MEMO

ARCADIS Design & Consultancy for natural and built assets

SUBJECT
Prince Llewelyn Reservoir – Ecology constraints Memo

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FROM
Alex Ellis

Ecology Constraints Memo

1. Introduction

1.1 Overview

Arcadis Consulting (UK) Ltd (Arcadis) has been asked to provide Natural Resources Wales (NRW) with an updated summary of ecological survey findings and likely constraints at Prince Llewelyn Reservoir, Snowdonia. Arcadis undertook a high-level ecological constraints survey of the land within the red line boundary on 13th March 2020, and a review of a previous environmental report to assess whether the conditions reported in the December 2015 Preliminary Ecological Appraisal report produced by Mott Macdonald had changed in the last four years. The main findings of the ecological desk study and field survey are set out below.

1.2 Site Location

Prince Llewelyn Reservoir is located in Snowdonia National Park (Grid Reference SH 74275 53057), approximately 3.7km to the south west of Betws-y-Coed. The land use within the immediate surrounding area is predominantly managed coniferous woodland and upland agricultural land. The site can be accessed via a gated forestry gravel track.

1.3 Details of the Proposed Development

NRW is planning to decommission the reservoir by removing the top section of the dam (c. 2.6m) such that the silt within the reservoir is retained. NRW currently undertake regular manual water releases at the dam to avoid over-topping and to regulate levels and have also installed pumps to control the water levels in flood conditions.

The works will involve

- Vegetation clearance of the embankment, and spillway (no tree removal required).
- Create temporary cofferdam alongside the western edge of the dam, to create dry working area for the construction work.
- Removal of the top section of the dam (c. 2.6m)
- Remove cofferdam and over-pumping works following completion of works.

The discharge point is to remain in the same location as the current water release point.

2. Methodology

2.1 Desk Study

The Multi-Agency Geographic Information for the Countryside (MAGIC) (Ref 1) website was reviewed in March 2020 to obtain information on designated sites within 2km of the proposed Development site and 10km for any Special Areas of Conservation (SACs) for which bats are one of the qualifying features.

The Lle Geo-Portal Ancient Woodland Inventory (Ref 2) was reviewed in March 2020 to identify any areas of ancient semi-natural woodland, restored ancient woodland and / or plantation on an ancient woodland site within 500m of the proposed Development site.

The previous environmental report (Ref 3) was reviewed for information on the ecological constraints present within the site. The Preliminary Ecological Appraisal report was produced by Mott MacDonald in December 2015.

2.2 Field Survey

2.2.1 Constraints Survey

A high-level ecological constraints survey was undertaken on 13th March 2020. This comprised a walkover survey of the site to identify any potential ecological constraints applicable to the proposed Development. The habitats were assessed for their potential to support protected / notable species of plants and / or animals and observation was made of any incidental signs of protected / notable species. The need for any further targeted surveys was also identified.

3. Results

3.1 Desk Study

3.1.1 Designated sites

The desk study revealed that there are no statutory designated sites within 2km of the site. However, two SACs were identified within 10km of the proposed development which are designed for their bat interest. Table 1 below details two SACs designated for bats within 10km of the site.

Table 1: SACs for bats within 10km of the proposed Development site.

Site name	Location in relation to the proposed Development	Site description / reason for selection
Mwyngloddiau Fforest Gwydir/ Gwydyr Forest Mines	7km north east	The site is designated primarily for its importance in supporting Annex I habitats, Calaminarian grasslands of the *Violetalia calaminariae*. However, the site is also noted for the presence lesser horseshoe bat (*Rhinolophus hipposideros)*, which form a qualifying feature of the designation of this site (Ref 4).
Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites	8km west	This site is designated for its importance in supporting a range of Annex I habitats, from Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation to Alluvial forests with Alder (*Alnus glutinosa)* and European Ash (*Fraxinus excelsior)* (AlnoPadion, Alnion incanae, Salicion albae) as well as old sessile oak woods with *Ilex* and *Blechnum* in the British Isles. Annex II species, lesser horseshoe bat, are a primary reason for designation (Ref 5).

3.1.2 Ancient Woodland Inventory Review

There are no areas of ancient woodland within 500m of the proposed Development site.

3.1.3 Previous Environmental Report

The previous environmental report (Appendix 2) identified habitats with the potential to support breeding birds, bats, and common species of reptiles and amphibians within the site and surrounding area. Several common bird species were noted during the 2015 site visit, these included: blackbird (*Turdus merula*), coal tit (*Periparus ater*), long-tailed tit (*Aegithalos caudatus*) and robin (*Erithacus rubecula*). In addition, a common frog (*Rana temporaria*) was also recorded. No mammals or invasive species were observed. Devil's Bit-Scabious (*Succisa pratensis*), the food plant of Marsh Fritillary Butterfly (*Euphydryas aurinia*) was recorded within the woodland bordering the north, east and west of the

reservoir.

The desk study reported several records of otter (*Lutra lutra*), bats, badger (*Meles meles*), polecat (*Mustela putorius*) and stoat (*Mustela erminea*), common amphibian and reptile species and numerous rare and common bird species within 2km of the surrounding area.

The previous report refers to the dam as a stone abutment/culvert.

3.2 Field Survey

The walkover survey identified a number of ecological constraints within the survey area. These are described below, with plates presented in Appendix 1.

3.2.1 Habitats

The habitats identified within the survey area included coniferous plantation woodland, scattered trees (coniferous and broad-leaved), standing water (reservoir) (Plate 1), stone dam (Plate 2 and 3) and several areas of hardstanding.

There were several differences between the habitats present on site during the visit and those shown on the previous Phase 1 plan. These were:

- The area of broadleaved parkland / scattered trees directly to the west of the dam in 2015 was now marginal aquatic vegetation (Plate 4) including Soft-rush (*Juncus effusus*), Frogbit (*Hydrocharis morsus-ranae*) and Floating Sweet-grass (*Glyceria fluitans*).
- The area of cultivated / disturbed land – ephemeral/short perennial in 2015 was now hardstanding.
- The dry ditches in 2015 were now running water (Plate 5 and 6).
- An area of Coniferous woodland in 2015 between the access track and the dam was felled a year ago (Plate 7 and 8).
- An area of Coniferous woodland to the south-east of the reservoir to the west of the access track was felled in the week commencing 2nd March to accommodate the compound for these works (Plate 9).

3.2.2 Flora

Invasive Species

One stand of Rhododendron (*Rhododendron ponticum*) was recorded to the north of the reservoir, outside of the proposed works boundary (Plate 10). In addition, a patch of Japanese Knotweed (*Fallopia japonica*) was recorded alongside the access track (Plate 11), this had been treated by NRW and had been fenced off with the appropriate signage (Plate 12).

3.2.3 Fauna

Invertebrates

The habitats on site were assessed as offering limited value for invertebrates. Devil's Bit Scabious was not recorded, but the survey was undertaken at a sub-optimal time of year to observe this species.

Fish

It is believed that fish are present within the reservoir, though there is currently no opportunity for them to migrate downstream.

Amphibians

The woodland, scrub and stone dam were assessed as offering potential to support both foraging and hibernating common species of amphibians.

Reptiles

The woodland, scrub and stone dam were assessed as offering potential to support both foraging and hibernating common species of reptiles.

Birds

The trees, scrub, and bracken were assessed as offering suitable nesting habitat for common bird species.

Bats

The woodland, scattered trees and stone dam offered potential for roosting bats (Plate 13 and 14). The site was assessed as providing optimal habitat for foraging and commuting bats.

Otter

The reservoir and its associated watercourse habitats were suitable for commuting, feeding and resting otters and there are several other waterbodies within 2.5km of the reservoir. No field signs of otter were recorded on site and no holts or lying up sites recorded. However, NRW have recorded camera trap footage of a pair of otters without cubs using the reservoir since 2015 (pers comms).

Badger

The woodland was assessed as suitable to support badger. No field signs of badger were recorded on site and no setts found. However, NRW have recorded camera trap footage showing badger using the site for foraging since 2015 (pers comms).

Other mammals

The coniferous plantation woodland alongside the site was assessed as suitable to support polecat (*Mustela putorius*) and stoat (*Mustela erminea*).

4. Ecological Assessment

Habitats within the proposed Development site have the potential to support invertebrates, breeding birds, bats, badger, otter, reptiles, fish and common species of amphibians.

Since the 2015 report vegetation clearance has been undertaken to facilitate the works at the dam, including the felling of an area of woodland alongside the access track to accommodate the works compound and an area of woodland between the access track and the dam to provide access for the works. In addition, there has been some vegetation clearance along the western edge of the dam.

The site is within 7km of Mwyngloddiau Fforest Gwydir/ Gwydyr Forest Mines SAC and 8km of Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites SAC which are both designated for the presence of lesser horseshoe bats. It is considered that given the scale of the proposed works it is unlikely that there would be an impact on the bat populations supported by these sites.

The water levels within the reservoir will be significantly reduced due to the works, this will reduce the suitability of the site to support otters. A temporary coffer dam will be implemented at the western edge of the dam to allow the works to progress.

The removal of the top section of the dam will remove potential roosting habitats for crevice dwelling bats.

5. Recommendations

Further surveys, mitigation and enhancement measures are recommended to minimise the potential effects of the proposed Development on ecological receptors. These include the following:

- Habitats Regulations Assessment screenings (Test of Likely Significance, ToLS) should be undertaken for each of the bat SACs within 10km, to ensure that there will be no impact from the proposed works.
- The site has the potential to support foraging and commuting bats. The potential foraging and commuting habitat being affected is a small percentage of the available habitat in the wider area. No trees are being felled. Therefore, it is considered that the removal of these habitats

would have a limited effect on the local bat population and so no further surveys are recommended.

- A pre-construction check of the stone dam should be carried out to identify and confirm if the gaps in the stonework support bat roosts. These only occasionally offer roosting potential, due to flooding). These would involve a day-time visit by appropriately trained ecologists to check the gaps with a fibrescope. The data gathered from these surveys would be used to inform any detailed avoidance or mitigation measures and if there is a requirement for a European Protected Species licence to cover the removal of the top layer of the dam.
- Where the removal of Devils Bit-Scabious, cannot be avoided during works, it is recommended that surveys for the larval webs of Marsh Fritillary Butterfly are undertaken. These surveys can be undertaken during March and early April, and late August and September, when the larvae have hatched and are feeding. Where larval webs and caterpillars are discovered, then consultation with the NRW local officer should be sought and an NRW licence would be required. Mitigation, such as vegetation translocation of $1m^2$ turf, may be recommended by NRW.
- If vegetation removal is required during the bird nesting season (which generally extends from early March to late August), any vegetation or section of stone dam proposed for removal would be subject to a pre-construction check for the presence of nesting birds no more than 48 hours prior to removal. If nesting birds are found to be present, then a suitable buffer zone (determined by the site ecologist) would be implemented and work in this area avoided until nesting is complete and any chicks have fledged.
- Pre-construction checks to confirm the continued absence of badger setts and otter holts.
- Pre-construction check to confirm the continued absence of non-native invasive species within the works area.
- a fish and eel rescue may be required in the coffer dam, and in the wider reservoir if sufficient water levels to support the fish population are not maintained.
- Ecological method statement and ecological supervision for any scrub removal to ensure no reptiles or amphibians are harmed and to ensure appropriate timings are incorporated into the programme.
- To avoid disturbance to foraging and commuting bats and badgers, there should be no night-time working. If this is not possible temporary lighting can only be used if shielded and directed away from neighbouring habitat to prevent light spill.
- The implementation of standard good practices and pollution control measures during site clearance and construction would ensure that the wider landscape is not adversely affected by dust, uncontrolled surface water run-off, inappropriate storage of materials and inappropriate refuelling of machinery (Ref 6 and 7).
- In the unlikely event of open excavations being required during the decommissioning works, these should be covered at night to prevent any nocturnal wildlife such as badgers from becoming trapped. If this is not possible ramps comprising boards or soil should be provided to allow animals to escape.
- As trees have been previously removed then the loss of bat foraging habitat and commuting habitat should be compensated for through the re-planting of trees of the same species, or native broad-leaved trees, and the installation of bat boxes.

6. Opportunities

The following opportunities for the inclusion of biodiversity enhancement and mitigation have been identified for the site. These would ensure that the development provided a net gain for biodiversity as well as compliance with the biodiversity policies of the Welsh Government (Ref 8) and Snowdonia National Park (Ref 9).

- Installation of bat boxes and bird boxes in the woodland on the site would provide additional nesting / roosting habitat.

- NRW are planning the creation of additional pools of water downstream of the reservoir to mitigate for otter as the water level will be reduced significantly.

7. References

Ref 1: MAGIC, 2014. Magic Interactive Mapping Application. Accessed online in July 2019: http://www.magic.gov.uk/MagicMap.aspx

Ref 2: Lle Geo-Portal Ancient Woodland Inventory, 2011. Data Set. (http://lle.gov.wales/map#m=-2.69743,51.64513,15&b=europa&l=60;) [Accessed in July 2019]

Ref 3: Mott McDonald for NRW, 2015. Preliminary Ecological Appraisal. Prince Llewelyn Reservoir. Mott McDonald, Cardiff

Ref 4: Natural Resources Wales (formerly Countryside Council for Wales), 2002. Mwyngloddiau Fforest Gwydir/ Gwydyr Forest Mines SAC Citation. Accessed in March 2020 https://naturalresources.wales/media/631228/SAC_UK0030161_Register_Entry001.pdf

Ref 5: Natural Resources Wales (formerly Countryside Council for Wales), 2002. Coedydd Derw a Safleoedd Ystlumod Meirion/ Meirionnydd Oakwoods and Bat Sites SAC Citation. Accessed in March 2020 https://naturalresources.wales/media/629644/SAC_UK0014789_Register_Entry001.pdf

Ref 6: CIRIA, 2001. Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors (C532).

Ref 7: Kukadia, V., Upton, S., and Hall, D., 2003. Control of dust from construction and demolition activities. Building Research Establishment

Ref 8: Welsh Government. 2016. Environment (Wales) Act. Welsh Government

Ref 9: Snowdonia National Park Authority. 1997. Snowdonia Local Biodiversity Action Plan. Snowdonia Wildlife Forum. Accessed in March 2020 https://www.snowdonia.gov.wales/looking-after/biodiversity/local-action-plan

Appendix 1: Photographic Record

Plate 1: Reservoir looking north

Plate 2: Eastern edge of dam

Plate 3: Eastern edge of dam

Plate 4: Marginal aquatic vegetation along west edge of dam

Plate 5: Running water

Plate 6: Running water downstream from dam

	
Plate 7: Felled area between access track and dam	**Plate 8:** Felled area between access track and dam
	
Plate 9: Felled area alongside access track – proposed for compound	**Plate 10:** Rhododendron
	
Plate 11: Treated Japanese Knotweed	**Plate 12:** Japanese Knotweed Signage

	
Plate 13: Gaps in stonework – potential for roosting bats	**Plate 14:** Gaps in stonework – potential for roosting bats

Appendix 2: Mott Macdonald (2015) Preliminary Ecological Appraisal Report