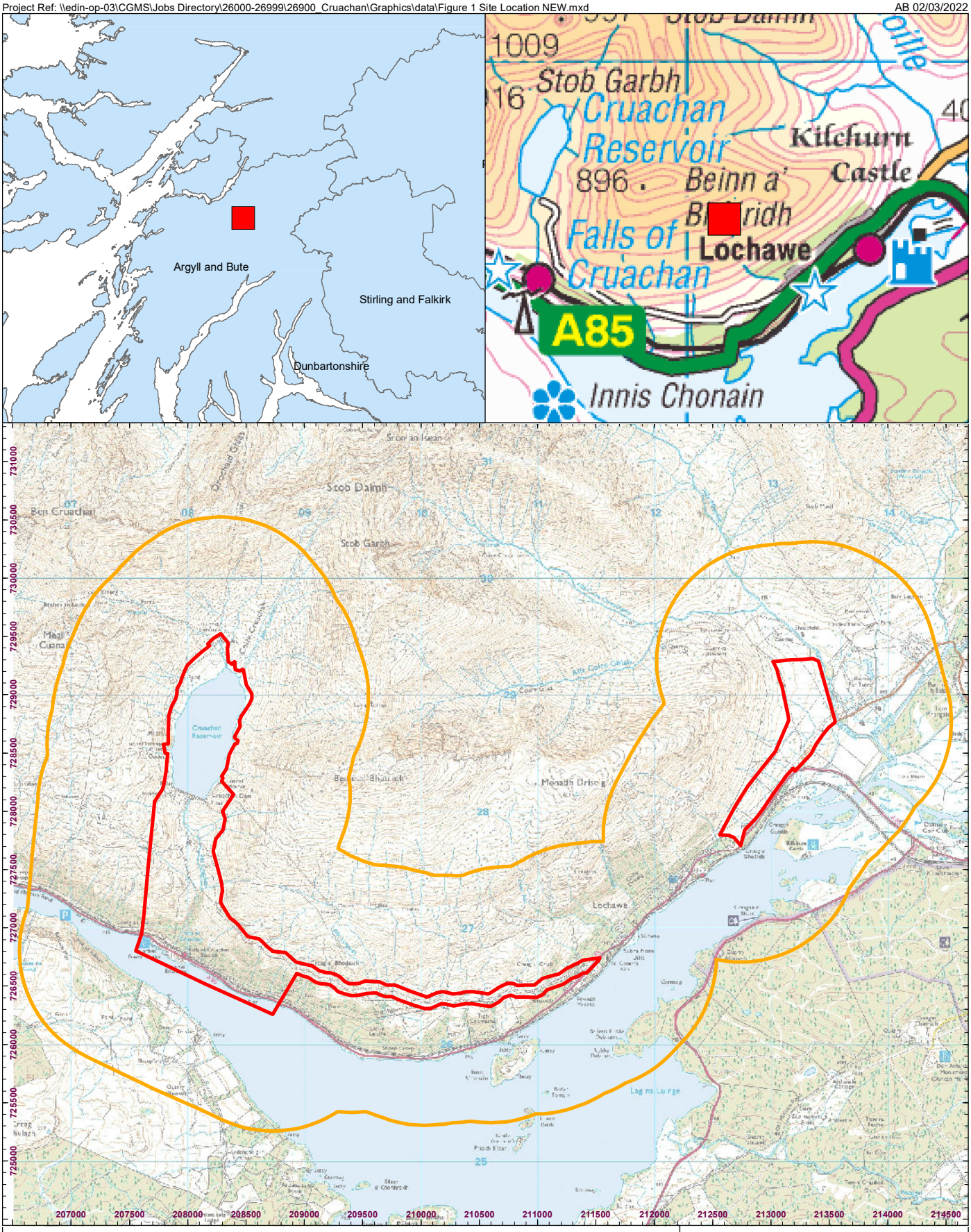
Aaron Arrowsmith 1807

Bartholomew Survey Atlas 1912

Ordnance Survey: 1843-1882, 1857-1891, 1888-1913, 1902-1923, 1955-1961

Google Earth: 2000, 2005, 2006, 2007, 2008, 2010, 2014, 2015, 2016, 2018, 2020

FIGURES



Site Boundary

1km Search Area

N

0 460 920 1,380 m

Scale at A4: 1:45,000

MAKING COMPLEX EASY

Figure 1

Site Location

AB 03/03/2022

LB51687
LB50811
LB51688
SM3772
SM90179
LB4701
LB4700
SM4194
Ardanaiseig House

Site Boundary
1km Search Area

Listed Buildings

Category A
Category B
Category C
Scheduled Monuments
Garden and Designated Landscape

N
0 320 640m
Scale at A3: 1:25,000

MAKING COMPLEX EASY

Figure 2

Designated Heritage Assets

Project Ref: \\edin-op-03\CGMS\Jobs Directory\26000-26999\26900_Cruachan\Graphics\data\Figure 2 Des Ass.mxd

AB 03/03/2022

Site Boundary
1km Search Area
Event Areas
Event Points
Monument Lines
Monument Points

N

0 320 640m

Scale at A3: 1:25,000

MAKING COMPLEX EASY

Figure 3

HER Data

Project Ref: \\edin-op-03\CGMS\Jobs Directory\26000-26999\26900_Cruachan\Graphics\data\Figure 3 HER.mxd

AB 03/03/2022

Site Boundary

LiDAR DATA

Source:
Environment Agency

Data Type: DTM

Resolution: 1m

Date Captured:
2020

Processing:
simple Local Relief Model overlaid on
Multi-direction Hillshade

N

0 95 190m

Scale at A3: 1:5,000

MAKING COMPLEX EASY

Figure 4a

LiDAR Data showing the south-western part of the site

Project Ref: \\edin-op-03\CGMS\Jobs Directory\26000-26999\26900_Cruachan\Graphics\data\Figure 4 LiDAR.mxd

AB 03/03/2022

Site Boundary

LiDAR DATA

Source:
Environment Agency

Data Type: DTM

Resolution: 1m

Date Captured:
2020

Processing:
simple Local Relief Model overlaid on
Multi-direction Hillshade

N

0 115 230m

Scale at A3: 1:6,000

MAKING COMPLEX EASY

Figure 4b

LiDAR Data showing the eastern part of the site

Project Ref: \\edin-op-03\CGMS\Jobs Directory\26000-26999\26900_Cruachan\Graphics\data\Figure 4 LiDAR.mxd

PLATES

Plate 1: Cruachan Dam seen from the footpath by Allt Cruachan

Plate 2: Cruachan Dam seen from the south-east

Plate 3: The rear of Cruachan Dam seen from the north-east

Plate 4: General view of proposed location of upper intake

Plate 5: Proposed location of upper intake

Plate 6: Proposed location of upper intake seen from the dam.

Plate 7: Cruachan Reservoir

Plate 8: General view of area to the south of the dam

Plate 9: Cruachan Dam seen from the south side of Loch Awe

Plate 10: South-eastern end of the Turbine Hall

Plate 11: South-eastern end of the Turbine Hall

Plate 12: South-eastern end of the Turbine Hall with the Faulkner mural

Plate 13: The Faulkner mural seen from the Visitor's Gallery

Plate 14: The Turbine Hall

Plate 15: North-western end of the Turbine Hall

Plate 16: Allt Cruachan footbridge (WoSAS 67511)

Plate 17: General view of eastern part of site.

Plate 18: General view of eastern part of site.

Plate 19: General view of eastern part of site.

APPENDICES

Appendix 1

Gazetteer of HER Entries

WoSAS Historic Environment Record

HER No.	Monument		Location	
	Name	Type	Eastings	Northings
13103	Strath of Orchy	Folly; Cross-slab (possible)	214320	727510
14758	Creag an Aoineidh	Charcoal Burning Platform	209280	726280
1589	McFadyen's Cave	Cave; Battle Site or Skirmish	206468	727005
1761	Portbeg	'Mound'; Building	213715	727525
1761	Portbeg	'Mound'; Building	213735	727515
1762	Portbeg	Cairn	213500	727400
1763	Castles Farm	Castle (possible)	213750	729650
1765	Loch Awe	Crannog	212155	726480
1766	Portbeg	Settlement; Harbour	213470	727370
1767	Loch Awe Hotel	Hotel	212350	727440
1771	Castles	Dun	213800	729670
1773	Kilchurn Castle / Kilcairn Castle, Loch Awe	Castle	213290	727610
1773	Kilchurn Castle / Kilcairn Castle, Loch Awe	Castle	213200	727600
19082	Corries	Farmstead	213050	729550
19937	Allt Coire Chreachainn	Shieling-huts; Enclosure	212030	729570
20343	Lochawe, St Conan's Church / Loch Awe	Church	211580	726730
21218	Coille Leitire	Cultivation Remains; Clearance Cairns; Enclosure; Structure: Shieling-hut (possible)	209810	726160
21218	Coille Leitire	Cultivation Remains; Clearance Cairns; Enclosure; Structure: Shieling-hut (possible)	209900	726170
21218	Coille Leitire	Cultivation Remains; Clearance Cairns; Enclosure; Structure: Shieling-hut (possible)	209790	726200
21218	Coille Leitire	Cultivation Remains; Clearance Cairns; Enclosure; Structure: Shieling-hut (possible)	209910	726150
21218	Coille Leitire	Cultivation Remains; Clearance Cairns; Enclosure; Structure: Shieling-hut (possible)	210020	726240
21218	Coille Leitire	Cultivation Remains; Clearance Cairns; Enclosure; Structure: Shieling-hut (possible)	209930	726150
21218	Coille Leitire	Cultivation Remains; Clearance Cairns; Enclosure; Structure: Shieling-hut (possible)	209830	726170
21218	Coille Leitire	Cultivation Remains; Clearance Cairns; Enclosure; Structure: Shieling-hut (possible)	209750	726240

21218	Coille Leitire	Cultivation Remains; Clearance Cairns; Enclosure; Structure: Shieling-hut (possible)	209840	726190
21218	Coille Leitire	Cultivation Remains; Clearance Cairns; Enclosure; Structure: Shieling-hut (possible)	209910	726160
21218	Coille Leitire	Cultivation Remains; Clearance Cairns; Enclosure; Structure: Shieling-hut (possible)	209780	726200
21219	Cruachan Power Station	Platforms: Charcoal Burning Platforms	209170	726320
21219	Cruachan Power Station	Platforms: Charcoal Burning Platforms	208140	726810
21219	Cruachan Power Station	Platforms: Charcoal Burning Platforms	208270	726720
21219	Cruachan Power Station	Platforms: Charcoal Burning Platforms	208180	726820
21219	Cruachan Power Station	Platforms: Charcoal Burning Platforms	208080	726850
21219	Cruachan Power Station	Platforms: Charcoal Burning Platforms	208050	726930
21219	Cruachan Power Station	Platforms: Charcoal Burning Platforms	208150	726830
21219	Cruachan Power Station	Platforms: Charcoal Burning Platforms	207940	726920
21219	Cruachan Power Station	Platforms: Charcoal Burning Platforms	207950	727030
21219	Cruachan Power Station	Platforms: Charcoal Burning Platforms	209370	726230
21219	Cruachan Power Station	Platforms: Charcoal Burning Platforms	208940	726390
21219	Cruachan Power Station	Platforms: Charcoal Burning Platforms	209400	726250
21219	Cruachan Power Station	Platforms: Charcoal Burning Platforms	208610	726480
21219	Cruachan Power Station	Platforms: Charcoal Burning Platforms	208500	726500
21219	Cruachan Power Station	Platforms: Charcoal Burning Platforms	208330	726620
21219	Cruachan Power Station	Platforms: Charcoal Burning Platforms	208290	726640
21219	Cruachan Power Station	Platforms: Charcoal Burning Platforms	208280	726660
21219	Cruachan Power Station	Platforms: Charcoal Burning Platforms	208220	726820
21231	Sailean Rubha Dubhairt / Sailean Rubha Dubhairt 2	Settlement; Enclosure; Rig (possible); Cup marked rock (possible)	212140	726190
21231	Sailean Rubha Dubhairt / Sailean Rubha Dubhairt 2	Settlement; Enclosure; Rig (possible); Cup marked rock (possible)	212140	726150

21232	Sailean Rubha Dubhairt / Sailean Rubha Dubhairt 1	Structure; Cairn; Field Boundaries	212060	726310
21232	Sailean Rubha Dubhairt / Sailean Rubha Dubhairt 1	Structure; Cairn; Field Boundaries	212150	726350
21232	Sailean Rubha Dubhairt / Sailean Rubha Dubhairt 1	Structure; Cairn; Field Boundaries	212130	726310
21232	Sailean Rubha Dubhairt / Sailean Rubha Dubhairt 1	Structure; Cairn; Field Boundaries	212070	726350
21908	Strath of Orchy, Viaduct	Viaduct	213700	728070
21909	Strath of Orchy, Road Bridge	Road Bridge	213770	728160
22916	Portbeg	Structure; rig and furrow	213310	727260
22916	Portbeg	Structure; rig and furrow	213260	727260
22916	Portbeg	Structure; rig and furrow	213270	727200
43583	Castles / Castles Estate	Estate	213820	729580
44183	Portbeg	Building	213270	727200
44184	Lower Kinachreachan	Township; Saw Mill	214400	727640
44646	Falls Of Cruachan, Railway Halt	Railway Halt	207960	726760
44816	Innis Chonain	Farmstead	210750	725840
44817	Leitire	Farmstead	210270	726140
44829	Creagan A' Bhuic	Enclosure	212910	727110
45600	Innis Chonain, Innis Chonain House / Innischonain	House	210700	725700
45607	Lochawe, St Conan's Tower / Loch Awe	Tower	211970	727250
45609	Lochawe, Village, General / Loch Awe	Village	211700	726900
45630	Tervine	Farmstead	207623	726042
45938	Straebridge Cottage / River Strae Bridge	Industrial; Limekiln (possible)	214500	729300
46104	Cruachan, Hydro-electric Scheme, Reservoir, Tunnel Entrance / Cruachan Pumped Storage Scheme; Ben Cruachan; Coire Cruachan; Allt Cruachan; Cruachan Reservoir	Tunnel	208280	728350
46105	Cruachan, Hydro-electric Scheme, Turbine Hall / Cruachan Pumped Storage Scheme; Ben Cruachan; Coire Cruachan; Allt Cruachan	Electricity Generating Station	208000	727750
46106	Cruachan, Hydro-electric Scheme, Reservoir, Outlet / Cruachan Pumped Storage Scheme; Ben Cruachan; Coire Cruachan; Allt Cruachan; Cruachan Reservoir	Tunnel	207800	728530
46107	Cruachan, Hydro-electric Scheme, Reservoir, Dam / Cruachan Pumped Storage Scheme; Ben Cruachan; Coire Cruachan; Allt Cruachan; Cruachan Reservoir	Dam	207860	728210
46108	Cruachan, Hydro-electric Scheme, Reservoir / Cruachan Pumped Storage Scheme; Ben Cruachan; Coire Cruachan; Allt Cruachan; Cruachan Reservoir	Reservoir	208100	728700

46109	Cruachan, Hydro-electric Scheme / Cruachan Pumped Storage Scheme; Ben Cruachan; Coire Cruachan; Allt Cruachan; Falls Of Cruachan; Loch	Electricity Generating Station: Pumped Storage	208000	727750
46276	Loch Awe, Leitire / Letterawe	Farming And Fishing; Farm Buildings	210548	726310
51863	Cruachan, Hydro-electric Scheme, Reservoir, Tunnel Entrance / Cruachan Pumped Storage Scheme; Ben Cruachan; Coire Cruachan; Allt Cruachan; Cruachan Reservoir	Electricity Supply; Tunnel	208279	729486
67511	Allt Cruachan	Footbridge	208122	727483
67512	Leitire	Rig and Furrow; Cultivation Remains	210273	726485
67513	Leitire	Sheepfold	210383	726394
67514	Creag a'Chuil	Bank (Earthwork); Structure	210909	726582
67515	Cruachan Buildings	Field; Rig and Furrow	212992	728259
67516	Barran an Tuirc	Pond	213667	729338
67517	Creag a' Bhodaich	Bank (Earthwork)	209186	726544
67518	Creag a' Bhodaich	Clearance Cairn	209470	726424
67519	Barr Leathan	Clearance Cairn	214047	729440
67520	Cruachan Buildings	Rig and Furrow	212946	728380
67521	Cruachan Buildings	Enclosure	212832	728110
21753	MR11	Dalmally to Bonawe Military Road		
21749	MR11	Dalmally to Bonawe Military Road		
21761	MR11	Dalmally to Bonawe Military Road		
	Event			
44	Reconnaissance survey in response to a Woodland Grant Scheme application		209000	726000
780	An archaeological watching brief , log stacking area. Lag Na Luinge, Dalmally.		212157	726202
4933	Cultural Heritage Baseline Assessment: Dalmally Substation Extension, Dalmally, Argyll and Bute		214180	729437
5149	Cultural Heritage Assessment: Replacement Overhead Line (YX route) - Ben Cruachan Hydro Power Station to Dalmally Substation		210027	726405
5150	Cultural Heritage Assessment: Replacement Overhead Line (YW route), Dalmally Substation to Windyhill Substation		214238	729398

5579	Walkover Survey: Replacement Overhead Line (YX route) - Ben Cruachan Hydro Power Station to Dalmally Substation		210567	726498
5580	Walkover Survey and Archaeological Excavation: Replacement Overhead Line (YX route): Ben Cruachan Hydro Power Station to Dalmally Substation		209186	726544
5848	Archaeological Mitigation Works - YW Overhead Line - Loch Lomond & the Trossachs National Park and Argyll & Bute Sections: EPZ Works and Temporary Access for Towers YW1-174 and YW176-188		214200	729400
5937	Archaeological Watching Brief: Kilchurn Castle		213290	727600
6094	Archaeological Watching Brief: Stronmilchan Mains Rehabilitation, Argyll & Bute		213597	728758
6667	Geophysical Survey: Kilchurn Castle		n/a	n/a
	Listed Buildings	**Category**		
LB4700	St Conan's Church, Lochawe	A	211595	726743
LB4701	Loch Awe Hotel, Loch Awe	C	212349	727441
LB50811	Falls Of Cruachan Railway Viaduct	A	207883	726824
LB51687	Cruachan Dam, Ben Cruachan Hydro Electric Scheme	B	208014	728152
LB51688	Turbine Hall, Ben Cruachan Hydro Electric Scheme	A	207990	726720
	Scheduled Monuments			
SM4194	Lochawe,crannog 600m SE of	Prehistoric domestic and defensive: crannog	212155	726480
SM90179	Kilchurn Castle, Dalmally	Secular: castle	213282	727621
SM3772	Castles Farm,dun 60m NNW of	Prehistoric domestic and defensive: dun	213805	729677
	Garden and Designed Landscape			
GDL00018	Ardanaiseig House		208652	724990

Appendix 2

Designation Entries

after Historic Environment Scotland - http://portal.historicenvironment.scot/ (accessed 04.03.2022)

BEN CRUACHAN HYDRO ELECTRIC SCHEME, CRUACHAN DAM (LB51687)

Category
B
Date Added
11/02/2011

Local Authority
Argyll And Bute
Planning Authority
Argyll And Bute
Parish
Ardchattan And Muckairn

NGR
NN 08014 28152
Coordinates
208014, 728152

Description

James Williamson and Partners; George Rennie (resident engineer for North of Scotland Hydro Electric Board technical panel) 1959-65. Large buttress dam with access roadway oversailing prominent arcaded buttresses; large central buttress containing pipeway inlets and control gates, dominating Cruachan corrie with a mountainous backdrop. Mass concrete, with some reinforced concrete to parapet. Battered downstream face with deep buttresses with rounded headed gaps between. Large buttress to centre. Small fixed spillway to far left (NW) with roadway oversailing on slender piers. Plain parapet to top integrated buttress heads.

Statement of Special Interest

Cruachan dam forms an A-group with Ben Cruachan power station (see separate listing). Ben Cruachan dam is a fine example of the work of prominent dam designer James Williamson, characteristic of a large suite of dams he designed for major hydro electric power schemes in Scotland. The dam forms an integral part of one of the most innovative hydro electric schemes in Britain and the first example of integrated pumped storage technology. The dam dominates the corrie below Ben Cruachan itself and creates a large reservoir. The development of the scheme was a key component of the North of Scotland Hydro Electric Board's (NoSHEB) plans to exploit the natural resources of Highland Scotland to generate electricity.

Cruachan was the penultimate of the major post-war hydro electric developments by the North of Scotland Hydro Electric Board (NoSHEB). The scheme played a key role in the realisation of the social agenda of NoSHEB by generating electricity which could be easily exported to the grid (via a connection at Windyhill on the fringe of Glasgow) and sold to the central belt. Revenue from the sale of the power financed the provision of electricity to remote north Highland communities on loss making schemes, and stimulated economic regeneration. Under the leadership of eminent chairman Sir Tom Johnston the board undertook developments throughout highland Scotland with a balance of social and economic schemes. This commitment saw the development of schemes in locations such as Loch Dubh near Ullapool and Storr Lochs on Skye.

The design of Cruachan Dam is typical of Williamson and Partners approach and uses buttress technology which was pioneered by James Williamson at Sloy Dam (see separate listing). The scale and degree of innovation behind the plans for Cruachan is characteristic of the skill of the firm and their long experience with hydro power and commitment to developing Scotland's resources for hydro electric power. Williamson had specialised in the design of dams following his work on the Galloway Hydro Electric scheme (see separate listings) in the 1930s. He acted as one of the chief engineering advisors to NoSHEB and was the lead engineer for a number of schemes before his death in 1953. After this date the company of James Williamson and Partners continued to be closely involved in the work of NoSHEB and were the lead team of engineers on a number of schemes, including Cruachan.

(Listed 2011 as part of Hydroelectric Power Thematic Survey)

References

Bibliography

National Archives of Scotland (NAS), Ref: NSE North of Scotland Hydro Electric Board Collection (1943 - 1990); NAS, Ref: NSE1 North of Scotland Hydro Electric Board Minutes (1943-1990); NAS, Ref NSE2 North of Scotland Hydro Electric Board Annual Reports (1943-1990); Peter Payne, The Hydro: A Study of the Development of the Major Hydro-Electric Schemes Undertaken by the North of Scotland Hydro-Electric Board (1988); Emma Wood, The Hydro Boys (2002), p178-79; J Miller, The dam builders: power from the glens, 2002, p230-40; F A Walker, The Buildings of Scotland: Argyll and Bute (2000) p375.

BEN CRUACHAN HYDRO ELECTRIC SCHEME, TURBINE HALL (LB51688)

Category
A
Date Added
11/02/2011

Local Authority
Argyll And Bute
Planning Authority
Argyll And Bute
Parish
Ardchattan And Muckairn

NGR
NN 07990 26720
Coordinates
207990, 726720

Description

James Williamson and Partners; George Rennie (resident engineer for North of Scotland hydro Electric Board technical panel); J B Armstrong (architect); 1959-65. Monumental underground barrel vaulted chamber forming turbine hall hollowed out from solid bedrock with long sloping vaulted access tunnel; additional chambers housing transformers and tunnels, one forming access roadway to machine hall. Large turbine hall 36 metres high, 90 metres long with viewing gallery to NE corner at upper level and concrete lined vaulted roof. Regularly spaced columns to N supporting track for overhead gantry cranes. Tiled floor. Control panels to S wall with large inlaid timber mural by Elizabeth Faulkner above to SE. Alternating timber panels and acoustic baffling panels of concrete consisting of regular geometric shapes to remainder of S wall. Offices to S including control room at upper level with projecting faceted timber and plate glass window overlooking turbine hall floor; transformer room and surge shaft to far S. Large overhead lighting panels with lights contained by panelled timber wings cantilevered from large central beam. Matt grey square ceramic tiles to entrance and replacement tiles to turbine hall.

ACCESS TUNNEL: vaulted vehicular access tunnel running for 1 kilometre from tunnel entrance. Terminating in round arched entrance to turbine hall lined with rectangular slate tiles. Pedestrian entrance to offices directly adjacent to left (E) with split slate tiles forming apron around doorway.

Statement of Special Interest

Ben Cruachan Turbine hall forms and A-group with Ben Cruachan Dam (see separate listing). Ben Cruachan turbine hall is a monumental engineering achievement and an integral part of one Britain's most innovative hydro electric power schemes and the first example of the use of reversible turbine pumped storage technology. The 3240 cubic metre turbine hall was hollowed out entirely from solid bedrock and is set deep within the side of the Ben Cruachan ridge. The turbine hall is accessed by a 1 kilometre long vehicular access tunnel. The lower end of the tunnel terminates in 'the crossroads' where secondary tunnels give access to visitors viewing gallery, transformer hall and surge shaft. The housing of a power station of this scale wholly underground in addition to secondary features such as transformers and pressure tunnels was pioneering and allowed for the development of a power station large enough to play a nationally significant role in energy supply in an area renowned for scenic beauty with very limited visual impact. The station exhibits a number of period design features dating from the 1960s including the timber artwork panel by Elizabeth Faulkner and careful attention to detail in lighting and acoustic design, all with imaginative uses of timber and concrete.

Cruachan was groundbreaking in its use of pumped storage when it was opened by the Queen in 1965, and still provides vital peak load capacity today. During periods of cheap electricity the turbines are run in reverse to pump water from Loch Awe back up into the reservoir, a process which provides 90% of the water used for generation by the station. Prior to the design of Cruachan pumped storage facilities had required separate pumps and a separate pipe network to pump water back into reservoirs, making them much more expensive to build than conventional hydro systems. The use of reversible turbines at Cruachan was highly innovative and removed the costly requirement for separate pumping infrastructure. The reversible technology was first developed in the 1930s, but Cruachan was one of the first large-scale applications in Europe. The Lünerseewerk station of 1958 in Austria pre-dates Cruachan, but has a smaller capacity of 232 MW. The technology became more widely used, in Britain and worldwide, from the later 1960s onwards with further schemes in Wales at Ffestiniog in 1963 with a 360MW station

The turbine hall houses four turbines capable of a combined capacity of 440MW with 2 sets generating at 120 MW and the original 2 at 100MW. Each set uses approximately 110MW of power to pump water back up to the dam (see separate listing). The station can move from standstill to full generating output in under 2 minutes,

compared to a time of several hours for a thermal power station. The station fulfils a key strategic requirement for the UK with the capability to produce enough power to re-start essential services nationwide (a so called 'Black Start').

Cruachan was the penultimate of the major post-war hydro electric developments by the North of Scotland Hydro electric Board (NoSHEB). The scheme played a key role in the realisation of the social agenda of NoSHEB by generating electricity which could be easily exported to the grid (via a connection at Windyhill on the fringe of Glasgow) and sold to Scotland's central belt. Revenue from the sale of the power subsidised the provision of electricity to remote north Highland communities on loss making schemes and stimulated economic regeneration. Under the leadership of eminent chairman Sir Tom Johnston the board undertook developments throughout Highland Scotland. This commitment saw the development of schemes in locations such as Loch Dubh near Ullapool and Storr Lochs on Skye. Johnstone's social aspirations ensured these schemes remained a key part of the NoSHEB development plan.

The design is typical of Williamson and Partners approach. James Williamson had completed a large number of innovative designs on behalf of NoSHEB, including developing the buttress dam which he first used at Loch Sloy (see separate listing) before his death in 1953. The scale and degree of innovation behind the plans for Cruachan is characteristic of the skill of the firm and their long experience with hydro power and commitment to developing Scotland's resources. Williamson had specialised in the design of dams following his work on the Galloway Hydro Electric scheme (see separate listings) in the 1930s. He acted as one of the chief engineering advisors to NoSHEB and was the lead engineer for a number of schemes before his death in 1953. After this date the company of James Williamson and Partners continued to be closely involved in the work of NoSHEB and were the lead team of engineers on a number of schemes, including Cruachan.

(Listed 2011 as part of Hydro Electric Power Thematic Survey)

References

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National Archives of Scotland (NAS), Ref: NSE North of Scotland Hydro Electric Board Collection (1943 - 1990); NAS, Ref: NSE1 North of Scotland Hydro Electric Board Minutes (1943-1990); NAS, Ref NSE2 North of Scotland Hydro Electric Board Annual Reports (1943-1990); Peter Payne, The Hydro: A Study of the Development of the Major Hydro-Electric Schemes Undertaken by the North of Scotland Hydro-Electric Board, (1988); Emma Wood, The Hydro Boys, (2002), p178-79; J Miller, The Dam Builders: Power from the Glens, 2002, p230-40; F A Walker, The Buildings of Scotland: Argyll and Bute (2000) p375.

FALLS OF CRUACHAN RAILWAY VIADUCT (LB50811)

Category
A
Date Added
01/02/2007

Local Authority
Argyll And Bute
Planning Authority
Argyll And Bute
Parish
Ardchattan And Muckairn

NGR
NN 07883 26824
Coordinates
207883, 726824

Description

John Strain, dated 1880. 3-arch, part-concrete railway viaduct with castellated parapet and cobelled-out retangular refuges to both sides flanking central arch. Bull-faced stone piers with mass-concrete arches; incised voussoirs and soffits. 41ft high central arch with span of 24ft; flanking arches of 19ft span. Stringcourse at base of parapet; raised central crenellation with coat of arms and date.

Statement of Special Interest

This well constructed and boldy detailed viaduct is the first on a British Railway to feature arches constructed from mass concrete, pre-dating the second at Killin by 5 years. Situated on steeply rising ground, the viaduct spans the small gorge created by the Falls of Cruachan from where it occupies a prominent position overlooking Loch Awe (although currently hidden by recent tree growth). The parapet crenellations support a steel safety-rail (2006).

In use during summer as part of the Glasgow to Oban Railway service.

References

Bibliography

2nd edition Ordnance Survey map (1898-1900). Gordon Biddle, Britain's Historic Railway Buildings (2003), p601, 602.

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