

Llanishen Reservoir licence variation supporting information

Justification for requested abstraction licence to support refill of Llanishen reservoir

1. Purpose

This technical note is in support of a licence variation application to licence number 21/57/12/0033.

Dŵr Cymru Cyfyngedig (DCWW) submitted a licence variation request on 01 June 2018 to allow Llanishen reservoir to be filled from the Nant Fawr and Nant Glandulais under licence number 21/57/12/0033 (herein referred to as “application 1”). A further pre-application (“application 2”) was submitted to enquire about the feasibility of increasing the licenced abstraction volume during periods of high flows to reduce the refill time of Llanishen reservoir. Following the pre application response this current licence variation application has been submitted (application 3).

2. Background

The previously submitted application 1 and the pre application, application 2, contains background information on the current and proposed operation of Llanishen and Lisvane reservoirs.

2.1. Previous licence variation application 1

Licence number 21/57/12/0033 allows an annual volume of 2045 MI/annum from the Nant Fawr and Nant Glandulais to feed Lisvane reservoir. Application 1 requested the following variations to allow Llanishen reservoir to be filled under the existing licence:

1. Change of purpose of water from public water supply to industrial water supply and recreational use to reflect current and future use of the reservoirs;
2. Addition of Llanishen reservoir to the licence as a receiving reservoir;
3. Removal of Llanishen Brook intake since it is no longer in use.

The variations requested in this application, 3, are requested in addition to application 1 which was granted on 10th May 2019.

3. Requested licence variation for refill period

Following the pre application response DCWW requests an additional abstraction amount of 500 MI/annum for the duration of the refill of Llanishen reservoir.

The Llanishen reservoir refill period is expected to begin in January 2020 and be completed by summer 2021 at the latest. The target date for the completion of the refill is spring 2021. Once Llanishen reservoir is full,

the higher rate of abstraction will cease and we will revert to current abstraction rates. Therefore we would like to have a time limited variation that covers the refill period.

3.1. Rationale for additional volume

The additional 500 MI/annum is based on a refill mass balance that would give a high probability of the refill being completed by summer 2021. The figures considered in the mass balance are as follows:

- Current annual licence = 2045 MI/annum
- Volume reserved for industrial customer supply = 1544 MI/annum (1st April to 31st March)
- Remaining licenced volume for refill with no licence variation = 501 MI/annum
- Empty Volume of Llanishen reservoir = 1275 MI
- Number of licence years required for refill with no licence variation = 3 years (Apr to Mar)

Based on the above figures, it would take three licence years to refill Llanishen with no increase in licence volume (this is subject to water availability in the catchments). The refill is planned to begin in January 2020, so the first licence year of the refill will be the current licence year, April 2019 to March 2020, and the final year will be April 2022 to March 2023. This would mean that the final 500 MI of refill would be during summer 2022, which is when the reservoir is planned to be opened to the public.

An additional 500 MI/d annum would allow the refill to be completed in two licence years (subject to water availability in the Nant Fawr and Nant Glandulais), so the final part of the refill is more likely to be in the spring before the planned opening to the public in summer 2021. There is strong support for refilling the reservoir as quickly as possible, without detrimentally impacting on the environment, from welsh government to allow recreational activities to start as early as possible. This s

The additional volume will allow us to fill Llanishen in a steady and continuous manner. This is important as extended periods of no refill will allow vegetation to regrow on the banks of the reservoir. This vegetation may create new temporary habitat for nesting birds that has previously prevented refill and may therefore extend the refill programme. We would like to avoid this additional delay.

3.2. Infrastructure capability

Maximum intake rate

Preliminary hydraulic assessments of the intakes suggest that the new intake structure on the Nant Fawr, when the Go Flow screen is installed, is designed to abstract at a rate of 23 MI/d when the river is at Q10.

The combined Nant Glandulais intakes are believed to be able to take 22.5 MI/d however recent modelling has shown that if flows exceed a combined rate of 7.7 MI/d the water will surcharge back into the Nant Glandulais at the bottom of the supply main at the structure known as the mushroom which is adjacent to Lisvane reservoir. Further work is being carried out on the supply mains to allow the Glandulais intakes to be utilised under all flow conditions. Once this work has been completed we will be able to test the system further. If the supply main is restricted to 7.7MI/d we will look to operate the individual intakes so that they do not cause the mushroom to surcharge and therefore we will limit our abstraction to 7.7 MI/d.

Hands off flow requirement

It is understood that an increase in abstraction amount will be subject to a hands off flow requirement. DCWW are able to install infrastructure on the Nant Fawr to maintain a hands off flow; however the Glandulais intakes would need more significant works to enable this. These works are currently ongoing however they are unlikely to be completed by spring 2020 as there are complications surrounding ongoing impoundment licence negotiations to allow for modifications to the Nant Glandulais intakes. DCWW would prefer the additional volume to be from the Nant Fawr, as per your Pre app response.

4. Further licence variation to be requested at a later date for the “business as usual” period

DCWW will, at a later date, apply for an additional variation to the abstraction licence to come into effect once the refill period is complete. It is acknowledged that further investigation is required on the Nant Glandulais to confirm whether a hands off flow is required and at what flow it should apply. DCWW will work

with NRW over the refill period to collect the data required to determine the hands off flow requirement. The modifications currently being carried out on the Nant Gladulais intakes will allow for a hands off flow to be measured if required.

This licence variation request will likely include the following items subject to the potential time limiting of the variations listed above:

- Purpose of water to be industrial water supply. However, DCWW would look to NRW to advise whether recreational use needs to remain on the licence. Once Llanishen reservoir is full, all further abstraction is simply to top up outflow for the industrial customer.
- Maintenance of both Llanishen reservoir and Lisvane reservoir as receiving reservoirs;
- Hands off flow for Nant Glandulais to be set to a level as required by NRW following WFD assessment of the river.
- Hands off flow for Nant Fawr to be Q96 (as per the ongoing HMWB project) unless the hands off flow requirement for the Nant Glandulais reduces deployable output to below the industrial customer's demand. In this scenario, it is unlikely to be cost beneficial for DCWW to implement the HMWB recommendation of a Q96 on the Nant Fawr.

5. Summary

DCWW aims to refill Llanishen reservoir over the period from January 2020 and spring 2021 to enhance raw water resilience and public amenity in the Cardiff area. To achieve this, DCWW is requesting a time limited variation to licence no. 21/57/12/0033 to allow an additional 500 Ml/d per year to be abstracted to refill Llanishen reservoir from the Nant Fawr and Nant Glandulais.

During the refill period, DCWW will apply for another licence variation to come into effect once the refill period is finished. This will support the future “business as usual” operation of Llanishen and Lisvane reservoirs for industrial water supply and public amenity. DCWW will support the investigation of the ecology and hydrology of the Nant Glandulais during the refill period to confirm the ongoing hands off flow requirements.