Wrexham Gateway

Nutrient Neutrality

September 2026

PREPARED FOR

Wrexham County Borough Council



Nutrient Neutrality

Prepared By	Sophia Reeve
Reviewed By	Becky McLean
Report Reference	Wrexham Gateway_Nutrient Nutrality_finaldraft_Sept2026
Issuing Company	Civic Engineers Limited
Issued	29/09/2026 – Rev02

Revisions

Date	Rev	Reason	Name
25/09/2026	01	Initial Issue	Becky McLean
29/09/2026	02	Final Draft Issued	Becky McLean

This report is the copyright of the issuing Civic group company and is intended solely for the use of the individual or organisation to whom it is addressed. It may not be disclosed, reproduced, or referred to in whole or in part by any other party without the prior written consent of the relevant Civic group company. No liability is accepted by any Civic group company for any loss or damage arising from any unauthorised use of this report.

"Civic" is a trading name used by companies within the Civic Plus Limited group (registered number: 14208271), including Civic Engineers Limited (registered number 06824088), Civic Plus Limited (registered number: 752376), Civic Earth Limited (registered number 14897633), Civic Heritage Limited (registered number 15913145), Civic MEP Limited (registered number 09245443), Civic Rail Limited (registered number 15913179) and New Practice Limited (registered number SC623648). All are private limited companies registered in England at Carvers Warehouse, 77 Dale Street, Manchester M1 2HB. Except for Civic Plus Limited (registered number: 752376), which is registered in the Republic of Ireland at 36 Lad Lane, Baggot Street Lower, Dublin D02 T208 and New Practice Limited, which is registered in Scotland at 35 Virginia Street, Glasgow, G1 1TN.

© Civic 2026

CONTENTS

Executive Summary 2
Abbreviations 3
1. Introduction 4
1.1. Background 4
1.2. Scope of Study 4
2. Water Quality in the Dee 5
2.1. The River Dee and Bala Lake Designated Sites 5
2.2. Nutrients of Significance 5
2.3. Water Quality 5
2.4. Strategic Approach 6
3. Site Description 7
3.1. Location 7
3.2. Proposed Development 7
4. Methodology 9
4.1. Stage 1 – Total Wastewater Load 9
4.2. Stage 2 and Stage 3 – Existing and Future Surface Water Loads 9
4.3. Stage 4 – Final Unmitigated Nutrient Budget 10
5. Assessment 11
5.1. Stage 1 - Additional Wastewater – customers and employees 11
5.2. Stage 2 – Nutrient Loading from Existing Landcovers 12
5.3. Stage 3 – Nutrient Loading from New Landcovers 12
5.4. Stage 3S - Nutrient Loading Removed Through SuDs 13
5.5. The Phosphorus Budget 14
6. Mitigation Strategy 16
6.1. Design 16
6.2. Five Fords WwTW 16
6.3. Securing the strategy 17
7. Conclusions 18

Executive Summary

In 2018, the European Court of Justice refined the definition of plans and projects and ruled that mitigation needs to be in place to ensure that there will be no likely significant effect on the conservation status of designated sites. Additional nutrient loading to designated sites already in an unfavourable conservation status is necessarily limited unless mitigation is in place. This ruling has come to be known as 'The Dutch Case.'

In the Dee River catchment in Wrexham, developments could adversely affect the designated site known as River Dee and Bala Lake. Several of the nature reserve lakes are in a state of eutrophication (an unfavourable conservation status) and therefore the ruling of the Dutch Case applies. All developments in the catchment must demonstrate 'nutrient neutrality' in order to ensure no adverse effect on the integrity of the designated site, meaning that the nutrients generated by the development must be less than or equal to the nutrients generated by the existing land use.

The Wrexham Gateway application site is a strategic regeneration site that incorporates Wrexham General Station and surrounding areas. The site extends from the Post Office in the south-eastern corner through to the Wrexham University car park in the north, incorporating Wrexham General Station.

The site covers a total area of approximately 3.46ha and currently comprises the existing station parking/drop-off area and Station Approach, a former Jewson's building, and Cambrian sheds with an area of hardstanding to the rear of the former Jewson's building. It also includes the Girl Guide hut and Wrexham District Scouts building, a vehicle access junction and pedestrian access locations.

The proposal is for change of use of the former Jewson's warehouse to a brewery (B2 use class) and the change of use of Cambrian sheds to a museum / taproom / restaurant / shop, and outline planning permission for a new commercial office building, creation of public realm and landscaping, accessibility improvements including new highway infrastructure and pedestrian footbridge, including parking facilities and coach/taxi drop off.

The proposed development is located in the River Dee catchment.

The planning department at Wrexham County Borough Council requested a nutrient budget for the proposed development, this has been calculated within this assessment and report.

Different nutrient budgets have been prepared to reflect the tightening of the Five Fords WwTW phosphorus permit limit from 30 March 2030. As the development is at outline design stage, the final mitigation requirements cannot yet be confirmed. The nutrient budgets will be updated at the detailed design stage to reflect the confirmed development parameters, wastewater flows, water-efficiency measures, drainage and SuDs design, and the applicable Five Fords permit limit.

A suitably worded planning condition or obligation should secure the submission and approval of an updated Nutrient Neutrality Assessment and Strategy before implementation of each phase. The strategy should demonstrate nutrient neutrality through quantified, secured mitigation, supplemented by nutrient credits or other approved mitigation where a residual phosphorus load remains. This will provide WCBC with sufficient certainty that the development can be delivered without adversely affecting the integrity of the Habitats Site.

Abbreviations

Acronym	Definition
AA	Appropriate Assessment
WCBC	Wrexham County Borough Council
EMC	Event Mean Concentrations
NRW	Natural Resources Wales
HRA	Habitats Regulations Assessment
NN	Nutrient Neutrality
SAAR	Standard Annual Average Rainfall
SAC	Special Area of Conservation
SSSI	Site of Special Scientific Interest
SuDs	Sustainable Drainage Systems
TAL	Technically Achievable Limits
TN	Total Nitrogen
TP	Total Phosphorus
WwTW	Wastewater Treatment Works

1. Introduction

The site covers a total area of approximately 3.46ha and currently comprises the existing station parking/drop-off area and Station Approach, a former Jewson's building, and Cambrian sheds with an area of hardstanding to the rear of the former Jewson's building. It also includes the Girl Guide hut and Wrexham District Scouts building, a vehicle access junction and pedestrian access locations.

The proposal is for change of use of the former Jewson's warehouse to a brewery (b2 use class) and the change of use of Cambrian sheds to a museum / taproom / restaurant / shop, and outline planning permission for a new commercial office building, creation of public realm and landscaping, accessibility improvements including new highway infrastructure and pedestrian footbridge, including parking facilities and coach/taxi drop off.

1.1. Background

In 2018, the European Court of Justice refined the definition of plans and projects in the so-called 'Dutch case' ruling that mitigation needs to be certain at the time of assessment to ensure that there will be no adverse effect on the conservation status of European designated sites which already exceed compliance limits[1].

Nutrient neutrality is a means of ensuring that a plan or project does not add to existing nutrient burdens. Where nutrient neutrality is properly applied and the existing land does not undermine the conservation objectives, Natural Resources Wales (NRW) considers that an adverse effect on integrity alone and in combination can be ruled out[2].

In the Dee River catchment in Wrexham, developments could adversely affect River Dee and Bala Lake, which is designated a Special Area of Conservation (SAC) and the river system is underpinned nationally by separate SSSIs divided by the national border—the River Dee (England) SSSI and the Afon Dyfrdwy (River Dee) SSSI in Wales. Several protected designations in the River Dee catchment—particularly the River Dee and Bala Lake Special Area of Conservation (SAC) in Wales—are at risk or failing due to eutrophication (an unfavourable conservation status) driven by elevated phosphorus and nutrient levels and therefore the ruling of the Dutch Case applies.

The practical implication of the Dutch Case across Wales is the necessity to mitigate increases in nutrient loading from new development including nutrients contained in surface water runoff and an increase in wastewater flows to any of the Wastewater Treatment Works (WwTW) in the relevant catchment.

In accordance with The Environmental Permitting (England and Wales) Regulations, the Five Fords (the Wastewater Treatment Works WWTW relevant to this project), will have to meet stricter effluent concentration requirements. It is understood that this will come into practice on the 30th March 2030, and so two different nutrient budgets will be calculated for the development.

1.2. Scope of Study

The main objectives of this study are to:

- Provide an overview of NRW's position with respect to water quality within the Habitats Sites.
- Provide a calculation for the phosphorus loading arising from the development; and
- Outline the mitigation strategy proposed to manage surface and wastewater from the proposed development and present supporting calculations in order to ensure that the proposed development is nutrient neutral.

[1] Joined Cases C-293/17 and C-294/17 of the European Court of Justice
[2] Natural Resources Wales / Principles of nutrient neutrality in relation to development or water discharge permit proposals

2. Water Quality in the Dee

The River Dee catchment from Snowdonia to the weir in Chester is designated under the Water Resources Act 1991 as a Water Protection Zone.

2.1. The River Dee and Bala Lake Designated Sites

The Afon Dyfrdwy (River Dee) SSSI[3] supports the following habitats and species listed in the EC Habitats Directive (Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora):

- Rivers with floating vegetation often dominated by water crowfoot - Annex I
- Otter – Annex II & IV
- Sea lamprey – Annex II
- River lamprey – Annex II & V
- Brook lamprey – Annex II
- Atlantic salmon – Annex II & V
- Bullhead – Annex II
- Freshwater pearl mussel – Annex II & V
- Grayling – Annex V
- The otter and the freshwater pearl mussel are listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended).

The River Dee and Bala Lake SAC[4] are designated for the following qualifying species

- Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation – Annex I
- Atlantic Salmon - Annex II
- Floating water-plantain – Annex II
- Sea lamprey – Annex II
- Brook lamprey – Annex II
- River lamprey – Annex II
- Bullhead – Annex II
- Otter – Annex II

The focus of this assessment is on the evidence of degrading water quality in the Afon Dyfrdwy SSSI and the River Dee and Bala Lake SAC, henceforth referred to as the 'Habitats Sites.'

2.2. Nutrients of Significance

It has been found that the nutrients of the highest significance in terms of water quality in the Habitats Sites are Total Nitrogen (TN) and Total Phosphorus (TP).

This report considers TP as requested by the planning department at WCBC. TP includes all phosphorus components – phosphate phosphorus (PO4-P), dissolved organic phosphorus and particulate phosphorus in algal and bacterial cells – and also includes mineral particles such as clay.

2.3. Water Quality

The condition of the Habitats Sites (which support the designated features) is in part dependent on the water quality within them. The occurrence of excessive nutrients in the Habitats Sites can impact the competitive interactions between high plant species, and between higher plant species and algae, which can result in dominance in attached forms of algae, and a loss of characteristic plant species.

Changes in plant growth and community composition can have implications for the wider food web and the species present. Increased nutrients and the occurrence of eutrophication can also affect the dissolved oxygen levels in the waterbody, which can also impact the biota within the Habitats Sites.

Elevated nutrient concentrations can stimulate excessive algal and cyanobacterial growth, particularly during warm, sunny, and low-flow conditions. Llyn Tegid has a recognised history of blue-green algal blooms, and catchment

[3] CYNGOR CEFN GWLAD CYMRU
[4] River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid - Special Areas of Conservation

measures are being undertaken to reduce phosphate inputs from agricultural land. When blooms die and decompose, microbial activity consumes dissolved oxygen; dense blooms can also cause marked day–night fluctuations in oxygen and pH. These effects may stress or kill fish and aquatic invertebrates, reduce light penetration, and alter aquatic plant communities, with potential consequences for the habitats and qualifying species of the River Dee and Bala Lake SAC.

Recent operational evidence demonstrates the sensitivity of the River Dee to this combination of pressures. During the June 2026 heatwave, NRW increased the discharge from Llyn Tegid by 2 m³/s (approximately 30%) for two to three days to reduce the risk of fish deaths associated with high temperatures, low river levels and reduced dissolved oxygen. This was a precautionary intervention rather than evidence that a fish-kill event had occurred. Further nutrient enrichment from the proposed development could add to the conditions that favour blooms and oxygen depletion; maintaining nutrient neutrality is therefore important to avoid increasing this existing ecological risk[5].

In the case of the River Dee, it has been estimated that the dominant source of phosphate is effluent from sewage treatment works (34% of the average daily load (kg/d), rural land use (contributing 48%), storm overflows (contributing 11%) and a further 7% from other sources including septic tanks and urban run-off.[6]

2.4. Strategic Approach

Where a European site is already in an unfavourable condition because of elevated nutrient levels, the competent authority must be satisfied, in view of the site's conservation objectives, that any additional nutrient inputs from a plan or project, either alone or in combination with other plans and projects, will not adversely affect the integrity of the site.

To address the associated uncertainty and risk to the Habitats Sites, this assessment has calculated the likely phosphorus load that will be generated by the development so that this can be considered in accordance with the Conservation of Habitats and Species Regulations 2017 (as amended)[7] and relevant case law.

The assessment has followed the latest applicable Natural Resources Wales (NRW) guidance and methodology to calculate the nutrient budget for the proposed development.

Recent technical evidence submitted in connection with appeal CAS-03789-W3C7T6[8] challenges the classification of the River Dee–Chester Weir to Ceiriog waterbody as failing its phosphorus target. Analysis of longer-term NRW and Environment Agency datasets indicates mean concentrations below the applicable 50 µg/l target and suggests that phosphorus headroom may be available. This evidence has not, however, been adopted as a formal revised compliance determination by NRW. Accordingly, the present assessment retains a precautionary nutrient-neutral approach unless and until the competent authority accepts an alternative position.

[5] Natural Resources Wales / Extra water released to protect River Dee fish during heatwave
[6] SAC Rivers: Source Apportionment Reports | Dŵr Cymru Welsh Water
[7] The Conservation of Habitats and Species Regulations 2017
[8] Reference: CAS-03789-W3C7T6

3. Site Description

3.1. Location

The application site is located in Wrexham, north of Regent Street and east of the railway line. The address is General Railway Station, Regent St, Wrexham LL11 2AD.

The site covers an area of approximately 3.46 ha and currently comprises the existing station parking/drop-off area and Station Approach, a former Jewson's building, and Cambrian sheds with an area of hardstanding to the rear of the former Jewson's building. It also includes the Girl Guide hut and Wrexham District Scouts building, a vehicle access junction and pedestrian access locations.

The site is located within the River Dee catchment Water Protection Zone that runs from Snowdonia to the weir in Chester, as designated under the Water Resources Act 1991. This designation is in place to help prevent water pollution arising from activities that cannot be controlled using other permits.

The site boundary and location in respect to the Dee Water Protection Zone is shown in Figure 1.

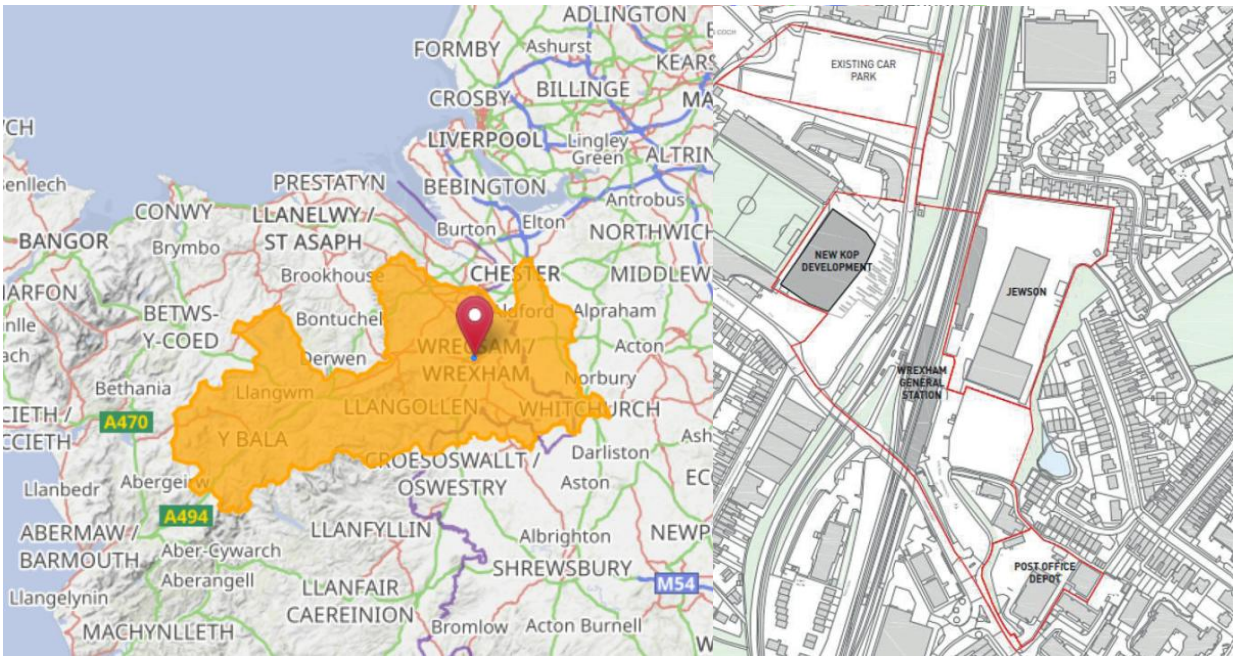


Figure 1 – Dee Water Protection Zone

3.2. Proposed Development

The proposal is for change of use of the former Jewson's warehouse to a brewery (b2 use class) and the change of use of Cambrian sheds to a museum / taproom / restaurant / shop, and outline planning permission for a new commercial office building, creation of public realm and landscaping, accessibility improvements including new highway infrastructure and pedestrian footbridge, including parking facilities and coach/taxi drop off (Figure 2).

The development is being progressed in two phases – the first phase that includes the public realm, the office building, a new main access point and a new pedestrian link. The second covers the conversion of the Jewson's warehouse to a brewery, carry out the change of use of Cambrian sheds to a museum/taproom/restaurant and shop and upgrade the parking and provide the new footbridge.

The development (both phases) is still at outline design stage and therefore this assessment has been based upon current assumptions with regards to number of visitors, where those visitors will come from, workers in the brewery and the drainage design and SuDs that will be in place in Phase 1. To provide a worst case assessment, it has been assumed that there are no SuDs included in Phase 2, as per the current outline plan. This assessment has been based upon the parameter plan that was submitted as part of the planning application (Figure 2).

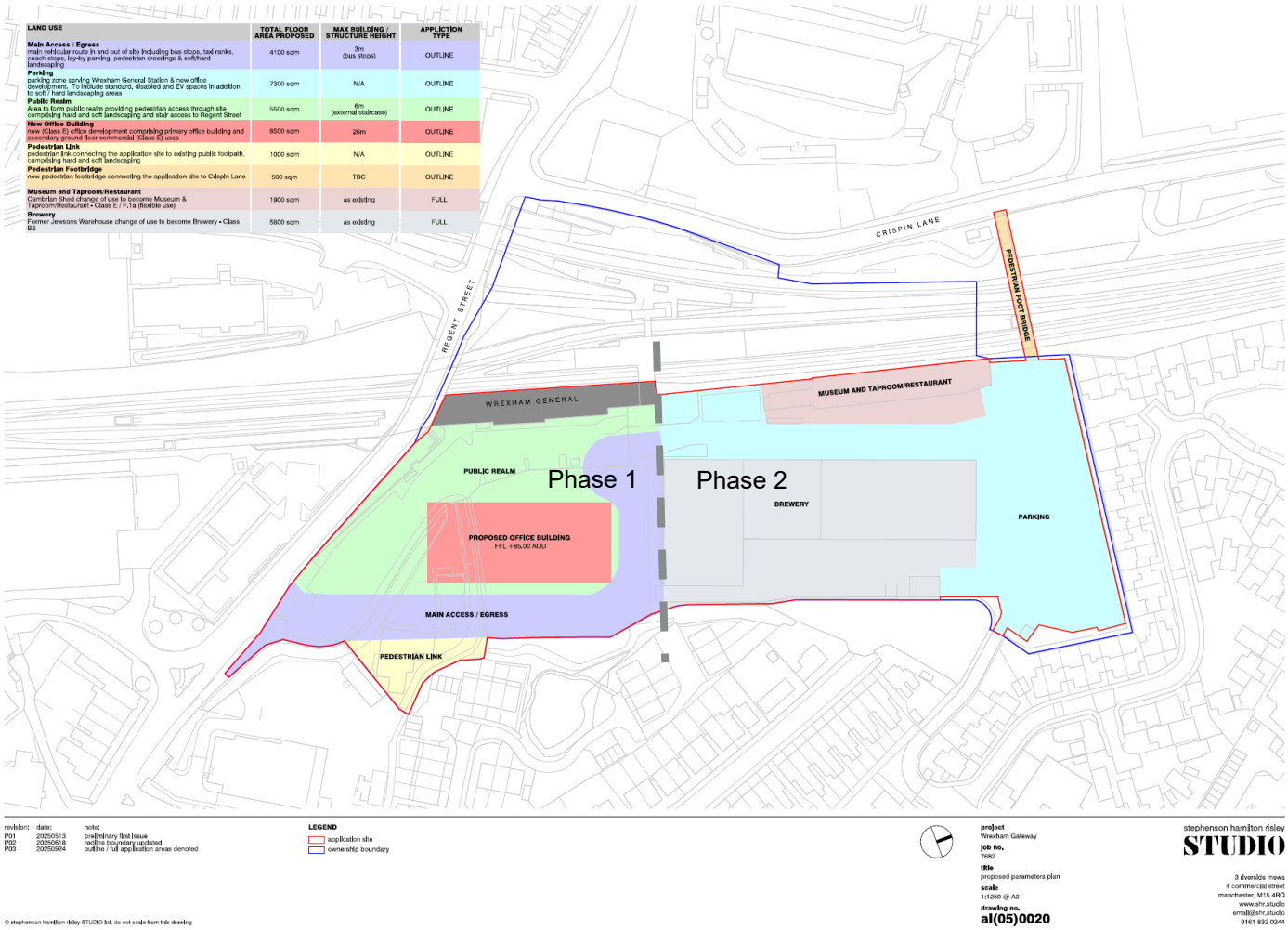


Figure 2 – Proposed Development Parameter Plan

Table 1 provides the proposed areas for each of the elements for information that are shown on the plan for information purposes.

Table 1 – Proposed Development Elements and Sizes (sqm and hectares) for Phases 1 and 2

Element	m2	hectares
Phase 1		
Main Access/Egress	4100	0.41
Public Realm	5500	0.55
New Office Building	8500	0.85
Pedestrian Link	1000	0.10
Total area	**19100**	**1.91**
Phase 2		
Parking	7300	0.73
Museum and Taproom/Restaurant	1900	0.19
Brewery	5800	0.58
Pedestrian Footbridge	500	0.05
Total area	**15500**	**1.55**
TOTAL COMBINED SITE AREA	**34600**	**3.46**

4. Methodology

The latest version of the Nutrient Budget Calculator for Special Areas of Conservation (SACs) in Wales[9] was used for determining whether a site achieves nutrient neutrality. The guidance lays out the process of calculating the nutrient budget and provides worked examples.

4.1. Stage 1 – Total Wastewater Load

Stage 1 calculates the additional nutrient loading from wastewater generated by the development. It applies to residential, commercial or tourism development that increases overnight stays, or brings employees, customers, or other users into the affected SAC catchment from outside it. For non-residential development, the calculator defaults to assuming that 100% of employees and users travel from outside the catchment unless robust, suitably precautionary evidence supports an alternative percentage agreed with the LPA.

The wastewater nutrient load is calculated from the estimated wastewater volume and the final effluent nutrient concentration for the receiving Wastewater Treatment Works (WwTW). The receiving WwTW should be confirmed with the sewerage undertaker and selected in the calculator. Where a septic tank or package treatment plant is proposed, the relevant default or independently supported user-defined final effluent concentration should be entered.

Water consumption is used as a proxy for wastewater generation. The Welsh calculator applies a default rate of 120 litres per person per day, comprising the Welsh Building Regulations standard of 110 litres per person per day plus a precautionary allowance of 10 litres. With the proposed uses on site (office building, brewery, and tourist attraction/museum/café) – suitable assumptions have been made with regards to predicted usage per person per day.

For commercial, leisure, public-service infrastructure and tourism development, the anticipated numbers of employees and customers or users must be entered, together with the proportion expected to travel from outside the affected catchment.

For this stage – the development has been assessed in two parts to reflect the different design stages as set out in section 3.2.

4.2. Stage 2 and Stage 3 – Existing and Future Surface Water Loads

Stages 2 and 3 calculate the annual nutrient loading from surface-water runoff associated with the pre-development and post-development land covers, respectively. They are required where surface water from the development drains to the River Dee and Bala Lake SAC.

For Stage 2, the land covers within the red-line boundary that will be changed by the development are identified and their areas entered in hectares. Land retained in the same use is excluded. The predominant soil drainage type and the site's average annual rainfall band are also entered; where the site crosses more than one soil type, the majority soil drainage type is used. The calculator then applies its embedded loading factors to calculate the existing annual phosphorus, and nitrogen loads in kilograms per year.

For Stage 3, the completed development is divided into the same calculator land-cover categories, and the area of each category is entered in hectares. The proposed brewery and associated industrial or storage areas are classified as commercial/industrial land. The museum, taproom, restaurant, shop, public realm, highways, parking, footbridge and other leisure or urban areas are classified as open land – built environment, except where a more specific calculator category applies. Areas of qualifying greenspace, woodland, shrub, or permanent water are entered separately. Where no exact category is available, the closest equivalent land-cover type is selected. The rainfall information entered at Stage 2 is carried forward automatically.

The Stage 3 calculation provides the future annual surface-water nutrient load. Any nutrient removal attributable to qualifying SuDs is assessed separately at Stage 3S and only where the drainage features comply with Schedule 3 of the Flood and Water Management Act 2010 and the national standards. The claimed treatment area and removal efficiency must be supported by site-specific design, performance, and maintenance evidence; untreated or bypass flows must not be credited. The Stage 2 and Stage 3 outputs are subsequently used in Stage 4 to determine the change in surface-water nutrient loading.

The calculator has been run separately for the different phases of the development.

[9] Nutrient budget calculator | GOV.WALES

4.3. Stage 4 – Final Unmitigated Nutrient Budget

Stage 4 of the calculation is the final stage. At this point, the totals from Stage 1 and Stage 3 are added together, and the total from Stage 2 is subtracted. If there is a surplus (i.e., the proposed total is higher than the existing total), a buffer (factor of safety) of 20% is added to the total, and this is then referred to as 'the nutrient budget'. If the nutrient budget comes out as less than or equal to zero, then the development has achieved nutrient neutrality.

To calculate the post 2030 budgets, we took the predicted annual wastewater production total for Phases 1 and 2, multiplied them by 0.7 and divided them by 1,000,000. These numbers where then used in to create the Stage 4 totals and the Stage 4 totals plus 20%.

5. Assessment

5.1. Stage 1 - Additional Wastewater – customers and employees

Typically, wastewater is conveyed from the development to the public sewerage and onto the WwTW for treatment before discharge to surface waters.

The proposed development comprises a new office block, public realm, pedestrian link and a main access in Phase 1 and a new brewery (change of use from the old Jewson's site), parking and conversion of the Cambrian sheds to a museum / taproom / restaurant / shop and a new pedestrian footbridge across the railway.

The standard annual average rainfall has been sourced from the Hawarden Airport Location-specific long-term averages - Met Office website which indicates an annual rainfall of 728.74mm. The calculator predicted 799 so this has been used as a worst case.

LandIS Soil Data Portal indicates that the site comprises Soil Drainage Type of "Freely Draining" (FreeDrain) and the site is not located within a Nitrate Vulnerable Zone.

It is anticipated that the new buildings will be designed to be water efficient10, however, to ensure a suitable precautionary indicative assessment, we have used an average of 50 litres per day[11]. The current estimate is that there will be 600 employees in the office, 35 in the brewery and based upon a rule of thumb of 5sqm per visitor to a museum attraction and a size of 1900sqm this would equate to 380 visitors per day. This is a rough estimate for the purposes of this calculation to provide a precautionary indicative assessment and an indication of the potential level of additional wastewater that could be generated.

The proportions of employees, customers and visitors assumed to originate from outside the River Dee SAC catchment are preliminary estimates based on the information currently available. As these assumptions materially affect the calculated wastewater nutrient load, they should be supported by proportionate evidence and agreed with Wrexham County Borough Council, as competent authority, in consultation with Natural Resources Wales where appropriate. In the absence of such agreement, the calculator's precautionary default assumption that 100% of employees and users originate from outside the catchment should be applied. The nutrient budget will therefore be reviewed and updated if the agreed proportions differ from those used in this assessment.

The nature and volume of brewery process wastewater have not yet been confirmed because the design is insufficiently developed at this stage. It is therefore recommended that details of the proposed process, wastewater flows and nutrient loading are secured by planning condition and submitted for approval before the relevant phase is implemented.

All information used in the calculator is provided in Table 2.

Table 2 – Additional Wastewater

Use	Phase of development	Number of Employees	% from 'out of catchment'	Number of Customers	% from 'out of catchment'	Litres / per day
Office	Phase 1	600	25	n/a	n/a	50 per employee
Brewery	Phase 2	35	25	n/a	n/a	50 per employee
Museum / taproom / restaurant / shop	Phase 2	20	25	380	80	50 per customer

These figures are an estimate and are based upon industry averages to provide a precautionary indicative assessment.

[10] New Branding - Waterwise Guide for Offices and Posters
[11] business-water-efficiency-leaflet-web3.pdf

The wastewater for the proposed development will be conveyed to Five Fords Wastewater Treatment Works (WwTW) for treatment. Five Fords WwTW has a licence limit of 1.00 mg/l for phosphorus pre 2030 and a reduced limit of 0.7 mg/l for phosphorous post 30th March 2030.

It has also been assumed at this stage that the number of employees originating from outside the catchment would be 25% for the office/brewery and would be 80% for the museum / taproom / restaurant and the shop.

Entering these figures into the calculator gives the following future wastewater nutrient load for the different phases of the development and to account for the tightening regulations after the 30th March 2030.

- Phase 1 – 2.74 kgP/year (pre 2030) / 1.28 kgP/year (post 2030)
- Phase 2 – 5.80 kgP/year (pre 2030) / 4.06 kgP/year (post 2030)

Note that the existing Jewson's would have produced wastewater but is currently closed so this calculation considers the brewery as a new source to ensure a precautionary indicative assessment.

5.2. Stage 2 – Nutrient Loading from Existing Landcovers

The site is currently in mixed use with a number of buildings, trees, and car parking. The application for the development has been split into two phases as set out in Section 3.2. The calculations of the current land use have been based upon a desk based review of online mapping data and confirmed by the landscape architect for the scheme. The two phases of the site have been classified as shown in Table 3 for this assessment.

Table 3 – Landcover classification - existing

Phase / Type	Area (hectares)
Phase 1	
Commercial/industrial land	0.06
Open land – built environment	1.71
Woodland	0.14
Total	1.91
Nutrient Load	
kgP/year	1.54
Phase 2	
Commercial/industrial land	0.56
Open land – built environment	0.94
Total	1.50
Nutrient Load	
kgP/year	1.60

5.3. Stage 3 – Nutrient Loading from New Landcovers

With the proposed development it is predicted that the landcover would change to incorporate the new buildings, the changes of use, the public realm and the changes to the parking and pedestrian and vehicular access. The changes to the land cover that have been used for this assessment are provided in Table 4. This table compares the landcover changes and the predicted nutrient loads associated with those areas.

Table 4 – New Landcover

Phase / Type	Area (hectares) existing	Area (hectares) proposed	Change (hectares)
Phase 1			
Commercial/industrial land	0.06	0.85	*+0.79*
Open land – built environment	1.71	0.8	*- 0.91*
Woodland	0.14	0	*-0.14*
Green Space	0	0.26	*+0.26*
Total	1.91	1.91	
Nutrient Load			
kgP/year	1.54	1.69	+0.15
Phase 2			
Commercial/industrial land	0.56	0.77	*+0.21*

Phase / Type	Area (hectares) existing	Area (hectares) proposed	Change (hectares)
Open land – built environment	0.94	0.78	*-0.16*
Greenspace	0	0	*0*
Total	1.50	1.55*	
Nutrient Load			
kgP/year	1.60	1.72	+0.12

**the increase is from the pedestrian footbridge*

5.4. Stage 3S - Nutrient Loading Removed Through SuDs

The sustainable drainage strategy (SuDs) for Phase 1 has been designed to be via a bioretention zone, consisting of a mix of SuDs planting, trees, wildflowers, lawns, and hedges which will provide a combination of conveyance and treatment of runoff through lined swales, plus an element of infiltration to ground.

CIRIA C815 *Using SuDs to reduce phosphorus in surface water runoff*[6] specifies that the treatment of runoff through a bioretention zone removes 44% of any flow that just receives sedimentation/filtration and leaves the system via an underdrain. It also advises that the design of these zones can be significantly increased by the inclusion of specific media for the capture of P and there are many treatment media available for this purpose. It also states that maintenance is required to remove sediment and build-up of material at the inlet or on the surface.

The following approach has been adopted for this nutrient neutrality assessment as follows

- Phase 1 – the area proposed for the bioretention zone is 2620m^2 of the wider public realm area 5500m^2 so 47% of the runoff generated from Phase 1 will be treated through surface SuDs with a phosphorous removal efficiency of 30%.
- Phase 2 – the design of the SuDs is still to be completed, so it has been assumed that as a worst case scenario that there are no SuDs included within the car parking area for Phase 2.

Table 5 – Nutrient Loading Removed through SuDs

Phase / Type	Area (hectares) existing	Area (hectares) proposed	Change (hectares)	Proposed SuDs Landcover %	P Removal %
Phase 1					
Commercial/industrial land	0.06	0.85	*+0.79*		
Open land – built environment	1.71	0.8	*- 0.91*		
Woodland	0.14	0	*-0.14*		
Green Space	0	0.26	*+0.26*	*100**	*30*
Total	1.91	1.91			
Nutrient Load					
kgP/year	1.54	1.69	+0.15		0
Phase 2					
Commercial/industrial land	0.56	0.77	*+0.21*		
Open land – built environment	0.94	0.78	*-0.16*		
Greenspace	0	0	*0*	*0*	*0*
Total	1.5	1.5			
Nutrient Load					
kgP/year	1.60	1.72	+0.12	n/a	n/a

**the greenspace represents the SuDs areas which is why 100% has been used here. For phase 2 – worst case has been assumed with no SuDs included in the parking area.*

The calculator indicates that there will be no P removal with the proposed SuDs for Phase 1, this is because the greenspace area of 0.26 will only generates 0.01kg TP/year as a load. The design is not developed enough to quantify what other landcover would drain to the SuDs areas, so these have been assumed to be zero at this stage to provide a precautionary indicative assessment.

5.5. The Phosphorus Budget

The phosphorus budget for this development has been automatically calculated by adding the future wastewater and surface water nutrient loads together then subtracting the existing nutrient load. The calculator also adds a 20% buffer to account for uncertainty and future change, the final nutrient budget for this development is provided in Tables 6 and 7 to reflect the pre and post 2030 budgets.

Table 6 – Phosphorus Budget (Phase 1 and Phase 2) – pre 2030

Stages	Phase 1 (pre 2030)	Phase 2 (pre 2030)
	Values generated	
Phosphorus		
Stage 1 phosphorus load (kg TP/year):	2.74	5.80
Stage 2 phosphorus reduction (kg TP/year):	1.54	1.60
Stage 3 phosphorus load (kg TP/year):	1.69	1.72
Stage 3S phosphorus load removed through SuDs (kg TP/year):	0.00	0.00
Phosphorus budget ((Stage 1 - Stage 2) + (Stage 3 - Stage 3S)):	2.89	5.92
Phosphorus budget + 20% buffer	3.46 kg TP/year requires mitigation	7.1 kg TP/year requires mitigation

Table 7 – Phosphorus Budget (Phase 1 and Phase 2) – post 2030

Stages	Phase 1 (post 2030)	Phase 2 (post 2030)
	Values generated	
Phosphorus		
Stage 1 phosphorus load (kg TP/year):	1.28	4.06
Stage 2 phosphorus reduction (kg TP/year):	1.54	1.60
Stage 3 phosphorus load (kg TP/year):	1.69	1.72
Stage 3S phosphorus load removed through SuDs (kg TP/year):	0.00	0.00
Phosphorus budget ((Stage 1 - Stage 2) + (Stage 3 - Stage 3S)):	1.43	4.18
Phosphorus budget + 20% buffer	1.71 kg TP/year requires mitigation	5.02 kg TP/year requires mitigation

Based upon these calculations, the budget for the total site would be as follows

- Pre2030 (including 20% buffer) – 10.56 TP/year
- Post2030 (including 20% buffer) – 6.73 TP/year

6. Mitigation Strategy

The development is currently at outline design stage. Accordingly, the mitigation strategy establishes a framework to be developed and verified through the detailed design and reserved-matters stages. The nutrient budget must be reviewed when the development parameters, occupancy, visitor numbers, brewery process requirements, and drainage arrangements are confirmed. The final strategy should demonstrate nutrient neutrality for each phase before that phase is implemented.

6.1. Design

6.1.1. SuDs Strategy

The Phase 1 SuDs strategy should be developed further to maximise phosphorus removal from surface-water runoff. Phase 2 should consider what SuDs could be incorporated, measures could include, where technically feasible:

- bioretention areas, rain gardens, filter strips, and suitably designed swales.
- permeable paving within parking and pedestrian areas.
- green or blue-green roofs.
- proprietary phosphorus-capture media where appropriate.
- maximisation of the impermeable area routed through treatment features; and
- measures to prevent untreated bypass flows during routine rainfall events.

Any phosphorus-removal allowance should be supported by the detailed drainage design, contributing catchment plans, calculations, and evidence of treatment performance. The design should also include safe access, inspection frequencies, sediment removal, and replacement of treatment media where required. A long-term management and maintenance plan should identify the responsible body and funding arrangements.

6.1.2. Water efficiency and wastewater reduction

The detailed design should maximise water efficiency and minimise water demand and foul-water generation. Measures could include:

- low-flush or dual-flush WCs.
- low-flow taps and showers.
- water-efficient appliances and sanitary fittings.
- leak detection and metering.
- rainwater harvesting for WC flushing, irrigation, or other suitable non-potable uses.
- green roofs and water-efficient landscaping; and
- water reuse within the brewery where practicable.

These measures could be considered by the design team at the next stage, with details provided as part of the future application process.

Brewery process wastewater should be assessed separately once the production process is defined, including anticipated volumes, phosphorus concentrations, opportunities for reuse and any pre-treatment requirements. Discharge arrangements should be agreed with Dŵr Cymru Welsh Water (DCWW).

6.2. Five Fords WwTW

The Proof of Evidence of James Ellaway, submitted on behalf of Redrow Homes in relation to a development in Wrexham, presents technical evidence indicating that phosphorus headroom may be available in the receiving waterbody. Separate information from DCWW concerning other developments indicates that Five Fords WwTW may have capacity to accommodate additional foul flows while complying with its existing and future phosphorus permit

limits. However, neither constitutes project-specific confirmation for Wrexham Gateway. Written confirmation should therefore be obtained from DCWW that:

- the development can connect to Five Fords.
- sufficient treatment and hydraulic capacity are available.
- the relevant permit limit will be met when each phase becomes operational; and
- brewery process effluent can be accepted, subject to any necessary trade-effluent consent or pre-treatment.

The nutrient budget should be updated at the detailed design stage using the confirmed development parameters, wastewater flows, drainage design, and applicable Five Fords permit limit.

6.3. Securing the strategy

It is suggested that a suitably worded planning condition or obligation should be put in place for the outline consent that requires the assessment to be updated when further information and confirmed details are available and that it should include

1. an updated nutrient budget.
2. the final drainage and SuDs design.
3. water-efficiency commitments.
4. brewery wastewater information.
5. confirmation from DCWW.
6. implementation, monitoring, and maintenance arrangements; and
7. evidence of sufficient nutrient credits or other approved mitigation for any residual phosphorus load.

7. Conclusions

The proposal is for change of use of the former Jewson's warehouse to a brewery (b2 use class) and the change of use of Cambrian sheds to a museum / taproom / restaurant / shop, and outline planning permission for a new commercial office building, creation of public realm and landscaping, accessibility improvements including new highway infrastructure and pedestrian footbridge, including parking facilities and coach/taxi drop off.

Following a request from the planning authority, an assessment has been carried out in accordance with the Nutrient Budget Calculator for Special Areas of Conservations (SACs) in Wales to determine the likely phosphorus load generated by the proposed development.

Different nutrient budgets have been prepared to reflect the tightening of the Five Fords WwTW phosphorus permit limit from 30 March 2030. As the development is at outline design stage, the final mitigation requirements cannot yet be confirmed. The nutrient budgets will be updated at the detailed design stage to reflect the confirmed development parameters, wastewater flows, water-efficiency measures, drainage and SuDs design, and the applicable Five Fords permit limit.

A suitably worded planning condition or obligation should secure the submission and approval of an updated Nutrient Neutrality Assessment and Strategy before implementation of each phase. The strategy should demonstrate nutrient neutrality through quantified, secured mitigation, supplemented by nutrient credits or other approved mitigation where a residual phosphorus load remains. This will provide WCBC with sufficient certainty that the development can be delivered without adversely affecting the integrity of the Habitats Site.