

1. Appropriate Technical Expertise

- This agricultural benefit statement has been prepared by Ryan Griffiths-Patel of Trade Effluent Services Ltd.
- Relevant Qualifications & Experience
 - Msc Environmental Informatics
 - Bsc Geography
 - 1 Year's experience in deployment applications

2. Location of Activity

- It is proposed to spread up to 10 commercial wastes at three different locations. These can be seen in the site plan at appendix A. The locations for each farm are Bryn-Y-Cosn Farm, Lixwm, Holywell, CH8 8AE, Racecourse Farm, Racecourse lane, Holywell, CH8 8PN and TREM Y FOEL, LIXWM, HOLYWELL, CH8 8JH. The main address for the spreading operation is at Bryn-Y-Cosn Farm. The total area of land is 28 hectares.
- This deployment application is for the application of 10 wastes to number of 16 fields in total - field sizes and OS National Grid references are shown in Table 1 below. A site plan is shown in Appendix A.

Field	Size (ha)	Grid Reference
BRYN Y COSN 1	3.2	SJ 18105 72753
BRYN Y COSN 2	3.5	SJ 17989 72664
BRYN Y COSN 3	1	SJ 17940 72593
BRYN Y COSN 4	1.3	SJ 18047 72538
BRYN Y COSN 5	0.6	SJ 18134 72497
BRYN Y COSN 6	0.5	SJ 17953 72429
BRYN Y COSN 7	0.3	SJ 17889 72434
RACECOURSE 3	1.3	SJ 15748 75257
RACECOURSE 4	1.2	SJ 15938 75279
RACECOURSE 5	2.1	SJ 15850 75360
RACECOURSE 6	1.4	SJ 15716 75373
RACECOURSE 7	1.6	SJ 15737 75490
LIXWM 1	4.2	SJ 15838 71395

LIXWM 2	5.8		SJ 15838 71574
Commercial Waste Storage Tank	Quantity Stored at any one time (Tonnes)	Grid Reference	Farm Name
Tank 1	120	SJ 17918 72521	Bryn y Cosyn Farm
Tank 2	120	SJ 15887 71259	Trem y Foel Farm
Tank 3	120	SJ 15813 74944	Race course Farm

Table 1 – Spreadable area and OSGR

- All fields to be spread are **within** an NVZ designated area, and spreading will comply with NVZ regulations. Nitrogen applications for land within a designated NVZ is 170 kg/ha/yr on a whole farm basis and 250kg/ha/yr on a field basis.
- When spreading equipment is on site, waste will be delivered into mobile storage tanks each with a capacity of approximately 30m³. Storage tank locations are illustrated on the site plan shown in Appendix A. No more than 120m³ will be stored in mobile storage tanks on site at the following locations (see table 1)

3. Soils

- The soils were sampled in **July** 2020 in accordance with the sampling procedures described in Section 1 of the RB209 (9th Edition). Analysis was carried out by NRM Ltd for pH, major plant nutrients, and potentially toxic elements (PTES) described in the Sludge (Use in Agriculture) Regulations.
- The NRM Ltd report is attached to Appendix B and summarised in Table 6.
- Soils were typically found to be clay loam and sandy loam and are categorised in accordance with RB209 (9th edition) as mineral soils for crop recommendations.
- The soil pH ranges from 6.5 to 5.7, although it shouldn't affect crop performance.
- Soil P index ranges from 0 to 3 and the soils are generally above at or above the guideline target index of 2. Where the index is 3 and above the nutrient applications will be limited to no more than crop offtake in the current rotation to ensure that there is increase no in soil P index.
- Soil potassium levels ranged from index 0 to 3 indicating the soil is satisfactory.

- The magnesium levels for all fields was satisfactory.
- PTE concentrations for all fields is low and within the typical range of uncontaminated soil.
- The soils proposed to be spread are suitable to receive an application of sludge as detailed within this application.

4. Waste To Be Spread

- It is proposed to spread up to 10 wastes to the land. The waste generally arises from food/beverage manufacturers and is primarily sludge from on-site effluent treatment plants and materials unsuitable for consumption and processing.
- A summary of the waste description and EWC code is show in Table 2.

Waste Producer	EWC Code	Waste Description	Total Amount being spread(Tonnes)
Secanim	02 02 04	Sludges from on-site ETP from abattoirs, poultry preparation plants, rendering plants or fish preparation plants only	1064
English Provender	02 03 01	Sludge from washing, cleaning, peeling, centrifuging and separation	2744
Croda Goole (Forward Environmental)	07 07 12	Sludges from on-site biological effluent treatment plant at chemical manufacturing sites other than those mentioned in 07 01 11 only	1456
Maelor Foods	02 02 04	Sludges from on-site ETP	924
Encirc	02 07 05	Sludge Cake from ETP	924
Beechdean Ice cream	02 05 01	Biodegradable materials unsuitable for consumption or processing	7000
Croda Widnes	02 03 05	Sludges from on-site ETP	6356
Kelloggs	02 03 05	Sludges from on-site ETP	5600

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Rowan Foods	02 03 05	Sludges from on-site ETP	7000
Highbury Poultry	02 02 04	Sludges from on-site ETP from abattoirs, poultry preparation plants, rendering plants or fish preparation plants only	672
Total Hectares	28	Total Tonnage	7000

Table 2 – Waste description

- To avoid the need for multiple deployments in a situation such as this when a range of wastes are available, it is necessary to include them all to accommodate such variables as the amount of material produced by the waste producer and timing of application (before seedbed preparation). Wastes will be applied on an individual basis and applications will be carefully managed and monitored to ensure that nutrients are applied at or below crop requirement/offtake values as described in this agricultural benefit statement. .
- As this is a multiple waste stream application, each waste is able to convey a benefit in its own right. Application rates are established for each waste when applied in isolation. When wastes are applied as a mix, the waste with the highest nutrient, PTE or other limiting factor is used as the maximum application rate (i.e. waste will be spread at the lowest application rate).
- **The waste will be applied before seedbed preparation for arable fields and while the leaf is short or after cuts of silage for grass field and as a split.** The waste is anticipated to be spread at the start of September for the arable fields and in September/August 2020 for grass fields, although **this** may change due to weather conditions and farmer requirements.
- Sludge has been analysed by NRM Ltd for major plant nutrients, including nitrogen, phosphate and potash and will provide agricultural benefit through the addition of these nutrients to the receiving soil.
- Waste will be delivered to site by road tanker and off loaded into mobile storage tanks each with a capacity of approximately 30m³. Waste will be spread individually up to the individual application rate via the appropriate method of application.
- The wastes will provide nutrients for the crop as described in the waste evaluation forms however this may be subject to change determined by analysis of individual samples during the agreed 12 month deployment period. The sludge is regularly analysed and application rates will be adjusted according to changes in analysis and volumes arising. If application rates are adjusted then nutrient loadings will not exceed either crop requirement or NVZ regulations. An assessment on spreading rate and nutrient addition will be made on each field. It should be noted that the waste Maelor Foods contains highly available (36%) nitrogen, and thus will not be spread during NVZ closed periods.
- Due to the coding of the Secanim and Maelor Foods and Highbury Poultry waste streams (02 02 04), a visual inspection was made to determine if analysis for FOGs was required. It was deemed not necessary yet has been undertaken and provided in the waste analysis. The wastes will be closely monitored during the spreading of this site, and so the requirement for FOGs analysis will be reviewed periodically. The Secanim waste is not expected to contain Selenium, Arsenic, Molybdenum and Fluoride, and so has not been tested for such elements. There will also be a interval of least three weeks between the application of wastes with the EWC's 02 02 04 and 07 07 12 any using the grass for grazing or cutting.

- If it is necessary to mix wastes prior to application (for example during storage during adverse weather) wastes will be applied at the lowest individual application rate.

5. Previous Nutrients Applied

- There has been a application of FYM in 2019 - details are shown in Table 3.
- Nutrients applied in the previous application have been taken into account when calculating crop requirement.

Field	Waste Applied	Application Rate (t/ha)	Nitrogen		Phosphate		Potash	
			Total	Available	Total	Available	Total	Available
BRYN Y COSN 1								
BRYN Y COSN 2								
BRYN Y COSN 3								
BRYN Y COSN 4								
BRYN Y COSN 5								
BRYN Y COSN 6								
BRYN Y COSN 7								
RACECOURSE 3	FYM	3	6	2	9.6	5.7	28.2	25.5
RACECOURSE 4	FYM	3	6	2	9.6	5.7	28.2	25.5
RACECOURSE 5	FYM	3	6	2	9.6	5.7	28.2	25.5
RACECOURSE 6	FYM	3	6	2	9.6	5.7	28.2	25.5
RACECOURSE 7								
LIXWM 1	FYM	3	6	2	9.6	5.7	28.2	25.5
LIXWM 2	FYM	3	6	2	9.6	5.7	28.2	25.5

Table 3 – Previous nutrients applied

6. Agricultural Benefit Of Waste Application

- The sludge will be used to provide plant nutrients which will replace a proportion of the fertiliser that the farmer would normally apply to their crop. Essential plant nutrients will be applied up to crop requirements or crop off take values where the soil nutrient index is above target values. The waste will also provide benefit through the addition of organic matter and trace elements. Crop fertiliser requirements are based on figures from the RB209 (9th Edition). Individual waste evaluations are attached in Appendix C.
- Table 4 shows the crop fertiliser requirement for the fields based on the proposed crop rotation and soil analysis.

Field	Size (ha)	Grid Reference	Soil Type	Current Crop	Next Crop	Expected Yield (t/ha)	Nitrogen kg/ha	Phosphate kg/ha	Potash kg/ha
BRYN Y COSN 1	3.2	SJ 18105 72753	Clay Loam	1st Cut silage and grazing	2nd cut silage and grazing	38	210	20 Offtake(64.6)	310
BRYN Y COSN 2	3.5	SJ 17989 72664	Clay Loam	1st Cut silage and grazing	Winter Barley (Straw Removed)	8	170	67.2	85
BRYN Y COSN 3	1	SJ 17940 72593	Clay Loam	1st Cut silage and grazing	2nd cut silage and grazing	38	210	95	310
BRYN Y COSN 4	1.3	SJ 18047 72538	Clay Loam	1st Cut silage and grazing	2nd cut silage and grazing	38	210	125	310
BRYN Y COSN 5	0.6	SJ 18134 72497	Clay Loam	1st Cut silage and grazing	2nd cut silage and grazing	38	210	95	Offtake 228
BRYN Y COSN 6	0.5	SJ 17953 72429	Clay Loam	1st Cut silage and grazing	Grazing		60	80	60
BRYN Y COSN 7	0.3	SJ 17889 72434	Clay Loam	1st Cut silage and grazing	Grazing		60	80	30
RACECOURSE 3	1.3	SJ 15748 75257	Sandy Clay Loam	1st Cut silage and grazing	Fodder Beet	85	120	Offtake (59.5)	340
RACECOURSE 4	1.2	SJ 15938 75279	Sandy	1st Cut silage	Fodder Beet	85	120	Offtake (59.5)	370

			Clay Loam	and grazing					
RACECOURSE 5	2.1	SJ 15850 75360	Sandy Clay Loam	1st Cut silage and grazing	Fodder Beet	85	120	90	340
RACECOURSE 6	1.4	SJ 15716 75373	Sandy Clay Loam	Fodder Beet	1st Cut silage and grazing	23	120	70	110
RACECOURSE 7	1.6	SJ 15737 75490	Sandy Clay Loam	Fodder Beet	1st Cut silage and grazing	23	120	70	110
LIXWM 1	4.2	SJ 15838 71395	Sandy Clay Loam	1st Cut silage and grazing	2nd cut silage and grazing	38	210	20 Offtake(64.6)	260
LIXWM 2	5.8	SJ 15838 71574	Sandy Clay Loam	1st Cut silage and grazing	2nd cut silage and grazing	38	210	20 Offtake(64.6)	260

Table 4 Fertiliser Requirements (*Crop offtake figures)

- It is intended to spread the wastes by sub-soil injection to reduce the risk of environmental incidents (run off, odour nuisance issues), to minimise dis-benefit to the growing crop (leaf scorch, smothering) and to provide nutrients to the root zone. Typically wastes will be applied by deep leg injector however a shallow injector n may be used dependant on soil/weather conditions at the time of application. In drought conditions, wastes with low odour potential and low risk of smothering crop leaf may be surface applied and will provide additional benefit through irrigation. Table 4 shows the crop fertiliser requirement for the fields based on the proposed crop rotation. The application of sludge will also provide small increases in soil organic matter, which can help improve soil structure and water and nutrient holding capacity.

- Assessment of the waste is attached in table 5.

Commercial Waste	Application Rate t/ha	pH	Nitrogen kg/ha		Phosphorous kg/ha		Potassium kg/ha		Magnesium kg/ha
			Total	Available (30%)	Total	Available (50%)	Total	Available (90%)	Total
Secanim	38	6.58	171	51	56	28	18	16	6
English Provender	98	6.76	118	35	57	29	5	4	3

Croda Goole (Forward Environmental)	52	7.55	94	28	57	28	9	8	8
Maelor Foods	33	6.65	122	37	56	28	7	7	13
Encirc	33	5.88	242	73	67	34	21	19	8
Beechdean Ice cream	250	5.96	75	23	33	17	28	25	6
Croda Widnes	227	9.65	45	14	5	3	9	8	4
Kelloggs	200	4.18	180	54	57	29	32	28	6
Rowan Foods	250	4.02	150	45	34	17	24	22	10
Highbury Poultry	24	6.58	245	73	73	37	16	14	6

*Table 5 – Application rate and nutrient input***Nitrogen**

- The analysis showed that the nitrate and ammoniacal nitrogen in the majority of wastes are relatively low indicating low immediate availability of nitrogen. The remaining total nitrogen applied will become available to the crop through mineralisation throughout following seasons as is typical from organic manures and biosolids..
- The rate of nitrogen release will be affected by several factors including soil type, climate, and timing and method of application.

Phosphorus

- Applications of wastes are limited to ensure that phosphate is applied at or below crop off take values as calculated from the RB209 ensuring that the spreading activities do not increase soil P reserves.

Potash

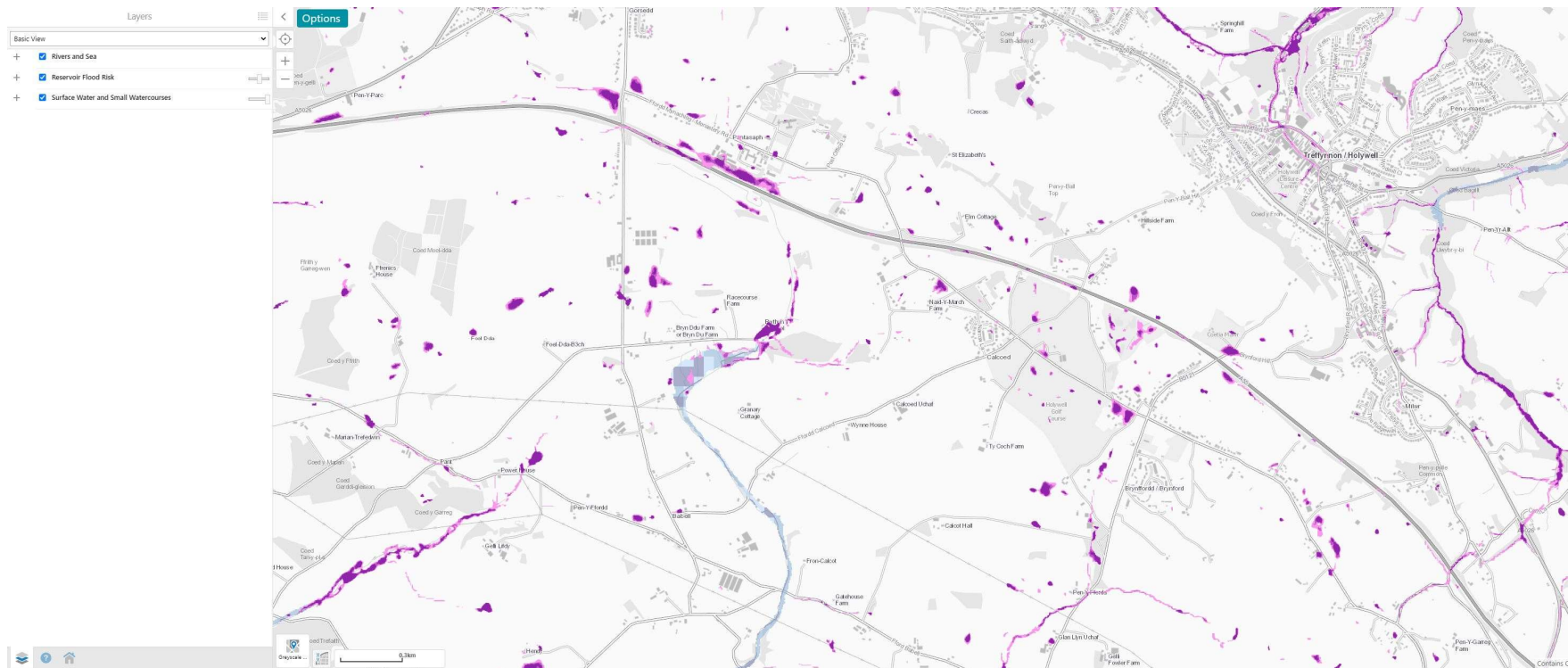
- The waste applied will supply up to 32kg/ha potash which will not meet crop offtake for all fields however will allow the landowner to significantly reduce the amount of chemical fertiliser required to meet the crop need.
- The applications of wastes at the proposed application rates will provide nutrients at or below crop requirement or offtake values and will not result in an increase in soil nutrient reserves.

Organic Matter

The application of sludge will also provide a small increase in soil organic matter, which can help to improve soil structure and water & nutrient holding capacity.

7. Pollution Risk Assessment

- There are a number of properties within 500m of the fields proposed to be spread. The sludges have the potential to cause odour however storage tanks will be sited away from dwellings and application of sludge via an umbilical cord sub soil injection system will minimise the risk of odour associated with landspreading and the operation is unlikely to cause nuisance odour issues. Operations will be carried out in accordance with normal agricultural hours to further reduce the risk of odour complaints and the overall risk of odour is low. An odour management plan has been included with this application.
- Waste will be stored on site in mobile holding tanks each with a capacity of approximately 30m³ prior to spreading. Storage tanks are inspected daily by the operator and wherever possible left empty at the end of the working day. Storage tanks will not be sited within 10m of watercourses – or at the top of a steep embankment. Signage on the tanks identifies the company and activity and has emergency contact details. Anticipated location of storage tanks are shown on the attached plan (Appendix A), however locations may vary slightly due to unforeseen operational requirements.
- Hazards have been identified on the site plan shown in Appendix A and relevant control measures and buffer zones have been identified. Operations are to be carried out in accordance with the company generic risk assessment for landspreading. There are three barrows in fields BYC3 and BYC2 at the following grid references SJ 17947 72606, SJ 17983 72649, SJ 18015 72660. Care will be taken to ensure that they are not damaged when spreading on the fields. These barrows have been marked on the site map as well
- There is a footpath/track alongside several fields however these have a appropriate buffer zone in place.
- There are several watercourses at the site which have been identified on the site plan. In order to protect the watercourses, a 10m buffer zone will be observed adjacent to all watercourses and are highlighted on the attached plan.
- No boreholes, wells have been identified within the spreading area. A spring has identified but it is not within in 50m of the spreading area so no action is necessary.
- The site is within 500m of a statutory designated environmentally sensitive area as defined by Magic.go.uk. This Is the SSSI called PARC LINDEN, LIXWM and COMIN HELYGAIN A GLASWELLTIROEDD TREFFYNNON/HALKYN COMMON AND HOLYWELL GRASSLANDS. A risk assessment has been prepared for both these SSSI. The fields located next to the SSSI COMIN HELYGAIN A GLASWELLTIROEDD TREFFYNNON/HALKYN COMMON AND HOLYWELL GRASSLANDS have a buffer zone of 30m plus to reduce the likelihood of pollution from waste spreading. The other SSSI does not have the same buffer zone as the fields are well over 300m away from the SSSI.
- The flood risk maps show that part of the land to be spread is not within flood prone areas and the land is not within a groundwater source protection zone. The sludge will be spread in appropriate conditions with weather and field conditions constantly monitored.



8. Contingency Planning

- In the event of machinery breakdown or failure, mobile mechanics are available to attend sites and replacement vehicles and equipment are available or can be hired from current suppliers.
- There are sufficient trained staff to maintain general sickness and holiday cover.

- During prolonged periods of adverse weather, planned spreading may be postponed or cancelled. An extensive land bank throughout North West/North Wales allows vehicles to be re-routed if conditions become unsuitable for spreading.

Supporting documents

Appendix A – Site Plan

Appendix B – Soil Analysis

Appendix C – Waste Evaluation

Appendix D – Table 6

Appendix E – Benefit Statement

Appendix F- SSSI Risk assessment

Field	Soil pH	Phosphate		Potash		Magnesium		SNS
	pH	mg/l	Index	mg/l	Index	mg/l	Index	Index
BRYN Y COSN 1	5.9	33.4	3	120	1	84	2	Moderate
BRYN Y COSN 2	5.9	34	3	126	2-	65	2	1
BRYN Y COSN 3	6.3	12.8	1	102	1	77	2	Moderate
BRYN Y COSN 4	6.3	7.4	0	91	1	82	2	Moderate
BRYN Y COSN 5	6.5	11	1	245	3	85	2	Moderate
BRYN Y COSN 6	6.1	8	0	56	0	60	2	Moderate
BRYN Y COSN 7	6.5	6.4	0	87	1	54	2	Moderate
RACECOURSE 3	6	32.6	3	180	2-	85.3	2	1
RACECOURSE 4	6	34.8	3	95.1	1	93.7	2	1
RACECOURSE 5	5.8	14.2	1	139	2-	67.4	2	1
RACECOURSE 6	6.1	9.8	1	78.2	1	60.3	2	Moderate
RACECOURSE 7	6.3	14	1	82.6	1	53.8	2	Moderate
LIXWM 1	5.7	31	3	39.9	0	47	1	Moderate
LIXWM 2	6.1	38	3	35.8	0	52.2	2	Moderate

Table 6 Table to show the soil quality of the fields to be spread

