



Department  
for Environment  
Food & Rural Affairs

[www.gov.uk/defra](http://www.gov.uk/defra)

# **Guidance on complying with the rules for Nitrate Vulnerable Zones in England for 2013 to 2016**

**June 2013**

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# Chapter 1: Introduction

## Guidance for farmers in Nitrate Vulnerable Zones in England

This guidance is for farmers in Nitrate Vulnerable Zones (NVZs) for the period 2013 to 2016. It explains how Defra interpret the requirements of the Nitrate Pollution Prevention Regulations 2008 (the Regulations). Ultimately, it is for the Courts to decide on the interpretation of legislation, but this document sets out our working assumptions in enforcing the Regulations, and also sets out Defra's recommendations as to good practice in complying with the Regulations.

The Regulations were updated most recently by the Nitrate Pollution Prevention (Amendment) and Water Resources (Control of Pollution) (Silage, Slurry and Agricultural Fuel Oil) (England) Regulations 2013 (SI 2013/1001), which largely came into force on 17 May 2013. However, there are some provisions which have effect later, particularly for land which is newly in the NVZ as of 2013, and these are described below.

### Structure of the chapters

Each chapter deals with a separate part of the Regulations. If you are in an NVZ, Table 1 shows which chapters or annexes are relevant to you, depending on your farm business. Where applicable, step-by-step guidance on carrying out and recording the calculations needed to show compliance is given in the annexes.

Chapters 1 to 4 contain background information. The main guidance is in Chapters 5 to 10.

In each of these chapters the legal requirements - what YOU MUST do, or what YOU MUST NOT do, is written in boxes.

Further guidance is given immediately below many of the boxes:

#### ***“Compliance guidance”***

is information you need to be able to comply with the rules in the preceding box; and

#### ***“Good practice guidance”***

includes advice on how you might go about complying.

### What do you need to do?

If any of your farmland is in an NVZ, some or all of the rules in the Regulations will apply to you. To find out if you are in an NVZ, see the Environment Agency's website.<sup>1</sup> To avoid penalties for breaching rules we advise you to check the map even if you think your land is not in an NVZ.

<sup>1</sup> <http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=e>

**Table 1: Quick guide to which chapters and annexes apply to different farm types**

Relevant chapter	2	3	4	5	6	7	8	9	10	Annexes					
Farm type	Principal changes to the rules	Scope, timing	Glossary	Planning nitrogen use	The livestock manure N farm limit	The crop nitrogen requirement limit (N max)	Field application of organic manures	Field application of manufactured fertilisers	Storing organic manures	Annex 1	Annex 2	Annex 3	Annex 4	Annex 5	Annex 6
Tillage crops, no livestock, no organic manures are applied to land	✓	✓	✓	✓		✓		✓		✓		✓			
Tillage crops, no livestock but imported organic manures are applied to land	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Livestock, organic manures applied to land	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Livestock only, no crops or grassland	✓	✓	✓						✓					✓	

## Chapter 2: Principal changes made by the new Regulations

The updated Regulations introduce a number of new flexibilities and new rules. These are the principal changes.

### **From 17 May 2013 the following new allowances apply:**

- If you grow grass for production of chlorophyll or high protein fodder, you can now apply more nitrogen – see Chapter 7.
- You can now use compost containing up to 1,000 kg nitrogen in any four year period as a mulch in top fruit orchards – see Chapter 8.
- You can now use compost containing up to 500 kg nitrogen in any two year period either as a mulch or worked into the soil – see Chapter 8.
- If you use precision spreading equipment, you can now spread manure to within 6m of watercourses – see Chapter 8.
- If you operate a low intensity farm you do not need to keep certain fertilisation records – see Chapter 5.

### **From Jan 2014 these new rules apply:**

- If you have medium or heavy land that was designated as an NVZ in 2008 or before, the closed period will be 2 weeks longer – it will continue until 31 January – see Chapter 8.
- If you grow horticultural crops, you will need to comply with the new N max values – see Chapter 7.
- When calculating N max you will need to include the nitrogen contained in all organic manures (not just livestock manures) applied to your land– see Chapter 7.
- The amount of nitrogen in pig and cattle slurry that you must assume is readily available to crops (the manure N efficiency values) has increased – see Annex 6.
- You will only be allowed to spread 30 cubic metres per hectare of slurry (rather than 50 cubic metres as before) at any one time every three weeks between the end of closed period and the end of February – see Chapter 8.

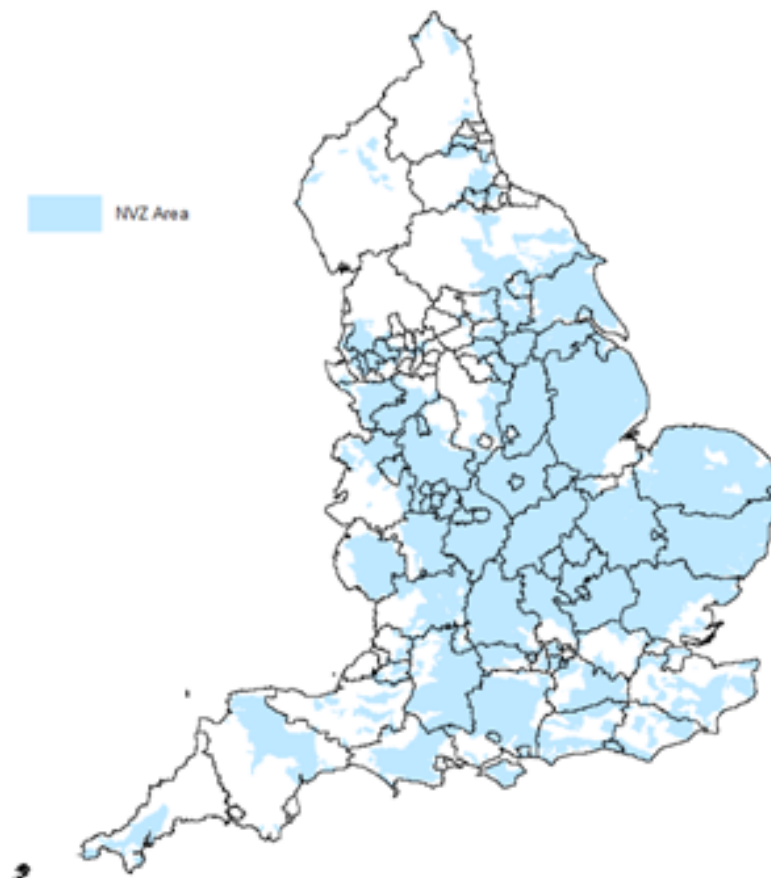
### **From 16 May 2014 there are changes to the rules on temporary field heaps**

- Field heaps must occupy as small a surface area as is practically required to support the heap and prevent it from collapsing. They must not be sited within 30m of surface water if the land is steeply sloping – see Chapter 10.

**From the start of the closed period in autumn 2015**

- If you have land in an NVZ designated for the first time in 2013 you will need to ensure you have provided sufficient storage capacity to comply with the Regulations – see Chapter 10. You should have undertaken your calculation as to your storage requirements by 1 January 2014.
- If you have medium or heavy land that was designated for the first time as an NVZ in 2013, you will need to comply with the longer closed period, which will end on 31 January – see Chapter 8.

### NITRATE VULNERABLE ZONES IN ENGLAND 2013



**Figure 1: NVZs as at 12 February 2013**

## Chapter 3: Scope and timing of the rules

This chapter tells you whether the NVZ rules apply to you and gives you some basic information about them.

### 1. Do the rules apply to me?

The Nitrate Vulnerable Zones (NVZ) rules apply to each **holding** with land in an NVZ. If you **occupy** such land, the rules apply to you.

**Holding** – This is the area of your holding within the NVZ where crops are grown in soil or where livestock are reared for agricultural purposes. It includes farm buildings except for glasshouses, which are largely excluded from the Regulations. The rules apply to all farms regardless of size.

**NVZs** - You can check if your land is in an NVZ on the Environment Agency's, What's in Your Back Yard website: <http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=e> NB: this information will transfer to the GOV.UK website during the life of this guidance.

**Occupier** – The occupier of a holding is usually the person who owns the land, or the person who rents and farms the land.

### 2. What if my farm is part in and part out of an NVZ?

Many of the rules apply to individual fields. The NVZ boundary has been drawn around whole fields, so there are no fields that are only partly in an NVZ. You will need to comply with the rules for each field on your farm that is in an NVZ.

However, note the following:

- The minimum storage capacity for livestock manure (see Chapter 4). You must calculate your storage volume and provide sufficient storage if a part or all of the farm buildings from which your slurry comes lies within an NVZ. If these buildings are completely outside an NVZ, then you do not have to comply with the NVZ rule on storage, but you are strongly advised to do so, as you will need to have enough storage to comply with the closed periods on that part of your land that falls within an NVZ, and to ensure slurry is spread safely on all your land at all times;
- The livestock manure N farm limit (see Chapter 5).

Land outside an NVZ is not subject to the NVZ rules.



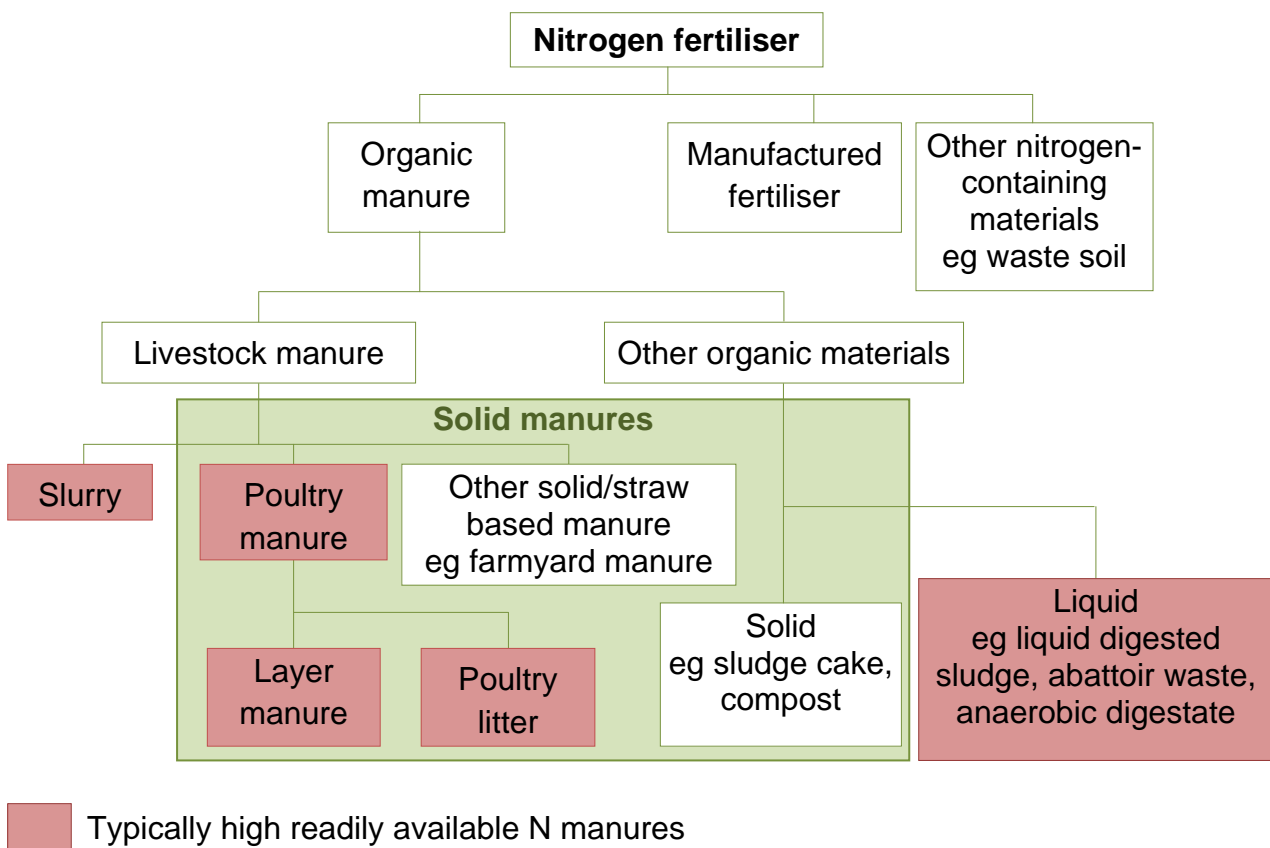
### 3. What do the rules do?

The NVZ rules affect the management of nitrogen fertiliser on farms<sup>2</sup>. Nitrogen fertiliser includes all materials applied to land to enhance growth of vegetation that contain nitrogen compounds. It includes manufactured fertiliser, and all types of organic manure, including livestock manure.

It is important to read this guidance to identify which of the different types of nitrogen fertiliser are affected by the rule in question. For example, rules can apply to:

- all types of nitrogen fertiliser,
- manufactured fertiliser only,
- all organic manures, or
- only certain types of organic manure (eg the livestock manure N farm limit applies to all 'livestock manure' whereas the closed period applies to all 'organic manure with high readily available N').

Figure 2 illustrates which fertilisers have high readily available N.



**Figure 2: Different manure types and the availability of their nitrogen**

<sup>2</sup> There are some rules on record-keeping and planning in relation to phosphate fertilisers which apply to farmers benefiting from a grassland derogation under Part 3A of the Regulations.

#### 4. When do the rules come into force?

Table 2 shows when the rules come into force for NVZs designated before 2013 and for those designated for the first time in 2013, and Table 3 gives sets out the main milestone dates during the farming year for compliance with the rules.

#### 5. What help is available?

In addition to this guidance, there is a range of sources of advice and tools are available to help you comply with the Regulations (as well as plan your nutrient use efficiently). These include:

- PLANET: a software tool to help farmers with field level nutrient management.
- MANNER NPK: a software tool that provides farmers and advisers with a quick estimate of crop available nitrogen, phosphate and potash from applications of organic manure. It is at: [www.planet4farmers.co.uk/Manner](http://www.planet4farmers.co.uk/Manner)
- ENCASH: a software tool that allows farmers and advisors to calculate the nitrogen production in manure produced by different types of permanently housed pigs and poultry.

All three software tools are on the PLANET website at: [www.planet4farmers.co.uk/](http://www.planet4farmers.co.uk/). There may be other packages providing a similar service.

- [RB209](#) (the Fertiliser Manual) helps farmers and land managers better assess the fertiliser required for the range of crops they plan to grow. (The edition referred to for calculations of nitrogen content in regulation 17 is the 8<sup>th</sup> edition, ISBN 978-0-11-243286-9.)
- FACTS-qualified advisors are qualified to give advice to promote farming systems that optimise crop nutrition and protect the quality of soil, water, air and farm biodiversity.<sup>3</sup>

#### 6. Greenhouses

The Regulations now clarify that in general the rules do not apply to land inside greenhouses. Greenhouses include both glasshouses and polytunnels, in which crops are grown under cover in an enclosed space. In such structures, the only water that reaches the land is from artificial irrigation. If land is exposed to the

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<sup>(3)</sup> The scheme is administered by Basis Registration Ltd, and a list of qualified persons is available from them on request at <http://www.basis-reg.com/contact.aspx>

open air (for example if you uncover a polytunnel for a period) we do not regard this as growing crops in a greenhouse and you must comply with all relevant rules.

However, the following rules continue to apply to land covered by greenhouses. These are:

- if you store organic manure you must do so in accordance with the Regulations on capacity, construction, and the associated calculations and records (see Chapter 10), including calculations of N production on farm, and imports and exports of organic manure (except where you only ever spread it inside a greenhouse);
- you must keep a record of crops sown in the ground outside the greenhouse, and when they were sown (see Chapter 5);
- you must keep a record of the size of your holding. If the size of your holding changes, but the change only affects the area covered by greenhouses (ie you acquire more land covered by greenhouses or dispose of land covered by greenhouses) you do not need to update your record.

You must also comply with all the rules for any agricultural land you occupy outside greenhouses.

Rule	Date when rules apply	
	NVZs designated before 2013	NVZs first designated in 2013
All rules in 2008 Regulations, as amended	1 January 2013, except those detailed below	1 January 2014, except those detailed below
Making and keeping a risk map	1 January 2010	17 May 2013
Closed periods for manufactured fertiliser	1 January 2009	17 May 2013
Inspect field before applying fertiliser	1 January 2009	17 May 2013
Observe restrictions on when and where to apply fertiliser (see Chapters 8 & 9)	1 January 2009	17 May 2013
New rules introducing flexibility <ul style="list-style-type: none"> <li>• Greater use of compost (see Chapter 8)</li> <li>• Increased N max for certain grass crops (see Chapter 7)</li> <li>• Reduced record-keeping for low intensity farmers (see Chapter 5)</li> </ul>	17 May 2013	1 January 2014 1 January 2014 1 July 2013
Increase to manure N efficiency for cattle and pig slurry (see Annex 6)	1 January 2014	1 January 2014
Inclusion of all organic materials in N max compliance calculations (see Chapter 7)	1 January 2014	1 January 2014
Introduction of N max values for horticultural crops (see Chapter 7)	1 January 2014	1 January 2014
Additional rules on placement and construction of temporary field heaps (see Chapter 10)	16 May 2014	16 May 2014
Extension of closed period to end of January for medium & heavy soils (see Chapter 8)	1 January 2014 (closed period autumn 2013)	1 January 2016 (closed period autumn 2015)
Limitation of slurry spreading to 30m <sup>3</sup> /ha between end of closed period and end of February (see Chapter 8)	1 January 2014	1 January 2016 (see below)
Planning spreading of nitrogen fertiliser (except on grass), records of crops sown and records of spreading nitrogen fertiliser	1 January 2009	1 July 2013
Closed periods for spreading organic manure, exemptions for organic holdings and spreading rates following the closed period	1 January 2009	31st July 2015
The separation of slurry and provision of storage capacity (see Chapter 10)	1 January 2012	Closed period autumn 2015

<b>Table 3: Typical annual calendar</b>	
<b>Date</b>	<b>Activity</b>
<b>1 January</b>	Start of period for assessing the livestock manure N farm limit Start producing a plan for applications of nitrogen to permanent grassland
<b>15 January</b>	End of closed period for spreading manufactured fertiliser
<b>31 January</b> (see note a)	End of closed period for spreading: <ul style="list-style-type: none"> <li>• organic manure on soils other than shallow or sandy soils</li> </ul>
<b>End February</b>	End of the following restrictions on applications of organic manure: <ul style="list-style-type: none"> <li>• 150 kg N/ha limit for registered organic producers</li> <li>• limitation on slurry and poultry manure single application rate</li> </ul>
<b>30 April</b>	Deadline for compiling records of livestock kept on your farm during the previous calendar year and storage period
<b>1 August</b>	Start of closed period for spreading organic manure to tillage land with shallow or sandy soils (unless a crop is sown on or before 15 September)
<b>1 September</b>	Start of closed period for spreading: <ul style="list-style-type: none"> <li>• organic manure to grassland on shallow or sandy soils</li> <li>• manufactured fertiliser on tillage land</li> </ul>
<b>15 September</b>	Start of closed period for spreading: <ul style="list-style-type: none"> <li>• organic manure to tillage land with shallow or sandy soils where a crop has been sown on or before 15 September</li> <li>• manufactured nitrogen fertiliser on grassland</li> </ul>
<b>1 October</b>	Start of closed period for spreading organic manure to tillage land with soils that are not shallow or sandy
<b>15 October</b>	Start of closed period for spreading organic manure to grassland with soils that are not shallow or sandy
<b>31 December</b>	End of closed period for spreading organic manure to shallow or sandy soils

**Note (a):** 31 January is the end of the closed period:

- for the closed period starting in autumn 2013, for land in an NVZ before 2013, and
- for the closed period starting in autumn 2015, for land newly in an NVZ in 2013.

## Chapter 4: Glossary of terms used in this Guidance

### Crop

any vegetation which is grown for agricultural profit or benefit, including grains, vegetables and fruit, grass and forage, horticulture and bulbs grown in open fields. Certain exemptions apply under the Regulations to crops grown under glass or crops under poly-tunnels or other similar structures defined as greenhouses in the Regulations.

### Crop available nitrogen

the total nitrogen content of organic manure that is available for crop uptake in the growing season in which it is spread on land.

### Dirty water

lightly contaminated run-off from lightly fouled concrete yards or from the dairy/parlour that is collected separately from slurry. It does not include liquids from weeping-wall stores, strainer boxes, slurry separators or silage effluent which are rich in nitrogen and regarded as slurries.

### FACTS

FACTS is the body responsible for both setting and maintaining standards of advice, including nutrient management advice, given by individuals on farm.

### Farmyard manure

livestock excreta that is mixed with straw bedding material, that can be stacked in a freestanding heap without slumping. See also 'temporary field heap'.

### Grassland

land on which the vegetation consists predominantly of grass species.

### Grazing livestock

means cattle (excluding veal calves) sheep, deer, goats and horses (as listed in detail in Table 1 of Schedule 1 to the Regulations).

### High readily available N content

more than 30% of the total N content of the organic manure is present in molecular forms that can be immediately taken up by the plant. Examples include cattle and pig slurry, most poultry manure, and liquid digested sludge.

### Holding

an area or areas of land in the NVZ and its buildings, which is used for the growing of crops or rearing of livestock, and includes livestock units and any outlying fields in the NVZ all of which form part of an individual farm business.

### Incorporation

a technique that achieves some mixing between the organic manure and the soil.

### Land drain

a permanent drain installed below the surface of the ground that is effective in removing surplus water away from field soils. It does not include sealed, impermeable pipes.

**Livestock**

means any animal including poultry, in Schedule 1 to the Regulations, and includes pigs, cattle, sheep, goats, deer, horses and poultry.

**Livestock manure N farm limit**

a limit to the average loading of the total amount of nitrogen (N) in livestock manure across the area of a holding.

**Low intensity farming**

farming where:

- a) at least 80% of your land is grassland; and
- b) no more than 100 kg N/ha per year as organic manure is applied, including what is applied direct to the field by animals; and
- c) no more than 90 kg N/ha per year as manufactured fertiliser is spread; and
- d) no organic manure is brought onto the holding.

**Low readily available N content**

less than 30% of the total N content of the organic manure is present in molecular forms that can be immediately taken up by the plant. Examples include straw based cattle and pig manure.

**Low run-off risk land**

land that has an average slope less than 3 degrees, does not have land drains (other than a sealed impermeable pipe), and is at least 50 metres from a watercourse or conduit leading to a watercourse.

**MANNER NPK**

a practical software tool that provides farmers and advisers with a quick estimate of crop available nitrogen, phosphate and potash supply from applications of organic manure. It is available at:

[www.planet4farmers.co.uk/Manner](http://www.planet4farmers.co.uk/Manner)

**Manufactured fertiliser**

any nitrogen fertiliser, (other than organic manure), which is manufactured by an industrial process.

**Manure N availability**

the percentage of the total nitrogen content of organic manure that is available for crop uptake in the growing season in which it is spread on land.

**Nitrate vulnerable zone (NVZ)**

an area of land designated in accordance with the Regulations.

**Nitrogen fertiliser**

any substance containing one or more nitrogen compounds used on land to enhance growth of vegetation and includes organic manures (see Figure 2 of Chapter 3).

**N max**

the maximum permitted amount of nitrogen from any source that a crop may receive.

**Organic manure**

Any nitrogen fertiliser derived from animal, human or plant sources, including livestock manure.



**Organic manure N field limit**

an annual upper limit of 250 kg/ha for nitrogen from all livestock manures and all other organic materials applied to each field. It does not include manures deposited by grazing animals.

**Organic producer**

a producer with all the land on a holding that is listed on a valid certificate of organic registration issued by an Organic Inspection Body approved by the Advisory Committee on Organic Standards.

**Other nitrogen-containing materials**

any substance containing nitrogen that is neither a manufactured nitrogen fertiliser nor an organic manure eg dredgings.

**Poultry litter**

a mixture of bedding material and poultry excreta which is sufficiently dry to be stored in a stack without slumping.

**Poultry manure**

excreta produced by poultry, including bedding material that is mixed with the excreta, but excluding duck manure with a readily available N content of 30% or less.

**Precision spreading equipment**

Under the Regulations, these are band spreaders (trailing hose and trailing shoe), shallow injectors (which inject the manure no deeper than 10cm below the surface of the soil) and dribble bar applicators.

**Readily available nitrogen**

the amount of nitrogen in organic manure that is present in molecular forms that can be immediately taken up by plants.

**Rough grazing**

low yielding permanent grassland, usually on low quality soil, for example on hilly land and at high altitudes, usually unimproved by fertiliser, cultivation, reseeding or drainage.

**Sandy soil**

Soil over sandstone and any other soil where –

**(a)** in the layer up to 40 cm deep, there are –

- (i) more than 50 % by weight of sand sized particles (particles from 0.06 to 2 mm diameter), and
- (ii) less than 18 % by weight of clay sized particles (particles less than 0.02 mm diameter), and
- (iii) less than 5 % by weight of organic carbon, **and**

**(b)** in the layer from 40 to 80 cm depth, there are –

- (i) more than 70 % by weight of sand sized particles (particles from 0.06 to 2 mm diameter), and
- (ii) less than 15 % by weight of clay sized particles (particles less than 0.02 mm diameter), and
- (iii) less than 5 % by weight of organic carbon.

**Shallow soil**

soil which is less than 40 cm deep.

**Slurry**

excreta produced by livestock (other than poultry) while in a yard or building, (including any bedding, rainwater and washings mixed with it), that has a consistency that allows it to be pumped or discharged by gravity. The liquid fraction of separated slurry is also defined as slurry.



**Spreading**

includes application to the surface of the land, injection into the land or mixing with the surface layers of the land, but does not include the direct deposition of excreta on to the land by animals.

**All other soils**

means all soils which are not sandy or shallow.

**Soil nitrogen supply (SNS)**

the amount of nitrogen (kg N/ha) in the soil that becomes available for uptake by the crop in the growing season, taking account of nitrogen losses.

**Solid livestock manure**

includes poultry manures (litter-based manures eg from broilers; and neat excreta eg from caged laying hens) and stackable farmyard manure (FYM) eg straw-based cattle and pig manure and any stackable separated fibre from the mechanical separation of slurry. See also 'temporary field heap'.

**Solid manure**

organic manure which can be stacked in a freestanding heap without slumping. See also 'temporary field heap'.

**Spring sown crop**

any crop which is sown after 1 January and before 31 July in any year.

**Standard values**

values for use within mandatory calculations.

**Steeply sloping**

land of slope 12 degrees (1 in 5 or 20%) or greater.

**Surface water**

includes coastal waters, estuaries, canals, lakes, ponds, rivers, streams and ditches which contain free water and also temporarily dry ditches and blind ditches.

**Temporary field heap**

farmyard manure or solid manure that does not give rise to free drainage of liquid from within the stacked material which is stored temporarily for up to 12 months on a field site.

**Tillage land**

land that is not being used for grass production and is sown with a crop.

## Chapter 5: Planning nitrogen use

Part 4 of the Regulations requires you to plan all applications of nitrogen fertilisers to your crops. This chapter tells you what your plan must include and the records you need to keep. There are transitional periods for those with land newly in the NVZs (see table 2).

### 1. Planning the use of nitrogen fertiliser

The Regulations require you to follow the following four steps when planning how much nitrogen fertiliser to apply to your crops (including grass).

**YOU MUST** plan all applications of nitrogen from organic manures and manufactured fertilisers to each crop in each field. The plan **MUST** show that you have followed the following four steps:

- Step 1** Calculated the amount of nitrogen in the soil that is likely to be available for uptake by the crop during the growing season (the soil nitrogen supply);
- Step 2** Calculated the optimum amount of nitrogen that should be applied to the crop, taking into account the soil nitrogen supply (the crop nitrogen requirement);
- Step 3** Calculated the amount of nitrogen, from any planned applications of organic manure, that is likely to be available for crop uptake in the growing season in which it is spread (the crop available nitrogen); and
- Step 4** Calculated the amount of manufactured fertiliser required.

### ***Compliance guidance***

The year for applying fertiliser to permanent grassland begins on 1 January. You must complete steps 1 and 2, and prepare a plan for the spreading of any nitrogen fertiliser for that growing season, before you apply any nitrogen fertiliser (whether manufactured or organic) to permanent grassland after this date.

For any other crop (inc. temporary grass) you must complete steps 1 and 2, and prepare a plan for the spreading of any nitrogen fertiliser for that growing season, before you apply any nitrogen fertiliser (whether manufactured or organic) for the first time to the crop or to a field intended to be planted.

You must also undertake steps 3 and 4 before each occasion you spread fertiliser.

Step-by-step guidance on producing your plan is in Annex 1.

When planning your applications you must take into account other rules in the Regulations that may restrict how much nitrogen you can apply to the crop and when you apply it. These are:

- An upper limit on the amount of nitrogen from organic manure and manufactured fertiliser that can be applied to the major crops. Note that these now include horticultural crops as from January 2014. (See Chapter 7 – the N max limit),
- a limit of 250 kg/ha of total N from all organic manures that are applied to land in any 12 month period, (see Chapter 8 – the organic manure N field limit),
- a limit of 170 kg/ha in any calendar year of the amount of nitrogen in livestock manure that is applied to your farm (see Chapter 6), and
- restrictions on the timing and rates of nitrogen applications (see Chapters 8 and 9).

### ***Good practice guidance***

If you need to, you should modify your plan during the growing season. Whilst the Regulations only require you to produce a plan at the start of each year for permanent grass, we recommend that you plan for each grass growth period (cutting or grazing). This is one of the reasons why steps 3 and 4 should be carried out in-year.

Whilst the Regulations only require you to plan your applications of nitrogen, we recommend that you carry out a similar planning activity for applications of other nutrients. Industry guidance is available to help.

## **2. Keeping field and crop records**

Parts 4 and 8 of the Regulations require you to keep a number of records for each crop grown in each field.

For each crop in each field, YOU MUST keep the following records:

- your four step plan (as described above and in Annex 1);
- details of the actual applications of manufactured fertiliser and organic manure;
- details of the crop grown, including the date of sowing; and
- a copy of any advice received from a FACTS-qualified adviser.

YOU MUST keep all records for at least 5 years.

### **NEW RULE**

If you are a low intensity farmer, you do not have to keep a record of your actual applications of manufactured fertiliser and organic manure to crops in each field.

### **Compliance guidance**

You may already regularly produce a plan for nitrogen applications on your farm, and you may already keep records of your applications of organic manure and manufactured fertiliser. If so, these records may be sufficient provided they follow the four steps and contain the relevant information required by the Regulations (see Annex 1).

Alternatively, you could use the template provided at the end of this guidance (Annex 1), or the PLANET software<sup>4</sup>, Tried & Tested or other suitable system of your choice.

### **3. Low intensity farming**

You are a low intensity farmer if:

- a) at least 80% of your land is grassland; and
- b) no more than 100 kg N/ha per year is applied as organic manure (including any N in manure applied directly to the field by animals; and
- c) you spread no more than 90 kg N/ha per year as manufactured fertiliser; and
- d) you do not bring any organic manure onto your holding.

If you choose to take advantage of this rule, (fertiliser records per field) you will need to record sufficient information to show that you comply with the above low intensity farmer criteria.

When calculating your fertiliser application rate you must exclude any area of your farm where you do not spread any fertiliser or work the soil (eg rough grazing) as described in Chapter 6.

You must keep all records for at least five years.

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<sup>4</sup> [www.planet4farmers.co.uk/](http://www.planet4farmers.co.uk/)

# Chapter 6: The livestock manure nitrogen farm limit

## Part A: applies to all farmers

Part 3 of the Regulations limit the amount of livestock manure that can be applied to your land each year, whether this is by spreading or directly by grazing animals.

This chapter tells you what the rules are, how to calculate how much N you are applying in livestock manure, and what records you need to keep. It also explains the grassland derogation rules which allow grassland farmers to spread more manure. This is subject to transitional periods for those with land newly in the NVZs (see table 2).

### 1. The livestock manure N farm limit

YOU MUST ensure that, in any calendar year (i.e. a year beginning 1<sup>st</sup> January), the amount of nitrogen in livestock manure that is applied to your farm (whether directly by grazing animals or by spreading) does not exceed 170 kg per hectare. This is the 'loading limit'. This figure is averaged over the farm.

However, if you have been granted a grassland derogation (see Part B) the 'loading limit' may be increased to 250 kg per hectare.

#### **Compliance guidance**

These 'loading limits' only apply to livestock manure. These 'loading limits' are separate from the limit of 250 kg total nitrogen in organic manure applying to what can be spread over any given hectare (see Chapter 8). The nitrogen from manufactured or other organic sources that does not originate from livestock does not count towards the loading limit. The limit is calculated as an average over your holding. In other words, you may apply livestock manure at a rate that gives a higher loading than the 170 kg N/ha limit to some fields provided that on other fields the loading is low enough to ensure the average across the holding is 170 kg N/ha or less. However, you must never exceed 250 kg N/ha (from all sources of organic manure) on any individual field, regardless of whether you hold a derogation or not (see Chapter 8, section 6).

If part of your farm is outside an NVZ, you will still need to ensure that the average loading for the part of your farm in the NVZ is no more than 170 kg N/ha. You will

also need to carry out the necessary calculations and keep records for this part of your farm.

For the purposes of the grassland derogation, the 250 kg N/ha limit only applies for 'grazing livestock', which includes cattle (except veal calves), sheep, deer, goats and horses. It does not include pigs and poultry.

If part of your farm is outside an NVZ, you will still need to ensure that the average loading for the part of your farm in the NVZ is no more than 170 kg N/ha, or 250 kg N/ha if you hold a derogation. You will also need to carry out the necessary calculations and keep records for this part of your farm.

## 2. Calculating your compliance

YOU MUST calculate compliance with the livestock manure N farm limit applicable to your farm.

- On farms where the 170 kg N/ha limit applies (those without a grassland derogation) this must be done for each calendar year by 30 April of the following year.

### ***Compliance guidance***

Annex 2 Part A gives you a step-by-step guide to calculating compliance with the livestock manure N farm limit.

Alternatively you can use the PLANET software. This will be accepted as a valid record of your calculation. Other methods and software may also be acceptable.

You will need to update your calculations if circumstances change on your farm.

### ***Good practice guidance***

It is recommended you plan for the year ahead. If you only do the calculation at the end of the year you may find you have breached the limit and cannot take any remedial action.

## 3. Record keeping

Your compliance will be assessed by checking that you have correctly calculated the amount of nitrogen produced by your livestock and by inspecting your annual records of livestock numbers, imports/exports of livestock manure. The Regulations therefore require you keep the following records.

By 30<sup>th</sup> April each year YOU MUST record the following information for the previous calendar year:

- the numbers of livestock kept on your farm;
- your calculation of the amount of nitrogen produced by these animals;
- a copy of your sampling and analysis and/or ENCASH results;
- any imports or exports of livestock manure; and
- the area of your farm.

YOU MUST keep all records for at least five years.

### ***Compliance guidance***

#### **Records of livestock numbers kept on your farm during the previous calendar year**

Your records must identify how many of your livestock fall within each category specified in Tables 30 to 33 of Annex 6. Therefore you will need to keep details of their gender, age and/or weight. You will also need to record how long these animals were kept on your farm during the previous calendar year. You do not need to keep records of other types of animals.

#### **Your calculation of the amount of nitrogen produced by these animals**

If you complete Step 3 in the template provided in Annex 2, Part B, or use the PLANET software, this will be accepted as a valid record of your calculation.

#### **Records of imports/exports of livestock manure**

If you bring livestock manure onto your farm, or send it off, you will need to keep the following records:

- the type and amount of livestock manure;
- the total nitrogen content of that manure, either from standard figures (Table 35) or sampling and analysis;
- the date it was brought onto/sent off your farm; and
- the name and address of the supplier/recipient.

You will also need to keep details of a contingency plan to be used if an agreement to send the manure off your farm fails.

#### **Area of your farm**

When calculating the area of your farm (land you occupy) at your disposal:-

include:

- rented land that is under your control during the year
- rough grazing
- land under management agreements
- an appropriate proportion of any common land you use.

exclude:

- surface waters
- hardstandings, buildings and roads
- woodland, unless that woodland is used for grazing.

As with all records required by the Regulations, you must keep these records for a minimum of 5 years.

***Good practice guidance***

The records described above are almost identical to those required for the minimum manure storage capacity requirements (Chapter 10), although they relate to a different period of the year. You should be able to keep one set of records to meet the record keeping requirements of both sets of rules.

The annual records of livestock numbers, and of imports and exports of livestock manure, can be kept using any existing written or computer-based record-keeping system that you may have in place provided it is adapted to contain the relevant information required by the Regulations.

**If you do not have a grassland derogation you can go direct to Chapter 7**



## Part B: Applies to farmers with a grassland derogation

### 1. The derogated livestock manure N farm limit

If you meet certain criteria, and agree to comply with some additional land management conditions designed to help you manage your nitrate and phosphate use as effectively as possible and minimise the risk of pollution, you can apply for a derogation. If you are granted a derogation, and you meet the conditions contained in this chapter, you will be able to apply up to 250 kg manure nitrogen (N) from grazing livestock per hectare per year on your farm. You will need to apply for the derogation annually, in the autumn before the year when you want to make use of it.

### 2. Eligibility

To be eligible for a derogation YOU MUST

- ensure that at least 80% of the agricultural area of your farm is grass
- be able to show that you expect to be able to comply with the 250 kg N/ha limit from grazing livestock and 170 kg N/ha from non-grazing livestock,
- make your application between the permitted dates.

#### ***Compliance guidance***

You can apply for a derogation online via the GOV.UK website ([www.gov.uk/nvz-derogation-application](http://www.gov.uk/nvz-derogation-application)).

We may also offer other means of application. If we do, information on them will be published each year.

Guidance on the information you need to support your application is provided at Annex 2 Part B. Annex 2 Part D also provides a step-by-step guide to calculate the figures needed prior to applying.

If you are granted a derogation but do not meet all of the relevant conditions during the year the derogation covers, you may be ineligible for a derogation in the following year or you may have your derogation withdrawn in the current year. If this were to happen, the 170 kg N/ha limit would apply to your farm.

### 3. Land Management Conditions

If you are granted a derogation YOU MUST ensure that, in the calendar year beginning 1 January:

- the total amount of nitrogen in livestock manure from grazing livestock that you apply on your farm, whether directly by grazing animals or by spreading, does not exceed 250 kg N/ha/yr; and
- the total amount of nitrogen in livestock manure from non-grazing livestock (veal calves, pigs and poultry) that is applied to your farm does not exceed 170 kg N/ha/yr;

(These limits are not additive. That is, if 250 kg N in manure from grazing livestock is applied to a hectare on your farm, you cannot apply a further 170 kg N in manure from non-grazing livestock to that same hectare.)

- at least 80% of the agricultural area of your farm is grass throughout the year of the derogation;
- you prepare a nitrogen and phosphate application plan for each field;
- if you plough up grassland, you plant a crop with a high nitrogen demand immediately afterwards (eg grass, potatoes, sugar beet maize, wheat, oilseed rape, barley, brassicas, rye and triticale);
- you do not plough up temporary grassland on sandy soils between 1 July and 31 December;
- you do not plough up any area of grass before 16 January if you have spread livestock manure to that area between the following dates:

Sandy or shallow soils	1 Sept to 31 Dec
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All other soils	15 Oct to 15 Jan
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- you do not include leguminous or other atmospheric nitrogen-fixing plants in the crop rotation (except grass with less than 50% clover or legumes under sown with grass).

#### ***Good practice guidance***

If at all possible, avoid ploughing permanent grassland.

If you decide to plough any grass, you should do this in the spring rather than autumn (on sandy soils you must not plough grass between 1 Sept and 31 Dec – see box above).

The list of crops to follow ploughed grass is not exhaustive. If you wish to grow a crop that is not listed above, you may still be able to grow this crop if you can demonstrate to the Environment Agency that it has a high nitrogen requirement.

#### 4. Planning fertiliser applications

You are already required to plan your nitrogen fertiliser applications. If you have a derogation, you also need to plan your phosphate fertiliser use.

**YOU MUST** plan your applications of nitrogen and phosphate fertiliser to each crop in each field before any nitrogen or phosphate fertiliser is applied. The plan **MUST** show that you have undertaken the following four steps:

- Step 1** Calculated the amount of nitrogen and phosphorus in the soil that is likely to be available for crop uptake during the growing season. **YOU MUST** carry out sampling and analysis for soil phosphorus (P) at least once every four years;
- Step 2** Calculated the optimum amount of nitrogen and phosphate that should be applied to the crop, taking into account the supply of these nutrients from the soil;
- Step 3** Calculated the amount of nitrogen and phosphate, from any planned applications of organic manure, that is likely to be available for crop uptake in the growing season in which it is spread; and
- Step 4** Calculated the amount of manufactured nitrogen and phosphate fertiliser required.

#### ***Compliance guidance***

The year for applying fertiliser to permanent grassland begins on 1 January. You must complete steps 1 and 2, and prepare a plan for the spreading of any nitrogen or phosphate fertiliser for that growing season, before you apply any nitrogen fertiliser (whether manufactured or organic) to permanent grassland after this date.

For any other crop (inc. temporary grass) you must complete steps 1 and 2, and prepare a plan for the spreading of any nitrogen or phosphate fertiliser for that growing season, before you apply any nitrogen or phosphate fertiliser (whether manufactured or organic) for the first time to the crop or to a field intended to be planted.

You must also undertake steps 3 and 4 before each occasion you spread fertiliser.

#### 5. Record-keeping

There are additional record-keeping requirements if you have a grassland derogation.

By 1 March of each derogated year, in addition to the records set out elsewhere in this guidance, YOU MUST have the following information about your farm available:

- the agricultural area of your farm, and the area of grassland for that calendar year;
- a map of your farm showing each field, corresponding to the recorded agricultural area of your farm, and having a reference number/name for each field;
- A description of the livestock housing and manure storage systems in place on your farm, including the volume of the manure storage available;
- The expected numbers and type of livestock to be kept on your farm during the calendar year and an estimate of the manure nitrogen and phosphate that these animals will produce; and
- The amount and type of livestock manure that you intend to import or export during the year and an estimate of the amount of nitrogen contained in the manure.

Before applying fertiliser to a crop for the first time, YOU MUST record the results of steps 1 and 2 of the planning process above.

Before each application of fertiliser, YOU MUST record the results of steps 3 and 4 of the planning process above.

Within a week of doing it, YOU MUST record details of:

- your actual applications of nitrogen and phosphate fertiliser (manufactured or organic);
- each crop you have sown, and the date of ploughing up grass (if relevant).

By 30 April in the year following a derogation, YOU MUST record the following information for the previous calendar year and submit it to the Environment Agency in the format specified by them. The format will include the need for records for each field (see annex 2, Part C) and sampling results. The legislation requires the following:

- the numbers and category of animals kept on your derogated holding during the calendar year;
- your calculation of the amount of nitrogen and phosphate produced by these animals;
- the amount and type of any imports or exports of livestock manure, and the nitrogen and phosphate content of that manure;
- the weight (tonnes) and nitrogen content of manufactured fertiliser brought onto and off the farm;
- the agricultural area of your farm and the areas covered by the following crops: winter wheat, spring wheat, winter barley, spring barley, winter oilseed rape, sugar beet, potatoes, forage maize, grass and other crops; and
- a summary of stocks and purchases of manufactured nitrogen fertilisers (see Annex 2 Part E).

### **Compliance guidance**

#### **Records of livestock numbers kept on your farm during the previous calendar year**

Your records must identify how many of your livestock fall within each category specified in Tables 30 to 33 of Annex 6. Therefore you will probably need to keep details of their sex, age and/or weight. You will also need to record how long these animals were kept on your farm during the previous calendar year. You do not need to keep records of other types of animals. The derogation process was delayed in 2013 and the 1 March date referred to above is 30<sup>th</sup> June for the calendar year 2013 only.

#### **Records of imports/exports of livestock manure**

If you bring livestock manure onto your farm, or send it off, you will need to keep the following records:

- the type and amount of livestock manure;
- the total nitrogen content of that manure, either from standard figures (Table 35, Annex 6) or sampling and analysis;
- the date it was brought onto/sent off your farm; and
- the name and address of the supplier/recipient.

You will also need to keep details of a contingency plan to be used if you are unable to send the manure off your farm.

You must keep all records for at least 5 years.

## Chapter 7: The N max limit

Part 4 of the Regulations contain a number of rules limiting the amount of nitrogen that can be applied to specified crops. This chapter tells you what the rules are, how to calculate compliance, and what records you need to keep. This is subject to transitional periods for those with land newly in the NVZs (see table 2).

### 1. The N max limit

YOU MUST ensure the average nitrogen application rate (from manufactured fertiliser and crop-available nitrogen from any organic manure) to the following crops does not exceed the N max limit for that crop type (See Table 4):

- winter wheat, spring wheat, winter barley, spring barley, winter oilseed rape, sugar beet, potatoes, forage maize, field beans, peas and grass

#### NEW RULE

Recent changes introduced N max limits for most horticultural crops (see Table 4). From 1 January 2014 YOU MUST also comply with the N max values for the following crop groups:

- Group 1: asparagus, carrots, radishes, swedes
- Group 2: courgettes, dwarf beans, lettuce, onions, parsnips, runner beans, sweetcorn, turnips
- Group 3: beetroot, Brussels sprouts, cabbage, calabrese, cauliflower, leeks.

#### **Compliance guidance**

The N max limit applies to the average nitrogen application rate for that crop type across your farm. In other words, you may apply fertilisers at a rate higher than N max to some fields provided that on other fields of the same crop the loading is low enough to ensure the average is at or below the N max limit.

For horticultural crops you must ensure that the nitrogen application rate to crops in each group, averaged across all crops from that group that you are growing does not exceed the N max value for the group.

The N max limits for these crops and groups are provided in Table 4. The limit applies to the growing season for each crop sown, so where you grow two or more crops in a single year, the limit applies separately to each crop.

#### **Good practice guidance**

In the majority of cases, if you follow your nitrogen fertiliser plan (Chapter 5) you should be applying considerably less than the N max limits.

The N max limits include the vast majority (by area) of crops grown in England. Nevertheless, you will need to plan the applications of nitrogen to other crops and must balance nitrogen inputs from all sources with the foreseeable nitrogen requirements of the crop (see Chapter 5).

<b>Table 4: The N max limits</b>		
Crop	N max limit (kg N/ha)	Standard crop yield (t/ha)
Wheat, autumn or early winter sown	220 (notes b, c, d)	8
Wheat, spring sown	180 (notes c, d)	7
Barley, winter	180 (notes b, c)	6.5
Barley, spring	150 (note c)	5.5
Oilseed rape, winter	250 (note e)	3.5
Sugar beet	120	n/a
Potatoes	270	n/a
Forage maize	150	n/a
Field beans	0	n/a
Peas	0	n/a
Grass	300 (note f)	n/a
<b>Group 1</b>		
Asparagus, carrots, radishes, swedes	180	n/a
<b>Group 2</b>		
Celery, courgettes, dwarf beans, lettuce, onions, parsnips, runner beans, sweetcorn, turnips	280	n/a
<b>Group 3</b>		
Beetroot, brussels sprouts, cabbage, calabrese, cauliflower, leeks	370	n/a

### Notes

- An additional 80 kg N/ha is permitted to all crops grown in fields where the previous or current crop received an application of straw for mulching or paper sludge.
- An additional 20 kg N/ha is permitted on fields with a shallow soil type (not shallow soils over sandstone)
- An additional 20 kg N/ha is permitted for every tonne that the expected yield exceeds the standard yield.

- d) An additional 40 kg N/ha is permitted to milling wheat varieties.
- e) This consists of a maximum autumn application of 30 kg N/ha (allowed as an exemption to the closed period for manufactured nitrogen fertiliser) and a maximum spring application of 220 kg N/ha. The spring application can be increased to 30 kg N/ha for every half tonne that the expected yield exceeds the standard yield.
- f) Where grass is grown to achieve a protein content of at least 16% of the dried product, nitrogen may be applied up to the level recommended by a FACTS advisor. A FACTS advisor may recommend no more than 700 kg N/ha per year if the grass is irrigated, and 500 kg N/ha per year if the grass is not irrigated. In addition, for the second and subsequent years, the FACTS advisor must be supplied with soil analyses from representative autumn soil samples (taken between 1 Sept and 31 Oct) to be incorporated into the calculation of N demand.
- g) An additional 40 kg N/ha is permitted to grass cut at least 3 times in a year.

## 2. Calculating your compliance

The Regulations set out the factors you must take into account when calculating your compliance with the N max limit.

When determining the amount of nitrogen available for crop uptake from applications of livestock manure, YOU MUST:

- First establish the total amount of nitrogen in the manure using the standard values in Table 35, Annex 6 or by sampling and analysis; and
- Then calculate the amount of crop-available nitrogen using the minimum percentages provided in Table 36, Annex 6. (i.e. this will be a percentage of the nitrogen content figures you have just arrived at above, i.e. by sampling & analysis, or by using the standard values.)

### NEW RULE

When determining the amount of nitrogen available for crop uptake from applications of other organic manure, YOU MUST:

- Establish the total amount of nitrogen and the amount of crop-available nitrogen in the manure as follows:
  - Using the manufacturer's or supplier's technical analyses;
  - If such technical analyses are not available, using the values given in the Fertiliser Manual (RB209) (in the Manual the total amount of nitrogen is referred to as "total nitrogen". It refers to crop-available nitrogen as "nitrogen available to the next crop");
  - Or in any case, if preferred, by sampling and analysis of the manure.

You MUST NOT apply organic manure to crops for which there is an N max value if you have not established the amount of crop-available nitrogen it contains using the means described above.



**Compliance guidance**

The N max limit (see table 4) applies to nitrogen from applications of manufactured fertiliser and to the crop-available nitrogen from applications of organic manure. Note that from 1 January 2014, this includes crop-available nitrogen from all organic manures, not just livestock manure.

If you import organic manure, you should rely on the supplier's or the manufacturer's information of total nitrogen and readily available nitrogen content. This must be specific to the material supplied.

You should include any crops grown on land (in an NVZ) which is rented by you and is under your control during the growing season of the crop.

You can adjust the N max limits that apply to the crops grown on your farm to take account of certain conditions in the field or your intentions for the crop (e.g. higher than standard yields, grain quality targets, shallow soil type). The notes to Table 4 describe the permitted adjustments. If you want to adjust the N max limit for a crop because you expect to achieve a higher than standard yield, we expect you to have written evidence from at least 2 previous crops to show that this is a realistic estimate of the likely crop yield.

To help with the calculation, you can use the step-by-step guide in Annex 3 or the PLANET software, which allows you to bring in the various permitted adjustments (ie, as per the Notes to Table 4 above). The Agency will accept either as a valid record of your calculation.

If your field records demonstrate that the nitrogen application rate to each field growing a particular crop type is lower than the N max limit for that crop type, then you can be confident that you have complied with the N max limit and do not need to complete the full calculation described in Annex 3.

**Good practice guidance**

It is recommended you take account of the N max limits when planning your use of nitrogen (see Chapter 5). If you only do the calculation after harvest you may find you have already exceeded the limit.

### 3. Record keeping

The Regulations require that you keep the following records:

For each crop in each field, YOU MUST record:

- details of the actual applications of organic manure and manufactured fertiliser; and
- details of the crop grown.

YOU MUST keep all records for at least five years.

A full description of the required records is provided in Annex 1. It is recommended you keep a record when you make a calculation of compliance with the N max limit.

## Chapter 8: Field application of organic manures

Part 5 and 6 of the Regulations establish rules that restrict when, where and how you can spread organic manure to land on your farm. These include livestock manures and all other nitrogen-containing organic materials such as sewage sludge, composts, food wastes, and organic wastes (treated and untreated).

The boxes in this chapter set out the rules in more detail and the following paragraphs provide further explanation. A step-by-step guide is provided in Annex 4 to help you prepare a risk map. This is subject to transitional periods for those with land newly in the NVZs (see Table 2).

### 1. Preparing a risk map for your farm

If you spread organic manure, YOU MUST produce a map of your farm which shows:

- each field and its area in hectares;
- all surface waters;
- any springs, wells or boreholes on the holding or within 50 metres of the holding boundary;
- areas with sandy or shallow soils;
- land with a slope of more than 12 degrees (1 in 5 or 20%);
- land within 10 metres of surface water and within 50 metres of a spring, well or borehole;
- land drains;
- sites suitable for temporary field heaps (if you use this method of storing manure); and
- land that has a low run-off risk (if you intend to spread to this land during the storage period for the purpose of reducing your storage capacity requirement – see Chapter 4).

YOU MUST update the risk map within three months of a change in circumstances (eg you take on more land, or you install or remove field drains).

#### ***Compliance guidance***

You may have prepared a risk map as part of your manure management plan for an Entry Level Stewardship agri-environment scheme, or a farm assurance scheme, or compliance with an environmental permit. This will be suitable provided you adapt it to include all the information listed above.

You must record the dates when sites for temporary field heaps are used. To minimise records, you could record them on your risk map.

## 2. Field inspections

Before you spread organic manures, YOU MUST inspect of conditions in the field to assess the risk of run-off to surface water, taking into account:

- the slope of the land, particularly if it is greater than 12° (equivalent to 20%, or 1 in 5);
- ground cover;
- proximity to surface water;
- weather conditions;
- soil type and condition; and
- presence of land drains.

YOU MUST NOT spread organic manure if you identify there is a significant risk of runoff getting into surface water.

### ***Good practice guidance***

You should use your risk map to help you carry out your field inspections.

## WHEN YOU MUST NOT SPREAD ANY ORGANIC MANURES

### 3. Non-spreading conditions and areas

YOU MUST NOT spread organic manure when the soil is:

- waterlogged, flooded, snow-covered, or frozen for more than 12 hours in the previous 24 hours.

YOU MUST NOT spread organic manures:

- less than 50 metres from a spring, well or borehole, or
- within 10 metres of surface water, except
  - on land managed for breeding wader birds or as species-rich semi-natural grassland and under certain circumstances (see below); or

#### **NEW RULE**

- when you are using precision manure spreading equipment to apply slurry, sewage sludge or anaerobic digestate, in which case you may spread manure 6 metres or more from surface water.

### ***Compliance guidance***

Applications are allowed on days when early morning frost thaws during that day.

If you manage land for breeding wader birds or as species-rich semi-natural grassland and the land is notified as a Site of Special Scientific Interest or is subject to an agri-environment scheme then you can spread straw-based solid manure (eg farmyard manure) within 10 metres of a surface water provided:

- it is spread between 1 June and 31 October;
- it is not spread directly into surface water; and
- the total annual amount does not exceed 12.5 tonnes per hectare.

Precision manure spreading equipment includes band spreaders (trailing hose and trailing shoe), shallow injectors (which inject the manure no deeper than 10cm below the surface of the soil) and dribble bar applicators.

Anaerobic digestion results in a stable sanitised material that can be applied to land for the benefit of agriculture or to improve the soil structure or nutrients in land. Anaerobic digestate referred to here is the product of anaerobic digestion other than from the anaerobic digestion of sewage or material in a landfill.

The application of sewage sludge must also comply with the Sludge Use in Agriculture Regulations 1989 (SI 1989/1263), as amended.

#### 4. Closed periods for organic manures with a high readily available N content

Organic manures that contain high readily available nitrogen (eg slurry, poultry manure and liquid digested sludge) present a significant risk of polluting water if spread on the land at the wrong time of the year. The Regulations therefore set a 'closed period', when those types of manure must not be spread.

**YOU MUST NOT** spread organic manures with a high readily available N content (ie more than 30% of the total N content is in a form that can be readily taken up by the crop) to land in the following periods (dates are inclusive):

	Grassland	Tillage land
Sandy or shallow soils	1 Sep to 31 Dec	1 Aug to 31 Dec
All other soils	15 Oct to 31 Jan	1 Oct to 31 Jan

#### The exceptions to this are:

- If you are in an NVZ designated for the first time in 2013, you do not have to comply with the closed periods until after July 2015.
- If a crop is sown on sandy or shallow tillage land on or before 15 September, you may apply organic manure between 1 August and 15 September inclusive.
- If you are an organic farmer, or you are formally converting to organic status, applications up to a maximum rate (150 kg N/ha) will be permitted during the closed period to:
  - winter oilseed rape – applications are permitted between the start of the closed

period and the end of October;

- asparagus; brassica; grass; overwintered salad onions; parsley; and bulb onions. Applications can be between the start of the closed period and the end of February.
- other crops on the basis of written advice from a FACTS qualified adviser

### **Compliance guidance**

The closed period does not apply to organic manures with a low readily available N content, which may include the following:

- farmyard manure (FYM);
- duck manure produced by birds on straw or wood shavings (but we will expect you to demonstrate a low level of readily available N by sampling and analysis);
- dirty water (ie very dilute run-off from lightly fouled concrete yards or from the dairy/parlour). This does not include liquids from weeping-wall stores, slurry strainer boxes, slurry separators or silage effluent which are all rich in nitrogen.

### **Good practice guidance**

As far as practically possible you should try to spread organic manure in the spring, as this is when the greatest amount of nitrogen will be taken up by the crop.

Applications during the autumn and winter will supply nitrogen to the soil that will be poorly utilised and at greater risk of leaching or runoff.

## **Constraints on when you can spread organic manures**

### **6. The organic manure N field limit**

Before you apply organic manure to a field YOU MUST decide what an appropriate application rate would be by:

- assessing the amount of crop available nitrogen likely to be supplied by the application of organic manure (see Chapter 5 and Annex 6).
- ensuring that this addition of nitrogen does not cause you to breach the N max limit (see Chapter 7).

YOU MUST NOT spread organic manures to any field at rate which would result in the total nitrogen supplied exceeding 250 kg N/ha in any rolling 12 month period.

#### **NEW RULE**

From 17 May 2013, subject to conditions, you may apply more than 250 kg N/ha in a rolling 12 month period if the only organic manure you apply to a field is compost. In this case, you may apply compost containing

- up to 500 kg N/ha every two years; you can apply the compost on any land as a mulch or work it into the soil; or

- up to 1,000 kg N/ha every four years; the compost must only be applied as a mulch, and only in an orchard (growing fruit of the genera Malus, Prunus or Pyrus).

### **Compliance guidance**

The 250 kg N/ha does not include livestock manures deposited by grazing animals.

There are areas specified in the Regulations where organic manure cannot be spread. Therefore, if you wish to ensure compliance with the 250 kg N/ha field limit by averaging your calculation over your whole holding then you should exclude any areas where organic manure cannot be spread. For example the buffer zone around surface waters (10m or 6m) and the 50 metre buffer zone around springs, wells and boreholes. Your risk map (Section 1, and see Annex 4 Part A) and Annex 4 Part B will help you identify the area of the field used to calculate your compliance with the 250 kg N/ha limit.

The new rule here enables users of compost to choose how and when to apply the allowances set out, provided that in any 2 or 4 year period, as appropriate, no more than the indicated amount is spread, eg, you could decide to apply 1,000 kg N/h to your orchard in year one and none in the following three years, or you might elect to apply 500 kg N in year one and 500 kg in year three.

### **Good practice guidance**

You can use Table 35 in Annex 6 to help you identify the application rates (in m<sup>3</sup>/ha or tonnes/ha) that supply 250 kg N/ha.

## **7. Restrictions on applications outside the closed period**

### **NEW RULE**

From the end of the closed period until the end of February, YOU MUST NOT spread more than 30 m<sup>3</sup>/ha of slurry or 8 tonnes/ha of poultry manure in a single application. (The poultry manure limit remains the same but the slurry limit has been reduced from 50 m<sup>3</sup> to 30 m<sup>3</sup>).

YOU MUST allow at least 3 weeks between each individual application.

**BUT** If you are in an NVZ designated for the first time in 2013, you do not have to comply with this rule until January/February 2016, depending on your soil type.

## 8. Slurry spreading equipment

If it is safe to spread organic manure, you will need to check before actually making the application that you are able to do so in the correct manner (see Section 9).

YOU MUST spread organic manure in as accurate a manner as possible, whatever equipment you use.

YOU MUST only spread slurry using equipment that has a low spreading trajectory (ie below 4 metres from the ground), unless you are using equipment that spreads slurry at an average rate of not more than 0.2mm per hour when operating continuously.

### **Compliance guidance**

Application equipment should be capable of producing a reasonably uniform spread pattern.

## 9. Spreading organic manure to bare soil and stubble

If you apply organic manure on bare soil or stubble (other than soil that has been sown), YOU MUST:

- incorporate poultry manure into the soil as soon as practicable, and within 24 hours at the latest.
- incorporate slurry and liquid digested sludge into the soil as soon as practicable, and within 24 hours at the latest unless it is applied by a trailing hose band spreader or a trailing shoe band spreader, or

### **NEW RULE injected into the soil**

- incorporate any other organic manure (eg farmyard manure) into the soil as soon as practicable, and within 24 hours (unless it has been spread as a mulch on sandy soil) if the land is sloping and within 50 metres of surface water that could receive run-off from that land.

### **Compliance guidance**

You can incorporate organic manures using any technique that mixes or buries the manure into the soil (eg by disc, tine, plough).

## 10. Record keeping

Your compliance with the rules described in this chapter will be checked by a physical inspection of the fields on your farm and by looking at your records.

YOU MUST keep the following records:

- A copy of your risk map.
- A record of all organic manure field applications (unless you are a low intensity



farmer, see Chapter 5, Section 2).

- A record of any written advice from a FACTS-qualified adviser.

### ***Compliance guidance***

For a full description of the field records that you must keep relating to applications of organic manure, please refer to Annex 1. As with all records required by the Regulations, you must keep the above for a minimum of five years.

## Chapter 9: Field application of manufactured nitrogen fertilisers and other nitrogen containing materials

As for organic manures, the Regulations (Part 6) establish rules that restrict when, where and how you can spread manufactured nitrogen fertilisers to land on your farm. This is subject to transitional periods for those with land newly in the NVZs (see table 2).

It is important to note that the rules described in this Chapter apply, where indicated, to both manufactured nitrogen fertilisers and other nitrogen-containing materials (this does not include organic manure, but includes other materials which contain nitrogen).

You must also make sure, before you apply any manufactured nitrogen fertiliser to a field, that you comply with the rules concerning Planning Nitrogen Use (see Chapter 5) and the N max limit (see Chapter 7).

### 1. Closed periods

The Regulations establish a 'closed period' that prohibits the spreading of manufactured fertiliser to land at times of the year when there is a high risk of nitrogen loss.

**YOU MUST NOT** spread manufactured nitrogen fertiliser between the following dates:

Grassland	Tillage land
15 September to 15 January	1 September to 15 January

Applications during the closed period will be permitted to the following crops up to a maximum permitted rate (see Table 34 in Annex 6, Part A):

- winter oilseed rape; asparagus; brassica; grass; overwintered salad onions; parsley; and bulb onions.

Applications to other crops during the closed period are permitted if you have written advice from a FACTS-qualified adviser.

**Compliance guidance**

If you apply manufactured nitrogen fertiliser during the closed period you should make sure that its use was identified as necessary in your 4-step plan of nitrogen use (see Chapter 5) i.e., after allowing for your planned organic fertiliser use.

**2. Field inspections**

YOU MUST make an inspection of conditions in the field to assess the risk of run-off to surface water before you spread manufactured fertiliser or other nitrogen-containing materials. YOU MUST take into account:

- the slope of the land, particularly if it is greater than 12 degrees (1 in 5);
- the ground cover;
- the proximity to surface water;
- the weather conditions;
- the soil type and condition;
- the presence of land drains.

YOU MUST NOT spread manufactured fertiliser or other nitrogen containing materials if you identify there is a significant risk of runoff getting into surface water.

**Good practice guidance**

Run-off can occur across the surface of the soil or through drains, and the risk of run-off increases with slope and the length of the drain.

**3. Non-spreading conditions and areas**

YOU MUST NOT apply manufactured fertiliser or other nitrogen containing materials if the soil is:

- waterlogged;
- flooded;
- snow covered; or
- frozen for more than 12 hours in the previous 24 hours.

YOU MUST NOT spread manufactured fertiliser within 2 metres of a surface water.

**Compliance guidance**

You should not make applications if heavy rain is falling or is forecast to fall within the next 48 hours. Normal common-sense definitions of waterlogged, flooded and snow covered will apply. Application is allowed on days when early morning frost thaws during that day.

Surface waters include lakes, ponds, rivers, streams and ditches which contain free water, and also temporary dry ditches and blind ditches. The 2 metre non-spreading distance is the minimum distance but greater distances may be required depending on slope and the risk of causing pollution. Your field inspection will help you.

#### **4. Fertiliser spreading**

If it is safe to spread, you will need to check before actually making the application that you are able to do so in the correct manner.

You **MUST** spread manufactured fertiliser and other nitrogen-containing materials in as accurate a way as possible.

#### ***Good practice guidance***

You should regularly check, calibrate and adjust each fertiliser spreader you use, following the manufacturer's instructions. You should use only manufactured fertiliser that has physical characteristics and quality that will allow you to spread it accurately.

## Chapter 10: Storing organic manures

Part 7 of the Regulations set rules about how you must store organic manures on your farm. There are transitional periods for those with land newly in the NVZs (see table 2). This chapter tells you how different manures can be stored on your farm, and about the required capacity and construction of your manure storage infrastructure. It also tells you what records you need to keep.

If you keep livestock on your farm, and they deposit excreta whilst in a yard or building, you will probably need to collect and store the manure before spreading it on your land or sending it off your farm ('exporting' it).

You may also produce other types of organic manure (eg composts, solids mechanically separated from slurry) or import organic manure (eg livestock manure from another farm, biosolids from a water company). This may also need to be stored before it can be spread or exported.

### 1. Storage capacity and type

The Regulations set the minimum storage capacity you must have for your slurry and poultry manure.

**YOU MUST** have sufficient facilities to store all slurry produced on the holding, and all poultry manure produced in a yard or building, during the following 'storage periods':

- 1 October to 1 April (six months) in the case of pigs and poultry.
- 1 October to 1 March (five months) in the case of other livestock.

If you have any slurry on your farm **YOU MUST** store it in a tank, lagoon or other suitable facility. (These requirements are set out in the Water Resources (Control of Pollution) (Silage, Slurry and Agricultural Fuel Oil) (England) Regulations 2010 – see further details under "Construction standards for manure stores", below.)

Slurry stores **MUST** have the capacity to store, in addition to the slurry:

- average rainfall expected to enter the store during the storage period; and
- any wash water or other liquids that enter the store during that period.

If you have poultry manure or other types of solid manure **YOU MUST** store them:

- in a vessel;
- on an impermeable base, with appropriate collection and containment of runoff;
- in a roofed building; or
- in an appropriately located temporary field heap.

**Compliance guidance**

You will need to calculate how much storage you need to comply with the above rules. Annex 5, Part A gives you step-by-step guidance on how to do this for slurry storage, and Annex 5, Part B for poultry manure storage. They also provide information on computer software (PLANET) that will do the calculations for you. You may also wish to seek professional advice.

Average rainfall for each month for 1981 to 2010 is available from the Met Office website [www.metoffice.gov.uk/climate/uk/averages/19812010/index.html](http://www.metoffice.gov.uk/climate/uk/averages/19812010/index.html)

If in the future you increase the number or type of livestock on your farm, you will need to re-calculate the storage volume, and may need to increase your capacity or find ways to reduce your storage needs. Similarly, any increase in unroofed yard areas will increase your slurry volume.

**Good practice guidance**

Some rainfall data is available free of charge. You can also buy data that is more specific to your farm. You are strongly advised to buy the more accurate data as the cost will be very small in relation to the overall cost of a new store.

The Regulations set a minimum storage capacity for stores. When you do the calculation, you should consider whether this legal minimum is sufficient for your business, taking into account your farming system, crop rotation, local soil and climate conditions and any operational considerations that may affect manure production and use, such as your intention to spread slurry on low run-off risk land. Low run-off risk land is land with an average slope of less than 3 degrees, does not have land drains, and is at least 50 metres from a watercourse or conduit leading to a watercourse.

When checking compliance with this rule, you should consider whether you intend to increase the number of livestock in the future, as it may be cheaper to buy the final volume needed in one go.

If you need to construct additional facilities you are likely to need planning permission.

**2. Construction standards for manure stores**

The Water Resources (Control of Pollution) (Silage, Slurry and Agricultural Fuel Oil) (England) Regulations (usually referred to as the “SSAFO Regulations”) set down construction standards for all manure storage facilities in England. (These requirements apply whether or not the farm is in an NVZ.)

If you build a new facility for storing organic manure (ie slurry stores or impermeable bases for solid manure) and/or if you substantially reconstruct or enlarge your existing facilities, YOU MUST:

- comply with standards set down in the SSAFO Regulations, and

#### **NEW RULE**

- notify the Environment Agency in writing about your intention to build a new store, or substantially enlarge or reconstruct an existing store at least 14 days before you start construction or reconstruction works.

### **3. Temporary storage of solid manures in field heaps**

You may store some types of solid manure in temporary field heaps. This option applies to poultry manures and other organic manures if:

- they are solid enough to be stacked in a free-standing heap, and
- they do not give rise to free drainage from within the stacked material.

If you choose to store manure in temporary field heaps, you need to comply with the following rules.

#### **YOU MUST**

- cover any poultry manure without bedding/litter which is stored in a field heap with an impermeable sheet.

YOU MUST ensure you do not build your field heap:

- within 10m of surface water (including ditches) or of a land drain,
- within 50m of a spring, well or borehole,
- on land likely to become waterlogged, or
- on land likely to flood.

YOU MUST also

- move any field heap at least every twelve months,
- leave a 2 year gap before returning to the same site, and
- keep a record of the sites used for field heaps, and the dates of use.

#### ***Compliance guidance***

Not all farms will have land that meets these requirements.

You will need to make alternative arrangements for storing organic manures that are too wet to be stored in a field heap (eg storage in a building or on an impermeable base). Any drainage fluid is classed as slurry and must be collected and stored. It will also be subject to the relevant closed period rules (see Chapter 8). However, it

may be possible to transfer these materials to a temporary field heap once sufficient drainage has occurred and they have become more solid.

#### NEW RULE - Effective from 16 May 2014

From 16 May 2014 YOU MUST:

- not build or maintain a field heap within 30m of surface water (including ditches) if the land slopes steeply (12 degrees (1 in 5, or 20%) or greater)
- make your field heap as compact as reasonably possible, ie, taking up as small a surface area as practically required to avoid the heap collapsing. We would not consider a heap that was well built (i.e. as compact as reasonably possible) and which had lost height/volume over time as a result of the natural composting process to be in breach of this rule.

**Note** Defra is currently considering revising this second rule so that it reflects that some heaps made using a tipper trailer, for example, would be expected to be less compact than one made using a front loader on a tractor with some unevenness in the height and width. In addition, the shape of the available site may affect the shape of the heap: a heap constructed along the edge of a field may not be as compact as one built where there was more room to make it round. This guidance will be updated to reflect relevant amendments.

#### **Good practice**

You should identify the location of temporary field heaps on your risk map.

#### **4. Record keeping**

Your compliance with the rules described in this Chapter may be checked by an examination of your records and by physically inspecting the storage facilities in place on your farm.

#### **Calculations**

YOU MUST record:

- the actual capacity of the storage facilities present on your farm. Any changes to the recorded capacity MUST be updated within one week.
- your calculation of the volume of manure that will be produced by the anticipated number of livestock kept in a yard or building during the five/six month storage period.
- your calculation of the amount of storage you need on your farm to comply with the five/six month storage capacity requirement.

If you introduce livestock onto your farm for the first time, YOU MUST complete the two calculations above within one month.



## Annual Records

By 30 April each year YOU MUST have a record of:

- the numbers of livestock kept on your farm during the previous storage period,
- any imports or exports of poultry manure or slurry during the previous storage period, and
- the dates and locations of any field sites used for storing solid manure.

YOU MUST keep these records for at least 5 years.

### **Compliance guidance**

If you complete the step-by-step guide provided at Annex 5, or use the PLANET software, this will be accepted this as a valid record of your calculations. When calculating the capacity of lagoons, you must take care to account for the sloping sides otherwise you may significantly overestimate their size.

### **Records of livestock numbers kept on your farm during the previous storage period**

Your records must identify the numbers of livestock on your farm that fall within the categories listed in Annex 6, Part A. Therefore, you will probably need to keep details of their sex, age and/or weight. You will also need to know how long these animals were on your farm during the previous storage period and how long they were kept in a building or on a yard. You do not need to keep records of animals that do not fall within the categories listed in Annex 6.

### **Records of imports/exports of slurry or poultry manure during the previous storage period**

If you bring slurry or poultry manure on to your farm (imports), or transport it off (exports), you need to record:

- the type and amount of livestock manure,
- the date you imported or exported it, and
- the name and address of the supplier or recipient, as appropriate.

You will also need to keep details of a contingency plan to be used if an agreement to send manure off your farm fails.

### **The dates and location of any field heaps used for storing solid manure**

You should record the dates and locations of any temporary field heaps on your risk map (see Annex 4).

# Annex 1

## Part A: Guide for producing the Fertilisation Plan and subsequent record keeping

You must produce a **plan** for each crop grown in each field, and make a number of **subsequent records**. A template for your plan and subsequent records is provided in Part B of this annex. In practice, you may already have compliant records through using one of the farm management software packages that are available, such as PLANET.

This guide provides further information on:

- how to carry out each of the 4 'planning' steps;
- when each of the 'planning' steps must be completed and what information needs to be recorded; and
- the subsequent records that must be kept.

General	
<b>RECORD</b>	<ol style="list-style-type: none"> <li>1. Before you apply any nitrogen fertiliser, record the reference or name of each field that you have planted or intend to plant, and its area.</li> <li>2. Within a week of planting a crop, record the crop type and date you planted it (if appropriate).</li> <li>3. By 30 April each year, how you managed your grass in the previous year (cut it or grazed it).</li> <li>4. Within a week of finding it out, record the yield of any arable crop.</li> </ol>

**Step 1: Assess soil nitrogen supply (SNS)**

<b>PLAN &amp; RECORD</b>	<b>Methods of assessment</b>
	You can assess SNS using an Index value based on information about the soil type, previous cropping, previous manure and fertiliser use and winter rainfall. Alternatively, we recommend you use soil sampling and analysis if you expect to have high or uncertain amounts of soil nitrogen. Analysis must include an estimate of the amount of nitrogen that is likely to be available for crop uptake due to the mineralisation of soil organic matter and from previous crop residues.
	<b>Timing</b>
	Assess SNS before applying any nitrogen fertiliser. We recommend you review this initial assessment before each application of nitrogen fertiliser and update it if necessary.
	<b>Record the following information</b>
	<ul style="list-style-type: none"> <li>• Soil type;</li> <li>• Previous crop;</li> <li>• If the previous crop was grass, how it was managed – cut or grazed;</li> <li>• Amount of nitrogen from the soil that is likely to become available for uptake by the crop during the growing season (SNS); and</li> <li>• Method used to ascertain SNS.</li> </ul>

**Step 2: Assess crop nitrogen requirement**

<b>PLAN &amp; RECORD</b>	<b>Methods of assessment</b>
	Several sources of information will help you assess crop nitrogen requirement, including FACTS-qualified advisers, PLANET software and the Fertiliser Manual ( <a href="#">RB209</a> ).
	<b>Timing</b>
	Make an initial assessment of the crop nitrogen requirement for the whole growing season before applying any nitrogen fertiliser. It is recommended you review this initial assessment before each application of nitrogen fertiliser and update if necessary.
	<b>Record the following information</b>
	<ul style="list-style-type: none"> <li>• Crop type;</li> <li>• If it is an arable crop, the anticipated yield,</li> <li>• If it is grass, the intended management – cut or grazed,</li> <li>• Anticipated month the crop will be planted (not necessary if previous crop is grass and it has not been ploughed out),</li> <li>• Crop nitrogen requirement taking account of SNS, and</li> <li>• A copy of any advice from a FACTS-qualified adviser.</li> </ul>

**Step 3: Assess organic manure applications, crop available nitrogen**

<b>PLAN &amp; RECORD</b>	<b>Methods of assessment</b>
	<p>You can use typical values for the total N content of the manure and the percentage of this nitrogen that is expected to become available for crop uptake. These typical values can be obtained from a number of sources, including MANNER software and the Fertiliser Manual (<a href="#">RB209</a>).</p> <p>Alternatively, you may use the results from sampling and analysis of the manure.</p> <p>For both methods you will need to take account of the type of organic manure, the date, rate and method of application and the soil type.</p>
	<b>Timing</b>
	<p>Make the assessment before each application of organic manure. This includes applications following harvest of the previous crop but before the next crop is sown or planted.</p>
	<b>Record the following information</b>
	<ul style="list-style-type: none"> <li>• Area (including location) to which the organic manure will be applied,</li> <li>• Quantity of organic manure to be applied,</li> <li>• Planned date of application (month),</li> <li>• Type of organic manure,</li> <li>• Total N content of the organic manure, and</li> <li>• Amount of nitrogen that is likely to become available for crop uptake in the growing season in which the organic manure is applied.</li> </ul>
<b>RECORD</b>	<p><u>Within one week</u> of each application, you must record</p>
	<ul style="list-style-type: none"> <li>• Date of application,</li> <li>• Area of application (ha),</li> <li>• Quantity of organic manure applied,</li> <li>• Method of application,</li> <li>• Type of organic manure,</li> <li>• Total N content (kg N/ha), and</li> <li>• Amount of nitrogen that is available for crop uptake.</li> </ul>

**Step 4: Assess manufactured nitrogen fertiliser applications**

<b>PLAN &amp; RECORD</b>	<b>Methods of assessment</b>
	You can calculate the amount of manufactured nitrogen fertiliser required by deducting the crop available nitrogen supplied from all applications of organic manures (identified from Step 3) from the crop nitrogen requirement (identified at Step 2).
	<b>Timing</b>
	Make the assessment before each application of manufactured fertiliser. This includes applications following harvest of the previous crop but before the next crop is sown or planted.
	<b>Record the following information</b>
	<ul style="list-style-type: none"> <li>• Amount of nitrogen needed from manufactured fertiliser, taking account of the crop available N from applications of organic manure, and</li> <li>• Planned date of application (month).</li> </ul>
<b>RECORD</b>	<p><u>Within one week</u> of each application, you must record</p> <ul style="list-style-type: none"> <li>• Date of application, and</li> <li>• Amount of nitrogen applied (kg N/ha).</li> </ul>

**Notes:** If your actual applications of manufactured fertiliser or organic manure were as planned, there is no need to re-record the details of the application; you can simply confirm that the application was undertaken as planned. However, you will still need to record the actual date of each application.

If your actual applications differed from your plan, you will need to record full details of the applications.

The Environment Agency and the Rural Payments Agency will use your records of actual applications to check your compliance with a number of other NVZ rules.

## Part B: Templates for keeping field records

Field name/reference: _____ Field area: _____ Harvest Year: _____ Soil type: _____.								
<b>Cropping, soil nitrogen supply and the crop N requirement</b>								
Cropping				Soil N Supply			Crop N requirement	
Crop	Crop area (ha)	Date sown (month/year)	Market (tillage crops) or cut/grazed (grass)	Yield (arable crops only)	kg N/ha or SNS Index	Method of assessment	Nitrogen application rate (kg N/ha)	Source of information
...								

<b>Planned and/or actual applications of manufactured nitrogen fertilizers and organic manures</b>								
Manufactured nitrogen fertilisers			Organic manures					
Date	Nitrogen rate kg N/ha		Date	Manure type	Application rate t/ha or m <sup>3</sup> /ha	Method of application	Total N content kg/t or kg/m <sup>3</sup>	Crop available N rate kg N/ha
...								

## Annex 2

### Part A: Step-by step guide for calculating compliance with the livestock manure N farm limit for a non-derogated farm (see Part D for calculations on a derogated farm)

The six steps you will need to follow are:

- 1 Collect your information
- 2 Calculate the livestock manure N capacity of your farm
- 3 Calculate the amount of manure N produced by the livestock kept on your farm
- 4 Calculate the amount of livestock manure N that is imported/exported on/off your farm
- 5 Calculate the total loading of livestock manure N on your farm
- 6 Compare the livestock manure N loading with the livestock manure N capacity of your farm

#### **Step 1** *Collect your information*

You will need to have available the following basic information:

- a) The 'total N produced by livestock type' figures from Tables 30 to 33 of Annex 6;
- b) The results of sampling and analysis or the outputs from ENCASH, if applicable;
- c) Records of livestock numbers kept on your farm during the previous calendar year;
- d) Records of any imports/exports of livestock manure; and
- e) The area (ha) of all your fields on your farm.

#### **Step 2** *Calculate the livestock manure N capacity of the farm*

Calculate the total area of your farm (in hectares) in an NVZ (**A**) by adding together the areas of each field, the area of rough grazing, land under management agreements (eg Environmental Stewardship) and an appropriate proportion of any common land you use in an NVZ during the calendar year. You should exclude areas of fields given over to surface water, hard standing, buildings, roads or woodland (unless the woodland is used for grazing).

Multiply the area of your farm in an NVZ (**A**) by 170 to give the livestock manure N capacity (as kg N) for your farm (**B**).

Area of the farm in an NVZ (ha)  <b>(A)</b>	<b>x</b>	Livestock manure N farm limit (kg N/ha)  <b>170</b>	<b>=</b>	Livestock manure N capacity kg N  <b>(B)</b>
------------------------------------------------------	----------	--------------------------------------------------------------	----------	-------------------------------------------------------

**Notes:** To convert acres to hectares, multiply the number of acres by 0.405. (eg 276 acres x 0.405 = 112 ha.)

If part of your farm is outside an NVZ, it is good practice to:

1. Calculate the area of the fields on your farm that are outside the NVZ.
2. Multiply this area by 250 kg N/ha (the limit contained within the Code of Good Agricultural Practice) to give the livestock manure N capacity for that part of the farm.
3. Add together the figure from **B** and the livestock manure N capacity for the area outside the NVZ to provide the total livestock manure N capacity recommended for your farm. Note that you still need to ensure that the average N loading from livestock manure to your land inside the NVZ is no more than 170 kg N/ha.

**Step 3**      **Calculate the amount of nitrogen produced by the livestock on your farm**

Complete **Table 5** using the standard figures for “total N produced by livestock type” (see Annex 6).

**Column 1**    Enter the type of livestock kept on your farm (see Annex 6) and units (usually 1, but 1,000 for some poultry).

**Column 2**    Enter the number of each livestock type that were on the farm during the year (from Step 1c).

**Notes:** If livestock are on the farm for only part of the year then enter the pro-rata number. For instance, if there are 30 dairy heifer replacements on the farm for just 4 months then calculate the pro rata average number for the year (ie 30 x 4/12 = 10) which is equivalent to having 10 heifers for the whole year.

Poultry (except ostrich) are in units of 1,000 so, for example, enter 50 for 50,000 birds.

**Column 3**    Enter the “total N produced by livestock type per year” using the standard values from Tables 30 to 33 of Annex 6.

**Notes:** For permanently housed pigs and poultry, you may use the outputs from the ENCASH computer software (from Step 1b) to enter into column 3 rather than the



standard values from Annex 6. To get an annual manure N production figure from the sampling and analysis results you must also estimate the weight of manure produced in the calendar year and use the equation:

$$\text{Total N production} = \text{Total N content of manure (kg/t) from analysis} \times \text{Total weight of manure (t)}$$

**Column 4** Multiply the numbers in Columns 2 and 3 in each row and enter the results into Column 4. Add up Column 4 to calculate the total amount of nitrogen produced by all livestock on your farm (**C**).

Livestock type and units	Number of livestock units	Total N produced by 1 livestock unit kg N/year	Total N produced by all these livestock kg N/year
Column 1	2	3	4
<b>Example</b>			
<i>1 dairy cow (6,000-9,000 litres milk yield )</i>	<i>150</i>	<i>x 101</i>	<i>= 15,150</i>
<i>1 finisher pig place, 66 kg and over, dry fed</i>	<i>1,200</i>	<i>x 10.6</i>	<i>= 12,720</i>
<i>1,000 laying hen places (caged)</i>	<i>50</i>	<i>x 400</i>	<i>= 2,000</i>
<b>Total N produced by all livestock on the farm (kg N/year)</b>		<b>=</b>	<b>(C)</b>

**Step 4 Calculate the amount of nitrogen in livestock manure that is imported or exported**

You only need to complete this step if you import / export livestock manure.

Complete **Table 6** (Imported manure) and/or **Table 7** (Exported manure) using standard values from Table 35 in Annex 6.

**Column 1** Enter the types of manure that you import or export (Table 35, Annex 6).

**Column 2** Enter the quantity (as t or m<sup>3</sup>) of each manure type that you import or export during the year.

**Column 3** Enter the total N content of each manure type. You must use the standard values (given in Table 35, Annex 6), or the results from sampling and analysis.

<b>Table 6: Manure N content of IMPORTED livestock manure</b>			
Manure type	Quantity t or m <sup>3</sup>	Total N content kg/m <sup>3</sup> or kg/t	Total N kg N
Column 1	2	3	4
<b>Example</b>			
<i>Layer manure</i>	200	x 16	= 3,200
<b>Total N of all imported livestock manure (kg N/year)</b>			<b>= (D)</b>

<b>Table 7: Manure N content of EXPORTED livestock manure</b>			
Manure type	Quantity t or m <sup>3</sup>	Total N content kg/ m <sup>3</sup> or kg/t	Total N kg N
Column 1	2	3	4
<b>Example</b>			
<i>Cattle FYM</i>	1,500	x 6	= 9,000
<b>Total N of all exported livestock manure (kg N/year)</b>			<b>= (E)</b>

**Column 4** Multiply Columns 2 and 3 and enter the results in Column 4. Add up Column 4 to calculate the total quantity of nitrogen imported (**D**) and/or exported (**E**) during the calendar year.

**Step 5** Calculate the total loading of livestock manure N on your farm

Add **C** to **D**, and subtract **E**, to give the net loading of livestock manure N on your farm (**F**)

Total N produced by all these livestock (kg) <b>(C)</b>	+	Total N of all imported livestock manure (kg) <b>(D)</b>	-	Total N of all exported livestock manure (kg) <b>(E)</b>	=	Net loading of livestock manure N (kg) <b>(F)</b>
---------------------------------------------------------------------	---	----------------------------------------------------------------------	---	----------------------------------------------------------------------	---	---------------------------------------------------------------

**Step 6** Compare the livestock manure N loading with the livestock manure N capacity of your farm

Compare the livestock manure N loading (**F**) with the livestock manure nitrogen capacity (**B**) of the farm. If **F** is larger than **B**, then the livestock manure N loading of your farm is greater than the limit of 170 kg N/ha. This means that you are not compliant with the Regulations and you must make arrangements to either reduce the

livestock manure N loading or increase the area of the farm (also see 'Derogation' information Chapter 6, Part B).

**Note:** If part of your farm is outside an NVZ, it is good practice to compare **F** with the total manure N capacity for your whole farm instead of the figure from **B** (see Step 2).

## Part B: Applying for a derogation

### 1. When must I apply for a derogation?

For each calendar year that you want the higher limit of 250 kg N/ha/yr to apply to your farm, you must complete and submit a successful application for a derogation and comply fully with all the rules described in this Annex.

The application period for a derogation in 2013 is now closed. Applications for a derogation in 2014 and subsequent years must be submitted online between 1 October and 31 December of the preceding year. We may also offer other means of application. If we do, information on them will be published each year.

### 2. How do I apply for a derogation?

You can apply for a derogation online via GOV.UK. No charge will be made for the application. Applying through this route

- a) will provide you with an immediate decision on your application (approval or rejection), giving you plenty of time to re-apply if your application is rejected (eg to correct any mistakes made in your application);
- b) reduces the risk of submitting incomplete or inaccurate application forms, which would otherwise be rejected;
- c) provides you with online advice to complete the application and calculates some of the figures for you; and
- d) keeps a record of your applications submitted in the past 4 years, and the associated notices of approval/rejection. You can view and print this history at any time.

You will not be able to apply via GOV.UK if your farm is partially in the NVZ and you have both grazing and non-grazing livestock. In this case we recommend you apply by telephone.

Online application is accessed via: [www.gov.uk/nvz-derogation-application](http://www.gov.uk/nvz-derogation-application)

If you do not have access to the internet, you may be able to arrange for a farm adviser to submit your application on your behalf.

If we decide to provide other application methods, (phone, post), this will be announced prior to the start of the application period.

Applications submitted outside the application period will not be accepted.

### **3. Applications from farms near a Special Area of Conservation (SAC) or Special Protection Area (SPA)**

When assessing derogation applications, the Environment Agency is required to assess if the granting of a derogation is likely to have a significant effect on Special Areas of Conservation or Special Protection Areas. These areas have special protection to avoid negative impacts on habitats. If your farm is near one of these areas your application may be subject to an additional assessment and the outcome of this assessment may mean that the application is refused even after an initial approval.

### **4. When can I expect a decision on my application?**

Your completed application will be used to determine if you are eligible for a derogation. If you apply online you will receive an immediate response.

You should print the approval together with your application information and keep it as proof that a derogation has been granted for your farm. If your application is rejected, you will be provided with an explanation of the rejection and an opportunity to appeal. You must comply with the livestock manure N farm limit of 170 kg N/ha/yr if your appeal is rejected.

### **5. Decisions to reject an application**

An application for a derogation will be refused if:

- a. it is not made online, or by another acceptable method (note we may require all applications to be made online);
- b. it is incomplete or the information submitted is inaccurate;
- c. the application is submitted outside the specified dates for submitting applications;
- d. information submitted indicates the farm does not have more than 80% of its agricultural area as grass;
- e. information submitted indicates the farm does not have sufficient land to comply with livestock manure N farm limits;
- f. an appropriate assessment undertaken under the Habitats Regulations, indicates that approving a derogation for the farm might cause an adverse impact on a nearby protected site (ie a SAC or SPA), or
- g. you have breached your derogation conditions.

You may be able to re-apply in order for example, to correct any mistakes made in the application which may have led to its rejection. However, you can only re-apply if the deadline for submitting applications has not passed. **It is**

**therefore recommended to submit applications well in advance of the deadline.**

If you think your application for a derogation has been rejected unfairly you can appeal to an independent panel. The appeal must be made in writing within 1 month of receiving a notice of rejection. Further information on the independent appeals panel and guidance on how to submit an appeal will be published on the Defra website and available on request from the Defra helpline.

## 6. Completing your application

You will need to supply a range of information to successfully complete your application online.

### Section 1: Farm Details

Name:	(A)
Address:	(B)
Post Code:	(C)
CPH number(s):	(D)
Telephone:	(E)
Email:	(F)

### Section 2: Agricultural Area Details

Agricultural area of your farm on 1 January (hectares)	(G)
Minimum area of grassland required (hectares)	(H)
Grassland area of your farm on 1 January (ha)	(I)

### Notes

Completing step 2 of the step-by-step guide at Part D of this Annex can help you provide the information needed to complete this section of the application.

#### Box (G) – Agricultural area

Agricultural area includes all areas under your control on 1 January including:

- rented land; and

- rough grazing.

You must exclude areas of surface water, any hard-standing, buildings, roads, woodland unless the woodland is used for grazing.

#### Box (H) – Minimum area of grassland

To calculate the minimum area of grassland required on your farm, multiply the agricultural area (G) by 0.8. This is calculated automatically if you apply online.

#### Box (I) – Grassland area – *the minimum area that will apply during the calendar year*

Grassland includes:

- both permanent and temporary grassland (temporary implying leys of less than four years);
- grassland with less than 50% clover; and
- other crops (eg maize) under-sown with grass.

If the value entered here is less than the value in Box (H), your application will be rejected.

### Section 3 – Details of manure nitrogen from grazing livestock

Estimated amount of manure nitrogen produced by grazing livestock kept on your farm during the calendar year (kg N)	(J)
How much manure nitrogen produced by grazing livestock do you intend to import onto your farm during the calendar year? (kg N)	(K)
How much manure nitrogen produced by grazing livestock do you intend to export off your farm during the calendar year? (kg N)	(L)
Total amount of manure nitrogen from grazing livestock (kg N)	(M)

#### Notes

Completing steps 3, 4 and 5 of the step-by-step guide at Part D of this Annex can help you provide the information needed to complete this section of the application.

Grazing livestock includes cattle (except veal calves), sheep, deer, goats and horses. It does not include non-grazing livestock (veal calves, pigs and poultry).

Box (J) – Manure N from grazing livestock kept on the farm

State the amount of manure nitrogen that will be produced by the number of grazing livestock you expect to keep on your farm during the calendar year. You must use standard manure N production values when calculating this value.

Boxes (K) and (L)

Enter the amount of manure N from grazing livestock you expect to import or export during the calendar year. You must use standard figures or the results of sampling and analysis when calculating the amount of manure N. If you do not intend to import or export any manure then enter a zero into the relevant box.

Box (M)

To calculate the total manure N from grazing livestock, add together the values given in Boxes (J) and (K), and then subtract the value given in (L). This will be calculated automatically if you are applying online or by telephone.

#### Section 4: Details of manure nitrogen from non-grazing livestock

Estimated amount of manure nitrogen produced by non-grazing livestock kept on your farm during the calendar year (kg N)	(N)
How much manure nitrogen produced by non-grazing livestock do you intend to import onto your farm during the calendar year? (kg N)	(O)
How much manure nitrogen produced by non-grazing livestock do you intend to export off your farm during the calendar year? (kg N)	(P)
Total amount of manure nitrogen from non-grazing livestock (kg N)	(Q)



## Notes

Completing steps 6, 7 and 8 of the step-by-step guide at Part D of this Annex can help you provide the information needed to complete this section of the application.

Non-grazing livestock refers to types of livestock which are not classed as grazing livestock and includes veal calves, pigs and poultry.

### Box (N)

State the amount of manure nitrogen that will be produced by the number of non-grazing livestock you expect to keep on your farm during the calendar year. You must use standard manure N production values when calculating this value. Alternatives to the standard figures can be used in some limited circumstances (see Annex 6 for full details). If you do not intend to keep any non-grazing livestock on your farm then enter a zero.

### Boxes (O) and (P)

Enter the amount of manure N from non-grazing livestock you expect to import or export during the calendar year. You must use standard figures or the results of sampling and analysis when calculating the amount of manure N. If you do not intend to import or export any manure then enter a zero into the relevant box.

### Box (Q)

To calculate the total manure N from non-grazing livestock, add together the values given in Boxes (N) and (O), and then subtract the value given in (P). This will be calculated automatically if you are applying online or by telephone.

## Section 5 – Agricultural area required to comply with the livestock manure N limits

Area required to comply with the manure N limit for grazing livestock (ha)

	(R)
	(S)
	(T)

Area required to comply with the manure N limit for non-grazing livestock (ha)

Area required to comply with both livestock manure N limits (ha)

## Notes

Completing steps 9 and 10 of the step-by-step guide at Part D of this Annex can help you provide the information needed to complete this section of the application. These figures will be calculated automatically if you are applying online, but may not be if other methods of application are offered.

### Box (R)

To calculate the area required to comply with the manure N limit for grazing livestock, divide the value entered in Box (M) by 250.

### Box (S)

To calculate the area required to comply with the manure N limit for non-grazing livestock, divide the value entered in Box (Q) by 170.

### Box (T)

To calculate the area required to comply with both livestock manure N limits, add together the values given in Boxes (R) and (S). If the value in Box (T) is more than the agricultural area entered into Box (G), your application will be rejected.

## Part C: Plans and records for farms with a derogation

A nitrogen and phosphate application plan must be produced for each crop grown in each field. A number of subsequent records must also be kept.

This part C provides further information on farms with a derogation on:

- how to carry out each of the 4 'planning' steps;
- when each of the 'planning' steps must be completed and what information needs to be recorded; and
- the subsequent records that must be kept.

General	
<b>RECORD</b>	1. <b>NEW RULE</b> A sketch of the land that you are planning for.
	2. Before you apply any nitrogen fertiliser, record the reference or name of each field that you have planted or intend to plant, and its area.
	3. Within a week of planting a crop, record the crop type and date you planted it (if appropriate).
	4. Within one week of ploughing an area of grass, the date on ploughing.
	5. By 30 April each year, how you managed your grass in the previous year (cut it or grazed it).
	6. Within a week of finding it out, the yield of any arable crop.

**Step 1: Assess soil nitrogen supply (SNS) and soil phosphorus (p) index**

PLAN &amp; RECORD

**Methods of assessment**

**Phosphorus** - Sampling and analysis for soil P MUST be done at least once every four years for at least every five hectares of the holding. You can rely on the results of previous sampling and analysis provided they are less than four years old. If you have not previously undertaken sampling and analysis for soil P then you must sample at least 75% of the agricultural area of your farm by March of the year following your first derogation, and the remaining 25% by March of the year following your second derogation.

**Nitrogen** - You can assess SNS using an Index value based on information about the soil type, previous cropping, previous manure and fertiliser use and winter rainfall. Alternatively, the use of soil sampling and analysis can be used. This will need to include an estimate of the amount of nitrogen that is likely to become available for crop uptake due to the mineralisation of soil organic matter and from previous crop residues.

**Timing**

Assess SNS before applying any nitrogen fertiliser. We recommend you review this initial assessment before each application of nitrogen fertiliser and update it if necessary.

**Record the following information**

- Soil type;
- Previous crop;
- If the previous crop was grass, how it was managed – cut or grazed;
- Amount of nitrogen from the soil that is likely to become available for uptake by the crop during the growing season (SNS);
- Soil P index; and
- Method used to ascertain SNS and soil P index.

**Step 2: Assess crop nitrogen requirement****PLAN & RECORD****Methods of assessment**

There are several sources of information to help you assess the crop nitrogen and phosphate requirement, including FACTS-qualified advisers, PLANET software and the Fertiliser Manual ([RB209](#)).

**Timing**

Make an initial assessment for the whole growing season before applying any nitrogen or phosphate fertiliser.

**Record the following information**

- Crop type;
- If it is an arable crop, the anticipated yield,
- If it is grass, the intended management – cut or grazed,
- Anticipated month the crop will be planted (not necessary if previous crop is grass and it has not been ploughed out),
- Crop nitrogen and phosphate requirement taking account of SNS and soil P index, and
- A copy of any advice from a FACTS-qualified adviser.

**Step 3: Assess organic manure applications, crop available nitrogen**

<b>PLAN &amp; RECORD</b>	<p><b>Methods of assessment</b></p> <p>You can use typical values for the total N and P content of the manure and the percentage of this nitrogen that is expected to become available for crop uptake. These typical values can be obtained from a number of sources, including MANNER software and the Fertiliser Manual (<a href="#">RB209</a>). See ‘further information’.</p> <p>Alternatively, you may use the results from sampling and analysis of the manure.</p> <p>For both methods you will need to take account of the type of organic manure, the date, rate and method of application and the soil type.</p>
	<p><b>Timing</b></p> <p>Make the assessment before each application of organic manure. This includes applications following harvest of the previous crop but before the next crop is sown or planted.</p>
	<p><b>Record the following information</b></p> <ul style="list-style-type: none"> <li>• Area (including location) to which the organic manure will be applied,</li> <li>• Quantity of organic manure to be applied,</li> <li>• Planned date of application (month),</li> <li>• Type of organic manure,</li> <li>• Total nitrogen and phosphate content of the organic manure, and</li> <li>• Amount of nitrogen that is likely to become available for crop uptake in the growing season in which the organic manure is applied.</li> </ul>
<b>RECORD</b>	<p>Within one week of each application, you must record</p> <ul style="list-style-type: none"> <li>• Date of application,</li> <li>• Area of application (ha),</li> <li>• Quantity of organic manure applied,</li> <li>• Method of application,</li> <li>• Type of organic manure,</li> <li>• Total nitrogen and phosphate content,</li> <li>• Amount of nitrogen that is available for crop uptake, and</li> <li>• Amount of phosphate supplied to meet the crop phosphate requirement.</li> </ul>

**Step 4: Assess manufactured nitrogen fertiliser applications**

<b>PLAN &amp; RECORD</b>	<b>Methods of assessment</b>
	You can calculate the amount of manufactured nitrogen and phosphate fertiliser required by deducting the crop available nitrogen and phosphate supplied from all applications of organic manures (identified from Step 3) from the crop nitrogen and phosphate requirement (identified at Step 2).
	<b>Timing</b>
	Make the assessment before each application of manufactured nitrogen of phosphate fertiliser.
	<b>Record the following information</b>
	<ul style="list-style-type: none"> <li>• Amount of nitrogen and phosphate needed from manufactured fertiliser, taking account of the crop available nitrogen and phosphate from applications of organic manure, and</li> <li>• Planned date of application (month).</li> </ul>
<b>RECORD</b>	<p><u>Within one week</u> of each application, you must record</p> <ul style="list-style-type: none"> <li>• Date of application, and</li> <li>• Amount of nitrogen applied (kg N/ha),</li> <li>• Amount of phosphate applied (kg P<sub>2</sub>O<sub>5</sub>/ha).</li> </ul>

**Notes:** If your actual applications of manufactured fertiliser or organic manure were as planned, there is no need to re-record the details of the application; you can simply confirm that the application was undertaken as planned. However, you will still need to record the actual date of each application.

If your actual applications differed from your plan, you will need to record full details of the applications within one week.

## Part D: Step-by-step guide to calculating compliance with the derogated livestock manure N farm limits

You will need to complete this calculation twice a year:

- At the time you apply for a derogation.
- By 30 April as part of your compliance records relating to the previous calendar year.

However, if the agricultural area of your farm, your actual livestock numbers and imports/exports are the same as in your application, then there is no need to re-do this calculation for your final records, you can simply confirm that the information provided in the plan was accurate.

The ten steps you will need to follow are:

- 1 Collect your information
- 2 Calculate the agricultural area of your farm including any areas under your control
- 3 Calculate the amount of manure N and  $P_2O_5$  produced by grazing livestock kept on your farm
- 4 Calculate the amount of manure N and  $P_2O_5$  from grazing livestock that is imported onto or exported off your farm
- 5 Calculate the total amount of manure N and  $P_2O_5$  from grazing livestock
- 6 Calculate the amount of manure N and  $P_2O_5$  produced by non-grazing livestock kept on your farm
- 7 Calculate the amount of manure N from non-grazing livestock that is imported onto or exported off your farm
- 8 Calculate the total amount of manure N from non-grazing livestock
- 9 Calculate how much land you need to comply with the livestock manure N farm limit for grazing livestock (250N) and for non-grazing livestock (170N)
- 10 Compare the area of your farm with the area needed to comply with the livestock manure N farm limits

**Note:** Steps 6 to 8 only need to be completed if you keep other (ie non-grazing) livestock on your farm or if you import onto your farm manure that was produced by non-grazing livestock.



## Step 1 - Collect your information

You will need to have available the following basic information:

- The area (ha) of all your fields on your farm;
- Estimates of livestock numbers expected to be kept on your farm during the forthcoming calendar year (your plan) OR records of livestock numbers kept on your farm during the previous calendar year;
- Estimates of any anticipated imports or exports of livestock manure (your plan) OR records of any imports or exports of livestock manure; and
- The results of manure sampling and analysis or the outputs from ENCASH, if applicable.

## Step 2 - Calculate the agricultural area of the farm

1. Complete **Table 8** as follows:

**Column 1** Enter the name of each field on your farm or under your control on the 1 January. Include rough grazing land and any rented land. Use the continuation columns if needed.

**Column 2** Enter the area of each field in hectares (from Step 1 above). Exclude areas of the field given over to surface water, hard-standing, buildings, roads or woodland unless the woodland is used for grazing.

**Note:** If you only know field areas in acres you will need to convert them to hectares. To do this, multiply the number of acres by 0.405, eg 276 acres = 112 ha.

**Column 3** Insert a tick to indicate if a field is grassland (include grassland with less than 50% clover and other crops (eg maize) under-sown with grass).

2. Add up the total of all field areas in column 2 to give the total agricultural area of your farm. Record the total in box **(A)**.
3. Add up the total of all field areas that are grass and record the total in box **(A<sub>1</sub>)**.

Table 8: The total agricultural area of the farm on 1 January		
Field name or number	Area (ha)	Grass (tick)
Column 1	2	3
...		
<b>Totals</b>	<b>A</b>	<b>A<sub>1</sub></b>

### Step 3 - Calculate the amount of manure nitrogen and phosphate produced by grazing livestock on your farm

You only need to complete this step if you keep animals classified as grazing livestock on your farm. Grazing livestock includes cattle (except veal calves), deer goats and horses. Table 9 provides the full list of livestock categories that are classified as 'grazing'.

Complete **Table 9** as follows:

**Column 2** Enter the number of each livestock type that are expected to be / were on the farm during the calendar year (from Step 1b).

**Note:** If livestock are on the farm for only part of the year then enter the pro-rata number. For instance, if there are 30 dairy heifer replacements on the farm for just 4 months then calculate the pro-rata average number for the year (ie  $30 \times 4/12 = 10$ ) which is equivalent to having 10 heifers for the whole year.

**Column 4** Multiply the numbers in Columns 2 and 3 in each row and enter the results into Column 4. Add up Column 4 to calculate the total amount of nitrogen produced by all grazing livestock on your farm (**B**).

**Column 6** Multiply the numbers in Columns 2 and 5 in each row and enter the results into Column 6. Add up Column 6 to calculate the total amount of phosphate produced by all grazing livestock on your farm (**C**).

**Table 9: Manure nitrogen (N) and phosphate (P<sub>2</sub>O<sub>5</sub>) produced by grazing livestock on the farm**

Livestock type and units	Number of livestock units	Total N produced by 1 livestock unit kg N/year (notes a, b)	Total N produced by all these livestock kg N/year	Total P <sub>2</sub> O <sub>5</sub> produced by 1 livestock unit kg P <sub>2</sub> O <sub>5</sub> /year (notes a, b)	Total P <sub>2</sub> O <sub>5</sub> produced by all these livestock kg P <sub>2</sub> O <sub>5</sub> /year
Column 1	2	3	4	5	6
1 calf (all categories, except veal) up to 3 months		x 1.4 (note c)	=	x 0.77 (note c)	=
1 dairy cow from 3 months and less than 13 months		x 29 (note d)	=	x 10.3 (note d)	=
1 dairy cow from 13 months up to first calf		x 61	=	x 25	=
1 dairy cow after first calf (over 9,000 litres milk yield)		x 115	=	x 52	=
1 dairy cow after first calf (6,000 to 9,000 litres milk yield)		x 101	=	x 44	=
1 dairy cow after first calf (up to 6,000 litres milk yield)		x 77	=	x 34	=
1 beef cow or steer (castrated male) from 3 months and less than 13 months		x 28 (note c)	=	x 10 (note d)	=
1 beef cow or steer from 13 months and less than 25 months		x 50	=	x 15.7	=
1 female or steer for slaughter 25 months and over		x 50	=	x 22	=
1 female for breeding 25 months and over weighing up to 500 kg		x 61	=	x 24	=

**Table 9: Manure nitrogen (N) and phosphate (P<sub>2</sub>O<sub>5</sub>) produced by grazing livestock on the farm**

Livestock type and units	Number of livestock units	Total N produced by 1 livestock unit kg N/year (notes a, b)	Total N produced by all these livestock kg N/year	Total P <sub>2</sub> O <sub>5</sub> produced by 1 livestock unit kg P <sub>2</sub> O <sub>5</sub> /year (notes a, b)	Total P <sub>2</sub> O <sub>5</sub> produced by all these livestock kg P <sub>2</sub> O <sub>5</sub> /year
Column 1	2	3	4	5	6
1 female for breeding 25 months and over weighing over 500 kg		x 83	=	x 31	=
1 non-breeding bull 3 months and over		x 54	=	x 8.8	=
1 bull for breeding from 3 to 25 months		x 50	=	x 15.7	=
1 bull for breeding 25 months and over		x 48	=	x 22	=
1 lamb, 6 to 9 months		x 0.5 (note e)	=	x 0.07 (note e)	=
1 lamb, 9 months and over, to first lambing, first tugging or slaughter		x 0.7 (note f)	=	x 0.38 (note f)	=
1 sheep, less than 60 kg, after lambing or tugging. For ewes this includes one or more suckled lambs up to 6 months		x 7.6	=	x 3.2	=
1 sheep, over 60 kg, after lambing or tugging. For ewes this includes one or more suckled lambs up to 6 months		x 11.9	=	x 3.7	=
1 goat		x 15	=	x 6.9	=
1 deer for breeding		x 15.2	=	x 6.4	=

<b>Table 9: Manure nitrogen (N) and phosphate (P<sub>2</sub>O<sub>5</sub>) produced by grazing livestock on the farm</b>					
Livestock type and units	Number of livestock units	Total N produced by 1 livestock unit kg N/year (notes a, b)	Total N produced by all these livestock kg N/year	Total P <sub>2</sub> O <sub>5</sub> produced by 1 livestock unit kg P <sub>2</sub> O <sub>5</sub> /year (notes a, b)	Total P <sub>2</sub> O <sub>5</sub> produced by all these livestock kg P <sub>2</sub> O <sub>5</sub> /year
Column 1	2	3	4	5	6
1 deer, other		x 12	=	x 4.3	=
1 horse		x 21	=	x 20	=
<b>Total N &amp; P<sub>2</sub>O<sub>5</sub> produced by all grazing livestock on the farm</b>		<b>B</b>	<b>=</b>	<b>C</b>	<b>=</b>

### Notes

- a) Includes an allowance for N losses from livestock housing and manure storage.
- b) Different units are used for cattle less than 13 months and for lambs – see notes c, d, e & f below.
- c) Total N produced (kg) during the 2 months that the animal is in this category.
- d) Total N produced (kg) during the 10 months that the animal is in this category.
- e) Total N produced (kg) during the 3 months that the animal is in this category.
- f) Total N produced (kg) assuming the animal is in this category for 6 months.

**Step 4 Calculate the amount of nitrogen in manure from grazing livestock that is imported or exported**

You only need to complete this step if you import or export manure that was produced by grazing livestock.

Complete **Table 10** as follows:

**Column 2** You can replace the standard values given in column 2 with the results from sampling and analysis.

**Column 3** Enter the quantity (as t or m<sup>3</sup>) of each manure type that is expected to be / was imported during the calendar year (from Step 1c).

**Column 4** Multiply Columns 2 and 3 and enter the results in Column 4. Add up Column 4 to calculate the total quantity of nitrogen imported (**D**) during the calendar year.

**Column 5** Enter the quantity (as t or m<sup>3</sup>) of each manure type that is expected to be / was exported during the calendar year.

**Column 6** Multiply Columns 2 and 5 and enter the results in Column 6. Add up Column 6 to calculate the total quantity of nitrogen exported (**E**) during the calendar year.

<b>Table 10: Manure N in imported <u>and</u> exported manure from grazing livestock</b>					
Manure type	Total N content kg/m <sup>3</sup> or kg/t	Imported		Exported	
		Quantity t or m <sup>3</sup>	Total N kg N	Quantity t or m <sup>3</sup>	Total N kg N
Column 1	2	3	4	5	6
Cattle farmyard manure	6	x	=	x	=
Pig farmyard manure	7	x	=	x	=
Sheep farmyard manure	7	x	=	x	=
Horse farmyard manure	7	x	=	x	=
Goat farmyard manure	6	x	=	x	=
Cattle slurry	2.6	x	=	x	=
Separated cattle slurry, liquid fraction, strainer box	1.5	x	=	x	=
Separated cattle slurry, liquid fraction, weeping-wall	2	x	=	x	=
Separated cattle slurry, liquid fraction, mechanically separated	3	x	=	x	=
Separated cattle slurry, solid fraction	4	x	=	x	=
Dirty water	0.5	x	=	x	=
<b>Total N imported</b>		<b>D</b>	<b>=</b>	<b>Total N exported</b>	<b>E =</b>

**Step 5 Calculate the total loading of manure N from grazing livestock**

- Transfer value **B** from Table 9 (nitrogen produced by grazing livestock on the farm) to the box in **Table 11** below. Then transfer values **D** and **E** from Table 3 to the boxes below. If you do not import or export livestock manure, then the values of D and E will be zero.
- Add **B** and **D** together, and deduct **E**, to give the net loading of manure N on your farm from grazing livestock (**F**).

**Table 11: Total loading of manure N from non-grazing livestock**

<b>B Table 9</b>	<b>D Table 10</b>	<b>E Table 10</b>	<b>Manure N loading</b>
	+		-
	=		
$B + D - E = F$			
B, D and E input values and output (F) are kg N/year			

**Note:** Steps 6 and 7 only need to be completed if you keep other livestock on your farm or if you import onto your farm manure that was produced by other livestock. If you do not keep ‘other’ livestock on your farm or import onto your farm manure from other livestock, go straight to Step 9.

**Step 6 Calculate the amount of manure nitrogen and phosphate produced by non-grazing livestock on your farm**

You only need to complete this step if you keep animals classified as non-grazing livestock on your farm (veal calves, pigs and poultry). Table 12 provides the full list of livestock categories that are classified as ‘other’. If only a part of your farm lies within the NVZ do not attempt this calculation.

1. Complete **Table 12** as follows:

**Column 3** Enter the number of each livestock type that are expected to be / were kept on the farm during the calendar year (from Step 1b).

**Notes:** If the occupancy on your farm is different to the assumed occupancy values shown in column 2, you should adjust the standard values of total N and P produced (given in columns 4 and 6 respectively) using the following equation:

$$Actual\ total\ N\ and\ P\ produced = Standard\ value \times \frac{Actual\ occupancy}{Standard\ occupancy}$$

Poultry (except ostriches) are in units of 1,000 so, for example, enter 50 for 50,000 birds.

**Column 4** You can replace the standard values given in column 4 in the following instances:

If your pigs and poultry are permanently housed, you may use values calculated using the ENCASH computer software; or

If your pigs and poultry are permanently housed AND your housing system only produces solid manure, you may use values determined by sampling and analysis of the manure.

**Column 5** Multiply the numbers in Columns 3 and 4 in each row and enter the results into Column 5. Add up Column 5 to calculate the total amount of nitrogen produced by non-grazing livestock on your farm (**G**).

**Column 7** Multiply the numbers in Columns 3 and 6 in each row and enter the results into Column 7. Add up Column 7 to calculate the total amount of phosphate produced by non-grazing livestock on your farm (**H**).



**Table 12: Manure nitrogen (N) and phosphate (P<sub>2</sub>O<sub>5</sub>) produced by non-grazing livestock on the farm**

Livestock type and units	Occupancy %	Number of livestock units	Total N produced by 1 livestock unit kg N/year (note a)	Total N produced by all these livestock kg N/year	Total P <sub>2</sub> O <sub>5</sub> produced by 1 livestock unit kg P <sub>2</sub> O <sub>5</sub> /year (notes a, b)	Total P <sub>2</sub> O <sub>5</sub> produced by all these livestock kg P <sub>2</sub> O <sub>5</sub> /year
Column 1	2	3	4	5	6	7
1 veal calf	n/a		x 1.4 (note c)	=	x 0.77 (note d)	=
1,000 replacement layer pullet places, up to 17 weeks	89		x 210	=	x 150	=
1,000 laying hens in cages, 17 weeks and over	97		x 400	=	x 350	=
1,000 laying hen places, free range, 17 weeks and over	97		x 530	=	x 390	=
1,000 broiler places	85		x 330	=	x 220	=
1,000 replacement broiler breeder pullet places, up to 25 weeks	92		x 290	=	x 260	=
1,000 broiler breeder places, 25 weeks and over	95		x 700	=	x 520	=
1,000 turkey places (male)	90		x 1,230	=	x 1,020	=
1,000 turkey places (female)	88		x 910	=	x 740	=
1,000 duck places	83		x 750	=	x 730	=
1 ostrich place	100		x 1.4	=	x 6.8	=
1 weaner place, 7 to 13 kg	71		x 1	=	x 0.34	=
1 weaner place, 13 to 31 kg	82		x 4.2	=	x 1.8	=

**Table 12: Manure nitrogen (N) and phosphate (P<sub>2</sub>O<sub>5</sub>) produced by non-grazing livestock on the farm**

Livestock type and units	Occupancy %	Number of livestock units	Total N produced by 1 livestock unit kg N/year (note a)	Total N produced by all these livestock kg N/year	Total P <sub>2</sub> O <sub>5</sub> produced by 1 livestock unit kg P <sub>2</sub> O <sub>5</sub> /year (notes a, b)	Total P <sub>2</sub> O <sub>5</sub> produced by all these livestock kg P <sub>2</sub> O <sub>5</sub> /year
Column 1	2	3	4	5	6	7
1 grower place, 31 to 66 kg (dry fed)	88		x 7.7	=	x 3.9	=
1 grower place, 31 to 66 kg (liquid fed)	88		x 7.7	=	x 3.9	=
1 finisher place, 66 kg and over (dry fed)	86		x 10.6	=	x 5.6	=
1 finisher place, 66 kg and over (liquid fed)	86		x 10.6	=	x 5.6	=
1 maiden gilt place, 66 kg and over	80		x 11.1	=	x 5.8	=
1 sow place, 66 kg and over, with litter up to 7 kg, fed on a lower protein diet but supplemented with synthetic amino acids	100		x 16	=	x 13.5	=
1 sow place, 66 kg and over, with litter up to 7 kg, fed on a diet without synthetic amino acids	100		x 18	=	x 13.5	=
1 breeding boar, from 66 kg to 150 kg	100		x 12	=	x 6.5	=
1 breeding boar, 150 kg and over	100		x 17.5	=	x 10.2	=
<b>Total N and P<sub>2</sub>O<sub>5</sub> produced by all non-grazing livestock on the farm</b>			<b>G</b>	<b>=</b>		<b>H</b> =

**Notes** **a)** N produced in excreta is per 1,000 poultry places (except ostriches) or per pig place and includes an allowance for N losses from livestock housing and manure storage. **b)** Includes an allowance for occupancy. **c)** Total N produced (kg) during the 2 months that the animal is in this category. **d)** Total P<sub>2</sub>O<sub>5</sub> produced (kg) during the 2 months the animal is in this category.

**Step 7 Calculate the amount of nitrogen in manure from non-grazing livestock that is imported or exported**

You only need to complete this step if you import or export manure from non-grazing livestock. Non-grazing livestock refers to types of livestock which are not classed as grazing livestock and includes pigs, poultry and veal calves. *Table 13 provides the full list of manure types that are classified as originating from 'other' livestock.*

1. Complete **Table 13** (overleaf) as follows:

**Column 2** You can replace the standard values given in column 2 with the results from sampling and analysis.

**Column 3** Enter the quantity (as t or m<sup>3</sup>) of each manure type that is expected to be / was imported during the calendar year (from Step 1c).

**Column 4** Multiply columns 2 and 3 and enter the results in column 4. Add up column 4 to calculate the total quantity of nitrogen imported (**I**) during the calendar year.

**Column 5** Enter the quantity (as t or m<sup>3</sup>) of each manure type that is expected to be / was exported during the calendar year.

**Column 6** Multiply Columns 2 and 5 and enter the results in Column 6. Add up Column 6 to calculate the total quantity of nitrogen exported (**J**) during the calendar year.

**Step 8 Calculate the total loading of manure N from non-grazing livestock**

1. Transfer value **G** from Table 12 (nitrogen produced by non-grazing livestock on the farm) to the box in **Table 14** below. Then transfer values **I** and **J** from Table 13 to the boxes in **Table 14**. If you do not import or export livestock manure, then the values of I and J will be zero.
2. Add **G** and **I** together, and deduct **J**, to give the net loading of manure N on your farm from non-grazing livestock (**K**).

**Table 13: Manure N in imported and exported manure from non-grazing livestock**

Manure type	Total N content kg/m <sup>3</sup> or kg/t	Imported		Exported	
		Quantity t or m <sup>3</sup>	Total N kg N	Quantity t or m <sup>3</sup>	Total N kg N
Column 1	2	3	4	5	6
Duck farmyard manure	6.5	x	=	x	=
Poultry layer manure	19	x	=	x	=
Poultry broiler litter	30	x	=	x	=
Turkey litter	30	x	=	x	=
Pig slurry	3.6	x	=	x	=
Separated pig slurry, liquid fraction	3.6	x	=	x	=
Separated pig slurry, solid fraction	5.0	x	=	x	=
Dirty water	0.5	x	=	x	=
<b>Total N imported</b>		<b>I</b>	<b>=</b>	<b>Total N exported</b>	<b>J =</b>

**Table 14: Total loading of manure N from non-grazing livestock**

(G Table 12)	(I Table 13)	(J Table 13)	Manure N loading			
<input type="text"/>	+	<input type="text"/>	-	<input type="text"/>	=	<b>K</b> <input type="text"/>
G, I and J input values and output (K) are kg N/year						

**Step 9 Calculate the area required to comply with the livestock manure N farm limits**

Transfer value **F** from Table 11 (the manure N loading from grazing livestock) to the relevant box in column 1 of **Table 15**. Then divide this value by 250 (the limit that applies to manure from grazing livestock) to give the area required to comply with the livestock manure N limit of 250 kg N/ha.

1. Transfer value **K** from Table 14 (the manure N loading from non-grazing livestock) to the relevant box in column 1 of **Table 15**. Then divide this value by

170 (the limit that applies to manure from non-grazing livestock) to give the area required to comply with the livestock manure N limit of 170 kg N/ha.

2. Add up the values in column 2 to give the total area needed to comply with both livestock manure N limits (**L**).

Table 15: Area required to comply with the livestock manure N limits						
Column 1				kg N/ha		Column 2
Manure N loading (kg N)						Area required (ha)
- from grazing livestock	<b>F</b>		÷	250	=	
- from non-grazing livestock	<b>K</b>		÷	170	=	
<b>Total</b>					<b>L</b>	

**Step 10**      *Compare the area required to comply with the livestock manure N farm limits with the area of your farm*

- (a) Compare the area required to comply with the livestock manure N farm limits (**L** from Step 9) with the total area of your farm (**A** from Step 2).
- (b) If **L** is larger than **A**, this means that you are not compliant with this rule and you must make arrangements to either reduce the livestock manure N loading or increase the area of the farm.

Area required to comply with the livestock manure N farm limits (ha)	
<b>L</b>	

Total area of your farm (ha)	
<b>A</b>	

## Part E: Stocks and purchases of manufactured fertilisers

You must record a summary of the stocks and purchases of manufactured nitrogen fertilisers on your farm. You may use the tables below to record the following information:

1. The tonnage and N content (%) of all manufactured nitrogen fertiliser stocks on 1 January and 31 December.
2. The tonnage and N content (%) of all manufactured nitrogen fertilisers that are imported and exported off the farm during the calendar year.

**Table 16: Manufactured nitrogen fertiliser stocks on farm on 1 January**

Fertiliser type (eg 25:5:5) N content (% , liquids % on w/v basis)	Quantity (tonnes or m <sup>3</sup> )
...	

**Table 17: Manufactured nitrogen fertilisers (purchased/imported and sold/exported)**

Date	Fertiliser type (eg 25:5:5)	Amount purchased or imported onto farm (tonnes)	Amount sold or exported off farm (tonnes)
...			

**Table 18: Manufactured nitrogen fertiliser stocks on farm on 31 December**

Fertiliser type (eg 25:5:5)	Quantity (tonnes)
...	

## Annex 3

### Step-by-step guide for calculating compliance with the N max limit

N max limits have been established for the crops set out in Table 4, Chapter 7.

It is recommended that you take account of the N max limits when planning your use of nitrogen (see Chapter 5). If you only calculate whether you comply after harvest you may find that you have applied too much nitrogen and have exceeded the limit.

You are not required to record this calculation, but you are advised to carry out the following 6 steps for each of the specified crop types grown on your farm where at least one field has received, or is expected to receive, a higher rate of nitrogen application than the N max limit listed in Table 4, Chapter 7.

- a. Collect your information.
- b. Calculate the maximum limit for N applications to the specified crop type, taking account of any relevant adjustments (see Chapter 7).
- c. Calculate the crop available nitrogen supplied to the crop type from all livestock manure applications.
- d. Calculate the nitrogen supplied to the crop type from all applications of manufactured nitrogen fertilizer.
- e. Calculate the total amount of nitrogen applied to the crop type (from manufactured fertiliser plus the crop available nitrogen from livestock manure).
- f. Compare the total amount of nitrogen applied to the adjusted N max limit for this crop type.

#### **Step 1**      **Collect your information**

You will need to have available the following basic information:

- a. Chapter 7 – specifically Table 4 for the N max limits and Annex 6, Tables 35 and 36 for the N content of livestock manures;
- b. The results of sampling and analysis of livestock manure (if undertaken);
- c. Field records of actual applications of livestock manure and manufactured fertiliser; and
- d. The cropped area of the fields on your farm.

**Note:** If you only know the field area in acres you will need to convert them to hectares. To do this multiply the number of acres by 0.405 (eg 276 acres x 0.405 = 112 ha).

**Step 2**      **Calculate the maximum limit for N applications to the crop type taking account of any relevant adjustments**

Complete **Table 19** to calculate the maximum limit for N applications to the crop type.

Enter the crop type, harvest year and N max limit (before adjustments) in the spaces provided in Table 19 (see Table 4, Chapter 7 for the N max limits). Then complete columns 1 to 9 for each field growing that crop type.

**Column 1**    Enter the field name/reference.

**Column 2**    Enter the cropped area of the field (ha).

**Column 3**    Enter your expected yield.

**Column 4**    Enter +20 if the soil type is 'shallow' and the crop type is autumn or early winter sown wheat or winter barley.

**Column 5**    Enter an appropriate adjustment (see Chapter 7) to the N max limit if your justifiable expected yield is above the standard yield for the crop type.

**Column 6**    Enter +40 if a milling wheat variety is being grown.

**Column 7**    Enter +80 if the current or previous crop has had straw or paper sludge applied to it.

**Column 8**    For grassland, enter +40 if three or more cuts of grass are taken from the field.

**Column 9**    Calculate the adjusted N max limit (kg N/ha) for each field. To do this, add the numbers in columns 4 to 8 to the N max limit (before adjustments) that you entered at the top of Table 19.

**Column 10**   Calculate the maximum limit for nitrogen applications (kg N) for each field (multiply column 2 by column 9). Add up the values in column 10



for all fields and enter this number in box **A** at the bottom of column 10 to give the maximum limit for nitrogen applications to the crop type.

A completed Table 19 example is provided below.

**Notes:** You can convert the total limit for N applications given in box A into an average and adjusted N max limit for the crop type by:

Dividing the figure in Box A by the total area of the crop type (ie the sum of column 2).

This average and adjusted N max limit could prove useful when planning your applications of nitrogen at the start of the growing season to ensure that you do not breach the N max limit.

**Table 19: Calculation of N max for a crop**

Crop type: _____ Harvest year: _____ N max limit (before adjustments): _____ kg N/ha									
Field name / reference	Crop area ha	Expected yield t/ha	Soil type kg N/ha	Adjustments				Adjusted N max limit kg N/ha	Maximum limit for N applied kg N
				Expected yield kg N/ha	Milling wheat kg N/ha	Paper sludge or straw kg N/ha	3 or more cuts of grass kg N/ha		
Column 1	2	3	4	5	6	7	8	9	10
...									
<b>Maximum limit for N applied to the crop (kg N)</b>								<b>A =</b>	

**Example completed for an arable crop** Table 19: Calculation of N max for a crop

Crop type: <u>Wheat, autumn or early winter sown</u> Harvest year: <u>2012</u> N max limit (before adjustments): <u>220</u> kg N/ha									
Field name / reference	Crop area ha	Expected yield t/ha	Soil type kg N/ha	Adjustments				Adjusted N max limit kg N/ha	Maximum limit for N applied kg N
				Expected yield kg N/ha	Milling wheat kg N/ha	Paper sludge or straw kg N/ha	3 or more cuts of grass kg N/ha		
Column 1	2	3	4	5	6	7	8	9	10
Woodside	8	9.5	+20	+30				270	2,160
Top field	6	8			+40			260	1,560
Upper No 1	12	10	+20	+40				280	3,360
<b>Maximum limit for N applied to the crop (kg N)</b>								<b>A =</b>	<b>7,080</b>

**Step 3 - Calculate the crop available nitrogen supplied from all livestock manure applications to the crop type**

Complete **Table 20** for each field growing the crop type and receiving one or more applications of livestock manure.

**Column 1** Enter the field name/reference receiving the application of livestock manure. If the same field receives more than one application of livestock manure, use one row per application.

**Column 2** Enter the cropped area of the field (ha).

**Column 3** Enter the type of livestock manure applied (the different types are described in Table 35 in Chapter 3, Annex 6, Part A).

**Column 4** Enter the application rate of the manure (t/ha or m<sup>3</sup>/ha).

**Column 5** Calculate the total quantity of manure applied to the field (multiply column 2 by column 4) and enter in column 5.

**Note:** If you already know the total quantity of manure applied, you can enter this directly into column 5 and do not need to enter information in columns 2 or 4.

**Column 6** Enter the total nitrogen content of the manure. This must be based on either standard values for the manure type (see Table 35, Annex 6) or on the results of sampling and analysis (which, for non-livestock organic manures, may be sampling and analysis carried out by the manufacturer or supplier).

**Column 7** Enter the percentage of the manure total nitrogen content that is assumed to be available for crop uptake (see Table 36 Annex 6 for the standard values that must be used).

**Column 8** Multiply column 5 by column 6, then multiply by the percentage value in column 7 to calculate the quantity of crop available nitrogen. Add up the values in column 8 for all applications of organic manure to the crop type for all fields and enter this number in box **B** at the bottom of the column.

**Note:** When multiplying using percentages you should first divide the percentage figure by 100 (eg 20% ÷ 100 = 0.2).

Example

A grass field of 8 ha receives an application of 35m<sup>3</sup>/ha of dairy slurry in late September. Therefore, the total amount of slurry applied is 35 m<sup>3</sup>/ha x 8 ha = 280m<sup>3</sup>.

The total nitrogen content of this manure type is 3 kg N/m<sup>3</sup> (from the standard values in Table 35, Annex 6). Therefore, the total amount of N applied to the field is 280 m<sup>3</sup> x 3 kg N/m<sup>3</sup> = 840 kg N.

You must assume (in 2013) that 35% of this nitrogen is available for crop uptake (see Table 36, Annex 6). Therefore, the total amount of crop available N applied to the field is 840 kg N x 0.35 = 294 kg N.

<b>Table 20: The crop available nitrogen from organic manure applications</b>							
Field name / reference	Crop area ha	Manure type	Application rate t/ha or m <sup>3</sup> /ha	Quantity applied t or m <sup>3</sup>	Total N content kg/t or kg/m <sup>3</sup>	Manure N availability %	Crop available N kg N
Column 1	2	3	4	5	6	7	8
...							
<b>Total amount of crop available N from all applications of livestock manure (kg N)</b>						<b>B</b>	

<b>Example for two types of manure Table 20: The crop available nitrogen from livestock manure applications</b>							
Field name/ reference	Crop area ha	Manure type	Application rate t/ha or m <sup>3</sup> /ha	Quantity applied t or m <sup>3</sup>	Total N content kg/t or kg/m <sup>3</sup>	Manure N availability %	Crop available N kg N
Column 1	2	3	4	5	6	7	8
Woodside	8	Dairy slurry	35	280	3	35	<b>294</b>
Top field	6	Layer manure	8	48	16	30	<b>230</b>
<b>Total amount of crop available N from all applications of livestock manure (kg N)</b>						<b>B</b>	<b>524</b>

**Step 4 Calculate the nitrogen supplied from all applications of manufactured nitrogen fertiliser to the crop type**

Complete **Table 21** for each field growing the crop type that receives one or more applications of manufactured fertiliser.

**Column 1** Enter each field name/reference growing the crop type.

**Column 2** Enter the cropped area of the field (ha).

**Column 3** Enter the total rate of nitrogen (kg N/ha) from all applications of manufactured fertiliser (eg for two applications, one at 40 kg N/ha and the other at 100 kg N/ha, the total rate is 140 kg N/ha).

**Column 4** Multiply column 2 by column 3 to give the total amount of nitrogen from manufactured fertiliser applied to each field. Add up the values in column 4 for all applications of manufactured fertiliser made to the crop type across the farm and enter this number in box **C** at the bottom of the column.

Table 21: Nitrogen from applications of manufactured fertilizer			
Field name/reference	Crop area ha	Total nitrogen rate kg N/ha	Total amount of nitrogen applied to the field kg N
Column 1	2	3	4
...			
Total amount of N from manufactured fertiliser			<b>C</b>

**Step 5 Calculate the total amount of nitrogen applied to the crop type**

Add together the total amount of crop available N from livestock manure (**B**) and the total amount of N from manufactured fertilizer (**C**) to give a total amount of nitrogen applied to the crop type across the farm (**D**).

**Step 6**      ***Compare the total amount of nitrogen applied to the crop type to the maximum limit for N applications to the crop type***

To comply with the Regulations, you need to ensure that total amount of nitrogen applied to the crop type across the farm (**D**) is smaller than the maximum calculated at **A**. If it is not, then you will have breached the N max limit for this crop type.

## Annex 4

### Part A: Step-by-step guide to preparing a risk map for your farm

This step-by-step guide will help you produce a risk map for your farm that highlights areas where you should never spread organic manures and areas where you may need to vary how you apply organic manures during the year to avoid causing water pollution.

The four steps you will need to follow are:

1. Collect your information
2. Identifying land where organic manures must not be spread
3. Identifying land where organic manures should not be spread under certain conditions or where rates should be restricted
4. Identifying other areas that you must take into account to comply with the NVZ rules

**Note:** The guidance provided here is similar to the Defra Manure Management Plan step-by-step guide for farmers. You may have prepared a risk map (in your manure management plan) for an Entry Level Stewardship agri-environment scheme or for farm assurance schemes or compliance with an environmental permit. These will be suitable but you will need to add to it any further information required by the Regulations (see Step 4).

#### **Step 1**      ***Collect your information***

To draw up the risk map you will need a map or maps of the farmed land that clearly shows:

- every field and watercourse (including all ditches),
- field areas in hectares (1 hectare = 2.5 acres), and
- any boreholes, springs or wells, including any on neighbouring land within 50m of your boundary.

If these features are not marked on your map, please draw them in.



**Notes:**

If you use a 1:2,500 scale map: 1 grid square = 1 hectare and 1 side of a square = 100 metres.

If you use a 1:10,000 scale map: 1 grid square = 100 hectares and 1 side of a square = 1,000 metres.

**Step 2      *Identifying areas where organic manures must not be spread***

- Identify where the following areas occur on your farm and colour them on your map in **red** (see Figure 3 below). Where an area is an unusual shape, for example circular areas around wells, mark off a square or 'practical' shaped area of the field.

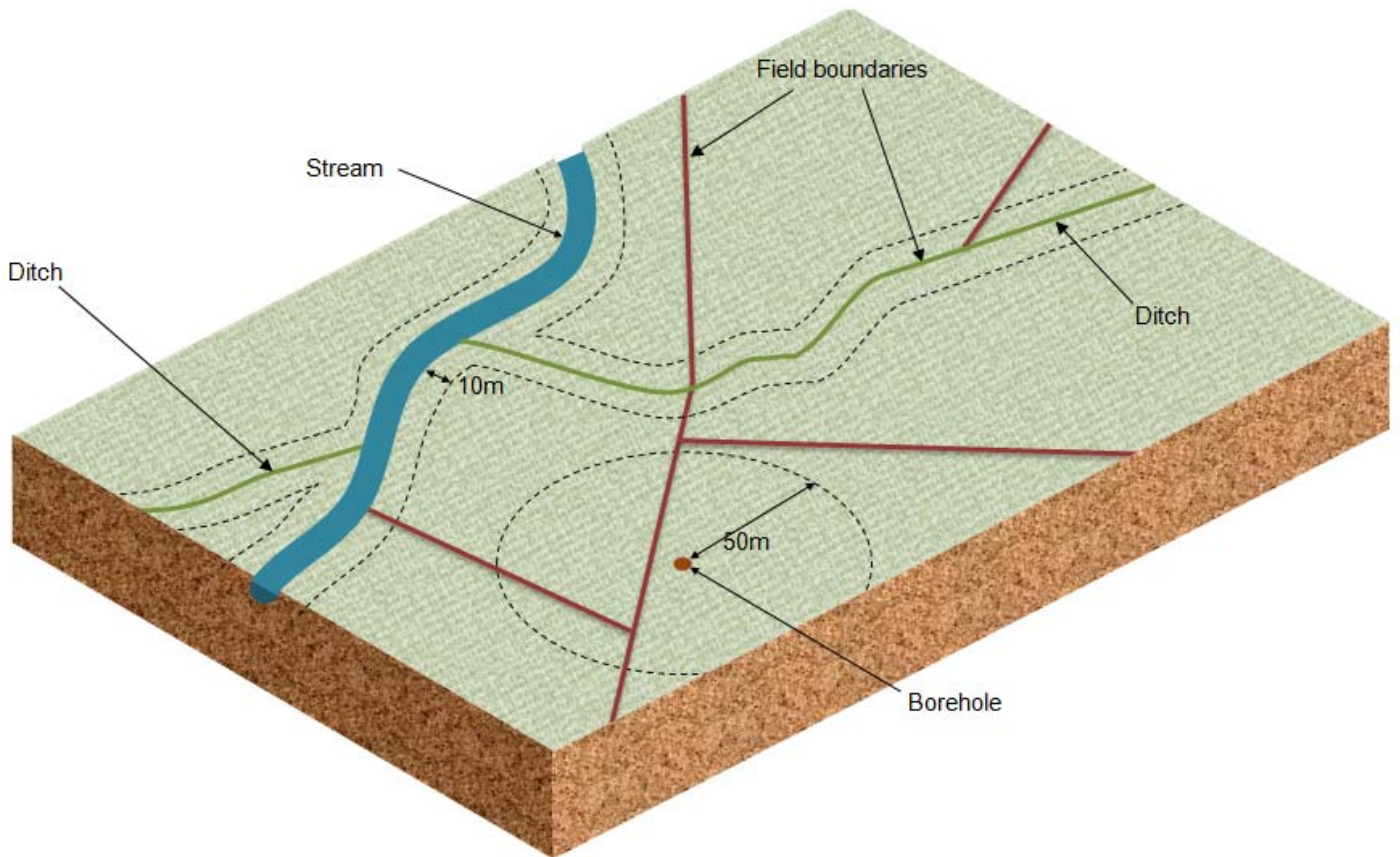
For the purposes of the nitrates rules, areas on which organic manures must not be spread are:

- Within at least 10 metres of either side of any surface water including ditches, temporary dry ditches and piped ditches. This will avoid direct spreading into the surface water and also reduce the risk of run-off reaching the surface water. Include surface waters that form the boundary of your farm.
- Within at least 50 metres of any spring, well, or borehole.

Other non-spreading (red) areas are:

- Very steep slopes (slopes steeper than 1 in 5 (20% or 12 degrees)) where run-off is a high risk throughout the year.
- Any areas where you may not be allowed to spread for reasons such as a tenancy agreement, an abatement notice due to smell, Sites of Special Scientific Interest, agri-environment agreement or other reason.
- The surface is rocky or uneven so that your equipment cannot be used effectively or safely.

You need to mark these because they are important for the calculation of the area on which you can spread organic manure.



**Figure 3: Areas on which organic manures must not be spread**

- You should identify other areas (fields or parts of fields) where you do not normally spread organic manures and leave these areas **white** on your map.

This may be because of:

- non-farmed areas - buildings, roads, tracks,
- particular land use such as woodlands, etc,
- location, eg they are too far from the farmstead.

**Step 3 Identifying areas where organic manures should not be spread under certain conditions or where rates should be restricted**

Some areas of the farm will be unsuitable for spreading at certain times of the year, particularly in winter, or under certain conditions. These will vary from year to year. Other areas may receive organic manure at any time of the year but you may need to adjust the rate and frequency of application to avoid causing pollution.

1. Identify areas which meet the conditions in **Table 22** and mark them on your map. The colour scheme given here and below is not compulsory but you may

find it a helpful way to distinguish the different categories of risk on your farm. We suggest you use **orange** (very high risk) or **yellow** (high risk) as indicated.

- **Orange areas** cannot be used when certain conditions apply, but they will usually be available at some times of the year.
  - **Yellow areas** may be used for spreading at most times of the year but application rates should be no more than 30m<sup>3</sup>/hectare of slurry in a single application when certain conditions apply.
2. Number the orange areas on your map using the reasons and number key from Table 22. Number the map with all the conditions affecting it.
  3. Colour the remaining areas of crops and grass **green** (lower risk). Green areas **do not** have effective pipe or mole drains and may be used for spreading at most times of the year. Remember you may need to leave some areas white (Step 2)

Table 22: Identifying very high risk (orange) and high risk (yellow) areas (see Step 3)		
Conditions leading to very high and high risk areas	Colour Map	Numbers for orange areas
Fields or part fields next to a watercourse, spring or borehole when the surface is severely compacted (note a) or waterlogged.	Orange	1
Fields or part fields that are likely to flood sometime in most winters.	Orange	2
Field or part fields next to a watercourse, spring or borehole when the soil is at field capacity (in winter) (note b) and there is:	Orange	3
<b>a)</b> a steep slope,		
<b>b)</b> a moderate slope and a slowly permeable soil (ie a clay soil or one through which water passes only slowly),	Orange	3
<b>c)</b> a moderate slope and a well-drained soil, <b>d)</b> a slight slope and a slowly permeable soil		
All fields or part fields with effective pipe or mole drains (but see extra limitations below (note c))	Yellow	4
Very shallow soils (less than 30 cm) over gravel or rock, eg limestone, chalk, slates and shales.		

#### Notes

- (a) 'Severely compacted': rain stays on the surface after rainfall.

- (b) 'Field capacity': fully wetted soil where more rain would cause water loss by drainage. Normally occurs from autumn and lasts until spring.
- (c) Fields or part fields which in the last 12 months have been pipe drained, mole drained or sub-soiled over drains should not be used for spreading.

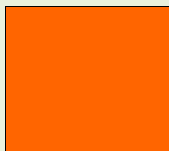

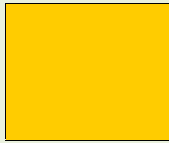
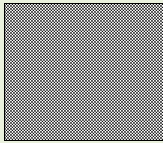


#### **Step 4      *Identifying other areas required by the NVZ rules***

1. Identify and mark land with a **slope of more than 12 degrees** (equivalent to 20% or 1 in 5) which is not included in your existing non-spreading (red) areas. You must not spread manures to these areas when there is a significant risk of run-off to surface water.
2. Identify any **sandy or shallow soils** on your map by cross-hatching. 'Closed periods' for sandy and shallow soils are different from those for other soil types. The cross-hatching will help you distinguish the relevant closed periods. Note: sandy soil and shallow soil is defined (see Chapter 4, Glossary).
3. Identify and mark **low run-off risk land**. Low run-off risk land is land with an average slope of less than 3 degrees, does not have land drains, and is at least 50 metres from a watercourse or conduit leading to a watercourse. Not all green (lower risk) areas are low run-off risk land.

You only need to mark this land if you want to apply slurry or poultry manure to it to reduce your storage need (see Chapter 10).

4. Identify sites **used for field heaps**, if any. Where possible, these should be located in green areas. They must never be situated in red areas, nor (from 16 May 2014) in areas within 30m of surface water if the land has a slope of 12 degrees or more. You should also record the dates of when the field sites were used.

**Colour key for risk maps**

	Orange areas numbered 1, 2, 3 or 4 Very high risk		Red areas (numbered 4 where necessary) Land where organic manure should never be spread
	Yellow areas (numbered 4 as necessary) High risk		Cross-hatched areas Identifies sandy or shallow soils
	Green areas Lower risk		White areas Land not normally used for spreading

**Key for numbered orange areas**

- 1 Do not spread on these fields when the surface is compacted or waterlogged.
- 2 Do should not spread when there is a risk of flooding.
- 3 Do not spread when the soil is at field capacity ie when the soil is fully wetted.
- 4 A field or part field with effective pipe or mole drains.

## Part B: Calculating the field spreading area for the organic manure N field limit

The organic manure N field limit in NVZs is 250 kg total N/ha in any rolling 12 month period. When calculating your compliance with this limit you should use the area of the field to which organic manure can be spread taking account of any non-spreading areas (the 'field spreading area').

Complete Table 23 to calculate the field spreading area of those fields that have some red or white areas. When completing Table 23, check that you have not entered any land twice, such as where red areas for different purposes overlap. For those fields without red or white areas, the field spreading area is the area of the whole field and you do not need to list them within the table.

- e) Enter the whole field area in Column 2, the ditch or watercourse length in Column 3 (remember ditches and watercourses have two sides), any other non-spreading areas (red) in Column 4, and any other areas where you don't spread manures (white) in Column 5.
- f) Complete the calculation in Column 3 to give an area (ha). Add together the areas (ha) in Columns 3, 4 and 5 and subtract it from the area in Column 2. Enter the answer in Column 6 to give the actual field spreading area.

**Table 23 - Calculating the field area for spreading (in those fields where there are red or white areas marked)**

Field name or number	Whole field area (ha)	Ditches and watercourses		Other red areas (ha)	White areas (ha)	Field spreading area (ha)
Column 1	2	3		4	5	6
		Total length in metres (m)	m/1,000 = area (ha) (note a)			
<i>eg Old meadow</i>	<i>7.45</i>	<i>220</i>	<i>0.22</i>	<i>0</i>	<i>0</i>	<i>7.23</i>
...						

**Note (a):** This calculation is derived from ditches x 10 m (red area) /10,000 to give hectares. If you do not multiply by the 10m first, you only need to divide by 1,000.

## Annex 5

### Part A: Step-by-step guide to calculating your slurry storage requirement

This step-by-step guide will help you calculate the minimum storage you must have on your farm to comply with the legal requirements of **6 months storage capacity for pig slurry** and **5 months storage capacity for slurry from other livestock** (eg cattle). You may need more than this for your business needs.

The eight steps you will need to follow are:

1. Collect your information
2. Calculate the volume of slurry produced per month
3. Calculate the average volume of rainfall that enters your slurry store(s) each month
4. Calculate the volume of wash water that enters your slurry store(s) each month
5. Calculate the total volume of slurry that needs to be stored
6. Calculate the capacity of your existing slurry store(s)
7. Compare existing slurry storage capacity with the capacity required
8. Consider actions that can reduce the volume of slurry to be stored

#### **Step 1**      **Collect your information**

Before assessing your requirements, you need to have available the following information:

1. The “volume per livestock type” figures from Tables 30 to 33 of Annex 6;
2. Estimates of the livestock types and numbers likely to be kept on your farm during the storage period. You should future proof your calculation by using estimates of livestock numbers likely to be kept on your farm in the future (if this is greater than the number currently kept);
3. The dimensions of existing slurry store(s) (metres);
4. The surface area (square metres) of any unroofed/uncovered existing slurry store(s);
5. The area of open yards, silage clamps, roofs etc. that drain into the slurry store(s) (in square metres); include all fouled concrete areas and dungsteads if the run-off drains to the slurry store(s); exclude clean yard areas and roof areas if rain falling on these is collected and discharged to a clean drain, but include such yard and roof water if it drains to the slurry store(s); and



6. The long term monthly rainfall for October to February/March.

**Note:** Average rainfall for each month for 1981 to 2010 is available from the Met Office website ([www.metoffice.gov.uk/climate/uk/averages/19812010/index.html](http://www.metoffice.gov.uk/climate/uk/averages/19812010/index.html)) or contact Meteorological Office Customer Care. Whilst you can obtain low resolution data free of charge, you are advised to use the data that relates most closely to your land. The charge for this will be small in relation to the cost of any construction and will improve the cost effectiveness of your store.

### Step 2 Calculate the volume of slurry produced per month

Complete Table 24 using standard “volume per livestock type” figures (see Tables 30 to 33, Annex 6, Part A).

Column	
1	Enter the type of livestock kept on your farm during the storage period (see Annex 6) and units (usually 1).
2	From your estimates (Step 1b), insert the number of livestock on slurry or part-slurry based systems during the storage period (normally stocked).
3	Estimate the proportion of excreta collected as slurry. For example, set the figure to 1 for all collected as slurry, 0.5 for half collected as slurry etc.
4	Insert the “volume per livestock type” figures from Annex 6 for each livestock type.
5	Multiply the numbers in Columns 2, 3 and 4 in each row and enter the results in Column 5. Add the numbers in Column 5 and enter into Box A.

Table 24: Slurry production per month (based on undiluted slurry)				
Livestock type on slurry or part-slurry based system	Number of livestock units on slurry or part-slurry based system	Proportion of excreta collected as slurry eg half = 0.5, all = 1	Volume per livestock unit (or place) per month (m <sup>3</sup> )	Volume produced per month (m <sup>3</sup> )
Column 1	2	3	4	5
<i>Example: 1 dairy cow (more than 9,000 litres milk yield)</i>	150	x 1.0	x 1.92	= 288
		x	x	=
		x	x	=
<b>Total volume of slurry produced per month (m<sup>3</sup>)</b>				<b>(A)</b>



**Note:** If the monthly production varies, you may wish to photocopy Table 24 and complete it for each separate month October to February or October to March, and then calculate the average monthly production **A**.

**Step 3 Calculate the average volume of rainfall that enters your slurry store(s) each month**

You only need to complete this step if you identified, in Steps 1d and 1e, that rain falls directly onto uncovered or unroofed existing slurry store(s), or onto concrete areas draining into these slurry store(s).

1. Enter rainfall information for each month (from Step 1f) in the relevant boxes below and add together to give total rainfall for the storage period.

Month	Oct	Nov	Dec	Jan	Feb	Mar pig farms only	Total
Rainfall (mm)		+	+	+	+	+	=

2. Divide this total rainfall by the relevant number of months ie 6 (for pig farms) or 5 (for other livestock farms), to get the average monthly storage periods rainfall (**B**).
3. Insert the total area of uncovered slurry store(s) and concrete areas (from Steps 1d and 1e) and average monthly rainfall (**B**) into the boxes below to establish the volume of rainfall entering the slurry store(s) each month.

Area of slurry store(s) plus concrete surface area $m^2$	x	Average monthly rainfall ( <b>B</b> ) mm	÷	1,000	=	Average volume of rainfall entering slurry store(s) per month $m^3$ ( <b>C</b> )
-------------------------------------------------------------	---	------------------------------------------	---	-------	---	-------------------------------------------------------------------------------------

**Step 4 Calculate the amount of wash water entering your slurry store(s) per month**

You only need to complete this step if wash water drains into your slurry store(s).

**For dairy farms**

Typical wash water use from high volume hoses is 0.9m<sup>3</sup> per cow per month (30 litres per cow per day); or from low volume hoses is 0.6m<sup>3</sup> per cow per month (20 litres per cow per day).

**Either**

Using the boxes below, enter the total number of dairy cows normally kept on your farm during the storage period and multiply by the figure that best represents your wash water use (0.9 or 0.6). Record the result in box **D**.

**or**

If you know the total amount (in cubic metres) used per month then enter your information directly into box **D**.

Number of dairy cows	x	Wash water used per cow per month (m <sup>3</sup> )	=	<b>Monthly wash water production (m<sup>3</sup>) (D)</b>
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**For pig farms**

Typical wash water use is provided in Table 25 below.

**Either**

Enter the number of pig places on your unit and multiply the numbers across each row. Add the numbers in the final column to give the total volume **E**.

**or**

If you know the amount (in cubic metres) used per month for the whole pig unit, you can enter your information directly into box **E**.

<b>Table 25: Wash water use for pig units</b>				
Pig type	Wash water (litres per pig place per week)	Number of pig places	Factor to convert into volume per month	Monthly wash water production (m <sup>3</sup> )
Sows with litter up to 7 kg	10 x		x 0.0043	
Maiden gilts and breeding boars	0.6 x		x 0.0043	
Weaners (7 – 12 kg)	2 x		x 0.0043	
Weaners (13 – 30 kg)	2.6 x		x 0.0043	
Growers (31 – 65 kg)	1.9 x		x 0.0043	
Finishers (66 kg and over)	1.6 x		x 0.0043	
<b>Total volume (m<sup>3</sup>) =</b>				<b>(E)</b>

**Step 5 Calculate the total volume of slurry (including any dilution by rainfall/wash water) that needs to be stored.**

- i. Add the values for A, C, and D or E together to give you the monthly slurry volume (**F**).
- ii. Now multiply **F** by 6 (for pigs) or 5 (for other livestock) to give the total volume of slurry plus dilution in m<sup>3</sup> (**G**) that potentially needs to be stored.

**Step 6 Calculate the capacity of your existing slurry store(s)**

- a. Enter the dimensions of your slurry store(s), and their capacities in Table 26 below.

**For square or rectangular stores**

Multiply length (metres) by width (metres) by height (metres). Make sure you reduce the actual height by 0.3 metres to allow for freeboard as a safety margin.

**For circular stores**

Calculate the diameter (D) of the store by dividing its circumference (metres) by 3.142. Then calculate the floor area (square metres) from  $D \times D \times 0.785$ . Finally multiply the floor area (square metres) by the height (metres). Make sure you reduce the actual height by 0.3 metres to allow for freeboard as a safety margin.

**For earth banked stores**

When calculating the capacity of these stores, you must take care to account for the sloping sides otherwise you may significantly overestimate the size. Make sure you allow for 0.75 metres freeboard. If you are not sure how to make this calculation, you should seek advice, or the following Canadian website can help: [www.agric.gov.ab.ca/app19/calc/volume/dugout.jsp](http://www.agric.gov.ab.ca/app19/calc/volume/dugout.jsp)

**Safety note:** Do not attempt to measure the depth of such a store while it contains any liquid.

- b. Add up the figures in the right hand column of Table 26 to give total capacity (**H**).

Table 26: Capacity of existing slurry storage facilities					
Store ref	Length (m)	Width (m)	Circumference (circular stores only) (m)	Working Height or Depth (m)	Capacity (m <sup>3</sup> )
Store 1					
Store 2					
...					
<b>Total existing capacity (m<sup>3</sup>) =</b>					<b>(H)</b>

**Step 7 Compare existing slurry storage capacity with the capacity required**

- i. If your existing storage capacity at **(H)** is greater than the capacity at **(G)**, you will not need to do any further calculations as you are compliant with the Regulations.
- ii. However, if **(G)** is greater than **(H)**, you may need to consider providing extra storage capacity to make up the difference. But first, you should consider if you currently take action (or could take action) which reduces the volume of slurry (or dilution) that needs to be stored (ie whether you can reduce **G**).

**Step 8 Consider actions that reduce the volume of slurry (plus dilution) that needs to be stored**

You may be able to reduce the volume of slurry (plus dilution) at **(G)** to be stored if any of the following actions apply:

- i. If you **always** export some of your slurry during the storage period to another farm for land spreading (for agricultural benefit) or to another environmentally acceptable destination, you may deduct the volume exported from the volume at **(G)**. You should take into consideration the risk to your business if this export arrangement should suddenly finish.
- ii. If you **always** use a mechanical separator to remove solids from the slurry, you may reduce the volume at **(G)** by 15 to 20% (cattle slurry) and by 5 to 10% (pig slurry).
- iii. If you **always** apply some slurry to land with a low risk of run-off (see Glossary) following the end of a closed period, you may deduct the volume applied from the volume at **(G)**, but you must ADD as a contingency an extra one week's slurry production to the volume at **(G)**.
- iv. If you are able to reorganise clean and foul yard areas, alter roof drainage, roof over fouled yard areas or cover slurry stores you may be able to reduce the volume of rainwater entering your existing slurry store(s) and so reduce the volume at **(G)**.

If you do use (or intend to use) any of the options at (a) to (d) above to reduce the amount of slurry (plus dilution) stored at (G), you must record your calculation and justification. You can use the boxes below/overleaf (if necessary, attach your calculation on a separate sheet).

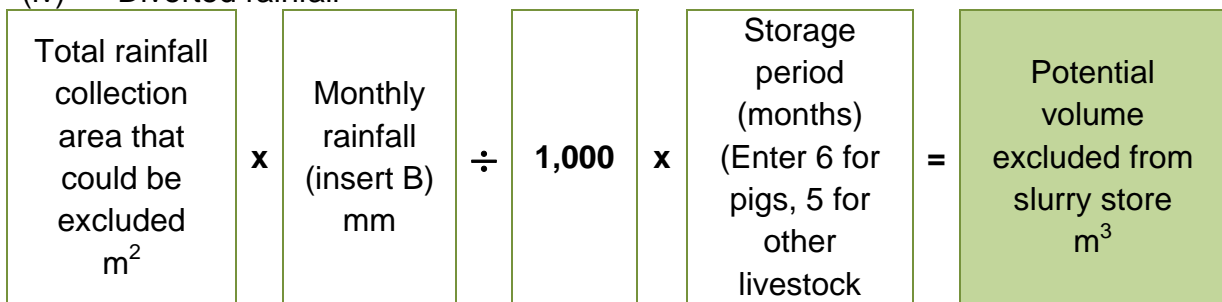
**Record of calculation and justification for reducing volume of slurry (plus dilution) to be stored**

(i) Exported slurry (Retain a copy of any agreements with your records)

(ii) Mechanically separated slurry

(iii) Slurry spread on low run-off risk land

(iv) Diverted rainfall



Subtract the volume of to be excluded from the slurry store from your calculation in step 4 above from (G). This gives you 'G rev'.

If **G rev** is greater than **H** you will need to consider providing extra storage capacity to make up the difference.

## Part B: Step-by-step guide to calculating your storage requirement for poultry manure and other types of solid manure

This step-by-step guide will help you calculate how much storage you need on your farm to comply with the legal requirements of **6 months storage capacity for poultry manure**.

Although there is no legal requirement to provide a minimum storage capacity for **other types of solid manure**, information is provided at the end of this step-by-step guide to enable you to estimate how much storage you may need on your farm for practical reasons.

The six steps you will need to follow are:

1. Collect your information
2. Calculate the volume of poultry manure produced per month
3. Calculate the total volume of poultry manure that needs to be stored
4. Calculate the capacity of any existing store(s)
5. Compare existing storage capacity with the capacity needed to meet the legal requirements
6. Consider actions that can reduce the volume of poultry manure that needs to be stored on an impermeable base / in a roofed building

### **Step 1**      **Collect your information**

Before assessing your storage requirements, you will need to have available the following basic information:

- (a) the “weight per livestock type” figures from Table 32 of Annex 6 ;
- (b) estimates of the livestock types and numbers likely to be kept on your farm during the storage period. You should future proof your calculation by inserting numbers of birds likely to be kept on your farm in the future (if this is greater than the number currently kept); and
- (c) the dimensions (metres) of any existing poultry manure store(s).

**Step 2 Calculate the weight of poultry manure produced per month**

Complete **Table 27** using standard “weight per livestock type” figures (see Annex 6).

Column	
1	Enter the type of poultry kept on your farm during the storage period (see Annex 6) and units (thousands, except for ostrich).
2	From your estimates (Step 1b), enter the number of poultry units kept during the storage period. Units are recorded in thousands of birds eg enter 3.5 for 3,500 birds.
3	Estimate the proportion collected as solid manure. For example, set the figure to 1 if everything is collected, or where poultry have access to fields it might be 0.8.
4	Insert the “weight per livestock type” figures from Annex 6 for each livestock type.
5	Multiply the numbers in Columns 2, 3 and 4 in each row and enter the results in Column 5. Add the numbers in Column 5 and enter into the appropriate Boxes <b>A</b> and <b>B</b> .

**Table 27: Poultry manure production per month**

Livestock type	Number of stock on solid manure or part-solid manure based system	Proportion of excreta collected as solid manure eg half = 0.5, all = 1	Weight per 1,000 birds per month (tonnes)	Weight produced each month (tonnes)
Column 1	2	3	4	5
<b>Laying hens</b>				
<i>Example: 1,000 laying hens (cages)</i>	20	x 1	x 3.6	= 72
...		x	x	=
<b>Total monthly production laying hen excreta (tonnes)</b>				<b>= (A)</b>
<b>Other poultry</b>				
		x	x	=
...		x	x	=
<b>Total monthly production of poultry litter (tonnes)</b>				<b>= (B)</b>

**Note:** If the monthly production varies, you may need to complete it for each separate month October to March, and then calculate the average monthly production **A** or **B**.

**Step 3 Calculate the total volume of poultry manure that potentially needs to be stored**

- i. Insert the monthly production values from **A** and/or **B** where indicated in the boxes below. Multiply the monthly production by 6, and divide the total by the density of excreta (0.9 for laying hen excreta and 0.5 for poultry litter) to give the store volume required.
- ii. Add together the totals for the two rows and record in **C**.

Monthly production from A or B (tonnes)		Months (6)		Density		Store volume (m <sup>3</sup> )
<b>A</b>	x	6	÷	0.9	=	
<b>B</b>	x	6	÷	0.5	=	
						C

**Note:** If you import poultry manure onto your farm during the storage period, and it needs to be stored, you will need to add the volume imported to figure **C** above.

**Step 4 Calculate the capacity of any existing store(s)**

You may already store poultry manure on an impermeable base or in a roofed building.

1. Enter the dimensions (in metres) of any existing poultry manure store(s) into Table 28 below. Use one row per store.
2. Multiply length by width by working height, and then enter the capacity of the store in the final column.
3. Add up the figures in the final column to give total existing capacity (**D**).

Table 28: Capacity of existing stores				
Store ref	Length (m)	Width (m)	Working height (m)	Capacity (m <sup>3</sup> )
Store 1				
Store 2				
...				
<b>Total existing capacity (m<sup>3</sup>) =</b>				<b>(D)</b>



**Step 5 Compare existing storage capacity with the capacity needed to meet the legal requirements**

- (i) If your existing storage capacity at (D) is greater than the capacity required at (C), you will not need to do any further calculations as you are compliant with the Regulations.
- (ii) However, if (C) is greater than (D), you may need to consider providing extra storage capacity to make up the difference. But first, you should consider if you currently take action (or could take action) which reduces the volume of poultry manure that needs to be stored (ie can you reduce C?) or if there are suitable field sites at which the poultry manure could be stored.

**Step 6 Consider actions that can reduce the volume of poultry manure that needs to be stored on an impermeable base / in a roofed building**

You may be able to reduce the volume of poultry manure at (C) to be stored if any of the following actions apply:

- i. If you **always** export some of your poultry manure during the storage period each year, for example to another farm for land spreading (for agricultural benefit) or to another environmentally acceptable destination (eg a power station), you may deduct the volume exported from the volume at (C).
- ii. If you are **always** able to store some poultry manure on suitable field sites, you may deduct the volume stored at the field sites from the volume at (C). Remember that layer manure must be covered.
- iii. If you **always** apply some poultry manure to land with a low risk of run-off following the end of a closed period, you may deduct the volume applied from the volume at (C), but you must ADD as a contingency an extra one week's poultry manure production to the volume at (C).

If you do use (or intend to use) any of the options at (i) to (iii) above to reduce the amount of poultry manure stored at (C), you must record your calculation and justification. You can use the boxes below to do so (if necessary, attach your calculation on a separate sheet).

1. Exported poultry manure

--

2. Storage on field sites

--

3. poultry manure spread on low run-off risk land

--

Insert your revised minimum volume to be stored:

**m<sup>3</sup> (C Rev)**

If (C Rev) is greater than (D) you will need to consider providing extra storage capacity to make up the difference.

***Calculating the volume of storage needed for other solid manures***

While there is no requirement to calculate the volume of storage needed for solid manures other than poultry, you may need to estimate your requirement for practical reasons.

1. You should fill in **Table 29** if you want to calculate the monthly volume of solid manure (eg farmyard manure) produced by **dairy cows, cattle, sheep and pigs**.

Column	
<b>1</b>	The type of livestock (see Annex 6) and units (usually 1).
<b>2</b>	The number of livestock on solid manure or part-solid manure based systems during the housing period (normally stocked).
<b>3</b>	The proportion collected as solid manure (and not slurry). For example, set the figure to 1 for all collected as solid manure, 0.5 for half collected as solid manure etc. If you have completed estimates for cattle slurry or pig slurry (Table 24) – the proportions used here will be the balance. For example if you used 0.4 as

	the proportion of excreta collected as dairy cow slurry – then 0.6 would be used here for the proportion of excreta collected as solid manure (all adding to 1.0 ie100%).
<b>4</b>	Insert the “volume per livestock type” figures (from Annex 6)
<b>5</b>	Multiply the numbers in Columns 2, 3 and 4 in each row and enter the results in Column 5. Add the numbers in Column 4 and enter into the appropriate Boxes <b>E</b> , and <b>G</b> . Multiply the value in Box <b>E</b> by the ‘straw addition’ factor 1.3 and enter into Box <b>F</b> . Multiply the value in Box <b>G</b> by the ‘straw addition factor’ 1.15 and enter into Box <b>H</b> .

2. Multiply the monthly production **F** and **H** by the number of months of storage you need to provide, and divide the total by 0.7 to give an estimated store volume. Note: 0.7 allows for the density of FYM.
3. Compare the estimated store volume needed to your existing solid manure storage capacity. You may be able to use field storage to satisfy some or all of your requirements. Consider whether to provide more storage on a constructed impermeable (eg concrete) base. Any liquid drainage from concrete pads containing solid manure (eg farmyard manure) is classed as slurry and must be collected and stored.

<b>Table 29: Cattle, sheep or pig solid manure production per month</b>				
Livestock type on solid manure or part-solid manure based system	Number of stock on solid manure or part-solid manure based system	Proportion of excreta collected as solid manure (eg half = 0.5, all = 1.0)	Volume per livestock type (or place) per month (m <sup>3</sup> )	Volume produced each month (m <sup>3</sup> and tonnes)
Columns 1	2	3	4	5
<b>Dairy cows</b>				
<i>Example 1 dairy cow (more than 9,000 litres annual milk yield)</i>	100	x 0.6	x 1.92	= 115.2
		x	x	=
<b>Total monthly volume of excreta from dairy cows =</b>				<b>(E)</b>
<b>Multiply E by 1.3 to give solid manure production (tonnes) =</b>				<b>(F)</b>
<b>Cattle</b>				
		x	x	=
<b>Sheep</b>				
		x	x	=
<b>Pigs</b>				
		x	x	=
<b>Total monthly volume of excreta from cattle, sheep and pigs =</b>				<b>(G)</b>
<b>Multiply G by 1.15 to give solid manure production (tonnes) =</b>				<b>(H)</b>

**Note:** If the monthly production varies, you may wish to complete Table 29 for each separate month October to February or October to March, and then calculate the average monthly production **F** and **H**.

## Annex 6

### **Part A: Standard values needed to calculate your manure storage capacity requirements and compliance with the livestock manure N farm limit**

The standard values in Tables 30 to 33 are calculated from the daily values given in Schedule 1 of the Regulations. You must use these values to calculate:

- your required manure storage capacity (Chapter 10), and
- your compliance with the livestock manure N farm limit (Chapter 6).

For permanently housed pigs and poultry, you may use alternative approaches (ie ENCASH or sampling and analysis) to derive alternatives to the “Total N produced by livestock” figures in Tables 31 & 32 below.

The Tables also provide figures for the number of animals per hectare that will supply the livestock manure N farm limit of 170 kg N/ha/yr. These figures are to be used as a guide only and to provide a rough indication of how close your farm is to the limit given the number of livestock on your farm.

**Table 30: Nitrogen and excreta production from cattle**

Cattle	Total N produced by cattle (kg/year) (notes a)	Volume of excreta (m <sup>3</sup> /month)	Animal number per ha to comply with maximum N loading (170 kg/ha N per year)
1 calf (all categories) up to 3 months	1.4 (note b)	0.21	21.2
1 dairy cow from 3 months and less than 13 months	29 (note c)	0.60	4.9
1 dairy cow from 13 months up to first calf	61	1.20	2.8
1 dairy cow after first calf (over 9,000 litres milk yield)	115	1.92	1.5
1 dairy cow after first calf (6,000 to 9,000 litres milk yield)	101	1.59	1.7
1 dairy cow after first calf (up to 6,000 litres milk yield)	77	1.26	2.2
1 beef cow or steer (castrated male) from 3 months and less than 13 months	28 (note c)	0.60	5.1
1 beef cow or steer from 13 months and less than 25 months	50	0.78	3.4
1 female or steer for slaughter 25 months and over	50	0.96	3.4
1 female for breeding 25 months and over weighing up to 500 kg	61	0.96	2.8
1 female for breeding 25 months and over weighing over 500 kg	83	1.35	2.0
1 non-breeding bull 3 months and over	54	0.78	3.1
1 bull for breeding from 3 to 25 months	50	0.78	3.4
1 bull for breeding 25 months and over	48	0.78	3.5

**Notes**

- (a) Different units are used for cattle less than 13 months – see notes b & c below.
- (b) Total N produced (kg) during the two months that the animal is in this category. This figure is calculated from 23g x 60 days (2 months).
- (c) Total N produced (kg) during the ten months that the animal is in this category. This figure is calculated from 95g x 300 days (10 months).

The figures provided in Tables 31 and 32 are based on an assumed level of occupancy by livestock. If the occupancy on your farm is different from the occupancy values shown in the tables, you should adjust the values of total N produced and volume of excreta using the following equation:

$$\text{Actual total N produced/excreta} = \text{Standard value (from table)} \times \frac{\text{Actual occupancy}}{\text{Standard occupancy}}$$

$$\text{Actual volume of excreta} = \text{Standard value (from table)} \times \frac{\text{Actual occupancy}}{\text{Standard occupancy}}$$

**Table 31: Nitrogen and excreta production by pigs places**

Pigs	Occupancy (%)	Total N produced (kg/year) (note a)	Volume of excreta (m <sup>3</sup> /month)	Animal places per ha to comply with maximum N loading (170 kg/ha N per year)
1 weaner place, 7 to 13 kg	71	1	0.03	170
1 weaner place, 13 to 31 kg	82	4.2	0.05	40.5
1 grower place, 31 to 66 kg (dry fed)	88	7.7	0.10	22.1
1 grower place, 31 to 66 kg (liquid fed)	88	7.7	0.18	22.1
1 finisher place, 66 kg and over (dry fed)	86	10.6	0.13	16
1 finisher place, 66 kg and over (liquid fed)	86	10.6	0.26	16.0
1 maiden gilt place, 66 kg and over	80	11.1	0.13	15.3
1 sow place, 66 kg and over, with litter, up to 7 kg, fed on diet supplement with synthetic amino acids	100	16	0.33	10.6
1 sow place, 66 kg and over, with litter, up to 7 kg, diet without synthetic amino acids (low protein diet)	100	18	0.33	9.4
1 breeding boar from 66 kg to 150 kg	100	12	0.15	14.2
1 breeding boar, 150 kg and over	100	17.5	0.26	9.7

**Note (a):** N produced in excreta is per pig place and includes an allowance for N losses from livestock housing and manure storage.

Table 32 Nitrogen and excreta production by poultry places				
Poultry	Occupancy (%)	Total N produced (kg/year) (note a)	Weight of excreta (tones / month)	Animal places per ha to comply with maximum N loading (170 kg/ha N /year)
1,000 replacement layer pullet places, up to 17 weeks	89	210	1.1	800
1,000 laying hens in cages, 17 weeks and over	97	400	3.5	420
1,000 laying hen places, free range (note b), 17 weeks and over	97	530	3.5 (note b)	320
1,000 broiler places	85	330	1.5	510
1,000 replacement broiler breeder pullet places, up to 25 weeks	92	290	1.1	590
1,000 broiler breeder places, 25 weeks and over	95	700	3.4	240
1,000 turkey places (male)	90	1,230	4.3	140
1,000 turkey places (female)	88	910	3.2	190
1,000 duck places	83	750	2.5	230
1 ostrich	100	1.4	0.05 (note b)	121

### Notes

- (a) N produced in excreta is per 1,000 poultry places (except ostriches) and includes an allowance for N losses from livestock housing and manure storage.
- (b) When calculating storage requirements, you should make an allowance for the proportion of time that birds are not housed. Commonly, free range laying hens are housed for 80% to 90% of the time. Figures given assume 80% of excreta are deposited in buildings.



Livestock type	Total N produced (kg/year) (notes a, b)	Volume of excreta (m <sup>3</sup> /month)	Animal numbers per ha to comply with maximum N loading (170 kg/ha N per year)
1 lamb, 6 to 9 months	0.5 (note c)	0.05	340
1 lamb, 9 months and over, to first lambing, first tugging or slaughter	0.7 (note d)	0.05	242.8
1 sheep, less than 60 kg, after lambing or tugging. For ewes this includes one or more suckled lambs up to 6 months	7.6	0.1	22.4
1 sheep, over 60 kg, after lambing or tugging. For ewes this includes one or more suckled lambs up to 6 months	11.9	0.15	14.3
1 goat	15	0.11	11.3
1 deer for breeding	15.2	0.15	11.2
1 deer, other	12	0.11	14.2
1 horse	21	0.74	8.1

**Notes**

- (a) Includes an allowance for N losses from livestock housing and manure storage.
- (b) Different units are used for lambs – see notes c & d below.
- (c) Total N produced (kg) during the three months that the animal is in this category.
- (d) Total N produced (kg) assuming the animal is in this category for six months.

**Table 34: Crops to which manufactured nitrogen fertiliser may be applied during the closed spreading period**

Crop	Maximum nitrogen rate (kg/ha)
Oilseed rape, winter (note a)	30
Asparagus	50
Brassica (note b)	100
Bulb onions	40
Over-wintered salad onions	40
Parsley	40
Grass (notes a, c)	80

**Notes**

- (a) Nitrogen must not be applied to these crops after 31 October.
- (b) An additional 50 kg N/ha may be applied every four weeks during the closed spreading period up to the date of harvest.
- (c) A maximum of 40 kg N/ha may be applied at any one time.

**Standard values and information needed to determine the nitrogen content of organic manures**

You can use either the standard values provided in Table 35 or manure sampling and analysis (see the Protocol in Part B of this Annex) to determine the total nitrogen content of imported or exported livestock manures when assessing your compliance with the livestock manure N farm limit (follow the calculations in Annex 2). To note: when calculating the total nitrogen content of manures produced by livestock kept on your farm for the livestock manure N farm limit YOU MUST use the standard figures in Tables 30 to 33. These figures have been derived differently from those provided in Table 35, as they are used for different purposes, and therefore are not directly comparable.

Table 35 also provides a figure for the maximum application rate that would supply the maximum amount of total N permitted under the organic manure N field limit of 250 kg N/ha/yr (follow the calculations in Annex 4 Part B). To note: these figures are provided for guidance only and you should determine a suitable application rate for your specific circumstances.

Table 36 must be used when calculating 'crop available N' from any livestock manure applications when assessing your compliance with the N max limit (follow the calculations in Annex 3).

**Table 35: The total N content of organic manures and maximum application rates to supply 250 kg N/ha of total nitrogen**

Manure type	Total N content	The maximum application rate to supply 250 kg/ha/N	
		Metric Units	Imperial Units
<b>Solid manure</b>	kg/m <sup>3</sup> or kg/t	tonnes/ha	tons/acre
Cattle farmyard manure	6	42	17
Pig farmyard manure	7	36	14.5
Sheep farmyard manure	6	42	17
Duck farmyard manure	6.5	38	15
Poultry layer manure	16	16	6.5
Poultry broiler litter	30	8	3.2
Turkey litter	30	8	3.2
Horse farmyard manure	7	36	1.5
Goat farmyard manure	6	42	17
<b>Slurry</b>	kg/m <sup>3</sup> or kg/t	m <sup>3</sup> / ha	gallons/acre
Dairy cattle	3	83	7,400
Beef cattle	2	125	11,200
Pigs	4	63	5,600
<b>Separated manures</b>	kg/m <sup>3</sup> or kg/t	m <sup>3</sup> / ha	gallons/acre
Separated cattle slurry, liquid fraction, strainer box	1.5	167	14,900
Separated cattle slurry, liquid fraction, weeping-wall	2	125	11,200
Separated cattle slurry, liquid fraction, mechanically separated	3	83	7,400
Separated cattle slurry, solid fraction	4	63	5,600
Separated pig slurry, liquid fraction	3	70	6,300
Separated pig slurry, solid fraction	5	50	4,500

**Table 36: The % of the total nitrogen content of livestock manure available for crop uptake in the growing season in which it is spread (Only for use in N max calculation)**

Manure type	Crop-available N (% of total N applied) from 1 January 2012	Crop-available N (% of total N applied) from 1 January 2014
Cattle slurry	35	40
Pig slurry	45	50
Poultry manure	30	30
Other livestock manures	10	10 (see note)

**Note:** The value for farmyard manure is at the lower end of the range of values in European countries. We will review the available evidence before the Regulations are next amended in 2016.

## Part B: The protocol for sampling slurry and solid manure for analysis

### For slurry and other liquid and semi-liquid organic manures

At least five sub-samples, each of 2 litres, must be taken.

- The sub-sample must be taken from a slurry vessel, and—
  - i. if reasonably practicable, the slurry must be thoroughly mixed before the sub-samples are taken, and
  - ii. each sub-sample must be taken from a different location.
- But if a tanker used for spreading is fitted with a suitable valve, the sub-samples may be taken while spreading, and each sub-sample must be taken at intervals during the spreading.

The sub-samples must be poured into a larger container, stirred thoroughly and a 2 litre sample must be taken from that container and poured into a smaller clean container to provide the sample for analysis.

### For solid manures

The samples must be taken from a manure heap.

- At least ten sub-samples of 1 kg each must be taken, each from a different location in a heap.
- Each sub-sample must be taken at least 0.5 metres from the surface of the heap.
- If sub-samples are being collected to calculate compliance with the whole farm limit for pigs and poultry, four samples for analysis must be taken in a calendar year (one taken in each quarter) from manure heaps not more than 12 months old.
- The sub-samples must be placed on a clean, dry tray or sheet.
- Any lumps must be broken up and the sub-samples must be thoroughly mixed.
- A representative sample of at least 2 kg must then be sent for analysis.