

Ynysarwed Mine Water Treatment Works Reedbed GCN eDNA & Manual Survey File Note

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Prepared by Jacob Middleton	Checked by Laura Jones	Approved by Kevin Webb	Issued by Ursula Jones
Updated by Anna Parry	Approved by Kevin Webb	Issued by Ursula Jones	

Introduction

AECOM were commissioned by the Coal Authority to determine the presence or likely absence of great crested newt *Triturus cristatus* in the reedbed in the south west of the Ynysarwed Mine Water Treatment Works ('the Site'), Neath Port Talbot.

Suitable great crested newt terrestrial habitat was identified in the reedbed by a previous consultancy; however, no records of great crested newt from within 1 km of the Site were returned from the local records centre (RSK, 2019).

Therefore, an estimation of a Habitat Suitability Index (HSI) to assess the suitability of the reedbed to support great crested newt and eDNA water sampling of the reedbed was undertaken by AECOM on 22 April 2020 to determine the presence or likely absence of great crested newt.

In addition, two manual surveys were performed- once on 22 April 2020 and once on 05 May 2020.

This File Note provides a summary of background information, an outline of the methodology and results of the HSI and eDNA assessment in the reedbed.

This File Note is for reedbed only. A file note assessing the suitability of the Ynysarwed Farm pond has been produced separately (AECOM, 2021a). Please refer to the Ecological Constraints and Opportunities Report (AECOM, 2021b) for further recommendations.

Site Location and Description

Ynysarwed Mine Water Treatment Works is located off the B4242, south west of Abergarwed in the county of Neath Port Talbot (NGR: SN 80863 01725). The reedbed is located towards south-west of the Site and lies between the A465 and River Neath to the South (Figure 1). The reedbed is approximately 1.9 ha and surrounded by woodland and scrub. The reedbed was the passive treatment scheme of the Site. The habitat is dominated by common reed *Phragmites australis* (Appendix A: Photograph 1).

Quality Assurance

The survey and subsequent report were undertaken in line with AECOM's Integrated Management System (IMS). Our IMS places great emphasis on professionalism, technical excellence, quality, environmental and Health and Safety management. All staff members are committed to maintaining our certification to the international standards BS EN ISO 9001:2015 and

14001:2015 and BS OH SAS 18001:2018. In addition, our IMS requires careful selection and monitoring of the performance of all sub consultants and contractors.

Methodology

Habitat Suitability Index (HSI) Assessment for Great Crested Newt

An HSI assessment of the reedbed was undertaken. The HSI assessment was undertaken in line with the approach outlined in Amphibian and Reptile Group (ARG) UK Advice Note 5, 2010.

The HSI was developed by Oldham et al. (2000). It is a measure of habitat suitability for great crested newts. It is not a substitute for manual surveys. In general, water bodies with high HSI scores are more likely to support great crested newt than those with low scores. However, the system is not sufficiently precise to allow the conclusion that any particular water body with a high score will support newts, or that any water body with a low score will not do so. However, when used in conjunction with information collected from the ecological desk study and local record centres, HSI can provide a good indication of the likelihood for a pond to support great crested newt.

There is also a positive correlation between HSI scores and the numbers of great crested newt observed in water bodies. So, in general, high HSI scores are likely to be associated with greater numbers of great crested newt. However, the relationship is not sufficiently strong to allow predictions to be made about the number of newts in any particular water body.

HSI scoring can be useful in:

- Evaluating the general suitability of a sample of ponds for great crested newt;
- Comparing general suitability of ponds across different areas; and,
- Evaluating the suitability of receptor ponds in a proposed mitigation scheme.

Categorisation of HSI Scores

ARG has developed a system for using HSI scores to define water body suitability for great crested newts on a categorical scale:

HSI Water Body Suitability:

- <0.5 = Poor;
- 0.5 – 0.59 = Below Average;
- 0.6 – 0.69 = Average;
- 0.7 – 0.79 = Good; and
- > 0.8 = Excellent.

The HSI assessment was undertaken by experienced AECOM ecologists (ACIEEM and MCIEEM) on 22 April 2020.

eDNA Sampling – Great Crest Newt Presence/Absence

eDNA sampling of the reedbed was undertaken on 22 April 2020 to determine the presence or likely absence of great crested newt. This was undertaken by an experienced AECOM Ecologist with a Natural Resources Wales (NRW) great crested newt licence.

eDNA sampling was completed following the methodologies provided in Biggs *et al* (2014). The eDNA kit was purchased from ADAS.

A total of 20 water samples were taken from five locations around the water body as described in the instructions provided by ADAS and per Biggs *et al* (2014).

Samples were stored in accordance with the instructions provided by ADAS and sent to ADAS for analysis. Care was taken at all steps in the procedure to avoid contamination of samples.

Manual Surveys

Under the conventional methodology current best practice (Natural England, 2013) states that surveyors should, under a class survey licence for great crested newts, conduct a total of four visits to determine the presence of great crested newts in potential breeding ponds using at least three of the following four established techniques (if presence is confirmed this rises to six visits to gain a population estimate):

- Bottle trapping: Set bottle traps around the margin of the water body in the evening and leave over overnight to catch adults during the breeding season. Set traps at an appropriate density of one trap per two metres of shoreline dependent upon individual site variations.
- Torching: surveyors walk around the perimeter of the water body (where access was possible), checking for newts in the torch beam using a high-powered torch every 2-3 metres, paying particular attention to marginal vegetation and potential display areas on the bottom of the reedbed.
- Netting: Use a sturdy dip-net with a 2-4 mm mesh to net for fifteen minutes per 50 m of pond shoreline. Care should be taken not to damage larvae, which need to be handled very carefully.
- Egg searching: Check submerged and floating aquatic vegetation to locate great crested newt eggs. Egg searches are terminated when presence of great crested newt egg(s) is confirmed.

Surveys should take place between mid-March and mid-June, with at least two visits between mid-April and mid-May (three to gain a population estimate).

Manual surveys were undertaken by two ecologists (including an NRW licensed ecologist) on 22 April 2020 and 05 May 2020.

Limitations

Dense scrub vegetation and very low water levels resulted in surveyors being unable to access approximately 90% of the reedbed perimeter for eDNA survey. It is estimated that 95% of the reedbed itself is very shallow (comprising entirely of dense *Phragmites australis* vegetation), due to its function as a filtration bed.

The eDNA sample that was sent to the lab had a "high sediment" content (see full report (AECOM, 2020c) for reasons why sediment should be avoided in sample). Surveyors noted that the water contained orange sludge around the northern edge (filtration outflow area).

It was not possible to undertake bottle trapping, egg searching or netting during the manual surveys due to restricted access (dense vegetation) and very low water levels. As a result, only two manual surveys were undertaken. The justification as to why this is not considered a significant limitation is provided in this report, following the results of the surveys.

Results

Habitat Suitability Index Assessment

The HSI score for the reedbed and its suitability categorisation is shown in Table 1.

Table 1. HSI Assessment Score

Pond Name	HSI Score	HSI Categorisation
Reedbed	0.67	Average

The HSI assessment indicates the reedbed has an 'average' suitability for supporting great crested newt.

In general, ponds with high HSI scores are more likely to support great crested newt than those with low scores. However, the system is not sufficiently precise to allow the conclusion that any particular pond with a high score will support newts, or that any pond with a low score will not do so.

eDNA Sampling – Great Crested Newt Presence/Absence

The eDNA results were returned from the laboratory as 'indeterminate' from the sample submitted. There was evidence of degradation in the sample, consequently, the eDNA results do not confirm the presence or likely absence of great crested newt.

A copy of the laboratory results sheet is included in Appendix B.

Manual Surveys

No great crested newts were recorded during manual (torching) surveys.

No other amphibians were observed within the reedbed. Common aquatic invertebrates and *Gasterosteidae* sp (Stickleback) were recorded.

It was not possible to undertake bottle trapping, egg searches or netting (see Limitations section).

Conclusion

The conclusion of the surveys for great crested newt in the reedbed are as follows:

- The HSI assessment score was 0.67 and indicates the reedbed has an 'average' suitability for supporting great crested newt. HSI is a measure of habitat suitability for great crested newts. However, the system is not sufficiently precise to allow the conclusion that any particular water body with a high suitability score will support newts, or that any water body with a low suitability score will not do so.
- The eDNA results were returned from the laboratory as 'indeterminate' from the sample submitted. There was evidence of degradation in the sample, consequently, the eDNA result does not confirm the presence or likely absence of great crested newt and has to be discounted. As the reedbed contains suspended solids and metals, this is also likely to make the reedbed unsuitable for great crested newt and successful great crested newt breeding.
- No great crested newts were recorded during manual surveys. No other amphibians were observed within the reedbed. On visit one (and subsequently visit two), the waterbody did not contain enough water for robust bottle trapping or netting, the sludge substrate inhibited access for egg searching and the turbidity limited the value of torch light surveys. The second survey was undertaken following the 'average' result of the HIS assessment, and following a period of a few days heavy rain, to assess if the water levels had increased; but they had not. Based on professional experience, if conditions are such, in addition to making a robust survey difficult, it also suggests that conditions would not be optimal for great crested newt.

Following the second visit, taking all available information into account (eDNA, HSI, potential contamination, pond likely to be very low/dry out during breeding season, nil manual survey results, local desk study information) and the professional judgement of the surveying NRW great crested newt licenced ecologist, it was concluded that the reedbed was not capable of supporting great crested newt. Surveys were therefore stopped after two visits.

References

AECOM (2021a). Ynysarwed Mine Water Treatment Works Pond GCN eDNA & Manual Survey File Note. April 2021.

AECOM (2021b). Ynysarwed Mine Water Treatment Works Ecological Constraints and Opportunities Report. April 2021.

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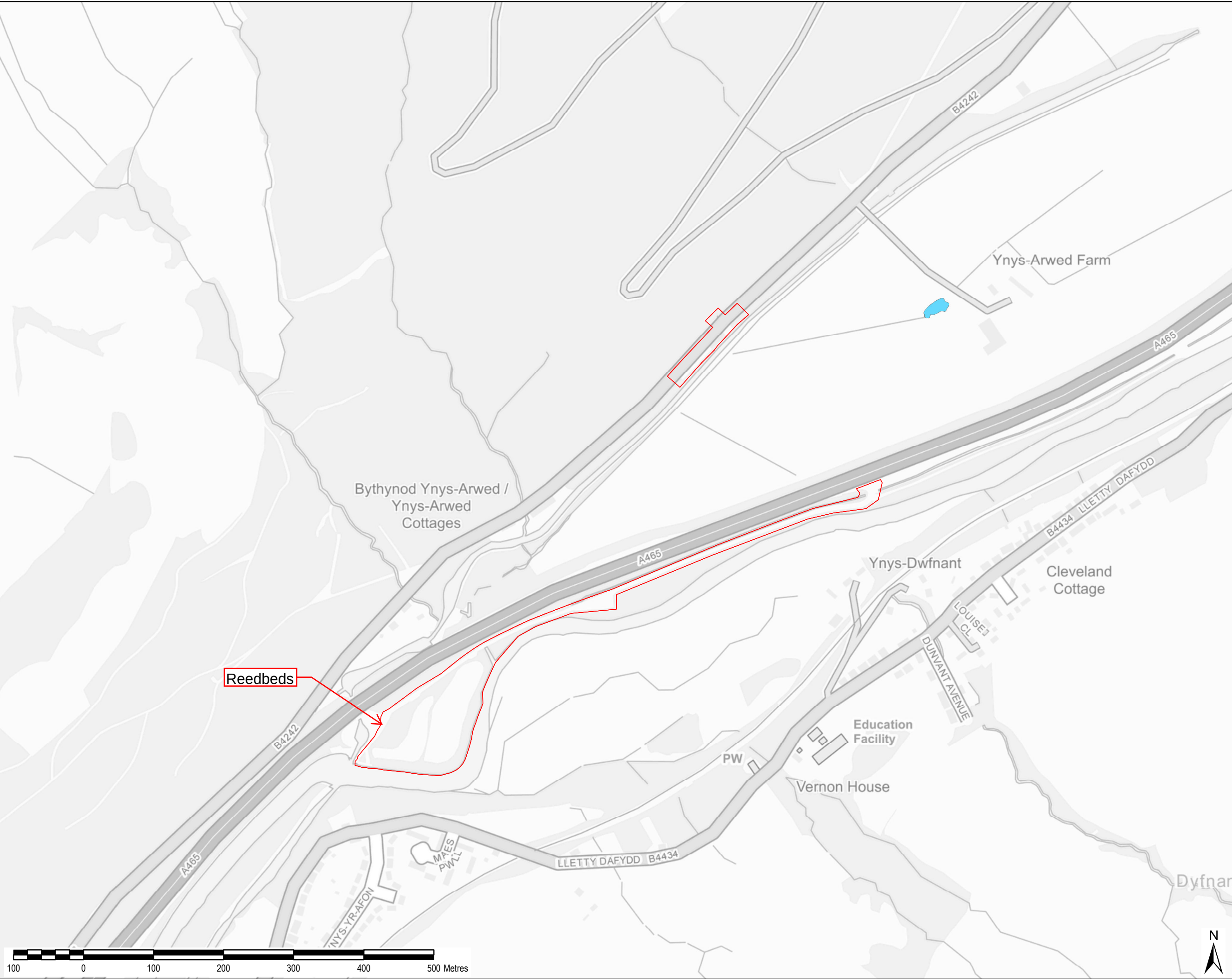
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Natural England (2013). Standing Advice Species Sheet: Great crested newts.

Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000). Evaluating the suitability of habitat for the Great Crested Newt (*Triturus cristatus*). Herpetological Journal 10(4), 143-155.

RSK (2019). Ynysarwed, Neath - Preliminary Ecological Appraisal.

Figure 1. Site Boundary



AECOM Limited
1 Callaghan Square
Cardiff, CF10 5BT
+44 (0)29 2067 4600 tel
www.aecom.com

Project Title:

YNYSARWED MINE
WATER TREATMENT
SCHEME

Client:

THE COAL AUTHORITY

LEGEND

- Project Boundary
- Pond

Copyright:

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Ordnance Survey 0100031673

AECOM Internal Project No:

60624809

Drawing Title:

SITE LAYOUT

Scale at A3: 1:5,000

Drawing No:

Rev:

FIGURE 1

A

Drawn: Chk'd: App'd: Date:

GM ST AP 12/04/21

Appendix A Site Photographs



Photograph 1: Northern edge of reedbed.



Photograph 2: Channel flowing into reedbed.



Photograph 3: Scrub habitat surrounding south of reedbed.

Appendix B eDNA Results
