

**ENVIRONMENTAL SETTING & SITE DESIGN
REPORT**

**Environmental and sustainability solutions provided to
BRYN RECYCLING LTD**



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Document Title	Environmental Setting & Site Design Report	
Client	Bryn Recycling Ltd	
Revision	v2.0	
Date	04/01/2024	
Document Reference	BRY-A04	
Project Reference	1213/J05	
Author: Martin Ropka	Reviewer: Joseph Epicheff	
		

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REVISION LOG

Revision	Details	Date
0.1	Initial draft	31/05/2023
0.2	Internal Review	31/05/2023
0.3	Addition of Section 10	17/08/2023
1.0	First Issue	22/12/2023
2.0	Second Issue	04/01/2024

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1.0 INTRODUCTION

Walker Resource Management Ltd (WRM) have been contracted by Bryn Recycling Ltd (Bryn Recycling) to produce an Environmental Setting and Site Design Report as part of their application for an environmental permit to recover 420,000m³ of inert waste material at Gelliargwellt Farm, Hengoed. The wider farm site is home to an Anaerobic Digestion facility, a composting facility, a quarry and a Materials Recovery Facility (MRF).

The inert waste material will be recovered for the extension of the existing material processing and storage yard at the MRF and creation of a screening bund to the south and southwest of Gelliargwellt Farm. The waste will be recovered in line with the requirements of the environmental permit.

2.0 PROPOSED ACTIVITY

Bryn Recycling propose to recover approximately 420,000m³ or 672,000 tonnes (using a conversion factor of 1.6 tonnes per m³) of inert waste material for the extension of the existing material processing and storage yard at the MRF and creation of a screening bund to the south and southwest at Gelliargwellt Farm. An additional 3,000 tonnes of non-waste (PAS 100 accredited compost) will be used as a top layer on the screening bund to provide a growing medium for the planting of native broadleaf woodland linking to the existing Coed Gelliau'r-gwellt to the south and west. However, these 3,000 tonnes of compost are not considered to fall under the control of the environmental permit on the basis that it is not a waste material. This recovery of waste activity seeks to enable Bryn Recycling to make improvements to the way in which recycled material is stored which will increase the quality and recovery rate of sorted and recovered recycled materials and the proposed landscape bund would also provide better screening of the fire prevention wall serving the MRF.

The waste will be recovered in line with the requirements set out in the environmental permit. Waste accepted onto site, following the strict protocols in the Waste Acceptance Procedure (BRY-OP02) which makes up part of the environmental management system, will be immediately deposited at its final location using a shovel loader and other agricultural and construction vehicles. If waste materials were not used, then non-waste materials would be used instead. The most likely source of an alternative would be to purchase virgin or recycled aggregates, clays and subsoil. These materials will likely come at a higher environmental cost.

The materials that will be used within this proposed development are wastes that have been brought to site directly by small local landscaping contractors or utility companies via the MRF. These wastes will not contain any hazardous materials. The recovery of discarded

material is justifiable as it potentially diverts waste that would normally be going to landfill for disposal.

3.0 SITE DETAILS

3.1 Site Address

Bryn Recycling Ltd
Gelliargwellt Farm,
Gelligaer Road,
Hengoed
CF82 8FY

3.2 Operational Location

Site Grid Reference: ST 12393 96501

3.3 Site Access

The primary vehicle access is from Gelligaer Road, which is located to the northwest of the site.

3.4 Current Site Description

The area in which the waste would be deposited for recovery is within land that makes up part of Gelliargwellt Uchaf Farm. Gelligaer Road connects neighbouring towns including Gelligaer and Penpedairheol which are located approximately 800m and 2,000m respectively, to the northeast of the site. Penybryn is located approximately 1,300m to the east, with the Penallta Industrial Estate located slightly further east. Caerphilly is located approximately 8.5km south of the site.

The site is bound to the south by agricultural land and Parc Penallta Country Park, which comprises an area of public open space and woodland is located approximately 850m to the southeast. Nelson Bog Site of Special Scientific Interest (SSSI) is located 550m to the southeast of the site. Waun Rydd Site of Importance for Nature Conservation (SINC) is located to the east of the site and Coed Gelliau'r – Gwellt SINC is located immediately adjacent (west) to the site and comprises an ancient woodland.

As described in Section 2.0 above, the recovery of 420,000m³ of inert waste would enable Bryn Recycling to make improvements to the way in which recycled material is stored, via the

extension to the MRF storage yard, which will increase the quality and recovery rate of sorted and recovered recycled materials and the proposed landscape bund would also provide better screening of the fire prevention wall serving the MRF.

3.5 Historical Land Use Activity

Historical land use development of the site is captured through historical mapping, dating back to 1884. On the map from this year, the land is undeveloped with a mixture of woodland and grassland present. There are two collieries located to the south and southwest of the site along with a railway line. The map from 1901 shows the site as it was in 1884, although there are now signs of agricultural expansion of Gelliargwellt Farm to the east and one of the collieries is not classified as disused. Between 1901 and 1965, there is no change to the site and the immediate vicinity although increased residential areas do appear in Nelson and to the southeast of the site. In 1965 the remaining colliery is classified as disused.

The map from 1974 shows that whilst the site has remained undeveloped, the residential areas of Penybryn and Nelson have undergone significant residential expansion. In 1999, the neighbouring quarry is in the early stages of development and there has been a widening of Gelligaer Road to the north of the site. By 2006, the quarry is fully established. In the latest map from 2022, the site remains undeveloped, although some of the woodland has been replaced by grassland. Gelliargwellt Farm has expanded its operations with the inclusion of an Anaerobic Digestion facility and the MRF site adjacent to the quarry.

4.0 SITE SETTING

4.1 Local and Regional Geology

The site is underlain by one type of bedrock (i.e. rock types far below the surface), the Grovesend Formation. This is bedrock composed of mudstone, siltstone and sandstone. It was formed approximately 318 to 319 million years ago in the Carboniferous Period. In one small portion near the south-eastern boundary of the site, the Grovesend Formation bedrock is classified as being composed of sandstone.

There is one superficial deposit under the site, this is Till which is formed of the rock type Diamicton. The Till formed approximately 11 to 116 thousand years ago in the Devensian stage.

4.2 Hydrology

Current mapping suggests that there are several watercourses around the proposed site. There is one that tracks along the western boundary of the proposed site which flows in a general north to south direction. This is immediately adjacent to the Coed Gelliau'r-gwellt SINC. There is another watercourse along the western portion of the southern boundary of the proposed site. This flows in an east to west direction.

These watercourses appear to join up with others in the area and flow towards the Nelson Bog SSSI. The bog acts as a natural attenuation system long before run-off enters the main river system (River Rhymney) and its tributaries.

The additional surface water created by installing an impermeable concrete layer on the proposed MRF storage yard extension will be directed towards a new MRF yard surface water storage lagoon, via an interceptor, which will be constructed as part of the proposal. This water will then be directed to a series of new settlement lagoons to filter out small plastic particles before ending up in the southern attenuation lagoon, which will be located in the southwest corner of the proposed site. From here, the clean water will be discharged into the watercourse that borders the Coed Gelliau'r-gwellt SINC via a hydro-brake system to control the flow of water in the watercourse and prevent flooding.

The southwestern corner of the proposed site is located in an area which has the potential for groundwater flooding to occur at the surface. There are certain locations within the proposed site that are designated as Flood Zones 2 and 3 for surface water and small watercourses as identified within the NRW Flood Map for Planning. Flood Zone 2 areas are those with 0.1% to 1% (1 in 1000 to 1 in 100) chance of flooding from surface water and/or small watercourses in a given year, including the effects of climate change. Flood Zone 3 areas are those with more than 1% (1 in 100) chance of flooding from surface water and/or small watercourses in a given year, including the effects of climate change.

However, the waste materials proposed to be used on site are inert and non-hazardous and so even in those locations where it is designed that surface water will run off site, it is anticipated that it will not cause a pollution incident.

4.3 Hydrogeology

The hydrogeological features of the subsurface features of the site are as follows:

- The bedrock beneath the site is designated as a Secondary A Aquifer. These are permeable layers of rock capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flows to rivers. They are generally aquifers formerly classified as minor aquifers.
- The majority of the site has no superficial aquifer designation. However, in the southwest corner of the site, the superficial aquifer is designated as Secondary Undifferentiated. This means it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type. These aquifers have only a minor value.

The site is not situated within a Groundwater Source Protection Zone (SPZ). The groundwater vulnerability classification for the west and southwest portions of the site bedrock is classified as a Secondary Bedrock Aquifer – Medium Vulnerability. Medium vulnerability areas are of intermediate vulnerability between High Vulnerability and Low Vulnerability areas. For context, the definitions for High Vulnerability and Low Vulnerability areas are provided below:

- High Vulnerability areas – Areas that are able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Low Vulnerability areas – Areas that provide the greatest protection to groundwater from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits with a low permeability.

The southwestern corner of the proposed site is located in an area which has the potential for groundwater flooding to occur at the surface. There are certain locations within the proposed site that are designated as Flood Zones 2 and 3 for surface water and small watercourses as identified within the NRW Flood Map for Planning. Flood Zone 2 areas are those with 0.1% to 1% (1 in 1000 to 1 in 100) chance of flooding from surface water and/or small watercourses in a given year, including the effects of climate change. Flood Zone 3 areas are those with more than 1% (1 in 100) chance of flooding from surface water and/or small watercourses in a given year, including the effects of climate change.

A Construction Environmental Management Plan has been produced which details the measures that are to be introduced both during the deposit of waste for recovery and following completion of the proposed development to ensure that flooding or contamination of waters does not occur. The risk of contamination of groundwater has also been covered in the Environmental Risk Assessment (BRY-B03) using the source-pathway-receptor conceptual site model and as such it is considered that a specific hydrogeological risk assessment is not required for this site.

4.4 Amenity Dust

The site has in place a Dust Management Plan (BRY-B01). This identifies the potential sources of fugitive dust emissions. The plan identifies the possible impacts associated with dust emissions, and thoroughly details the control measures which shall be taken to prevent and minimise dust emissions, including monitoring.

4.5 Noise and Vibration

The site also has in place a Noise and Vibration Management Plan (BRY-B05) which identifies the potential sources of noise and vibration and possible impacts. Mitigation measures proposed to minimise noise and vibration emissions are clearly identified in this document.

4.6 Ecology / Habitats

An Ecological Assessment was carried out in April 2022 by BSG Ecology as part of the application for planning permission. In January 2022, an extended Phase 1 Habitat Survey of the site was undertaken. All habitats were mapped using standard methods (JNCC, 2010) and any signs of protected or rare species, or suitable habitats for such species, were identified.

The study identified the watercourse along the western edge of the site that ultimately flows to the Nelson Bog SSSI. The assessment determined that this watercourse will not be directly affected by the proposed development, apart from where it will be connected to the site drainage and water attenuation scheme. The assessment also considers that indirect adverse impacts on water quality in this watercourse are unlikely. The surface water drainage and attenuation scheme will intercept any slippage of unconsolidated materials from the surface of the landscape mound at times of higher rainfall. Adverse impacts from other sources of pollution are also considered unlikely given the catchment of the site drainage and water attenuation scheme, and the construction of the landscape mound from inert materials and clean soils.

The study also identified the Gelliau'r-gwellt SINC woodland that immediately neighbours the proposed development site on the western side. The toe of the landscape mound and the proposed surface water drainage channel will be at least 15m from the SINC boundary and no significant impact on the SINC was considered to arise.

Construction of outfall structures and the construction of the landscape mound, the surface water drainage system on the face of the landscape mound, and the surface water runoff attenuation lagoon, will be controlled by implementation of a Construction Environment Management Plan (CEMP). Implementation of the CEMP will provide watercourse protection

measures throughout the construction phase, and the constructed surface water management system will ensure that no unconsolidated or other polluting materials end up in the watercourse (or in Nelson Bog SSSI).

The assessment determined that the proposed development will deliver biodiversity enhancement amongst local species and structures by replacing a large, improved grassland field with a landscape mound of native woodland, along with native wet woodland on the lower part of the field. This will benefit a range of species locally, and in particular, will provide commuting, foraging and long-term roosting opportunities for bats that are not currently present.

The surface water management system is designed to attenuate water from the new mound slope before entering the local watercourse system, but it will also increase the amount of open water locally and has the potential for further enhancement through the incorporation of native marginal planting to provide additional wetland habitat of value for a wide variety of species.

In summary, once established, the wooded mound will be of higher biodiversity value than the improved grassland habitat that it replaces.

5.0 POLLUTION CONTROL MEASURES

5.1 General

The site is secured to reduce the risk of accidents and pollution incidents. The Gelliargwellt Farm site has a chain link fence surrounding it with a gate at the site entrance which is locked when the site is closed. The main Gelliargwellt Farm, on which the site office is located is secured with gates and fences to prevent access. The facility is also situated within a largely agricultural location.

All security measures will be subject to visual inspection by a trained operative. Any defects will be recorded in the site diary and rectified in the appropriate manner.

The boundary is checked on a regular basis for damage or signs of attempted entry. Such occurrences are entered in the site diary and any damage is repaired at the earliest opportunity.

All visitors will be required to sign in at the main farm Site Office on arrival and exiting the site.

5.2 Site Engineering

The proposal for the recovery operation has been designed by qualified personnel. The proposal was produced following an initial topographical survey carried out by JPCE Ltd. The same company also completed the pre and post development cross sections and levels calculations using the information gathered by the topographical survey. JPCE Ltd are a well-established consulting engineering company who provide technical advice services within the waste industry to waste management companies, such as MRF developments; foundations and drainage infrastructure; landfill cell designs. Surveying and ground modelling are also integral elements within their portfolio. The company Director, John Perkins, who carried out the surveys, calculations and design, as well as producing the maps, is a chartered civil engineer with nearly 40 years of experience. His previous roles have included, Section Engineer for Glamorgan County Council and Senior Engineer at George Crowder Associates.

The pre and post restoration cross sections that were produced were used to accurately calculate the volume of waste material required for the completion of the restoration scheme. The clear scope of the works i.e. to alter the gradient of the existing hillslope to create a larger level area at the top of the slope, and to construct a screening bund at the top of the slope ensures that only the minimum volume of materials were calculated. The cross sections clearly show that no additional waste material will be used above the minimum required amount. The level area at the top of the existing hillslope is at the same level as the existing level area which is above the AD digestate storage lagoon yet below the MRF protection wall. An attenuation layer will not be required as the waste material that will be recovered is inert and will not risk polluting the soil or water.

Given that the proposed development involves altering the gradient of the existing hillslope, on top of which a concrete pad will be constructed, an engineering plan and slope stability risk assessment have been carried out by JCPE Limited.

The waste recovery works associated with the proposals will follow the detailed designs presented above. A dedicated Site Manager will be employed to oversee the waste recovery operations only.

5.3 Procedural

The materials that will be used within the development at Gelliargwellt Farm are wastes that have been brought to site via the Material Recycling Facility (MRF) located on the farm. The

materials are wastes that have been brought to the MRF directly by small local landscaping contractors or utility companies. These wastes will not contain any hazardous materials. The waste will be transported onto the site over the course of approximately 2 years.

The operator will apply strict waste acceptance procedures as part of the implementation of the Environmental Management System (EMS) in accordance with the requirements of the Environmental Permit for these operations. This will ensure that only suitable waste materials are imported for use in the proposed restoration. A Waste Acceptance Procedure will be included in the EMS that will control how waste is accepted to ensure that only suitable waste is recovered in the development area.

No waste will be accepted at the site unless it has been subjected to an appropriate basic characterisation procedure. The minimum information to be collected includes:

- the full address where the waste was produced; and
- the identity of the producer; and
- all the reasonably identifiable previous uses of the producer site where the waste is excavation waste; and
- the process giving rise to the waste; and
- the physical appearance of the waste including colour and texture; and
- confirmation and evidence that the waste has been classified and inert; and
- where a weighbridge isn't used a metric conversion factor for volume (cubic metres) to weight (tonnes) for each waste stream; and
- the quantity of waste to be imported; and
- evidence of compliance with these procedures.

All waste producers are required to complete a Waste Questionnaire to ensure the materials suitability and quality. All Waste Questionnaires will be reviewed by the Technically Competent Manager (or otherwise appointed representative) to ensure the suitability of the material prior to acceptance at the site.

All waste types listed in Table 1 below are included in the recovery guidance as the types of waste a producer may not need to test. Consistent with the recovery guidance, where the waste is from a single waste stream (from only one source) and where there is no suspicion of contamination the waste will be accepted without testing.

Table 1 - Waste types that may be accepted without testing

01 Waste resulting from exploration, mining, quarrying and physical and chemical treatment of minerals	
01 01	wastes from mineral excavation
01 01 02	Wastes from mineral non-metalliferous excavation
01 04	wastes from physical and chemical processing of non-metalliferous minerals
01 04 08	Waste gravel and crushed rocks other than those mentioned in 01 04 06
01 04 09	Waste sand and clays
17 Construction and demolition wastes	
17 01	concrete, bricks, tiles and ceramics
17 01 01	Concrete
17 01 02	Bricks
17 01 03	Tiles and ceramics
17 05	soil stones and dredging spoil
17 05 04	Soil and stones other than those mentioned in 17 05 03 ¹
19 Wastes from waste management facilities	
19 12	wastes from the mechanical treatment of waste (for example sorting, crushing, compacting, pelletising) not otherwise specified
19 12 09	Minerals (for example sand, stones) only
20 MUNICIPAL WASTES (HOUSEHOLD WASTE AND SIMILAR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL WASTES) INCLUDING SEPARATELY COLLECTED FRACTIONS	
20 02	separately collected fractions (except 15 01)
20 02 02	Soil and stones

Notes:

¹ Soil and stones will not be accepted directly from contaminated sites. They will be sampled, and a site-specific risk assessment will be carried out.

Level 2 compliance testing comprises testing periodically to determine whether the waste complies with the results of the basic characterisation testing and the site-specific conditions of the Permit.

Verification testing will comprise a visual inspection of the incoming waste and verification of the accompanying documentation. The basic characterisation information will be available prior to the acceptance of the waste at the site.

All incoming waste loads to the site will be checked. On arrival of each load of waste at the site the Duty of Care (DoC) documentation will be reviewed by the site personnel to confirm that it conforms with the basic characterisation. Once it is determined that the waste is potentially suitable for acceptance at the site a visual inspection where possible of the waste will be carried out at the site reception area to confirm that the waste conforms with the description on the DoC documentation. If any waste does not conform with the description in the DoC documentation or if on the DoC documentation the waste described is unsuitable for acceptance for deposit at the site the waste will be rejected.

The site personnel and plant operative will be trained to recognise the types of waste that may be accepted at the site and to identify the details which should be presented on the DoC documentation. A record will be kept of the date and time of waste deliveries, the quantities and the nature of waste deposited at the site, the name of the company, the name of the representative delivering each load of waste and the vehicle registration number. DoC documentation for the waste received will be kept on record for the statutory period which comprises 6 years.

Given the strict adherence to the waste acceptance criteria that will be followed by Bryn Recycling, the likelihood of pollution being caused by these proposals are extremely low.

5.4 Ground and Surface Water Management

An Environmental Risk Assessment (BRY-C03) has been produced as part of this permit application which shows the residual risk of the development to be low. This includes the risk of contamination of groundwater. The site is located outside any groundwater source protection zones.

There are two types of Bedrock Aquifer under the site. At the western portion of the site, it is designated as a Secondary A Aquifer. These are permeable layers of rock capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flows to rivers. They are generally aquifers formerly classified as minor aquifers. At the south-western portion of the site it has been determined that there is a Secondary Undifferentiated Aquifer, with this aquifer type it is not possible to apply either a secondary A or B definition because of the variable characteristics of the rock type. These are

of minor value. There is a productive superficial aquifer under the south-western portion of the site. The bedrock beneath the site is classified as a Secondary A aquifer meaning it is capable of supporting water supplies at a local rather than strategic scale, in some cases forming an important source of base flows to rivers. Although at medium risk of groundwater vulnerability, the inert nature of the waste in addition to the stringent waste acceptance procedures means that the residual risk of soil and groundwater contamination is low.

The site is in location where the risk of flooding is low. There is also limited potential for groundwater flooding to occur on site. However, the proposed development will create surface water runoff from the extended MRF storage area and as the gradient of the slope increases.

To combat this, prior to the import of material under the Waste Recovery permit a series of new surface water attenuation lagoons will be constructed with appropriately placed temporary drainage channels that direct surface water runoff from the works area to the lagoon. The location and number of these channels will vary as the works progress.

Where necessary the operator may:

- Install hay bales at points along the temporary drainage channels to slow the flow to the attenuation lagoon and allow any suspended solids to settle before entering the southern attenuation lagoon.
- Block the outflow from the southern attenuation lagoon to stop or restrict flow out of the lagoon system.
- Deal with the situation either in the works area, the drainage system or both to remediate whatever the source of any potential contamination or excess flow.
- Re-instate the flow once ready.

The new storage yard will be covered with an impermeable concrete pad and will be used to store clean soils only. All surface waters from the new storage yard extension will be directed to a new Class 1 interceptor via falls in the newly laid impermeable concrete surface, before being collected in a new appropriately sized storage lagoon. Water from this lagoon will be discharged to the watercourse via the new southern attenuation lagoon. This lagoon (the final one of the series of attenuation lagoons) features a manhole chamber with a Hydro-Brake Optimum flow control device that is able to dictate the eventual release of water from the site.

The western and southern slopes of the storage yard extension will be planted to create a native broadleaf species woodland habitat. Following tree planting there will be no works

associated with the MRF in this area. In the short term, drainage ditches will be installed to direct surface water runoff to the southern attenuation lagoon. Once the woodland is established, the runoff of any rainfall from this area will be reduced by the natural uptake of the trees.

5.5 Amenity

The proposed activities outlined in Section 2 of this document will have a positive effect on amenity of the surrounding landscape. The proposed new screening bund will help to visually screen the activities of the MRF when looking northwards towards the site. The hillslope which is currently largely covered in grass shall be planted with native broadleaf trees to create a woodland habitat. It is therefore not considered that additional control measures will be required to protect the amenity of the site.

5.6 Post Closure Controls

Given the proposed activities, the proposed waste types (non-hazardous and inert) and the detailed design that has gone into the proposed development, post closure controls such as gas monitoring are not considered to be necessary.

6.0 MONITORING

To ensure that Bryn Recycling are not causing pollution and that the pollution control measures implemented are effective, Bryn Recycling follow a monitoring schedule. This schedule details the routine and periodic monitoring requirements required by Bryn Recycling in line with their Environmental Permit.

6.1 Meteorological Monitoring

Weather conditions will be monitored routinely and recorded in line with the site's Dust Management Plan and Monitoring Schedule. The below section identifies the prevailing weather conditions on site, in terms of wind direction.

Information on wind direction has been derived from a weather station at Caerphilly, which is located approximately 10km southeast of Gelliargwellt Farm over the last 30 years. This data is illustrated by the wind rose in Figure 2. Figure 2 demonstrates that the predominant wind direction in the region is from a south-westerly direction. The land to the southwest of the site, is used for agriculture. The nearest non-agricultural land use is the village of Gelligaer, approximately 750m to the east-northeast of the site. The nearest sensitive receptor to the

northeast of site is the edge of the village of Gelligaer which is approximately 765m away. The nearest sensitive receptor to the site is Tophill Cottage approximately 400m to the north-northwest. The Dust Management Plan and Fugitive Emissions Plan outline control measures to reduce the risk of potential emissions to sensitive receptors.

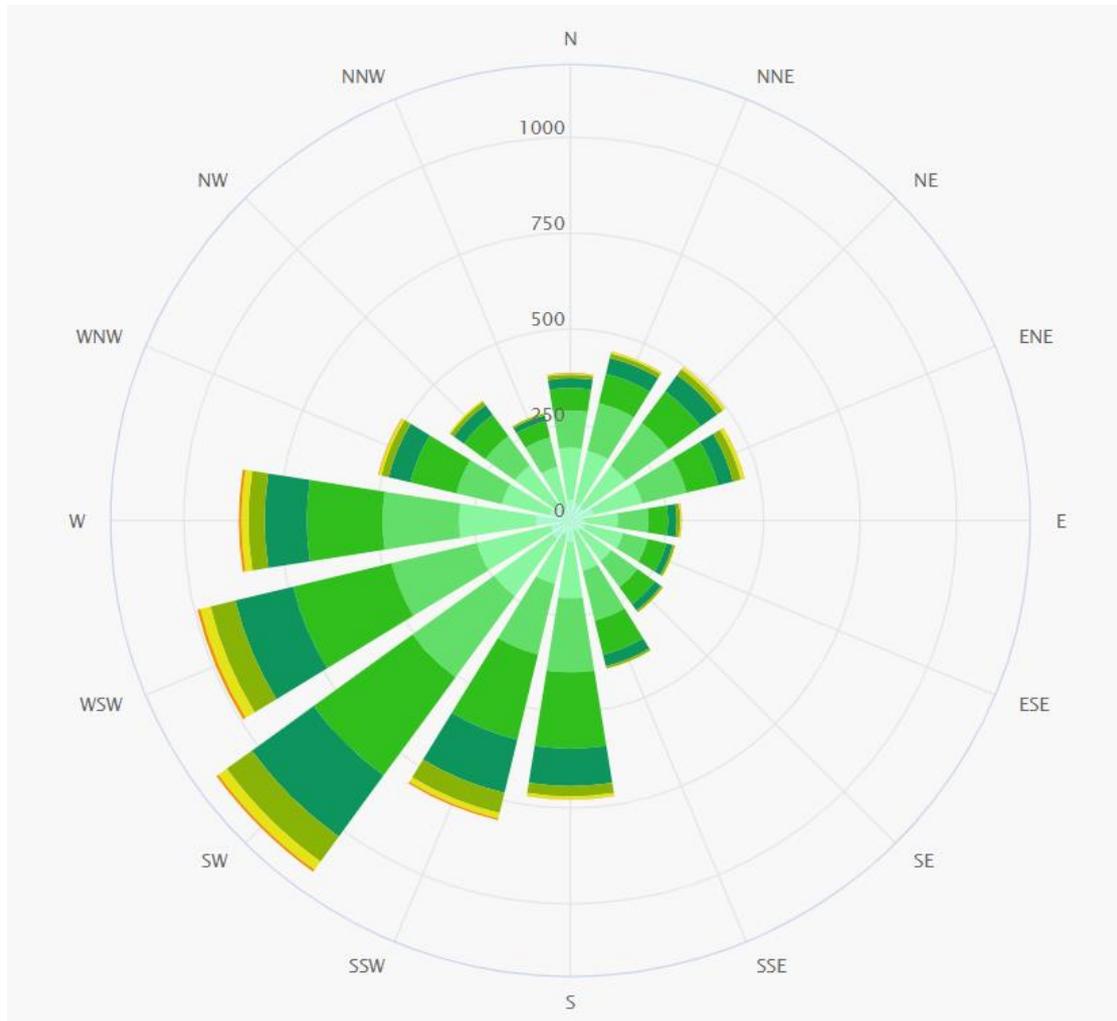


Figure 1 - Windrose showing the number of hours the wind has blown from each direction over the last 30 years at Caerphilly

6.2 Gas, Groundwater, Surface Water and Amenity Monitoring

The use of inert waste and the adherence to the strict waste acceptance procedures negates the need for gas and water monitoring throughout the lifetime of the permit. Ground and surface water will not be adversely affected due to the types of waste used in the development and the control measures that are proposed. The extended MRF storage area will be covered by a layer of impermeable concrete. All surface water generated in this area shall be directed to a new lagoon via an interceptor. From this lagoon, the water will be directed to a series of

attenuation lagoons before being discharged to surface water via a Hydro-Brake Optimum flow control device that is able to dictate the eventual release of water from the site. The surface water generated on the newly graded hillslope shall also be directed to this series of attenuation lagoons.

The proposed development has been designed to improve habitats within the site. The designs include the creation of a new native broadleaved woodland habitat in keeping with the neighbouring Coed Gelliau'r-gwellt SINC which immediately neighbours the site to the west. This will create additional wildlife habitats. The restoration will positively impact local habitat sites and therefore amenity monitoring is not considered necessary.

7.0 SITE CONDITION

7.1 Description of the Site

Site address:

Bryn Recycling Ltd
Gelliargwellt Farm,
Gelligaer Road,
Hengoed
CF82 8FY

Grid reference: ST 12393 96501

The area in which the waste would be deposited for recovery is within land that makes up part of Gelliargwellt Uchaf Farm. The primary vehicle access is from Gelligaer Road, which is located to the northwest of the site. It also connects neighbouring towns including Gelligaer and Penpedairheol which are located approximately 800m and 2,000m respectively, to the northeast of the site. Penybryn is located approximately 1,300m to the east, with the Penallta Industrial Estate located slightly further east. Caerphilly is located approximately 8.5km south of the site.

The site is bound to the south by agricultural land and Parc Penallta Country Park, which comprises an area of public open space and woodland is located approximately 850m to the southeast. Nelson Bog Site of Special Scientific Interest (SSSI) is located 550m to the southeast of the site. Waun Rydd Site of Importance for Nature Conservation (SINC) is located

to the east of the site and Coed Gelliau'r – Gwellt SINC is located immediately adjacent (west) to the site and comprises an ancient woodland.

Bryn Recycling propose to recover approximately 420,000m³ or 672,000 tonnes (using a conversion factor of 1.6 tonnes per m³) of inert waste material for the extension of the existing material processing and storage yard at the MRF and creation of a screening bund to the south and southwest at Gelliargwellt Farm.

7.2 Historical Land Use

Historical land use development is captured through historical mapping, dating back to 1884. At this time, the land within the site boundary is seen to be undeveloped. The map from 1884 shows a mixture of woodland and grassland present on the site. To the southwest and south of the site are two collieries.

In 1901 the map shows that the site remains undeveloped and consists predominantly of woodland with portions of grassland. There are signs of agricultural expansion of Gelliargwellt Farm to the east of the site. The colliery to the southwest of the site is classified as disused in 1901. The next available map is from 1921-22 which shows the site is still undeveloped and predominantly woodland with portions of grassland to the south and north.

The map from 1938-1945 shows no change. The next map is from 1965 which shows the southern colliery is no longer in use. The site remains undeveloped, and the immediate surroundings appear unchanged. In the map from 1974, the residential areas of the nearby towns of Penybryn and Nelson are seen to have expanded considerably although the site remains undeveloped.

The quarry that is located to the east of the site first appears in the map from 1999. The site remains undeveloped. The latest map from 2022 shows that the site is still undeveloped, however woodland on the site has been cleared. This is also similar to the surrounding areas where the majority of wooded areas are now either grassland or agricultural land. Gelliargwellt Farm has expanded their operations further with the inclusion of an additional AD works and MRF alongside the quarry. There is also a lagoon on the eastern boundary of the site.

7.3 History of Incidents

There have been four recorded pollution incidents to controlled waters within 1km of the site location. Of the four recorded pollution incidents, three were recorded as Category 3 – Minor Incidents, with the remaining incident categorised as a Category 2 – Significant incident. The

nearest Category 3 incident, which comprised the pollution of a freshwater stream/river with mud/clay/soil occurred in 1996 at 794m away. The Category 2 incident took place in 1991 and involved the pollution of a bog, The Nelson, 769m south of the site.

There have been 14 recorded incidents to air and land. The closest to the site was a category 2 incident for both air and land. This was located 92m to the east of the site.

8.0 ENVIRONMENTAL RISK ASSESSMENT

Pollutant Model			Judgement				Action	
Source	Pathway	Receptor	P	C	M	Justification of Magnitude	Risk Management	Residual Risk
Airborne dust particulates and microorganisms during the movement, handling and storage of waste.	Aerial dispersion.	Human Health	Med	Med	Med	Med - Dusts and powders are not permitted waste types on this site, however, dust may arise from the movement of soils and other inert waste. There is the potential for dust exposure for people near the site. There are no sensitive receptors near the site so the magnitude is classed as low.	<ul style="list-style-type: none"> The site has a Dust Management Plan (<i>BRY_B01_Dust_Management_Plan</i>) which details the preventative measures in place for reducing dust and the actions to be taken when there is a dust issue. The site will be kept clean and dust suppression will be used when required. Material will be assessed prior to receipt. Materials will be handled carefully by trained operatives. Daily site inspections. Speed limit for vehicles on site. 	Low

Pollutant Model			Judgement				Action	
Source	Pathway	Receptor	P	C	M	Justification of Magnitude	Risk Management	Residual Risk
Airborne dust particulates from the transport of waste materials.	Aerial Dispersion	Human Health	Med	Low	Low	Low - Limited potential for frequent and long-term exposure for people working close to the site due to location of facility.	<ul style="list-style-type: none"> The site has a Dust Management Plan (<i>BRY_B01_Dust_Management_Plan</i>) which details the preventative measures in place for reducing dust and the actions to be taken when there is a dust issue. Dust generation attributable to vehicle movements will be controlled by the maintenance and sweeping of the site access roads. During dry weather action will be taken to remove dust from the road. The Site Manager will carry out a daily visual assessment of dust emission within the site and at the downwind site boundaries. 	Low
Fugitive releases of litter.	Aerial dispersion or spillage.	Wildlife and human health	Low	Med	Med	Med - Nuisance, loss of amenity and danger to wildlife.	<ul style="list-style-type: none"> Waste is inspected on delivery and rejected if the waste is not of the permitted EWC code or is contaminated, as detailed in the Waste Acceptance Procedure. Daily site inspection and removal of litter. 	Low

Pollutant Model			Judgement				Action	
Source	Pathway	Receptor	P	C	M	Justification of Magnitude	Risk Management	Residual Risk
Waste, mud and litter on local roads.	Spillage.	Human	Med	Med	Med	Med – potential to cause a hazard on the roads, risking the safety of drivers in the area.	<ul style="list-style-type: none"> Daily site inspection and cleaning of access roads around the site as necessary. Facilities to wash vehicles on site if required. 	Low
Odour	Aerial dispersion.	Human	Low	Low	Low	Low – all waste being delivered on site is inert so the odour will be low. The distance between the site and the nearest residents will mitigate the odour.	<ul style="list-style-type: none"> Daily site inspection. A detailed Waste Acceptance Procedure (BRY-OP02 Waste Acceptance) will be followed to ensure that only appropriate waste materials are accepted onto site. 	Low
Noise and vibration	Aerial dispersion/ ground	Human and wildlife disruption.	Low	Low	Low	Low – the equipment required to transport and handle the waste generates low noise. The distance between the site and the nearest sensitive receptors will mitigate the noise.	<ul style="list-style-type: none"> Regular maintenance of plant and machinery. Works will be carried out during operational hours, 07:00 – 18:00 Monday to Friday and on Saturday between 07:00 and 13:00. 	Low

Pollutant Model			Judgement				Action	
Source	Pathway	Receptor	P	C	M	Justification of Magnitude	Risk Management	Residual Risk
Scavenging animals and birds.	Air	Human	Low	Low	Low	Low – permitted waste types are inert and are unlikely to attract scavenging animals and birds.	<ul style="list-style-type: none"> Waste checks on delivery. Daily site inspections. As part of the farming activities, pests are controlled. Pest control procedures as per the PIC-<i>B02Fugitive_Emissions_Managemen_Plan</i>. 	Low
Pests (e.g. flies)	Air	Human	Low	Low	Low	Low – insects are unlikely to increase as the waste permitted to be brought onto site is inert and so will not decompose and attract insects.	<ul style="list-style-type: none"> Waste checks on delivery. Daily site inspections. Pest control procedures as per the PIC-<i>B02Fugitive_Emissions_Managemen_Plan</i>. 	Low
Contamination of groundwater	Water	Groundwater, local residents.	Low	Med	Med	Low – the bedrock beneath the site is classified as having a medium Groundwater Vulnerability and has intermediate permeability. The Superficial Aquifer is secondary undifferentiated, meaning it is only a minor aquifer. The waste permitted is also inert	<ul style="list-style-type: none"> The waste storage yard extension shall have a drainage system with impermeable concrete when completed. Any surface water that may interact with the wastes is contained within the drainage system, mitigating the risk of this water percolating through the topsoil, superficial deposits and finally entering the groundwater. The site's waste acceptance procedure ensures that only non-hazardous, inert waste is accepted on site. 	Low

Pollutant Model			Judgement				Action	
Source	Pathway	Receptor	P	C	M	Justification of Magnitude	Risk Management	Residual Risk
						and non-hazardous so the risk to groundwater is low. Furthermore, the site is situated outside any Groundwater Source Protection Zones.	<ul style="list-style-type: none"> Further detail is presented in more detail in the Construction Environmental Management Plan. 	
Additional surface runoff	water	Groundwater, Human and wildlife disruption.	Low	Med	Med	Low - The proposed development will create surface water runoff from the extended MRF storage area. However, the extended storage area features its own surface water storage lagoon.	<ul style="list-style-type: none"> The site's waste acceptance procedure ensures that only non-hazardous, inert waste is accepted on site. The site has a drainage system in place and the storage area is constructed with an impermeable concrete base. Any surface water that may interact with the wastes is contained within the drainage system, mitigating the risk of this water entering waterways/groundwater without prior treatment. To combat the runoff from the hillslope, prior to the import of material under the Waste Recovery permit a new appropriately sized southern surface water attenuation lagoon will be constructed with appropriately placed temporary drainage channels directing surface water runoff from the works area to the lagoon. The 	Low

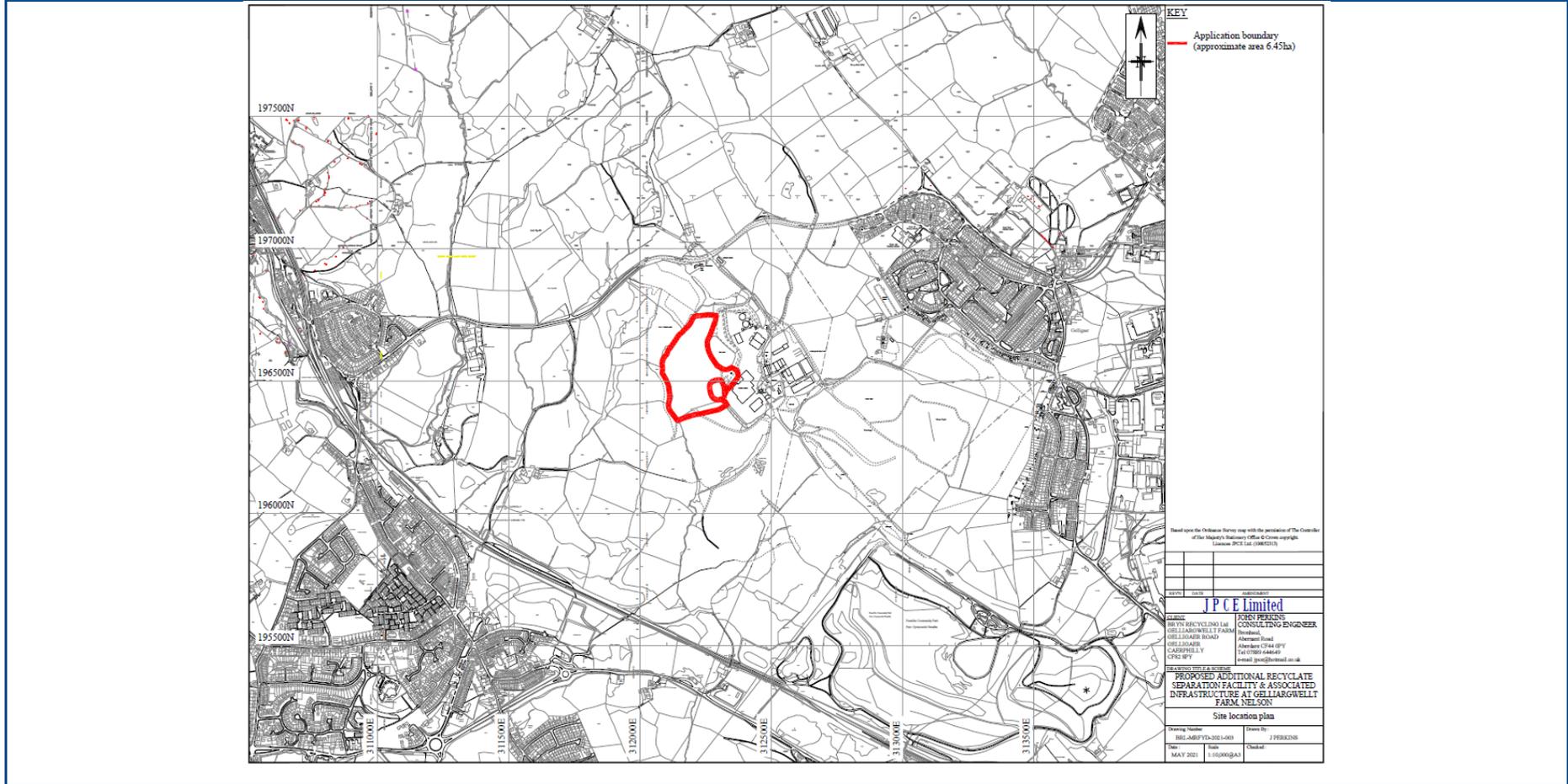
Pollutant Model			Judgement				Action	
Source	Pathway	Receptor	P	C	M	Justification of Magnitude	Risk Management	Residual Risk
							location and number of these channels will vary as the works progress. <ul style="list-style-type: none"> This information is presented in more detail in the Construction Environmental Management Plan. 	
Damage to ecological receptors	Water / ground	Protected species disruption (great crested newts, bats)	Low	Med	Med	<ul style="list-style-type: none"> Med – The nearest ecological receptor is the Coed Gelliau'r-gwellt SINC immediately west of the site and Nelson Bog SSSI which is located approximately 600m south of the site. However, the distance between site operations and known receptors is such that there is anticipated to be no adverse effects on these sites. Additionally, the site has a drainage 	<ul style="list-style-type: none"> Habitats Management Plan to be followed during lifetime of permit. The site has a drainage system in place and the storage area is constructed with an impermeable concrete base. Any surface water that may interact with the wastes is contained within the drainage system, mitigating the risk of this water entering waterways/groundwater without prior treatment. Further information is presented in the Construction Environmental Management Plan. 	Low

Pollutant Model			Judgement				Action	
Source	Pathway	Receptor	P	C	M	Justification of Magnitude	Risk Management	Residual Risk
						system in place and the waste storage area is constructed from an impermeable concrete base. Any surface water that may interact with the wastes is contained within the drainage system, mitigating the risk of this water entering waterways/ground water without prior treatment.		
Flooding of site	Water	Local people and environment.	Low	Low	Low	Low – the site is in a flood zone 1 so the risk of flooding is low. The site is also located on a hill so is unlikely to flood. The permitted waste is non-hazardous so would not cause pollution if washed offsite.	<ul style="list-style-type: none"> • Ensure drainage system is properly maintained. • Further information is presented in the Construction Environmental Management Plan. 	Low

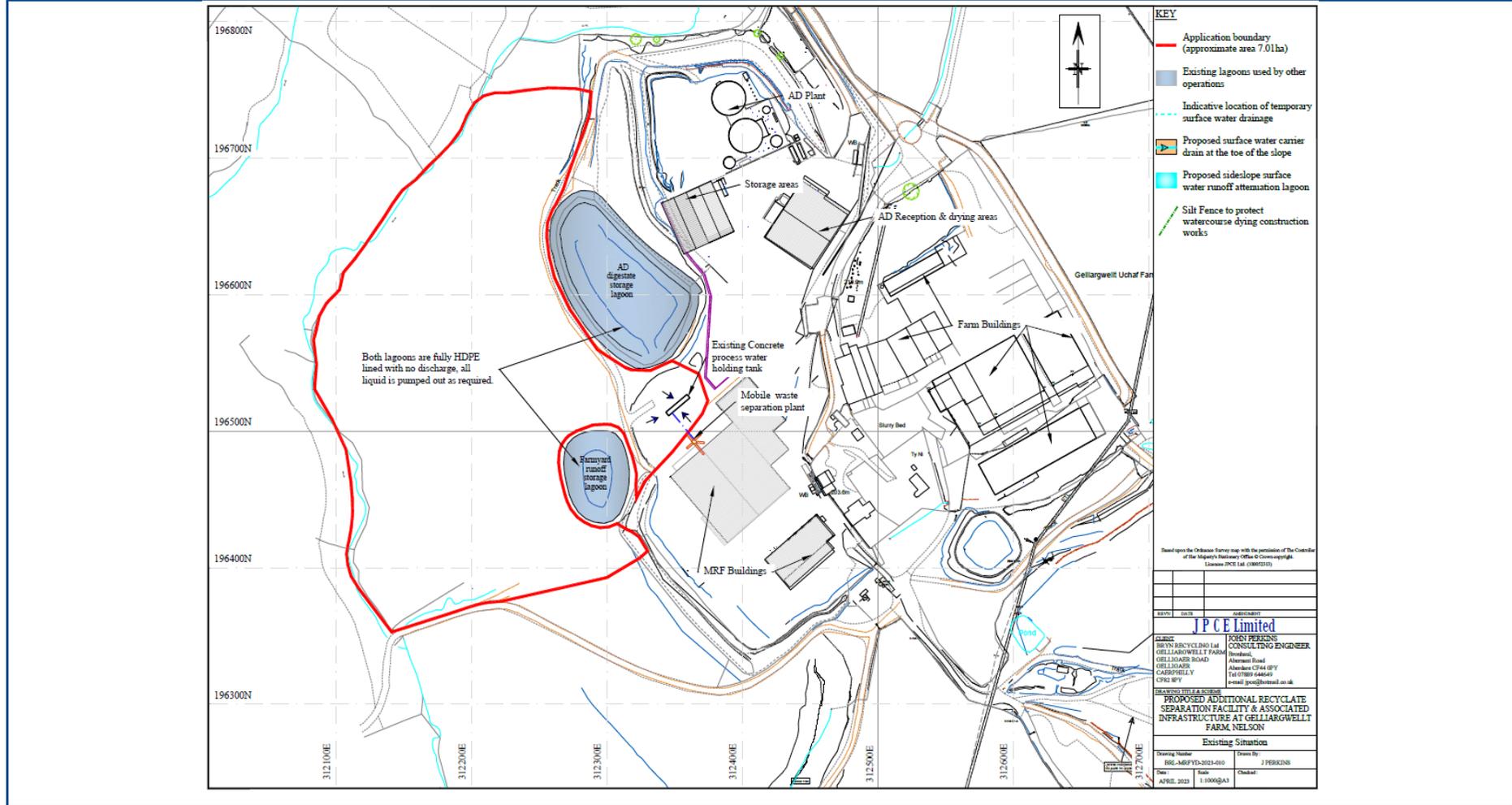
Pollutant Model			Judgement				Action	
Source	Pathway	Receptor	P	C	M	Justification of Magnitude	Risk Management	Residual Risk
Water leak	Spillage	Staff and local residents	Low	Low	Low	Low – few opportunities for release of water.	<ul style="list-style-type: none"> Pipework is inspected regularly and maintained by a trained operative when required. 	Low
Fire on site	Aerial dispersion	Staff and local residents	Med	Med	Low	Med - Fires can be deliberate or accidental.	<ul style="list-style-type: none"> Follow manufacturer guidance and instructions on plant maintenance. Manually controlled mains water dousing system Site inspections to identify faulty equipment and other fire hazards. 	Low
P = Possibility C = Consequence M = Magnitude								

9.0 SITE DRAWINGS

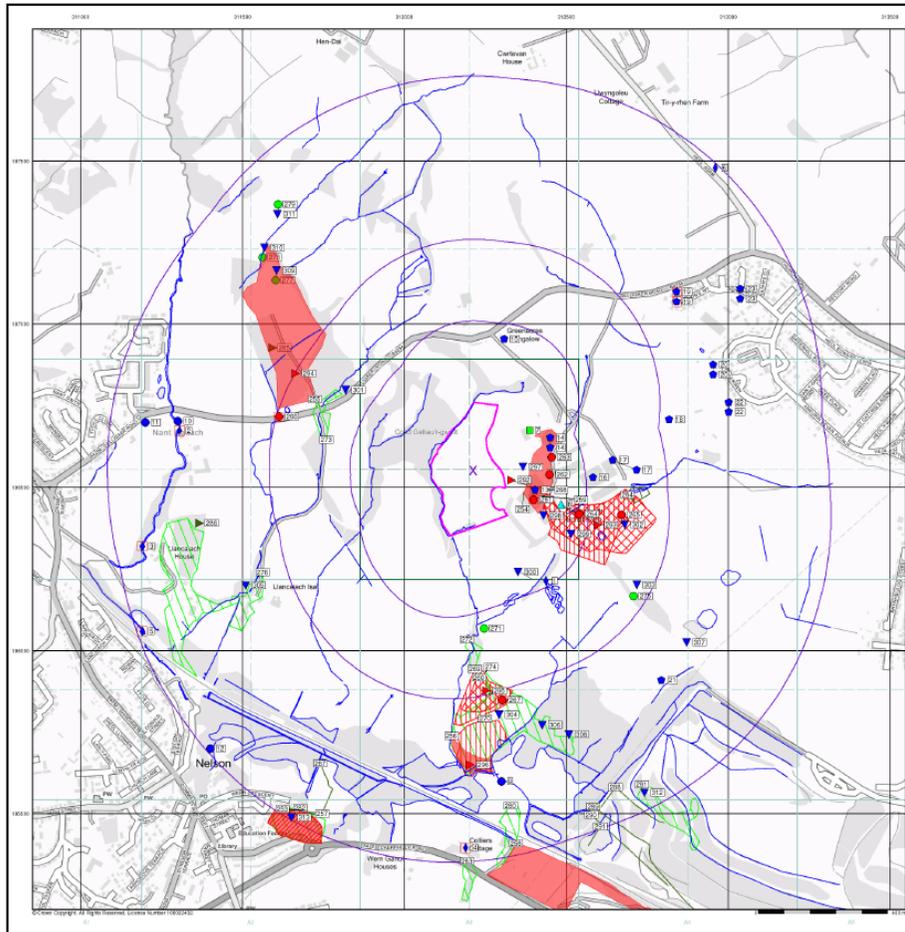
Drawing	Scale	Title	Site Name
ESSD-1	1:10,00 @ A3	Site Location Plan	Bryn Recycling Ltd, Gelliargwellt Farm, Gelligaer Road, Hengoed, CF82 8FY



Drawing	Scale	Title	Site Name
ESSD-2	1:1,000 @ A3	Application Boundary	Bryn Recycling Ltd, Gelliargwellt Farm, Gelligaer Road, Hengoed, CF82 8FY



Drawing	Scale	Title	Site Name
ESSD-3	1:10,000	Environmental Site Setting	Bryn Recycling Ltd, Gelliargwellt Farm, Gelligaer Road, Hengoed, CF82 8FY



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General
 Selected Site Selected Buffer (1) Being Reference Point Map ID
 Severn of Type at Location

Agency and Hydrological
 Contaminated Land Register Entry or Index
 Contaminated Land Register Entry or Index
 Discharge Consent
 Enforcement or Imposition Notice
 Integrated Pollution Control
 Local Authority Integrated Pollution Prevention and Control
 Local Authority Pollution Prevention and Control
 Pollution Incident to Controlled Waters
 Pollution Incident to Controlled Waters
 Pollution Incident to Controlled Waters
 Registered Radioactive Substance
 River Network or Water Feature
 River Quality Sampling Point
 Substantiated Pollution Incident Register
 Water Abstraction
 Water Quality Act Potential

Waste
 Registered Landfill Site (Active)
 Registered Landfill Site
 EA Hazard Landfill (Buried Part)
 EA Hazard Landfill (Open)
 Integrated Pollution Control Registered Waste Site
 Local Authority Waste Management Facility (Landfill Part)
 Local Authority Waste Management Facility (Landfill)
 Local Authority Registered Landfill Site (Active)
 Local Authority Registered Landfill Site
 Potentially Infill Land (Non-water)
 Potentially Infill Land (Non-water)
 Potentially Infill Land (Non-water)
 Potentially Infill Land (Other)
 Potentially Infill Land (Other)
 Registered Landfill Site
 Registered Landfill Site (Active)
 Registered Landfill Site (Active - Buried to 2000)
 Registered Landfill Site (Active - Buried to 2000)
 Registered Waste Transfer Site (Active)
 Registered Waste Transfer Site
 Registered Waste Treatment or Disposal Site
 Registered Waste Treatment or Disposal Site

Hazardous Substances
 COSHH Site
 Explosive Site
 HHS Site
 Planning Hazardous Substance Consent
 Planning Hazardous Substance Discharge
 Registered Hazard Site

Geological
 Registered Mineral Site

Site Sensitivity Map - Slice A

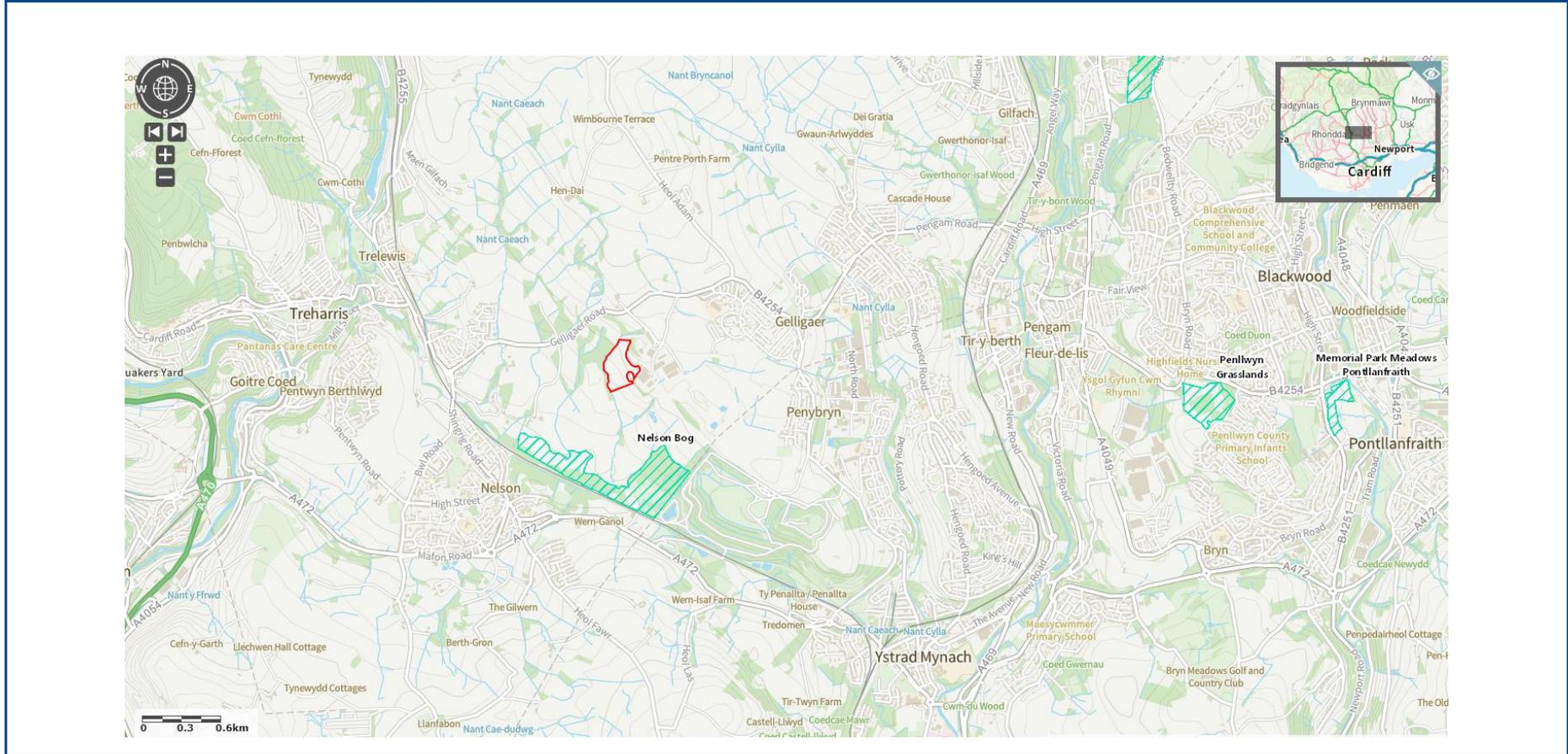
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 National Grid Reference: 312210, 190550
 Slice: A
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 Search Buffer (m): 1000

Site Details
 Site at 312200, 190530

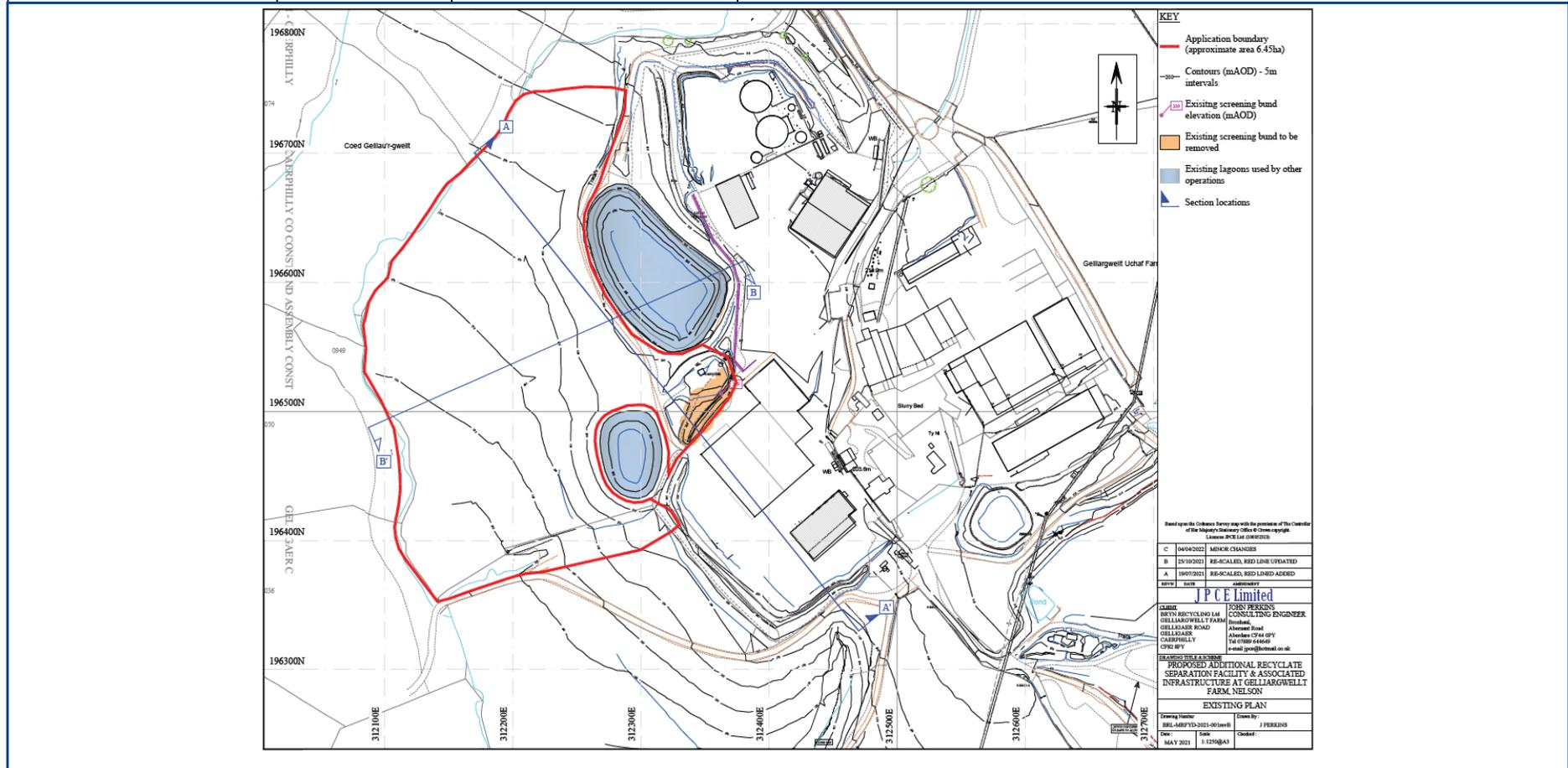
Landmark
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 Web: www.envirocheck.co.uk

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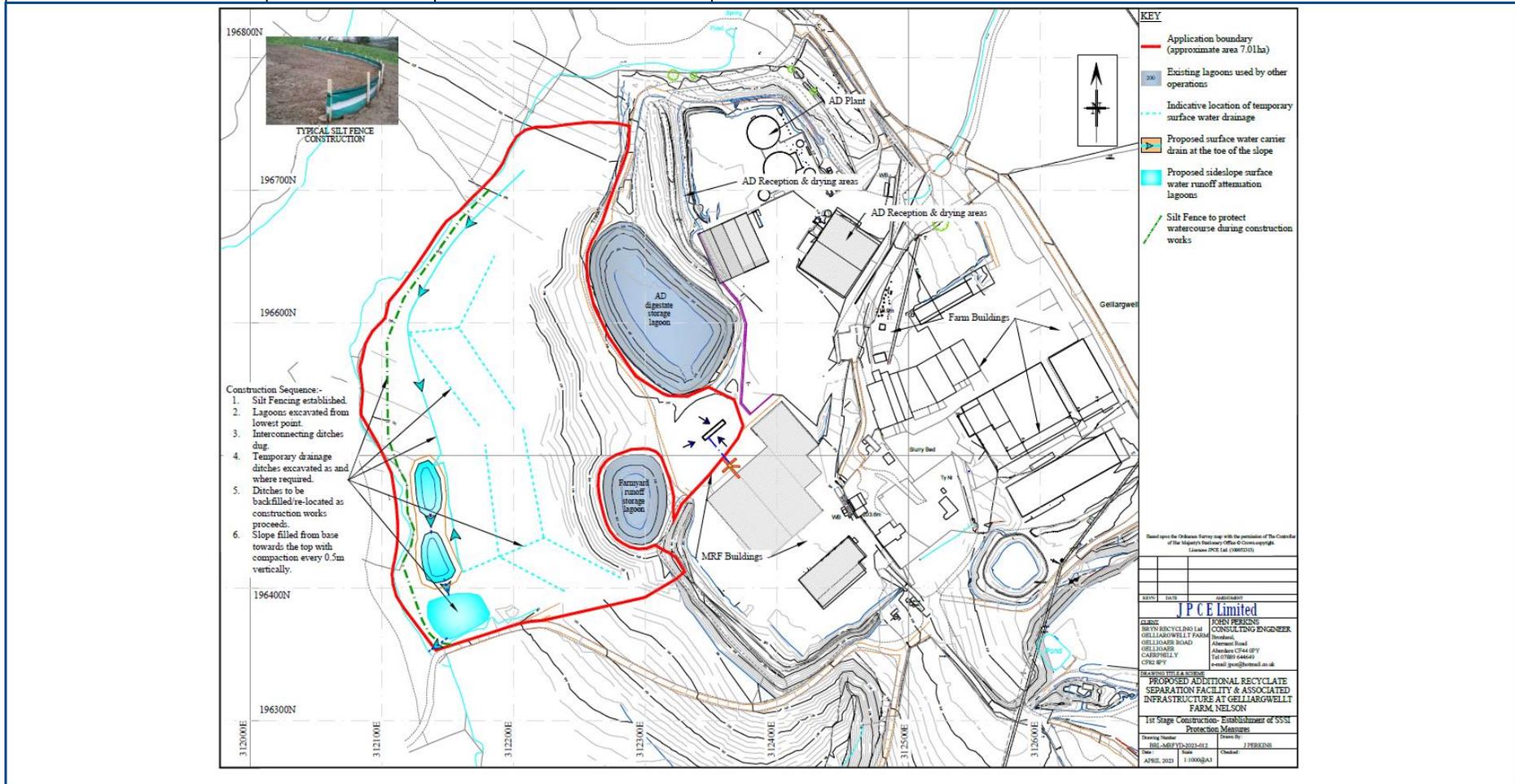
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ESSD-4	1:25,000	Ecological Receptors	Bryn Recycling Ltd, Gelliargwellt Farm, Gelligaer Road, Hengoed, CF82 8FY



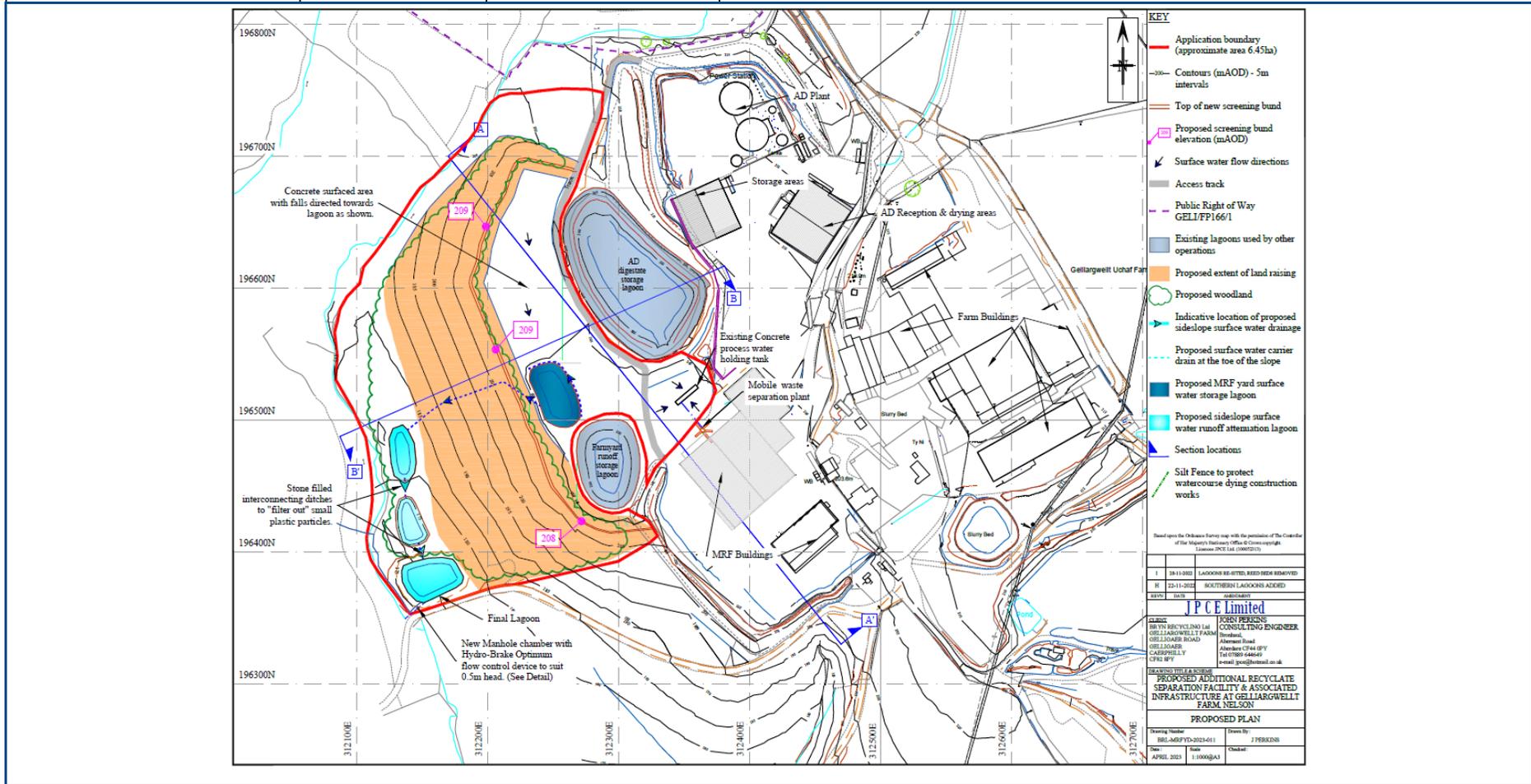
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ESSD-5	1:1,250 @ A3	Existing Topography	Bryn Recycling Ltd, Gelliargwellt Farm, Gelligaer Road, Hengoed, CF82 8FY



Drawing	Scale	Title	Site Name
ESSD-6	1:1,000 @ A3	Construction Sequence	Bryn Recycling Ltd, Gelliargwellt Farm, Gelligaer Road, Hengoed, CF82 8FY



Drawing	Scale	Title	Site Name
ESSD-7	1:1,000 @ A3	Final Topography	Bryn Recycling Ltd, Gelliargwellt Farm, Gelligaer Road, Hengoed, CF82 8FY



Drawing	Scale	Title	Site Name
ESSD-9	N/A	Hydro-Brake Tech. Spec.	Bryn Recycling Ltd, Gelliargwellt Farm, Gelligaer Road, Hengoed, CF82 8FY

Technical Specification

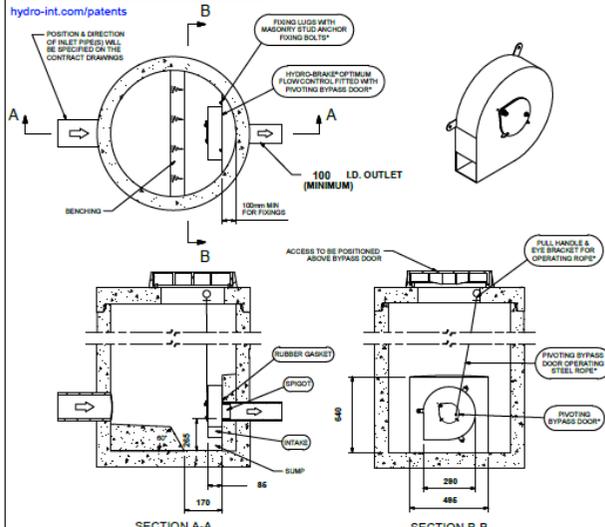
Control Point	Head (m)	Flow (l/s)
Primary Design	0.500	2.480
Flush-Flo™	0.120	2.478
Kick-Flo®	0.314	2.014
Mean Flow		2.057

Hydro-Brake® Optimum Flow Control including:

- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting bypass door allowing clear line of sight through to outlet, via stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fittings
- Rubber gasket to seal outlet
- Indicative Weight: 5 kg




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IMPORTANT: LIMIT OF HYDRO INTERNATIONAL SUPPLY
 THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
 FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
 ALL CIVIL AND INSTALLATION WORK BY OTHERS
 *WARES SUPPLIED
 HYDRO-BRAKE® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS FOR FLOW CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

DESIGN ADVICE

The headflow characteristics of this SCL-0077-2480-0500-2480 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full headflow characteristic curve. The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

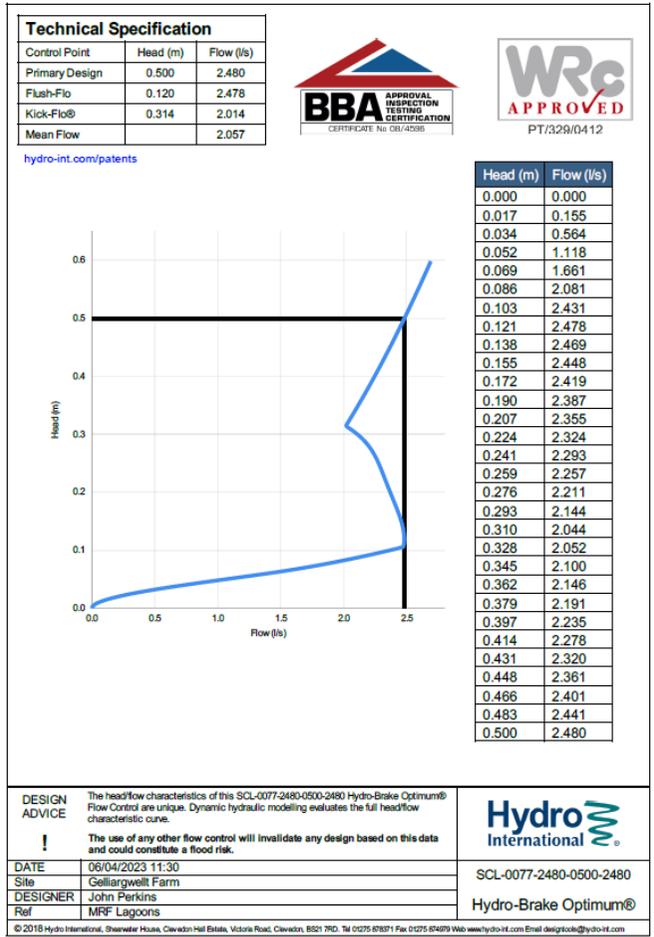


SCL-0077-2480-0500-2480
Hydro-Brake® Optimum

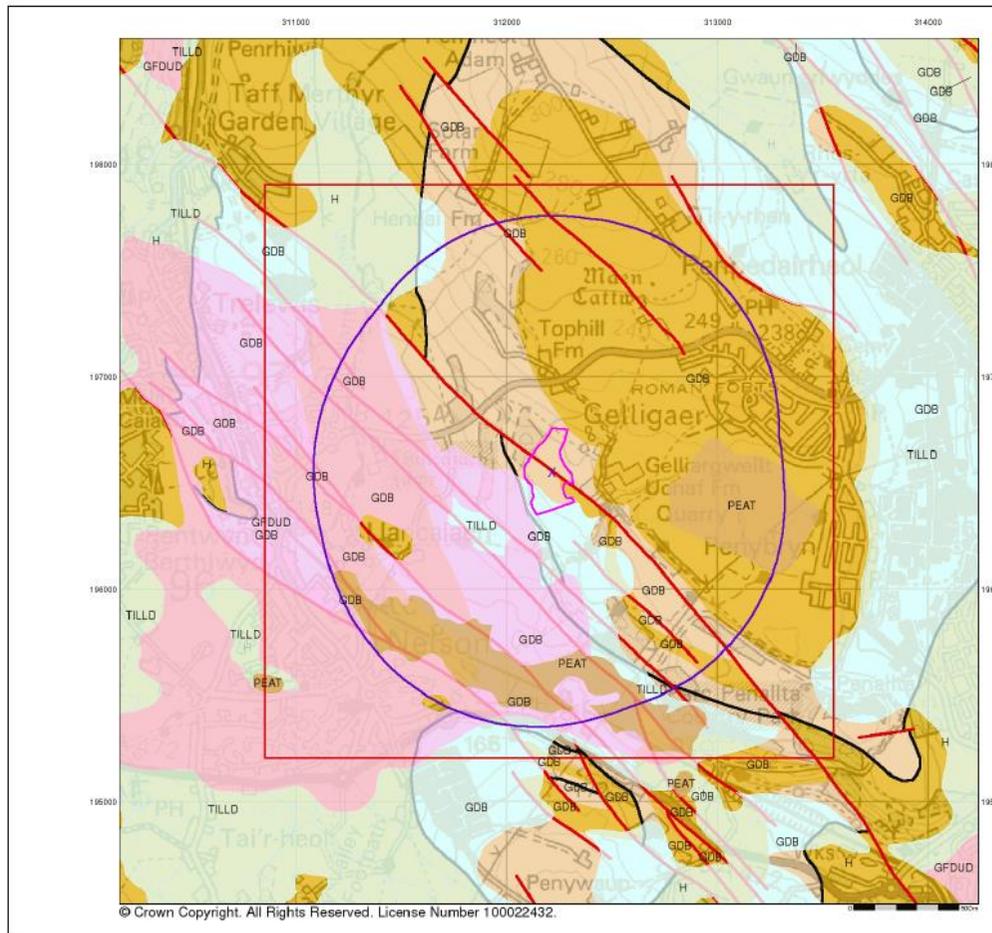
DATE	06/04/2023 11:30
SITE	Gelliargwellt Farm
DESIGNER	John Perkins
REF	MRF Lagoons

© 2023 Hydro International Ltd, Shearwater House, Clevedon Hill Estate, Victoria Road, Clevedon, 8021 7RD. Tel: 01275 878371. Fax: 01275 874375. Web: www.hydro-int.com. Email: enquiries@hydro-int.com

Drawing	Scale	Title	Site Name
ESSD-10	N/A	Hydro-Brake Hydraulic Characteristics	Bryn Recycling Ltd, Gelliargwellt Farm, Gelligaer Road, Hengoed, CF82 8FY



Drawing	Scale	Title	Site Name
ESSD-11	1:50,000	Regional Geology	Bryn Recycling Ltd, Gelliargwellt Farm, Gelligaer Road, Hengoed, CF82 8FY



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Combined Surface Geology

The Combined Surface Geology map combines all the previous maps into one combined geological overview of your site.

Please consult the legends to the previous maps to interpret the Combined 'Surface Geology' map.

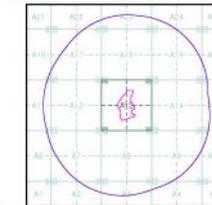
Additional Information

More information on 1:50,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

Contact

British Geological Survey
 Kingsley Dunham Centre
 Keyworth
 Nottingham
 NG12 5GG
 Telephone: 0115 936 3143
 Fax: 0115 936 3276
 email: enquiries@bgs.ac.uk
 website: www.bgs.ac.uk

Combined Geology Map - Slice A



Order Details:

Order Number: 310433061_1_1
 Customer Reference: PR1213J05
 National Grid Reference: 312210, 196550
 Slice: A
 Site Area (Ha): 5.02
 Search Buffer (m): 1000

Site Details:
 Site at 312200, 196530

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Geology 1:50,000 Maps Legends

Superficial Geology

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	TILLD	Till, Devensian	Diamicton	Not Supplied - Devensian
	GFDUD	Glaciofluvial Deposits, Devensian	Sand and Gravel	Not Supplied - Devensian
	PEAT	Peat	Peat	Not Supplied - Quaternary

Bedrock and Faults

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	GDB	Grovesend Formation	Mudstone, Siltstone and Sandstone	Not Supplied - Westphalian
	GDB	Grovesend Formation	Sandstone	Not Supplied - Westphalian
	H	Hughes Member	Sandstone	Not Supplied - Westphalian
		Faults		
		Rock Segments		

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Geology 1:50,000 Maps

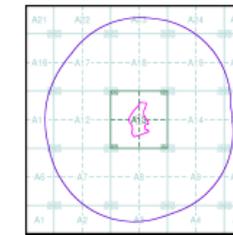
This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:50,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around the site. This mapping may be more up to date than previously published paper maps.

The various geological layers - artificial and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps, but superimposed on the final 'Combined Surface Geology' map. All map legends feature on this page. Not all layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

Geology 1:50,000 Maps Coverage

Map ID:	1
Map Sheet No:	240
Map Name:	Newport
Map Date:	1969
Bedrock Geology:	Available
Superficial Geology:	Available
Artificial Geology:	Available
Faults:	Not Supplied
Landslip:	Available
Rock Segments:	Not Supplied

Geology 1:50,000 Maps - Slice A



Order Details:

Order Number: 310433061_1_1
 Customer Reference: PR1213J05
 National Grid Reference: 312210, 196550
 Site: A
 Site Area (Ha): 5.02
 Search Buffer (m): 1000

Site Details:

Site at 312200, 196530

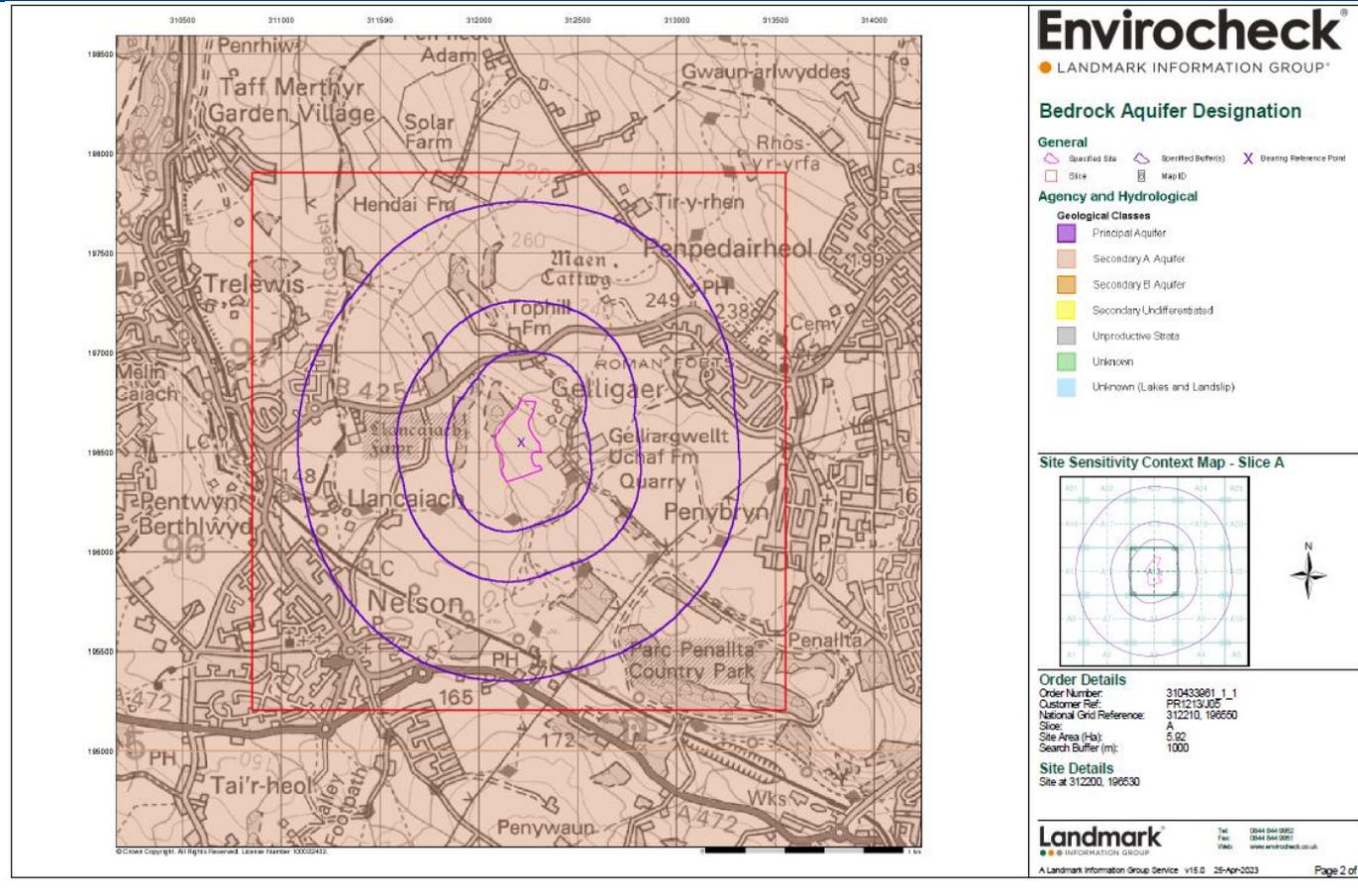
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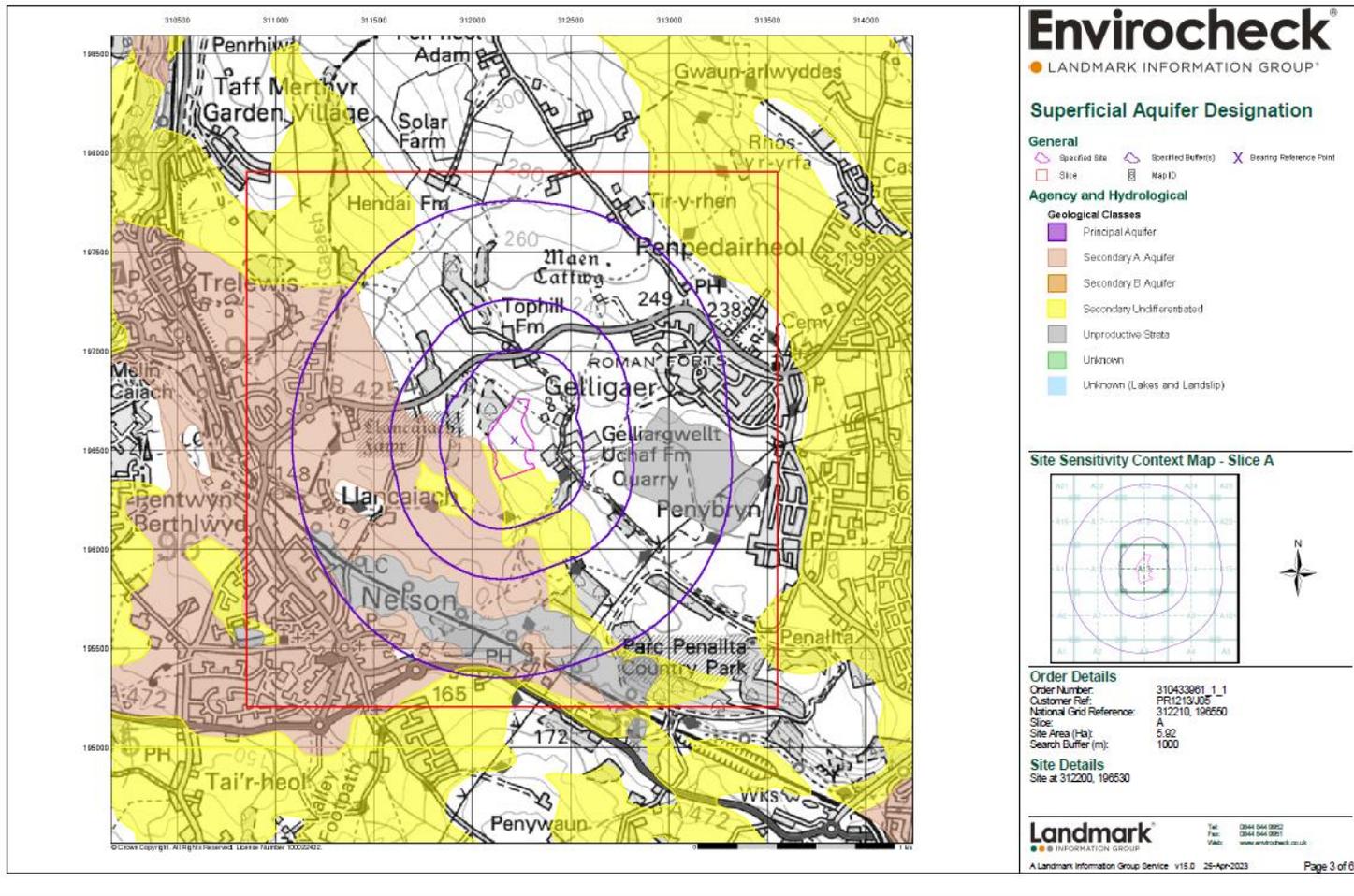
v15.0 25-Apr-2023

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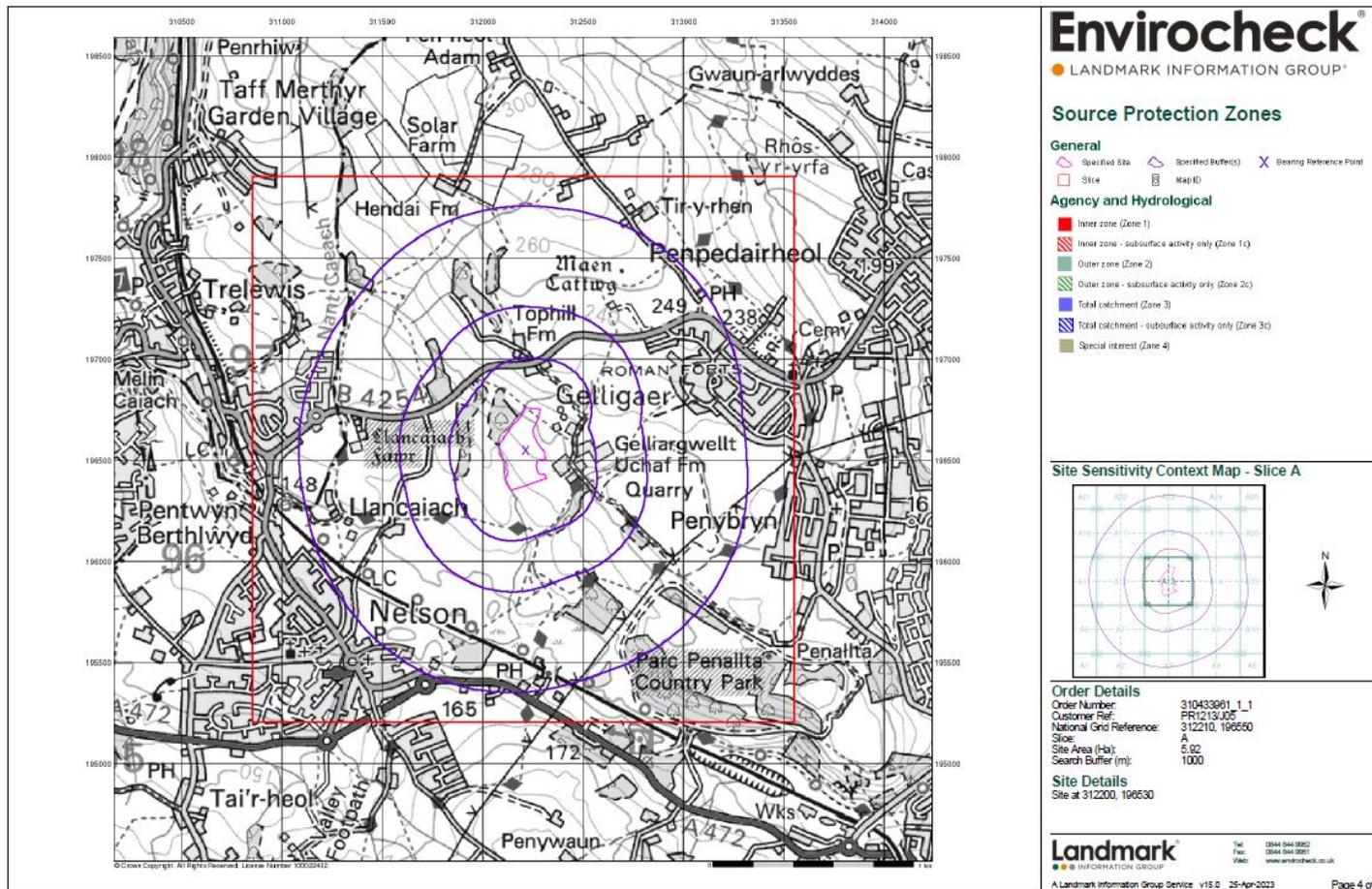
Drawing	Scale	Title	Site Name
ESSD-12	1:50,000	Bedrock Aquifer Designation	Bryn Recycling Ltd, Gelliargwellt Farm, Gelligaer Road, Hengoed, CF82 8FY



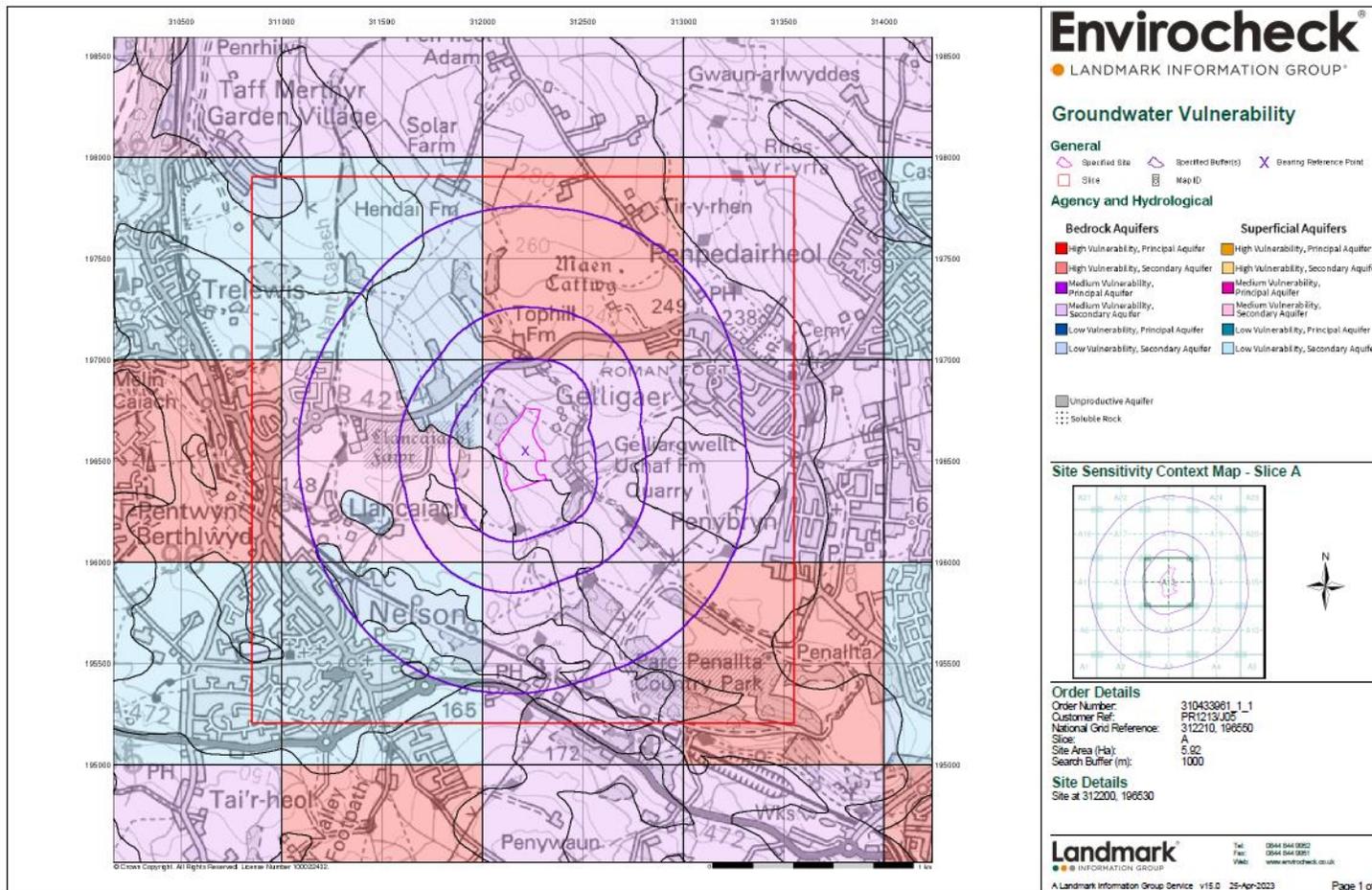
Drawing	Scale	Title	Site Name
ESSD-13	1:50,000	Superficial Aquifer Designation	Bryn Recycling Ltd, Gelliargwellt Farm, Gelligaer Road, Hengoed, CF82 8FY



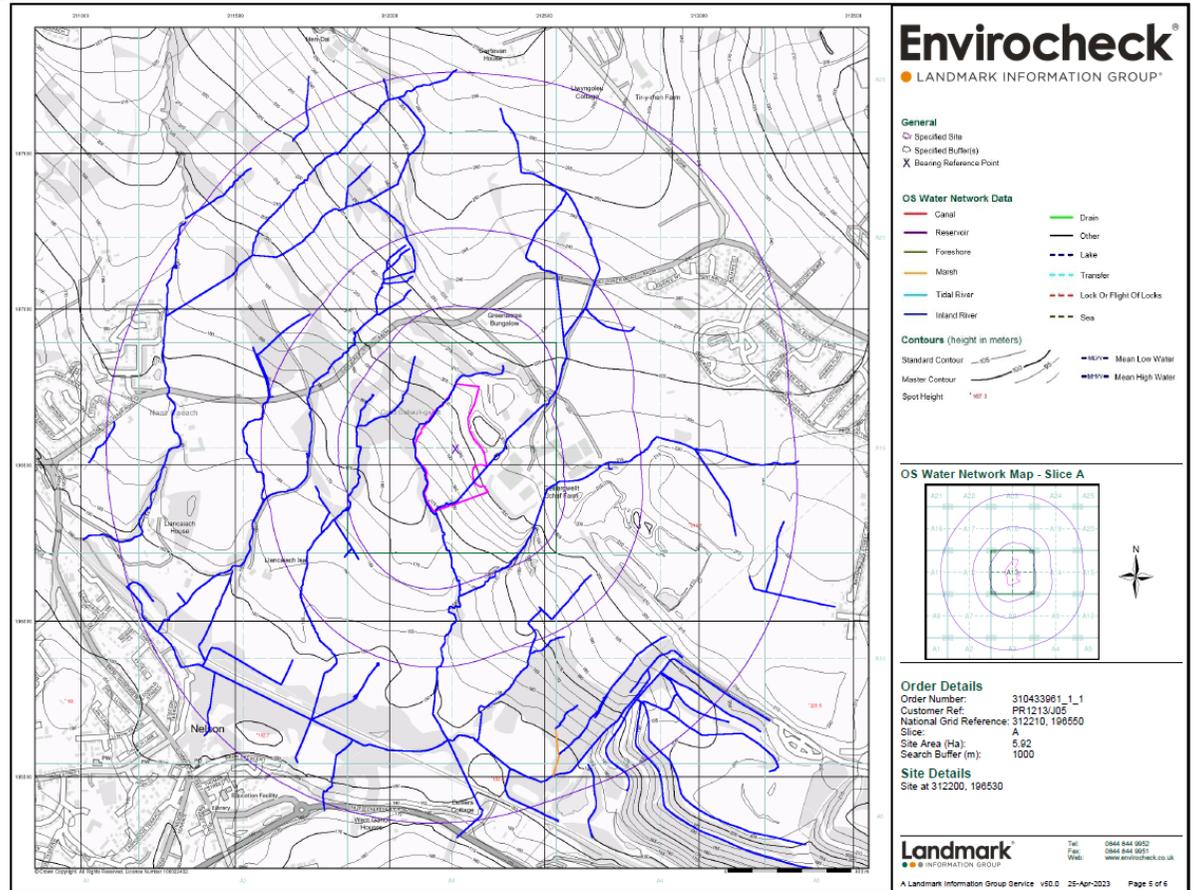
Drawing	Scale	Title	Site Name
ESSD-14	1:50,000	Source Protection Zones	Bryn Recycling Ltd, Gelliargwellt Farm, Gelligaer Road, Hengoed, CF82 8FY



Drawing	Scale	Title	Site Name
ESSD-15	1:50,000	Groundwater Vulnerability	Bryn Recycling Ltd, Gelliargwellt Farm, Gelligaer Road, Hengoed, CF82 8FY



Drawing	Scale	Title	Site Name
ESSD-16	1:10,000	Local Hydrology	Bryn Recycling Ltd, Gelliargwellt Farm, Gelligaer Road, Hengoed, CF82 8FY



10.0 CONCLUSIONS

Bryn Recycling propose recover 420,000m³ or 672,000 tonnes (using a conversion of 1.6 tonnes per m³) of inert waste material for the extension of the existing material processing and storage yard at the MRF and creation of a screening bund to the south and southwest of Gelliargwellt Farm.

The geology of the area is Grovesend Formation which is classified by Natural Resources Wales as a Secondary-A Aquifer. The majority of the site has no superficial aquifer designation. Following the implementation of the highlighted mitigation measures during both the enabling / construction phase, as well as across the operational lifespan of the proposed development, it is believed that the potential impacts on the identified sensitive receptors can be offset. It is therefore considered that the potential risks should not preclude the proposed Development.

The plans in the Section 9 above show the pre and post recovery contours as well as the pre and post recovery cross sections. Due to the volume of material is proposed to be recovered on site, a Construction Environmental Management Plan and a Stability Risk Assessment have been carried out considering the basal subgrade, sideslope subgrade, waste mass and the capping system. These documents accompany this Environmental Setting and Site Design Report.

The use of inert waste negates the need for gas monitoring to be carried out throughout the lifetime of the permit. However, in the Construction Environmental Management Plan it is proposed that all water levels in all lagoons will be inspected visually on a weekly basis or daily during periods of high rainfall. Where there is a suspicion of contamination, the management system for the affected drainage element will be followed. If necessary, water samples will be collected by suitably trained personnel with dedicated and clean sampling equipment. The water samples collected will be analysed at a suitably accredited laboratory.

The results of the stability risk assessment show satisfactory factors of safety at all stages of the site development. It is considered appropriate to undertake an annual topographical survey to identify areas of settlement or instability and a weekly visual inspection of the exposed subgrade and imported soils for signs of settlement and instability during the stages of construction. Following completion, a visual inspection for signs of settlement or instability will be undertaken during topographical survey visits.

Additionally, dust monitoring will be carried out daily given the potential for dust emissions during the recovery of waste materials on site.