Carbon Credits (Carbon Farming Initiative) (Reforestation by Environmental or Mallee Plantings—FullCAM) Methodology Determination 2014[1]

Carbon Credits (Carbon Farming Initiative) Act 2011

I, GREG HUNT, Minister for the Environment, make this Methodology Determination under subsection 106(1) of the *Carbon Credits (Carbon Farming Initiative) Act 2011*.

Dated 9 : 9 : 2014

GREG HUNT Greg Hunt

Minister for the Environment

Contents

Part 1 Preliminary

1.1 Name of Determination

This Determination is the *Carbon Credits (Carbon Farming Initiative) (Reforestation by Environmental or Mallee Plantings—FullCAM) Methodology Determination 2014*.

1.2 Duration

Note See subsection 122(1) of the Act.

This Determination:

(a) commences on the day after it is registered on the Federal Register of Legislative Instruments; and

(b) unless sooner revoked, expires on the day before it would otherwise be repealed under subsection 50(1) of the *Legislative Instruments Act 2003*.

Note This Determination will expire on the first 31 March or 30 September on or after the tenth anniversary of its registration.

Note This Determination continues to apply after expiry in accordance with section 125 of the Act.

1.3 Definitions

In this Determination:

above-ground biomass means all live material in a tree or shrub above the soil substrate and includes the stem and crown.

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

actual plot location means spatial coordinates, collected in the field using a geographic positioning system, which define the locations of plots.

adjacent tree means a non-project tree that:

(a) has a stem in an adjoining area; and

(b) has a crown that extends 3 metres or more across at its widest point, at the time of FullCAM modelling.

adjoining area means the area that extends outwards for 20 metres perpendicular to the long axis of each side of a narrow or wide-linear planting as measured from the outer stems of the planting.

below-ground biomass means all live material in a tree or shrub below the soil substrate and includes the tap root or lignotuber, and the lateral roots.

belt planting means a planting that:

(a) is established in a belt configuration;

(b) can follow landscape contours or be arranged in a straight line; and

(c) is either a narrow or wide-linear planting.

block planting —see section 3.13.

calibration means either a generic or a specific calibration.

carbon estimation area (CEA) means an area of land that is within the project area and that meets the requirements in section 3.3.

carbon pool means a reservoir which has the capacity to accumulate or release carbon and includes above-ground biomass, below-ground biomass or debris.

carbon stock of an area of land, at a specified time, means the quantity of carbon held within the area at that time as:

(a) above-ground biomass;

(b) below-ground biomass; and

(c) debris.

carbon stock change means the change in the quantity of carbon stock over a specified time, expressed in units of mass.

CFI Mapping Guidelines means the guidelines of that name, as published from time to time on the Department's website.

CFI Mapping Tool means the online mapping tool of that name, as published from time to time on the Department's website.

CFI methodology determination means a legislative instrument made under section 106 of the Act or as varied under section 114 of the Act.

CO_2-e means carbon dioxide equivalent.

crown cover means the area of land circumscribed by the outer limits of the crown (viewed as a horizontal cross-section) of a tree, or collection of trees.

debris means above-ground and below-ground dead plant material.

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

Note The declaration date is different from the planting date or modelling commencement date.

Department means the department that administers the Act.

disturbance event means an event, whether natural or caused by humans, that affects the accumulation or loss of carbon stock within the greenhouse gas assessment boundary.

domain group means a set of:

(a) planting types—see Division 3.3;

(b) planting geometries—see Division 3.4;

(c) planting spacing—see Division 3.4; and

(d) if relevant, stocking density and tree proportion—see Division 3.5;

that taken together define the requirements under which a particular calibration may be applied.

establishment means the act of establishing a mixed-species environmental planting or mallee planting and as a minimum involves the planting of species eligible under this Determination.

exclusion area has the meaning given by section 3.7.

forest has the meaning given in the Regulations.

forest cover—land has ***forest cover*** if the vegetation on the land includes trees that:

(a) are 2 metres or more in height; and

(b) provide crown cover of at least 20% of the land.

forest potential—land has ***forest potential*** if:

(a) the land has an area of at least 0.2 hectares; and

(b) the vegetation on the land includes trees that have the potential:

(i) to reach 2 metres or more in height; and

(ii) to provide crown cover of at least 20% of the land.

fuel emissions means emissions of carbon dioxide (CO_2), nitrous oxide (N_2O), or methane (CH_4) arising from fossil fuel use in implementing the project mechanism.

FullCAM means the latest version of the Full Carbon Accounting Model as released on the Department's website.

FullCAM Guidelines means the guidance for using FullCAM for this Determination, as published from time to time on the Department's website.

generic calibration means the 'mixed-species environmental planting' setting used in FullCAM.

GIS means a geographic information system designed to capture, store, manipulate, analyse, manage, and present all types of geographical data.

initial carbon stock means carbon stock existing at the declaration date.

intended plot location means the spatial coordinates for a randomly-selected grid intersect from a GIS overlay used to define the proposed location of plots—see section 3.30.

land management regime means the set of actions including:

(a) preparation prior to planting;

(b) planting;

(c) thinning;

(d) weed control treatment; and

(e) the application of fertiliser;

which are applied in a uniform or consistent manner to an area of land.

landscape planting means a planting in an urban centre or locality as follows:

(a) in a residential place (for example, in a backyard, park or on a nature strip);

(b) on the grounds of a sporting facility, factory or other commercial facility;

(c) on the grounds of a hospital, school or other institution;

(d) in a car-park or cemetery.

mallee species means any of the Australian species of the genus *Eucalyptus* that generally exhibit a growth form of multiple stems arising from a large underground lignotuber.

Note Eucalyptus species recognised as having the form of a mallee include:

E. calycogona

E. cneorifolia [Kangaroo Island CS20275]

E. cyanophylla [Loxton cult.]

E. dumosa

E. gracilis [Loxton cult.]

E. horistes

E. incrassata

E. kochii

E. kochii ssp. borealis

E. kochii ssp. plenissima

E. leptophylla

E. loxophleba ssp. lissophloia

E. oleosa

E. plenissima

E. polybractea

E. porosa

E. socialis.

mallee planting has the meaning given in subsection 3.9(1).

management event means a land management activity that can be modelled in FullCAM, such as a planting, thinning, harvest, or fire.

mixed-species environmental planting has the meaning given in section 3.10.

model point means a static location defined by latitude and longitude coordinates for each carbon estimation area for the purpose of estimating carbon stocks using FullCAM.

modelling commencement means the commencement date used for modelling forest growth in FullCAM, and is the planting date for each carbon estimation area.

narrow-linear planting has the meaning given in section 3.11.

native vegetation means vegetation:

(a) consisting of species native to the local area; and

(b) with a mix of trees, shrubs, and understorey species that reflects the structure and composition of the local native vegetation community.

Note A monoculture may constitute native vegetation where it can naturally occur within the local vegetation community.

NGER Measurement Determination means the applicable determination made under subsection 10(3) of the *National Greenhouse and Energy Reporting Act 2007*.

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

permanent planting means a planting:

(a) that is not harvested other than:

(i) for thinning for ecological purposes; or

(ii) to remove debris for fire management; or

(iii) to remove firewood, fruits, nuts, seeds, or material used for fencing or as craft materials, if those things are not removed for sale; or

(iv) in accordance with traditional indigenous practices or native title rights; and

(b) that is not a landscape planting.

planting means:

(a) as a verb, to put or set in the ground species that are eligible under this Determination using:

(i) propagated seedling stock; or

(ii) direct seeding, including in rows or broadcast;

for the purposes of growing project trees;

(b) as a noun, an area of project trees established using direct seeding or propagated seedling stock.

planting date means for a carbon estimation area, the date on which planting last occurred within the carbon estimation area.

planting geometry means one of the following:

(a) narrow-linear planting;

(b) wide-linear planting; or

(c) block planting.

planting spacing means the spatial configuration of a planting type and is one of the components that defines a domain group.

planting type is one of the components that defines a domain group and means one of the following:

(a) a mallee planting; or

(b) a mixed-species environmental planting.

plot means a defined area of land within a carbon estimation area where on-ground samples are collected or for which imagery is analysed.

probable limit of error means a measure of precision estimated as half the confidence interval expressed as a percentage of the estimate calculated here in accordance with Equations 4 and 9 for a probability of 0.05 of obtaining a value as or more extreme than the estimate for the two-tailed student's *t* distribution.

project mechanism has the meaning given by section 2.2.

project tree means a tree or shrub that has been established within a carbon estimation area through undertaking the project mechanism.

random planting means a planting not planted in rows.

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

shrub means a perennial plant that has primary supporting structures consisting of secondary xylem and that does not have, or have the potential for its stem diameter to be measured at breast height (DBH), where DBH is defined as 130 centimetres in height.

Note i.e. if the common growth habit of the plant precludes the possibility for a stem diameter measurement to be taken at breast height (130 cm), then the plant is treated as shrub.

specific calibration means a calibration used in FullCAM and specified in Schedule 1 to this Determination.

stem means the ascending axis of a plant and the main structural component of the above-ground portion of trees and shrubs.

Note Multi-stemmed trees or shrubs are treated as a single plant for estimating stocking density.

stocking density means the number of live individual trees or shrubs per hectare in a carbon estimation area and/or the number of live individual seedlings or seeds per hectare at establishment.

stratification means the division of the project area into one or more carbon estimation areas and, if required, exclusion areas.

thinning means the selective removal of trees for ecological purposes, including to maintain species diversity or ground cover.

tree means a perennial plant that has primary supporting structures consisting of secondary xylem and that has, or has the potential to for its stem diameter to be measured at 130 centimetres height (i.e. DBH).

tree proportion means the proportion of individual live trees relative to the total of individual live trees and shrubs in a mixed-species environmental planting.

wide-linear planting has the meaning given in section 3.12.

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

certificate of entitlement

eligible offsets project

emission

greenhouse gas

offsets report

project

project area

project proponent

Regulator; and

reporting period.

1.4 Kind of project to which this Determination applies

Note See paragraph 106(1)(a) of the Act.

(1) This Determination applies to the following kinds of project:

(a) the establishment of a permanent planting on or after 1 July 2007;

(b) a forestry project accredited under the Commonwealth Government's Greenhouse Friendly™ initiative;

(c) a permanent planting accredited under:

(i) the New South Wales Government's Greenhouse Gas Reduction Scheme; or

(ii) the Australian Capital Territory Government's Greenhouse Gas Abatement Scheme; or

(d) a permanent planting established before 1 July 2007 for which there is documentary evidence of a kind mentioned in subsection (2) that demonstrates, to the satisfaction of the Regulator, that the primary purpose of the planting was generation of carbon offsets.

(2) Documentary evidence, for paragraph (1)(d) must:

(a) be dated no later than 2 years after the date the plantings were established;

(b) show that carbon sequestration rights had been registered for the plantings; and

(c) include a statutory declaration that the plantings were entirely privately funded.

Note The documentary evidence in paragraph (2) may include contracts for the sale of offsets.

Part 2 Requirements for declaration as eligible project

Note See paragraphs 27(4)(c) and 106(1)(b) of the Act.

2.1 Eligible projects

To be declared an eligible offsets project, a project to which this Determination applies must meet the requirements in this Part.

Note In addition, a project must meet the requirements in section 27 of the Act and in the Regulations, including a requirement to provide, in an application for a declaration of an eligible offsets project, a geospatial map of the project area that meets the requirements of the CFI Mapping Guidelines (regulation 3.1), and that the project is not an excluded offsets project (regulations 3.36 and 3.37).

2.2 Project mechanism

The project must establish by planting, and maintain, the following types of permanent plantings:

(a) a mixed-species environmental planting; or

(b) a mallee planting.

2.3 Land on which project mechanism is implemented

(1) This section sets out requirements for the land on which the project mechanism is implemented.

(2) The land must be:

(a) within Australia, excluding external territories; and

(b) in an area for which FullCAM data exists.

(3) The land must not contain woody biomass or an invasive native scrub species that need to be cleared in order for planting to occur, other than known weed species required or authorised by law to be cleared.

(4) For at least 5 years before project commencement, the project area must have been clear of forest cover.

(5) Project trees established on land on which the project mechanism is to be implemented will have the potential to attain:

(a) a height of 2 metres or more; and

(b) a crown cover of at least 20% over the total area of the stratum in which the project trees are located.

Note The potential to attain the requirements in subsection (2) may be demonstrated by a description of the species of trees to be planted, the growth characteristics of the species and the anticipated height and crown cover across the stratum area when project trees are at maturity.

Mallee plantings—600mm long-term average annual rainfall

(6) Subject to subsection (7), land in the project area on which a mallee planting occurs must receive long-term average rainfall of 600 millimetres or less, as determined by the long term average rainfall map layer in the CFI Mapping Tool.

(7) A mallee planting that satisfies the requirements for a specific calibration is not subject to the restriction in subsection (6).

Note The geographic limits that apply to mallee specific calibrations under FullCAM serve a similar function as the 600 mm rainfall restriction.

2.4 Identification of project area

The boundaries of the project area must be delineated in accordance with the CFI Mapping Guidelines.

Note Regulation 3.1 of the Regulations includes a requirement to provide, in an application for a declaration of an eligible offsets project, a geospatial map of the project area that meets the requirements of the CFI Mapping Guidelines.

Part 3 Project operation

Note See paragraphs 27(4)(c), 35(2)(a) and 106(1)(b) of the Act and regulations 1.12 and 3.26 of the Regulations.

Division 3.1 Operation of eligible projects

3.1 Operation of eligible projects

An eligible offsets project to which this Determination applies must be operated in accordance with this Part.

Division 3.2 Stratification of the project area

3.2 Initial stratification of project area

Before submitting the first offsets report for the project, the project proponent must stratify the project area in accordance with this Division.

3.3 Requirements for a carbon estimation area

(1) A carbon estimation area must:

(a) consist of land on which the project mechanism is implemented; and

(b) be mapped in accordance with the CFI Mapping Guidelines.

Uniformity requirements

(2) A carbon estimation area must:

(a) have uniform site characteristics in relation to the following:

(i) soil type;

(ii) aspect; and

(iii) slope;

(b) be planted with the same combination of plant species;

(c) be established and managed under the same land management regime, including in relation to:

(i) preparation prior to planting;

(ii) planting;

(iii) thinning;

(iv) weed control treatment; and

(v) the application of fertiliser.

Note Project proponents may optionally stratify carbon estimation areas based on planting date.

(3) For a carbon estimation area comprised of a set of polygons the applicable radius specified in CFI Mapping Guidelines is taken to be:

(a) for a mixed species environmental planting—1.5 kilometres; and

(b) for a mallee planting—5 kilometres.

3.4 Carbon estimation area boundaries

(1) This section sets out requirements for the boundaries of carbon estimation areas.

(2) In addition to the requirements in subsections (3), (4) and (5), the boundaries of each carbon estimation area must be defined in accordance with the CFI Mapping Guidelines using at least one of the following:

(a) field surveys;

(b) aerial photographs;

(c) date-stamped, geo-referenced remotely-sensed imagery, including indicators of vegetation cover data;

(d) soil, vegetation or landform maps.

(3) If the plantings in a carbon estimation area are established in accordance with a narrow or wide-linear planting geometry:

(a) the boundary parallel to the long axis of the planting must be one metre beyond the outer row of stems;

(b) the boundary parallel to the short axis of the planting must be one metre beyond the outer stems of the plants at the end of the rows; and

(c) the boundary circumscribing an exclusion area within a carbon estimation area must be one metre beyond the outer stems bordering the exclusion area.

(4) If the plants in a carbon estimation area are established in any planting geometry that is not consistent with a narrow or wide-linear planting geometry:

(a) the outer boundary of the carbon estimation area is immediately outside the stems of the outermost plants; and

(b) the boundary surrounding any exclusion area within a carbon estimation area is immediately outside the stems of the plants bordering the exclusion area.

(5) If the plantings in a carbon estimation area are established:

(a) in any planting geometry that is not consistent with a narrow or wide-linear planting; and

(b) the boundary of the carbon estimation area was defined in accordance with another CFI methodology determination for which an offsets report has been submitted and accepted by the Regulator;

then, subject to still meeting the requirements of section 3.3 and 3.8, the existing carbon estimation area boundary may be used.

(6) The boundaries must be defined before submitting the next offsets report to the Regulator.

(7) In this section:

indicators of vegetation cover means satellite or aerial imagery that has been processed to indicate vegetation cover or other relevant vegetation attributes.

3.5 Maximum permitted carbon estimation area width

The maximum permitted width for a carbon estimation area is specified in Schedule 2 to this Determination.

3.6 Carbon estimation area planting requirements

(1) A carbon estimation area must contain either a:

(a) mixed-species environmental planting; or

(b) mallee planting.

(2) Only one calibration may be applied to a carbon estimation area in a reporting period.

(3) The planting in the carbon estimation area must still have forest potential no later than 12 months after the planting date.

3.7 Requirements for an exclusion area

Land in the project area on which the project mechanism is not implemented must be defined and mapped as an exclusion area in accordance with the CFI Mapping Guidelines.

3.8 Re-stratification of a carbon estimation area

(1) A carbon estimation area may be re-stratified only as provided in this Division.

(2) A carbon estimation area must be re-stratified if one or more of the following occurs:

(a) the site characteristics in the area are no longer uniform;

(b) the land management regime or a management event (e.g. weed control or fertiliser application) ceases to be uniform across the area;

(c) parts of a planting within the area fail to achieve forest potential;

(d) a disturbance event kills 5% or more trees in the area;

(e) a different calibration is to be applied to part of an existing carbon estimation area—in which case the existing carbon estimation area may be re-stratified according to where the different calibrations are to be applied.

(3) If a carbon estimation area is re-stratified, the new boundaries must be identified in the next offsets report that is submitted to the Regulator.

(4) If the project mechanism is carried out in an area previously defined as an exclusion area, the area may be re-stratified as a carbon estimation area.

Division 3.3 Domain group—planting types and requirements

Note ***Domain group***—Divisions 3.3 to 3.5 define the domain group for a particular calibration. The domain group is the set of requirements for:

planting type;

planting geometry;

planting spacing; and

if relevant, stocking density and tree proportion;

that taken together restrict the circumstances where a particular calibration may be applied.

An additional restriction on the use of a specific calibration may arise due to competition from adjacent trees as determined in Division 3.7.

A further restriction on the application of a specific calibration occurs within FullCAM which intentionally limits the availability of a specific calibration for modelling purposes to within the geographical area for which the specific calibration has been validated.

Section 4.9 creates limited exceptions to the requirement to satisfy the domain group conditions.

3.9 Mallee plantings

(1) A mallee planting must consist of a planting only of mallee species.

(2) A mallee planting is only eligible for the application of a specific calibration if:

(a) the planting satisfies the requirements of the domain group for a specific calibration; and

(b) the planting consists of a specified mallee species.

Note To avoid doubt, a mallee planting that is not a specified mallee species is not eligible for the application of a specific calibration.

(3) Subject to subsections 2.3(6) and (7), a project proponent may choose to apply the generic calibration to a mallee planting at any time.

(4) In this section:

specified mallee species means a single species planting of one of the following:

(a) *Eucalyptus loxophleba* ssp. *lissophloia* L.A.S. Johnson and K.D. Hill (smooth bark York gum); or

(b) *Eucalyptus polybractea* R.T. Baker (blue mallee); or

(c) *Eucalyptus kochii* sub-species comprising:

(i) *E. kochii*, Maiden and Blakely; and/or

(ii) *E. kochii* ssp. *borealis* C.A. Gardner; and/or

(iii) *E. kochii* ssp. *plenissima* C.A. Gardner.

3.10 Mixed-species environmental plantings

(1) A mixed-species environmental planting must consist of a mixture of tree and shrub species that:

(a) are native to the local area of the planting;

(b) are sourced from seeds:

(i) from within the natural distribution of the species; and

(ii) that are appropriate to the biophysical characteristics of the area of the planting;

(c) may be a mix of trees, shrubs, and understorey species where the mix reflects the structure and composition of the local native vegetation community; and

(d) are established through planting.

(2) A mixed-species environmental planting is only eligible for the application of a specific calibration if the planting satisfies the requirements for one of the following domain groups as specified in Schedule 1:

(a) Mixed-species environmental planting—tropical; or

(b) Mixed-species environmental planting—temperate.

Note To avoid doubt, a mixed-species environmental planting that does not meet the requirements of subsection (2) is not eligible for the application of a specific calibration.

(3) A project proponent may choose to apply the generic calibration to a mixed-species environmental planting at any time.

Division 3.4 Domain group—planting geometry and spacing

3.11 Narrow linear plantings

A narrow linear planting must consist of:

(a) for a mallee planting—a belt planting:

(i) of 2 rows of trees planted from tube-stock or direct seeding; and

(ii) that meets the requirements of section 3.14.

(b) for a mixed-species environmental planting—a planting that:

(i) is established:

(A) in rows using tube-stock or direct seeding; or

(B) randomly using tube-stock or broadcast seeding, or both; and

(ii) meets the requirements of section 3.15.

3.12 Wide linear plantings

A wide linear planting must consist of:

(a) for a mallee planting—a belt planting:

(i) of at least 3 and no more than 8 rows of trees planted from tube-stock or direct seeding; and

(ii) that meets the requirements of section 3.14;

(b) for a mixed-species environmental planting—a planting that

(i) is established:

(A) in rows using tube-stock or direct seeding; or

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(B) randomly using tube-stock or broadcast seeding, or both; and

(ii) meets the requirements of section 3.16.

3.13 Block planting

A block planting is any planting that does not meet the requirements of a:

(a) narrow linear planting; or

(b) wide linear planting;

and which:

(c) meets the requirements specified in section 3.17; and

(d) does not consist of a single row.

3.14 Mallee plantings—plant spacing

(1) This section specifies the plant spacing of a narrow or wide linear planting for a mallee planting.

(2) The average distance between the rows in the planting must be no greater than 4 metres.

(3) The distance between the stems of the trees in the outermost rows in the planting must be at least 40 metres from the stems of any adjacent planting in the project area.

(4) The planting must not be affected by material competition from adjacent trees as determined by Division 3.7.

3.15 Mixed-species environmental plantings—narrow linear plant spacing

(1) This section specifies the plant spacing of a narrow linear planting for a mixed-species environmental planting.

(2) The distance between:

(a) for random plantings—the stems of the outermost trees or shrubs on one side of the planting to that of the stems of the outermost trees or shrubs on the other side of the planting; or

(b) for other plantings—the outermost row on one side of the planting to that of the outermost row on the other side of the planting;

must be less than or equal to 20 metres.

(3) The distance between the stems of trees or shrubs at the outermost edge of the planting must be at least 40 metres from the stems of another planting in the project area.

(4) The planting must not be affected by material competition from adjacent trees as determined by Division 3.7.

3.16 Mixed-species environmental plantings—wide linear plant spacing

(1) This section specifies the plant spacing of a wide linear planting in a mixed-species environmental planting.

(2) The distance between:

(a) for random plantings—the stems of the outermost trees or shrubs;

(b) for other plantings—the outermost rows;

must be greater than 20 metres and less than 40 metres.

(3) The distance between the stems of trees or shrubs at the outermost edge of the planting must be at least 40 metres from the stems of another planting in the project area.

(4) The planting must not be affected by material competition from adjacent trees as determined by Division 3.7.

3.17 Block planting—plant spacing

For the avoidance of doubt, spacing within and between block plantings must be in accordance with the CFI Mapping Guidelines.

Division 3.5 Domain group—stocking density and tree proportion

Subdivision 3.5.1 Stocking density and tree proportion—default values

3.18 Propagated seedling stock—default values

If a carbon estimation area is established using propagated seedling stock:

(a) for the first 5 years following the planting date:

(i) the planting is taken to have a stocking density of 85% of the average number of propagated seedling stock planted per hectare for the carbon estimation area; and

(ii) tree proportion is taken to be the same as the proportion of trees to shrubs for the propagated seedling stock planted; and

(b) after 5 years from the planting date:

(i) stocking density is taken to be less than 500 stems per hectare; and

(ii) if the planting includes a mix of tree and shrubs—the tree proportion is taken to be less than 0.75.

3.19 Direct seeding—default values

If a carbon estimation area is established using direct seeding:

(a) stocking density is taken to be less than 500 stems per hectare; and

(b) if the seed used:

(i) consisted of tree species only—the tree proportion is taken to be greater than 0.75; or

(ii) consisted of a mix of tree and shrub species—the tree proportion is taken to be less than 0.75.

3.20 Alternatives to default values

After 2 years from the planting date, a project proponent may choose to sample stocking density and tree proportion to ascertain measured values for relevant carbon estimation areas in accordance with Subdivision 3.5.2.

Subdivision 3.5.2 Stocking density and tree proportion requirements

3.21 Requirements for a specific calibration

(1) For the purposes of sections 3.22 and 4.8, to be eligible to use a specific calibration for which a stocking density and/or tree proportion is defined in Schedule 1, a project proponent must:

(a) apply the default values determined in accordance with section 3.18 or 3.19; or

(b) measure the values for stocking density and/or tree proportion in accordance with section 3.20 and this Subdivision.

(2) Subject to subsection (3), a project proponent is only required to estimate the stocking density and/or tree proportion once over the duration of the crediting period.

(3) If an event occurs that may change the stocking density and/or tree proportion such that the requirements for a specific calibration may no longer be met, then for the purpose of section 3.22, the project proponent must remeasure the stocking density and/or tree proportion in accordance with section 3.20 and this Subdivision.

"No sampling" requirement for a specific calibration

(4) If it is specified in Schedule 1 that no sampling is required for a specific calibration then for that specific calibration:

(a) a project proponent is not required to undertake the processes in section 3.18 or 3.19; and

(b) the evidence requirements in section 3.22 do not apply.

3.22 Evidence of stocking density and tree proportion

A project proponent that has:

(a) applied a specific calibration for the purposes of section 4.8; and

(b) not applied default values determined in accordance with section 3.18 or 3.19;

must be able to demonstrate, to the satisfaction of the Regulator, that a planting in a carbon estimation area meets or exceeds the stocking density or tree proportion requirements for the specific calibration with information collected in accordance with this Subdivision.

3.23 Estimating stocking density

Note For reasons of efficiency, it is likely that the method applied to estimate stocking density under this section would be the same kind as that used to estimate tree proportion under section 3.24.

(1) Stocking density for a carbon estimation area may be estimated by:

(a) counting every tree and shrub, and dividing the total number by the area of the carbon estimation area; or

(b) systematic random sampling in accordance with subsection (2).

(2) If systematic random sampling is used to estimate stocking density, intended plot locations must be selected in accordance with section 3.27.

(3) The methods specified in subsection (1) may be undertaken by:

(a) on-ground measurement; or

(b) using date-stamped, geo-referenced, remotely-sensed imagery.

(4) To estimate stocking density by on-ground measurement:

(a) plots must be established within the carbon estimation area at intended plot locations;

(b) each living tree and shrub in the plot must be counted; and

(c) the stocking density for the carbon estimation area must be calculated using the calculations specified in Subdivision 3.6.1.

(5) To estimate stocking density using date-stamped, geo-referenced, remotely-sensed imagery:

(a) the imagery must have:

(i) a horizontal accuracy that meets the CFI Mapping Guidelines; and

(ii) a pixel resolution of 2.5 metres or better so that individual trees can be differentiated; and

(iii) plots established at each intended plot location specified in subsection (2); and

(b) each living tree and shrub in the plot must be counted; and

(c) the stocking density for the carbon estimation area must be calculated using the calculations specified in Subdivision 3.6.1.

3.24 Estimating tree proportion

Note For reasons of efficiency, it is likely that the method applied to estimate tree proportion under this section would be the same kind as that used to estimate stocking density under section 3.23.

(1) Tree proportion for a carbon estimation area may be estimated by:

(a) counting every tree and shrub, and calculating the ratio; or

(b) systematic random sampling in accordance with subsection (3).

(2) If systematic random sampling is used to estimate tree proportion, intended plot locations must be selected in accordance with section 3.27.

(3) To estimate tree proportion:

(a) plots must be established within the carbon estimation area at intended plot locations;

(b) each living tree and shrub in the plot must be counted; and

(c) the tree proportion for the carbon estimation area must be calculated using the calculations specified in Subdivision 3.6.2.

3.25 Number of plots and probable limits of error

(1) Subject to subsection (2), if a project proponent undertakes systematic random sampling in a carbon estimation area, the project proponent must establish and analyse a minimum of 10 plots in each carbon estimation area.

(2) The project proponent must establish and analyse an additional number of plots estimated to achieve a target probable limit of error at the P=0.05 level.

3.26 Determining values for stocking density and tree proportion

For stocking density

(1) If the probable limit of error for stocking density at the P=0.05 level of significance is:

(a) equal to or less than 10%—then the stocking density for the carbon estimation area may be taken to be equal to the mean as calculated by Equation 2 in section 3.33;

(b) greater than 10% and equal to or less than 50%—then the stocking density for the carbon estimation area may be taken to be equal to the lower confidence limit as calculated by Equation 5 in section 3.36; or

(c) greater than 50%—then:

(i) the sampling process must be repeated with an additional grid overlay as specified in section 3.27; or

(ii) the default stocking density for the planting as specified in section 3.18 or section 3.19 must be used.

For tree proportion

(2) If the probable limit of error for tree proportion at the P=0.05 level of significance is:

(a) equal to or less than 10%—then the tree proportion for the carbon estimation area may be taken to be equal to the mean as calculated by Equation 7 in section 3.38;

(b) greater than 10% and equal to or less than 50%—then the tree proportion for the carbon estimation area may be taken to be equal to the lower confidence limit as calculated by Equation 10 in section 3.41; or

(c) greater than 50%—then:

(i) the sampling process must be repeated with an additional grid overlay as specified in section 3.27; or

(ii) the applicable default tree proportion for the planting as specified in section 3.18 or section 3.19 must be used.

3.27 Establishing a grid overlay

(1) If a project proponent samples in accordance with section 3.23 or 3.24, a grid overlay must be established in accordance with this section.

(2) The grid must consist of square cells.

(3) There must be at least 10 grid intersects within each carbon estimation area being sampled.

(4) Subject to subsection 5, an anchor point for the grid must be established by:

(a) adopting an anchor point as determined by the requirements of another CFI methodology determination; or

(b) randomly selecting easting and northing coordinates within the ranges of easting and northing coordinates for the project area.

Note A project may require more than one grid anchor point to be established.

(5) The easting and northing coordinates referred to in subsection (4) must be from the Map Grid of Australia, known as MGA94, or any Australian standard that replaces MGA94.

(6) The orientation of one axis of the grid must be along an azimuth determined by randomly selecting a whole number angle within the range of zero and 89 degrees inclusive, where zero degrees is true north.

(7) Each grid intersect must be assigned a unique identifier.

(8) Actual plot locations must be located within 10 metres of each intended plot location.

3.28 Plot shapes—general

(1) Plots must have:

(a) a fixed orthogonal area; and

(b) a minimum size of 0.01 ha.

(2) All plots in a carbon estimation area must have the same shape.

(3) In this section:

orthogonal area means the area in a horizontal plane, not a sloping plane. Any measurements of length (e.g. the length of the side of a rectangular plot) must be the horizontal distance, not the slope distance.

3.29 Plot shapes—block plantings

(1) If a carbon estimation area contains one or more block plantings, the plots must be either circular or rectangular.

Circular plots

(2) A circular plot must be established so that:

(a) the centre of the circular plot is the actual plot location; and

(b) the boundary of the circular plot is defined by the circumference.

Rectangular plots

(3) A rectangular plot must be established so that the actual plot location is sited at the same relative position in each rectangular plot in the carbon estimation area.

(4) In this section:

relative position means the most north-westerly, north-easterly, south-easterly or south-westerly corner of a rectangular plot.

3.30 Plot shapes—linear plantings

(1) If the carbon estimation area contains a narrow or wide linear planting, the plots must be established in accordance with this section.

(2) The plots must have a rectangular shape.

(3) The centre line of the plot must:

(a) be perpendicular to the long axis of the planting; and

(b) pass through the actual plot location.

(4) The centre line between the boundaries of the carbon estimation area must be used to measure the plot width.

(5) The distance between the 2 ends of the plot must be determined by:

(a) dividing the plot area (square metres) by plot width (metres); and

(b) establishing the lines dividing the 2 ends of the plot parallel to and equidistant from the centre line.

3.31 Plots extending beyond carbon estimation area

(1) Subject to subsection 2, if a plot extends beyond the boundaries of a carbon estimation area, only trees and shrubs in the plot that are also within the carbon estimation area boundary are permitted to be counted.

Note For plots that extend beyond a carbon estimation area's boundary, only trees and shrubs within the CEA are counted, but for calculation purposes the area of the plot is taken to be the same as for other plots in that CEA.

(2) If the plot has been established in accordance with another CFI methodology determination, the rules pertaining to the treatment of a plot crossing the boundary of a carbon estimation area or equivalent under that CFI methodology determination may be applied to the treatment of the plot.

Division 3.6 Calculating stocking density and tree proportion

Subdivision 3.6.1 Stocking density

3.32 Calculating stocking density of a plot

The stocking density of a plot must be calculated using the following formula:

$z_{ij} = \frac{S_{ij}}{a_j}$	**Equation 1**

Where:

$z_{ij} =$	stocking density (in stems/ha) of the j^{th} plot in the i^{th} carbon estimation area.
$S_{ij} =$	total number of individual living trees and shrubs in the j^{th} plot in the i^{th} carbon estimation area
$a_j =$	plot area (in hectares)
$i =$	i^{th} carbon estimation area.
$j =$	j^{th} plot

3.33 Calculating average stocking density

The average stocking density of a carbon estimation area must be calculated using the following formula:

$\overline{z}_i = \frac{\sum_{j=1}^{M_i} z_{ij}}{M_i}$	**Equation 2**

Where:

$\overline{z}_i =$	average stocking density (in stems/ha) for the i^{th} carbon estimation area.
$M_i =$	total number of plots in the i^{th} carbon estimation area.
$z_{ij} =$	stocking density (in stems/ha) of the j^{th} plot in the i^{th} carbon estimation area—see equation 1.
$i =$	i^{th} carbon estimation area.
$j =$	j^{th} plot

3.34 Calculating margin of error for stocking density

(1) The margin of error for the average stocking density of a carbon estimation area must be calculated using the following formula:

$E_{\overline{z}i} = t_{0.05} \times \frac{\sigma_{\overline{z}i}}{\sqrt{M_i}}$	**Equation 3**

Where:

$E_{\overline{z}i} =$	margin of error for the average stocking density (in stems/ha) for the i^{th} carbon estimation area.
$t_{0.05} =$	critical value of the t-distribution for a Student's t-test, using M_i-1 degrees of freedom at the P=0.05 level of significance.
$\sigma_{\overline{z}i} =$	standard deviation of average stocking density ($\overline{z}$) for plots within the i^{th} carbon estimation area.
$M_i =$	total number of plots in the i^{th} carbon estimation area.
$i =$	i^{th} carbon estimation area.

(2) The standard deviation of the average stocking density for plots within the carbon estimation area must be calculated using the formula for sample standard deviation using Equation 3a as follows:

$\sigma_{\overline{z}i} = \sqrt{\frac{1}{M_i - 1}\sum_{i=1}^{M_i}(z_{ij} - \mu_z)^2}$ where $\mu_z = \frac{1}{M_i - 1}\sum_{i=1}^{M_i} z_{ij}$	**Equation 3a**

Where:

$\sigma_{\overline{z}i} =$	standard deviation of average stocking density ($\overline{z}$) for plots within the i^{th} carbon estimation area.
$\mu_z =$	average of the stocking density z_{ij} for j plots within the i^{th} carbon estimation area.
$z_{ij} =$	stocking density (in stems/ha) of the j^{th} plot in the i^{th} carbon estimation area.
$M_i =$	total number of plots in the i^{th} carbon estimation area.
$i =$	i^{th} carbon estimation area.
$j =$	j^{th} plot

3.35 Calculating probable limits of error for stocking density

The probable limit of error for the average stocking density of a carbon estimation area must be calculated using the following formula:

$L_{\overline{z},i} = \left(\frac{E_{\overline{z}i}}{\bar{z}_i}\right) \times 100$	**Equation 4**

Where:

$L_{\overline{z}\,i} =$	probable limits of error (PLE) for the average stocking density ($\overline{z}$), at the *P*=0.05 level of significance for the i^{th} carbon estimation area as a percentage.
$E_{\overline{z}i} =$	margin of error for the average stocking density (in stems/ha) for the i^{th} carbon estimation area—see equation 3.
$\bar{z}_i =$	average stocking density (in stems/ha) for the i^{th} carbon estimation area—see equation 2.
$i =$	i^{th} carbon estimation area.

3.36 Calculating conservative estimate of stocking density

The conservative estimate of the average stocking density of a carbon estimation area must be calculated as the lower confidence limit using the following formula:

$\tilde{z}_i = \overline{z}_i - \left(\mathrm{t}_{0.05} \times \frac{\sigma_{\overline{z},i}}{\sqrt{M_i}}\right)$	**Equation 5**

Where:

$\tilde{z}_i =$	conservative estimate of the average stocking density (in stems/ha) within the i^{th} carbon estimation area.
$\overline{z_i} =$	average stocking density (in stems/ha) for the i^{th} carbon estimation area—see equation 2.
$t_{0.05} =$	critical value of the t-distribution for a Student's t-test, using *n*-1 degrees of freedom at the *P*=0.05 level of significance.
$\sigma_{\overline{z}i} =$	standard deviation of average stocking density ($\overline{z}$) for plots within the i^{th} carbon estimation area—see equation 3a.
$M_i =$	total number of plots in the i^{th} carbon estimation area.
$i =$	i^{th} carbon estimation area.

Subdivision 3.6.2 Tree proportion

3.37 Calculating tree proportion

The proportion of the planting consisting of trees in a plot in a carbon estimation area must be calculated using the following formula:

$R_{ij} = \left(\frac{T_{ij}}{S_{ij}}\right)$	**Equation 6**

Where:

$R_{ij} =$	proportion of the planting consisting of trees in the j^{th} plot within the i^{th} carbon estimation area.
$T_{ij} =$	total number of individual living trees in the j^{th} plot within the i^{th} carbon estimation area.
$S_{ij} =$	total number of individual living trees and shrubs in the j^{th} plot in the i^{th} carbon estimation area.
$i =$	i^{th} carbon estimation area.
$j =$	j^{th} plot

3.38 Calculating average tree proportion

The average proportion of trees in a carbon estimation area must be calculated using the following formula:

$\overline{R_i} = \frac{\sum_{j=1}^{M_i} R_{ij}}{M_i}$	**Equation 7**

Where:

$\overline{R_i} =$	average proportion of trees for the i^{th} carbon estimation area.
$j =$	j^{th} plot
$R_{ij} =$	proportion of the planting consisting of trees in the j^{th} plot within the i^{th} carbon estimation area—see equation 6.
$M_i =$	total number of plots in the i^{th} carbon estimation area.
$i =$	i^{th} carbon estimation area.

3.39 Calculating margin of error for tree proportion

(1) The margin of error for the average tree proportion in a carbon estimation area must be calculated using the following formula:

$E_{\overline{R}i} = \ t_{0.05} \times \frac{\sigma_{\overline{R}i}}{\sqrt{M_i}}$	**Equation 8**

Where:

$E_{\overline{R}i} =$	margin of error for the average tree proportion in the i^{th} carbon estimation area.
$t_{0.05} =$	critical value of the t-distribution for a Student's t-test, using M_i-1 degrees of freedom at the P=0.05 level of significance.
$\sigma_{\overline{R}i} =$	standard deviation of average tree proportion ($\overline{R}$) for plots within the i^{th} carbon estimation area.
$M_i =$	total number of plots in the i^{th} carbon estimation area.
$i =$	i^{th} carbon estimation area.

(2) The standard deviation of the average tree proportion for plots within the carbon estimation area must be calculated using the formula for sample standard deviation using Equation 8a as follows:

$\sigma_{\overline{R}i} = \sqrt{\frac{1}{M_i - 1}\sum_{i=1}^{M_i}(R_{ij} - \mu_R)^2}$ where $\mu_R = \frac{1}{M_i - 1}\sum_{i=1}^{M_i} R_{ij}$	**Equation 8a**

Where:

$\sigma_{\overline{R}i} =$	standard deviation of average tree proportion ($\overline{R}_i$) for plots within the i^{th} carbon estimation area.
$\mu_R =$	average of the tree proportion R_{ij} for j plots within the i^{th} carbon estimation area.
$R_{ij} =$	proportion of the planting consisting of trees in the j^{th} plot within the i^{th} carbon estimation area—see equation 6.
$M_i =$	total number of plots in the i^{th} carbon estimation area.
$i =$	i^{th} carbon estimation area.
$j =$	j^{th} plot

3.40 Calculating probable limits of error for tree proportion

The probable limits of error for average tree proportion in a carbon estimation area must be calculated using the following formula:

$L_{\overline{R}i} = \left(\frac{E_{\overline{R}i}}{\overline{R}_i}\right) \times 100$	**Equation 9**

Where:

$L_{\overline{R}i} =$	probable limits of error for average tree proportion ($\overline{R}$), percentage error at the P=0.05 level of significance for the i^{th} carbon estimation area.
$E_{\overline{R}i} =$	margin of error for the average tree proportion for the i^{th} carbon estimation area—see equation 8.
$\overline{R}_i =$	average proportion of trees for the i^{th} carbon estimation area—see equation 7.
$i =$	i^{th} carbon estimation area.

3.41 Calculating conservative estimate of tree proportion

The conservative estimate of average tree proportion in a carbon estimation area must be calculated as the lower confidence limit using the following formula:

$\tilde{R}_i = \overline{R}_i - \left(t_{0.05} \times \frac{\sigma_{\overline{R}i}}{\sqrt{M_i}}\right)$	**Equation 10**

Where:

$\tilde{R}_i =$	conservative estimate of average tree proportion (in stems/ha) within the i^{th} carbon estimation area.
$\overline{R}_i =$	average proportion of trees for the i^{th} carbon estimation area—see equation 7.
$t_{0.05} =$	critical value of the t-distribution for a Student' t-test, using M_i-1 degrees of freedom at the P=0.05 level of significance.
$\sigma_{\overline{R}i} =$	standard deviation of average tree proportion ($\overline{R}$) for plots within the i^{th} carbon estimation area—see equation 8a.
$M_i =$	total number of plots in the i^{th} carbon estimation area.
$i =$	i^{th} carbon estimation area.

Division 3.7 Narrow or wide linear plantings—competition from adjacent trees

3.42 Competition from adjacent trees

(1) A narrow or wide linear planting must not be subject to competition from adjacent trees if the competition has a material impact on sequestration in the planting.

(2) A project proponent must determine whether there is material competition from adjacent trees on a narrow or wide linear planting in accordance with this Division.

Note The presence or absence of adjacent trees may be demonstrated using remote imagery dated no earlier than 3 years prior to the planting date for the planting. A proponent is able to re-stratify in accordance with section 3.8, to define a carbon estimation area such that it is not subject to material competition from adjacent trees.

(3) In this Division:

grouped adjacent trees means a group of adjacent trees where all the stems in the group are less than 20 metres apart.

individual adjacent tree means an adjacent tree that is more than 20 metres from any other adjacent tree.

3.43 Determining material competition —individual adjacent trees only

(1) Subject to section 3.44, material competition from individual adjacent trees is taken to be occurring for a narrow or wide linear planting if, on average, there is more than one individual adjacent tree for:

(a) a narrow linear planting— every 150 metres in length of the boundaries parallel to the long axis of the planting; or

(b) a wide linear planting— every 75 metres in length of the boundaries parallel to the long axis of the planting.

3.44 Determining material competition—grouped adjacent trees

(1) The occurrence of material competition from grouped adjacent trees must be determined in accordance with this section.

Note Material competition from grouped adjacent trees for a narrow or wide linear planting could occur where there exists:

(a) a single occurrence of grouped adjacent trees;

(b) multiple occurrences of grouped adjacent trees; or

(c) either (a) or (b) in combination with individual adjacent trees

If only individual adjacent trees are present in the adjoining area the project proponent must determine if material competition is determined in accordance with section 3.19.

(2) The net length of impact of grouped adjacent trees is estimated in accordance with subsections (3) to (8).

(3) The distance between the outermost stems of each occurrence of grouped adjacent trees must be measured along the long axis of the planting.

(4) The length of impact of each clump must be determined by adding 40 metres to the distance determined in subsection (3).

(5) The length of impact of each occurrence of an individual adjacent tree is taken to be 40 metres.

(6) The gross length of impact of the adjacent trees is determined by adding together the distances specified in subsections (4) and (5) for all grouped and individual adjacent trees .

Overlap adjustment for a narrow linear planting

(7) If the planting is a narrow linear planting where:

(a) there are adjacent trees on opposite sides of a narrow linear planting; and

(b) the length of impact of these adjacent trees overlaps;

then:

(c) the distance of the overlap along the long axis of the planting must be measured; and

(d) the distance determined in paragraph (c) must be halved to give the overlap adjustment; and

(e) the overlap adjustment calculated in paragraph (d) must be subtracted from the gross length of impact determined in subsection (6).

(8) The net length of impact must:

(a) for a narrow linear planting—be the length determined in accordance with subsection (6) and, if relevant, subsection (7) ; or

(b) for a wide linear planting—be the length determined in accordance with subsection (6).

(9) If the net length of impact of adjacent trees is:

(a) for a narrow linear planting— more than 20% of the length of the long axis of the planting; or

(b) for a wide linear planting— more than 20% of twice the length of the long axis of the planting;

then:

(c) the adjacent trees are taken to cause material competition for the planting.

Note Adjacent trees are taken to impact the entire width of a narrow linear planting, but only taken to impact one half of the width of a wide linear planting. Consequently in paragraph (9)(b) the length of the long axis of the planting is doubled before calculating the impacted percentage of the planting. This means a wide linear planting can effectively have twice as many individual adjacent tree impacts before there is a material impact on sequestration.

Division 3.8 Restricted activities

3.45 Harvesting

(1) Subject to section 3.24, biomass must not be removed from a carbon estimation area except in accordance with this Division.

(2) Up to 10% of fallen timber may be removed from a carbon estimation area in a calendar year for personal use.

(3) In this section:

personal use, of fallen timber, means use that does not involve the sale, or other commercial use, of the timber.

3.46 Other permitted removals

Biomass may be harvested:

(a) subject to section 3.48, for thinning for ecological purposes; or

(b) to remove debris for fire management; or

(c) to remove fruits, nuts, seeds, or material used for fencing or as craft materials, if those things are not removed for sale; or

(d) in accordance with traditional indigenous practices or native title rights.

3.47 Grazing

If grazing occurs in a carbon estimation area:

(a) the grazing must not affect the achievement or maintenance of forest cover in the area; and

(b) the Regulator may request evidence that demonstrates that the grazing has not prevented:

(i) for a generic calibration—the achievement or maintenance of forest cover; or

(ii) for a specific calibration:

(A) compliance with the requirements for stocking density and/or tree proportion for the calibration; and

(B) the achievement or maintenance of forest cover.

Note Evidence may include date-stamped, geo-referenced, remotely-sensed imagery.

3.48 Thinning

If thinning occurs in a carbon estimation area:

(a) a specific calibration cannot be used; and

(b) the generic calibration must be used;

for the purpose of Division 4.3.

Note Section 4.8 specifies the primary requirements to be met for the use of a specific calibration.

3.49 Use of lime or fertiliser

If the use of lime or fertiliser occurs in a carbon estimation area:

(a) a specific calibration cannot be used; and

(b) the generic calibration must be used;

for the purpose of Division 4.3.

Note Section 4.8 specifies the primary requirements to be met for the use of a specific calibration.

Part 4 The net abatement amount

Division 4.1 The net abatement amount

4.1 The net abatement amount

Note See paragraph 106(1)(c) of the Act.

For an eligible offsets project to which this Determination applies, the carbon dioxide equivalent net abatement amount in relation to a reporting period for the project is taken to be the change in total carbon stock for all of the carbon estimation areas within the project area when compared to the baseline, less the project emissions.

Division 4.2 Calculations—Preliminary

Subdivision 4.2.1 General

4.2 General

In this Part if a calculation refers to a factor or parameter prescribed in the NGER Measurement Determination or the NGER Regulations, the person carrying out the calculations must apply, for the whole reporting period, that factor or parameter from the NGER Measurement Determination or NGER Regulations in force at the time that the offsets report is submitted or was required to be submitted, whichever is earlier.

4.3 Greenhouse gas assessment boundary

When making calculations under this Part:

(a) the carbon pools and emission sources and the corresponding greenhouse gases in Table 1 must be taken into account; and

(b) no other gases, carbon pools or emission sources may be taken into account.

Table 1: Gases accounted for in the abatement calculations

Carbon pool	**Greenhouse gas**
Live above-ground biomass	Carbon dioxide (CO_2)
Live below-ground biomass	Carbon dioxide (CO_2)
Debris	Carbon dioxide (CO_2)
Emission source	**Greenhouse gas**
Fuel use	Methane (CH_4) Nitrous oxide (N_2O) Carbon dioxide (CO_2)
Fire—planned and unplanned	Methane (CH_4) Nitrous oxide (N_2O) Carbon dioxide (CO_2)

4.4 Baseline for the project

(1) The baseline for a project in relation to a reporting period is the carbon stock that the carbon estimation areas for the project would have had in the absence of the project if the land use and management had continued as they were during the baseline period for the project; and

(2) The baseline amount is taken to be zero and is not recalculated during the project.

Subdivision 4.2.2 FullCAM modelling

4.5 FullCAM modelling

FullCAM must be used to model the following parameters for each carbon estimation area in accordance with the FullCAM Guidelines:

(a) carbon stock;

(b) emissions resulting from disturbance; and

(c) the effects of a management event.

4.6 FullCAM input data

For input to FullCAM, the following information must be collected or estimated for each carbon estimation area:

(a) the model point location (latitude and longitude);

(b) the last planting date;

(c) the species;

(d) where applicable, the stocking density of the trees and shrubs;

(e) where applicable, the tree proportion;

(f) domain information to support the use of a given FullCAM calibration;

(g) management event data; and

(h) disturbance event data.

4.7 FullCAM outputs

The data specified in Table 2 and generated in accordance with the FullCAM Guidelines as outputs from FullCAM must be used when calculating abatement in accordance with this Part:

Table 2: FullCAM output required for calculating abatement

FullCAM Output	Units	Description	Form	Parameter and Equation
Initial C mass of trees	tonnes C per hectare	Initial carbon stock in above-ground and below ground tree biomass	Time series - monthly (cumulative)	C_{Dti} Equation 12a
Initial C mass of forest debris	tonnes C per hectare	Initial carbon stock in debris	Time series - monthly (cumulative)	C_{Ddi} Equation 12a
C mass of trees	tonnes C per hectare	Carbon stock in above-ground and below ground tree biomass	Time series - monthly (cumulative)	C_{ti} Equation 12b
C mass of forest debris	tonnes C per hectare	Carbon stock in debris	Time series - monthly (cumulative)	C_{di} Equation 12b
CH_4 emitted due to fire	tonnes CH_4 per hectare	Mass of CH_4 emitted to the atmosphere due to fire	Time series monthly (non-cumulative)	$E_{CH_4 i}$ Equation 13
N_2O emitted due to fire	kg N_2O per hectare	Mass of N_2O emitted to the atmosphere due to fire	Time series – monthly (non-cumulative)	$E_{N_2 Oi}$ Equation 14

Note FullCAM outputs referred to in masses of carbon, methane or nitrous oxide per hectare are converted to tonnes of CO_2-e in the Equations in this Part. Biomass from the shrub component of a planting is incorporated in the FullCAM calibrations.

4.8 FullCAM modelling—requirements for calibrations

(1) For the purpose of modelling using FullCAM under section 4.5, a calibration must be applied for each carbon estimation area in accordance with this section and the FullCAM Guidelines.

(2) Subject to section 4.9, if a planting in a carbon estimation area does not satisfy the requirements to apply a specific calibration, the generic calibration must be applied for the carbon estimation area.

Requirements for the application of a specific calibration in FullCAM

(3) Subject to section 4.9, a specific calibration may only be applied to a carbon estimation area if:

(a) the planting in the area satisfies the requirements of an applicable domain group specified in Schedule 1 as follows:

(i) planting type as defined in Division 3.3;

(ii) planting geometry and spacing as defined in Division 3.4;

(iii) if applicable for the specific calibration, stocking density and tree proportion, as determined by Division 3.5; and

(b) there is no material competition from adjacent trees as determined by Division 3.7.

4.9 FullCAM modelling—calibration requirement exemptions

Block calibration exemption

(1) If the planting in subsection (2) satisfies the planting type requirements of a domain group but fails any or all of:

(a) the requirements for:

(i) planting geometry;

(ii) planting spacing; or

(iii) stocking density and or tree proportion; or

(b) the test for material competition from adjacent trees on a narrow or wide linear planting;

then the specific calibration for the relevant block planting geometry for that planting type may be applied for the purpose of Division 4.3.

Note This exemption allows for a planting type that fails to meet the conditions for certain specific calibrations to be modelled using the 'block planting-geometry' calibration for the planting type rather than the generic calibration.

E.polybractea calibration exemption

(2) A mallee planting of *E.polybractea* that:

(a) meets the requirements of a narrow linear planting as specified in subsection 3.11; and

(b) meets the requirements of section 3.14; and

(c) is not affected by material competition from adjacent trees as determined by Division 3.7;

may apply the FullCAM '*Regime (Initial Rotation)*' setting for the '*Mallee eucalypt polybractea, geometry wide'* specific calibration for the purpose of modelling using FullCAM under section 4.5.

Note Stocking density and tree proportion are not relevant for the '*Mallee eucalypt polybractea, geometry wide'* specific calibration.

Division 4.3 Calculation of carbon stock change

4.10 Calculating initial carbon stock for project

(1) The initial carbon stock for a project must be calculated in accordance with this section.

(2) The initial carbon stock for the first offsets report is:

(a) for projects that commenced before the declaration date—the carbon stock for the project area at the declaration date;

(b) for all other projects—zero.

(3) The initial carbon stock specified in paragraph (2)(a) must be calculated for each reporting period using the following formula:

$C_N = \sum_{i=1}^{n_a} C_{Di} \times \frac{44}{12}$	**Equation 11a**

Where:

$C_N =$	initial carbon stock for the project area (in tonnes CO_2-e).
$C_{Di} =$	carbon stock for the i^{th} carbon estimation area at the declaration date D (in tonnes C)—see Equation 12a.
$n_D =$	total number of carbon estimation areas at the declaration date D.
$i =$	i^{th} carbon estimation area.

4.11 Calculating project area carbon stock at end of reporting period

For each reporting period, the carbon stock for the project area is the sum of the carbon stock in each carbon estimation area and must be calculated using the following formula:

$C_P = \sum_{i=1}^{n} C_i \times \frac{44}{12}$	**Equation 11b**

Where:

$C_P =$	carbon stock for the project area at the end of a reporting period (in tonnes CO_2-e).
$C_i =$	carbon stock for the i^{th} carbon estimation area at the end of the current reporting period (in tonnes C)—see Equation 12b.

$n =$	total number of carbon estimation areas at the end of the current reporting period.
$i =$	i^{th} carbon estimation area.

4.12 Calculating carbon stock for carbon estimation area

(1) For each reporting period, the initial carbon stock for a carbon estimation area must be calculated as the sum of FullCAM outputs for carbon in the tree and debris pools determined in accordance with Subdivision 4.2.2, and must be calculated using the following formula:

$C_{Di} = (C_{Ddi} + C_{Dti}) \times a_i$	**Equation 12a**

Where:

$C_{Di} =$	initial carbon stock for the i^{th} carbon estimation area at the beginning of the first reporting period (in tonnes C).
$C_{Ddi} =$	initial carbon stock in debris for the i^{th} carbon estimation area determined using FullCAM at the declaration date D (in tonnes C per hectare).
$C_{Dti} =$	initial carbon stock in trees for the i^{th} carbon estimation area determined using FullCAM at the declaration date D (in tonnes C per hectare).
$a_i =$	area of the i^{th} carbon estimation area (in hectares).
$i =$	i^{th} carbon estimation area.

(2) For each reporting period, the carbon stock for a carbon estimation area must be calculated as the sum of FullCAM outputs for carbon in the tree and debris pools determined in accordance with Subdivision 4.2.2, and must be calculated using the following formula:

$C_i = (C_{di} + C_{ti}) \times a_i$	**Equation 12b**

Where:

$C_i =$	carbon stock for the i^{th} carbon estimation area at the end of the current reporting period (in tonnes C).
$C_{di} =$	carbon stock in debris for the i^{th} carbon estimation area determined using FullCAM for the final month of the reporting period (in tonnes C per hectare).
$C_{ti} =$	carbon stock in trees for the i^{th} carbon estimation area determined using FullCAM for the final month of the reporting period (in tonnes C per hectare).
$a_i =$	area of the i^{th} carbon estimation area (in hectares).

$i =$	i^{th} carbon estimation area.

Division 4.4 Calculation of project emissions

4.13 Calculating emissions from biomass burning

(1) For each reporting period, emissions of methane (CH_4) for the project due to biomass burning in the reporting period must be calculated using the following formula:

$$E_{BCH_4} = G_{CH_4} \times \sum_{i=1}^{n} \left(E_{CH_4 i} \times a_{Bi}\right)$$	**Equation 13**

Where:

$E_{BCH_4} =$	emissions of CH_4 from biomass burning for the project for a reporting period (in tonnes CO_2-e).
$E_{CH_4 i} =$	mass of CH_4 emitted during the reporting period due to biomass burning in the i^{th} carbon estimation area determined using FullCAM (in tonnes per hectare).
$a_{Bi} =$	area burnt in the i^{th} carbon estimation area during the reporting period (in hectares).
$G_{CH_4} =$	global warming potential of methane as specified in the NGER Regulations.
$n =$	total number of carbon estimation areas within the project area at the end of the reporting period.
$i =$	i^{th} carbon estimation area.

(2) For each reporting period, emissions of nitrous oxide (N_2O) due to biomass burning in the reporting period must be calculated using the following formula:

$$E_{BN_2O} = \left(\frac{G_{N_2O}}{1000}\right) \times \sum_{i=1}^{n} \left(E_{N_2 Oi} \times a_{Bi}\right)$$	**Equation 14**

Where:

$E_{BN_2O} =$	emissions of N_2O from biomass burning for the project for the reporting period (in tonnes CO_2-e).
$E_{N_2 Oi} =$	mass of N_2O emitted during the reporting period due to biomass burning in the i^{th} carbon estimation area determined using FullCAM (in kilograms per hectare).

$a_{Bi} =$	area burnt in the i^{th} carbon estimation area during the reporting period (in hectares).
$G_{N_2O} =$	global warming potential of nitrous oxide as specified in the NGER Regulations.
$n =$	total number of carbon estimation areas within the project area at the end of the reporting period.

(3) For each reporting period, total emissions due to biomass burning for the project in the reporting period must be calculated using the following formula:

$E_B = E_{BCH_4} + E_{BN_2O}$	**Equation 15**

Where:

$E_B =$	total emissions from biomass burning for the project for the reporting period (in tonnes CO_2-e).
$E_{BCH_4} =$	emissions of CH_4 from biomass burning for the project for the reporting period (in tonnes CO_2-e)—see Equation 13.
$E_{BN_2O} =$	emissions of N_2O from biomass burning for the project for the reporting period (in tonnes CO_2-e)—see Equation 14.

4.14 Calculating emissions from fuel use

(1) For each reporting period, emissions from fuel use must be calculated:

(a) from the end of the previous reporting period to the last month of the current reporting period;

(b) from either:

(i) raw data; or

(ii) estimates for quantities and types of fuel used; and

(c) using Equations 16 and 17.

(2) For each reporting period, the fuel emissions for each fuel type and each greenhouse gas type (carbon dioxide, nitrous oxide and methane) for the reporting period must be calculated using the following formula:

$E_{fk} = \frac{Q_f \times e_f \times F_{fk}}{1000}$	**Equation 16**

Where:

$E_{fk} =$	fuel emissions for fuel type *f* and greenhouse gas *k* for the reporting period (in tonnes CO_2-e).
$Q_f =$	quantity of fuel type *f* combusted within the reporting period (in kilolitres).

$e_f =$	energy content factor of fuel type *f*, as prescribed in Schedule 1 of the NGER Measurement Determination (in gigajoules per kilolitre).
$F_{fk} =$	emission factor for gas type *k* for fuel type *f* as prescribed in Schedule 1 to the NGER Measurement Determination (in kilograms CO_2-e per gigajoule).
$f =$	fuel type.
$k =$	type of greenhouse gas (carbon dioxide, methane or nitrous oxide) emitted for a given fuel type.

Note The relevant energy content and emission factors are included, with worked examples, in the National Greenhouse Accounts Factors available via the Department's website. If Q_f is measured in gigajoules, then $e_f = 1$.

(3) For each reporting period, total emissions from fuel use in the reporting period must be calculated using the following formula:

$E_F = \sum_{f=1}^{q} \sum_{k=1}^{g} E_{fk}$	**Equation 17**

Where:

$E_F =$	total fuel emissions (in tonnes CO_2-e).
$E_{fk} =$	fuel emissions for each fuel type *f* and each greenhouse gas *k* (in tonnes CO_2-e) for the reporting period—see Equation 16.
$q =$	number of different types of fuel.
$g =$	number of different types of greenhouse gas emitted for a given fuel type.
$f =$	fuel type.
$k =$	type of greenhouse gas (carbon dioxide, methane or nitrous oxide) emitted for a given fuel type.

Division 4.5 Calculation of the carbon dioxide equivalent net abatement amount

4.15 Calculating the carbon dioxide equivalent net abatement amount for a project

Note See paragraph 106(1)(c) of the Act.

(1) For each reporting period, the carbon dioxide equivalent net abatement amount for an eligible offsets project to which this Determination applies must be calculated using the following formula:

$A = C_P - E_B - E_F - C_N - C_V$	**Equation 18**

Where:

$A =$	Project net abatement for the reporting period (in tonnes CO_2-e).
$C_P =$	carbon stock for the project (in tonnes CO_2-e)—see Equation 11b.
$E_B =$	total project emissions from biomass burning for the project (in tonnes of CO_2-e)—see Equation 15.
$E_F =$	total project fuel emissions for the project (in tonnes CO_2-e) —see Equation 17.
C_N	initial carbon stock for the project area (in tonnes CO_2-e)—see Equation 11a.
C_V	carbon stock for the project from the previous offsets report (in tonnes CO_2-e)—(see the carbon stock value reported in the previous offsets report).

(2) In this section:

previous offsets report means the most recent report for the project submitted under this or another CFI methodology determination applicable for the project mechanism and for which a certificate of entitlement has been issued.

Note For ***certificate of entitlement***, see section 15 of the Act.

Note The carbon stock for the project from the previous offsets report C_V is the carbon stock value reported in the previous offsets report submitted to the Regulator. For the first offsets report for the project there is no previous carbon stock reported in an earlier offsets report and so the value of C_V is zero.

Division 4.6 Data collection

4.16 Data collection—general

A project proponent must collect and record data on:

(a) forest potential;

(b) stratification of a carbon estimation area;

(c) project monitoring;

(d) timing and intensity of grazing; and

(e) fuel use.

Note A project proponent must retain records that can be used to estimate the quantity of fuel, recorded in kilolitres (kL), for each fuel type combusted when undertaking project activities within a reporting period.

4.17 FullCAM inputs

The following data relating to FullCAM inputs must be collected in accordance with Part 3 and the FullCAM Guidelines:

(a) location data;

(b) domain information to support the use of a given FullCAM calibration;

(c) management event data; and

(d) disturbance event data.

Part 5 Monitoring, record-keeping and reporting requirements

Note See subsection 106(3) of the Act.

Division 5.1 General

5.1 Application

For subsection 106(3) of the Act, a project proponent of an eligible offsets project to which this Determination applies must comply with the monitoring, record-keeping and reporting requirements of this Part.

5.2 Geospatial information requirements

The CFI Mapping Tool or a geographic information system that meets the requirements of the CFI Mapping Guidelines must be used to monitor and report on geospatial information in accordance with the CFI Mapping Guidelines.

Division 5.2 Monitoring requirements

5.3 Project monitoring

(1) A project proponent must monitor the project to:

(a) ensure compliance with Part 3 and the CFI Mapping Guidelines; and

(b) if a specific calibration has been used, collect information to demonstrate that the requirements for the use of the specific calibration have been met; and

(c) identify and record management events within the project area; and

(d) identify and record disturbance events within the project area; and

(2) A project proponent may use on-ground observation and/or remote-sensing imagery in order to:

(a) meet the requirements of subsection (1) above; and

(b) collect information to demonstrate that the requirements for the use of a specific calibration have been met.

Division 5.3 Record-keeping requirements

5.4 Records that must be kept

A project proponent must create and maintain the following records:

(a) evidence that there was no forest cover in the project area before project commencement;

(b) a description of how each carbon estimation area was identified;

(c) evidence to justify stratification within the project area, including any of the following:

(i) planting or management records;

(ii) satellite imagery;

(iii) soil, vegetation or landform maps; and

(iv) monitoring records;

(d) evidence of all plant species established within each carbon estimation area, including the stocking density and tree proportion at establishment;

(e) date-stamped FullCAM output files (.plo file) for each carbon estimation area modelled using FullCAM;

(f) information regarding fires occurring in a carbon estimation area, including:

(i) the date the fire occurred;

(ii) the location of the fire;

(iii) the proportion of the carbon estimation area affected by the fire; and

(iv) the percentage of trees that were killed by the fire;

(g) information regarding each Equation in Division 4.3, including:

(i) all input data;

(ii) the result; and

(h) records relating to fuel use on project activities.

Note Records referred to in paragraph (h) could include invoices, vehicle logbooks, records of project activities, or reports of calculated consumption based on hourly or per hectare consumption rates.

If fuel use records for project activities cannot be disaggregated from records for other non-project activities, estimates of project fuel use may be based on the time spent undertaking project activities and the known average fuel consumption of vehicles or machinery.

5.5 Forest management records

A project proponent must collect and maintain the following records relating to forest management:

(a) for each carbon estimation area:

(i) evidence of forest potential, including:

(A) estimated stocking density; and

(B) anticipated crown cover at maturity;

(ii) once forest cover is achieved:

(A) an estimate of the year when forest cover was achieved; and

(B) evidence that forest cover is maintained;

and;

(iii) the modelling commencement date;

(b) FullCAM inputs for each carbon estimation area, including the:

(i) type and timing of management events, including:

(A) planting;

(B) weed control;

(C) fertiliser application;

and;

(ii) type, timing and extent of disturbance events;

(c) a description of any management actions or disturbance events that affected a carbon estimation area during the reporting period, including if applicable, actions proposed and undertaken to ensure that carbon stocks are restored; and

(d) if applicable, evidence demonstrating that grazing has not prevented the requirements in section 3.47 being met.

5.6 Specific calibration records

(1) If a specific calibration is applied for FullCAM modelling of a carbon estimation area, a project proponent must create and maintain records that include:

(a) planting type;

(b) planting geometry;

(c) planting spacing

(d) if applicable, evidence of stocking density and tree proportion; and

(e) evidence that the adjacent tree assessment process specified in Division 3.7 has been completed and the result for each carbon estimation area.

Note Section 3.21 specifies the circumstances where evidence of stocking density and tree proportion are required.

(2) If sampling is used to estimate stocking densities and tree proportions, the following records must be created and maintained:

(a) a map of the intended and actual plot locations;

(b) the grid orientation and anchor coordinates;

(c) a description of plot area and dimensions;

(d) if used, a copy of remotely-sensed imagery;

(e) the number of plots in each carbon estimation area;

(f) the estimated average stocking density and tree proportion for each carbon estimation area;

(g) probable limits of error for stocking density and tree proportions for each carbon estimation area; and

(h) stocking density and tree proportion.

5.7 Project area records

A project proponent must create and maintain the following records relating to the project area:

(a) geospatial maps that identify:

(i) the project area;

(ii) carbon estimation areas;

(iii) exclusion areas; and

(iv) model points for each carbon estimation area;

(b) if the areas specified in paragraph (a) are not clearly visible on the maps, a list of names or other identifiers that identify the project area and each carbon estimation area; and

(c) any adjustments to a carbon estimation area if:

(i) the carbon estimation area no longer meets the requirements set out in Division 3.2; or

(ii) changes in the management of the carbon estimation area result in re-stratification.

Division 5.4 Offsets report requirements

5.8 Information in first offsets report

The following information must be included in the first offsets report for a project to which this Determination applies:

(a) carbon dioxide equivalent net abatement amount for the project;

(b) carbon stock change for the first reporting period for the project;

(c) total emissions due to biomass burning for the project;

(d) total fuel emissions due to project activities;

(e) initial carbon stock for the first reporting period;

(f) if the planting date occurred before the declaration date—the initial carbon stock at the declaration date;

(g) carbon stock for the project at the end of the reporting period;

(h) forest management information set out in section 5.5;

(i) if relevant, specific calibration information set out in section 5.6;

(j) project area information set out in subsections 5.7(a) to (b);

(k) date-stamped FullCAM plot files (.plo) and a copy of the associated output data in a spread sheet file for each carbon estimation area in the project area; and

(l) if forest cover is attained during the first reporting period—evidence that the cover has been attained.

Note Evidence may include date-stamped, geo-referenced satellite imagery.

Note that if the project proponent has previously submitted an offsets report for the project under another CFI methodology determination, then the first offsets report for the project has taken to have been submitted under that CFI methodology determination

5.9 Information in subsequent offsets reports

The following information must be included in the second and subsequent offsets reports for a project to which this Determination applies:

(a) carbon dioxide equivalent net abatement amount for the project for the reporting period;

(b) carbon stock change for the project for the reporting period;

(c) total emissions due to biomass burning for the project;

(d) total fuel emissions due to project activities;

(e) carbon stock for the project at the end of the reporting period;

(f) forest management information set out in section 5.5 and, if relevant, section 5.6, including any change to this information provided in the previous reporting period;

(g) date-stamped FullCAM plot files (.plo) and a copy of the associated output data in a spreadsheet file for each carbon estimation area in the project area;

(h) if forest cover is attained in the reporting period, evidence that forest cover has been attained;

Note Evidence may include date-stamped, geo-referenced remotely-sensed imagery.

(i) if forest cover was attained in a previous reporting period, evidence that forest cover has been maintained; and

Note Evidence may include date-stamped, geo-referenced, remotely-sensed imagery.

(j) either:

(i) a statement that the carbon estimation area boundaries have not been changed; or

(ii) details of any change to carbon estimation area or exclusion area information provided in the previous reporting period.

Schedule 1 Specific calibrations for use in FullCAM.

Calibration type	Planting Type (FullCAM Tree species)	Planting geometry	Stocking density and tree proportion	Specific Calibration [FullCAM Regimes (Initial Rotation)]
Specific	Mixed species environmental planting temperate	Narrow Linear	Stocking > 1500 stems/ha and Tree Proportion >= 0.75	Mixed species temperate, Geometry narrow, Stocking >1,500, Prop tree >=0.75
			Tree Proportion >= 0.75	Mixed species temperate, Geometry narrow, Stocking <1,500, Prop tree >=0.75
			Stocking > 1500 stems/ha	Mixed species temperate, Geometry narrow, Stocking >1,500, Prop tree <0.75
			No sampling required	Mixed species temperate, Geometry narrow, Stocking <1,500, Prop tree <0.75
		Wide linear	Stocking > 1500 stems/ha and Tree Proportion >= 0.75	Mixed species temperate, Geometry wide, Stocking >1,500, Prop tree >=0.75
			Stocking > 1500 stems/ha	Mixed species temperate, Geometry wide, Stocking >1,500, Prop tree <0.75
			Tree Proportion >= 0.75	Mixed species temperate, Geometry wide, Stocking <1,500, Prop tree >=0.75
			No sampling required	Mixed species temperate, Geometry wide, Stocking <1,500, Prop tree <0.75
		Block	Stocking 500 - 1500 stems/ha and Tree Proportion >= 0.75	Mixed species temperate, Geometry block, Stocking 500 - 1,500, Prop tree >=0.75
			Stocking > 1500 stems/ha	Mixed species temperate, Geometry block, Stocking >1,500
			Stocking 500 - 1500 stems/ha	Mixed species temperate, Geometry block, Stocking 500 - 1,500, Prop tree <0.75
			Tree Proportion >= 0.75	Mixed species temperate, Geometry block, Stocking <500, Prop tree >=0.75
			No sampling required	Mixed species temperate, Geometry block, Stocking <500, Prop tree <0.75
Specific	Mixed species environmental planting tropical	Block	No sampling required	Mixed species tropical, Geometry block
Generic	Mixed species environmental planting	n/a	No sampling required	Mixed species environmental planting (1970-present All Plantation low: Non-commercial planting; No prunes)
		n/a	No sampling required	Mixed species environmental planting (1970-present All Plantation high: Non-commercial planting; No prunes)
		n/a	No sampling required	Mixed species environmental planting (1970-present All Plantation medium: Non-commercial planting; No prunes)
Specific	Mallee eucalypt kochii	Block	No sampling required	Mallee eucalypt kochii, Geometry block
		Wide linear	No sampling required	Mallee eucalypt kochii, Geometry wide
		Narrow linear	Stocking > 2,300 stems/ha	Mallee eucalypt kochii, Geometry narrow, Stocking >2,300
			No sampling required	Mallee eucalypt kochii, Geometry narrow, Stocking <2,300
Specific	Mallee eucalypt loxophleba lissophloia	Block	No sampling required	Mallee eucalypt loxophleba lissophloia, Geometry block
		Wide Linear	No sampling required	Mallee eucalypt loxophleba lissophloia, Geometry wide

Calibration type	Planting Type (FullCAM Tree species)	Planting geometry	Stocking density and tree proportion	Specific Calibration [FullCAM Regimes (Initial Rotation)]
		Narrow linear	Stocking > 2,300 stems/ha	Mallee eucalypt loxophleba lissophloia, Geometry narrow, Stocking >2,300
			No sampling required	Mallee eucalypt loxophleba lissophloia, Geometry narrow, Stocking <2,300
Specific	Mallee eucalypt polybractea	Block	No sampling required	Mallee eucalypt polybractea, Geometry block
		Wide linear	No sampling required	Mallee eucalypt polybractea, Geometry wide

Schedule 2 Planting geometry requirements for belt plantings planted in rows

Planting Type	Planting geometry	Number of rows in a belt planting (R)[1]	Maximum permitted row width for a belt planting (M)[1] (metres)	Maximum permitted width for a belt planting (A)[1] (metres)
Mallee Planting (planted in rows)	Narrow Linear	2	4	4
	Wide Linear	3	3	6
		4	2.67	8
		5	2.5	10
		6	2.4	12
		7	2.33	14
		8	2.29	16
	Block	More than 8 rows or other geometry that is not consistent with a linear planting	4	Width of planting+ 2 metres
Environmental Planting (planted in rows)	Narrow Linear	Not Applicable— Planting can be up to 20 metres wide	Not Applicable [2]	Width of planting+2 metres up to a maximum of 22 metres
	Wide Linear	Not Applicable— Planting can be between 20 metres and 40 metres wide	Not Applicable [2]	Width of planting+2 metres up to a maximum of 42 metres
	Block	Not Applicable— Planting is more than 40 metres wide	Not Applicable [2]	Width of planting+ 2 metres

Notes:

1: Maximum permitted row width for a belt planting (M) is determined using the following equation: $M = A/(R-1)$; where A is the maximum permitted carbon estimation area width and R is the number of rows in an individual belt. If any linear plantings are planted at the maximum allowable row width, then the boundary of the carbon estimation area along the long axis will equal the stem line of the outer rows.

2: Effective maximum row width in a belt is less than 5 metres – in order to be consistent with the CFI Mapping Guidelines with respect to exclusion areas.

Note

1. All legislative instruments and compilations are registered on the Federal Register of Legislative Instruments kept under the *Legislative Instruments Act 2003.* See http://www.frli.gov.au.