

Agricultural Benefit Statement

For the application of beneficial wastes to fields at;

Hafod Farm 1 Ferwig Cardigan Ceredigion SA43 1PU

12th March 2019

1 Person with appropriate technical expertise and permit details

This benefit statement has been compiled by Vanessa McDonnell (Trainee Environmental Consultant) who has

the following qualifications and experience;

- Foundation Degree in Agriculture with Land Management
- Level 3 Diploma in Agriculture

Verified by; K Brook, FQA FE/0829

Permit number under which this deployment application is being made: EPR/ GP3792SK

2 Where the waste is to be spread

Table 1. Where the waste is to be spread

<i>Farm address:</i>	Hafod Farm 1 Ferwig Cardiga, Ceredigion SA43 1PU	
<i>Lagoon Grid Reference:</i>	Refer to Table 4.	
<i>Area of the receiving land:</i>	50ha	
<i>Quantity to be stored at any one time:</i>	Stackable (temporary field stockpile): 3,000t	Non-Stackable: 1,250t
<i>Total maximum quantity to be spread:</i>	12,500t	
<i>Location map document reference:</i>	2. Spreading Area	

3 What is the waste to be spread

Table 2. Description of waste(s) to be applied

Waste	EWC Code	Description	Waste Producer	Additional Information
1	19 09 02	Sludges from water clarification. Potable water treatment effluent. - SL	DCWW Llechryd	
2	19 09 02	Sludges from water clarification. Potable water treatment effluent. - LQ	DCWW Llechryd	
3	19 09 02	Sludges from water clarification. Potable water treatment effluent. - LQ	DCWW Bryngwyn	
4	19 09 02	Sludges from water clarification. Potable water treatment effluent. - LQ	DCWW Capel Dewi	
5	19 09 02	Sludges from water clarification. Potable water treatment effluent. - SL	DCWW Bontgoch	
6	19 09 02	Sludges from water clarification. Potable water treatment effluent. - LQ	DCWW Bontgoch	
7	19 09 02	Sludges from water clarification. Potable water treatment effluent. - LQ	DCWW Strata Florida	
8	19 09 02	Sludges from water clarification. Potable water treatment effluent. - SL	DCWW Strata Florida	
9	19 09 02	Sludges from water clarification. Potable water treatment effluent. - LQ	DCWW Preseli	
10	19 09 02	Sludges from water clarification. Potable water treatment effluent. LQ	DCWW Bolton Hill	

4 Operational details

4.1 Cropping details

Table 3. Cropping details

<i>Current crop including projected yield if known:</i>	Refer to tables 6-15
<i>Is straw removed?</i>	Y <input type="checkbox"/> N <input type="checkbox"/> N/A <input checked="" type="checkbox"/>
<i>Following crop and any sensitive crops within rotation which you are amending the soil for in good time:</i>	Refer to Tables 6-15
<i>When do you intend to apply this waste; e.g. post harvest – pre-ploughing, during seed bed cultivations, on the stubble over winter:</i>	<p>When both the ground and weather conditions are suitable.</p> <p>The wastes will be spread during periods of peak nutrient requirement, for example - March-April prior to first cut silage, May-June after first cut, July-August after second cut and other times of the year when ground conditions allow for grazing.</p> <p>The grass will be left for a minimum of three weeks before it is used for grazing or cutting.</p> <p>The EA will be notified within 48 hours prior to spreading.</p>

4.2 Waste storage

Table 4. Waste storage

<p><i>How is the waste to be stored?</i></p> <p><i>e.g. mobile tank, field heap, spread on delivery</i></p>	<p>Stackable wastes: Field Stockpiles</p> <p>Non-stackable wastes: Lagoon/Spread on delivery.</p>
<p><i>Where is the waste to be stored prior to spreading?</i></p>	<p>A) Above the ground store – 217958 250061</p> <p>B) Lagoon – 218125 250334</p> <p>C) Stockpile – 217937 250032</p> <p>D) Stockpile – 218178 249938</p> <p>E) Stockpile – 218128 249798</p> <p>F) Storage Pit – 219448 246774</p> <p>G) Stockpile – 219208 246941</p> <p>H) Stockpile – 219260 246653</p>
<p><i>Why were these storage locations chosen?</i></p>	<p>The storage locations are accessible by delivery vehicle near field entrances so the potential damage to fields by delivering vehicles is minimal.</p> <p>The storage locations are not within 10m of any ditch, watercourse, or footpath, nor within an SPZ1, and are at least 50m from any well spring or borehole. They are also a safe distance from overhead powerlines.</p>

4.3 Waste application

Table 5. Waste application

<p><i>How is the waste to be spread and why is it to be spread that way?</i></p>	<p>The cake will be spread using conventional rear discharge spreaders as this equipment is readily available to the farmer/contractor and the most appropriate for the material and application rates used.</p> <p>Liquid sludges will be surface spread by tractor and tanker using a low-trajectory splash plate.</p>
<p><i>How do you plan to incorporate the waste following application?</i></p>	<p>There is no residue on the surface and therefore no requirement for incorporation of wastes on grass fields especially considering the very low levels of ammonia.</p>
<p><i>With liquid wastes is there any mole draining or sub-soiling planned?</i></p> <p><i>Are there land drains in the field?</i></p>	<p>There is no mole draining or subsoiling planned.</p>
<p><i>Other relevant operational information:</i></p>	<p>Spreading the wastes will be carried out in accordance with the Code of Good Agricultural Practice for the Protection of Water, Soil, and Air for Wales (2011), NVZ regulations and the permit holder Environmental Management System.</p>

Table 6. DCWW Llechryd SL

Field Reference	Total Area	Sprd Area	Current Crop	Next Crop	Soil pH	N			P ₂ O ₅			K ₂ O			Mg			Rate t/ha	Totals tonnes				
						SNS	Req	In Wst	P Ind	Req	Crop Use	In Wst	K Ind	Req	Crop Use	In Wst	Mg Ind	Req	In Wst				
						kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha				
4414	6.40	6.10	Grass	Grass	5.4	M	205	0	3	20	65	**64	2+	120	228	**9	3	0	*8	49	299		
2892	5.80	5.80	Grass	Grass	5.5	M	205	0	3	20	65	**64	2-	170	228	**9	3	0	*8	49	284		
6060	8.00	8.00	Grass	Grass	5.5	M	205	0	3	20	65	**64	2+	120	228	**9	3	0	*8	49	392		
5136	10.30	10.30	Grass	Grass	5.1	M	205	0	2	65	65	**64	2+	120	228	**9	3	0	*8	49	505		
1	2.50	2.40	Grass	Grass	6.1	M	205	0	2	65	65	**64	3	70	228	**9	3	0	*8	49	118		
2	2.80	2.40	Grass	Grass	6.1	M	205	0	2	65	65	**64	3	70	228	**9	3	0	*8	49	118		
3	2.20	2.00	Grass	Grass	6.1	M	205	0	2	65	65	**64	3	70	228	**9	3	0	*8	49	98		
5	4.30	4.30	Grass	Grass	6.1	M	205	1	1	95	65	*42	2-	170	228	**28	3	0	*26	158	679		
6	2.90	2.90	Grass	Grass	5.8	M	205	1	0	125	65	*42	1	210	228	*6	2	0	*26	158	458		
7	6.70	5.80	Grass	Grass	6.4	M	205	1	0	125	65	*42	1	210	228	*6	2	0	*26	158	916		
Ha	51.90	50.00																			3867		
Nutrient requirement based on values described in the nutrient management guide (RB209) updated May 2017.																							
Phosphate and Potash requirements based on Grass Silage, 2 Cuts (38t/ha) (target DM yield 9-12t/ha) (Nutrient management guide (RB209) updated May 2017) with aftermath grazing.																							
Crop use based on Grass totalling 38t/ha yield where 1.7kg/t P₂O₅ and 6kg/t K₂O removed in offtake (Nutrient management guide) (RB209) updated May 2017)																							
Expected Grazing yield of 4-5t/ha																							
*P ₂ O ₅ and K ₂ O stated are Available concentrations in kg/ha index 1 or below																							
*** Total nutrient content of waste used on P & K index 2 or above																							
Availability of nutrients in waste - N measured as NH ₄ , P ₂ O ₅ 20%, K ₂ O 20%, Mg 20%																							
Total N supplied at an application rate of 158t/ha is 249kg/ha																							

Table 7. DCWW Llechryd LQ

Field Reference	Total Area	Sprd Area	Current Crop	Next Crop	Soil pH	N			P ₂ O ₅			K ₂ O			Mg			Rate t/ha	Totals tonnes				
						SNS	Req	In	P	Req	Crop Use	In	K	Req	Crop Use	In	Mg	Req	In				
						kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha				
4414	6.40	6.10	Grass	Grass	5.4	M	205	8	3	20	65	**65	2+	120	228	**5	3	0	*3	168	1025		
2892	5.80	5.80	Grass	Grass	5.5	M	205	8	3	20	65	**65	2-	170	228	**5	3	0	*3	168	974		
6060	8.00	8.00	Grass	Grass	5.5	M	205	8	3	20	65	**65	2+	120	228	**5	3	0	*3	168	1344		
5136	10.30	10.30	Grass	Grass	5.1	M	205	8	2	20	65	**65	2+	120	228	**5	3	0	*3	168	1730		
1	2.50	2.40	Grass	Grass	6.1	M	205	8	2	65	65	**65	3	70	228	**5	3	0	*3	168	403		
2	2.80	2.40	Grass	Grass	6.1	M	205	8	2	65	65	**65	3	70	228	**5	3	0	*3	168	403		
3	2.20	2.00	Grass	Grass	6.1	M	205	8	2	65	65	**65	3	70	228	**5	3	0	*3	168	336		
5	4.30	4.30	Grass	Grass	6.1	M	205	13	1	95	65	*19	2-	170	228	**7	3	0	*5	250	1075		
6	2.90	2.90	Grass	Grass	5.8	M	205	13	0	125	65	*19	1	210	228	*1	2	0	*5	250	725		
7	6.70	5.80	Grass	Grass	6.4	M	205	13	0	125	65	*19	1	210	228	*1	2	0	*5	250	1450		
Ha	51.90	50.00																		9466			
Nutrient requirement based on values described in the nutrient management guide (RB209) updated May 2017.																							
Phosphate and Potash requirements based on Grass Silage, 2 Cuts (38t/ha) (target DM yield 9-12t/ha) (Nutrient management guide (RB209) updated May 2017) with aftermath grazing.																							
Crop use based on Grass totalling 38t/ha yield where 1.7kg/t P₂O₅ and 6kg/t K₂O removed in offtake (Nutrient management guide) (RB209) updated May 2017)																							
Expected Grazing yield of 4-5t/ha																							
*P ₂ O ₅ and K ₂ O stated are Available concentrations in kg/ha index 1 or below																							
** Total nutrient content of waste used on P & K index 2 or above																							
Availability of nutrients in waste - N measured as NH ₄ , P ₂ O ₅ 20%, K ₂ O 20%, Mg 20%																							
Total N supplied at an application rate of 250t/ha is 150kg/ha																							

Table 8. DCWW Bryngwyn LQ

Field Reference	Total Area	Sprd Area	Current Crop	Next Crop	Soil pH	N			P ₂ O ₅			K ₂ O			Mg			Rate t/ha	Totals tonnes				
						SNS	Req	In	P	Req	Crop Use	In	K	Req	Crop Use	In	Mg	Req	In				
						kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha				
4414	6.40	6.10	Grass	Grass	5.4	M	205	2	3	20	65	**33	2+	120	228	**3	3	0	*4	250	1525		
2892	5.80	5.80	Grass	Grass	5.5	M	205	2	3	20	65	**33	2-	170	228	**3	3	0	*4	250	1450		
6060	8.00	8.00	Grass	Grass	5.5	M	205	2	3	20	65	**33	2+	120	228	**3	3	0	*4	250	2000		
5136	10.30	10.30	Grass	Grass	5.1	M	205	2	2	65	65	**33	2+	120	228	**3	3	0	*4	250	2575		
1	2.50	2.40	Grass	Grass	6.1	M	205	2	2	65	65	**33	3	70	228	**3	3	0	*4	250	600		
2	2.80	2.40	Grass	Grass	6.1	M	205	2	2	65	65	**33	3	70	228	**3	3	0	*4	250	600		
3	2.20	2.00	Grass	Grass	6.1	M	205	2	2	65	65	**33	3	70	228	**3	3	0	*4	250	500		
5	4.30	4.30	Grass	Grass	6.1	M	205	2	1	95	65	*7	2-	170	228	**3	3	0	*4	250	1075		
6	2.90	2.90	Grass	Grass	5.8	M	205	2	0	125	65	*7	1	210	228	*1	2	0	*4	250	725		
7	6.70	5.80	Grass	Grass	6.4	M	205	2	0	125	65	*7	1	210	228	*1	2	0	*4	250	1450		
Ha	51.90	50.00																		12500			
Nutrient requirement based on values described in the nutrient management guide (RB209) updated May 2017.																							
Phosphate and Potash requirements based on Grass Silage, 2 Cuts (38t/ha) (target DM yield 9-12t/ha) (Nutrient management guide (RB209) updated May 2017) with aftermath grazing.																							
Crop use based on Grass totalling 38t/ha yield where 1.7kg/t P₂O₅ and 6kg/t K₂O removed in offtake (Nutrient management guide) (RB209) updated May 2017)																							
Expected Grazing yield of 4-5t/ha																							
*P ₂ O ₅ and K ₂ O stated are Available concentrations in kg/ha index 1 or below																							
** Total nutrient content of waste used on P & K index 2 or above																							
Availability of nutrients in waste - N measured as NH ₄ , P ₂ O ₅ 20%, K ₂ O 20%, Mg 20%																							
Total N supplied at an application rate of 250t/ha is 97kg/ha																							

Table 9. DCWW Capel Dewi LQ

Field Reference	Total Area	Sprd Area	Current Crop	Next Crop	Soil pH	N			P ₂ O ₅			K ₂ O			Mg			Rate t/ha	Totals tonnes				
						SNS	Req	In	P	Req	Crop Use	In	K	Req	Crop Use	In	Mg	Req	In				
						kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha				
4414	6.40	6.10	Grass	Grass	5.4	M	205	2	3	20	65	**1	2+	120	228	**1	3	0	*1	250	1525		
2892	5.80	5.80	Grass	Grass	5.5	M	205	2	3	20	65	**1	2-	170	228	**1	3	0	*1	250	1450		
6060	8.00	8.00	Grass	Grass	5.5	M	205	2	3	20	65	**1	2+	120	228	**1	3	0	*1	250	2000		
5136	10.30	10.30	Grass	Grass	5.1	M	205	2	2	65	65	**1	2+	120	228	**1	3	0	*1	250	2575		
1	2.50	2.40	Grass	Grass	6.1	M	205	2	2	65	65	**1	3	70	228	**1	3	0	*1	250	600		
2	2.80	2.40	Grass	Grass	6.1	M	205	2	2	65	65	**1	3	70	228	**1	3	0	*1	250	600		
3	2.20	2.00	Grass	Grass	6.1	M	205	2	2	65	65	**1	3	70	228	**1	3	0	*1	250	500		
5	4.30	4.30	Grass	Grass	6.1	M	205	2	1	95	65	*0	2-	170	228	**1	3	0	*1	250	1075		
6	2.90	2.90	Grass	Grass	5.8	M	205	2	0	125	65	*0	1	210	228	*0	2	0	*1	250	725		
7	6.70	5.80	Grass	Grass	6.4	M	205	2	0	125	65	*0	1	210	228	*0	2	0	*1	250	1450		
Ha	51.90	50.00																		12500			
Nutrient requirement based on values described in the nutrient management guide (RB209) updated May 2017.																							
Phosphate and Potash requirements based on Grass Silage, 2 Cuts (38t/ha) (target DM yield 9-12t/ha) (Nutrient management guide (RB209) updated May 2017) with aftermath grazing.																							
Crop use based on Grass totalling 38t/ha yield where 1.7kg/t P₂O₅ and 6kg/t K₂O removed in offtake (Nutrient management guide) (RB209) updated May 2017)																							
Expected Grazing yield of 4-5t/ha																							
*P ₂ O ₅ and K ₂ O stated are Available concentrations in kg/ha index 1 or below																							
** Total nutrient content of waste used on P & K index 2 or above																							
Availability of nutrients in waste - N measured as NH ₄ , P ₂ O ₅ 20%, K ₂ O 20%, Mg 20%																							
Total N supplied at an application rate of 250t/ha is 40kg/ha																							

Table 10. DCWW Bontgoch SL

Field Reference	Total Area	Sprd Area	Current Crop	Next Crop	Soil pH	N			P ₂ O ₅			K ₂ O			Mg			Rate t/ha	Totals tonnes				
						SNS	Req	In	P	Req	Crop Use	In	K	Req	Crop Use	In	Mg	Req	In				
						kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha				
4414	6.40	6.10	Grass	Grass	5.4	M	205	2	3	20	65	**64	2+	120	228	**2	3	0	*1	25			
2892	5.80	5.80	Grass	Grass	5.5	M	205	2	3	20	65	**64	2-	170	228	**2	3	0	*1	25			
6060	8.00	8.00	Grass	Grass	5.5	M	205	2	3	20	65	**64	2+	120	228	**2	3	0	*1	25			
5136	10.30	10.30	Grass	Grass	5.1	M	205	2	2	65	65	**64	2+	120	228	**2	3	0	*1	25			
1	2.50	2.40	Grass	Grass	6.1	M	205	2	2	65	65	**64	3	70	228	**2	3	0	*1	25			
2	2.80	2.40	Grass	Grass	6.1	M	205	2	2	65	65	**64	3	70	228	**2	3	0	*1	25			
3	2.20	2.00	Grass	Grass	6.1	M	205	2	2	65	65	**64	3	70	228	**2	3	0	*1	25			
5	4.30	4.30	Grass	Grass	6.1	M	205	4	1	95	65	*28	2-	170	228	**3	3	0	*2	54			
6	2.90	2.90	Grass	Grass	5.8	M	205	4	0	125	65	*28	1	210	228	*1	2	0	*2	54			
7	6.70	5.80	Grass	Grass	6.4	M	205	4	0	125	65	*28	1	210	228	*1	2	0	*2	54			
Ha	51.90	50.00																					
Nutrient requirement based on values described in the nutrient management guide (RB209) updated May 2017.																							
Phosphate and Potash requirements based on Grass Silage, 2 Cuts (38t/ha) (target DM yield 9-12t/ha) (Nutrient management guide (RB209) updated May 2017) with aftermath grazing.																							
Crop use based on Grass totalling 38t/ha yield where 1.7kg/t P₂O₅ and 6kg/t K₂O removed in offtake (Nutrient management guide) (RB209) updated May 2017)																							
Expected Grazing yield of 4-5t/ha																							
*P ₂ O ₅ and K ₂ O stated are Available concentrations in kg/ha index 1 or below																							
** Total nutrient content of waste used on P & K index 2 or above																							
Availability of nutrients in waste - N measured as NH ₄ , P ₂ O ₅ 20%, K ₂ O 20%, Mg 20%																							
Total N supplied at an application rate of 54t/ha is 162kg/ha																							

Table 11. DCWW Bontgoch LQ

Field Reference	Total Area	Sprd Area	Current Crop	Next Crop	Soil pH	N			P ₂ O ₅			K ₂ O			Mg			Rate t/ha	Totals tonnes				
						SNS	Req	In	P	Req	Crop Use	In	K	Req	Crop Use	In	Mg	Req	In				
						kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha	kg/ha				
4414	6.40	6.10	Grass	Grass	5.4	M	205	8	3	20	65	**65	2+	120	228	**2	3	0	*1	162			
2892	5.80	5.80	Grass	Grass	5.5	M	205	8	3	20	65	**65	2-	170	228	**2	3	0	*1	162			
6060	8.00	8.00	Grass	Grass	5.5	M	205	8	3	20	65	**65	2+	120	228	**2	3	0	*1	162			
5136	10.30	10.30	Grass	Grass	5.1	M	205	8	2	65	65	**65	2+	120	228	**2	3	0	*1	162			
1	2.50	2.40	Grass	Grass	6.1	M	205	8	2	65	65	**65	3	70	228	**2	3	0	*1	162			
2	2.80	2.40	Grass	Grass	6.1	M	205	8	2	65	65	**65	3	70	228	**2	3	0	*1	162			
3	2.20	2.00	Grass	Grass	6.1	M	205	8	2	65	65	**65	3	70	228	**2	3	0	*1	162			
5	4.30	4.30	Grass	Grass	6.1	M	205	13	1	95	65	*20	2-	170	228	**3	3	0	*2	250			
6	2.90	2.90	Grass	Grass	5.8	M	205	13	0	125	65	*20	1	210	228	*1	2	0	*2	250			
7	6.70	5.80	Grass	Grass	6.4	M	205	13	0	125	65	*20	1	210	228	*1	2	0	*2	250			
Ha	51.90	50.00																		9244			
Nutrient requirement based on values described in the nutrient management guide (RB209) updated May 2017.																							
Phosphate and Potash requirements based on Grass Silage, 2 Cuts (38t/ha) (target DM yield 9-12t/ha) (Nutrient management guide (RB209) updated May 2017) with aftermath grazing.																							
Crop use based on Grass totalling 38t/ha yield where 1.7kg/t P₂O₅ and 6kg/t K₂O removed in offtake (Nutrient management guide) (RB209) updated May 2017)																							
Expected Grazing yield of 4-5t/ha																							
*P ₂ O ₅ and K ₂ O stated are Available concentrations in kg/ha index 1 or below																							
** Total nutrient content of waste used on P & K index 2 or above																							
Availability of nutrients in waste - N measured as NH ₄ , P ₂ O ₅ 20%, K ₂ O 20%, Mg 20%																							
Total N supplied at an application rate of 250t/ha is 100kg/ha																							

Table 12. DCWW Strata Florida LQ

Field Reference	Total Area	Sprd Area	Current Crop	Next Crop	Soil pH	N			P ₂ O ₅			K ₂ O			Mg			Rate t/ha	Totals tonnes				
						SNS	Req	In Wst	P Ind	Req	Crop Use	In Wst	K Ind	Req	Crop Use	In Wst	Mg Ind	Req	In Wst				
							kg/ha	kg/ha		kg/ha	kg/ha	kg/ha		kg/ha	kg/ha	kg/ha		kg/ha	kg/ha				
4414	6.40	6.10	Grass	Grass	5.4																		
2892	5.80	5.80	Grass	Grass	5.5																		
6060	8.00	8.00	Grass	Grass	5.5																		
5136	10.30	10.30	Grass	Grass	5.1																		
1	2.50	2.40	Grass	Grass	6.1	M	205	13	2	65	65	**54	3	70	228	**5	3	0	*1	250	600		
2	2.80	2.40	Grass	Grass	6.1	M	205	13	2	65	65	**54	3	70	228	**5	3	0	*1	250	600		
3	2.20	2.00	Grass	Grass	6.1	M	205	13	2	65	65	**54	3	70	228	**5	3	0	*1	250	500		
5	4.30	4.30	Grass	Grass	6.1	M	205	13	1	95	65	*11	2-	170	228	**5	3	0	*1	250	1075		
6	2.90	2.90	Grass	Grass	5.8																		
7	6.70	5.80	Grass	Grass	6.4	M	205	13	0	125	65	*11	1	210	228	*1	2	0	*1	250	1450		
Ha	51.90	50.00																			4225		
Nutrient requirement based on values described in the nutrient management guide (RB209) updated May 2017.																							
Phosphate and Potash requirements based on Grass Silage, 2 Cuts (38t/ha) (target DM yield 9-12t/ha) (Nutrient management guide (RB209) updated May 2017) with aftermath grazing.																							
Crop use based on Grass totalling 38t/ha yield where 1.7kg/t P₂O₅ and 6kg/t K₂O removed in offtake (Nutrient management guide) (RB209) updated May 2017)																							
Expected Grazing yield of 4-5t/ha																							
*P ₂ O ₅ and K ₂ O stated are Available concentrations in kg/ha index 1 or below																							
** Total nutrient content of waste used on P & K index 2 or above																							
Availability of nutrients in waste - N measured as NH ₄ , P ₂ O ₅ 20%, K ₂ O 20%, Mg 20%																							
Total N supplied at an application rate of 250t/ha is 100kg/ha																							

Table 13. DCWW Strata Florida SL

						N				P ₂ O ₅				K ₂ O				Mg									
Field Reference	Total Area	Sprd Area	Current Crop	Next Crop	Soil pH	SNS	Req	In Wst	P Ind	Req	Crop Use	In Wst	K Ind	Req	Crop Use	In Wst	Mg Ind	Req	In Wst	Rate	Totals						
							kg/ha	kg/ha		kg/ha	kg/ha	kg/ha		kg/ha	kg/ha	kg/ha		kg/ha	kg/ha	t/ha	tonnes						
4414	6.40	6.10	Grass	Grass	5.4																0						
2892	5.80	5.80	Grass	Grass	5.5																0						
6060	8.00	8.00	Grass	Grass	5.5																0						
5136	10.30	10.30	Grass	Grass	5.1																0						
1	2.50	2.40	Grass	Grass	6.1	M	205	1	2	65	65	**46	3	70	228	**2	3	0	*1	104	250						
2	2.80	2.40	Grass	Grass	6.1	M	205	1	2	65	65	**46	3	70	228	**2	3	0	*1	104	250						
3	2.20	2.00	Grass	Grass	6.1	M	205	1	2	65	65	**46	3	70	228	**2	3	0	*1	104	208						
5	4.30	4.30	Grass	Grass	6.1	M	205	1	1	95	65	*9	2-	170	228	**2	3	0	*1	104	447						
6	2.90	2.90	Grass	Grass	5.8																0						
7	6.70	5.80	Grass	Grass	6.4	M	205	1	0	125	65	*9	1	210	228	*0	2	0	*1	104	603						
Ha	51.90	50.00																			1758						
Nutrient requirement based on values described in the nutrient management guide (RB209) updated May 2017.																											
Phosphate and Potash requirements based on Grass Silage, 2 Cuts (38t/ha) (target DM yield 9-12t/ha) (Nutrient management guide (RB209) updated May 2017) with aftermath grazing.																											
Crop use based on Grass totalling 38t/ha yield where 1.7kg/t P₂O₅ and 6kg/t K₂O removed in offtake (Nutrient management guide) (RB209) updated May 2017)																											
Expected Grazing yield of 4-5t/ha																											
*P2O5 and K2O stated are Available concentrations in kg/ha index 1 or below																											
**Total nutrient content of waste used on P & K index 2 or above																											
Availability of nutrients in waste - N measured as NH4, P2O5 20%, K2O 20%, Mg 20%																											
Total N supplied at an application rate of 104t/ha is 195kg/ha																											

Table 14. DCWW Preseli LQ

Field Reference	Total Area	Sprd Area	Current Crop	Next Crop	Soil pH	N			P ₂ O ₅			K ₂ O			Mg			Rate t/ha	Totals tonnes				
						SNS	Req	In Wst	P Ind	Req	Crop Use	In Wst	K Ind	Req	Crop Use	In Wst	Mg Ind	Req	In Wst				
							kg/ha	kg/ha		kg/ha	kg/ha	kg/ha		kg/ha	kg/ha	kg/ha		kg/ha	kg/ha				
4414	6.40	6.10	Grass	Grass	5.4																		
2892	5.80	5.80	Grass	Grass	5.5																		
6060	8.00	8.00	Grass	Grass	5.5																		
5136	10.30	10.30	Grass	Grass	5.1																		
1	2.50	2.40	Grass	Grass	6.1	M	205	13	2	65	65	**46	3	70	228	**3	3	0	*1	250	600		
2	2.80	2.40	Grass	Grass	6.1	M	205	13	2	65	65	**46	3	70	228	**3	3	0	*1	250	600		
3	2.20	2.00	Grass	Grass	6.1	M	205	13	2	65	65	**46	3	70	228	**3	3	0	*1	250	500		
5	4.30	4.30	Grass	Grass	6.1	M	205	13	1	95	65	*9	2-	170	228	**3	3	0	*1	250	1075		
6	2.90	2.90	Grass	Grass	5.8																		
7	6.70	5.80	Grass	Grass	6.4	M	205	13	0	125	65	*9	1	210	228	*1	2	0	*1	250	1450		
Ha	51.90	50.00																			4225		
Nutrient requirement based on values described in the nutrient management guide (RB209) updated May 2017.																							
Phosphate and Potash requirements based on Grass Silage, 2 Cuts (38t/ha) (target DM yield 9-12t/ha) (Nutrient management guide (RB209) updated May 2017) with aftermath grazing.																							
Crop use based on Grass totalling 38t/ha yield where 1.7kg/t P₂O₅ and 6kg/t K₂O removed in offtake (Nutrient management guide) (RB209) updated May 2017)																							
Expected Grazing yield of 4-5t/ha																							
*P ₂ O ₅ and K ₂ O stated are Available concentrations in kg/ha index 1 or below																							
** Total nutrient content of waste used on P & K index 2 or above																							
Availability of nutrients in waste - N measured as NH ₄ , P ₂ O ₅ 20%, K ₂ O 20%, Mg 20%																							
Total N supplied at an application rate of 250t/ha is 100kg/ha																							

Table 15. DCWW Bolton Hill LQ

Field Reference	Total Area	Sprd Area	Current Crop	Next Crop	Soil pH	N			P ₂ O ₅			K ₂ O			Mg			Rate t/ha	Totals tonnes				
						SNS	Req	In Wst	P Ind	Req	Crop Use	In Wst	K Ind	Req	Crop Use	In Wst	Mg Ind	Req	In Wst				
							kg/ha	kg/ha		kg/ha	kg/ha	kg/ha		kg/ha	kg/ha	kg/ha		kg/ha	kg/ha				
4414	6.40	6.10	Grass	Grass	5.4																		
2892	5.80	5.80	Grass	Grass	5.5																		
6060	8.00	8.00	Grass	Grass	5.5																		
5136	10.30	10.30	Grass	Grass	5.1																		
1	2.50	2.40	Grass	Grass	6.1	M	205	13	2	65	65	**35	3	70	228	**8	3	0	*3	250	600		
2	2.80	2.40	Grass	Grass	6.1	M	205	13	2	65	65	**35	3	70	228	**8	3	0	*3	250	600		
3	2.20	2.00	Grass	Grass	6.1	M	205	13	2	65	65	**35	3	70	228	**8	3	0	*3	250	500		
5	4.30	4.30	Grass	Grass	6.1	M	205	13	1	95	65	*7	2-	170	228	**8	3	0	*3	250	1075		
6	2.90	2.90	Grass	Grass	5.8																		
7	6.70	5.80	Grass	Grass	6.4	M	205	13	0	125	65	*7	1	210	228	*2	2	0	*3	250	1450		
Ha	51.90	50.00																			4225		
Nutrient requirement based on values described in the nutrient management guide (RB209) updated May 2017.																							
Phosphate and Potash requirements based on Grass Silage, 2 Cuts (38t/ha) (target DM yield 9-12t/ha) (Nutrient management guide (RB209) updated May 2017) with aftermath grazing.																							
Crop use based on Grass totalling 38t/ha yield where 1.7kg/t P₂O₅ and 6kg/t K₂O removed in offtake (Nutrient management guide) (RB209) updated May 2017)																							
Expected Grazing yield of 4-5t/ha																							
*P ₂ O ₅ and K ₂ O stated are Available concentrations in kg/ha index 1 or below																							
** Total nutrient content of waste used on P & K index 2 or above																							
Availability of nutrients in waste - N measured as NH ₄ , P ₂ O ₅ 20%, K ₂ O 20%, Mg 20%																							
Total N supplied at an application rate of 250t/ha is 100kg/ha																							

5 Compliance with NVZ regulations

Table 16. Compliance with NVZ regulations

Does the site fall within a designated NVZ?	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>																														
Do closed periods apply for the wastes to be applied?	<p>Y <input type="checkbox"/> N <input checked="" type="checkbox"/></p> <p>Applicable to:</p> <p>If yes, please indicate the appropriate period:</p> <table border="1" data-bbox="687 678 1374 920"> <thead> <tr> <th>Start Date</th> <th>End Date</th> <th>Land Use</th> <th>Soil Type</th> <th></th> </tr> </thead> <tbody> <tr> <td>1st Aug</td> <td>31st Dec</td> <td>Tillage Land</td> <td>Shallow/Sandy</td> <td><input type="checkbox"/></td> </tr> <tr> <td>1st Sept</td> <td>31st Dec</td> <td>Grassland</td> <td>Shallow/Sandy</td> <td><input type="checkbox"/></td> </tr> <tr> <td>16th Sept</td> <td>31st Dec</td> <td>Tillage Land*</td> <td>Shallow/Sandy</td> <td><input type="checkbox"/></td> </tr> <tr> <td>1st Oct</td> <td>31st Jan</td> <td>Tillage Land</td> <td>All Other Soils</td> <td><input type="checkbox"/></td> </tr> <tr> <td>15th Oct</td> <td>31st Jan</td> <td>Grassland</td> <td>All Other Soils</td> <td><input type="checkbox"/></td> </tr> </tbody> </table> <p>*For Tillage Land with crops sown on or before 15th September</p> <p>If no, applications will be carried out as per CoGAP <i>i.e.</i> when ground conditions are suitable and when no heavy rain is forecast.</p>	Start Date	End Date	Land Use	Soil Type		1st Aug	31st Dec	Tillage Land	Shallow/Sandy	<input type="checkbox"/>	1st Sept	31st Dec	Grassland	Shallow/Sandy	<input type="checkbox"/>	16th Sept	31st Dec	Tillage Land*	Shallow/Sandy	<input type="checkbox"/>	1st Oct	31st Jan	Tillage Land	All Other Soils	<input type="checkbox"/>	15th Oct	31st Jan	Grassland	All Other Soils	<input type="checkbox"/>
Start Date	End Date	Land Use	Soil Type																												
1st Aug	31st Dec	Tillage Land	Shallow/Sandy	<input type="checkbox"/>																											
1st Sept	31st Dec	Grassland	Shallow/Sandy	<input type="checkbox"/>																											
16th Sept	31st Dec	Tillage Land*	Shallow/Sandy	<input type="checkbox"/>																											
1st Oct	31st Jan	Tillage Land	All Other Soils	<input type="checkbox"/>																											
15th Oct	31st Jan	Grassland	All Other Soils	<input type="checkbox"/>																											
Will application rates comply with crop requirement and field/whole farm limit?	<p>Please refer to Tables 6-15</p> <p>The wastes may be applied separately, or in combination. If the wastes are applied in combination, application rates will be lowered, the total combined amount applied will not exceed 250t/ha, the total organic nitrogen loading will be less than 250kg/ha, and the amount of available N and total, or available phosphate and potash (whichever is appropriate) will not exceed the fertiliser recommendation or the amount removed in offtake, whichever is greater.</p> <p>Please refer to Appendix 1 for an example mixed waste calculation.</p>																														
Previous applications:	Please refer to Table 4 of the LPD1.																														

6 Benefits and nutrients supplied to the soil or crop from this application

6.1 Receiving soils

The nutrient status of individual fields to be registered are provided in tables 6-15 above. General soil type(s) for the fields to be registered are;

The soil type is freely draining acid loamy soils.

Table 17. Soil type

Light sand soils	Soils which are sand, loamy sand or sandy loam to 40cm depth and are sand or loamy sand between 40 and 80 cm, or over sandstone rock.	<input type="checkbox"/>
Shallow soils	Soils over impermeable subsoils and those where the parent rock (chalk, limestone or other rock) is within 40cm of the soil surface. Sandy soils developed over sandstone rock should be regarded as light sand soils.	<input type="checkbox"/>
Medium soils	Mostly medium-textured mineral soils that do not fall into any other soil category. This includes sandy loams over clay, deep loams, and silty or clayey topsoils that have sandy or loamy subsoils.	<input checked="" type="checkbox"/>
Deep clayey soils	Soils with predominantly sandy clay loam, silty clay loam, clay loam, sandy clay, silty clay or clay topsoil overlying clay subsoil to more than 40cm depth. Deep clayey soils normally need artificial field drainage.	<input type="checkbox"/>
Deep silty soils	Soils of sandy silt loam, silt loam or silty clay loam textures to 100 cm depth or more. Silt soils formed on marine alluvium, warp soils (river alluvium) and brickearth soils are in this category. Silty clays of low fertility should be regarded as other mineral soils.	<input type="checkbox"/>
Organic soils	Soils that are predominantly mineral but with between 10 and 20% organic matter to depth. These can be distinguished by darker colouring that stains the fingers black or grey.	<input type="checkbox"/>
Peat soils	Soils that contain more than 20% organic matter derived from sedge or similar peat material.	<input type="checkbox"/>

The soil analyses (**Soil Analysis**) shows the soils to have sufficient background concentrations of Mg (*i.e.* ADAS Index 1-3). It is therefore unlikely that the crop will require any additional input of Mg over the course of the cropping cycle. The wastes contains some Mg but it is highly unlikely that applications of these materials will increase background levels in the receiving soil over time and are only likely to have a soil conditioning effect by increasing the base element content.

6.2 Waste characterisation

Full characterisations of individual wastes with total and available nutrients at the recommended rates for each waste stream are supplied in **Waste Analysis**. This information is further summarised against the nutrient requirements for proposed crops in Tables 6-15.

Limiting factors for the different wastes are as follows –

- All cakes: Nitrogen, phosphate and arsenic
- All liquids: Maximum rate of 250t/ha and phosphate

6.3 Summary of benefits

These wastes are a source of essential elements N, P, K, macronutrients Mg, Ca, S and provide trace amounts of micronutrients. Wastes are beneficially used to replace a proportion of the bagged mineral

fertiliser used by farmers. The recommended application rates shown in tables 6-15 above are based on the crop requirement and soil analysis.

Clean water treatment sludges contain significant amounts of organic matter. Additions of organic matter to soil will improve soil structural stability, biological activity, water and nutrient holding capacity, i.e. resistance to drought, and reduction of localised flooding, reduced leaching of nutrients, and improved workability in soil. Organic matter is a particularly good source of N and S and organic acids that aid nutrient solubility and uptake, as well as enhancing microbial activity for enhanced nutrient cycling in soils.

6.4 Additional requirements

Fields may require additional N, P, and K to achieve optimum yield.

7 Potential negative impacts to the soil or crop from this application

7.1 Potentially Toxic Elements (PTEs)

All the wastes contain traces of PTEs, however concentrations applied to the receiving soils are below maximum upper limits for heavy metal applications described in the Sludge (Use in Agriculture) Regulations 1989 (SI, 1989). Refer to interpretations in **Waste Analysis**.

7.2 Other waste characteristics

The pH levels in the wastes range from 3.97 – 7.0.

It is unlikely that soil pH will decrease following the application detailed here due to the extensive buffering capacity of the receiving soils. The pH levels of the receiving soils are between 5.1 and 6.4, therefore it is unlikely that availability of any naturally occurring heavy metals present in these soils will become more available after application of these wastes.

7.3 Operational factors

1. Wastes will be applied at low trajectory and will have little visual impact as they are not brightly coloured.
2. Potential compaction of receiving soil will be mitigated by suitable adjustment of tyres/tyre pressure to match soil conditions, direction of spreading and load to be spread.
3. Wastes will be applied when ground and weather conditions are suitable, following CoGAP to avoid soil damage including wheel ruts, compaction, structural damage, erosion and run-off.
4. Sampling methods will be consistent with those set out in the RB209, and the analysis for PTEs are consistent with the code of agricultural practice.
5. With regards to odour management for any potentially odorous material – the materials will only be disturbed when the material is being spread, and application to land will be done under permit conditions, following procedures in our permit EMS to minimise risk of odour emissions.

8 Sensitive human and environmental receptors

Table 18. Sensitive receptors close to the deployed area

Receptor	Distance from Area	Emission Type	Likelihood of Emission Detection Red=High Amber=Moderate Green=Low	Mitigation for Red/Amber

Y Ferwig Village	Adjacent to field 2892.		Medium risk due to the proximity to the site.	Spreading will be carried out using CoGAP using application techniques listed above.
Heolcwn & Frondeg	Adjacent to fields 2892 and 4414.		Medium risk due to the proximity to the site.	Spreading will be carried out using CoGAP using application techniques listed above.
Nantycroy	305m N of field.		Medium risk due to proximity to the site, and direction of the prevailing winds.	Spreading will be carried out using CoGAP using application techniques listed above.
Cardigan/Aberteifi	150m NW of field 1		Low risk due to direction of the prevailing winds.	Spreading will be carried out using CoGAP using application techniques listed above.
Tre-Cift	Adjacent to fields 2 and 7.		High risk due to proximity to the site and direction of the prevailing winds.	Spreading will be carried out using CoGAP using application techniques listed above.
Ael Y Bryn	38m E of field 7.		High risk due to proximity to the site and direction of the prevailing winds.	Spreading will be carried out using CoGAP using application techniques listed above.
Rhoswerdd	235m NE of field 6.		High risk due to proximity to the site and direction of the prevailing winds.	Spreading will be carried out using CoGAP using application techniques listed above.
Glantegfan	105m E of field 6		High risk due to proximity to the site and direction of the prevailing winds.	Spreading will be carried out using CoGAP using application techniques listed above.
Pen Lan	Adjacent to fields 2, 7 and 5.		High risk due to proximity to the site and direction of the prevailing winds.	Spreading will be carried out using CoGAP using application techniques listed above.

Locations of sensitive receptors are shown in 2. Spreading Maps. Prevailing winds are south-westerly.

9 Practices to reduce the impacts of the operation on identified sensitive receptors

Mitigation measures to safeguard against site-specific high and moderate likelihood of emission detection by sensitive receptors are shown above. Generic measures (in addition to permit requirements and following the EMS) to reduce potential negative impacts of the proposed spreading operation will be as follows;

1. Spreading will only be undertaken when weather conditions are suitable within restrictions outlined in CoGAP and any relevant closed periods.
2. Spreading will not be carried out in any areas of a field that will be sub-soiled.
3. Machinery operations will take account of soil conditions, slopes *etc.*
4. Liquid spreading machinery will be turned off and lifted away from soil prior to turning at the end of each run.
5. Machinery will be checked daily when in use, regularly serviced and spreading equipment calibrated. Umbilical hoses will be regularly checked for damage to prevent leaks.

6. Machinery turns will not be executed in the buffer strips.
7. Waste deliveries to field/stores will be supervised.
8. All spillages will be reported immediately to NRW.

10 Contingency planning

Replacement spreading machinery will be available to prevent waste being retained in faulty machinery. Hire vehicles will be used if required. All machinery will be fully serviced.

There will be a sufficient number of trained staff available to ensure that the operation continues throughout operational hours (*i.e.* there will be sufficient cover for illness, holiday *etc.*).

In adverse weather, storage is available until ground/weather conditions become favourable for land application.

In circumstances where the wastes cannot be stored or spread beyond normal capacities, wastes will be diverted to a local alternative deployment or DCWW sewage treatment works.