



Carbon Credits (Carbon Farming Initiative— Estimating Sequestration of Carbon in Soil Using Default Values) Methodology Determination 2015

I, Greg Hunt, Minister for the Environment, make the following determination.

Dated 18:7:2015

GREG HUNT

Greg Hunt
Minister for the Environment

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Part 1—Preliminary

1 Name

This is the *Carbon Credits (Carbon Farming Initiative—Estimating Sequestration of Carbon in Soil Using Default Values) Methodology Determination 2015*.

2 Commencement

This determination commences on the day after it is registered.

3 Authority

This determination is made under subsection 106(1) of the *Carbon Credits (Carbon Farming Initiative) Act 2011*.

4 Duration

This determination remains in force for the period that:

- (a) begins when this instrument commences; and
- (b) ends on the day before this instrument would otherwise be repealed under subsection 50(1) of the *Legislative Instruments Act 2003*.

5 Definitions

In this determination:

Act means the *Carbon Credits (Carbon Farming Initiative) Act 2011*.

additional water has the meaning given by section 34.

application means one of the following:

- (a) if a proponent is applying to the Regulator for declaration of a soil carbon project as an eligible offsets project under section 22 of the Act—that application;
- (b) if a proponent is applying to vary a declaration in relation to the project area for the purposes of section 29 of the Act—that application.

appropriate testing—see section 6.

bare fallowed, in relation to land, means land that is not seeded and has less than 40% ground cover for 3 months or longer.

bare soil—see section 89.

baseline emissions period, for a particular management action, means the 5 years immediately before the application that led to the undertaking of that action.

carbon estimation area means an area that is within a project area and on which a specific project management activity and one or more management actions are carried out under this determination.

Note: Carbon estimation areas are the basic unit within which management actions are carried out and for which sequestration and project emissions are estimated under this determination. A carbon estimation area may consist of a single area of land with an unbroken perimeter or of several adjacent or non-adjacent, discrete areas of land of differing sizes and shapes—see section 15.

CFI Mapping Guidelines means the document entitled ‘Carbon Farming Initiative (CFI) Mapping Guidelines’, published by the Department and as in force from time to time.

Note: In 2015 the CFI Mapping Guidelines could be viewed on the Department’s website (<http://www.environment.gov.au>).

CFI Mapping Tool means the online mapping tool entitled ‘Carbon Farming Initiative (CFI) Mapping Tool’, published by the Department from time to time.

Note: In 2015 the CFI Mapping Tool could be viewed on the following website <http://ncat.climatechange.gov.au/cmt/#/Home>.

CO₂-e means carbon dioxide equivalent.

conversion to pasture—see section 40.

depletion event means an event which is taken, for the purposes of this determination, to result in the reversal of sequestration from the eligible offsets project in accordance with:

- (a) section 88; or
- (b) subsection 89(1).

Note 1: Section 88 deals with project management activities or management actions ceasing.

Note 2: Subsection 89(1) deals with vegetation groundcover.

designated waste-stream means a waste-stream from one of the following:

- (a) intensive animal production;
- (b) food processing;
- (c) manufacturing;
- (d) municipal waste collection processes.

eligible land has the meaning given by section 12.

forest land means land with a tree height of at least 2 metres, and crown canopy cover of 20% or more and covering at least 0.2 of a hectare.

form means the chemical form in which a nutrient is present in fertiliser.

Guidelines—Qualified Person means the document entitled ‘Guidelines—Qualified Person under the Estimating Sequestration of Carbon in Soil Using Default Values Determination’, published by the Department and as in force from time to time.

Note: In 2015 the *Guidelines—Qualified Person* could be viewed on the Department’s website (<http://www.environment.gov.au>).

irrigation infrastructure operator has the same meaning as in the *Water Act 2007*.

irrigation right means a right that:

- (a) a person has against an irrigation infrastructure operator to receive water; and
- (b) is not a water delivery right.

lime means a product which is mainly comprised of calcium carbonate (CaCO₃) or calcium magnesium carbonate (CaMg(CO₃)₂), or both, and which is used to manage acidity in agricultural soils.

Note: Calcium magnesium carbonate is commonly known as dolomite.

management action means any of the following actions:

- (a) nutrient management;
- (b) soil acidity management;
- (c) new irrigation;

- (d) renovating pasture;
- (e) establishing pasture;
- (f) maintaining pasture that has been established or re-established;
- (g) retaining stubble.

material deficiency means a concentration of one or more nutrients in the soil, where the concentration limits plant growth to 70% or less of the water limited yield potential, or of the water limited potential annual pasture growth, which could have been achieved.

Note: A material deficiency is assessed by a qualified person in accordance with industry best practice nutrient management.

National Inventory Report means the most recently published document of that name that is prepared by the Department in fulfilment of obligations that Australia has under the Climate Change Convention.

native forest cover—land has **native forest cover** if the land covers at least 0.2 of a hectare and is dominated by trees that:

- (a) are located within their natural range; and
- (b) have attained a crown cover of at least 20% of the area of land; and
- (c) have reached a height of at least 2 metres.

new irrigation—see section 34.

NGER Act means the *National Greenhouse and Energy Reporting Act 2007*.

NGER Measurement Determination means the applicable determination made under subsection 10(3) of the NGER Act.

NGER Regulations means the *National Greenhouse and Energy Reporting Regulations 2008*.

non-synthetic fertiliser means any biologically-derived solid or liquid substance that:

- (a) is created using waste products of other industries or processes; and
- (b) where relevant—must be applied to the surface of, or incorporated into, agricultural soils in accordance with the laws and regulations of the relevant State, Territory or local government; and
- (c) is used to supply nutrients to plants and soils to enhance plant growth and the fertility of soils; and
- (d) does not include:
 - (i) polymers and non-biodegradable substances, such as plastics, rubber or coatings; or
 - (ii) crop residue, hay, or straw, from a waste stream that is not a designated waste stream.

nutrient means one or more of the following elements:

- (a) Nitrogen;
- (b) Phosphorus;
- (c) Potassium;
- (d) Sulphur.

nutrient management—see section 27.

nutrient management strategy—see section 28.

organosols means soils dominated by organic matter and also known as histosols.

pasture means land that is continuously under any combination of perennials, annual grasses, or legumes, and on which production livestock is raised.

pasture renovation—see section 36.

pasture renovation strategy—see section 37.

production livestock means livestock managed for production purposes and from which commercial products or services are derived.

project declaration date means the date on which the declaration of a soil carbon project as an eligible offsets project under section 27 of the Act takes effect.

project management activity—see section 9.

qualified person means a person who satisfies the requirements for being a qualified person specified in the *Guidelines—Qualified Person*.

replenishment period—see section 91.

SA2 region means a region that is indicated, in the soil carbon maps published on the CFI Mapping Tool, as an SA2 region.

Note: The SA2 regions are standardised regions defined by the Australian Bureau of Statistics as Statistical Area Level 2 regions.

sequestration period—see sections 48 and 91.

sequestration value means the value for the project management activity undertaken in a carbon estimation area, as derived from the CFI Mapping Tool in accordance with the CFI Mapping Guidelines.

sequestration year—see section 87.

soil acidity management—see section 31.

soil acidity management strategy—see section 32.

soil carbon project—see section 8.

Standard Parameters and Emissions Factors means the document entitled ‘Standard Parameters and Emissions Factors for the *Carbon Credits (Carbon Farming Initiative—Estimating Sequestration of Carbon in Soil Using Default Values) Methodology Determination 2015*’, as published and made available on the Department’s website and as updated from time to time.

Note: In 2015 the Standard Parameters and Emissions Factors could be viewed on the Department’s website (<http://www.environment.gov.au>).

stubble means post-harvest crop residue.

stubble removal event means burning or baling that:

- (a) occurs in a carbon estimation area that is under crops; and
- (b) removes stubble from the area.

stubble retention—see subsection 9(3).

sustainable intensification—see subsection 9(2).

synthetic fertiliser means any synthetic substance that:

- (a) is used to supply nutrients to plants and soils to enhance plant growth and the fertility of soils; and

- (b) where relevant—must be applied to the surface of, or incorporated into, agricultural soils in accordance with the laws of the relevant State, Territory or local government.

tillage means any form of mechanical preparation of the soil.

water access entitlement has the same meaning as in the *Water Act 2007*.

water allocation has the same meaning as in the *Water Act 2007*.

water delivery right has the same meaning as in the *Water Act 2007*.

wetland includes lakes, rivers, natural wetlands, and human-made dams.

Note: Other words and expressions used in this determination have the meaning given by the Act. These include:

carbon dioxide equivalent

Climate Change Convention

crediting period

eligible carbon abatement

eligible offsets project

emission

greenhouse gas

legislative rules

offsets project

offsets report

permanence period

project

project area

project proponent

Regulator

reporting period

6 Appropriate testing

- (1) In this determination:

appropriate testing means soil testing and (if relevant) plant tissue testing that is undertaken to inform soil nutrient requirements or management of soil acidity for a carbon estimation area.

- (2) The testing must meet industry best practice standards for:

- (a) the measurement or estimation of:
- (i) relevant nutrients in soil or plant tissue; or
 - (ii) soil pH; and
- (b) the choice of test; and
- (c) the number of samples taken; and
- (d) for soil samples—the depth of the samples.

- (3) Analysis of the soil and plant tissue samples for nutrients must be undertaken by a laboratory that is certified for the relevant test by the National Association of Testing Authorities (NATA).

7 Factors and parameters from external sources

- (1) If a calculation in this determination includes a factor or parameter that is defined or calculated by reference to another instrument or writing, the factor or parameter to be used for a reporting period is the factor or parameter referred to in, or calculated by reference to, the instrument or writing as in force at the end of the reporting period.

Note: This means that calculations using historical data for a reporting period may not be correct for later reporting periods because reference instruments might have changed. Baseline calculations, for example, will have to be re-worked from one reporting period to another, as necessary.

- (2) Subsection (1) does not apply if:
 - (a) this determination specifies otherwise; or
 - (b) it is not possible to define or calculate the factor or parameter by reference to the instrument or writing as in force at the end of the reporting period.

Part 2—Soil carbon projects

8 Soil carbon projects

- (1) For paragraph 106(1)(a) of the Act, this determination applies to a sequestration offsets project that:
 - (a) involves the sequestration of carbon in soil; and
 - (b) could reasonably be expected to result in eligible carbon abatement; and
 - (c) is not declared an eligible offsets project for which the *Carbon Credits (Carbon Farming Initiative) (Sequestering Carbon in Soils in Grazing Systems) Methodology Determination 2014* is the applicable determination.
- (2) A project covered by subsection (1) is a ***soil carbon project***.

9 Project management activities in soil carbon projects

- (1) A soil carbon project must involve undertaking one or more of the following ***project management activities***:
 - (a) sustainable intensification;
 - (b) stubble retention;
 - (c) conversion to pasture.
- (2) ***Sustainable intensification*** involves undertaking 2 of the following management actions in a carbon estimation area:
 - (a) nutrient management;
 - (b) soil acidity management;
 - (c) new irrigation;
 - (d) pasture renovation.
- (3) ***Stubble retention*** involves undertaking the management action of retaining stubble in a carbon estimation area after a crop is harvested.
- (4) ***Conversion to pasture*** involves undertaking the management actions of establishing and maintaining pasture in a carbon estimation area.

Part 3—Eligibility requirements

Division 1—Eligible projects

10 Operation of this Part

For paragraph 106(1)(b) of the Act, this Part sets out requirements that must be met for a soil carbon project to be an eligible offsets project.

Division 2—Requirements for declaration as eligible project

Subdivision 1—Land on which the project is carried out

11 Location

- (1) The project must be carried out on land for which FullCAM data exists.
- (2) For this section, **FullCAM** means the latest publicly released version on the Department's website of the Full Carbon Accounting Model used to model forest and soil carbon stocks associated with land use and management for Australia's National Greenhouse Gas Inventory.

Note 1: The Department's website is www.environment.gov.au.

Note 2: In 2015 FullCAM data existed for mainland Australia and Tasmania but not for any external Territories or offshore islands.

12 Eligible land

- (1) Each project area must consist entirely of eligible land.
- (2) For this determination, **eligible land** is land which has a sequestration value as determined in accordance with the soil carbon maps published on the CFI Mapping Tool.

Subdivision 2—Carbon estimation areas

13 Carbon estimation areas—stratification

- (1) At the time of the application, the project proponent must stratify each project area, or each added or varied project area, into one or more carbon estimation areas.
- (2) If land in a project area is not a carbon estimation area, it may be stratified into one or more exclusion areas.

Definitions

- (3) In this section:

exclusion area means a part of a project area that is not a carbon estimation area.

14 Carbon estimation areas—general requirements

- (1) A carbon estimation area must consist of land which:
 - (a) during the 5 years immediately before the application, was grazed, cropped or bare fallowed at least once; and
 - (b) is entirely within a single SA2 region.

- (2) A carbon estimation area must not include the following:
 - (a) forest land;
 - (b) areas with organosols;
 - (c) settlements including dwellings or other structures;
 - (d) land that has been subject to:
 - (i) clearing of native forest cover; or
 - (ii) drainage of a wetland; within the relevant baseline emissions period;
 - (e) land on which a project management activity could not be carried out.
- (3) At the time of the application the project proponent must nominate one project management activity for each carbon estimation area, or each added or varied carbon estimation area.

15 Carbon estimation areas—boundaries and mapping

- (1) A carbon estimation area must comprise:
 - (a) a single area of eligible land with an unbroken perimeter; or
 - (b) separate areas of eligible land.
- (2) The geographic boundaries of each carbon estimation area must be defined:
 - (a) in accordance with the CFI Mapping Guidelines; and
 - (b) using at least one of the following:
 - (i) field surveys;
 - (ii) soil, vegetation, or landform maps;
 - (iii) aerial photography;
 - (iv) remotely-sensed imagery;
 - (v) deposited title plans from a State or Territory land title registry.
- (3) Any photography or imagery must be:
 - (a) date-stamped; and
 - (b) geo-referenced.
- (4) The project proponent must provide the Regulator with a map showing each carbon estimation area in a project area.

Note: A carbon estimation area may be modified after the project declaration date only in accordance with section 16.

16 Change of carbon estimation areas

- (1) If changes are made to the number or boundaries of carbon estimation areas within a project, each changed or new carbon estimation area must meet the requirements set out in:
 - (a) section 14; and
 - (b) subsections 15(1) to (3).

Note 1: Details regarding changes to the number or boundaries of carbon estimation areas must be provided in an offsets report in accordance with section 95.

Note 2: Compliance with subsection 15(4) is required at the time of submission of the next offsets report—see subsection 95(2).

- (2) For the purposes of paragraph (1)(a), a reference to ‘the application’ in subsection 14(3) is taken to be a reference to when the changes are made to the number or boundaries of the carbon estimation areas within a project.
- (3) If changes are made to the number or boundaries of a carbon estimation area within a project, the changes must not result in any portion of a carbon estimation area that has been reported on in an offsets report no longer being within a carbon estimation area.
- (4) If a project management activity has been undertaken in a particular carbon estimation area during a particular reporting period, changes must not be made to the boundaries of that carbon estimation area before the end of the reporting period.

Subdivision 3—Sustainable intensification

17 Sustainable intensification—general requirement

If an application relates to carrying out sustainable intensification in a carbon estimation area, the project proponent must nominate on the application 2 of the following management actions to be carried out in each carbon estimation area in which sustainable intensification will be undertaken:

- (a) nutrient management;
- (b) soil acidity management;
- (c) new irrigation;
- (d) pasture renovation.

Note: While more than 2 actions may be carried out in a carbon estimation area, only 2 actions will be credited.

18 Application requirements—nutrient management

- (1) If an application relates to sustainable intensification that will involve nutrient management as a management action, the project proponent must provide written advice with the application.
- (2) The advice must not be more than 3 months old at the time the application is submitted.
- (3) The advice must be provided by a qualified person.
- (4) The advice must state that, at the time the advice is prepared:
 - (a) the carbon estimation area in which sustainable intensification will take place has a material deficiency; and
 - (b) in every year of the baseline emissions period, the area was likely to have had a material deficiency.
- (5) The advice must be based on evidence that must include one or more of the following:
 - (a) historical fertiliser application;
 - (b) crop yield, pasture production, or stocking rates;
 - (c) appropriate testing.

Note: The requirements for nutrient management as a management action are set out in Subdivision 3 of Division 3.

19 Application requirements—soil acidity management

- (1) If an application relates to sustainable intensification that will involve soil acidity management as a management action, the project proponent must provide written advice with the application.

- (2) The advice must not be more than 3 months old at the time the application is submitted.
- (3) The advice must be provided by a qualified person.
- (4) The advice must state that, at the time the advice is prepared, the average soil pH as measured in calcium chloride (CaCl₂) in the carbon estimation area in which sustainable intensification will take place is less than one or both of the following:
 - (a) 5.5 in the surface soil (0–10 centimetre depth);
 - (b) 4.8 in the subsoil (below 10 centimetre depth).
- (5) The advice must:
 - (a) be based on evidence that includes appropriate testing of soil pH as measured in calcium chloride; and
 - (b) specify the results of the testing.

Note: The requirements for soil acidity management as a management action are set out in Subdivision 4 of Division 3.

20 Application requirements—new irrigation

If an application relates to sustainable intensification that will involve new irrigation as a management action, the project proponent must provide with the application evidence to demonstrate that the carbon estimation area for which irrigation is being introduced was not under irrigation at any time during the baseline emissions period.

Note 1: Evidence provided with the application may include farm records, tax receipts, written advice from the relevant State or Territory government authority or irrigation infrastructure operator, or photographic images (date-stamped and geo-referenced).

Note 2: The requirements for new irrigation as a management action are set out in Subdivision 5 of Division 3.

21 Application requirements—pasture renovation

If an application relates to sustainable intensification that will involve pasture renovation in a carbon estimation area as a management action, the project proponent must provide evidence with the application to demonstrate that the area was under pasture for at least the 2 years before the application was submitted.

Note 1: Evidence provided with the application may include farm records, tax receipts, written advice from local land services, or photographic images (date-stamped and geo-referenced).

Note 2: The requirements for pasture renovation as a management action are set out in Subdivision 6 of Division 3.

Subdivision 4—Stubble retention

22 Application requirements—stubble retention

- (1) If an application relates to stubble retention that will involve retaining stubble in a carbon estimation area after a crop is harvested, the project proponent must provide evidence with the application to demonstrate that:
 - (a) the area was cropped at least annually in the baseline emissions period; and
 - (b) subject to subsection (2), more than 30% of crop stubble was removed from the area by burning or baling in at least 4 out of the 5 years in the baseline emissions period.

Note: Evidence provided with the application may include farm records or receipts from bales sold.

- (2) More than 30% of crop stubble must have been removed by burning or baling in the carbon estimation area in the year immediately before the application.

Note: The requirements for stubble retention as a management action are set out in Subdivision 7 of Division 3.

Subdivision 5—Conversion to pasture

23 Application requirements—conversion to pasture

If an application relates to conversion to pasture that will involve establishing pasture by seeding in a carbon estimation area as a management action, the project proponent must provide evidence with the application to demonstrate that the area in which the activity will take place:

- (a) has not been under pasture at any point during the baseline emissions period; and
- (b) was:
 - (i) under crops; or
 - (ii) bare fallowed; or
 - (iii) a combination of (i) and (ii);throughout the baseline emissions period.

Note 1: Evidence provided with the application may include farm records, tax receipts, written advice from local land services, and photographic images (date-stamped and geo-referenced).

Note 2: The requirements for conversion to pasture as a management action are set out in Subdivision 8 of Division 3.

Division 3—Requirements for eligible projects

Subdivision 1—General requirements for eligible projects

24 General requirements for soil carbon projects

- (1) A soil carbon project is an eligible offsets project only if a project management activity is carried out in a carbon estimation area:
 - (a) for the duration of the nominated permanence period; and
 - (b) in accordance with this Division.
- (2) The activity carried out in the carbon estimation area must be:
 - (a) that nominated in accordance with subsection 14(3); or
 - (b) if that activity has changed in accordance with section 85—the activity as so changed.
- (3) To avoid doubt, and subject to this determination, a land management activity that is not a project management activity nominated under section 14 or a management action nominated under section 17 may be carried out in a carbon estimation area at the same time as a project management activity or management action is carried out.

Subdivision 2—Sustainable intensification—general requirements

25 Sustainable intensification—management actions

- (1) Subject to section 26, a soil carbon project that involves sustainable intensification in a carbon estimation area is an eligible offsets project only if 2 of the following management actions are carried out in the area:
 - (a) nutrient management, in accordance with Subdivision 3;

- (b) soil acidity management, in accordance with Subdivision 4;
 - (c) new irrigation, in accordance with Subdivision 5;
 - (d) pasture renovation, in accordance with Subdivision 6.
- (2) Each such action must be:
- (a) a management action nominated in accordance with section 17; or
 - (b) if either or both management actions have changed in accordance with section 85— a management action as so changed.
- (3) For this section, each such management action is a ***nominated management action***.
- (4) For this determination, the date sustainable intensification is taken to have commenced as a project management activity is:
- (a) if 2 nominated management actions are taken to have commenced on the same date—that date; and
 - (b) if:
 - (i) 2 nominated management actions are taken to have commenced on different dates; and
 - (ii) those dates are no more than 6 months apart;
 the date the earlier action is taken, under this determination, to have commenced.
- (5) If the nominated management actions are taken, under this determination, to have commenced more than 6 months apart, sustainable intensification does not commence as a project management activity by the undertaking of those management actions.

26 Sustainable intensification—stubble removal event in carbon estimation area under crops

If:

- (a) a soil carbon project involves sustainable intensification in a carbon estimation area that is under crops; and
- (b) one or more stubble removal events occur in the area;

the project is an eligible offsets project only if no more than one removal event occurs in the area every 5 years that it is under crops.

Subdivision 3—Eligibility requirements for nutrient management

27 Nutrient management—management action

- (1) For this determination, ***nutrient management***, when undertaken as part of sustainable intensification, means a management action that:
- (a) is carried out on land that, immediately before the start of the action, had a material deficiency; and
 - (b) involves applying nutrients to the land in the form of synthetic or non-synthetic fertiliser to address the deficiency.
- (2) Before nutrient management is undertaken as a management action in a carbon estimation area, the project proponent must obtain a nutrient management strategy that complies with sections 28 and 29.
- (3) Nutrient management is taken to commence in the carbon estimation area when nutrients are first applied to the carbon estimation area under the nutrient management strategy referred to in subsection (2) and in accordance with this determination.

- (4) Nutrients must be applied to the carbon estimation area using the rate, form, timing and placement specified by the nutrient management strategy.
- (5) Nutrients must be applied in accordance with industry best practice for the management of environmental risks.
- (6) Nutrients must be reapplied at whichever is the more frequent of the following:
 - (a) the interval specified in the nutrient management strategy;
 - (b) every 5 years.
- (7) While nutrient management is a management action, appropriate testing of the carbon estimation area must be undertaken at least every 5 years after nutrient management commences in the area.

28 Nutrient management—strategy

- (1) A nutrient management strategy is a signed and dated written document prepared and, where appropriate, revised, by a qualified person.
- (2) The strategy must specify nutrient management practices that could reasonably be expected:
 - (a) to address the material deficiency in a carbon estimation area each year from when the nutrients were first applied as part of a management action in the area; and
 - (b) to result in improved biomass.
- (3) The nutrient management practices must be designed:
 - (a) to provide, as a minimum, the nutrients that will be removed from the soil by pasture or crops before the nutrients are next applied; and
 - (b) to achieve at least 90% of:
 - (i) the water limited yield potential; or
 - (ii) the water limited potential annual pasture growth;
 in each year for each carbon estimation area to which the strategy applies.
- (4) The strategy must specify, as a minimum, the rate, form, timing and placement of nutrients in each carbon estimation area to which the strategy applies.
- (5) The strategy must take into account limitations to sustainable intensification in the carbon estimation area, other than a material deficiency.

Note: The limitations may include:

 - (a) soil sodicity; or
 - (b) if soil acidity management is not being undertaken as a management action in the carbon estimation area—soil acidity; or
 - (c) micronutrients.
- (6) The strategy must refer to evidence that shows how:
 - (a) the steps prescribed in the strategy will result in improved biomass; and
 - (b) any product prescribed in the strategy to be used as part of nutrient management, including the rate, form, timing and placement of the product, is likely to help achieve the strategy's aim as set out in subsection (2).

Note: Evidence may include product information, industry literature and product testing results.
- (7) The strategy must be consistent with industry best practice for the management of environmental risks.

29 Nutrient management—appropriate testing for strategy

First strategy

- (1) If undertaken, appropriate testing for the first nutrient management strategy must have been undertaken no earlier than 12 months before:
 - (a) the application was submitted; or
 - (b) if nutrient management is undertaken as a management action in a carbon estimation area after the project declaration date—the commencement of that action.
- (2) Appropriate testing for a nutrient for the first strategy may be omitted if:
 - (a) it is known that that nutrient is not deficient in the carbon estimation area in which the nutrient management will take place; and
 - (b) the strategy explains why the area is known not to be deficient in that nutrient.
- (3) Appropriate testing for nitrogen for the first strategy may be omitted if it can be demonstrated by other means that the area is deficient in that nutrient.

Subsequent strategies

- (4) Subsequent strategies must be based on appropriate testing that is no more than 12 months old.

30 Nutrient management—review of strategy

At least every 5 years after nutrient management commences in a carbon estimation area, a nutrient management strategy must:

- (a) be reviewed by a qualified person taking into account the results from the most recent appropriate testing; and
- (b) if recommended by the qualified person—be revised.

Note: If a review of the strategy must be undertaken during a reporting period, the project proponent must include evidence in the report to demonstrate that the review was undertaken—see section 93.

Subdivision 4—Eligibility requirements for soil acidity management

31 Soil acidity management—management action

- (1) For this determination, *soil acidity management*, as part of sustainable intensification, means a management action that:
 - (a) is carried out on land on which, immediately before the start of the action, the average soil pH as measured in calcium chloride (CaCl₂) was less than one or both of the following:
 - (i) in the surface soil (0–10 centimetre depth);
 - (ii) in the subsoil (below 10 centimetre depth); and
 - (b) involves applying lime to decrease the soil acidity.
- (2) Before soil acidity management is undertaken as a management action in a carbon estimation area, the project proponent must obtain a soil acidity management strategy that complies with section 32.
- (3) Soil acidity management is taken to commence when lime is first applied to the carbon estimation area under the soil acidity management strategy referred to in subsection (2) and in accordance with this determination.

- (4) Subject to subsection (5), lime must be reapplied in accordance with a soil acidity management strategy.
- (5) Subject to subsection (6), lime must be reapplied at whichever is the more frequent of the following:
 - (a) the interval specified in the soil acidity management strategy;
 - (b) every 5 years.
- (6) A project proponent does not need to reapply lime to the carbon estimation area if appropriate testing indicates that the average soil acidity for that area is more than pH 5.5 for both surface soils and subsoils.
- (7) While soil acidity management is a management action, appropriate testing of the carbon estimation area must be undertaken at least every 5 years after soil acidity management commences in the area.

32 Soil acidity management—strategy

- (1) A soil acidity management strategy is a signed and dated written document prepared and, where appropriate, revised, by a qualified person.
- (2) The strategy must specify soil acidity management practices that could reasonably be expected:
 - (a) to bring surface soils to a pH of more than 5.5 no later than 5 years from when lime was first applied; and
 - (b) to bring sub-soils to a pH of more than 5.5 over time.
- (3) The strategy must:
 - (a) specify, as a minimum, the rate, form, timing and placement of lime in each carbon estimation area to which the strategy applies; and
 - (b) demonstrate that the strategy is consistent with industry best practice for:
 - (i) the management of environmental risks; and
 - (ii) establishing and managing critical levels of soil acidity considering the production use of the relevant carbon estimation area.
- (4) The strategy must be based on results of appropriate testing that is:
 - (a) for the first strategy—undertaken no earlier than 12 months before:
 - (i) the application that relates to the management action was submitted; or
 - (ii) if soil acidity management is subsequently undertaken as a management action in a carbon estimation area—the commencement of that action; and
 - (b) for subsequent strategies—no more than 12 months old.
- (5) The strategy must take into account limitations to sustainable intensification in the carbon estimation area other than soil acidity.

Note: The limitations may include:

 - (a) soil sodicity; or
 - (b) if nutrient management is not being undertaken as a project management activity in the carbon estimation area—a material deficiency; or
 - (c) micronutrients.
- (6) The strategy must refer to evidence that shows how:
 - (a) the actions prescribed in the strategy can reasonably be expected to result in improved biomass; and

- (b) any product prescribed in the strategy to be used as part of soil acidity management, including the rate, form, timing and placement of the product, is likely to help achieve the strategy's aim as set out in subsection (2).

Note: Evidence may include product information, industry literature and product testing results.

33 Soil acidity management—review of strategy

At least every 5 years after soil acidity management commenced, the strategy must:

- (a) be reviewed by a qualified person taking into account the results from the most recent appropriate testing; and
- (b) if recommended by the qualified person—be revised.

Note: If a review of the strategy must be undertaken during a reporting period, the project proponent must include evidence in the report to demonstrate that the review was undertaken—see section 93.

Subdivision 5—Eligibility requirements for new irrigation

34 New irrigation—management action

- (1) For this determination, *new irrigation*, as part of sustainable intensification, means a management action that:
 - (a) is carried out on a carbon estimation area that, immediately before the start of the action, was not under irrigation; and
 - (b) involves obtaining water from either of the following:
 - (i) irrigation efficiency savings made outside of the carbon estimation area on which the new irrigation is carried out;
 - (ii) one of the following:
 - (A) a water access entitlement obtained after the application under section 22 of the Act is made; or
 - (B) an irrigation right obtained after the application under section 22 of the Act is made; and
 - (c) involves applying at least 2 megalitres of that water per hectare per year to the carbon estimation area in which the action is carried out.
- (2) New irrigation in a particular carbon estimation area is taken to commence when the water that is added as part of new irrigation (*additional water*) is first applied to the carbon estimation area in accordance with this determination.
- (3) In this section, *irrigation efficiency savings* means improving the efficiency of one or both of the following:
 - (a) on-farm irrigation infrastructure;
 - (b) management practices.
- (4) If the additional water used to carry out the management action on a carbon estimation area comes from irrigation efficiency savings specified in subparagraph (1)(b)(i), the irrigation efficiency improvements must not be carried out using funding from any Commonwealth, State, Territory, or local government program.

35 New irrigation—additional water

- (1) Subject to subsection (2), the additional water must be applied:
 - (a) across the carbon estimation area in every year that the management action is undertaken; and

- (b) if relevant—in accordance with the conditions of a water access entitlement, water allocation or irrigation right.
- (2) Additional water must not be applied to a carbon estimation area if the circumstances specified in paragraph 87(4)(b) are met.

Note: Paragraph 87(4)(b) deals with the situation in which environmental conditions are such that additional water would not achieve an increase in yield or pasture growth.

Subdivision 6—Eligibility requirements for pasture renovation

36 Pasture renovation—management action

- (1) For this determination, *pasture renovation*, as part of sustainable intensification, means a management action in a carbon estimation area that:
 - (a) is carried out on land that, for at least 2 years immediately before the start of the action, has been under pasture; and
 - (b) involves re-establishing pasture on the land by seeding.
- (2) Before pasture renovation is undertaken as a management action in a carbon estimation area, the project proponent must obtain a pasture renovation strategy that complies with section 37.
- (3) Pasture renovation is taken to commence in a carbon estimation area when pasture is first re-seeded in the area under the pasture renovation strategy referred to in subsection (2) and in accordance with this determination.
- (4) The renovated pasture must achieve at least 70% vegetation ground-cover within 12 months of re-seeding.

Note: Monitoring and record keeping requirements in relation to vegetation groundcover are set out in section 99.

- (5) The renovated pasture may include any combination of annual, perennial, or legume species.
- (6) The renovated pasture must be dominated by vegetation from seed stock that was sown as part of the action.

Note: Evidence to demonstrate that the requirement in subsection (6) is met may include receipts for seed quantities sufficient to sow the carbon estimation area in accordance with a pasture renovation strategy.

- (7) The pasture renovation management action must implement a pasture renovation strategy.

37 Pasture renovation—strategy

- (1) A pasture renovation strategy is a signed and dated written document prepared and, if relevant, revised, by a qualified person.
- (2) The strategy must specify practices that could reasonably be expected to re-establish pasture on the carbon estimation area.
- (3) The strategy must provide advice on the requirements for pasture renovation for each carbon estimation area in which the management action is undertaken, including:
 - (a) the appropriate species to use; and
 - (b) preparation activities; and
 - (c) post-seeding care; and

- (d) maintenance activities; and
 - (e) consideration and appropriate management of any environmental risks.
- (4) The strategy must take into account limitations to sustainable intensification in the carbon estimation area.
- Note: The limitations may include:
- (a) soil sodicity; or
 - (b) a material deficiency; or
 - (c) soil acidity; or
 - (d) micronutrients.
- (5) The strategy must refer to evidence that shows how:
- (a) the steps prescribed in the strategy will result in improved biomass; and
 - (b) any product prescribed in the strategy to be used as part of pasture renovation, including the rate, form, timing and placement of the product, is likely to achieve the strategy's aim.
- Note: Evidence may include product information, industry literature and product testing results.

38 Pasture renovation—review of strategy

At least every 5 years after pasture renovation commences in a carbon estimation area, the strategy must be:

- (a) reviewed by a qualified person; and
- (b) if recommended by the qualified person—revised to ensure that the strategy specifies appropriate practices to maintain, or re-establish by re-seeding, pasture.

Note: If a review of the strategy must be undertaken during a reporting period, the project proponent must include evidence in the report to demonstrate that the review was undertaken—see section 93.

Subdivision 7—Eligibility requirements for stubble retention

39 Eligibility requirements for stubble retention

- (1) A soil carbon project that involves stubble retention in a carbon estimation area is an eligible offsets project only if:
- (a) stubble is retained in the carbon estimation area after a crop is harvested; and
 - (b) burning or baling occurs in the area no more than once every 5 years that the area is under crops.
- (2) For the purposes of this determination, stubble retention commences in a carbon estimation area if:
- (a) a crop is sown in the carbon estimation area; and
 - (b) no burning or baling occurred in the area after the previous crop in the area was harvested; and
 - (c) the sowing and the harvest referred to in paragraphs (a) and (b) occurred after the project declaration date.
- (3) The stubble retention is taken to have commenced when the sowing referred to in paragraph (2)(a) is completed.

Subdivision 8—Eligibility requirements for conversion to pasture

40 Conversion to pasture—management action

- (1) For this determination, *conversion to pasture* means a project management activity in a carbon estimation area that:
 - (a) is carried out on land that was:
 - (i) under crops; or
 - (ii) bare fallowed; or
 - (iii) a combination of (i) and (ii);immediately before the start of the activity; and
 - (b) involves the management actions of:
 - (i) establishing pasture by seeding; and
 - (ii) maintaining pasture throughout the nominated permanence period; on the land in accordance with a conversion to pasture strategy.
- (2) Before conversion to pasture is undertaken in a carbon estimation area, the project proponent must obtain a conversion to pasture strategy that complies with section 41.
- (3) Conversion to pasture is taken to commence in a carbon estimation area when pasture is first seeded in the area under the conversion to pasture strategy referred to in subsection (2) and in accordance with this determination.
- (4) The pasture must achieve at least 70% vegetation groundcover within 12 months of the activity commencing in the carbon estimation area.

Note: Monitoring and record keeping requirements in relation to vegetation groundcover are set out in section 99.

- (5) The pasture may include any combination of annual, perennial, or legume species.
- (6) The pasture must be dominated by vegetation from seed stock that was sown as part of the activity.

Note: Evidence to demonstrate that the requirement in subsection (6) is met may include receipts for seed quantities sufficient to sow the carbon estimation area in accordance with a pasture renovation strategy.
- (7) The conversion to pasture project management activity must implement a conversion to pasture strategy.

41 Conversion to pasture—strategy

- (1) A conversion to pasture strategy is a signed and dated written document prepared and, where relevant, revised, by a qualified person.
- (2) The strategy must specify practices that could reasonably be expected to lead to established pasture in the carbon estimation area.
- (3) The strategy must provide advice on the requirements for conversion to pasture for each carbon estimation area in which the project management activity is undertaken, including:
 - (a) the appropriate species to use; and
 - (b) preparation activities; and
 - (c) post-seeding or post-planting care; and
 - (d) maintenance activities; and

- (e) consideration and appropriate management of any environmental risks.
- (4) The strategy must refer to evidence that shows how:
 - (a) the steps prescribed in the strategy will result in improved biomass; and
 - (b) any product prescribed in the strategy to be used as part of conversion to pasture, including the rate, form, timing and placement of the product, is likely to achieve the strategy's aim.

Note: Evidence may include product information, industry literature and product testing results.

42 Conversion to pasture—review of strategy

At least every 5 years after the first conversion to pasture is undertaken in a carbon estimation area, the strategy must be:

- (a) reviewed by a qualified person; and
- (b) if recommended by the qualified person—revised to ensure that the strategy specifies appropriate practices to maintain pasture.

Note: If a review of the strategy must be undertaken during a reporting period, the project proponent must include evidence in the report to demonstrate that the review was undertaken—see section 93.

Subdivision 9—Other eligibility requirements

43 Clearing woody vegetation

- (1) A soil carbon project is not an eligible offsets project if it involves the clearing of woody vegetation from a project area, other than:
 - (a) clearing from a project area in accordance with a right or approval from the relevant government body (such as a valid clearing permit) that was already in force before the relevant date for that project area; or
 - (b) to manage growth of invasive woody weeds that have grown in a project area since the relevant date for that project area, provided the clearing is undertaken in accordance with any applicable regional natural resource management plan and Commonwealth, State, Territory or local government environmental and planning laws.
- (2) For subsection (1), the *relevant date* for a project area is the date on which the project area was first identified in the declaration under section 27 of the Act as a project area or a varied project area.

44 Newness requirement

For subparagraph 27(4A)(a)(ii) of the Act, a requirement in lieu of the newness requirement for a soil carbon project is that the project complies with subparagraph 27(4A)(a)(i) of the Act, disregarding the preparation of any nutrient management strategy, soil acidity management strategy, pasture renovation strategy, or conversion to pasture strategy, before the relevant management action or project management activity commences.

Part 4—The net abatement amount

Division 1—The net abatement amount—general

45 The net abatement amount

- (1) For paragraph 106(1)(c) of the Act, this Part specifies the method for working out the carbon dioxide equivalent net abatement amount for a reporting period for a project to which this determination applies.
- (2) The carbon dioxide equivalent net abatement amount in relation to a reporting period for the project is taken to be the increase in soil carbon sequestration associated with the relevant management actions for a project area, minus the change in project emissions.

46 Overview of gases accounted for in abatement calculations

Table 1 provides an overview of the greenhouse gas sources that are relevant to working out the carbon dioxide equivalent net abatement amount for a soil carbon project.

Table 1: Carbon pools and emission sources accounted for in the abatement calculations

<i>Baseline carbon pool or emission source</i>	<i>Greenhouse gas</i>
Soil organic carbon	Carbon dioxide (CO ₂)
Livestock	Nitrous oxide (N ₂ O) Methane (CH ₄)
Synthetic fertiliser	Nitrous oxide (N ₂ O) Carbon dioxide (CO ₂)
Lime	Carbon dioxide (CO ₂)
Residues	Nitrous oxide (N ₂ O) Carbon dioxide (CO ₂) Methane (CH ₄)
Irrigation energy	Nitrous oxide (N ₂ O) Carbon dioxide (CO ₂) Methane (CH ₄)
<i>Project carbon pool or emission source</i>	<i>Greenhouse gas</i>
Soil organic carbon	Carbon dioxide (CO ₂)
Livestock	Nitrous oxide (N ₂ O) Methane (CH ₄)
Synthetic fertiliser	Nitrous oxide (N ₂ O) Carbon dioxide (CO ₂)
Lime	Carbon dioxide (CO ₂)
Residues	Nitrous oxide (N ₂ O) Carbon dioxide (CO ₂) Methane (CH ₄)
Irrigation energy	Nitrous oxide (N ₂ O) Carbon dioxide (CO ₂) Methane (CH ₄)

Note: Emissions from energy use for irrigation include fuel and electricity emissions.

Division 2—Calculations—general

Subdivision 1—Calculations—general

47 Calculating the net abatement amount—overview of process

- (1) The carbon dioxide equivalent net abatement amount for a soil carbon project must be determined in accordance with the process that is specified in this Part, and which is summarised in this section.

Calculation of project sequestration

- (2) The annual sequestration value for the project management activity carried out in a carbon estimation area must be identified.

Note: This value is derived from the CFI Mapping Tool.

- (3) To work out the sequestration value for each carbon estimation area, the annual sequestration value for each project management activity that was undertaken must be multiplied by the length of the reporting period and by the area of the carbon estimation area.
- (4) All sequestration values for the reporting period from each carbon estimation area being reported on must be summed to derive project sequestration.

Calculation of change in emissions

- (5) The relevant emissions sources, and the relevant baseline methods which must be taken into account for each carbon estimation area, must be identified.
- (6) The baseline emissions from each relevant source for each carbon estimation area must be calculated.
- (7) Reporting period emissions from each relevant source for each carbon estimation area being reported on must be calculated.
- (8) Changes in emissions from each relevant source for each carbon estimation area being reported on must be calculated by determining the difference between baseline and project emissions.
- (9) The change in emissions from all emissions sources within each carbon estimation area being reported on must be summed to derive net change in project emissions for the carbon estimation area.
- (10) The net change in project emissions for each carbon estimation area being reported on must be summed to derive net change in project emissions for the relevant project for the reporting period.

Calculation of carbon dioxide equivalent net abatement amount

- (11) Net change in project emissions for the parts of the project that are being reported on must be subtracted from total sequestration for those parts of the project to derive the carbon dioxide equivalent net abatement amount for the parts of the project that are being reported on for the reporting period.
- (12) The carbon dioxide equivalent net abatement amount may be adjusted if necessary by any negative carbon dioxide equivalent net abatement that has been carried over from previous reporting periods.

Note: This process may be affected by a depletion event under Division 8 of this Part.

Subdivision 2—Calculating soil carbon sequestration

48 Sequestration period

- (1) This subsection sets out a simplified description of the sequestration period.

- For each reporting period the general rule is that sequestration of carbon in soil, and changes in emissions, in a particular carbon estimation area are calculated only for the portion of the reporting period over which a project management activity is taking place in that carbon estimation area. This is termed the ‘sequestration period’ of the particular reporting period.
- The exception to this general rule is when there has been a ‘depletion event’ under Division 8. After such an event:
 - further sequestration of soil carbon stocks is not credited until the depletion event has finished and soil carbon stocks have been replenished to the levels they were at before the depletion event; and
 - changes in emissions are not calculated until the depletion event has finished (but they are calculated while soil carbon stocks are being replenished to the levels they were at before the depletion event).

The rules for depletion events are set out in Division 8.

- (2) Subject to section 91 (which deals with depletion events), for a carbon estimation area in which a particular project management activity is being undertaken, the **sequestration period**, for a particular reporting period (the **current** reporting period):
- (a) commences:
- (i) if the project management activity had commenced in a previous reporting period and has not been changed in accordance with section 85 (in which case the activity is continuing into the current reporting period)—at the start of the current reporting period; and
 - (ii) if the project management activity commences during the reporting period—when the activity is taken to commence in accordance with Division 3 of Part 3; and
- (b) ends at the end of the current reporting period.

49 Sequestration amount in each carbon estimation area

- (1) The amount of sequestration that has occurred in each carbon estimation area must be determined using the soil carbon maps published on the CFI Mapping Tool.
- (2) For each carbon estimation area, the sequestration value for the project management activity must be calculated:
- (a) if the project management activity involves new irrigation from a water access entitlement or an irrigation right, as outlined in subparagraph 34(1)(b)(ii)—using Equation SC1A; or
 - (b) if the project management activity does not involve new irrigation from a water access entitlement or an irrigation right, as outlined in subparagraph 34(1)(b)(ii)—using Equation SC1B.

- (3) The sequestration value for a project management activity that involves new irrigation from a water access entitlement or an irrigation right must be calculated using the following formula:

$SC_x = \text{Sequestration value} \times 0.75$	Equation SC1A
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Where:

SC_x = Sequestration value for project management activity x ; t CO₂-e / ha / y.
 Sequestration value = value derived from the soil carbon maps published on the CFI Mapping Tool; t CO₂-e / ha / y.
 0.75 = leakage discount factor.

- (4) The sequestration value for a project management activity that does not involve new irrigation from a water access entitlement or an irrigation right must be calculated using the following formula:

$SC_x = \text{Sequestration value}$	Equation SC1B
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Where:

SC_x = Sequestration value for project management activity x ; t CO₂-e / ha / y.
 Sequestration value = value derived from the soil carbon maps published on the CFI Mapping Tool; t CO₂-e / ha / y.

- (5) The sequestration value for the project management activity must be multiplied by the period (in years) that the activity was carried out in the reporting period in a carbon estimation area, and by the area of the carbon estimation area, using the following formula:

$SC_{x,Rc,A} = SC_x \times n_{Rc,x,A} \times h_A$	Equation SC2
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Where:

$SC_{x,Rc,A}$ = total sequestration for project management activity x for reporting period Rc in carbon estimation area A ; t CO₂-e.
 SC_x = sequestration value for project management activity x ; t CO₂-e / ha / y.
 $n_{Rc,x,A}$ = length of the sequestration period of the reporting period (in years) that project management activity x was undertaken in reporting period Rc for carbon estimation area A ; y.
 h_A = number of hectares in carbon estimation area A ; ha.
 Rc = current reporting period.

Note: These calculations should not be used to calculate net abatement if a depletion event has commenced under section 88 or section 89.

Subdivision 3—Calculating project emissions—general

50 Livestock emissions

- (1) Emissions from livestock must be calculated for a carbon estimation area for each reporting period in accordance with this Part.
- (2) A livestock group must be defined by the species (g), state/region (i), livestock class (j) and season (k) (where appropriate), in relation to each carbon estimation area and each reporting period, that are specified in the Standard Parameters and Emissions Factors.

51 Synthetic fertiliser emissions

- (1) Emissions from the use of synthetic fertiliser must be calculated for a carbon estimation area in accordance with this Part if one or more of the following apply to the area:
 - (a) nutrient management is a management action;
 - (b) pasture renovation is a management action;
 - (c) conversion to pasture is a project management activity.
- (2) A synthetic fertiliser group must be defined by the fertiliser type (*f*), and by the state (*i*) and production system (*j*) that are specified in the Standard Parameters and Emissions Factors.

52 Lime emissions

Emissions from the use of lime must be calculated in accordance with this Part if soil acidity management is a management action in a sustainable intensification project management activity.

53 Residue emissions

Residue emissions must be calculated in accordance with this Part if a carbon estimation area involves any of the following:

- (a) stubble retention;
- (b) pasture renovation as part of sustainable intensification;
- (c) sustainable intensification carried out in a carbon estimation area under crops;
- (d) conversion to pasture.

54 Emissions from irrigation energy use

Emissions from irrigation energy use must be calculated in accordance with this Part if new irrigation is a management action in a sustainable intensification project management activity.

Division 3—Calculating baseline emissions

Subdivision 1—Calculating baseline emissions—livestock

55 Livestock emissions during baseline emissions period—general

- (1) If livestock are on one or more carbon estimation areas during the sequestration period of a reporting period, then emissions from livestock during the baseline emissions period must be calculated in accordance with this Subdivision for the carbon estimation areas in that reporting period.
- (2) Subject to subsection (3), historical stock rate data must be used to determine livestock emissions during the baseline emissions period (*livestock baseline A*).
- (3) If the historical stock rate data is unavailable, livestock emissions must be calculated using assessed carrying capacity (*livestock baseline B*).

Livestock baseline A

- (4) If accounting for livestock emissions using livestock baseline A, annual stocking rates, according to livestock groups *gijk*, over the baseline emissions period must be used to

calculate the average annual emissions from livestock for the relevant carbon estimation area.

- (5) Emissions above or below one standard deviation from the average annual baseline emissions are taken to be materially different and must be accounted for in calculating net abatement.

Livestock baseline B

- (6) If accounting for livestock emissions using livestock baseline B, assessed carrying capacity must be used to calculate the average annual emissions from livestock for the relevant carbon estimation area under pasture.
- (7) A tolerance margin of 10% must be used in the calculation of livestock baseline B.

56 Livestock baseline A—requirements

- (1) If accounting for livestock emissions using livestock baseline A, the total emissions from livestock during each year of the baseline emissions period for each relevant carbon estimation area must be calculated using the following formula where the sum is over all livestock groups *gijk* that have been defined in accordance with subsection 50(2):

Note: Some livestock groups will not be characterised in terms of their livestock class (*j*) or their season (*k*).

$E_{LS,B,A} = \sum_{\substack{\text{(all groups)} \\ gijk}} Q_{LSgijk,B,A} \times D_{gijk,B,A} \times \frac{EF_{LSgijk}}{1000}$	Equation LS1
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Where:

$E_{LS,B,A}$ = total emissions from livestock during year *B* of the baseline emissions period in carbon estimation area *A*; t CO₂-e.

$Q_{LSgijk,B,A}$ = number of animals in livestock group *gijk* within carbon estimation area *A* in year *B* of the baseline emissions period; livestock head.

$D_{gijk,B,A}$ = number of days in year *B* of the baseline emissions period that livestock group *gijk* was within carbon estimation area *A*; days.

EF_{LSgijk} = default emission factor for livestock group *gijk*, as set out in Tables 1–4 of the Standard Parameters and Emissions Factors; kg CO₂-e / livestock head / day.

B = year of the baseline emissions period, being 1, 2, 3, 4 or 5.

- (2) The mean annual emissions from livestock during the baseline emissions period for each relevant carbon estimation area must be calculated using the following formula:

$\bar{E}_{LS,BEP,A} = \frac{1}{5} \sum_{B=1}^5 E_{LS,B,A}$	Equation LS2
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Where:

$\bar{E}_{LS,BEP,A}$ = mean annual emissions from livestock during the baseline emissions period in carbon estimation area *A*; t CO₂-e / y.

$E_{LS,B,A}$ = total emissions from livestock during year *B* of the baseline emissions period in carbon estimation area *A*; t CO₂-e / y.

B = year of the baseline emissions period being 1, 2, 3, 4 or 5.

- (3) The standard deviation of the annual livestock emissions for the baseline emissions period for each relevant carbon estimation area must be calculated using the following formula:

$S_{LS,BEP,A} = \sqrt{\frac{\sum_{B=1}^5 (E_{LS,B,A} - \bar{E}_{LS,BEP,A})^2}{4}}$	Equation LS3
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Where:

$S_{LS,BEP,A}$ = standard deviation of the annual livestock emissions for the baseline emissions period for carbon estimation area A ; t CO₂-e / y.

$E_{LS,B,A}$ = total emissions from livestock during year B of the baseline emissions period in carbon estimation area A ; t CO₂-e / y.

$\bar{E}_{LS,BEP,A}$ = mean annual emissions from livestock during the baseline emissions period in carbon estimation area A ; t CO₂-e / y.

B = year of the baseline emissions period being year 1, 2, 3, 4 or 5.

57 Livestock baseline B—general

- (1) If accounting for livestock emissions using livestock baseline B, an assessment of carrying capacity for the relevant carbon estimation area must be obtained from the relevant government body.
- (2) The carrying capacity must:
 - (a) be expressed as a total number of animal units; and
 - (b) have regard to any available property-specific data; and
 - (c) be based on:
 - (i) the recommended pasture utilisation rate for the relevant district; and
 - (ii) an assessment that the carrying capacity is sustainable over a minimum of 10 years; and
 - (iii) the assumption that annual rainfall will be at the 10 year average for that district.
- (3) An auditable description of the process that was used to calculate the carrying capacity of the relevant carbon estimation area must be obtained from the relevant government body.
- (4) For the purpose of calculating livestock emissions using livestock baseline B:

AU_A = assessed annual carrying capacity of carbon estimation area A ; animal units.

58 Livestock baseline B—requirements

- (1) The emissions from livestock for the first year of the project for each relevant carbon estimation area must be calculated using the following formula, where the sum is over all livestock groups $gijk$ that have been defined in accordance with subsection 50(2):

Note: Some livestock groups will not be characterised in terms of their livestock class (j) or their season (k).

$E_{LS,Y,A} = \sum_{\substack{\text{(all groups)} \\ gijk}} Q_{LSgijk,Y,A} \times D_{gijk,Y,A} \times \frac{EF_{LSgijk}}{1000}$	Equation LS4
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Where:

$E_{LS,Y,A}$ = total emissions from livestock during the first year Y of the project in carbon estimation area A ; t CO₂-e.

$Q_{LSgijk,Y,A}$ = number of animals in livestock group $gijk$ that were within carbon estimation area A in the first year Y of the project; livestock head.

$D_{gijk,Y,A}$ = number of days in project year Y that livestock group $gijk$ was within carbon estimation area A ; days.

EF_{LSgijk} = default emission factor for livestock group $gijk$, as set out in Tables 1–4 of the Standard Parameters and Emissions Factors; kg CO₂-e / livestock head / day.

- (2) The stocking rate for the first year of the project for each relevant carbon estimation area must be calculated in accordance with the process for establishing carrying capacity specified in subsection 57(2) and using the following formula:

$AU_{Y,A}$ = stocking rate of the carbon estimation area A for the first year Y of the project; animal units.

- (3) The annual baseline emissions from livestock for each relevant carbon estimation area must be calculated using the following formula:

$\bar{E}_{LS,BEP,A} = \left(\frac{AU_A}{AU_{Y,A}} \right) E_{LS,Y,A}$	Equation LS5
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Where:

$\bar{E}_{LS,BEP,A}$ = mean (assumed) annual livestock emissions for the baseline emissions period for carbon estimation area A ; t CO₂-e / y.

AU_A = assessed annual carrying capacity of carbon estimation area A ; animal units.

$AU_{Y,A}$ = stocking rate of carbon estimation area A for the first year Y of the project; animal units.

$E_{LS,Y,A}$ = total emissions from livestock during the first year of the project in carbon estimation area A ; t CO₂-e / y.

- (4) The tolerance margin for the annual livestock emissions during the baseline emissions period for each relevant carbon estimation area must be calculated using the following formula:

$T_{LS,A} = \bar{E}_{LS,BEP,A} \times 0.1$	Equation LS6
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Where:

$T_{LS,A}$ = tolerance margin for the baseline emissions period for carbon estimation area A ; t CO₂-e / y.

$\bar{E}_{LS,BEP,A}$ = mean (assumed) annual livestock emissions for the baseline emissions period for carbon estimation area A ; t CO₂-e / y.

0.1 = tolerance margin of 10% (expressed as a decimal).

Subdivision 2—Calculating baseline emissions—synthetic fertiliser

59 Synthetic fertiliser baseline emissions

- (1) Subject to subsection (3), a default zero baseline (*synthetic fertiliser baseline A*) must be used to determine synthetic fertiliser emissions during the baseline emissions period.
- (2) If accounting for synthetic fertiliser emissions using synthetic fertiliser baseline A:

- (a) synthetic fertiliser baseline emissions are taken to be zero; and
 - (b) all emissions associated with applying synthetic fertiliser in the relevant carbon estimation area must be accounted for in calculating net abatement.
- (3) If synthetic fertiliser was applied to the relevant carbon estimation area in at least 3 out of the 5 years before a project management activity commenced in the area, baseline emissions may be calculated using synthetic fertiliser baseline B.

60 Synthetic fertiliser baseline B

- (1) If accounting for synthetic fertiliser emissions using synthetic fertiliser baseline B, the nitrous oxide emissions from synthetic fertiliser applied to a carbon estimation area during each year of the baseline emissions period must be calculated using the following formula, where the sum is over all synthetic fertiliser groups *fij* that have been defined in accordance with subsection 51(2):

$E_{SF_N,B,A} = \sum_{\substack{\text{(all groups)} \\ fij}} G_{SF_{fij},B,A} \times P_f \times EF_{SF_{fij}}$	Equation SF1
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Where:

$E_{SF_N,B,A}$ = total nitrous oxide emissions from synthetic fertiliser (*SF*) applied to carbon estimation area *A* during year *B* of the baseline emissions period; t CO₂-e.

$G_{SF_{fij},B,A}$ = quantity of synthetic fertiliser group *fij* applied to carbon estimation area *A* during year *B* of the baseline emissions period; t fertiliser.

P_f = percentage nitrogen content of fertiliser (*f*) in synthetic fertiliser group *fij*, as provided by the manufacturer; t N / t fertiliser.

$EF_{SF_{fij}}$ = default emission factor for synthetic fertiliser group *fij*, as set out in Tables 5 and 6 of the Standard Parameters and Emissions Factors; t CO₂-e / t N.

- (2) The total emissions from fertiliser applied to each relevant carbon estimation area during each year of the baseline emissions period must be calculated using the following formula:

$E_{SF,B,A} = E_{SF_N,B,A} + U_{B,A} \times EF_U$	Equation SF2
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Where:

$E_{SF,B,A}$ = total emissions from synthetic fertiliser applied to carbon estimation area *A* during year *B* of the baseline emissions period; t CO₂-e.

$E_{SF_N,B,A}$ = total nitrous oxide emissions from synthetic fertiliser applied to carbon estimation area *A* during year *B* of the baseline emissions period; t CO₂-e.

$U_{B,A}$ = quantity of urea applied to carbon estimation area *A* during year *B* of the baseline emissions period; t urea.

EF_U = National Inventory Report emission factor for carbon dioxide emissions from urea; t CO₂-e / t urea.

- (3) The mean emissions from fertiliser applied to each relevant carbon estimation area during the baseline emissions period must be calculated using the following formula:

$$\bar{E}_{SF,BEP,A} = \frac{1}{5} \sum_{B=1}^5 E_{SF,B,A}$$

Equation SF3

Where:

$\bar{E}_{SF,BEP,A}$ = mean annual emissions from synthetic fertiliser applied to carbon estimation area *A* during the baseline emissions period; t CO₂-e / y.

$E_{SF,B,A}$ = total emissions from synthetic fertiliser applied to carbon estimation area *A* during year *B* of the baseline emissions period; t CO₂-e / y.

B = year of the baseline emissions period being year 1, 2, 3, 4 or 5.

Subdivision 3—Calculating baseline emissions—lime

61 Lime baseline emissions

If a project proponent is managing soil acidity as part of sustainable intensification, baseline emissions from lime are taken to be zero.

Subdivision 4—Calculating baseline emissions—residues

62 Residue baseline emissions—general

- (1) For a soil carbon project, emissions from tillage events must include:
 - (a) nitrous oxide releases from soil, crop, or pasture residue; and
 - (b) greenhouse gases emitted from fuel use.
- (2) For the purposes of paragraph (1)(b), a default amount of 12 litres of diesel fuel per hectare is taken to be used for each tillage event.
- (3) To determine residue emissions during the baseline emissions period, a project proponent must use the relevant baseline method from subsection (4).
- (4) For the purposes of determining residue emissions, the baseline methods are:
 - (a) residue baseline A—see section 63; and
 - (b) residue baseline B—see section 64; and
 - (c) residue baseline C—see section 65.

63 Residue baseline A

If any of the following applies to a carbon estimation area:

- (a) stubble retention is carried out as a project management activity;
- (b) pasture renovation is a management action in a sustainable intensification project management activity;

then baseline residue emissions are taken to be zero.

64 Residue baseline B

If sustainable intensification is carried out as a project management activity on a carbon estimation area under crops, then:

- (a) baseline residue emissions are taken to have increased by 20% to equal project residue emissions; and

- (b) the change in emissions from residues under residue baseline B must be calculated in the project emissions equations.

Note: Baseline emissions are calculated with reference to project emissions under Equation R13.

65 Residue baseline C

- (1) If conversion to pasture is carried out as a project management activity in a carbon estimation area, the emissions from residues from each crop grown in the area for each year of the baseline emissions period must be calculated in accordance with this section.
- (2) The emissions from crop residues during the baseline emissions period must be calculated even if there are no emissions from residues during the project.
- (3) The quantity of emissions released from the residues of each crop that:
 - (a) follows a tillage event; and
 - (b) is grown in each year of the baseline emissions period;

must be calculated for each year of the baseline emissions period for each relevant carbon estimation area using the following formula:

$E_{R,v,B,A} = VQ_{v,B,A} \times EF_R \times (NC_{v,AB} \times (1 - RF_{v,B,A}) + NC_{v,BG})$	Equation R1
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Where:

- $E_{R,v,B,A}$ = emissions released from residues of crop type v in year B of the baseline emissions period in carbon estimation area A ; t CO₂-e.
- $VQ_{v,B,A}$ = quantity of harvested crop by crop type v in year B of the baseline emissions period in carbon estimation area A ; t crop.
- $NC_{v,AB}$ = nitrogen content in crop residue above ground (AB) from crop type v as set out in Table 7 of the Standard Parameters and Emissions Factors; t N / t crop.
- $RF_{v,B,A}$ = fraction of crop residue from crop type v that was removed in year B of the baseline emissions period in carbon estimation area A ; decimal.
- $NC_{v,BG}$ = nitrogen content in crop residue below ground (BG) from crop type v as set out in Table 7 of the Standard Parameters and Emissions Factors; t N / t crop.
- EF_R = National Inventory Report emission factor for residues; t CO₂-e / t N.
- v = crop type listed in the Standard Parameters and Emission Factors.
- B = year of the baseline emissions period, being year 1, 2, 3, 4, or 5.

- (4) The total emissions from residues of all crop types grown in the relevant carbon estimation area for each year of the baseline emissions period must be calculated using the following formula:

$E_{R,B,A} = \sum_{v=1}^n E_{R,v,B,A}$	Equation R2
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Where:

- $E_{R,B,A}$ = emissions released from residues of all crop types for year B of the baseline emissions period in carbon estimation area A ; t CO₂-e.
- $E_{R,v,B,A}$ = emissions released from residues of crop type v in year B of the baseline emissions period in carbon estimation area A ; t CO₂-e.
- n = total number of crops grown in year B in carbon estimation area A .
- v = crop type as listed in the Standard Parameters and Emissions Factors.

- (5) Emissions from diesel fuel used for tillage events must be calculated using the following formula:

$E_{F,B,A} = \sum_{g=1}^n Area-T_{B,A} \left(\frac{0.012 \times EC_F \times EF_{Fg}}{1000} \right)$	Equation R3
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Where:

$E_{F,B,A}$ = emissions from diesel fuel used for tillage events in year B of the baseline emissions period in carbon estimation area A ; t CO₂-e.

n = number of gas types.

$Area-T_{B,A}$ = tilled area in year B of the baseline emissions period in carbon estimation area A ; ha.

EC_F = energy content factor for diesel fuel as set out in the NGER Measurement Determination; GJ / kL.

EF_{Fg} = emission factor for each gas type g for diesel fuel as set out in the NGER Measurement Determination; kg CO₂-e / GJ.

0.012 = default diesel fuel use per hectare; kL / ha.

1000 = conversion factor from kg CO₂-e to t CO₂-e.

Note 1: Values for EC_F and EF_{Fg} are specified in Part 4 of Schedule 1 to the NGER Measurement Determination.

Note 2: A default fuel use quantity of 0.012 kL of diesel fuel per hectare has been developed considering a range of different tillage types.

- (6) Total emissions from residues and tillage events for each year of the baseline emissions period for each relevant carbon estimation area must be calculated using the following formula:

$E_{Res,B,A} = E_{F,B,A} + E_{R,B,A}$	Equation R4
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Where:

$E_{Res,B,A}$ = total emissions from residues and tillage events in year B of the baseline emissions period in carbon estimation area A ; t CO₂-e.

$E_{F,B,A}$ = emissions from diesel fuel used for tillage events in year B of the baseline emissions period in carbon estimation area A ; t CO₂-e.

$E_{R,B,A}$ = emissions from all crop types in year B of the baseline emissions period in carbon estimation area A ; t CO₂-e.

- (7) Mean annual emissions from residues and tillage for the baseline emissions period for each relevant carbon estimation area must be calculated using the following formula:

$\bar{E}_{Res,BEP,A} = \frac{1}{5} \sum_{B=1}^5 E_{Res,B,A}$	Equation R5
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Where:

$\bar{E}_{Res,BEP,A}$ = mean annual emissions from all tillage events in the baseline emissions period in carbon estimation area A ; t CO₂-e / y.

$E_{Res,B,A}$ = total emissions from residues and tillage in year B of the baseline emissions period in carbon estimation area A ; t CO₂-e / y.

B = year of the baseline emissions period, being year 1, 2, 3, 4, or 5.

Subdivision 5—Calculating baseline emissions—irrigation energy use

66 Irrigation energy use baseline emissions

If new irrigation is a management action for a sustainable intensification project management activity carried out on pasture, energy baseline emissions from energy use for irrigation are taken to be zero.

Division 4—Calculating project emissions

67 Project emissions—livestock

- (1) The emissions for each livestock group must be calculated for the reporting period using the following formula:

$E_{LS_{gijk},Rc,A} = Q_{LS_{gijk},Rc,A} \times D_{LS_{gijk},Rc,A} \times EF_{LS_{gijk}} / 1000$	Equation LS7
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Where:

$E_{LS_{gijk},Rc,A}$ = emissions for livestock group $gijk$ for the reporting period in carbon estimation area A ; t CO₂-e.

$Q_{LS_{gijk},Rc,A}$ = number of animals in livestock group $gijk$ that were within carbon estimation area A in the sequestration period of the reporting period; livestock head.

$D_{LS_{gijk},Rc,A}$ = period (in days) that livestock group $gijk$ was within carbon estimation area A in the sequestration period of the reporting period; days.

$EF_{LS_{gijk}}$ = default emission factor for the livestock group, as set out in Tables 1–4 of the Standard Parameters and Emissions Factors; kg CO₂-e / livestock head / day.

1000 = conversion factor from kg to t CO₂-e.

- (2) The total livestock emissions for the reporting period for each relevant carbon estimation area must be calculated using the following formula where the sum is over all livestock groups $gijk$ that have been defined in accordance with subsection 50(2) in relation to the reporting period:

Note: Some livestock groups will not be characterised in terms of their livestock class (j) or their season (k).

$E_{LS,Rc,A} = \sum_{\substack{\text{(all groups)} \\ gijk}} E_{LS_{gijk},Rc,A}$	Equation LS8
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Where:

$E_{LS,Rc,A}$ = total livestock emissions for the reporting period for carbon estimation area A ; t CO₂-e.

$E_{LS_{gijk},Rc,A}$ = emissions for livestock group $gijk$ for the reporting period in carbon estimation area A ; t CO₂-e.

- (3) The mean annual livestock emissions for the reporting period for each relevant carbon estimation area must be calculated using the following formula:

$\bar{E}_{LS,Rc,A} = \frac{E_{LS,Rc,A}}{n_{Rc,A}}$	Equation LS9
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Where:

$\bar{E}_{LS,Rc,A}$ = mean annual livestock emissions in the reporting period for carbon estimation area A ; t CO₂-e / y.

$E_{LS,Rc,A}$ = total livestock emissions for the reporting period for carbon estimation area A ; t CO₂-e.

$n_{Rc,A}$ = length of the sequestration period of the reporting period for carbon estimation area A (years) (section 48).

68 Project emissions—synthetic fertiliser

- (1) The nitrous oxide emissions from synthetic fertiliser applied to a carbon estimation area during the reporting period must be calculated using the following formula, where the sum is over all synthetic fertiliser groups fij that have been defined in accordance with subsection 51(2):

$E_{SF_N,Rc,A} = \sum_{\substack{\text{(all groups)} \\ fij}} G_{SF_{fij},Rc,A} \times P_f \times EF_{SF_{fij}}$	Equation SF4
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Where:

$E_{SF_N,Rc,A}$ = total nitrous oxide emissions from synthetic fertiliser applied to carbon estimation area A during the reporting period; t CO₂-e.

$G_{SF_{fij},Rc,A}$ = quantity of synthetic fertiliser group fij applied to carbon estimation area A during the sequestration period of the reporting period; t fertiliser.

P_f = percentage nitrogen content of fertiliser (f) in synthetic fertiliser group fij , as provided by the manufacturer; t N / t fertiliser.

$EF_{SF_{fij}}$ = default emission factor for synthetic fertiliser group fij , as set out in Tables 5 and 6 of the Standard Parameters and Emissions Factors; t CO₂-e / t N.

- (2) The total emissions from synthetic fertiliser applied to each relevant carbon estimation area during the reporting period must be calculated using the following formula:

$E_{SF,Rc,A} = E_{SF_N,Rc,A} + U_{Rc,A} \times EF_U$	Equation SF5
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Where:

$E_{SF,Rc,A}$ = total emissions from synthetic fertiliser applied to carbon estimation area A during the reporting period; t CO₂-e.

$E_{SF_N,Rc,A}$ = total nitrous oxide emissions from synthetic fertiliser applied to carbon estimation area A during the reporting period; t CO₂-e.

$U_{Rc,A}$ = quantity of urea applied to carbon estimation area A during the sequestration period of the reporting period; t urea.

EF_U = National Inventory Report emission factor for carbon dioxide emissions from urea; t CO₂-e / t urea.

- (3) The mean annual emissions from synthetic fertiliser applied to each relevant carbon estimation area during the reporting period must be calculated using the following formula:

$\bar{E}_{SF,Rc,A} = \frac{1}{n_{Rc,A}} \times E_{SF,Rc,A}$	Equation SF7
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Where:

$\bar{E}_{SF,RC,A}$ = mean annual emissions from synthetic fertiliser applied to carbon estimation area A during the reporting period; t CO₂-e / y.

$E_{SF,RC,A}$ = total emissions from synthetic fertiliser applied to carbon estimation area A during the reporting period; t CO₂-e.

$n_{RC,A}$ = length of the sequestration period of the reporting period for carbon estimation area A ; y.

69 Project emissions—lime

- (1) For the reporting period the total quantity of carbonates (CaCO₃ or CaMg(CO₃)₂) applied to each relevant carbon estimation area must be calculated using the following formula:

$Q_{L,RC,A} = \sum_{l=1}^n (L_{l,RC,A} \times P_l)$	Equation L1
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Where:

$Q_{L,RC,A}$ = total carbonates applied during the reporting period in carbon estimation area A ; t.

$L_{l,RC,A}$ = quantity of lime type l applied in the sequestration period of the reporting period in carbon estimation area A ; t.

P_l = percentage carbonate content of lime type l , as provided by the manufacturer; decimal.

Note: The percentage carbonate content of lime is described as its neutralising value.

l = type of lime as defined by the percent carbonate content.

n = number of types of lime applied in the sequestration period of the reporting period.

- (2) The quantity of carbon dioxide emissions released from lime applied to each relevant carbon estimation area must be calculated using the following formula:

$E_{L,RC,A} = Q_{L,RC,A} \times EF_L$	Equation L2
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Where:

$E_{L,RC,A}$ = total carbon dioxide emissions from lime applied in the reporting period to carbon estimation area A ; t CO₂-e.

$Q_{L,RC,A}$ = total carbonates applied during the reporting period in carbon estimation area A ; t.

EF_L = National Inventory Report emission factor for carbonates; t CO₂-e / t carbonate.

Note: The parameter EF_L is the National Inventory Report emission factor for dolomite, which was 0.13 t CO₂-e / t carbonate at the time the determination commenced. The emission factor is to be applied to all lime and dolomite types.

70 Project emissions—residues

- (1) The quantity of emissions released from the residues of each crop grown in each year of the reporting period for each relevant carbon estimation area must be calculated using the following formula:

$E_{R,v,RC,A} = VQ_{v,RC,A} \times EF_R \times (NC_{v,AB} \times (1 - RF_{v,RC,A}) + NC_{v,BG})$	Equation R6
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Where:

- $E_{R,v,Rc,A}$ = emissions released from residues of crop type v in the reporting period in carbon estimation area A ; t CO₂-e.
- $VQ_{v,Rc,A}$ = quantity of harvested crop by crop type v in the sequestration period of the reporting period in carbon estimation area A ; t crop.
- $NC_{v,AB}$ = nitrogen content in crop residue above ground from crop type v as set out in Table 7 of the Standard Parameters and Emissions Factors; t N / t crop.
- $RF_{v,Rc,A}$ = fraction of crop residue from crop type v that was removed in the sequestration period of the reporting period in carbon estimation area A ; decimal.
- $NC_{v,BG}$ = nitrogen content in crop residue below ground from crop type v as set out in Table 7 of the Standard Parameters and Emissions Factors; t N / t crop.
- EF_R = National Inventory Report emission factor for residues; t CO₂-e / t N.
- v = crop type as listed in the Standard Parameters and Emissions Factors.

- (2) The total quantity of emissions released from residues for each relevant carbon estimation area for the reporting period must be calculated using the following formula:

$E_{R,Rc,A} = \sum_{v=1}^n E_{R,v,Rc,A}$	Equation R7
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Where:

- $E_{R,Rc,A}$ = emissions released from residues of all crop types for the reporting period for carbon estimation area A ; t CO₂-e.
- $E_{R,v,Rc,A}$ = emissions released from residues of crop type v in the reporting period for carbon estimation area A ; t CO₂-e.
- n = total number of crops grown.
- v = crop type listed in the Standard Parameters and Emissions Factors.

- (3) The quantity of emissions released from each pasture tillage event for the reporting period for each relevant carbon estimation area must be calculated using the following formula:

$E_{P,Rc,A} = O_P \times Area-T_{Rc,A} \times EF_R \times (NC_{P,AB} \times (1 - RF_{P,Rc,A}) + NC_{P,BG})$	Equation R8
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Where:

- $E_{P,Rc,A}$ = emissions from pasture tillage events in the reporting period for carbon estimation area A ; t CO₂-e.
- O_P = annual dry matter yield for pasture as set out in the Standard Parameters and Emissions Factors; t / ha.
- $Area-T_{Rc,A}$ = tilled area for pasture establishment or renovation in the sequestration period of the reporting period in carbon estimation area A ; ha.
- EF_R = National Inventory Report emission factor for residues; t CO₂-e / t N.
- $NC_{P,AB}$ = nitrogen content of pasture residues above ground as set out in Table 8 of the Standard Parameters and Emissions Factors; t N / t residue.
- $RF_{P,Rc,A}$ = fraction of residues of pasture removed from carbon estimation area A in the sequestration period of the reporting period; decimal.
- $NC_{P,BG}$ = nitrogen content of pasture residues below ground as set out in Table 8 of the Standard Parameters and Emissions Factors; t N / t residue.

Note: Values of O_p , $NC_{p,AB}$ and $NC_{p,BG}$ are specified in Table 7 of the Standard Parameters and Emissions Factors.

- (4) Emissions from fuel used for tillage events must be calculated using the following formula:

$E_{F,Rc,A} = \sum_{g=1}^n Area-T_{Rc,A} \left(\frac{0.012 \times EC_F \times EF_{Fg}}{1000} \right)$	Equation R9
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Where:

$E_{F,Rc,A}$ = emissions from fuel use associated with tillage in the reporting period in carbon estimation area A ; t CO₂-e.

n = number of gas types.

$Area-T_{Rc,A}$ = area tilled in the sequestration period of the reporting period in carbon estimation area A ; ha.

EC_F = energy content factor for diesel fuel as set out in the NGER Measurement Determination; GJ / kL.

EF_{Fg} = emission factor for each gas type g for diesel fuel as set out in the NGER Measurement Determination; kg CO₂-e / GJ.

0.012 = default diesel fuel use per hectare; kL / ha.

1000 = conversion factor from kg to t CO₂-e.

Note 1: A default fuel use quantity of 0.012 kL of diesel fuel per hectare has been developed considering a range of different tillage types.

Note 2: Values for EC_F and EF_{Fg} are set out in the NGER Measurement Determination.

- (5) Total emissions from all residues and tillage events for the reporting period for each relevant carbon estimation area must be calculated using the following formula:

$E_{Res,Rc,A} = E_{F,Rc,A} + E_{P,Rc,A} + E_{R,Rc,A}$	Equation R10
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Where:

$E_{Res,Rc,A}$ = total emissions from all residues and tillage events in the reporting period in carbon estimation area A ; t CO₂-e.

$E_{F,Rc,A}$ = emissions released from fuel use associated with tillage in the reporting period in carbon estimation area A ; t CO₂-e.

$E_{P,Rc,A}$ = emissions released from pasture tillage events in the reporting period in carbon estimation area A ; t CO₂-e.

$E_{R,Rc,A}$ = emissions released from all crop residues in the reporting period in carbon estimation area A ; t CO₂-e.

71 Project emissions—irrigation energy use

- (1) Emissions from the use of fuel and electricity to irrigate a carbon estimation area must be calculated if new irrigation is a management action in a sustainable intensification project management activity.
- (2) The emissions released from fuel use associated with irrigation for each relevant carbon estimation area for the reporting period must be calculated using the following formula:

$E_{IFuel,Rc,A} = \sum_{g=1}^n \left(\frac{Q_{I,Rc,A} \times EC_F \times EF_{Fg}}{1000} \right)$	Equation I1
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Where:

$E_{IFuel,Rc,A}$ = emissions from irrigation fuel in the reporting period in carbon estimation area A ; t CO₂-e.

n = number of gas groups.

$Q_{I,Rc,A}$ = quantity of fuel used to irrigate carbon estimation area A in the sequestration period of the reporting period; kL.

EC_F = NGER energy content factor for diesel fuel; GJ / kL.

EF_{Fg} = NGER emission factor for gas type g for diesel fuel; kg CO₂-e / GJ.

Note: The values for EC_F and EF_{Fg} are set out in ‘Fuel combustion—liquid fuels and certain petroleum-based products for stationary energy purposes’ in ‘Schedule 1—Energy content factors and emission factors’ to the NGER Measurement Determination.

- (3) The emissions released from electricity use associated with irrigation for each relevant carbon estimation area for the reporting period must be calculated using the following formula:

$E_{IP,Rc,A} = Q_{IP,Rc,A} \times \frac{EF_{IP}}{1000}$	Equation I2
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Where:

$E_{IP,Rc,A}$ = emissions from irrigation electricity in the reporting period in carbon estimation area A ; t CO₂-e.

$Q_{IP,Rc,A}$ = quantity of electricity used to irrigate carbon estimation area A in the sequestration period of the reporting period; kWh.

EF_{IP} = NGER emission factor for scope 2 electricity use; kg CO₂-e / kWh.

- (4) For $Q_{IP,Rc,A}$, if the electricity purchased is measured in gigajoules, the quantity of kilowatt hours must be calculated by dividing the amount of gigajoules by 0.0036.

Note: Values for emission factors for the relevant State/Territory/region are set out in ‘Schedule 1—Energy content factors and emission factors’ to the NGER Measurement Determination.

Division 5—Calculating total change in emissions

Subdivision 1—Calculating total change in emissions—livestock

72 Calculating material difference in livestock emissions—general

- (1) The material difference between mean annual livestock emissions for the baseline emissions period and the reporting period for each relevant carbon estimation area must be calculated in accordance with this section.
- (2) If the mean annual livestock emissions for the reporting period are greater than the mean annual livestock emissions for the baseline emissions period, Equation LS10 must be used to calculate the material difference.
- (3) If the mean annual livestock emissions for the reporting period are less than the mean annual livestock emissions for the baseline emissions period, Equation LS11 must be used to calculate the material difference.

73 Material difference in livestock emissions—reporting period emissions greater than baseline emissions

- (1) For subsection 72(2), the material difference must be calculated using the following formula:

$\Delta \bar{E}_{LS,Rc,A} = \bar{E}_{LS,Rc,A} - (\bar{E}_{LS,BEP,A} + S_{LS,BEP,A})$	Equation LS10
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Where:

$\Delta \bar{E}_{LS,RC,A}$ = material difference in mean annual livestock emissions between the baseline emissions period and the reporting period for carbon estimation area *A*; t CO₂-e / y.

$\bar{E}_{LS,RC,A}$ = mean annual livestock emissions in the reporting period for carbon estimation area *A*; t CO₂-e / y (see Equation LS9, subsection 67(3)).

$\bar{E}_{LS,BEP,A}$ = mean annual livestock emissions in the baseline emissions period for carbon estimation area *A*; t CO₂-e / y (see Equation LS2 or LS5, subsection 56(2) or 58(3)).

$S_{LS,BEP,A}$ = standard deviation of the annual livestock emissions for the baseline emissions period for carbon estimation area *A*; t CO₂-e / y (see Equation LS3, subsection 56(3)).

(2) For livestock baseline B, the tolerance margin T_{LS} must be substituted for $S_{LS,BEP,A}$; t CO₂-e / y (see Equation LS6, subsection 58(4)).

(3) If $\Delta \bar{E}_{LS,RC,A}$ is less than zero then the material difference is taken to equal zero.

74 Material difference in livestock emissions—reporting emissions less than baseline emissions

(1) For subsection 72(3), the material difference must be calculated using the following formula:

$\Delta \bar{E}_{LS,RC,A} = \bar{E}_{LS,RC,A} - (\bar{E}_{LS,BEP,A} - S_{LS,BEP,A})$	Equation LS11
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Where:

$\Delta \bar{E}_{LS,RC,A}$ = material difference in mean annual livestock emissions between the baseline emissions period and the reporting period for carbon estimation area *A*; t CO₂-e / y.

$\bar{E}_{LS,RC,A}$ = mean annual livestock emissions in the reporting period for carbon estimation area *A*; t CO₂-e / y (see Equation LS9, subsection 67(3)).

$\bar{E}_{LS,BEP,A}$ = mean annual livestock emissions in the baseline emissions period for carbon estimation area *A*; t CO₂-e / y (see Equation LS2 or LS5, subsection 56(2) or 58(3)).

$S_{LS,BEP,A}$ = standard deviation of the annual livestock emissions for the baseline emissions period for carbon estimation area *A*; t CO₂-e / y (see Equation LS3, subsection 56(3)).

(2) For livestock baseline B, the tolerance margin T_{LS} must be substituted for $S_{LS,BEP,A}$; t CO₂-e / y (see Equation LS6, subsection 58(4)).

(3) If $\Delta \bar{E}_{LS,RC,A}$ is greater than zero then the material difference is taken to equal zero.

75 Calculating total change in livestock emissions

The change in livestock emissions for the reporting period for each relevant carbon estimation area must be calculated using the following formula:

$\Delta E_{LS,RC,A} = \Delta \bar{E}_{LS,RC,A} \times n_{RC,A}$	Equation LS12
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Where:

- $\Delta E_{LS,Rc,A}$ = total change in livestock emissions for the reporting period for carbon estimation area A ; t CO₂-e.
- $\Delta \bar{E}_{LS,Rc,A}$ = material difference in mean annual livestock emissions between the baseline emissions period and the reporting period for carbon estimation area A ; t CO₂-e / y (see Equation LS10 or LS11, subsection 73(1) or 74(1)).
- $n_{Rc,A}$ = length of the sequestration period of the reporting period for carbon estimation area A ; y.

Subdivision 2—Calculating total change in emissions—synthetic fertiliser, lime, residues and fuel

76 Calculating total change in synthetic fertiliser emissions

- (1) This section applies to a sustainable intensification project management activity for which nutrient management is a management action.
- (2) If synthetic fertiliser baseline A was used to determine the baseline emissions for the action, the net emissions from synthetic fertiliser emissions for the reporting period must be calculated using the following formula:

$\Delta E_{SF,Rc,A} = E_{SF,Rc,A}$	Equation SF8
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Where:

- $\Delta E_{SF,Rc,A}$ = total change in synthetic fertiliser emissions for the reporting period in carbon estimation area A ; t CO₂-e.
- $E_{SF,Rc,A}$ = total synthetic fertiliser emissions for the reporting period in carbon estimation area A ; t CO₂-e (Equation SF5, subsection 68(2)).

- (3) If synthetic fertiliser baseline B was used to determine the baseline emissions for the project, the net emissions from synthetic fertiliser emissions for the reporting period must be calculated using the following formula:

$\Delta E_{SF,Rc,A} = (\bar{E}_{SF,Rc,A} - \bar{E}_{SF,BEP,A}) \times n_{Rc,A}$	Equation SF9
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Where:

- $\Delta E_{SF,Rc,A}$ = total change in synthetic fertiliser emissions for the reporting period; t CO₂-e.
- $\bar{E}_{SF,BEP,A}$ = mean annual emissions from synthetic fertiliser applied to carbon estimation area A during the baseline emissions period; t CO₂-e / y (Equation SF3, subsection 60(3)).
- $\bar{E}_{SF,Rc,A}$ = mean annual emissions from synthetic fertiliser applied to carbon estimation area A during the reporting period; t CO₂-e / y (Equation SF7, subsection 68(3)).
- $n_{Rc,A}$ = length of the sequestration period of the reporting period for carbon estimation area A ; y.

77 Calculating total change in lime emissions

The total change in lime emissions for the reporting period for each relevant carbon estimation area must be calculated using the following formula:

$\Delta E_{L,Rc,A} = E_{L,Rc,A}$	Equation L4
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Where:

$\Delta E_{L,Rc,A}$ = total change in emissions from baseline to project for lime for carbon estimation area A ; t CO₂-e.

$E_{L,Rc,A}$ = total emissions for lime for carbon estimation area A in the reporting period; t CO₂-e (Equation L2, subsection 69(2)).

78 Calculating total change in residues emissions

- (1) If residues baseline A was used to determine the baseline emissions for a soil carbon project, the net emissions from residues for the reporting period must be calculated using the following formula:

$\Delta E_{Res,Rc,A} = E_{Res,Rc,A}$	Equation R12
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Where:

$\Delta E_{Res,Rc,A}$ = total change in emissions from residues and tillage events for the reporting period for carbon estimation area A ; t CO₂-e.

$E_{Res,Rc,A}$ = total emissions from all residues and tillage events in the reporting period for carbon estimation area A ; t CO₂-e (Equation R10, subsection 70(5)).

- (2) If residues baseline B was used to determine the baseline emissions for a soil carbon project, the net emissions from residues for the reporting period must be calculated using the following formula:

$\Delta E_{Res,Rc,A} = E_{Res,Rc,A} - \frac{E_{Res,Rc,A}}{1.2}$	Equation R13
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Where:

$\Delta E_{Res,Rc,A}$ = total change in emissions from residues and tillage events for the reporting period for carbon estimation area A ; t CO₂-e.

$E_{Res,Rc,A}$ = total emissions from residues and tillage events in the reporting period for carbon estimation area A ; t CO₂-e (Equation R10, subsection 70(5)).

1.2 = increase in residue emissions; percentage.

Note: The value of 1.2 reflects a 20% increase in residue emissions.

- (3) If residues baseline C was used to determine the baseline emissions for a soil carbon project, the net emissions from residues for the reporting period must be calculated using the following formula:

$\Delta E_{Res,Rc,A} = E_{Res,Rc,A} - (\bar{E}_{Res,BEP,A} \times n_{Rc,A})$	Equation R14
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Where:

$\Delta E_{Res,Rc,A}$ = total change in emissions from residues for the reporting period for carbon estimation area A ; t CO₂-e.

$E_{Res,Rc,A}$ = total emissions from residues in the reporting period for carbon estimation area A ; t CO₂-e (Equation R10, subsection 70(5)).

$\bar{E}_{Res,BEP,A}$ = mean annual emissions from residues and tillage events in the baseline emissions period in carbon estimation area A ; t CO₂-e / y (Equation R5, subsection 65(7)).

$n_{Rc,A}$ = length of the sequestration period of the reporting period for carbon estimation area A ; y.

79 Calculating total change in fuel emissions

- (1) This section applies to soil carbon projects for which new irrigation is a management action.
- (2) If fuel is used to supply irrigation water to the relevant carbon estimation area, the net emissions from irrigation fuel for the reporting period must be calculated using the following formula:

$\Delta E_{IFuel,Rc,A} = E_{IFuel,Rc,A}$	Equation I3
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Where:

$\Delta E_{IFuel,Rc,A}$ = total change in irrigation fuel emissions for the reporting period for carbon estimation area *A*; t CO₂-e.

$E_{IFuel,Rc,A}$ = emissions from irrigation fuel use in the reporting period in carbon estimation area *A*; t CO₂-e (Equation I1, subsection 71(2)).

- (3) If electricity is used to supply irrigation water to the relevant carbon estimation area, the net emissions from irrigation fuel for the reporting period must be calculated using the following formula:

$\Delta E_{IP,Rc,A} = E_{IP,Rc,A}$	Equation I4
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Where:

$\Delta E_{IP,Rc,A}$ = total change in irrigation electricity emissions for the reporting period for carbon estimation area *A*; t CO₂-e.

$E_{IP,Rc,A}$ = emissions from irrigation electricity in the reporting period in carbon estimation area *A*; t CO₂-e (Equation I2, subsection 71(3)).

Division 6—Calculation of the carbon dioxide equivalent net abatement amount

80 Calculation of net abatement amount—general

For the purposes of paragraph 106(1)(c) of the Act, the carbon dioxide equivalent net abatement amount must be calculated in accordance with this Part.

81 Calculation of net abatement amount—net change in emissions for the carbon estimation area

- (1) The net change in emissions for each carbon estimation area in the project must be calculated using the following formula:

$\Delta E_{ALL,Rc,A} = \Delta E_{LS,Rc,A} + \Delta E_{SF,Rc,A} + \Delta E_{L,Rc,A} + \Delta E_{Res,Rc,A} + \Delta E_{IFuel,Rc,A} + \Delta E_{IP,Rc,A} + \Delta E_{ALL,Rc-1,A}$	Equation EALL1
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Where:

$\Delta E_{ALL,Rc,A}$ = total change in emissions from all sources for the reporting period for carbon estimation area *A*; t CO₂-e.

$\Delta E_{LS,Rc,A}$ = total change in livestock emissions for the reporting period for carbon estimation area *A* (where relevant; Equation LS12, section 75); t CO₂-e.

$\Delta E_{SF,Rc,A}$ = total change in synthetic fertiliser emissions for the reporting period for carbon estimation area *A* (where relevant; Equation SF8 or SF9, section 76); t CO₂-e.

- $\Delta E_{L,Rc,A}$ = total change in lime emissions for the reporting period for carbon estimation area A (where relevant; Equation L4, section 77); t CO₂-e.
- $\Delta E_{Res,Rc,A}$ = total change in residue and tillage event emissions for the reporting period for carbon estimation area A (where relevant; Equation R12, R13 or R14, section 78); t CO₂-e.
- $\Delta E_{IFuel,Rc,A}$ = total change in irrigation fuel emissions for the reporting period for carbon estimation area A (where relevant; Equation I3, subsection 79(2)); t CO₂-e.
- $\Delta E_{IP,Rc,A}$ = total change in irrigation electricity emissions for the reporting period for carbon estimation area A (where relevant; Equation I4, subsection 79(3)); t CO₂-e.
- $\Delta E_{ALL,Rc-1,A}$ = total change in emissions from all sources for carbon estimation area A for the reporting period before the current reporting period (subsections (3) to (5)).
- (2) If any of the parameters specified in subsection (1) are not relevant to the carbon estimation area, the value for the parameter must be zero.
 - (3) For the first reporting period, the value for $\Delta E_{ALL,Rc-1,A}$ must be zero.
 - (4) For subsequent reporting periods, the value for $\Delta E_{ALL,Rc-1,A}$ must be equal to or less than zero to be included in Equation EALL1.
 - (5) If $\Delta E_{ALL,Rc,A}$ is a negative value for the reporting period, then $\Delta E_{ALL,Rc,A}$ must be used in calculations of total change in emissions in the subsequent reporting period as the value for $\Delta E_{ALL,Rc-1,A}$.

82 Calculation of net abatement amount—net change in emissions for the project

The net change in emissions for all carbon estimation areas in the project must be calculated using the following formula:

$\Delta E_{ALL,Rc,Proj} = \sum_{A=1}^n \Delta E_{ALL,Rc,A}$	Equation NA1
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Where:

- $\Delta E_{ALL,Rc,Proj}$ = total change in emissions from all sources for the reporting period for the project; t CO₂-e.
- $\Delta E_{ALL,Rc,A}$ = total change in emissions from all sources for the reporting period for carbon estimation area A ; t CO₂-e.
- A = carbon estimation area.
- n = number of carbon estimation areas in the project.

83 Calculation of net abatement amount—project sequestration

The sequestration for project management activity x , and for all carbon estimation areas in the project, must be calculated using the following formula:

$SC_{Rc,Proj} = \sum_{A=1}^n SC_{x,Rc,A}$	Equation NA2
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Where:

- $SC_{Rc,Proj}$ = total sequestration for the project for reporting period Rc ; t CO₂-e.

$SC_{x,Rc,A}$ = total sequestration for project management activity x for reporting period Rc in carbon estimation area A ; t CO₂-e.
 A = carbon estimation area.
 n = number of carbon estimation areas in the project.

84 Calculation of net abatement amount—net abatement for project

- (1) The net abatement for the project must be calculated using the following formula:

$NA_{Rc,Proj} = SC_{Rc,Proj} - \Delta E_{ALL,Rc,Proj} + NA_{Rc-1,Proj}$	Equation NA3
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Where:

$NA_{Rc,Proj}$ = project net abatement for the reporting period; t CO₂-e.
 $SC_{Rc,Proj}$ = total sequestration for the project for reporting period Rc ; t CO₂-e.
 $\Delta E_{ALL,Rc,Proj}$ = total change in emissions from all sources for the reporting period for the project; t CO₂-e.
 $NA_{Rc-1,Proj}$ = project net abatement for the reporting period before the current reporting period; t CO₂-e.

- (2) For the first reporting period, the value for $NA_{Rc-1,Proj}$ must be zero.
- (3) For subsequent reporting periods, the value for $NA_{Rc-1,Proj}$ must be equal to or less than zero to be included in Equation NA3.
- (4) If $\Delta E_{ALL,Rc,Proj}$ is a negative value for the reporting period, then $\Delta E_{ALL,Rc,Proj}$ must be taken to be zero for the purpose of Equation NA3.
- (5) If $NA_{Rc,Proj}$ is a non-negative value for the reporting period Rc , then:
- for the purposes of paragraph 106(1)(c) of the Act, the carbon dioxide equivalent net abatement amount for the reporting period is taken to be $NA_{Rc,Proj}$; and
 - for the subsequent reporting period, $NA_{Rc-1,Proj}$ is taken to be zero.
- (6) If $NA_{Rc,Proj}$ is a negative value for the reporting period Rc , then:
- for the purposes of paragraph 106(1)(c) of the Act, the carbon dioxide equivalent net abatement amount for the reporting period is taken to be zero; and
 - $NA_{Rc,Proj}$ must be used in calculations of net abatement amount in the subsequent reporting period as the value for $NA_{Rc-1,Proj}$.

Division 7—Changing project management activities or management actions

85 Limitations on changing activities or actions

- (1) A project proponent may change project management activities and management actions during a project only if:
- changing from stubble retention to another project management activity; or
 - changing management actions within a sustainable intensification project management activity.
- (2) If a project management activity is undertaken in a particular carbon estimation area during a particular reporting period, the activity must not be changed before the end of the reporting period.

- (3) If sustainable intensification has commenced as a project management activity in a particular carbon estimation area during a particular reporting period, neither management action that makes up the activity may be changed before the end of the reporting period.
- (4) A project proponent must carry out the activity or action in accordance with Division 3 of Part 3.

86 When management action is taken to have ceased in carbon estimation area with pasture

- (1) The management actions of establishing, renovating and maintaining pasture are taken to have ceased in a carbon estimation area if a depletion event occurs in the area in accordance with subsections 89(1) and (2).
- (2) The actions are taken to have ceased when the depletion event commences in accordance with subsection 89(3).

87 When other activity or action is taken to have ceased in carbon estimation area

Nutrient management

- (1) Nutrient management in a sustainable intensification project management activity is taken to have ceased as a management action if a nutrient is not applied at the time specified in subsection 27(6).

Soil acidity management

- (2) Soil acidity management in a sustainable intensification project management activity is taken to have ceased as a management action if lime is not applied at the time determined in accordance with section 31.

New irrigation

- (3) Subject to subsection (4), new irrigation in a sustainable intensification project management activity is taken to have ceased as a management action if additional water is not applied in any year within the nominated permanence period.
- (4) If:
 - (a) additional water is not applied in a year within the nominated permanence period; and
 - (b) the environmental conditions in that year are such that additional water would not achieve an increase in yield or pasture growth;

then the management action will not be taken to have ceased under subsection (3).

Note: Records demonstrating the requirement in paragraph (4)(b) is met are required to be kept under paragraph 98(1)(g).

Sustainable intensification

- (5) Sustainable intensification is taken to cease as a project management activity in a carbon estimation area if the project proponent ceases to undertake a nominated management action, or both nominated management actions, in the carbon estimation area.
- (6) For subsection (5), **nominated**, in relation to a management action, has the same meaning as it has in section 25.

Stubble retention

- (7) Stubble retention is taken to have ceased as a project management activity in a carbon estimation area if a second stubble removal event occurs in the area within 5 years that the area is under crops.

When activity taken to have ceased

- (8) If sustainable intensification ceases under this section, it is taken to cease at the start of the sequestration year in which the activity ceased in accordance with this section.
- (9) If stubble retention ceases under this section, the project management activity is taken to cease when the second stubble removal event commences.

Meaning of sequestration year

- (10) For this determination, **sequestration years** begin on the first day of the sequestration period for a project management activity in the carbon estimation area, and on each anniversary of that day.

88 Ceased activity or action taken to be depletion event

If a project management activity or management action is taken to have ceased under section 87, a depletion event is taken to have occurred at the time specified in subsection 87(8) or (9).

Division 8—Carbon depletion

89 Bare soil

- (1) Subject to subsection (2), if a carbon estimation area:
 - (a) has less than 70% vegetation groundcover; or
 - (b) is not monitored in accordance with section 99;for 3 consecutive soil monitoring periods, a depletion event is taken to have occurred.
- (2) A depletion event specified in subsection (1) cannot occur in the first sequestration year after establishing, renovating or maintaining pasture commenced as a management action in the carbon estimation area.
- (3) The depletion event is taken to have commenced on the first day after the 3 consecutive soil monitoring periods have passed.
- (4) The vegetation groundcover referred to in subsection (1) includes vegetation that is alive or dead.
- (5) In this determination, a **soil monitoring period** is the period referred to in subsection 99(2).

Note: Subsection 99(2) requires that vegetation groundcover must be monitored every 3 months.

90 Depletion and replenishment events—requirements

- (1) From the time that the depletion event is taken to have commenced in accordance with this determination, soil carbon stocks are taken to reverse at an annual rate of one-seventh of the total sequestration achieved for the relevant carbon estimation area (as calculated in accordance with section 91) in the period between the project declaration date and the day before the depletion event commenced.

- (2) A depletion event in a carbon estimation area is taken to stop when:
 - (a) for the depletion event referred to in section 88—the project management activity that was undertaken immediately before the depletion event resumes, or another project management activity commences in the carbon estimation area; and
 - (b) for the depletion event referred to in section 89—the project proponent has monitored the carbon estimation area in accordance with this determination and the area does not have bare soil.
- (3) If the depletion event does not stop in accordance with subsection (2) within 7 years after the depletion event commenced, it is taken to stop after that 7 years has elapsed.
- (4) Replenishment of soil carbon stocks following a depletion event in a carbon estimation area is taken to commence:
 - (a) when the project proponent has monitored the carbon estimation area in accordance with this determination and the area does not have bare soil, if:
 - (i) the depletion event is taken to have stopped in accordance with paragraph (2)(b); and
 - (ii) throughout the depletion event the project proponent was undertaking a project management activity in the carbon estimation area in accordance with Part 3; or
 - (b) otherwise—when the project management activity that was undertaken immediately before the depletion event resumes, or another project management activity commences in the carbon estimation area in accordance with Part 3 and section 85.

91 Calculation of carbon depletion

Application of section

- (1) This section applies in relation to carbon estimation area (*A*) if there has been a depletion event in that area.

Definitions

- (2) In this determination:

depletion period means the period relating to that carbon estimation area that:

- (a) commences when the depletion event commences in accordance with section 88 or 89; and
- (b) ends immediately before the replenishment of soil carbon stocks commences in accordance with subsection 90(4).

replenishment period means the period of $Y_{R,A}$ years that commences immediately after the depletion period ends, where $Y_{R,A}$ is calculated in accordance with this section.

Modifications to operation of determination following depletion event

- (3) Despite section 16, the boundaries of the carbon estimation area must not be changed between the start of the depletion period and the end of the replenishment period.
- (4) Despite section 48, the ***sequestration period*** for the carbon estimation area for a particular reporting period does not include any portion of the reporting period that overlaps with:
 - (a) for the purposes of provisions that deal with the calculation of sequestration—the depletion period or the replenishment period; and

- (b) for the purposes of provisions that deal with the calculation of changes in emissions—the depletion period.

Note: As a result, further sequestration of carbon in soil is not calculated (and therefore not credited) during the depletion and replenishment periods. In contrast, changes in emissions are calculated and taken into account during the replenishment period.

- (5) If, as a result of this section, there is no sequestration period for the carbon estimation area in a particular reporting period, then for that carbon estimation area and for that reporting period:
- (a) no calculations relating to changes in emissions are required; and
 - (b) for Equation EALL1 (section 81), $\Delta E_{All,RC,A}$ is taken to be zero.
- (6) Despite subsection 85(1), the project proponent must not change the project management activity or management actions in the carbon estimation area during the replenishment period.

Calculation of depletion and working out when replenishment period ends

- (7) If a depletion event has commenced in a carbon estimation area, and the event is not taken to have stopped under subsection 90(2), then the sequestration amount for the project management activity for the carbon estimation area where the depletion event is underway must be calculated using the following formula:

$SC_{x,A} = SC_x \times h_A$	Equation D1
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Where:

$SC_{x,A}$ = sequestration amount for the project management activity x for carbon estimation area A ; t CO₂-e / y.

SC_x = sequestration value for the project management activity x ; t CO₂-e / ha / y (see Equations SC1A and SC1B, section 49).

h_A = area of carbon estimation area A ; ha.

x = project management activity that was being undertaken in carbon estimation area A immediately before the depletion event commenced.

A = carbon estimation area A as it was when the depletion event commenced, whether or not its boundaries have changed previously.

- (8) The total accumulated carbon sequestration achieved for the relevant carbon estimation area in the period between the project declaration date and the day the depletion event commenced (section 88 or 89) must be calculated using the following formula:

$SC_{Seq,A} = SC_{x,A} \times Y_T$	Equation D2
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Where:

$SC_{Seq,A}$ = total accumulated carbon sequestration for carbon estimation area A ; t CO₂-e.

$SC_{x,A}$ = sequestration value for the project management activity x for carbon estimation area A ; t CO₂-e / y.

Y_T = total (T) period (in years (Y)) since a project management activity was first undertaken on the carbon estimation area until the depletion event was considered to have commenced in accordance with this determination; y.

x = project management activity that was being undertaken in carbon estimation area A immediately before the depletion event commenced.

A = carbon estimation area A as it was when the depletion event commenced, whether or not its boundaries have changed previously.

Note: Project management activities and carbon estimation areas may have changed across reporting periods. For the purposes of calculating $SC_{Seq,A}$ the project management activity and carbon estimation area is considered to be the same throughout the project as the carbon estimation area that is undergoing the depletion event.

- (9) For the first 7 years following the start of a depletion event in the area, the soil carbon stocks in carbon estimation area A must be calculated using the following formula:

$SC_{D,A,Y_D} = SC_{Seq,A} - Y_D \left(\frac{SC_{Seq,A}}{7} \right)$	Equation D3
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Where:

SC_{D,A,Y_D} = sequestration value for carbon estimation area A in years Y_D since the depletion event (D) commenced; t CO₂-e.

Note: SC_{D,A,Y_D} cannot be a value less than zero.

$SC_{Seq,A}$ = total accumulated carbon sequestration for carbon estimation area A ; t CO₂-e.

Y_D = period (in years (Y)) that has elapsed since the depletion event (D) first occurred.

7 = 1/7th is the annual rate of depletion of the soil carbon stocks sequestered in carbon estimation area A .

A = carbon estimation area A as it was when the depletion event commenced, whether or not its boundaries have changed previously.

- (10) After 7 years of depletion, sequestration levels are taken to reach the levels that they had reached before the commencement of any project management activity in the carbon estimation area (when the total accumulated carbon sequestration, SC_{D,A,Y_D} , reaches zero).
- (11) If a depletion event is taken to have stopped under subsection 90(2), sequestration for the carbon estimation area continues to be zero until the soil carbon is replenished to the level present the day before the depletion event and the length of time to achieve this must be calculated using the following formula:

$Y_{R,A} = \frac{SC_{Seq,A} - SC_{D,A,Y_D}}{SC_{x,A}}$	Equation D4
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Where:

$Y_{R,A}$ = period of time (in years (Y)) required to replenish (R) soil carbon to the level present the day before the depletion event; y.

$SC_{Seq,A}$ = total accumulated carbon sequestration for carbon estimation area A ; t CO₂-e.

SC_{D,A,Y_D} = sequestration value for carbon estimation area A in years Y_D since the depletion event (D) commenced; t CO₂-e.

$SC_{x,A}$ = annual sequestration amount for carbon estimation area A ; t CO₂-e / y.

x = project management activity that is being undertaken in carbon estimation area A at the start of the replenishment period.

A = carbon estimation area A as it was when the depletion event commenced, whether or not its boundaries have changed previously.

Part 5—Reporting, notification, record-keeping and monitoring requirements

Division 1—General

92 Operation of this Part

For subsection 106(3) of the Act, this Part sets out reporting, notification, recordkeeping, and monitoring requirements for a soil carbon project that is an eligible offset project.

Division 2—Reporting requirements

Note: Other reporting requirements are prescribed in the legislative rules.

93 Offsets reports requirements—review of strategies

If, during a reporting period, review of a strategy was required under any of the following:

- (a) section 30 (nutrient management strategy);
- (b) section 33 (soil acidity management);
- (c) section 38 (pasture renovation);
- (d) section 42 (conversion to pasture);

the project proponent must include, in the offsets report for that period, evidence that demonstrates that the review was undertaken.

Note: For example, the evidence could include a letter from the qualified person who conducted the review.

94 Offsets reports requirements—determination of certain factors and parameters

If, in the circumstances described in paragraph 7(2)(b), a factor or parameter is defined or calculated for a reporting period by reference to an instrument or writing as in force from time to time, the offsets report about the project for the reporting period must include the following information for the factor or parameter:

- (a) the versions of the instrument or writing used;
- (b) the start and end dates of each use;
- (c) the reasons why it was not possible to define or calculate the factor or parameter by reference to the instrument or writing as in force at the end of the reporting period.

95 Offsets reports requirements—changing carbon estimation areas

- (1) If changes are made to the number or boundaries of carbon estimation areas within a project, the new carbon estimation areas or new boundaries must be identified in the next offsets report that is submitted to the Regulator and that reports on those carbon estimation areas.
- (2) The map referred to in subsection 15(4) must be provided to the Regulator with the offsets report referred to in subsection 95(1).

96 Offsets reports requirements—depletion events

If a depletion event occurs during a reporting period, the offsets report for that period must include the following information about the event:

- (a) the date the event occurred, or was taken to have occurred;
- (b) if the event has ceased—the date the event ceased, or was taken to have ceased;
- (c) the nature of the event;
- (d) the provision in this determination under which the depletion event is taken to have occurred.

Division 3—Notification requirements

Note: Other notification requirements are prescribed in the legislative rules.

97 Notification of Regulator

- (1) If a project management activity or management action is stopped before the nominated permanence period has ended, the project proponent must notify the Regulator within 30 days after the activity or action has stopped.
- (2) If a project management activity or management action is changed, the project proponent must notify the Regulator within 30 days after the activity or action is changed.
- (3) If a depletion event has occurred within a carbon estimation area, the project proponent must notify the Regulator within 30 days after the depletion event commenced in accordance with this determination.
- (4) The notification of a depletion event must include:
 - (a) the date the event commenced; and
 - (b) if the event has ceased—the date it ceased.

Division 4—Record-keeping and project monitoring requirements

Note: Other record-keeping and project monitoring requirements are prescribed in the legislative rules.

98 Records that must be created and kept

- (1) The project proponent must keep records of:
 - (a) the identity and qualifications of each qualified person involved in the project; and
 - Note: Examples of when a qualified person may be involved in the project include:
 - (a) providing advice about material deficiency or the average soil pH in a carbon estimation area submitted as part of an application; or
 - (b) preparing or reviewing a management strategy used as part of a project management activity.
 - (b) material and evidence used in the preparation of a management strategy that is prepared as part of a project management activity or management action; and
 - (c) material and evidence to support any written advice by a qualified person and provided with the application in accordance with Subdivision 3 of Division 2 of Part 3; and
 - (d) the results of any appropriate testing undertaken as part of the project; and
 - (e) material to demonstrate that each management action nominated for a carbon estimation area has been carried out as required under Part 3; and
 - (f) if a depletion event has occurred—material and evidence used to determine when the event occurred; and
 - (g) if additional water is not applied in a year as part of a new irrigation management action—material and evidence that demonstrates the environmental conditions in that year are such that additional water would not achieve an increase in yield or pasture growth.

- (2) The proponent must keep any management strategy prepared as part of a project management activity or a management action.
- (3) The proponent must create and keep records of the result of every calculation completed in accordance with Part 4.

Note: The requirement to create and keep records of the results of calculations includes the results of calculations of carbon depletion under Division 8 of Part 4.

- (4) If a project proponent changes a project management activity or management action, the proponent must keep the information and evidence required under Subdivisions 3–5 of Division 2 of Part 3 for each project management activity or management action to which the proponent has changed.

99 Record keeping and project monitoring—vegetation groundcover

- (1) The project must be monitored throughout the nominated permanence period to determine whether a carbon estimation area has less than 70% vegetation groundcover.
- (2) Monitoring must be undertaken every 3 months and records must be collected demonstrating the percentage groundcover.
- (3) Records must include:
 - (a) the location of transects through a carbon estimation area; and
 - (b) date-stamped and geo-referenced photographs along each transect in a carbon estimation area; and
 - (c) a description of the method used to estimate the percentage ground cover in sufficient detail to enable the method to be replicated.
- (4) The transects specified in subsection (3) must be revisited each time monitoring is conducted.

100 Project monitoring—livestock

- (1) For the baseline (where appropriate) and the crediting period, the project proponent must determine the following parameters at least once a year:
 - (a) the number of animals within a carbon estimation area, according to species, state/region and livestock class;
 - (b) the number of days, according to season, that the animals are on the carbon estimation area within a year.
- (2) For the purposes of determining the number of animals in each livestock class, the date of birth of each animal is deemed to be the first day of summer.
- (3) For the purposes of this section, data collection:
 - (a) may include the use of log books, farm gate records, or similar methods; and
 - (b) must be sufficiently accurate to capture stock movements according to group characteristics, by day and by season.

101 Project monitoring—other parameters

The project proponent for a soil carbon project must monitor and determine a parameter set out in an item of the following table in accordance with the instructions in the item.

Parameter	Description	Unit	Measurement procedure (including frequency as required)
1	Sequestration value (see subsection 49(4))	t CO ₂ -e/ha/y	The value must relate to the activity being undertaken on the carbon estimation area and the SA2 region in which the area is located. The CFI Mapping Tool should be reviewed at the time of reporting
2	h_A (see subsection 49(5))	Ha	Determined at the time of reporting based on the CFI Mapping Tool
3	$Q_{LS_{gijk,Y,A}}$ (see subsection 58(1))	Livestock head	Determined in accordance with section 100
4	$D_{gijk,Y,A}$ (see subsection 58(1))	Days	Determined in accordance with section 100
5	$Q_{LS_{gijk,RC,A}}$ (see subsection 67(1))	Livestock head	Determined in accordance with section 100
6	$AU_{Y,A}$ (see subsection 58(2))	Animal units	Determined in accordance with subsection 57(2)
7	$G_{SF_{fij,RC,A}}$ (see subsection 68(1))	t per year	Evidenced by invoices, contractual arrangements or sales records
8	$U_{RC,A}$ (see subsection 68(2))	t per year	Evidenced by invoices, contractual arrangements or sales records

Parameter	Description	Unit	Measurement procedure (including frequency as required)
	period		
9	$L_{l,Rc,A}$ (see subsection 69(1))	t	Evidenced by invoices, contractual arrangements or sales records
10	$VQ_{v,Rc,A}$ (see subsection 70(1))	t of crop per year	Evidenced by invoices, contractual arrangements or other industry standard practices
11	$RF_{v,Rc,A}$ (see subsection 70(1))	Decimal	Evidenced by invoices, contractual arrangements or other industry standard practices
12	$RF_{p,Rc,A}$ (see subsection 70(3))	Decimal	Evidenced by invoices, contractual arrangements or other industry standard practices
13	$Area - T_{Rc,A}$ (see subsection 70(3))	Ha	Using CFI Mapping Tool
14	$Q_{I,Rc,A}$ (see subsection 71(2))	kL	Evidenced by invoices or contractual arrangements and apportioned based on hectares of the carbon estimation area irrigated as a fraction of the total hectares of land irrigated and the fuel used to run all pumps on that land
15	$Q_{IP,Rc,A}$ (see subsection 71(3))	kWh or GJ	Evidenced by invoices or contractual arrangements and apportioned based on hectares of the carbon estimation area irrigated as a fraction of the total hectares of land irrigated and the fuel used to run all pumps on that land. Where

Parameter	Description	Unit	Measurement procedure (including frequency as required)
			electricity purchased is measured in gigajoules, the quantity of kWh must be calculated by dividing the amount of GJ by 0.0036.

102 Consequences of not monitoring livestock

- (1) If, during a particular period (the *non-monitored period*) in a reporting period, the project proponent for a soil carbon project fails to monitor livestock in a carbon estimation area as required by the monitoring requirements, the abatement for the area during the non-monitored period is taken to be zero.
- (2) To avoid doubt, this determination does not prevent the Regulator from taking action under the Act, or regulations or rules made under the Act, in relation to the project proponent's failure to monitor vegetation groundcover or livestock as required by the determination.

Note: Examples of action that may be taken include the following:

- (a) if the failure constitutes a breach of a civil penalty provision in section 194 of the Act (which deals with project monitoring requirements), the Regulator may apply for a civil penalty order in respect of the breach;
- (b) if false or misleading information was given to the Regulator in relation to the failure, the Regulator may revoke the project's section 27 declaration under regulations or rules made for the purposes of section 38 of the Act;
- (c) if the giving of false or misleading information in relation to the failure led to the issue of Australian carbon credit units, the Regulator may require all or some of those units to be relinquished under section 88 of the Act.

103 Consequences of not meeting requirement to monitor certain parameters

If, during a particular period (the *non-monitored period*) in a reporting period, a project proponent for a soil carbon project fails to monitor a parameter as required by the monitoring requirements, the value of the parameter for the purpose of working out the activity abatement portions for the reporting period is to be determined for the non-monitored period in accordance with the following table.

Consequence of not meeting requirement to monitor certain parameters		
Item	Parameter	Determination of parameter for non-monitored period
1	(a) Sequestration value (see subsection 49(4)); (b) h_A (see subsection 49(5))	The abatement for the area during the non-monitored period is taken to be zero.
2	(a) $Q_{LS_{gijk},Y,A}$ (see subsection 58(1));	The abatement for the area during the non-monitored period is taken to be zero.
3	(a) $Q_{LS_{gijk},Rc,A}$ (see subsection 67(1)) (b) $D_{LS_{gijk},Rc,A}$ (see subsection 67(1)); (c) $G_{SF_{fij},Rc,A}$ (see	The abatement for the area during the non-monitored period is taken to be zero.

Consequence of not meeting requirement to monitor certain parameters

Item	Parameter	Determination of parameter for non-monitored period
	subsection 68(1)	
4	Each of the following: (a) $U_{RC,A}$ (see subsection 68(2)); (b) $L_{I,RC,A}$ (see subsection 69(1)); (c) $VQ_{v,RC,A}$ (see subsection 70(1)); (d) $RF_{v,RC,A}$ (see subsection 70(1)); (e) $RF_{p,RC,A}$ (see subsection 70(3)); (f) $Area - T_{RC,A}$ (see subsection 70(3)); (g) $Q_{I,RC,A}$ (see subsection 71(2)); (h) $Q_{IP,RC,A}$ (see subsection 71(3))	The project proponent must make a conservative estimate of the parameter having regard to: (a) any relevant measurement or estimation approaches or requirements that apply to the parameter under the NGER Measurement Determination; and (b) any relevant historical data for the project; and (c) any other data for the project that relates to the parameter; and (d) any other matter the project proponent considers relevant.

Division 5—Reporting under section 77A of the Act

104 No division of carbon estimation area

For subsection 77A(2) of the Act, the division of the overall project must not result in the division of a carbon estimation area