Infrastructure Capacity, Wastewater Treatment Context and Nutrient Loading Assessment

Planning Application - **P/2025/0824 - Croft Cottage**

The applicants wish to thank Natural Resources Wales (NRW) for their consideration of the proposal and acknowledge the statutory role it performs in safeguarding the ecological integrity of the River Dee and Bala Lake Special Area of Conservation (SAC).

The proposal comprises the conversion of an existing ancillary building within the established residential curtilage of Croft Cottage into a single dwelling. The scheme is therefore of a genuinely minor scale, involving a change of use within an existing built footprint and introducing no commercial, tourism, or intensively loaded wastewater generating activity.

The applicants fully recognise the sensitivity of phosphorus concentrations within the River Dee catchment and the requirements of the Conservation of Habitats and Species Regulations 2017 (as amended). In this context, the submitted nutrient budget assessment has been undertaken on a precautionary basis using the All-Wales Nutrient Budget Calculator.

The assessment identifies a net increase of approximately 0.026 kg Total Phosphorus per annum (26 grams per annum). This represents a very small marginal increase in loading, arising from a single residential unit, and must be interpreted within the context of the existing regulated wastewater treatment pathway.

A load of 0.026 kg Total Phosphorus per annum (26 g/year) is extremely small in practical, environmental, and domestic terms. To make it more intelligible, it helps to translate it into familiar or policy-relevant comparisons.

1. Everyday household scale (detergent context)

Historically, phosphate-based detergents contained relatively high phosphorus concentrations. Even modern phosphate-free or low-phosphate products still involve trace phosphorus contributions.

- 26 g/year is broadly comparable to:
  - a few washing machine cycles worth of legacy detergent phosphorus input (historically phosphate-based products), or
  - roughly the phosphorus contained in a very small number of heavily dosed dishwasher or laundry detergent uses under older formulations.

In other words, it is closer to minor variation in household cleaning product usage across a year than a distinct, identifiable new pollution source.

2. Human waste equivalence (contextual biology)

An average adult typically excretes approximately 0.5–1.0 kg of phosphorus per year through urine and faeces (varies with diet).

- 26 g/year therefore represents:
    - about 2.5–5% of one person's annual phosphorus excretion, or
    - roughly 10–20 days of a single adult's natural biological phosphorus output.

This illustrates that the figure is small even relative to a single individual's baseline biological contribution, let alone a full household system.

3. Wastewater treatment scale (engineering context)

At wastewater treatment works level:

- Facilities typically handle tons of phosphorus per year (i.e., 1,000 kg+ annually, depending on catchment size).
- 26 g/year is therefore:
    - several orders of magnitude below operational variability, and
    - effectively indistinguishable from routine fluctuations in influent loading.

4. Visual analogy (policy communication)

- 26 g of phosphorus is roughly equivalent to:
    - a small handful of salt-sized material spread across an entire year, or
    - a trace contaminant level more typical of analytical rounding than a discrete loading source in catchment-scale modelling.

All foul drainage from the development will discharge to the public sewerage system. Dŵr Cymru Welsh Water, in its statutory consultation response, confirms that capacity exists within the public sewerage network to accommodate domestic foul flows from the proposed development, and raises no objection in principle to connection to the public sewer. This provides clear confirmation that the development can be integrated into existing wastewater infrastructure without the need for network reinforcement or alternative treatment arrangements.

Accordingly, all foul flows will be conveyed to Five Fords Wastewater Treatment Works, a strategically important treatment facility within the River Dee catchment. The works benefits from substantial investment in enhanced treatment processes, including tertiary phosphorus removal via chemical dosing (ferric salts) and advanced biological treatment stages, designed to achieve stringent consented discharge standards.

Of particular relevance, the facility operates under Environment Permit conditions that include tightened phosphorus consents (circa 1 mg/L), reflecting its role in supporting compliance objectives for the River Dee SAC. These controls ensure that phosphorus is actively managed and reduced prior to discharge, rather than released untreated or partially treated.

Welsh Water's published engineering and investment programmes further demonstrate ongoing upgrades to aeration capacity, settlement efficiency, sludge processing, and nutrient removal resilience, all of which contribute to the optimisation of effluent quality and compliance performance at the works.

In this context, the proposal does not introduce any new discharge point to the environment, nor does it require private wastewater treatment or alternative drainage infrastructure. The entirety of foul water generation will be subject to full treatment within a regulated, consented system prior to any environmental discharge.

It is also material that, at present, there is no operational phosphorus credit trading scheme or established nutrient neutrality market mechanism available in Wales through which small-scale residential developments can secure off-site mitigation. The applicant therefore relies upon the established statutory wastewater treatment framework and confirmed infrastructure capacity, rather than non-operational mitigation mechanisms.

Whilst nutrient modelling outputs are necessarily precautionary and represent theoretical estimates rather than measured emissions, the development must be considered in its proper operational context: a single residential conversion served by existing mains drainage infrastructure and fully treated at a tertiary treatment works operating under strict environmental permit conditions.

Taking all factors together, the proposal constitutes a very small-scale residential conversion resulting in a minimal increase in foul water loading. This increase is fully accommodated within existing sewerage infrastructure, confirmed as available by the statutory undertaker, and subject to comprehensive treatment and phosphorus reduction controls at Five Fords Wastewater Treatment Works prior to discharge.

On this basis, the applicants respectfully submit that the proposal results in a negligible and fully mediated increase in phosphorus loading, occurring entirely within a regulated treatment system with no direct pathway for untreated discharge to the River Dee SAC and no change to the existing environmental discharge regime.