

INFORMATION TO SUPPORT PERMIT VARIATION

DISCHARGE OF TREATED WATER

FEBRUARY 2026

Environmental Permit DP3934EW

Point of Ayr Gas Terminal

Eni UK Limited

Introduction

This document provides information relating to the proposal to discharge treated water to Talacre Brook via emission point W1 in Environmental Permit DP3934EW. We have been advised that this assessment will be carried out as part of permit variation application PAN-029789.

Application Overview

The site is currently being developed as part of the Liverpool Bay Carbon Capture and Storage Scheme, which plays a vital role in supporting the UK's net zero ambitions across north Wales and north-west England.

Decommissioning and site preparation works at the Point of Ayr (PoA) Terminal and surrounding colliery area began in September 2025, with planning consent for this work granted by FCC in May 2024. These works will play a crucial role in preparing the PoA Terminal for future carbon transportation and storage operations and ensuring it is ready for the equipment to transport and store CO₂ offshore. The construction phase, including the preparation for installing new equipment, will begin in early 2026.

To allow for the underground demolition and construction activities, temporary abstraction and discharge of groundwater is required (approx. Mar 2026 – May 2028).

It is proposed that any groundwater encountered will be

1. removed from the excavations (covered in abstraction application PAN-030979),
2. treated through OSSO WTS20 fully automated chemical dosing systems and a Granular Activated Carbon (GAC) filters (covered in information submitted previously in application PAN-029789 with some elements updated in this submission),
3. prior to being discharged to Talacre Brook (proposal covered in this submission).

Recent results have also highlighted the presence of PFAS within the surface water system. It is therefore also proposed to treat all surface water collected on site through the GAC filtration system.

The H1 screening assessment identifies several substances within the groundwater that cannot be screened out as insignificant without treatment. The design of the proposed treatment system has been updated to ensure these substances are reduced prior to discharge into Talacre Brook.

The existing environmental permit allows the discharge of boiler and cooling tower blowdown, site surface water and boiler pre-treatment plant effluent. The S1.1 (combustion) and 1.2 (refining gas) listed activities ceased in December 2024. There is therefore no longer a discharge of blowdown or boiler pre-treatment effluent in the discharge to Talacre Brook, just surface water.

The information in this document is provided to support the request to vary the existing Environmental Permit to allow for the discharge of treated water into Talacre Brook.

The proposed methodology (phase 2) described in this document will only be implemented once the results of the GAC validation (phase 1) have been obtained and deemed fit for purpose by NRW, Eni and Saipem.

Details of Proposed Discharge

Due to the known presence of PFAS on site and elevated metals in groundwater, all ground and surface water encountered on site will be treated prior to discharge to Talacre Brook via emission point W1.

Appendix 1 shows the site, the location of the discharge point to Talacre Brook and the direction of flow of the Brook.

Abstraction Details

The maximum groundwater abstraction rate is anticipated to be approximately 17.6 l/s (1,520 m³/day). Actual abstraction volumes will vary depending on:

- excavation depth,
- local groundwater levels, and
- ground conditions at each excavation location.

Excavations will be undertaken sequentially thereby minimising the volume of groundwater abstracted and discharged concurrently.

Further information, including drawdown modelling and impact assessment, has been submitted to NRW under groundwater abstraction application PAN-030979, which is currently under determination.

Water Treatment

Previous submission PAN-029789 covers the proposed treatment of groundwater through a GAC filtration system. However, due to the conclusion of the recent H1 assessment and the presence of PFAS in the surface water, the exact design of the system has been updated.

More detailed information on groundwater characterisation and pre-treatment testing is provided within application PAN-029789.

The proposed treatment system itself will be located near to the outfall basin and has been sized based on conservative design flow and contact time. A copy of the P&ID for the proposed system is in *appendix 2*.

Groundwater from the abstractions will be pumped to the Firewater Pond. Surface water will be collected in the existing drainage system and will also be pumped into the Firewater Pond from the pumping chamber (prior to the outfall basin). The ground and surface water will be homogenised in the firewater pond (approximately 4,500m³) and then pass through a treatment system.

The proposed treatment system is to

- Pump the homogenised water from the firewater pond through 2 x WTS20 units to remove the zinc and cadmium. An automated pH correction system will be used to raise the pH to around 10 which will facilitate the precipitation of the metal hydroxides
- The water will then be forwarded onto further 2 x WTS20 units (operating in parallel) where they will dose back down to a pH of around 8 where the remaining metals will be co-precipitated with ferric chloride. The ferric chloride will allow for the coagulation of any slow settling solids present in the pre-treated water. A polymer is also added to aid precipitation of the total suspended solids
- Water will discharge under gravity into a forwarding tank (inclusive of float activated pump arrangement)
- The next stage will involve 2 x carbon vessels filled with CR005 (regenerated carbon) where any PAHs will be absorbed (to protect the lifetime of the PFOS targeted GAC filters). These filters will run in lead – lag formation to support efficient swap out when required
- Water will discharge under gravity into a forwarding tank inclusive of pump (on a float switch set up)
- The final stage of the treatment is to forward the pre-treated water onto 4 x GAC vessels running in lead – lag formation and operating in parallel. The 50 m³/hr flow will be distributed equally between the two lead filters using a split flow manifold
- Water leaving the GAC vessels will discharge under gravity into the outfall basin where it will be discharged to Talacre Brook via emission point W1.

Datasheets for the chemicals and WTS20 system, as well as the operating instructions for the GAC filters are included in *appendix 2*.

An environmental screening statement is included in *appendix 2*.

GAC Replacement and Breakthrough Management

The treatment system comprises GAC vessels operating in lead–lag configuration. The lead vessels provide primary PFAS adsorption, with the lag vessels acting as a polishing and safeguard stage. During GAC validation, adsorption performance and indicative carbon lifespan (based on influent concentration and treated volume) will be established.

During full operation, cumulative treated volume will be tracked and compared against validated adsorption capacity, with a conservative safety factor applied to ensure carbon replacement occurs well in advance of predicted breakthrough. Operational monitoring, including PFAS sampling and review of post-lead performance trends, will provide additional assurance.

GAC Monitoring and Performance Verification

The treatment train comprises solids removal via the WTS20 system (coagulation, flocculation and settlement) followed by dual-stage GAC adsorption. The WTS20 provides primary removal of suspended solids and particulate-bound contaminants, including metals, prior to GAC polishing.

Monitoring of the treatment system will verify ongoing performance and ensure compliance with the 0.1 µg/L PFOS discharge criterion and existing permit parameters.

During validation, sampling will be undertaken at the influent, post-lead vessel and post-lag vessel to confirm adsorption performance and establish carbon lifespan.

During full operation, routine monitoring will include:

- Final effluent pH, BOD, TSS, PFAS, metals and hydrocarbon sampling
- Periodic post-lead vessel sampling to provide early indication of GAC breakthrough
- Recording of cumulative treated volume to track carbon usage.

Monitoring frequency will be increased during commissioning and early operation, with scope to optimise once stable performance is demonstrated.

If any analytical result indicates declining treatment performance or exceedance of the PFOS criterion or permit discharge limits, discharge will cease and corrective action will be implemented in accordance with the carbon replacement protocol.

Discharge to Talacre Brook

Current Discharge Process

Environmental Permit DP3934EW permits the discharge of surface water and trade effluent to Talacre Brook via point W1, subject to the limits specified in Table S3.2.

Permit condition 3.5.1 requires monitoring of pH and BOD prior to discharge. There are currently no restrictions on discharge volume or frequency under the existing permit.

Surface water is collected within the outfall basin and batch discharged via W1. Discharge is facilitated by a pump with a capacity of approximately 50 m³/hour. The outfall basin has a total storage capacity of approximately 4,000 m³, and discharge frequency is rainfall dependent.

A summary of discharges to Talacre Brook during 2025 is provided in the table below.

Month	Water Discharged m ³	Number of discharges	Min pH	Max pH	Max BOD
Jan	25,965	5	7.58	7.80	5.90
Feb	13,993	4	7.35	7.80	5.80
Mar	18,687	4	7.00	7.80	4.90
Apr	10,270	5	7.80	8.90	8.70
May	9,478	5	8.20	8.80	7.50
Jun	13,305	4	7.34	8.60	7.20
Jul	3,982	4	7.90	8.90	5.80
Aug	2,439	2	8.80	8.90	7.70
Sep	10,648	5	8.70	8.90	13.60
Oct	5,798	3	7.98	8.76	14.70
Nov	20,020	7	7.20	8.80	9.10
Dec	12,516	5	7.4	8.40	3.90
Total	134,585	53			
Min			7.00		
Max				8.9	14.7

Proposed Discharge Process

The fundamental discharge mechanism via W1 is not proposed to change during the demolition and construction phases.

However, the composition of the discharge will change to include groundwater in addition to surface water already permitted, and all water discharged will be treated.

Key elements of the proposed discharge process are:

- Treated ground and surface water will be discharged via W1 following validation of treatment performance and supported by routine monitoring and defined operational safeguards.
- The existing pump rate (50 m³/hr) will be maintained.
- The frequency of discharge events is expected to increase during active excavation works due to additional groundwater inputs.

Saipem has explored the option of discharging treated water to the foul sewer. However, Dŵr Cymru Welsh Water has confirmed that they are unable to accept PFAS-impacted effluent or the volumes associated with excavation dewatering. Discharge to controlled waters therefore remains the only viable option.

Proposed Monitoring at W1

At the time of the original submission of PAN-029789 it was only anticipated that the GAC system would be used to treat groundwater. However, it is now the intention that all ground and surface water will be treated prior to being discharged from site. This increases the volume of water that will require processing prior to discharge.

The maximum daily volume of groundwater for treatment is anticipated to be 1,520 m³/day. Based on the 2025 data the average daily discharge of surface water was 369 m³. This would result in 1,869 m³ of water being produced in a day.

The standard lab turnaround for PFAS analysis results is 8 – 10 days.

Given the potential daily volume and lab turnaround time, routine attenuation of treated water pending laboratory confirmation is therefore not practicable without materially impacting the programme and site operations.

GAC validation is specifically designed to demonstrate and validate treatment performance against the agreed 0.1 µg/L PFOS discharge criterion, providing regulator confidence prior to sustained discharge under full operation.

A copy of the presentation provided to NRW in January 2025 which covers the emptying of the Firewater Pond and validation phase in detail, is included in *appendix 3* of the application.

Monitoring will be undertaken to ensure ongoing compliance with permit conditions and PFAS management objectives.

It is proposed that initially weekly monitoring will be carried out for the following substances, with the potential to decrease the frequency (in agreement with NRW) once the system has been proven:

- Routine monitoring pH and BOD in accordance with existing permit DP3934EW.
- PFAS monitoring, including PFOS at a UKAS accredited lab.
- Total Suspended Solids (TSS) monitoring, particularly where upstream solids control or flocculation is implemented.
- Hydrocarbons.

On a monthly basis monitoring of metals in the treated water will be carried out by a UKAS accredited lab.

A PFOS discharge concentration of 0.1 µg/L, previously accepted by NRW through the remediation strategy and discharge of condition 12 of the TCPA, is proposed.

Monitoring frequency will be increased during commissioning and early operational phases, with scope to reduce frequency subject to stable performance and agreement with NRW.

Proposed Response if any permit limits are exceeded

If monitoring indicates exceedance of permit limits or agreed PFAS discharge criteria:

- Discharge via W1 will be immediately suspended.
- The cause of the exceedance will be investigated (e.g. treatment performance, solids loading, carbon exhaustion).
- Corrective actions will be implemented, which may include carbon replacement, adjustment of treatment configuration, recirculation of treated water, storage in a temporary holding area
- NRW will be notified as appropriate, in accordance with permit conditions.

Receiving Water Information

Discharge will continue via point W1 to Talacre Brook, which is a slow-moving watercourse that ultimately discharges to the Dee Estuary approximately 1km downstream.

The first approximately 500m of Talacre Brook is open, after which it becomes culverted beneath the colliery before discharging into the penstock lagoon and subsequently to the estuary via the Sluice House Gutter Channel.

Appendix 1 shows the route of the receiving watercourse.

A water features survey was undertaken by Stuart Wells as part of the application and is included within *Appendix 4*. The survey assessed sensitive receptors and the capacity of the receiving water to accommodate more frequent discharges and concluded that, “*due to the size of the culverts throughout Talacre Brook the volume of water throughflow should not cause significant or long-term problems*”

H1 Risk Assessment

An H1 assessment has been carried out based on the samples collected from the GIC pumping test carried out in 2025, see *appendix 5 for both the H1 assessment and the results of the pumping trial*.

The H1 screening assessment identifies several substances within the groundwater that cannot be screened out as insignificant without treatment.

The assessment was carried out based on the raw water contamination levels. The proposed treatment system (the OSSO WTS 20 and GAC filters) on site are designed to remove these contaminants to below levels that will not impact the EQS. A Case Study in

appendix 2 details a previous case where a similar system has been used to remove metals and PAHs.

The proposed system at PoA is designed to reduce the levels of metals, PAH and PFAS to levels below those that will cause EQS exceedances. Regular routine monitoring (as described above) of the treatment system and the outfall will be carried out to demonstrate that the system is working and compliance with the Environmental Permit.

Habitat Regulations Assessment (HRA)

The HRA carried out as part of the wider CCS TCPA application (PF.3.3 Habitat Regulation Assessment Stage 1 & 2 PAC June 2025) concluded that *“there would be no adverse effects on site integrity in relation to any of the European Sites or their associated qualifying habitats or species. This is on the provision that appropriate mitigation measures are secured and fully implemented during construction and decommissioning”*. It is not envisaged that this will be altered by the proposed temporary discharge of treated groundwater via W1.

Environmental Statement

An Environmental Statement (T4 HyNet Carbon Dioxide Pipeline TCPA) was completed as part of the wider CCS planning application and can be provided in full if required.

One conclusion of the Environmental Statement was that there would be a biodiversity net gain as a result of the proposed development. It is not envisaged that this will be altered by the proposed temporary discharge of treated groundwater via W1.

The Environmental Statement concluded that *“with mitigation measures in place, no significant adverse or beneficial residual effects on the water environment and flood risk are likely to occur during construction, operational and decommissioning stages of the TCPA proposed development”*. It is not envisaged that this will be altered by the proposed temporary discharge of treated groundwater via W1.

The Water Framework Directive (WFD) Assessment carried out as part of the Environmental Statement concluded that *“the proposed development will not prevent the achievement of WFD mitigation measures set for the Dee (North Wales) Transitional water body (GB531106708200), which is the only water body, which is the only water body with applicable measures proposed by Natural Resources Wales”*.

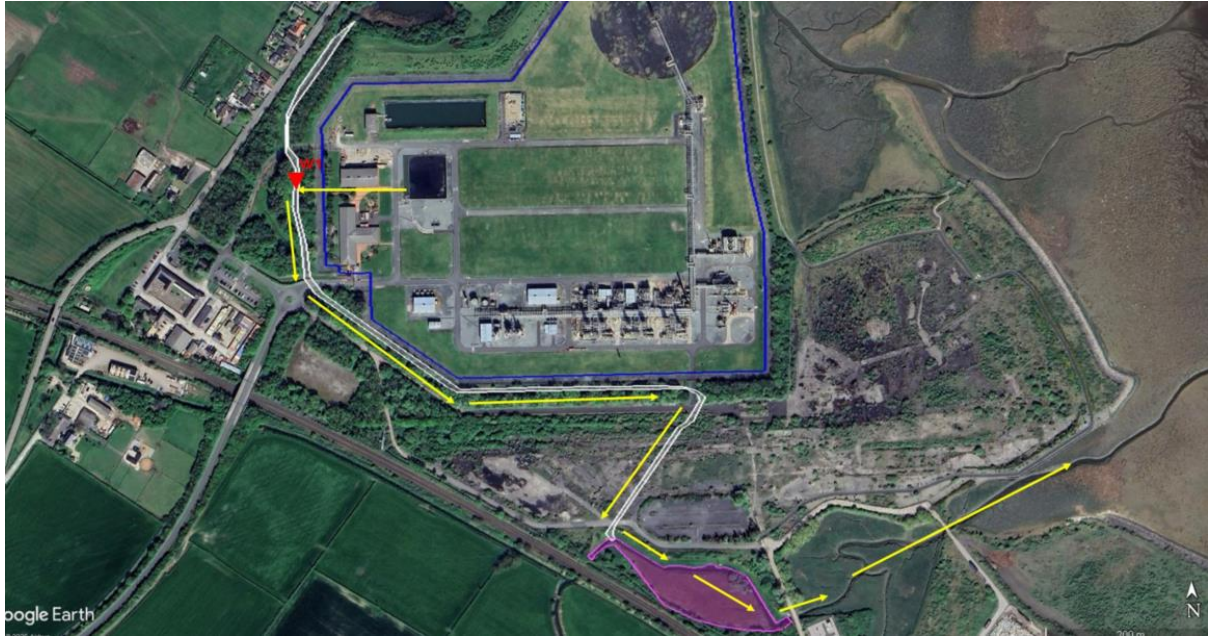
Impacts of the demolition and construction activities will be mitigated through best practice measures and in line with the CEMP.

The WFD assessment concluded that “with the proposed mitigation in place, the TCPA Proposed Development is WFD compliant. It is not envisaged that this will be altered by the proposed temporary discharge of treated groundwater via W1.

Pollution Control Measures

The site Pollution Prevention Plan will be updated prior to the commencement of the water treatment activity.

Appendix 1



Appendix 2

Information relating to the water treatment set up

- Datasheets for caustic, polymer and ferric chloride
- Previous case study
- Datasheet WTS20
- Operating Instructions GAC Filter
- Environmental Screening Assessment
- Phase 2 P&ID

Appendix 3

PFAS Surface Water presentation to NRW January 2026 on request to empty fire water pond and Phase 1 (validation).

Appendix 4

Water Features Survey

Appendix 5

H1 Assessment and GIC Report (with sample results used for H1)