BERRYS

PROPERTY | BUSINESS | PLANNING

MANURE MANAGEMENT PLAN

IN RELATION TO THE PROPOSED ERECRTION OF A BROILER CHICKEN POULTRY UNIT

ON LAND AT

GLANMEHELI, NEWTOWN

ON BEHALF OF

G & A POWELL

RTPI mediation of space · making of place

RICS

Contents

1 Introduction

The Manure Management Plan has been prepared for G & A Powell of Glanmehli Farm, Newton. The following plan has been constructed to incorporate the current legislation relating to manure management and control of nitrates. The plan will be reviewed annually by G & A Powell before being updated annually. If changes to the holding take place before the annual review date then the plan will updated earlier.

This Manure Management Plan has been undertaken to generate a clear understanding of the farms ability to service the production and disposal of any manures produced by the poultry unit along with the existing manure produced on the farm.

All manure is utilised by the farms own 500 kW anaerobic digestion (AD) Plant. Currently the farm has to import over 2,500 tonnes of chicken muck from other units for use in the digester. Producing the manure on-site will reduce the amount of manure haulage currently coming into the farm.

The Manure Management Plan is split into three sections;

- Land available – this will help decide when and where to spread slurry, manure, dirty water and other organic wastes to minimise the risk of pollution.
- Nitrogen loading – provides information on nitrogen loading on the farm based on stock numbers.
- Contingency Plan analysing the storage available and required.

The main limitation when applying organic manure to land is the total Nitrogen content. In order for the farm to be compliant there must not be more than 250 kg/ha of Nitrogen applied to any farmland outside of an NVZ or 170 kg/ha of Nitrogen applied per year to any land within an NVZ.

A schedule of the farmland is provided in Appendix 1, with field maps of the farmland attached at Appendix 2, showing all the land the business has control over.

The field maps have been marked to highlight the area's most at risk based on guidance available. The following colour code has been used.

Red	Don't spread at any point in time due to location of land next to watercourses. This applies to both organic and none organic products and creates a 10m buffer strip either side of any watercourse, 50m within springs, wells, boreholes and reservoirs. Steep slopes of more than 12 degrees (20% or 1 in 5), any other areas – i.e. fallow land, SSSI land or areas where applications cannot be applied correctly due to terrain. Temporary field stores should also be identified in red with the date last used recorded next to them.
Orange	Cannot be used when certain conditions apply but will usually be available at some time of the year. For example fields cannot be used when they are prone to flooring and remain water logged or if soil cracks during the summer. Field which cannot be used when they are at field capacity.

	Cannot be used is steep slopes i.e. over 7% or moderate slopes but on slowly permeable soil i.e. 5 – 7% slope on clay.
Yellow	May be used for spreading at most times of the year. Moderate slope on well-draining soil i.e. 5 – 7% Slight slope on slowly permeable soil i.e. 3-5% Anywhere with effective pipe or mole drain
Green	These areas can have applications throughout the spreading season without limitations outside of the closed period.

In addition areas which are not available for spreading have been left white, such as woodland, yards and tracks.

2 Land Available For Spreading

As per the schedule of field areas at Appendix 1, the total land available to apply manure and other fertiliser on is 240 hectares, once no spread areas have been deducted.

The Areas shown on this list have been measured using the GPS system on the Self-Propelled Crop sprayer, being the most accurate way of measuring available spreading sizes.

The farmland is not located within an NVZ and therefore the maximum Nitrogen allowance is 250kg/ha. Solids Fibre 5000 x 3.64 = 18'200 kg N. Liquid 5000 x 7.84 = 39'200. Total N Production is therefore 57,400kg. Leaving 2,600kg of available nitrogen spreading capacity.

All manures and digestate from the AD Plant is analysed prior to application to identify the N content. Manures high in N should under best practice not be applied to the land during autumn or early winter so as to minimise N leeching and the subsequent effects of pollution.

In all Risk Areas (as well as Green when the soil is not well drained or shallow) the below recommendations will be followed;

Do Not Apply	When the ground will be damaged by machinery
	More than 50m3/ha in a single application
	More than 5mm/hour 1/5" hour of dirty water through projecting application (and only when they have low trajectory)
	More than 50m3/ha of diluted silage effluent
Do	Move regular applications
	Maintain a 3 week interval between applications
	Incorporate any manure, poultry or FYM as soon as practicable
	If slurry is applied to bare soil incorporate as soon as practicable

3 AD Plant

Including crops and muck the AD plant consumes in total 30 tonnes per day. Times by 365 in a year total consumption is maximum 10,950 tonnes. 90% of this comes out as digestate.

A maximum of 9855 tonnes of digestate can be produced per year. All discharged digestate goes through a screw press separator, which splits it into a solid and liquid fraction. The total 9855 tonnes are split 50/50, so 4928 tonnes of liquid and solids per year. The Liquid is stored in a purpose built slurry tower and the solids are stored in roofed manure sheds – these are detailed in the manure contingency plan below.

Chicken muck will be stored in the roofed manure storage adjoining the AD feeder shed. The muck produced in the 48-day cycle period should match the AD plants consumption for that time. In the event of an AD plant breakdown and below normal consumption, there will be ample space in the roofed storage shed for extra chicken muck storage, details are set out in the manure contingency plan below.

4 Contingency Plan

This section shows how Glanmiheli Farm deals with the manure produced on the holding, including the following;

- Does and will store all Chicken manure and cattle manure prior to use in the Anaerobic Digester.
- Does and will store all wash water from the current and proposed chicken unit before use in the Anaerobic Digester.
- Does and will store all Digestate (AD by-product) produced by the Anaerobic Digester, prior to spreading.

4.1 Chicken Manure and Cattle Manure

Currently all chicken manure which is brought on to Glanmiheli is stored in 1 of 3 storage sheds. All the sheds are the same size, which is 45ft wide x 120ft long x 15ft tall to the top of the concrete panels. This gives a minimum capacity per shed of 81000 cubic feet or 2294 cubic metres, without stacking muck above the level of the concrete walls.

In the first picture you can see at the back of the sheds is the muck from one crop of 250,000 birds, approximately 275 tonnes. The digester consumes on average 6 tonnes of chicken muck per day. So in the 48 day period of one flock of birds to the next, the digester will consume all the muck from 250,000 birds.

With the proposed new chicken shed development nothing will change in this muck store, as the muck produced by the sheds on site will replace muck currently being imported.

The picture shows the most muck which will ever need to be stored under normal circumstances. However, as you can see from the picture, there is still over 7/8th of the shed space free, which means in the event of any digester breakdown, there is more than ample room for extra chicken muck storage.

On the right is the pile of manure from the cattle sheds spring clean out, before the cattle are turned out to the land. There are roughly 80 tonnes in this pile, and that is the most that will ever be stored in this shed. The AD plant will consume 2 tonnes of cattle muck per day if it is available. So, any muck cleared from the sheds over the winter period (1 tonne per fortnight,) will be fed directly into the digester.

Photograph of one of the Storage Sheds

4.2 Wash Water

All dirty water and wash water from the current and proposed poultry unit, is and will be transferred from the holding tank outside the chicken sheds, into the current underground storage.

There is an underground pit below the cattle cubicles which already stores cattle slurry and dirty water, a pump is located outside the storage (2nd photo) which pumps the slurry/dirty water mix directly to the digester.

The mixture is a vital part of the AD process which has 2 roles, the first is keeping the dry matter inside the digester tank below 10% to allow bacteria to thrive, and the second is introducing fresh bacteria from the cattle slurry to maintain overall plant health and digesting capability.

The tank is kept liquefied by an air bubbler system (the silver box and black pipes in the back of the 1st photo) which blows air through the mixture to stir it and keep it in a liquid state at all times ready for use by the digester.

The storage pit measures 10ft deep x 120ft long by 33ft wide, giving a total capacity of 39600 ft cubed or 1121 metres cubed.

60 suckler cows are housed on the slats for on average 6 months of the year.

The discharge pump is currently set to pump 3 cubic metres per day from the pit to the digester, and this maintains the level of the pit at a quarter full to allow space of 840 cubic metres for contingency inside the pit for chicken shed wash water. The amount pumped per day can be adjusted at the click of a button.

Photograph of Cattle Shed

Photograph of AD Plant Pump

4.3 Digestate Storage

Including crops and muck the AD plant consumes in total 30 tonnes per day. Times by 365 days in a year, the total consumption is on average 10,950 tonnes. 90% of this comes out as digestate. On average 9855 tonnes of digestate is produced per year. All discharged digestate goes through a screw press separator, which splits it into a solid and liquid fraction.

The total 9855 tonnes are split 50/50, so 4928 tonnes are liquid and 4928 are solids per year.

The liquid is stored in a purpose-built storage tower, with a maximum capacity of 3200 metres cubed. The tower is emptied completely in the spring onto growing crops, over the course of the summer and in the autumn to be incorporated into the soil for crops to be planted. The maximum storage time in the tower is 8 months production. The tower is emptied in October for planting and spreading begins again in March so the tower usually reaches nearly 60% full, so there is always plenty of additional spare space.

Photogrpah of the Storage Tower

The solid digestate is a dry, stackable fibre. This again is spread throughout the season on growing crops and on land to be incorporated into the soil for crop planting.

All of the Digestate is stored in covered muck stores just as the chicken muck is. The remaining two sheds capacities of 2294 cubic metres each gives a total storage capacity of 4588 metres cubed, without stacking material above the walls.

Over the winter months about 2000 tonnes of fibre will be stored for spreading in the spring. After this there will usually be no more than 500 tonnes stored at a time before being spread to land.

The photo on the right shows the Digestate Fibre coming off the conveyer belt from the separator

Appendix 1

Schedule of Farmland

Cropping

Main Business: Fielder
Year: 2019
Area: ha

Crop	Variety	FieldGroup	Field Name	Working ha	Percent
Barley Spring	Barley Spring	G. Powell - The Block	Block 1	3.83	1.59 %
			Block 2	3.87	1.61 %
			Block 3	3.07	1.28 %
			Block 4	6.52	2.71 %
			Block 5	2.37	0.99 %
		Total for G. Powell - The Block		19.66	8.17 %
	Total for Barley Spring			19.66	8.17 %
Total for Barley Spring				19.66	8.17 %
Grass	Grass	G. Powell	Cow Pasture G. Powell	3.85	1.60 %
			Jarmons	3.95	1.64 %
			Mervins Bottom	2.55	1.06 %
			Mervins Side	5.00	2.08 %
			Siop Foch Large	4.85	2.02 %
			Top Waens	4.60	1.91 %
		Total for G. Powell		24.80	10.31 %
	Total for Grass			24.80	10.31 %
Total for Grass				24.80	10.31 %
Maize Forage	Maize Forage	G. Powell	Garage Field	3.72	1.55 %
			Llwyn Davy	6.52	2.71 %
			Newhall	5.58	2.32 %
			Pool Field G.Powell	5.10	2.12 %
			Sale Field.	3.01	1.25 %
			The Paddock	4.19	1.74 %
		Total for G. Powell		28.12	11.69 %
		G. Powell - The Lake	Banky	5.19	2.16 %
			Behind Chicken Shed	4.22	1.75 %
			Chicken Shed Small	2.50	1.04 %
			Grass Small	2.30	0.96 %
			Stubble Field	2.40	1.00 %
		Total for G. Powell - The Lake		16.61	6.91 %
	Total for Maize Forage			44.73	18.60 %
Total for Maize Forage				44.73	18.60 %
Silage	Silage	G. Powell	17 Acres	5.95	2.47 %
			Bank Field	2.14	0.89 %
			G. Powell Tree Field	3.40	1.41 %
			Half Field	1.45	0.60 %
			Jonny Big	2.00	0.83 %
			Jonny Flat	1.13	0.47 %
			Jonny Long	1.34	0.56 %
			Jonny Small	0.70	0.29 %
			Jonny Small Bank	1.02	0.42 %
			Jonny Turnip	1.12	0.47 %
			L-Shape Field	3.76	1.56 %
			Mervins Top	2.75	1.14 %
			Woggy Bank Field	2.00	0.83 %
			Woggy Griffy	2.29	0.95 %
			Woggy Mill Farm	2.41	1.00 %

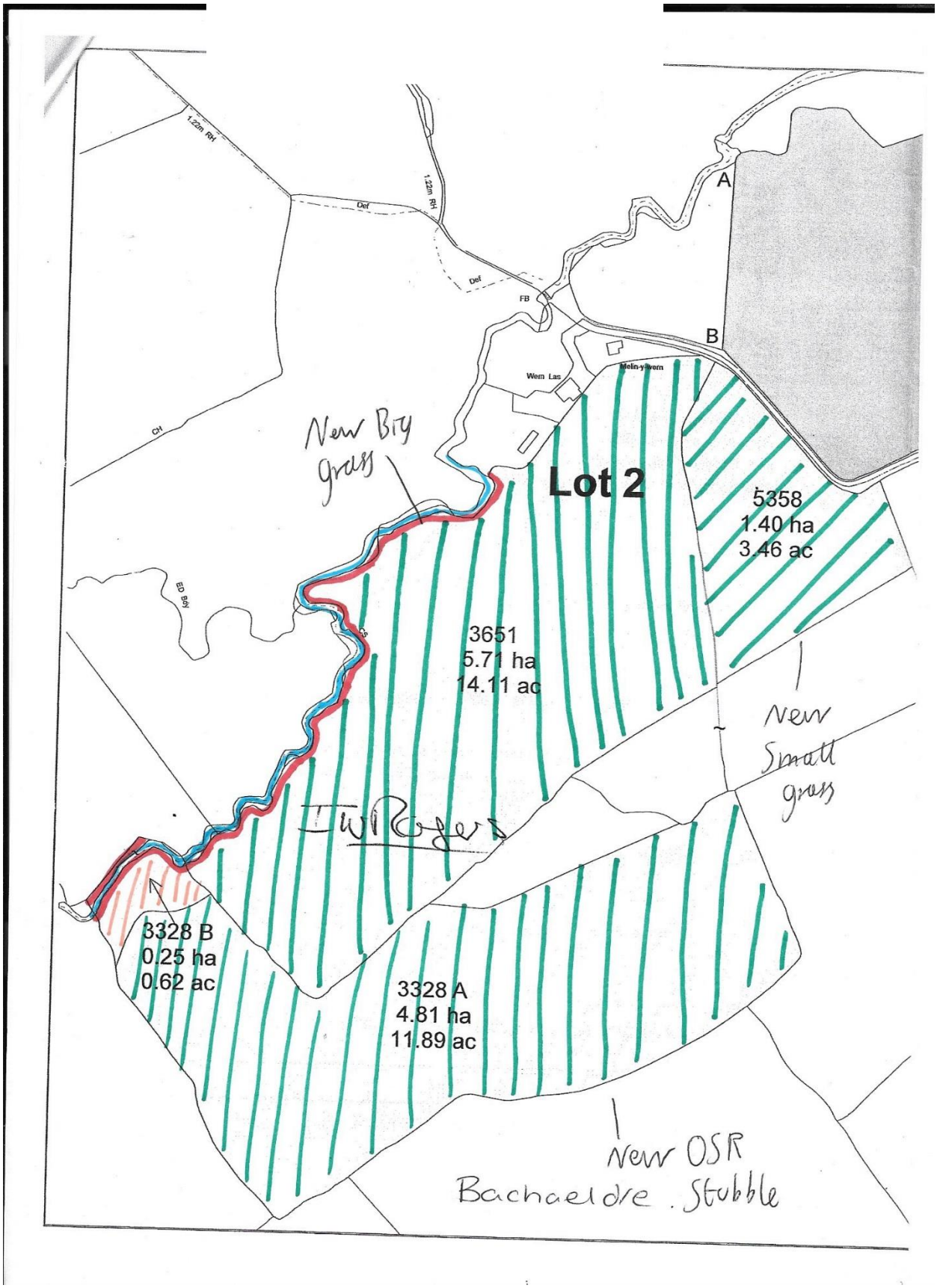
Cropping

Main Business: Fielder
Year: 2019
Area: ha

Crop	Variety	FieldGroup	Field Name	Working ha	Percent
			Woggy Pool	2.06	0.86 %
		Total for G. Powell		35.52	14.77 %
	Total for Silage			35.52	14.77 %
Total for Silage				35.52	14.77 %
Triticale Winter	Triticale Winter	G. Powell	Auctioneer's	2.27	0.94 %
			Bottom Waens	4.42	1.84 %
			Far Brickyard	6.52	2.71 %
			Far Fingerpost	2.73	1.13 %
			Far Sawmills	2.93	1.22 %
			Football Field	2.02	0.84 %
			Griffy 12	5.45	2.27 %
			Little Roadside	2.47	1.03 %
			Near Brickyard	5.54	2.30 %
			Near Fingerpost	1.82	0.76 %
			Near Sawmills	2.43	1.01 %
			Ned's	4.09	1.70 %
			Norman's	2.14	0.89 %
			Sideland	4.94	2.05 %
			Sports	6.67	2.77 %
			Three Corner Field	1.62	0.67 %
			Woggy Pasture	5.66	2.35 %
		Total for G. Powell		63.72	26.49 %
	Total for Triticale Winter			63.72	26.49 %
Total for Triticale Winter				63.72	26.49 %
Wheat Winter	Wheat Winter	G. Powell	Ash Meadow	5.90	2.45 %
			Far Hodley	4.83	2.01 %
			Far Mervins	2.87	1.19 %
			Mervins Flat Fields	6.93	2.88 %
			Near Goetre	9.59	3.99 %
			Near Hodley	4.52	1.88 %
			Watkin's Large	6.26	2.60 %
		Total for G. Powell		40.90	17.00 %
		G. Powell - The Lake	New Big Grass	5.13	2.13 %
			New OSR Stubble	4.72	1.96 %
			New Small Grass	1.37	0.57 %
		Total for G. Powell - The Lake		11.22	4.66 %
	Total for Wheat Winter			52.11	21.67 %
Total for Wheat Winter				52.11	21.67 %
GRAND TOTAL				240.54	100.00 %

Appendix 2

Manure Management Maps of the Farmland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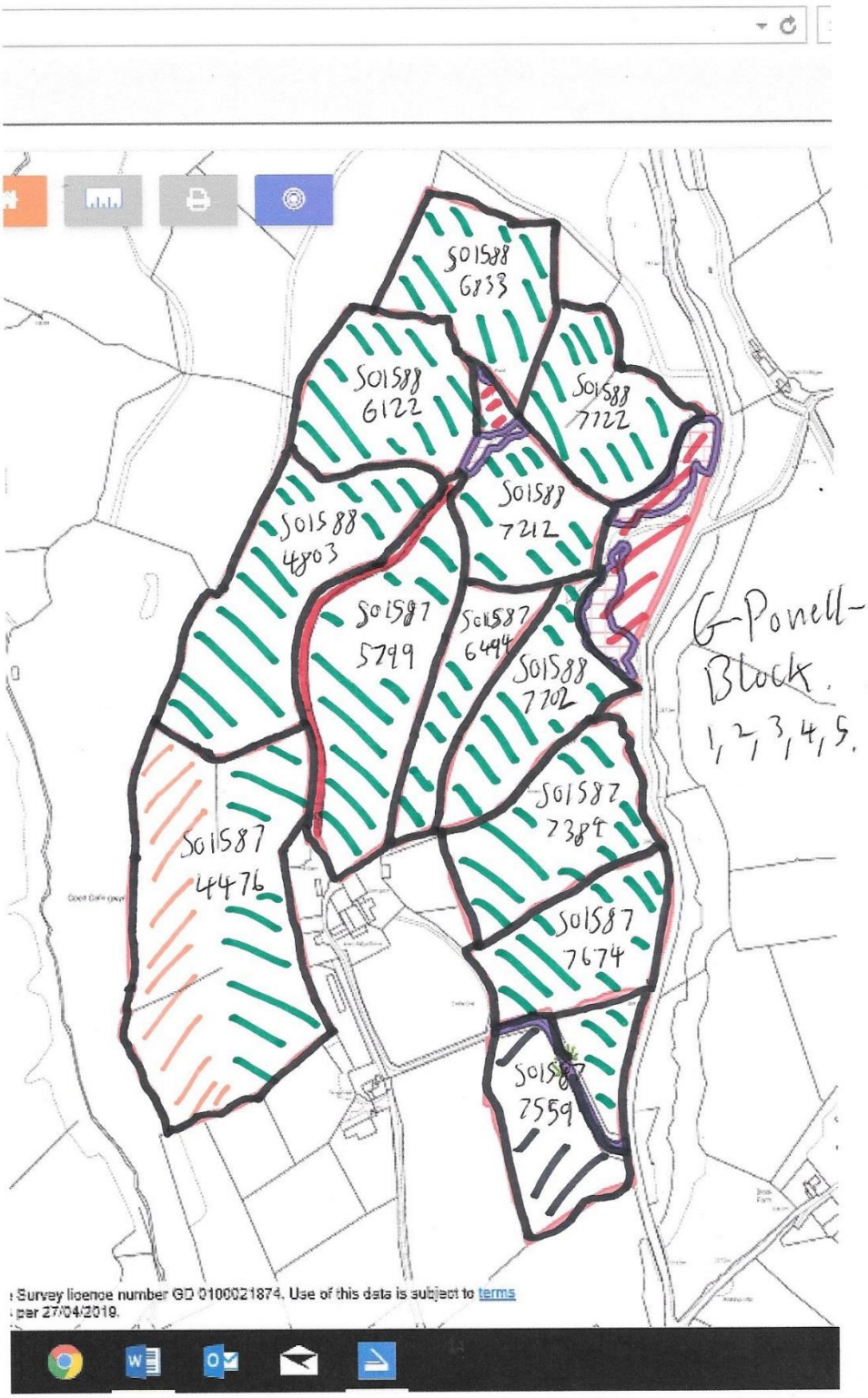
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SO1587 4476
SO1587 7674
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G Powell - Block. 1, 2, 3, 4, 5.
Survey licence number GD 0100021874. Use of this data is subject to terms
per 27/04/2019.

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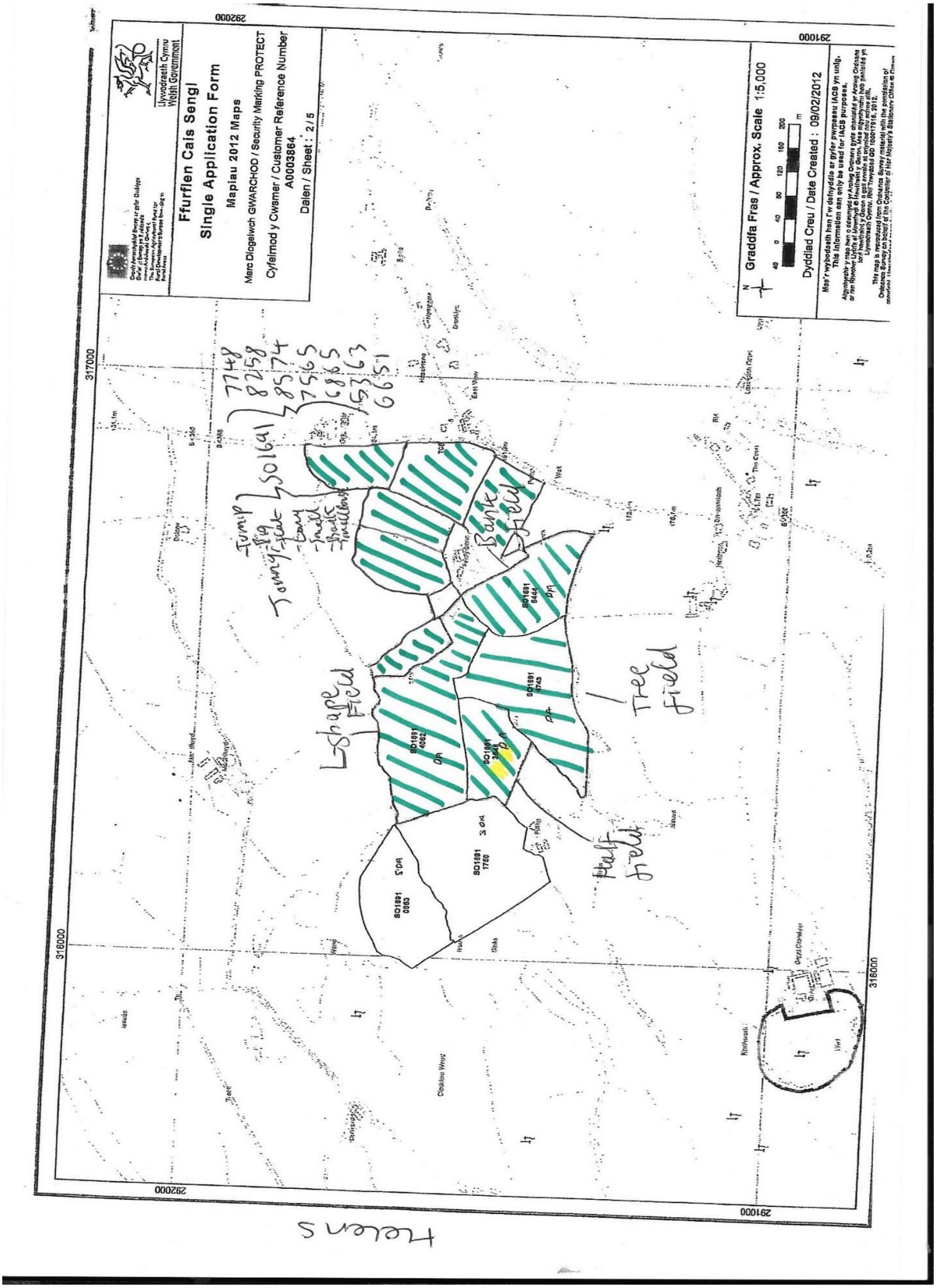

Llywodraeth Cymru
Welsh Government
Ffurflen Cais Sengl
Single Application Form
Mapiau 2012 Maps
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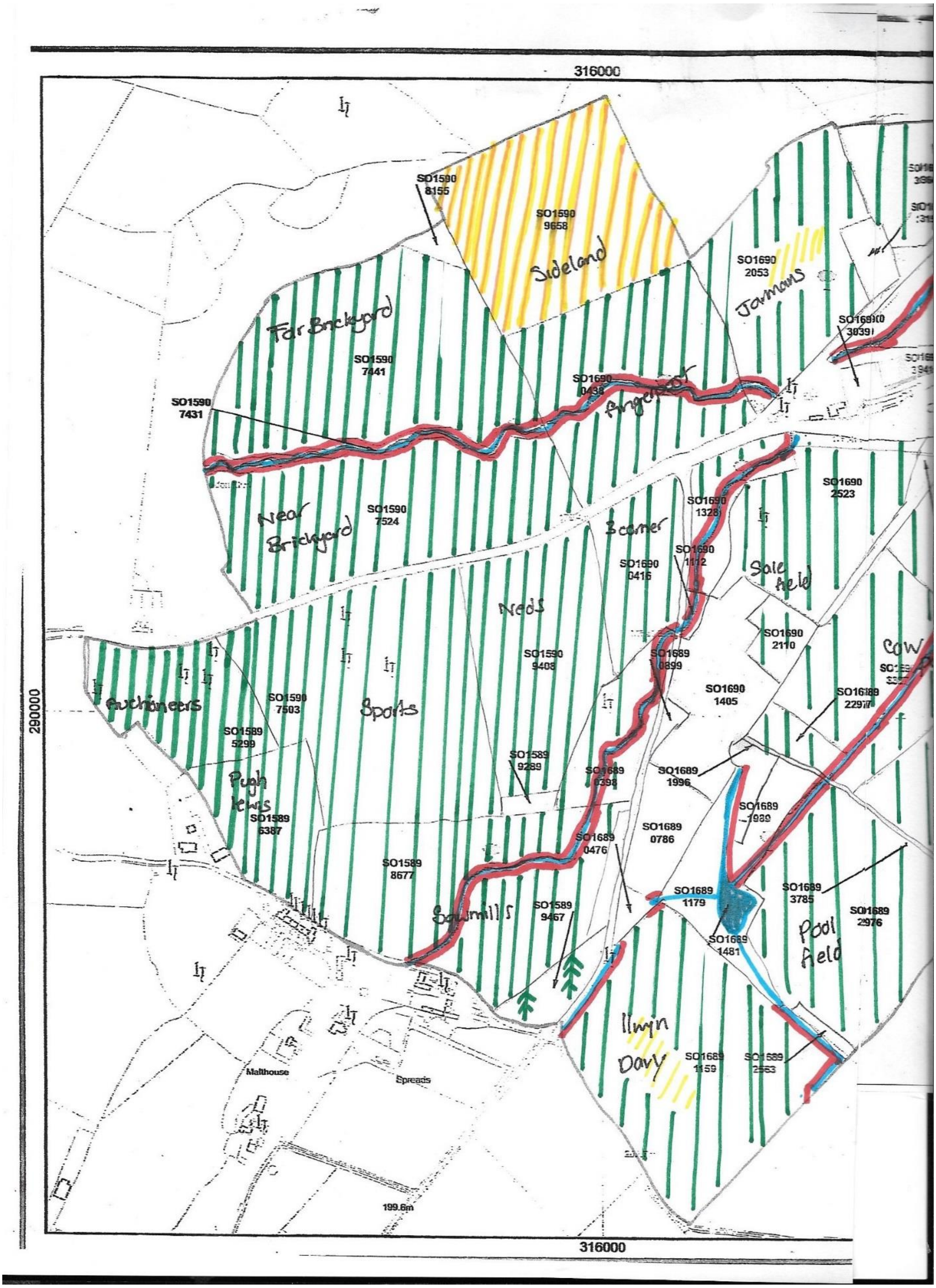
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Near Brickyard
SO1590 7524
3 corner
SO1690 1112
SO1690 0416
Sale field
Neds
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Auctioneers
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Sports
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Sawmills
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Malthouse
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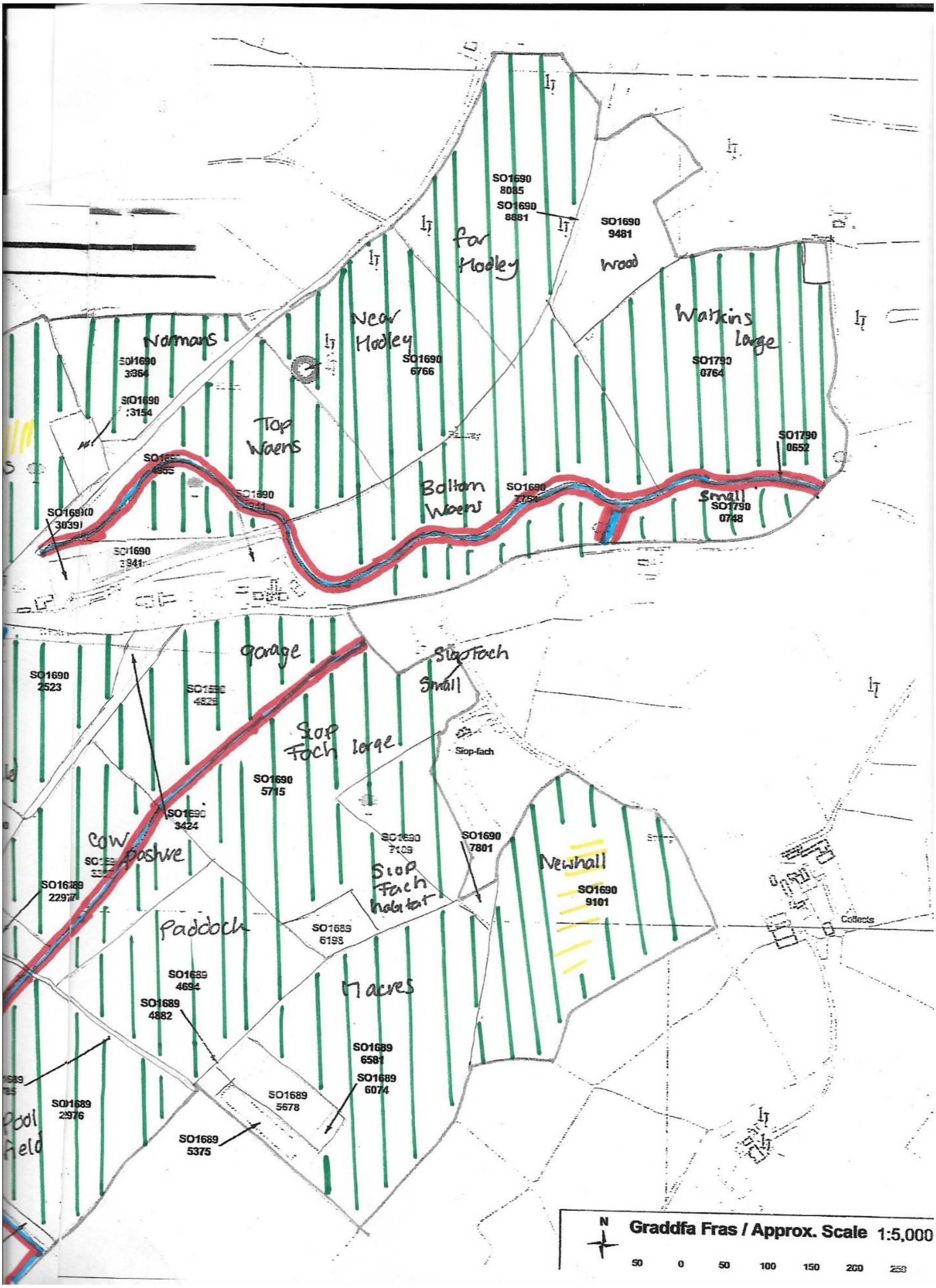
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Top Waens
Bottom Waens
SO1690 7754
SO1790 0652
Small
SO1790 0748
SO1690 3039
SO1690 3941
garage
SO1690 2523
Siop Fach Small
Siop Fach large
Siop-fach
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cow pasture
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Newhall
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Appendix 3

Record of Manure Movements

The below is an example of the Schedule that is used to record all movements of manure off and on the holding;

Date	Type of Manure	Typical spreading capacity	Tonnes / Volume (m3)	Movement of Manure to / from (Name and Address)	Where stored	Signed by

By signing the schedule you are agreeing to confirm to the manure will be spread in accordance with the Code of Good Agricultural Practice and other industry guidance and requirements.