Ref ABS C2-224
(Nov 2025)

Statement of Benefit

Managing soil health through the use of dredging sediments on fields at:
Llangynidr, NP8 1LR

Introduction:

This benefit statement relates to the application to deploy SR2010No4 Landspreading Permit (**EPR/GP3498LG**) held by Land & Water Services Ltd.

The application will result in agricultural benefit or ecological improvement of the receiving land. This benefit statement details the planned recovery of dredging sediment produced from the maintenance dredging of the Monmouthshire & Brecon canal between Llangattock and Llangynydir, onto fields at Cyffredyn Lane.

Contents

1. Qualifications and Technical Expertise

The benefit statement has been written by:
Dr Chris Ash (*Land & Water Group Environmental Manager*) on behalf of Land & Water Services Ltd.

Chris has worked in the waste industry, and particularly landspreading, for the past 8 years, as a Contract Manager and as a waste Consultant. He is experienced in the interpretation and classification of waste, nutrient management planning and producing fertiliser recommendations; His work has included the preparation and submission of numerous landspreading deployment applications over several years for a range of permit holders in England and Wales.
Chris is a BASIS registered member and has been a FACTS Qualified Advisor (FE/6324) since 2018. Other relevant academic and industry qualifications are as follows:

- Ph.D. Fate and Behaviour of Potentially Toxic Elements in Soils
- MSc. Natural Resources and Environment
- BSc. (Hons) Environmental Science
- CIWM member
- Site Environmental Awareness Training Scheme (SEATS) certified

Email: chris.ash@land-water.co.uk
Tel: 07531 996 510

2. Assessment of Agricultural Benefit or Ecological Improvement

The application activity is for the *recovery of waste* silt that has been dredged as part of maintenance operations on an inland freshwater course, the Mon & Brec canal. The recovery activity will result in agricultural improvement without causing harm to the environment.
The agricultural land will benefit from the spreading activity due to:

The replenishment of soil. Dredging sediments are made up of mainly inorganic material with some organic matter and have a similar make-up to mineral topsoil. The application of dredging sediments will add volume to the existing topsoil, which replenishes the field and replaces soil that is lost due to erosion. In addition to agricultural benefit, the application of sediments helps to maintain the landscape.

The addition of nutrients. Dredging sediments are typically a good source of phosphate, often potash and to a smaller extent nitrogen (the availability of N in dredgings is assumed to be 3%). The amounts of organic matter in dredging sediment can vary depending on the source and origins of the sediment but can typically range between 1% - 15%.

This benefit statement presents details of the volumes of material intended for use and the nutrient mass balances as a result of spreading to each field.

The quantity of waste applied per hectare shall not exceed that in the agreed deployment form and in any case no more than stated quantities of waste shall be spread on the land in any period of 12 months:

- In the case of dredging spoil from inland waters, (17 05 06) 5,000 tonnes per hectare.

3. Waste type

Wastes to be used under this deployment are listed below in Table 1.

Table 1. Description of wastes to be applied

EWC Code	***Description***	***Waste Producer***	***Additional Information***
17 05 06	Dredging spoil other than those mentioned in 17 05 05* (dredging spoil containing dangerous substances)	Non-waste producing site	Dredging spoil from inland waters, (17 05 06) can be spread at a rate of up to 5,000t/ha for the purpose of soil creation under SR2010No4.

Origin of the waste:

The waste material arisings are from planned maintenance dredging of the Monmouthshire & Brecon Canal as part of a planned campaign in 2026, between Llangattock and Llangynidr. The material has been thoroughly assessed using a comprehensive suite of inorganic and organic analysis and was classified accordingly. The waste classification report has been appended as part of this application SUIR-LAWS-C2-224 2025-M&B_v2 (silt).

4. Waste Storage and Spreading

4.1 Storage of waste

Dredging sediments will not be stored as part of this deployment application. Sediments will be dredged and dewatered in a nearby bunded storage area and once dried, they will be transferred and spread directly onto the fields. The registration of the storage area is independent of this permit deployment.

4.2 Spreading of waste

The sediments will be spread using a rear discharge spreader at a rate of up to 2,000 t/ha (1,429 m^3 at 1.4 t/m^3 assumed density of silt), after which they will be ploughed into the existing topsoil to a depth of circa 40cm. There will be no spreading within 10m of a watercourse, or 50m of a borehole or well used for drinking water abstraction. The fields are accessible by the farmers only and are restricted to public access, i.e., no unauthorized vehicles can enter the site or access the fields. A public footpath runs through field CD1; during operational activities, for safety, public movements across the field will be controlled by a banksman.

5. Operational Details

5.1 Cropping

All of the fields are improved grassland used for grazing. Following any spreading, the dredging silt will be ploughed into the soil and then fields will be reseeded with grass in the same year.

5.2 When waste will be spread

Application of waste silts is intended to follow the dredge in the Spring of 2026 and possibly into the early Summer, assuming suitable field and weather conditions. The regulator will be notified ahead of spreading.

5.3 Application rates

Sediment will be applied to the fields up to a potential maximum rate of 2,000 t/ha. The incorporation depth of sediments is circa 0.4m.

6. Benefits and Nutrients Supplied to the Land, Soil or Crop

6.1 The receiving soils

The soil in the fields to be spread are all classified by Soilscape as loamy and freely draining soil (SS6). Soil samples were collected from the fields at a rate of 1 sample per 5 hectares (25no composite grabs per sample), according to the methods stated in RB209 Section 3 and

the guidance in 'Landspreading to Manage Soil Health'. Field samples were analysed for the major soil nutrients, organic matter and for PTEs, refer to the Socotec report 25091021; Results are presented below in table 2. Overview of the sampling plan is provided in Figure 1.

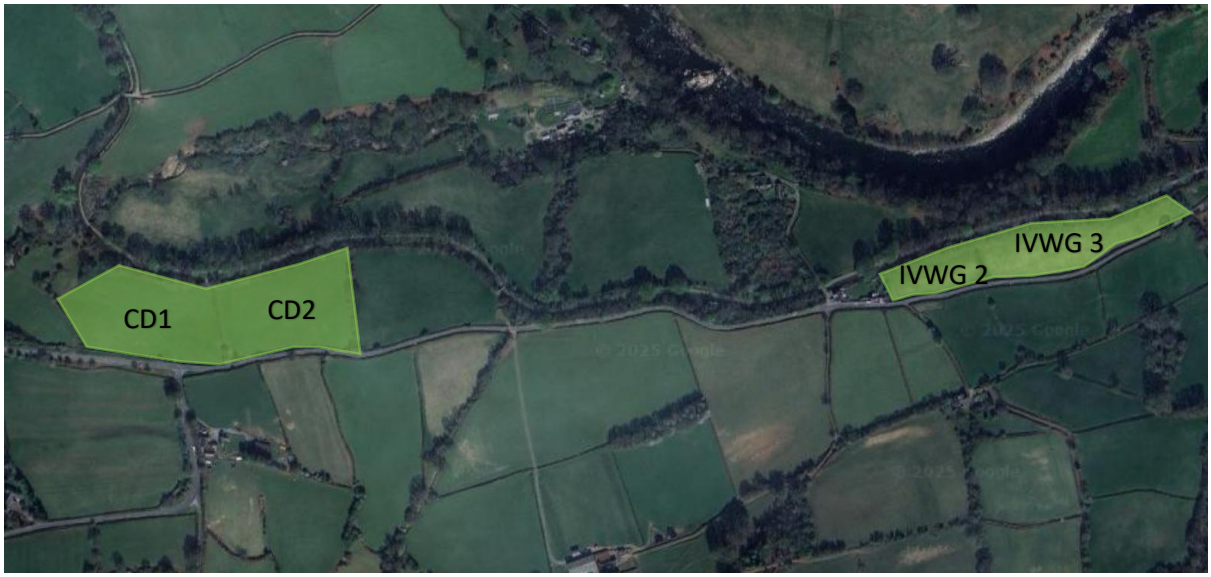

Figure 1. Field locations

Table 2.1 Soil analysis for field 'CD1'

Project:	C2-224	***Sample REF:***	CD1
Farm:	William Richard	***Matrix:***	Soil sample
Report Created:	29/08/2025	***Sampling Date:***	04/08/2025

Analyte	**Units**	
Magnesium as Mg (mg/l)	mg/l (s)	138
Potassium as K (mg/l)	mg/l (s)	143
Organic matter %	% m/m	9.4
pH (2.5:1 extraction)^	pH units	8.2
Magnesium Index	-	3
Phosphorus Index	-	1
Potassium Index	-	2-
Total Nitrogen as N*	%	0.48
Extractable Phosphorus as P	mg/l (s)	11.9

**Nitrogen content based on data from BGS UK Soil observatory map*

Zn	mg/kg	67.9
Cu	mg/kg	12
Pb	mg/kg	40.6

Ni	mg/kg	15.6
Cr	mg/kg	26.7
As	mg/kg	11.9
Cd	mg/kg	0.3
Hg	mg/kg	0

Soil at 'CD1' is characterised by a low (deficient) phosphorus content, and low to moderate levels of potash and magnesium. PTE contents are low.

Table 2.2 Soil analysis for field 'CD2'

Project:	C2-224	***Sample REF:***	CD2
Farm:	William Richard	***Matrix:***	Soil sample
Report Created:	29/08/2025	***Sampling Date:***	04/08/2025

Analyte	**Units**	
Magnesium as Mg (mg/l)	mg/l (s)	84
Potassium as K (mg/l)	mg/l (s)	87
Organic matter %	% m/m	9.8
pH (2.5:1 extraction)^	pH units	8.6
Magnesium Index	-	2
Phosphorus Index	-	0
Potassium Index	-	1
Total Nitrogen as N*	%	0.48
Extractable Phosphorus as P	mg/l (s)	7.6

**Nitrogen content based on data from BGS UK Soil observatory map*

Zn	mg/kg	68
Cu	mg/kg	9.2
Pb	mg/kg	30.1
Ni	mg/kg	14.4
Cr	mg/kg	22.3
As	mg/kg	10.4
Cd	mg/kg	0.3
Hg	mg/kg	0

Soil at field 'CD2' is characterised by a deficiency of phosphorus and potassium, and low level of magnesium. Organic matter content is moderate with 9.8% of organic matter. Soil pH is neutral to slightly alkaline.

Table 2.3 Soil analysis for field 'IV WG2'

Project:	C2-224	***Sample REF:***	IV WG2

Farm:	The Barn	***Matrix:***	Soil sample
Report Created:	29/08/2025	***Sampling Date:***	04/08/2025

Analyte	**Units**	
Magnesium as Mg (mg/l)	mg/l (s)	88
Potassium as K (mg/l)	mg/l (s)	115
Organic matter %	% m/m	9.2
pH (2.5:1 extraction)^	pH units	-
Magnesium Index	-	2
Phosphorus Index	-	1
Potassium Index	-	1
Total Nitrogen as N*	%	0.48
Extractable Phosphorus as P	mg/l (s)	5.7

**Nitrogen content based on data from BGS UK Soil observatory map*

Zn	mg/kg	59
Cu	mg/kg	20.4
Pb	mg/kg	29.9
Ni	mg/kg	16.9
Cr	mg/kg	21.7
As	mg/kg	9.3
Cd	mg/kg	0.3
Hg	mg/kg	0

Field IV WG2 is phosphorus and potassium deficient and has a moderate amount of organic matter.

Table 2.4 Soil analysis for field 'IV WG3'

Project:	C2-224	***Sample REF:***	IV WG3
Farm:	The Barn	***Matrix:***	Soil sample
Report Created:	29/08/2025	***Sampling Date:***	04/08/2025

Analyte	**Units**	
Magnesium as Mg (mg/l)	mg/l (s)	101
Potassium as K (mg/l)	mg/l (s)	113
Organic matter %	% m/m	7.3
pH (2.5:1 extraction)^	pH units	4.8
Magnesium Index	-	3
Phosphorus Index	-	3
Potassium Index	-	1

Total Nitrogen as N*	%	0.48
Extractable Phosphorus as P	mg/l (s)	26.5

**Nitrogen content based on data from BGS UK Soil observatory map*

Zn	mg/kg	67.5
Cu	mg/kg	10.9
Pb	mg/kg	26
Ni	mg/kg	16.2
Cr	mg/kg	25.1
As	mg/kg	9.9
Cd	mg/kg	0.4
Hg	mg/kg	0

The soil is characterized by a moderate phosphorus content, a low potassium content and a moderate content of organic matter, the forms are not described in the measurement. pH of the soil is toward the acid range, measuring 4.8. Soil type as per Soilscape is SS6 (loamy and free draining).

6.2 Characterization of dredging sediment

The waste material to be spread are arisings from planned dredging works in the Mon & Brec Canal. Over time the water way fills with sediment, this accumulation in the watercourse requires periodic dredging to maintain the channel depth and capacity for navigation as part of routine waterways works.

The sediments will be applied as a soil replacement, providing agronomic benefit as a source of organic carbon, N, P and K, plus trace nutrients, under a SR2010No4 Mobile Plant permit. The application rate is appropriate for the amount of dredgings removed and the available field areas, the application will not exceed the statutory maximum rate of 5,000 t/ha. Full characterisation of the sediments are provided in the analysis report **'25083916'**. The mean dredging sediment results from the laboratory report are presented below in Table 3.

Table 3. Mean pH, major nutrient and PTE content in dredging sediment

Property	***Unit***	***Sediment***	
		In dry matter	*Fresh weight*
pH		**7.1**	**7.1**
Nitrogen	%	**0.6**	**0.2**
Phosphorous	mg/kg	**125**	**40.4**

Potassium	mg/kg	**146**	**47.2**
Magnesium	mg/kg	**240**	**77.5**
Organic Matter	%	**13.3**	**4.3**
Zn	mg/kg	**110**	**35.5**
Cu	mg/kg	**22.4**	**7.2**
Pb	mg/kg	**32.4**	**10.5**
Ni	mg/kg	**21.8**	**7.0**
Cr	mg/kg	**21.3**	**6.9**
As	mg/kg	**4.1**	**1.3**
Cd	mg/kg	**0.6**	**0.2**
Hg	mg/kg	**0**	**0**
Se	mg/kg	**1.0**	**0.3**

Nutrient status of the dredgings shows levels of available P by mass of 40 mg/kg and K by mass of around 47 mg/kg (moisture corrected); the immediate availabilities of these will be slow as a portion of the P and K will be partially fixed or bound, a proportion of which is in organic forms. At the specified rates of application, the addition of P_2O_5 and K_2O will confer benefit by maintaining levels in the soil and supplying the future rotation with these essential nutrients. The dredging application will supply a fresh mass of organic carbon and minerals which will replenish and increase the topsoil levels.

The sediments were analysed using a comprehensive suite of analysis, to include organic contaminants. Results of the analysis showed that sediments are non-hazardous (EWC 17 05 06). The sediments contain major nutrients N, P and K and some organic matter, which is within the typical range for freshwater dredging spoil. Dredging sediments are also a source of trace nutrients.

6.3 Mixing calculation for topsoil following spreading

The following table (4) shows the calculated topsoil output characteristics following spreading application and incorporation of the material to the specified depth.

Table 4.1 Output topsoil characteristics following application of sediment to field CD1 (2,000t/ha) with mixing to circa 0.4m depth

Mixing depth =	0.4	m					
Soil density =	1.4	kg/m3					
Application rate =	2000	tonne					
Property	**Receiving soil**	**Unit**	**Sediment**	**Unit**	**Calculated topsoil output following application**		
N	0.48	%	0.6	%	0.48	%	
P	11.9 (**1**)	ppm (INDEX)	125	ppm	23.1	ppm (INDEX)	**2**
K	143 (**2-**)	ppm (INDEX)	146	ppm	140	ppm (INDEX)	**2-**
Mg	138 (**3**)	ppm (INDEX)	240	ppm	146	ppm (INDEX)	**3**
OM	9.4	%	13.3	%	9.6	%	Limit
Zn	67.9	mg/kg	110	mg/kg	70.7	mg/kg	300
Cu	12	mg/kg	22	mg/kg	12.8	mg/kg	200
Pb	40.6	mg/kg	32	mg/kg	39.0	mg/kg	300
Ni	15.6	mg/kg	22	mg/kg	42.3	mg/kg	110
Cr	26.7	mg/kg	21	mg/kg	25.6	mg/kg	400
As	11.9	mg/kg	4.1	mg/kg	10.9	mg/kg	50
Cd	0.3	mg/kg	0.6	mg/kg	0.3	mg/kg	3
Hg	0	mg/kg	0	mg/kg	0.0	mg/kg	1
Se	0.6	mg/kg	0	mg/kg	0.6	mg/kg	3

Post-application soil properties of field CD1 show that the P Index of soil will be elevated from current Index 1 to P Index 2. Potassium index will remain at its current level; magnesium Index will remain at Index level 3. Concentrations of PTEs in soil following application, at the specified rates, are significantly lower than the guideline limits for agricultural soils as per Sewage Sludge in Agriculture Code of Practice.

Table 4.2 Output topsoil characteristics following application of sediment to field CD2 (2,000t/ha) with mixing to circa 0.4m depth

Mixing depth =	0.4	m					
Soil density =	1.4	kg/m3					
Application rate =	2000	tonne					
Property	**Receiving soil**	**Unit**	**Sediment**	**Unit**	**Calculated topsoil output following application**		
N	0.48	%	0.6	%	0.48	%	
P	7.6 (**0**)	ppm (INDEX)	125	ppm	19.3	ppm (INDEX)	**2**
K	87 (**1**)	ppm (INDEX)	146	ppm	91	ppm (INDEX)	**1**
Mg	84 (**2**)	ppm (INDEX)	240	ppm	98	ppm (INDEX)	**2**
OM	9.8	%	13.3	%	9.6	%	Limit
Zn	68	mg/kg	110	mg/kg	70.8	mg/kg	300
Cu	9.2	mg/kg	22	mg/kg	10.3	mg/kg	200
Pb	30.1	mg/kg	32	mg/kg	29.8	mg/kg	300
Ni	14.4	mg/kg	22	mg/kg	14.9	mg/kg	110
Cr	22.3	mg/kg	21	mg/kg	21.7	mg/kg	400
As	10.4	mg/kg	4.1	mg/kg	9.6	mg/kg	50
Cd	0.3	mg/kg	0.6	mg/kg	0.3	mg/kg	3
Hg	0	mg/kg	0	mg/kg	0.0	mg/kg	1
Se	0.5	mg/kg	0	mg/kg	0.6	mg/kg	3

Post-application soil properties of field CD2 show that the P Index of soil will be elevated from current Index 0 to P Index 2. Potassium index will remain at its current level of Index 1; magnesium Index will remain at Index level 2. Concentrations of PTEs in soil following application, at the specified rates, are significantly lower than the guideline limits for agricultural soils as per Sewage Sludge in Agriculture Code of Practice.

Table 4.3 Output topsoil characteristics following application of sediment to field IV WG2 (2,000t/ha) with mixing to circa 0.4m depth

Mixing depth =	0.4	m					
Soil density =	1.4	kg/m3					
Application rate =	2000	tonne					
Property	**Receiving soil**	**Unit**	**Sediment**	**Unit**	**Calculated topsoil output following application**		
N	0.48	%	0.6	%	0.48	%	
P	5.7 (**1**)	ppm (INDEX)	125	ppm	17.7	ppm (INDEX)	**2**
K	115 (**1**)	ppm (INDEX)	146	ppm	116	ppm (INDEX)	**1**
Mg	88 (**2**)	ppm (INDEX)	240	ppm	102	ppm (INDEX)	**3**
OM	9.2	%	13.3	%	9.4	%	Limit
Zn	59	mg/kg	110	mg/kg	62.9	mg/kg	300
Cu	20.4	mg/kg	22	mg/kg	20.1	mg/kg	200
Pb	29.9	mg/kg	32	mg/kg	29.6	mg/kg	300
Ni	16.9	mg/kg	22	mg/kg	17.1	mg/kg	110
Cr	21.7	mg/kg	21	mg/kg	21.2	mg/kg	400
As	9.3	mg/kg	4.1	mg/kg	8.6	mg/kg	50
Cd	0.3	mg/kg	0.6	mg/kg	0.3	mg/kg	3
Hg	0	mg/kg	0	mg/kg	0.0	mg/kg	1
Se	0	mg/kg	0	mg/kg	0.6	mg/kg	3

Post-application soil properties of field IV WG2 show that the P Index of soil will be elevated from current Index 1 to P Index 2. Potassium index will remain at its current level of Index 1; magnesium Index will increase from Index 2 to Index 3. Concentrations of PTEs in soil following application, at the specified rates, are significantly lower than the guideline limits for agricultural soils as per Sludge Regs.

Table 4.4 Output topsoil characteristics following application of sediment to field IV WG3 (1,000t/ha) with mixing to circa 0.4m depth

Mixing depth =	0.4	m					
Soil density =	1.4	kg/m3					
Application rate =	1000	tonne					
Property	**Receiving soil**	**Unit**	**Sediment**	**Unit**	**Calculated topsoil output following application**		
N	0.48	%	0.6	%	0.48	%	
P	26.5(**3**)	ppm (INDEX)	125	ppm	31.5	ppm (INDEX)	**3**
K	113(**1**)	ppm (INDEX)	146	ppm	114	ppm (INDEX)	**1**
Mg	101(**3**)	ppm (INDEX)	240	ppm	107	ppm (INDEX)	**3**
OM	7.3	%	13.3	%	7.5	%	Limit
Zn	67.5	mg/kg	110	mg/kg	69.0	mg/kg	300
Cu	10.9	mg/kg	22	mg/kg	11.4	mg/kg	200
Pb	26	mg/kg	32	mg/kg	26.1	mg/kg	300
Ni	16.2	mg/kg	22	mg/kg	16.3	mg/kg	110
Cr	25.1	mg/kg	21	mg/kg	24.6	mg/kg	400
As	9.9	mg/kg	4.1	mg/kg	9.5	mg/kg	50
Cd	0.4	mg/kg	0.6	mg/kg	0.4	mg/kg	3
Hg	0	mg/kg	0	mg/kg	0.0	mg/kg	1
Se	0.6	mg/kg	0	mg/kg	0.6	mg/kg	3

Post-application soil properties of field IV WG3 show that the P Index of soil will remain at P Index 3. Potassium and magnesium indices will remain at current levels. Concentrations of PTEs in soil following application, at the specified rates, are significantly lower than the guideline limits for agricultural soils as per Sludge Regs.

6.4 Summary of benefit

Dredging sediments supply nutrients in the form of phosphate, potash and organically bound nitrogen (the mineralisation rate for dredging spoil is assumed to be 3%) (Environment Agency 2022 - Land Spreading to Improve Soil Health). The dredgings were analysed for pH, major nutrients and potentially toxic elements (Table 3). The analysis shows the dredgings to be a source of major nutrients, soil forming minerals and organic carbon.

The pH and nutrient status of the dredgings as defined by soil analysis methods allow the dredgings to be described as a direct substitute for agricultural soil and not as an organic manure or fertiliser. Dredgings, defined as a substance containing nitrogen that is neither a manufactured nitrogen fertiliser nor an organic manure, do not need to be taken into account in the N – Max calculation.

In order to achieve optimal yield, the crop may require additional readily available nitrogen.

7. Potential negative impacts to the land, soil or crop

7.1 PTEs and organic contaminants

Dredging sediment can potentially contain elevated levels of PTEs and other contaminants, depending on their source and location. The sediments in the Mon & Brec canal were comprehensively analysed and assessed; the waste classification details the assessment SUIR-LAWS-C2-224 2025-M&B_v2 (silt). Sediments are classified as non-hazardous, the dry and fresh weight concentrations of organic and inorganic contaminant are low and will not pose a high risk when applied to agricultural land.

7.2 Other waste characteristics

The mean pH level of the waste is neutral at pH 7.1, the measured pH of receiving fields varied from 4.8 to pH 8.6. Dredging sediments naturally have a high moisture content once collected but will be subjected to a degree of drying out whilst they are in storage prior to spreading (storage not registered as part of this deployment).

7.3 Duty of Care

Dredged sediments (EWC 17 05 06) are being recovered at or near to the place where they are stored. if there is a requirement to transport the waste by land and between waste holders, waste transfer notes will be generated. Once the spreading operation is complete,

the site will be monitored to ensure that all obligations have been fulfilled (e.g., reseeding has been done, site is tidy etc.).

7.4 Sensitive receptors

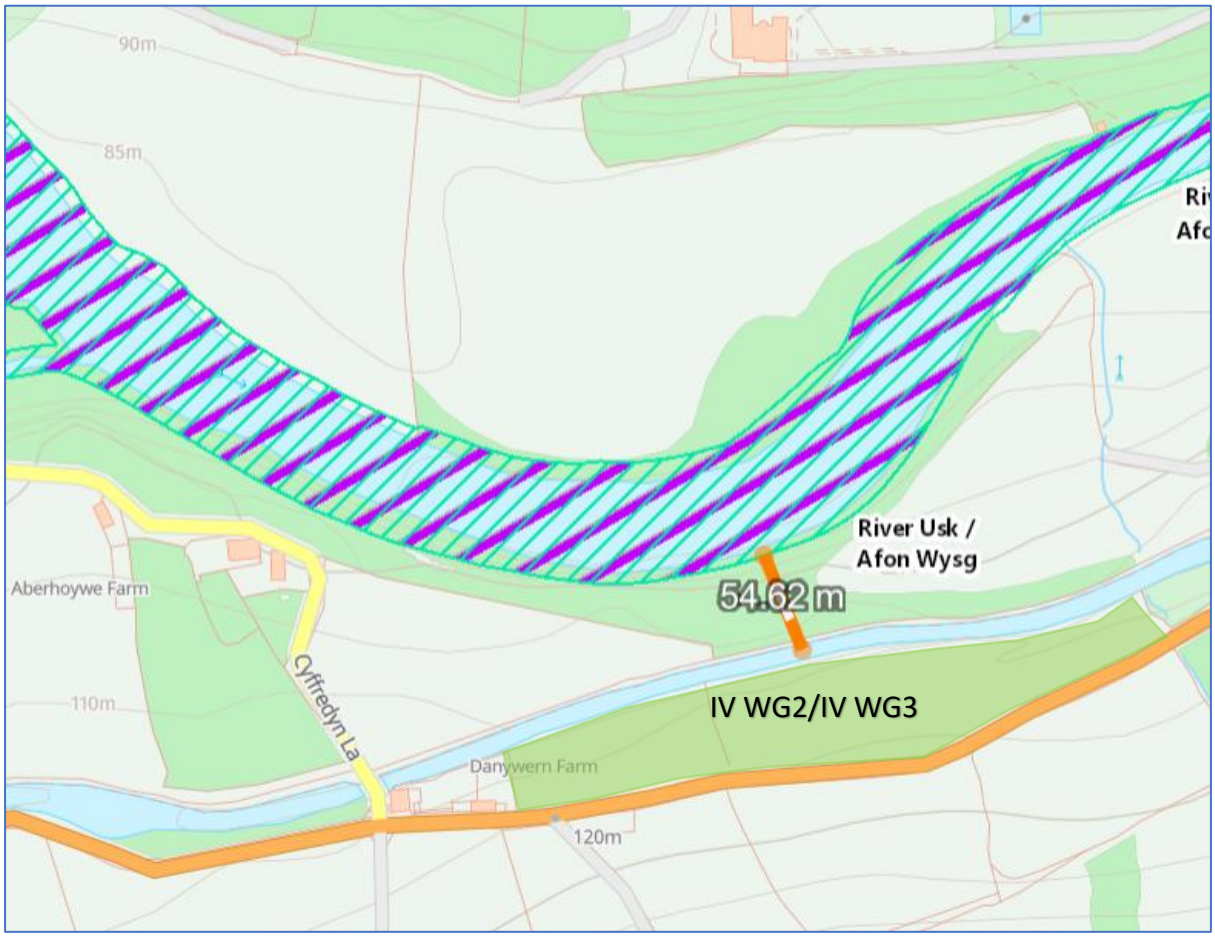

Figure 2. Location of Afon Wysg

The nearest designated site, at its shortest point, is approximately 55m to the North of IV WG3; a site-specific risk assessment has been completed and is attached to this application.

The deployed area is wholly within an NVZ but due to the waste type being applied, is not subject to any spreading restrictions other than those defined in this benefit statement.

Table 5. Sensitive receptors identified near to the deployed area

Receptor	***Distance from Area***	***Emission Type***
Afon Wysg (River Usk)	<100m from IV WG2 and IV WG3	Dust, spray, run-off

Forest inventory mixed woodland	< 10m from fields	Dust, spray, run-off

In addition to those listed above in table 5, receptors are shown in the spreading plan (3. Spreading plan C2-224 Mon & Brec 2025). Due to proximity to the SSSI, a site-specific risk assessment has been appended with this application.

8. Other operational considerations

- Wastes will be applied within reasonable hours, i.e., no spreading between dusk and dawn.
- Spreading of wastes will only take place when the weather and ground conditions are suitable.
- Machinery is well maintained, and appropriate for the task, i.e., correct tyres/ tyre pressures for the field and ground conditions.
- Spill kits are attached to all machines.
- Spreading will be carried out by Land & Water Services (LAWS) or by a LAWS approved contractor.
- Land & Water operations are internally audited for safety and for environmental compliance.
- Following spreading, the fields will be reseeded as soon as practicably possible.

9. Contingency Planning

In the unlikely event of a spill or pollution incident, Land & Water has a procedure for oil, fuel and chemical spills. Spill kits are attached to all vehicles and are available on site at all times.

Additional or replacement machinery is available to continue the spreading operation in the event of a breakdown. No waste will be left in machinery, buckets and hoppers will be empty and clean at the end of each working shift. There will be a sufficient number of trained staff available to ensure that the operation continues throughout operational hours, including cover for any sick or absent staff.

If weather prohibits the spreading, then waste can remain in its current secure store until the appropriate opportunity to spread arises.

In the event of any spill or pollution incident, the Environment Agency will be contacted.