Ref ABS C2-224
(Jun 2026)

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 around 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 9 years. 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, and is WAMITAB certified for operator competence for non-hazardous sludge and landspreading (Accreditation no. 601/8526/0).

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 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. Regulator published guidance specific to EWC '17 05 06 Dredging spoil other than those mentioned in 17 05 05' has been followed, which is cited in Landspreading: benefits and risks of the waste types you can use - 17 Waste codes - Guidance - GOV.UK.

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 campaign taking place 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 density of silt), after which they will be incorporated into the existing topsoil to a depth of up to 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 on private land, 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. As evidence of this, refer to document '**2.2 Fields in improved grassland v2**'.

5.2 When waste will be spread

Application of waste silts is intended to follow the dredge in the Summer of 2026; The silt arisings will be contained in a sealed bund for some weeks following the dredge, which will allow some of the moisture to be removed and facilitate the handling and spreading. The silt

will be spread from the bund in Autumn of 2026, assuming suitable field and weather conditions. The regulator will be notified ahead of any 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. Rates that are specific to each field have been calculated according to the silt analysis and respective soils analysis; these are presented further down in this benefit statement.

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 and 26052725. Results of field soils analysis are presented below in tables 2. An overview of the field locations is provided in Figure 1, and in document '**2. Spreading plan C2-224 Mon & Brec 2025 v3**'.

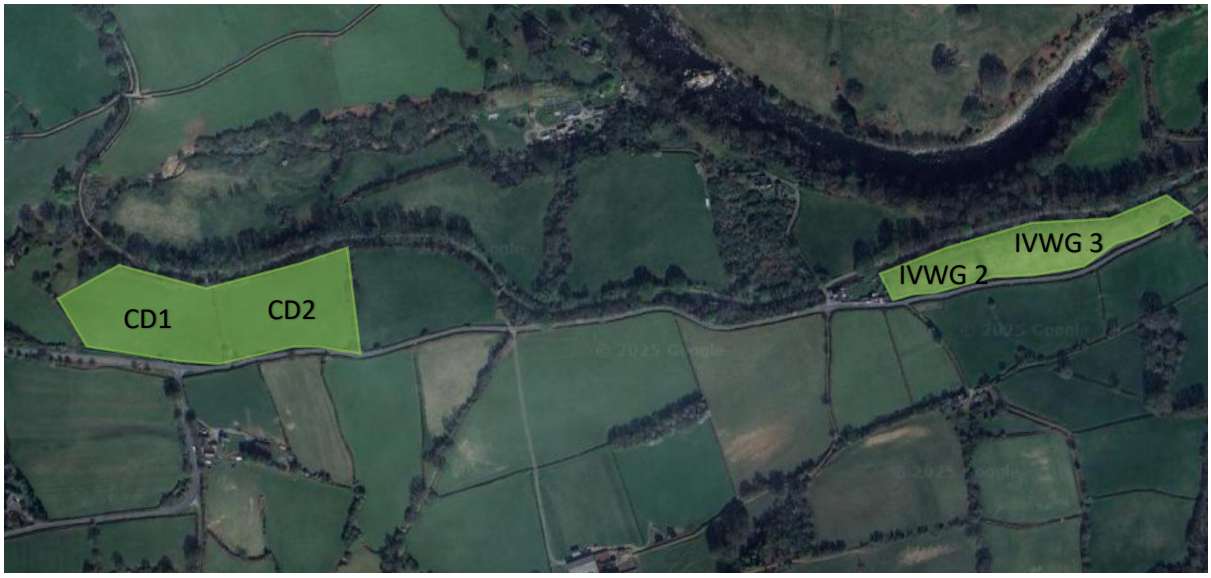

Figure 1.1 Field locations CD 1,2 and IVWG 2,3

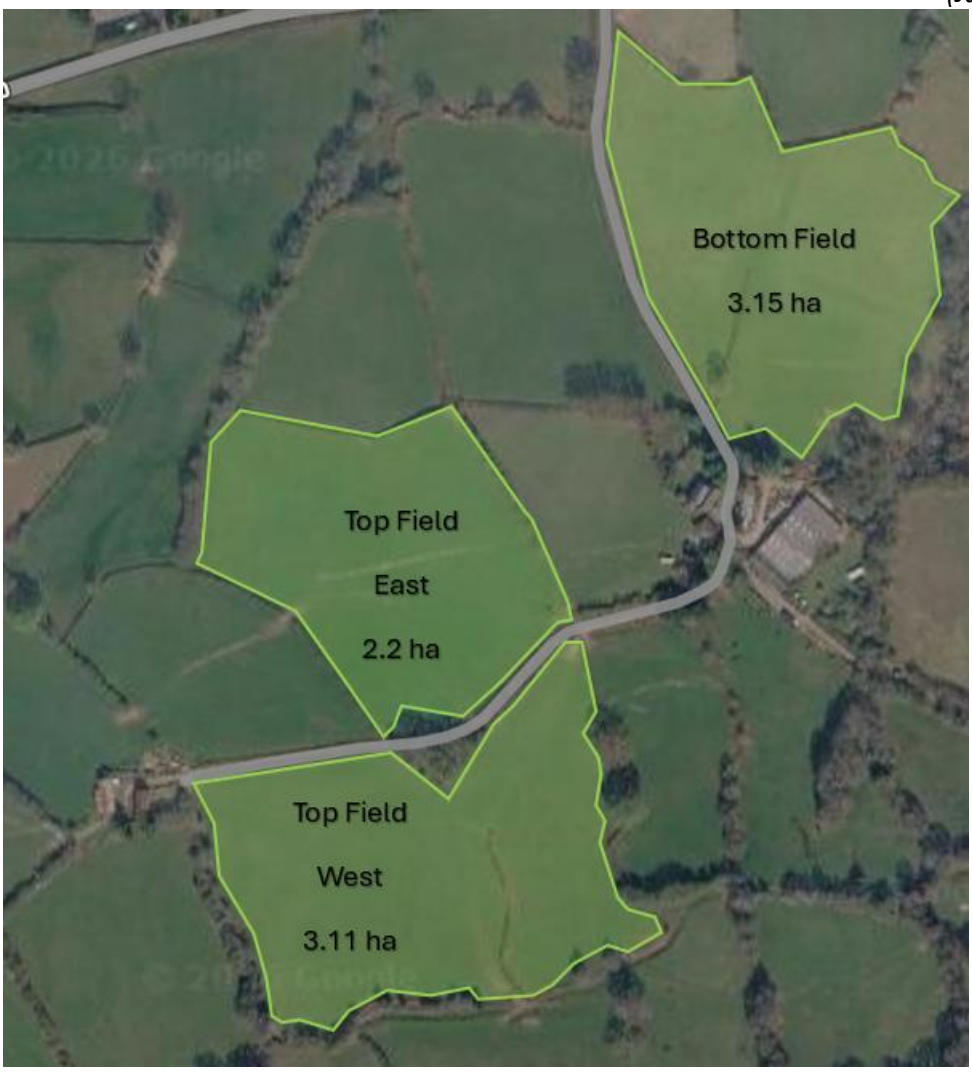

Figure 1.2 Field locations Top Field East, Tope Field West, Bottom Field

Table 2.1 Soil analysis for field 'CD1'

Lab reference	25091021	***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*	%	0.26
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	<0.5

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'

Lab reference	25091021	***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*	%	0.3
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	<0.5

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 in the neutral to slightly alkaline range.

Table 2.3 Soil analysis for field 'IV WG2'

Lab reference	26052723	***Sample REF:***	IV WG2
Farm:	The Barn	***Matrix:***	Soil sample
Report Created:	11/06/2026	***Sampling Date:***	18/05/2026

Analyte	**Units**	
Magnesium as Mg (mg/l)	mg/l (s)	102
Potassium as K (mg/l)	mg/l (s)	112
Organic matter %	% m/m	8.3
pH (2.5:1 extraction)^	pH units	5.8
Magnesium Index	-	2
Phosphorus Index	-	1
Potassium Index	-	1
Total Nitrogen as N*	%	0.32
Extractable Phosphorus as P	mg/l (s)	15

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

Zn	mg/kg	70.5
Cu	mg/kg	12.1
Pb	mg/kg	31.5
Ni	mg/kg	17
Cr	mg/kg	23.9
As	mg/kg	10.8
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. PTE contents are low to moderate and within the safe range as per Sludge Use in Agriculture Regulations limits.

Table 2.4 Soil analysis for field 'IV WG3'

Lab reference	25091021	***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*	%	0.21
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).

Table 2.5 Soil analysis for field 'Top Field East'

Lab reference	26052723	***Sample REF:***	Top Field East
Farm:	Llwyncelyn	***Matrix:***	Soil sample
Report Created:	11/06/2026	***Sampling Date:***	18/05/2026

Analyte	**Units**	
Magnesium as Mg (mg/l)	mg/l (s)	150
Potassium as K (mg/l)	mg/l (s)	122
Organic matter %	% m/m	6.8
pH (2.5:1 extraction)^	pH units	5.8

Magnesium Index	-	3
Phosphorus Index	-	2
Potassium Index	-	3
Total Nitrogen as N*	%	0.39
Extractable Phosphorus as P	mg/l (s)	19.5

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

Zn	mg/kg	64.5
Cu	mg/kg	9.2
Pb	mg/kg	22.9
Ni	mg/kg	17.2
Cr	mg/kg	22.1
As	mg/kg	10.4
Cd	mg/kg	0.3
Hg	mg/kg	0

Soils in field Top Field East are characterised by a moderate content of phosphorus, potassium and magnesium. Organic matter is slightly lower than other fields that were sampled, with approximately 6.8% of organic matter, and only 2% of total organic carbon.

Table 2.6 Soil analysis for field 'Top Field West'

Lab reference	26052723	***Sample REF:***	Top Field West
Farm:	Llwyncelyn	***Matrix:***	Soil sample
Report Created:	11/06/2026	***Sampling Date:***	18/05/2026

Analyte	**Units**	
Magnesium as Mg (mg/l)	mg/l (s)	140
Potassium as K (mg/l)	mg/l (s)	88
Organic matter %	% m/m	8.8
pH (2.5:1 extraction)^	pH units	5.8
Magnesium Index	-	3
Phosphorus Index	-	2
Potassium Index	-	1
Total Nitrogen as N*	%	0.36
Extractable Phosphorus as P	mg/l (s)	20.9

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

Zn	mg/kg	112.4
Cu	mg/kg	113.4

Pb	mg/kg	36.9
Ni	mg/kg	18.4
Cr	mg/kg	24.3
As	mg/kg	11.2
Cd	mg/kg	0.3
Hg	mg/kg	0

Soils at Top Field West have moderate to low fertility as P and K Indices are at 2 and 1 respectively. PTEs are safely within the guideline limits. pH is on the acidic side, which may be contributing the loss of key nutrients from the soils over time.

Table 2.7 Soil analysis for field 'Bottom Field'

Lab reference	26052723	***Sample REF:***	Bottom Field
Farm:	Llwyncelyn	***Matrix:***	Soil sample
Report Created:	11/06/2026	***Sampling Date:***	18/05/2026

Analyte	**Units**	
Magnesium as Mg (mg/l)	mg/l (s)	140
Potassium as K (mg/l)	mg/l (s)	88
Organic matter %	% m/m	8.8
pH (2.5:1 extraction)^	pH units	5.7
Magnesium Index	-	3
Phosphorus Index	-	2
Potassium Index	-	1
Total Nitrogen as N*	%	0.36
Extractable Phosphorus as P	mg/l (s)	20.9

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

Zn	mg/kg	112.4
Cu	mg/kg	113.4
Pb	mg/kg	26.9
Ni	mg/kg	18.4
Cr	mg/kg	24.3
As	mg/kg	11.2
Cd	mg/kg	0.3
Hg	mg/kg	0

Bottom Field has a low to moderate fertility, organic matter content is moderate, and pH is low, tending towards acidic. PTEs are low with the exception of selenium, which has a value

of 4.5 mg/kg, slightly above the Sludge Reg limit of 3 mg/kg. However, the sediment contains no selenium, which will help to reduce the overall concentration in the receiving soil.

6.2 Characterization of dredging sediment

The waste material to be spread are arisings from dredging works in the Mon & Brec Canal. Over time the waterway 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 to increase soil volume, 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, some 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 tables (4) show 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 (1,750t/ha) with mixing to circa 0.4m depth

Mixing depth =	0.4	m					
Soil density =	1.4	kg/m3					
Application rate =	1,750	tonne					
Property	**Receiving soil**	**Unit**	**Sediment**	**Unit**	**Calculated topsoil output following application**		
N	0.26	%	0.6	%	0.28	%	
P	11.9(1)	ppm (IND 1)	125	ppm	21.9	ppm (INDEX)	**2**
K	143(2-)	ppm (IND 2-)	146	ppm	141	ppm (INDEX)	**2-**
Mg	138(3)	ppm (IND 3)	240	ppm	145	ppm (INDEX)	**3**
OM	9.4	%	13.3	%	9.6	%	Limit
Zn	67.9	mg/kg	110	mg/kg	70.4	mg/kg	300
Cu	12	mg/kg	22	mg/kg	12.7	mg/kg	200
Pb	40.6	mg/kg	32	mg/kg	39.2	mg/kg	300
Ni	15.6	mg/kg	22	mg/kg	42.6	mg/kg	110
Cr	26.7	mg/kg	21	mg/kg	25.7	mg/kg	400
As	11.9	mg/kg	4.1	mg/kg	11.0	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 =	2,000	tonne					
Property	**Receiving soil**	**Unit**	**Sediment**	**Unit**	**Calculated topsoil output following application**		
N	0.3	%	0.6	%	0.32	%	
P	7.6(0)	ppm (IND 0)	125	ppm	19.3	ppm (INDEX)	**2**
K	87(1)	ppm (IND 1)	146	ppm	91	ppm (INDEX)	**1**
Mg	84(2)	ppm (IND 2)	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 (1,800t/ha) with mixing to circa 0.4m depth

Mixing depth =	0.4	m					
Soil density =	1.4	kg/m3					
Application rate =	1,800	tonne					
Property	**Receiving soil**	**Unit**	**Sediment**	**Unit**	**Calculated topsoil output following application**		
N	0.32	%	0.6	%	0.34	%	
P	15	ppm (IND 1)	125	ppm	24.9	ppm (INDEX)	**2**
K	112	ppm (IND 1)	146	ppm	113	ppm (INDEX)	**1**
Mg	102	ppm (IND 2)	240	ppm	113	ppm (INDEX)	**3**
OM	8.3	%	13.3	%	8.6	%	Limit
Zn	70.5	mg/kg	110	mg/kg	72.8	mg/kg	300
Cu	12.1	mg/kg	22	mg/kg	12.8	mg/kg	200
Pb	31.5	mg/kg	32	mg/kg	31.1	mg/kg	300
Ni	17	mg/kg	22	mg/kg	17.1	mg/kg	110
Cr	23.9	mg/kg	21	mg/kg	23.2	mg/kg	400
As	10.8	mg/kg	4.1	mg/kg	10.0	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	2.7	mg/kg	0	mg/kg	2.5	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 =	1,000	tonne					
Property	**Receiving soil**	**Unit**	**Sediment**	**Unit**	**Calculated topsoil output following application**		
N	0.21	%	0.6	%	0.23	%	
P	26.5	ppm (IND 3)	125	ppm	31.5	ppm (INDEX)	**3**
K	113	ppm (IND 1)	146	ppm	114	ppm (INDEX)	**1**
Mg	101	ppm (IND 3)	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.

Table 4.5 Output topsoil characteristics following application of sediment to field Top Field East (900t/ha) with mixing to circa 0.4m depth

Mixing depth =	0.4	m					
Soil density =	1.4	kg/m3					
Application rate =	900	tonne					
Property	**Receiving soil**	**Unit**	**Sediment**	**Unit**	**Calculated topsoil output following application**		
N	0.39	%	0.6	%	0.40	%	
P	19.5	ppm (IND 2)	125	ppm	24.5	ppm (INDEX)	**2**
K	122	ppm (IND 2-)	146	ppm	122	ppm (INDEX)	**2-**
Mg	150	ppm (IND 3)	240	ppm	153	ppm (INDEX)	**3**
OM	6.8	%	13.3	%	7.1	%	Limit
Zn	64.5	mg/kg	110	mg/kg	66.1	mg/kg	300
Cu	9.2	mg/kg	22	mg/kg	9.7	mg/kg	200
Pb	22.9	mg/kg	32	mg/kg	23.2	mg/kg	300
Ni	17.2	mg/kg	22	mg/kg	17.3	mg/kg	110
Cr	22.1	mg/kg	21	mg/kg	21.8	mg/kg	400
As	10.4	mg/kg	4.1	mg/kg	10.0	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	2.3	mg/kg	0	mg/kg	2.2	mg/kg	3

Table 4.6 Output topsoil characteristics following application of sediment to field Top Field West (750t/ha) with mixing to circa 0.4m depth

Mixing depth =	0.4	m					
Soil density =	1.4	kg/m3					
Application rate =	750	tonne					
Property	**Receiving soil**	**Unit**	**Sediment**	**Unit**	**Calculated topsoil output following application**		
N	0.36	%	0.6	%	0.37	%	
P	20.9	ppm (IND 2)	125	ppm	25.0	ppm (INDEX)	**2**
K	88	ppm (IND 1)	146	ppm	90	ppm (INDEX)	**2-**
Mg	140	ppm (IND 3)	240	ppm	143	ppm (INDEX)	**3**
OM	8.8	%	13.3	%	8.9	%	Limit
Zn	112.4	mg/kg	110	mg/kg	120.9	mg/kg	300
Cu	113.4	mg/kg	22	mg/kg	108.7	mg/kg	200
Pb	26.9	mg/kg	32	mg/kg	26.9	mg/kg	300
Ni	18.4	mg/kg	22	mg/kg	18.4	mg/kg	110
Cr	24.3	mg/kg	21	mg/kg	24.0	mg/kg	400
As	11.2	mg/kg	4.1	mg/kg	10.8	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	4.5	mg/kg	0	mg/kg	4.4	mg/kg	3

Following spreading the receiving field will benefit from the addition of P, K and Mg. Field P and Mg Indices will remain at their current levels, K Index will be raised from 1 to the lower target level of 2. The selenium content, which is currently above the Sludge Reg limit, will have its concentration in soil decrease due to the addition of silt which contains no selenium, hence there will be a diluting effect on this PTE.

Table 4.7 Output topsoil characteristics following application of sediment to field Bottom Field (750t/ha) with mixing to circa 0.4m depth

Mixing depth =	0.4	m					
Soil density =	1.4	kg/m3					
Application rate =	750	tonne					
Property	**Receiving soil**	**Unit**	**Sediment**	**Unit**	**Calculated topsoil output following application**		
N	0.29	%	0.6	%	0.30	%	
P	30.5	ppm (IND 3)	125	ppm	34.1	ppm (INDEX)	**3**
K	104	ppm (IND 1)	146	ppm	105	ppm (INDEX)	**1**
Mg	126	ppm (IND 3)	240	ppm	130	ppm (INDEX)	**3**
OM	8	%	13.3	%	8.2	%	Limit
Zn	71.3	mg/kg	110	mg/kg	72.3	mg/kg	300
Cu	13.5	mg/kg	22	mg/kg	13.7	mg/kg	200
Pb	30.7	mg/kg	32	mg/kg	30.5	mg/kg	300
Ni	15.6	mg/kg	22	mg/kg	15.7	mg/kg	110
Cr	18.6	mg/kg	21	mg/kg	18.6	mg/kg	400
As	12.1	mg/kg	4.1	mg/kg	11.7	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	2.2	mg/kg	0	mg/kg	2.2	mg/kg	3

Bottom Field will see small increases in P, K and Mg levels in soil. Organic matter content will increase slightly by 0.2%, PTE levels in the soil will not be negatively affected, i.e., no marked increases.

Table 5. Total nutrient additions as part of the application (at a maximum assumed rate of 2,000 t/ha)

Analysis of Mon and Brec dredging sediment

Date: 19/08/2025 Lab report no. 25083916

Application rate (t/ha)	**2000**
Application rate (t/acre)	**800.0**
pH	**7.1**
Dry solids (%)	**32.3**
Organic matter (%)	**13.3**
Conductivity (µS/cm)	**132**

NUTRIENT CONTENT

			Total		Available	
TOTALS	**result**	**units**	**(kg/tonne)**	**(kg/ha)**	**(kg/tonne)**	**(kg/ha)**
Nitrogen (N)	0.60	%	1.94	3880.8	0.00	1.7
Ammonium-N	2.7	mg/kg	0.00	1.7		
Phosphorus (P)	125	mg/kg	0.04	81.0		
Phosphate (P2O5)			0.09	184.8	0.0	92.4
Potassium (K)	146	mg/kg	0.05	94.4		
Potash (K2O)			0.06	113.3	0.0	102.0
Magnesium (Mg)	240	mg/kg	0.08	155.2		
Magnesium (MgO)			0.12	248.4	0.0	24.8
Sulphur (S)	1000	mg/kg	0.32	646.8		
Sulphur (SO_3)			0.81	1617.0	0.1	161.7
Calcium (Ca)		mg/kg	0.0	0.0		
Sodium (Na)	229	mg/kg	0.07	148.1		

POTENTIALLY TOXIC ELEMENTS

			Amount	
TOTALS	**result**	**units**	**(g/tonne)**	**(kg/ha)**
Zinc	109.5	mg/kg	35.4	70.82
Copper	22	mg/kg	7.24	14.49
Nickel	21.8	mg/kg	7.05	14.10
Lead	32.4	mg/kg	10.48	20.96
Cadmium	0.6	mg/kg	0.19	0.39
Chromium	21.3	mg/kg	6.89	13.78
Mercury	0.0	mg/kg	0.00	0.00
Arsenic	4.1	mg/kg	1.33	2.65
Selenium	1.0	mg/kg	0.32	0.65
Molybdenum	0.0	mg/kg	0.00	0.00
Fluoride	0	mg/kg	0.10	0.19

Table 5 lists the total (and available) nutrients and PTEs applied at the potential maximum rate of 2,000 t/ha. Note that unlike organic manures and fertilisers, the application of dredgings (due to inevitably large volumes) is assessed using a mixing ratio as opposed to calculating the total inputs. To make an assessment based on the total inputs is prohibitive as it would not yield any realistic application rates for the waste types (up to 5,000 t/ha permitted). The guidance on dredgings states this as follows:

Application rate
Potentially toxic elements and the limits that must be met are given in the Sewage sludge in agriculture: code of practice. These limits apply to this waste not just sewage sludge.

You can use the mixing ratio of the dredgings and the field soil when you calculate the concentrations of nutrients and potentially toxic elements.

Here is an example.

A field soil has a particular nutrient such as a phosphate content of 100mg/kg and the dredgings a content of 10mg/kg of the same nutrient. If you mix the soil and the dredgings in a 1:1 mass ratio, the mixed material will have (100 + 10)/2 = 55mg/kg of that nutrient.

This has the effect of diluting the nutrient or potentially toxic element concentrations in the receiving soils. However, any waste recovery to agricultural land must not result in the receiving soil exceeding the maximum permissible concentration of each given potentially toxic element. You will need to:

- carry out a site-specific assessment of the risks
- provide justification with data or estimates of the mineral content of the waste and bulk density of the waste and soils

The addition of nutrients has been well demonstrated within this application, with final soil nutrient and PTE concentrations evidenced within the benefit statement in tables 4.1 to 4.7. Care has been taken to balance the addition of silt to the receiving soil so that final soil profile created does not contain excessive nutrients and PTEs do not exceed the Sludge Use in Agriculture Regulations limits.

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%). 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, as cited in **TGN 8.01**, and in the contemporary guidance on specific waste streams (**Landspreading: benefits and risks of the waste types you can use, 17 Waste codes**).

The formation of new topsoil enriches the fields with nutrients and organic matter for the benefit of future crop performance and longevity. At their current Index level, and following the application, fields will utilise the following P and K amounts annually (as per table 6).

Table 6. Annual phosphate and potash requirements (kg/ha) for fields at present Index and at Index level following the application

Field REF	Req. at present levels		Req. following application	
	Phosphate	Potash	Phosphate	Potash
CD1	50	0	20	0
CD2	80	30	20	30
IVWG2	50	30	20	30
IVWG3	0	30	0	30
Top Field East	20	0	20	0
Top Field West	20	30	20	0
Bottom Field	0	30	20	30

To be able 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; refer

to document '**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 is 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 and site is tidy).

7.4 Sensitive receptors

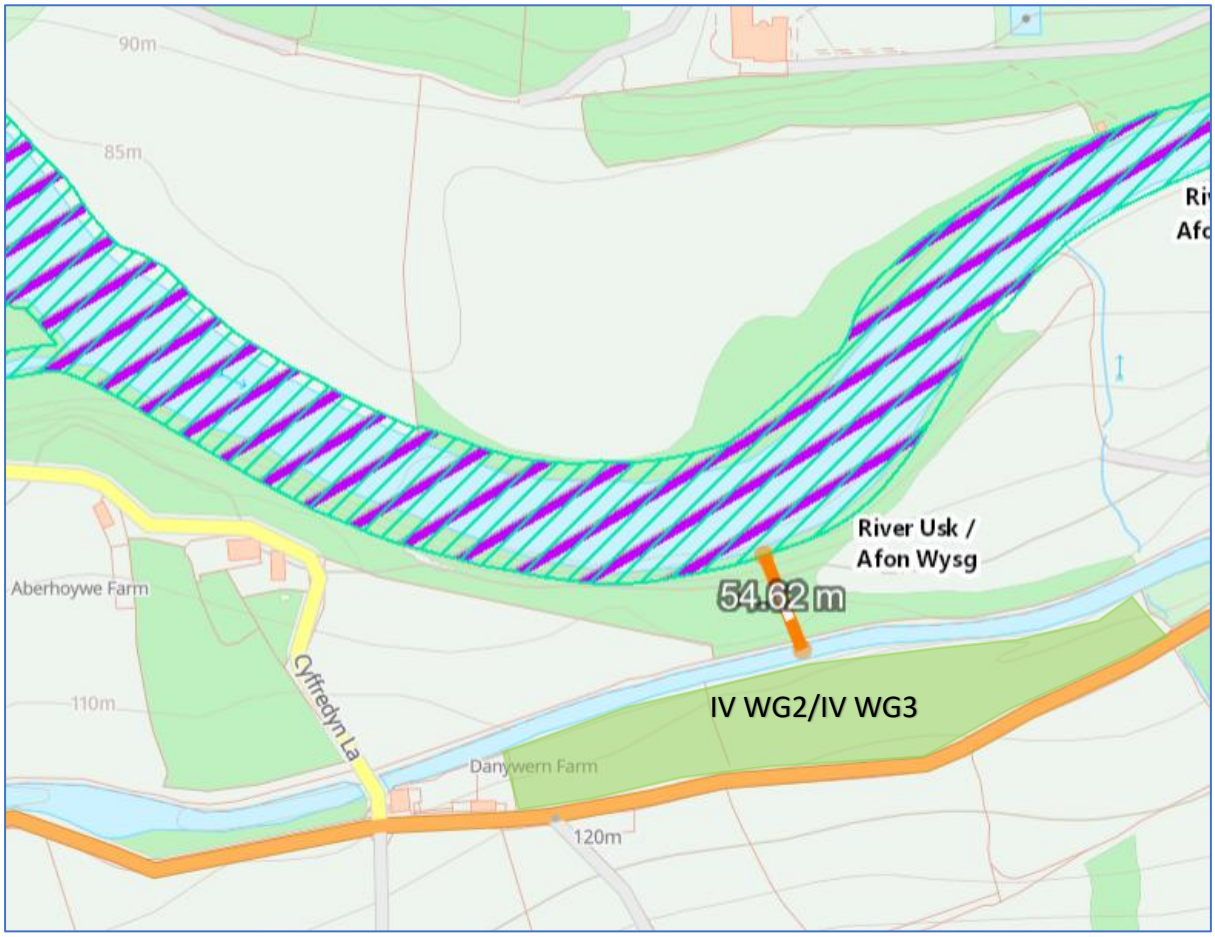

Figure 2. Location of Afon Wysg

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 7. 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

Mynyddoedd Llangynidr a Llangatwg, Cefn yr Ystrad a Chomin Merthyr SSSI	>500 m from spread areas	Dust

In addition to those listed above in table 7, 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 storage area until the appropriate opportunity to spread.

In the event of any spill or pollution incident, the Natural Resources Wales will be notified.