Technical Note

Project:	P18-669 Glan Llyn, Newport
Subject:	Residential Discharge Permit – Schedule 5 Response Technical Note
Date:	February 2026
Document Reference:	18669-RLL-26-XX-RP-O-0852-P01
Prepared by	Chris Wilson – Principal Geo-Environmental Consultant
Checked & Approved by	Howel Morris – Director

Introduction

Rodgers Leask Ltd (RLL) have been commissioned by Glan Llyn Estate Management Limited to prepare this Technical Note to provide further information in response to a Schedule 5 Notice from the Natural Resources Wales Permitting Team (NRW) to support the Permit Application referenced PAN-029406 for the discharge of surface waters from Glan Llyn, Newport into Monks Ditch via the on-site reen network.

A plan showing the location and routing of the Glan Llyn reen network alongside monitoring positions is shown on RLL Drawing 18669-RLL-25-XX-DR-O-0742-P02.

Background to Permit and Schedule 5

In May 2025 RLL submitted a discharge permit application relating to the discharge of surface waters into Monks Ditch (PAN-029406), the information presented within this application and associated correspondence should be read in conjunction with this Technical Note.

The Schedule 5 request for further information from NRW, dated 13th February 2026 is presented in **Appendix A**. The requirements of the schedule were as follows:

1. *Provided a revised management plan/operating technique that details how treatment of the discharge will be achieved. This should include (but not limited to):*
    a. *a map showing the location of the treatment system, type of treatment to be used, ongoing maintenance of the treatment system, contingency plan for failure (if applicable) and long term expectation of the system and the discharge quality*
    b. *The limits that are required to be achieved in the discharge are:*
        i. *Ammonia 0.8 mg/l as a maximum*
        ii. *and BOD 11 mg/l as a maximum.*
    c. *Details of the ongoing sampling regime to be used to monitor the following chemicals identified as requiring further monitoring after assessment:*
        i. *Sulphate*
        ii. *Chromium*

iii. *Chloride*
iv. *Copper*
v. *Manganese*
vi. *Nickel*

To address the requirements of the Schedule 5 notice, Glan Llyn Estate Management Limited and RLL have begun dialogue with a 3rd party Reviewer (Hannah Fraser Consulting (HFC)) and a Specialist Contractor (John F Hunt Water Tech (JFH)).

Following a design brief period between Glan Llyn Estate Management Limited, RLL, HFC and JFH, outline proposals to manage the above criteria on the site have been developed. The following shall be presented in response to the Section 5 notice:

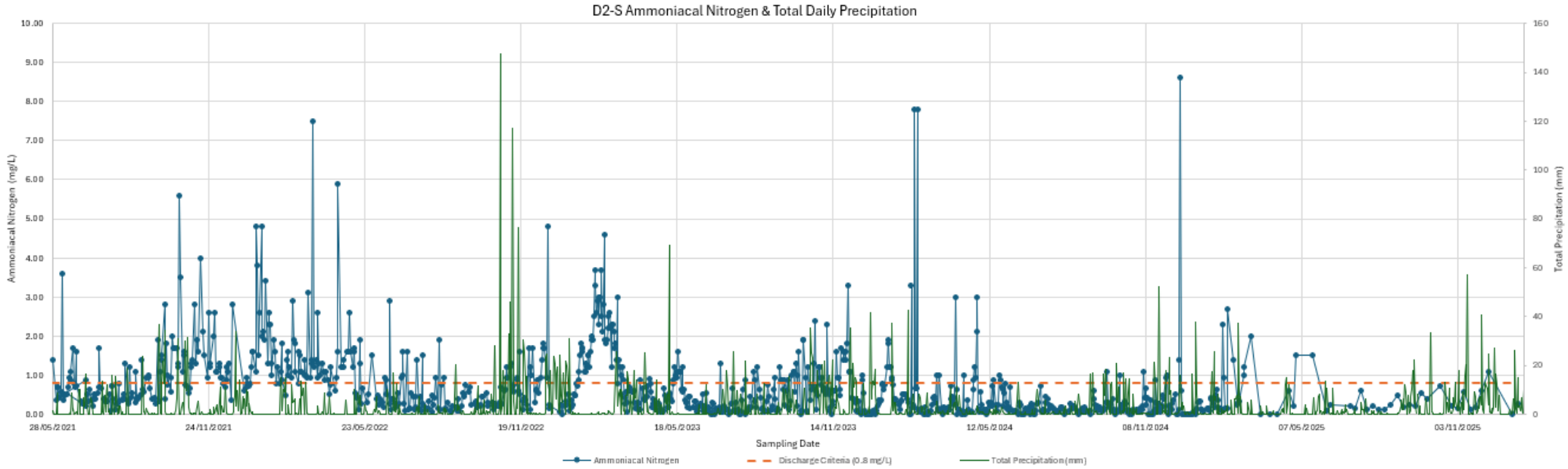
- **Operation Management Plan**, a straightforward management plan showing details relating to the proposed treatment facility and waterway management to be used by operators on the site.
- **Treatment Proposal Technical Note**, to present technical details relating to the surface waters treatment proposals for the Site.

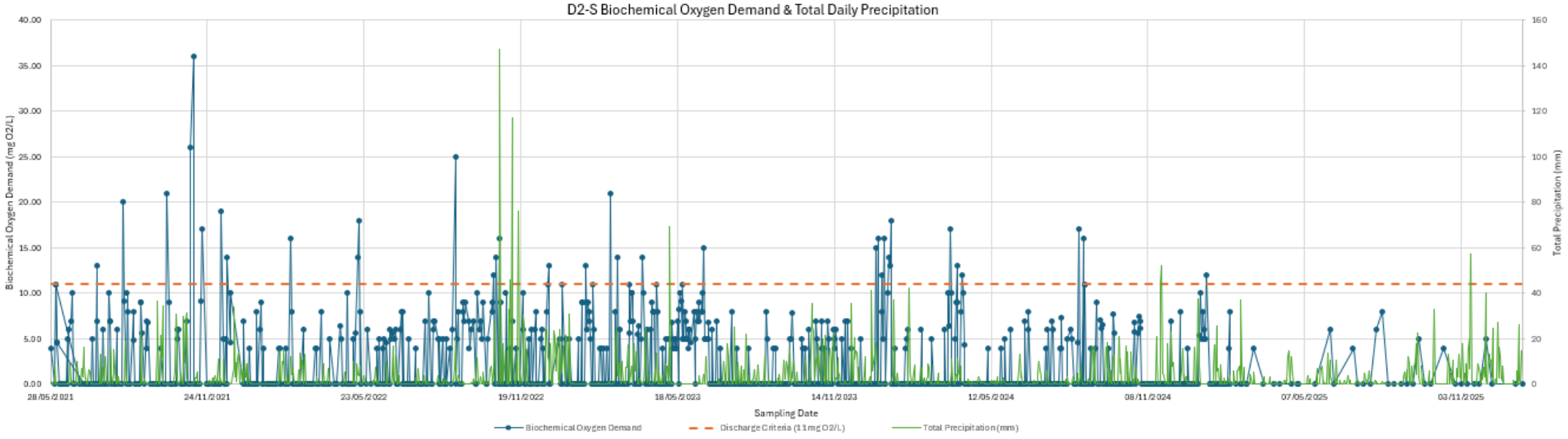
Surface Waters Information

As a part of the permit application, surface water quality information was submitted to NRW in July 2025 which included a full dataset from the Drain 2 – south position (D2-S), being representative of proposed discharge water, dating back to May 2021. The monitoring position is shown on Drawing 18669-RLL-25-XX-DR-O-0742-P02.

For discussion purposes, for ammoniacal nitrogen and biochemical oxygen demand (BOD), where discharge limits were applied in the Section 5 Notice, results have been presented in graph format on the following page (more recent data added). Rainfall from a local weather station has also been presented.

RLRE Consulting Engineers





Treatment Requirements

Ammoniacal Nitrogen

Ammoniacal nitrogen (ammonia) was highlighted in the Section 5 Notice as a determinant of concern where a discharge concentration maximum of 0.8mg/l would apply. Based on the data provided in Figure 1 for the past 3.5 years, surface water within the Glan Llyn reen network occasionally exceeds the 0.8mg/l concentration, although waters appear to have improved over time.

It is considered that the reason behind the exceedances is multifactorial.

It is understood that elevated ammoniacal nitrogen concentrations align with periods when earthworks were being undertaken on site, potentially impacting the watercourse. Remediation earthworks are substantially complete on the wider development and remaining risks lie with minimal excavations being undertaken by oncoming housebuilders. It is for this reason that treatment for construction waters should be considered for future development phases. A Surface Water Management Plan shall be prepared by each housebuilder on a phase-by-phase basis and they shall be responsible for their construction water. This will be in accordance with the approved development Construction Environmental Management Plan, CEMP (ref 5159748-LLA-OUT-03950-2.0).

Construction works do not provide a reason for all exceedances of the proposed criteria and for this reason rainfall has been added to Figure 2. Figure 2 shows a trend of elevated ammoniacal nitrogen following prolonged periods of rainfall which may be a result of increased surface run off from exposed Made Ground on the undeveloped part of the site or influent from off site. It is thought that as the site is built out and interception increases the amount of surface run-off will reduce and likely lead to a reduction in ammoniacal nitrogen entering the reen network. To mitigate intermittent exceedances of the ammonium discharge criteria the implementation of a telemetrically controlled part-time ammoniacal nitrogen treatment system for the water in the reen is proposed.

Seasonal change is also shown on Figure 1 to impact the ammoniacal nitrogen levels within the reen network. Ammoniacal nitrogen is an important source of nitrogen for plants and during the growing season (spring/ summer) and a reduction in concentration is evident in the reen, reeds also act as a natural filter for the waters when mature. In winter we have the converse of this where plants die back and decay, releasing ammoniacal nitrogen back into the watercourse whilst also not growing and therefore not taking up nitrogen. It is for this reason that an annual vegetation management strategy is proposed.

Biochemical Oxygen Demand

Biochemical Oxygen Demand (BOD) was highlighted in the Section 5 notice as a determinant of concern where a discharge concentration maximum of 11.0mg/l would apply. Based on the data provided in Figure 2 for the past 4.5 years, surface water within the Glan Llyn reen network only occasionally exceeds the proposed screening criteria, an exceedance has not been recorded since early 2025.

Given the only rare exceedances of BOD, direct treatment of the reens on site is not proposed at this time. We have considered how treatment could be managed if it were to be required to positively impact BOD. We will monitor this position going forward and can implement the measures highlighted if these are required.

It should be noted that some treatments that are proposed will positively impact BOD and it should be monitored.

Treatment Proposal

As discussed in the previous sections, to achieve the requirements of the Section 5 Notice, treatment is required for the Glan Llyn reen network to achieve the required discharge limits. It is thought that the reason behind elevated ammoniacal nitrogen in the watercourse is multifactorial and therefore required a combination of treatment techniques focussed at both water with the reen and water from construction.

Drawing 18669-RLL-26-XX-DR-O-0853-P01 shows a preliminary illustrative plan of the treatment area and its location within the proposed Eastern Sports Pitch area within Glan Llyn, which is located near the discharge position and is sequenced to be constructed last. It will therefore be possible to manage water for a long period of time, if required.

Housebuilders on the wider development will be expected to manage construction waters on their own phases and are required to provide respective Surface Water Management Plans for their sites. In accordance with the approved development CEMP the housebuilder shall present how they are to manage construction waters for their respective phases for approval by Glan Llyn Estate Management Limited, an option for construction water management for housebuilders on individual phases is presented on Drawing 18669-RLL-26-XX-DR-O-0857-P01.

As construction develops and therefore interception of rainfall increases and vegetation and landscaping is planted the water quality within the Reen is anticipated to improve over time, eventually negating the requirement for treatment of the reen, this will be monitored in an ongoing sampling regime.

<u>Silt Management During Construction</u>

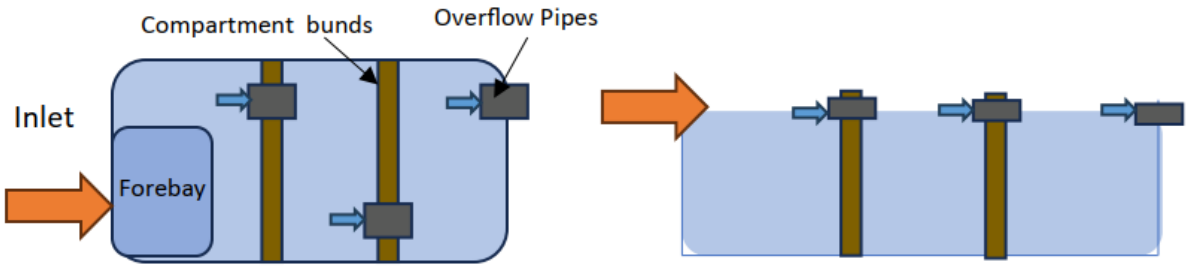
To manage silts during construction individual housebuilders will be required to manage and monitor construction waters prior to discharge to the Glan Llyn reen network in accordance with the approved CEMP.

The way in which suitable water quality is achieved is the responsibility of the housebuilder which is to be agreed with Glan Llyn Estate Management Limited, however an example is via a large, lined settlement lagoon and polishing channel shown Drawing 18669-RLL-26-XX-DR-O-0857-P01.

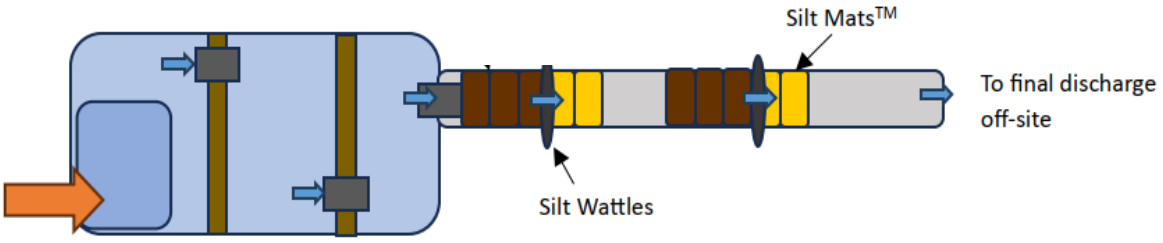
The location of this lagoon and connection point to the reen network shall be the responsibility of the housebuilder, but should be sequenced to allow its retention through to substantial completion of construction works on each phase.

The settlement lagoon example presented on Drawing 18669-RLL-26-XX-DR-O-0857-P01 will aid in silt management and improve the quality of construction water during construction phases of the development before discharging into the Glan Llyn reen network. The construction of a settlement lagoon will encourage the natural settlement of silt, with construction waters becoming less turbid as they flow through several compartments within the lagoon. After which, the overflow is proposed to enter into a polishing channel designed to remove any remaining solid fractions from the attenuated water ahead of the discharge point into the reen.

The temporary settlement lagoon should be large and include a forebay (locally deepened area) where construction waters can be pumped, and the inclusion of compartments will prolong the duration in which surface water is spent in the attenuation; increasing the time sediment can drop out of suspension. The following figure presents a possible layout.



The construction of the Polishing Channel will be designed to receive the outfall of the settlement lagoon via gravity. The Polishing Channel will be lined with an impermeable liner to prevent silt ingress into the already attenuated water and clean stone to add another layer of friction. The channel will comprise various sections of silt mat and wattles to remove the potential for remaining solid fractions that may remain in suspension from the treated waters, before being discharged into the reen at the discharge point.



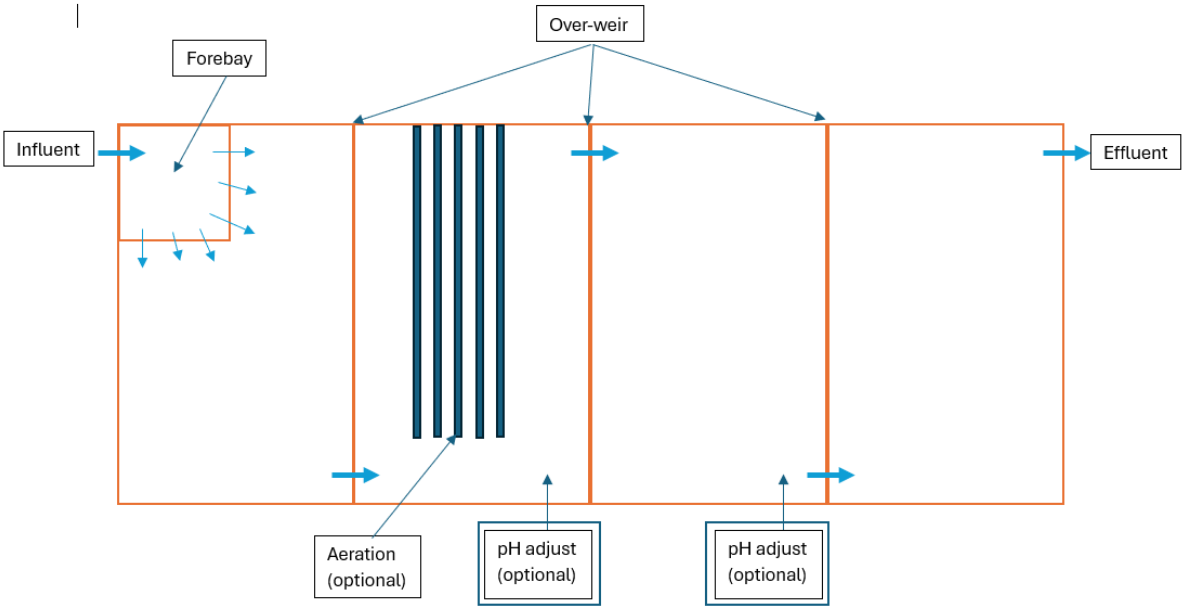
Settlement Lagoon retrofit for Ammoniacal Nitrogen During Construction

To further improve the ammoniacal removal in the example settlement lagoon, it can be retrofitted with the potential to add a flocculant/ coagulant polymer at the inlet stream via an in-line mixer. The use of a flocculant/ coagulant polymer will aid colloidal solids capture and precipitate metals which were outlined in the Section 5 notice. To ensure that an environmentally friendly polymer is used, an aquatics specialist has been consulted who are a provider of a gel polymer which is environmentally friendly and non-accumulative in aquatic species.

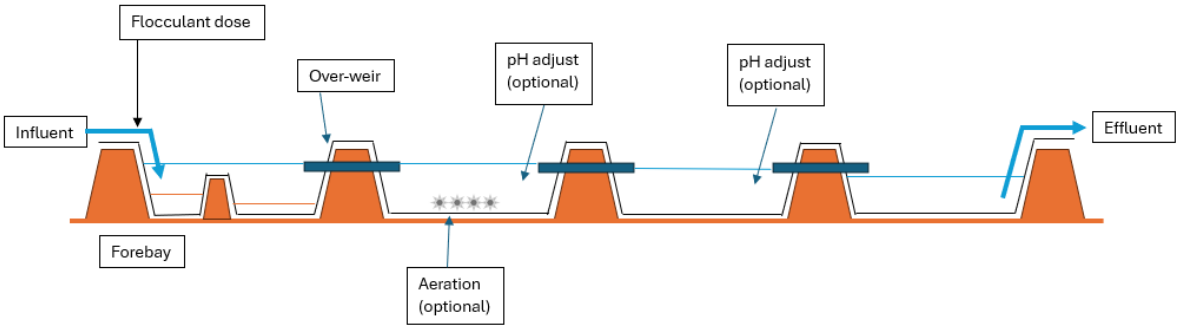
The settlement lagoon could also be retrofitted to remove ammoniacal nitrogen as a gas (ammonia) through aeration and pH adjustment. pH adjustment shall be controlled through the use of sustainably sourced sodium hydroxide (caustic soda) and an acid (likely hydrochloric acid) if required depending on pH criteria for discharge.

All options should be installed, but if through monitoring they are found to not all be required they can incrementally be switched off, or not used to make the system as sustainable as possible.

A plan view of the retrofitted settlement lagoon is presented below:



A cross section of the retrofitted lagoon is presented below:



Automated Treatment - Reen Network

To manage ammoniacal nitrogen within the reen network to achieve the requirements of the Section 5 notice, it is proposed that an automated ion-exchange (IX) system is installed and managed by Glan Llyn Estate Management Limited, it is also considered that the deployment of a Reverse Osmosis (RO) system may also provide an effective solution.

The treatment facility is proposed to be located on the north west corner of the Eastern Sports Pitch (18669-RLL-26-XX-DR-O-0853-P01). The location of this facility and proposed build

sequence at Glan Llyn will allow its retention through to completion of construction works, if required.

Ammoniacal nitrogen is proposed to be monitored telemetrically within the reen when levels are recorded to exceed the trigger value of 0.8mg/l (the upper trigger level) and will pump water into the treatment lagoon (18669-RLL-26-XX-DR-O-0853-P01) and process water until a lower trigger level is achieved (0.6mg/l) and the water is returned to the reen network. This process is then repeated.

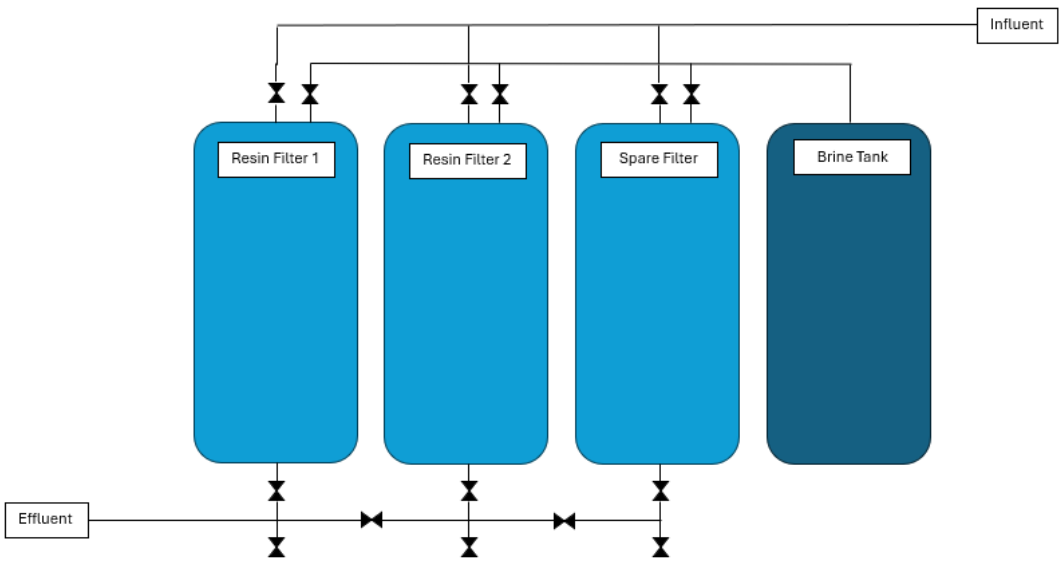
The automated system is proposed to comprise three resin filters and a brine tank. The ion-exchange (IX) system will remove ammoniacal nitrogen from water running through the resin filter before being discharged into the lagoon. Water within the lagoon can be cycled though the system several times before discharge and telemetric monitoring and management of the lagoon will allow discharge of treated water once the lower trigger level has been achieved.

Two of the three resin filters shall be running at any one time, the third will be in place which can be used during regeneration cycles of the other resin filters to allow for 24 hour treatment, if required.

Brine, a saline solution, is used for the regeneration cycle of the resin filters and brine rinse effluent will be held on site and disposed of via waste carrier/ facility. No saline water will be discharged to the Reen network.

Ion exchange is largely indiscriminate so it is likely there will be a reduced in total minerals in any water that we treat, this will subsequently reduce conductivity and other determinands discussed in the Section 5 Notice.

A schematic of the system is presented below.



Vegetation Management

Seasonal change is known to impact the ammoniacal nitrogen levels within the Glan Llyn reen network. Ammoniacal nitrogen is an important source of nitrogen for plants and during the growing season (spring/ summer), during summer reeds also act as a natural filter for the waters when mature. In winter the converse of this occurs where plants die back and decay, releasing ammoniacal nitrogen back into the watercourse whilst also not growing and therefore not taking up nitrogen.

On agreement with the Site Ecologist, annual vegetation clearance is recommended where reeds are trimmed to 330mm above ground or water level to reduce the amount of decay that occurs during the winter months. It is proposed that this is undertaken across the entire reen network.

In addition to this, in line with the water vole management plan for the site, full vegetation clearance shall be undertaken in 50m sections, every 3 years. The removal of this decaying material will reduce the amount of ammoniacal nitrogen being added to the reen and the BOD of the reen during the winter months.

Monitoring and Data Sharing

The treatment systems on site will be managed and controlled through the use of in situ telemetric monitoring equipment for ammoniacal nitrogen, the monitoring positions are shown on Drawing 18669-RLL-25-XX-DR-O-0742-P02.

Weekday sampling shall be undertaken at the location of discharge (Monks Lake) for ammoniacal nitrogen, BOD, Sulphate, Chromium, Chloride, Copper, Manganese and Nickel and a suitable suite of contaminants including all determinands included in the Schedule 5 notice. It is proposed that a summary is presented quarterly to the Environmental Officer alongside results presented in excel format.

It is recommended that the sampling frequency is reviewed every three months based on the evolving dataset with the potential to drop the frequency to weekly, then monthly monitoring.

Drawings

GENERAL NOTES

NO DIMENSIONS TO BE SCALED OFF THIS DRAWING.

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

KEY:

- MONKS DITCH
- SURFACE WATER SYSTEM
- PROPOSED COMPLIANT TESTING POINT (SWPS1)
- INFLUENT DRAINAGE
- TATA DRAIN
- BLOCKED OFF DRAIN
- PHASE BOUNDARIES
- SURFACE WATER SAMPLING LOCATION

Rev	Date	Amendments	By	Chk
P02	04:07:25	Amended Discharge Point	AMS	CW
P01	15:05:25	First Issue	ET	CW

Client

Revantage

Project

P18-669 Llanwern Reclemation

Drawing Title

Glan Llyn

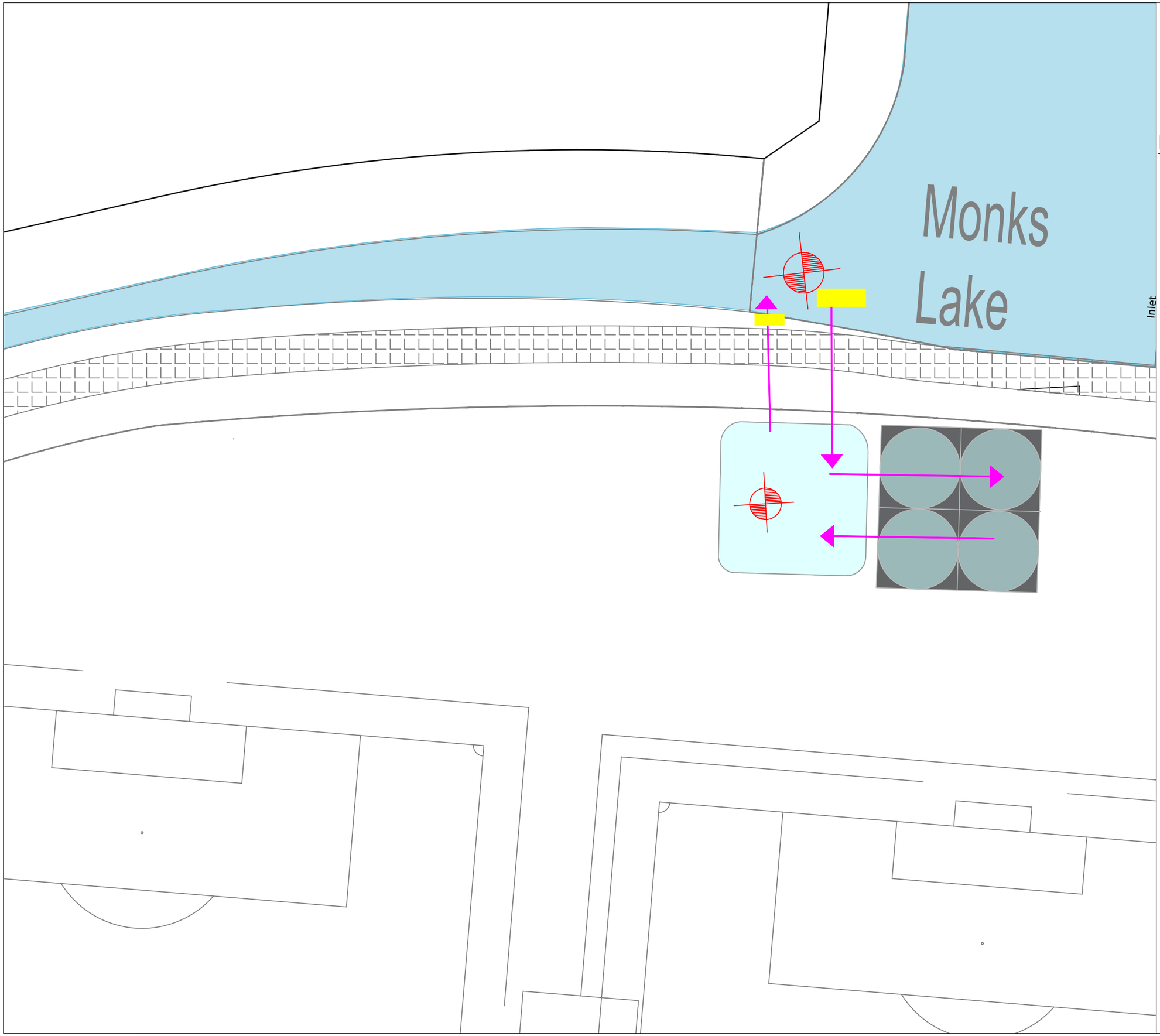
Surface Water System

INFORMATION

	Drawn	Checked	Date
NTS	ET	CW	15/05/25

Drawing No. 18669-RLL-25-XX-DR-O-0742 Rev. P02

1/100A Woodlands Court ● Ash Ridge Road ● Bristol ● B32 4LB ● Tel: 01332 285 000 ● www.rodgersleask.co.uk



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ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

Key

- WATER QUALITY SAMPLE MONITORING POINT
- RESIN FILTRATION (RF) OR REVERSE OSMOSIS (RO) UNIT (TBC)
- SURFACE WATER TREATED WATER PATHWAY
- REAL TIME MONITORING (TBC)

Rev	Date	Amendments	By	Chk
P01	20/02/2026	First Issue	AMS	CW

Client

Revantage Real Estate

Project

P18-669 Llanwern
Glan Llyn Residential Development

Drawing Title

Proposed Water Treatment System

INFORMATION

	Drawn	Checked	Date
NTS	AMS	CW	20/02/26

Drawing No. — Rev.

18669-RLL-26-XX-DR-O-0853 P01

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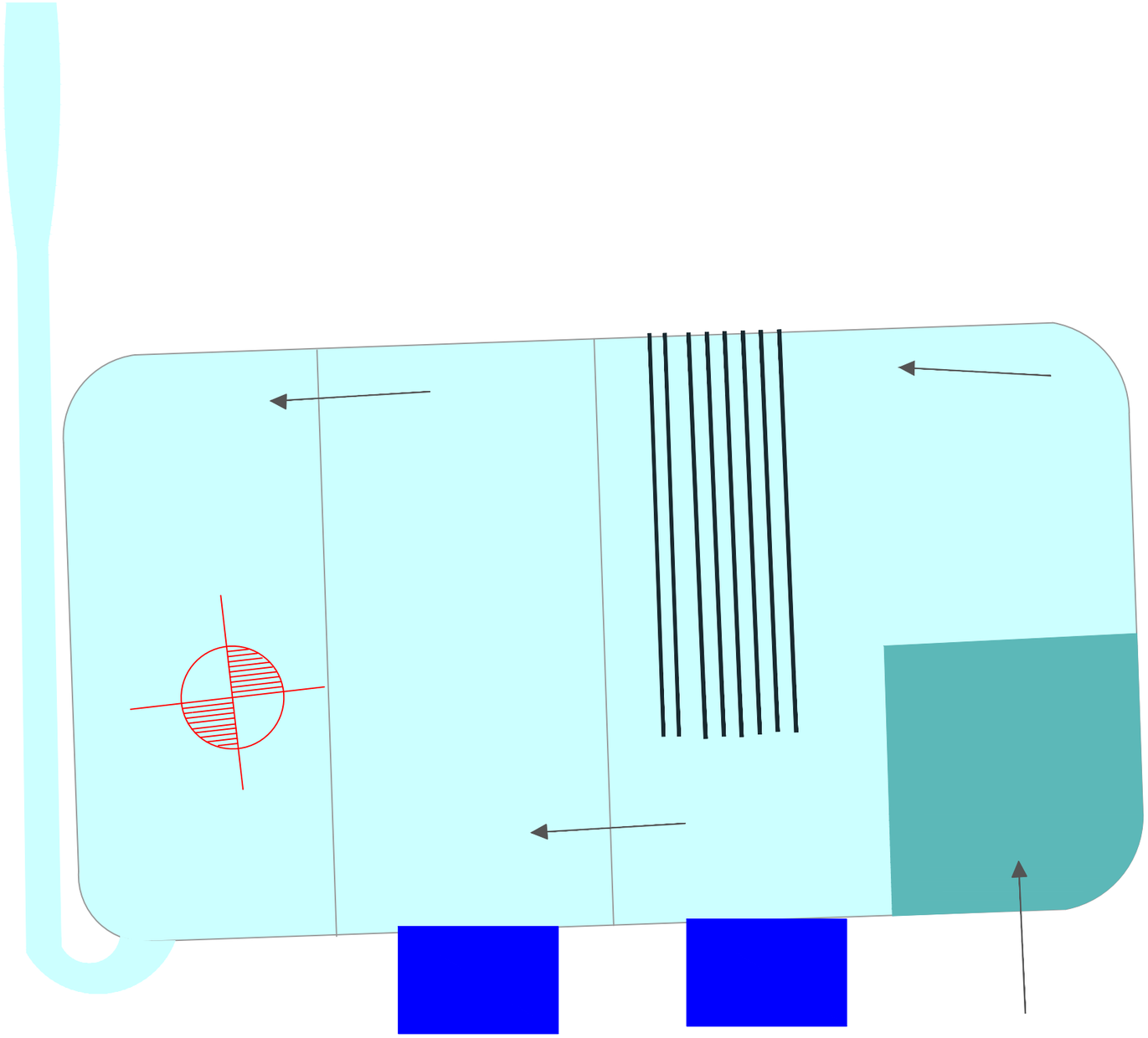

Discharge of construction waters

GENERAL NOTES

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ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

Key

- WATER QUALITY SAMPLE MONITORING POINT
- AERATION TUBES (TBC)
- SETTLEMENT LAGOON (TBC)
- POLISHING CHANNEL (TBC)
- SURFACE WATER TREATED WATER PATHWAY
- CONSTRUCTION WORKS WATER PATHWAY
- PH ALTERATION (TBC)

Rev	Date	Amendments	By	Chk
P01	27/02/2026	First Issue	ET	CW

Client

Revantage Real Estate

Project

P18-669 Llanwern
Glan Llyn Residential Development

Drawing Title

Construciton Waters Management Option

INFORMATION

	Drawn	Checked	Date
NTS	ET	CW	27/02/26

Drawing No. — Rev.

18669-RLL-26-XX-DR-O-0857 P01

1/100A Woodlands Court ● Ash Ridge Road ● Bristol ● B32 4LB ● Tel: 01332 285 000 ● www.rodgersleask.co.uk

Appendix A

Cyfoeth Naturiol Cymru
Natural Resources Wales

Chris Wilson
Rogers Leask Limited
1/100A, Woodland Court
Ash Ridge Road
Almondsbury
Bristol
BS32 4LB

Our ref: PAN-029406

Date: 13/02/2026

Dear Chris Wilson

Request for further information to support your application

Application reference: PAN-029406
Operator: Glan Llyn Estate Management Ltd
Facility: Glan Llyn, Newport, NP19 4RG

I enclose a notice that asks you to send us more information to support your application for an environmental permit. We need this information so that we may continue to process your application. The notice specifies what you need to send and when you must send it by.

If we do not receive it by the date set out in the notice then we may treat your application as having been withdrawn. If this happens you may lose your application fee.

If you have any concerns about being able to provide this information on time please let me know.

If you have any questions about this notice please phone me on 0300 065 3646 or email steve.bickerton@cyfoethnaturiolcymru.gov.uk.

Yours sincerely

Steve Bickerton
Permitting Officer, Water Quality

Ffôn/Tel 0300 065 3646
Ebost/Email steve.bickerton@cyfoethnaturiolcymru.gov.uk
steve.bickerton@naturalresourceswales.gov.uk
Cyfoeth Naturiol Cymru, Swyddfeydd Llywodraeth Cymru, Parc Cathays, Rhodfa'r Brenin Edward VII, Caerdydd, CF10 3NQ
Natural Resources Wales, Welsh Government Offices, Cathays Park, King Edward VII Avenue, Cardiff, CF10 3NQ
Gwefan/Website www.cyfoethnaturiolcymru.gov.uk
www.naturalresourceswales.gov.uk

Cyfoeth Naturiol Cymru
Natural Resources Wales

Notice of request for more information

Environmental Permitting (England and Wales) Regulations 2016

Notice requiring further information

To: **Glan Llyn Estate Management Ltd**

C/O
Chris Wilson
Rogers Leask Limited
1/100A, Woodland Court
Ash Ridge Road
Almondsbury
Bristol
BS32 4LB

Application number: PAN-029406

Natural Resources Wales, in exercise of its powers under paragraph 4 of Part 1 of Schedule 5 of the above Regulations, requires you to provide the information detailed in the attached schedule. The information is required in order to determine your application for a permit, dated 23/05/2026. The information requested should be sent to the following address by 27/02/2026.

Information should be sent to: Steve.Bickerton@cyfoethnaturiolcymru.gov.uk

Permitting Centre
Welsh Government Offices
Cathays Park 2
King Edward VII Avenue
Cardiff
CF10 3NQ

Name	Date
Katrin Raynor	13/02/2025

Authorised on behalf of Natural Resources Wales

Schedule

1. Provide a revised management plan/operating technique that details how treatment of the discharge will be achieved. This should include (but not limited to)

    a. a map showing the location of the treatment system, type of treatment to be used, ongoing maintenance of the treatment system, contingency plan for failure (if applicable) and long term expectation of the system and the discharge quality.

    b. The limits that are required to be achieved in the discharge are:
    Ammonia 0.8 mg/l as a maximum
    and
    BOD 11 mg/l as a maximum

    c. Details of the ongoing sampling regime to be used to monitor the following chemicals identified as requiring further monitoring after assessment:
    Sulphate
    Chromium
    Chloride
    Copper
    Manganese
    Nickel

Cyfoeth Naturiol Cymru' Swyddfeydd Llywodraeth Cymru, Parc Cathays, Rhodfa'r Brenin Edward VII, Caerdydd, CF10 3NQ
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Ebost/Email steve.bickerton@cyfoethnaturiolcymru.gov.uk
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