Chapter 4: Section Identification

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4.0 Section Identification

To help the FC report on the composition of our forests, we must break down the areas they occupy into classes or categories. Generally, we are looking to differentiate between homogenous, discrete and unique areas of land.

NFI surveyors are required to break each 1Ha Sample Square down into **mappable** Sections i.e. discrete, homogenous areas of unique character. Sections must be at least 0.05Ha in extent and at least 5m wide, with a couple of notable exceptions (see later).

Sections are differentiated on the basis of:

- Forest or open area type
- Landuse
- Habitat
- Tree/shrub species composition
- Tree age (distinct differences)
- Tree height (distinct differences)
- Tree storey structure (distinct differences)
- Silvicultural system
- Woodland origin (e.g. Ancient Woodland, Plantation etc.).
- Management (e.g. thinning, livestock grazing etc.).

This is not an exhaustive list, and some judgement is required. Each Section needs to be as homogenous as possible, without unduly creating more sampling in the field.

4.1 Section Types and the Level of Assessment Required

Sections fall into 4 different categories:

- NFI Treed Sections
- NFI Open Sections
- Non-NFI Treed Sections
- Non-NFI Open Sections

At every Sample Square, NFI surveyors must **first** distinguish NFI land from Non-NFI land and, where minimum Section size rules allow, map these areas separately to one

another. Surveyors must **then** break the NFI land down into mappable Treed and Open Sections, and do the same for the Non-NFI land.

Guidance on distinguishing between NFI and Non-NFI land is given in Chapter 4.2 Distinguishing between NFI and Non-NFI Land.

Guidance on distinguishing between Treed and Open Sections is given in Chapter 4.3 Distinguishing between Treed and Open areas

Minimum Section size rules for NFI and Non-NFI land are outlined in Chapter 4.5 Minimum Section Size.

4.2 Distinguishing between NFI and Non-NFI Land

NFI land is land that conforms to the NFI definition of woodland (see Chapter 4.2.1 Definition of NFI Woodland). As such, it is referred to as "NFI Woodland". The two terms are interchangeable.

Non-NFI land is simply everything else i.e. land that does **not** qualify as NFI Woodland.

In order to distinguish between NFI and Non-NFI land, surveyors **must**, in the first instance, refer to the **2010 NFI Woodland Map**. This is a digital map showing the location and extent of NFI Woodland across GB.

The NFI Woodland Map is derived from desk-based aerial photograph interpretation dating between 2000 and 2009, so may not necessarily be correct in every Sample Square at the time of field survey.

Surveyors **must**, therefore, routinely check the accuracy of the NFI Woodland Map within **every** Sample Square. Specifically, surveyors must check that:

- NFI Woodland is correctly identified as such.
- NFI Woodland external boundaries are correctly mapped. This includes identifying instances where the boundaries need to be updated to reflect areas of new planting or permanent woodland loss (e.g. part of the woodland has been turned into a housing estate).

In order to do this, surveyors must have a clear understanding of what does and does not constitute NFI Woodland, and of the mapping rules employed in creation of the 2010 NFI Woodland Map. They must also ensure that subsequent amendments and additions

to these rules are implemented on the ground when undertaking field survey of the Sample Squares.

4.2.1 Definition of NFI Woodland

NFI Woodland is defined as:

"An area of land **≥0.5Ha** in extent and **≥20m** wide, which has **≥20%** tree canopy cover or the potential to achieve this through maturation of the existing crop of trees (saplings and seedlings included)."

A **tree** is defined as "a woody perennial of a species typically forming a single self-supporting main stem and having a definite crown." NFI tree species are listed in Chapter 8.9. This includes Hawthorn and blackthorn, which are **always** regarded as trees in the NFI.

NFI Woodland can be land conventionally regarded as woodland, but equally the land beneath the tree canopy may be a residential garden, amenity grassland, urban parkland, grazing pasture, a cemetery etc. As long as the area, width and tree canopy cover thresholds are met, the land is classed as NFI Woodland.

4.2.2 Definition of Non-NFI land

Non-NFI land is simply land that does **not** conform to the definition of NFI Woodland outlined above. This includes:

- Woodland areas too narrow or too small in extent to qualify as NFI Woodland (referred to as Non-NFI Woodland).
- Open areas with up to 19% tree canopy cover, or the potential to achieve this through maturation of the existing crop of trees (saplings and seedlings included).

4.2.2.1 Definiton of Non-NFI Woodland

Non-NFI Woodland is defined as:

"An area of land **<20m** wide or **<0.5Ha** in extent, which has **≥20%** tree canopy cover or the potential to achieve this through maturation of the existing crop of trees (saplings and seedlings included)". Thin bands of trees **<5m** wide are **not** included.

Where part of a woodland area fits the definition of NFI Woodland, the remainder is classed as Non-NFI woodland.

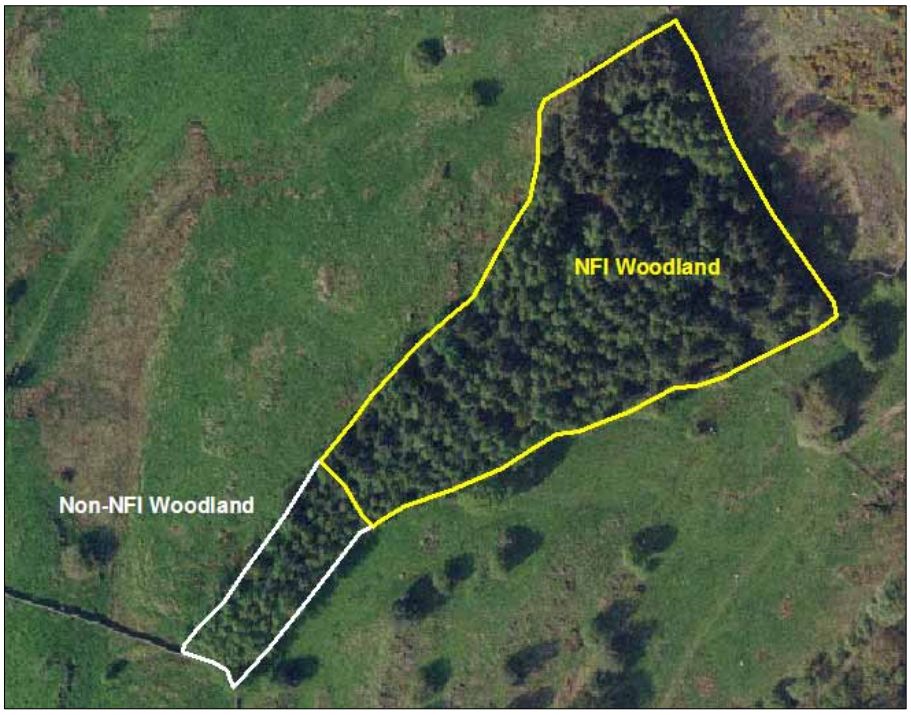


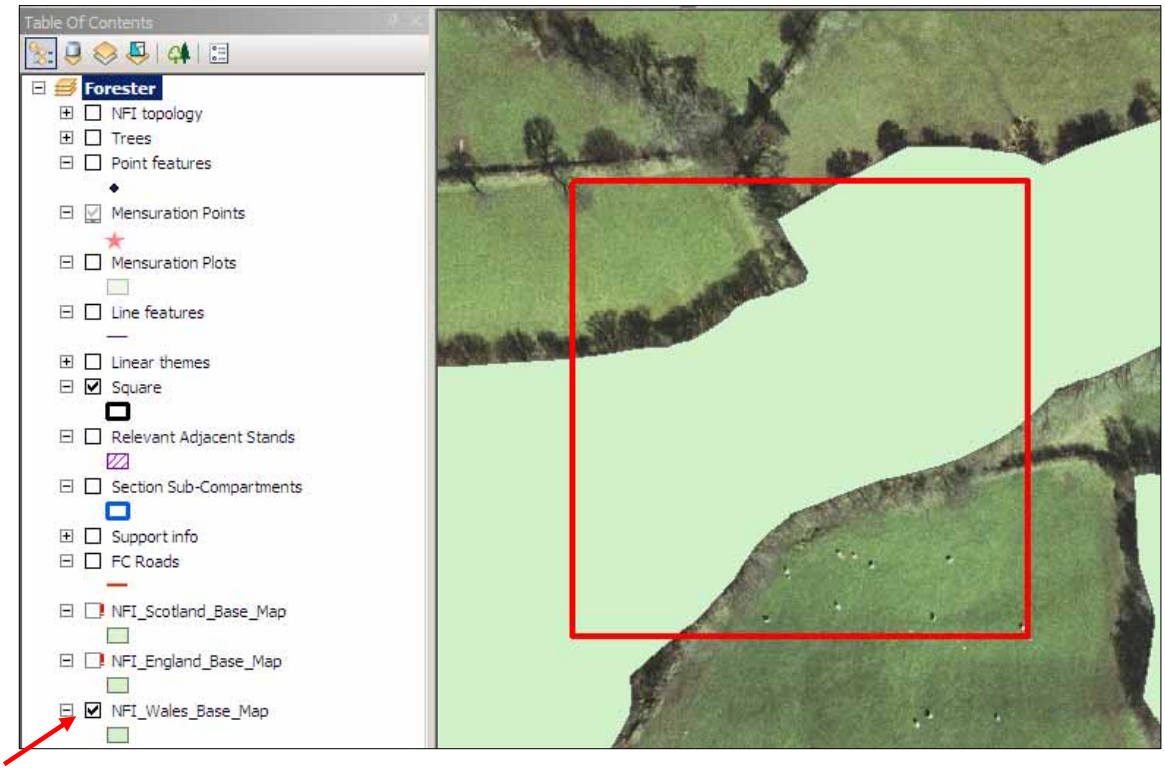
Figure 4- 1: NFI and Non-NFI Treed areas

4.2.3 The 2010 NFI Woodland Map

The 2010 NFI Woodland Map is a digital map showing the location and extent of NFI Woodland across GB.

The map is supplied as individual GIS layers for Scotland, England and Wales. These automatically load into Forester when the Sample Square geodatabase and default map schema are opened.

Place a tick against the appropriate NFI Woodland Map Layer(s) in the Table of Contents to see the extent of NFI Woodland within the Sample Square.



Change the NFI Woodland Map symbology from opaque to hollow for a clearer view.

Zoom out to see the full extent of the NFI Woodland beyond the Sample Square.

4.2.3.1 Interpreted Forest Types and Interpreted Open Areas

The NFI Woodland Map was broadly differentiated into Interpreted Forest Type (IFT) and Interpreted Open Area (IOA) categories, each ≥0.5Ha in extent and ≥20m wide. See Chapter 8.5 for a listing and description of the various IFT and IOA categories.

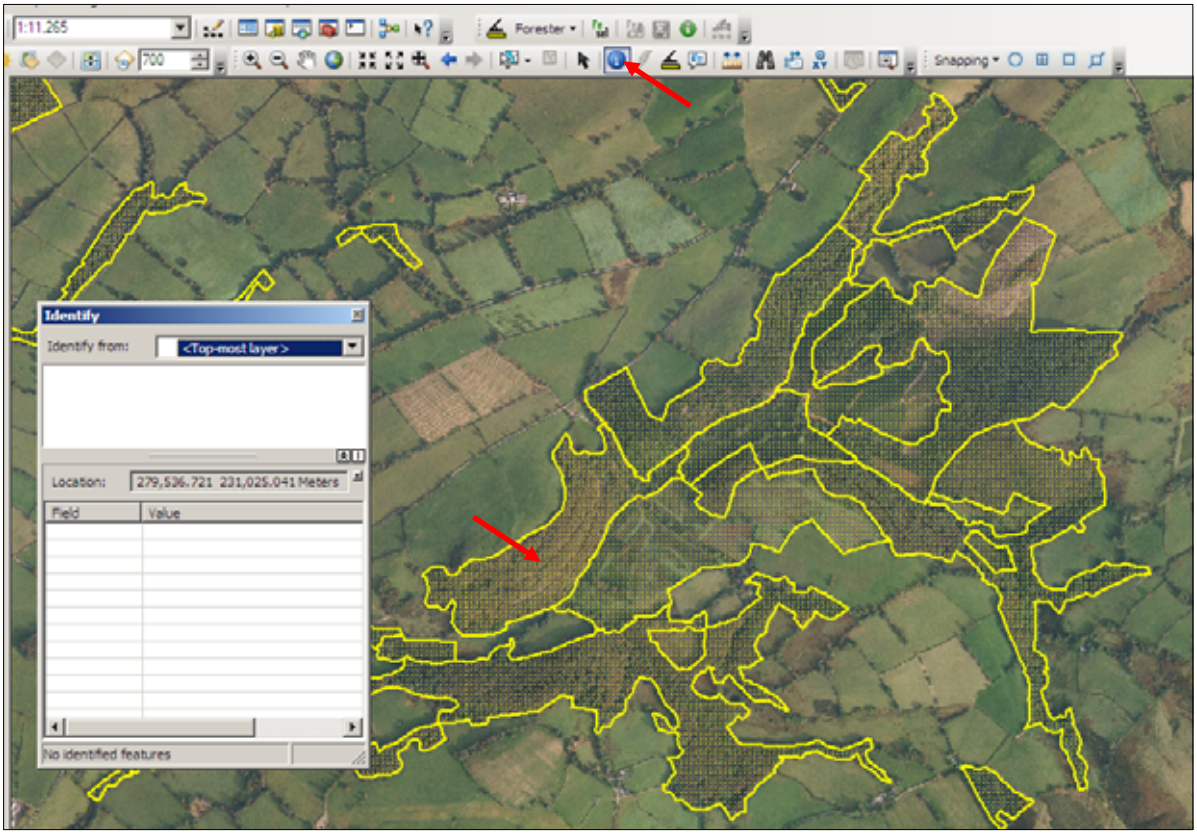
Interpreted Forest Types were assigned to parcels of land with **≥20%** tree canopy cover or the potential to achieve this through maturation of the existing trees (saplings and seedlings included).

Interpreted Open Areas were assigned to parcels of land with **<20%** tree canopy cover and **no** potential to achieve this through maturation of any existing trees (saplings and seedlings included).

A NFI Woodland may be comprised of a single IFT, or multiple IFT and IOA categories displayed as a patchwork of internal polygons (see example below).

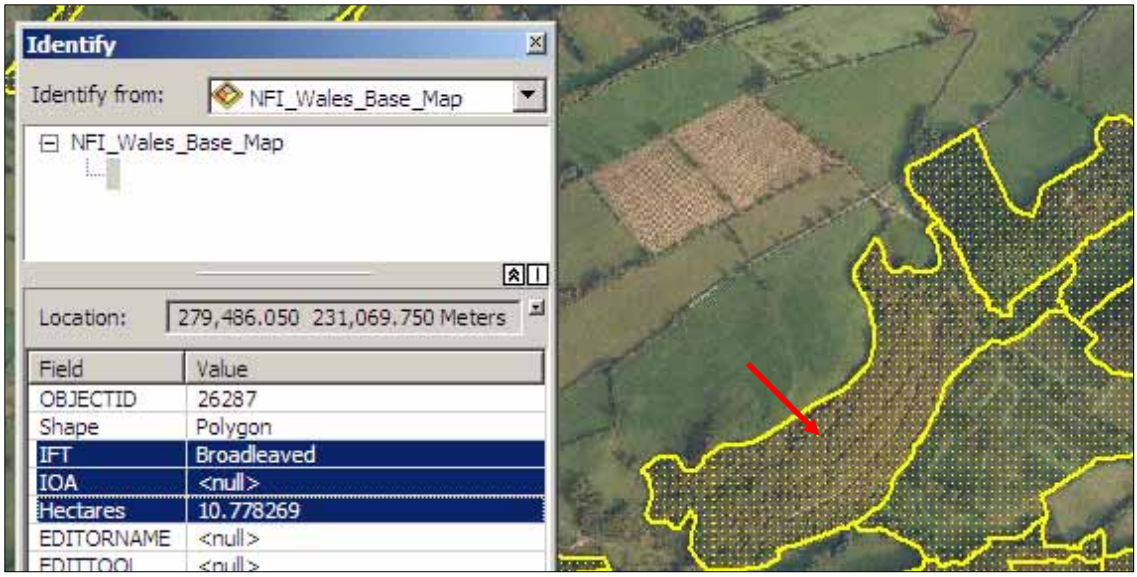
To view the IFT/IOA for a particular polygon:

- Click on the blue "Identify" button and then left-click within the desired NFI Woodland internal polygon. The Identify window opens.

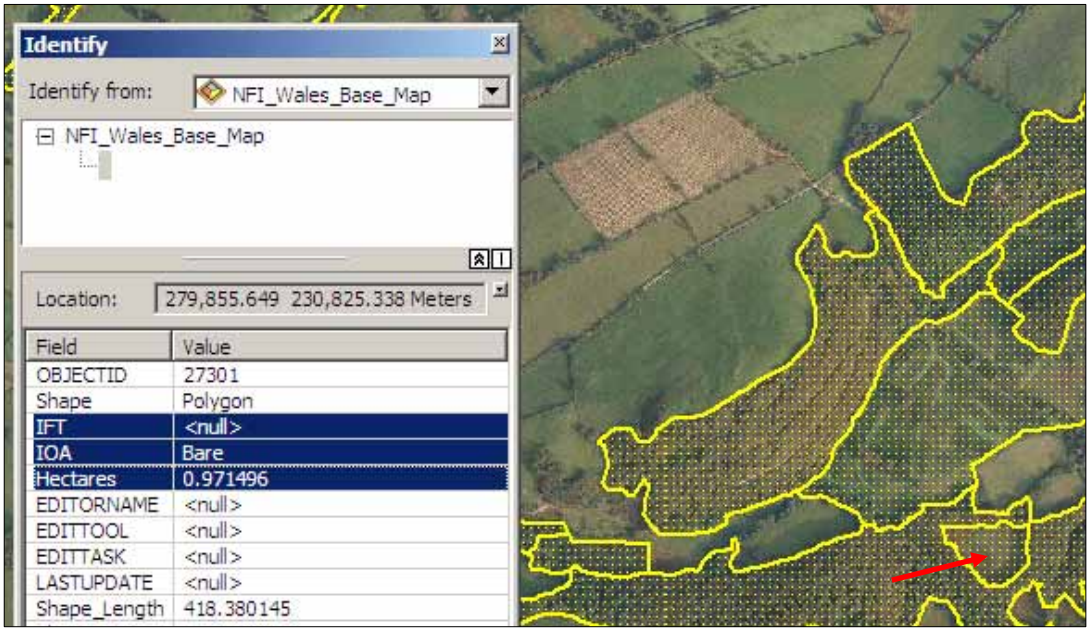


- In the Identify window, select the relevant NFI Woodland Map Layer from the "Identify from" drop-down list. In this example, the "NFI_Wales_Base_Map".

- Click in the polygon again. It temporarily flashes green. The IFT/IOA and polygon area are displayed in the Identify window.



- Click in each polygon in turn to view the IFT/IOA.



- Close the Identify box. Click on the "Select Elements" button on the ArcMap toolbar to finish.

4.2.4 NFI Woodland identification rules

Surveyors must identify the full extent of NFI Woodland within the Sample Square, using the 2010 NFI Woodland Map as a starting point and checking the accuracy of this on the ground.

Surveyors must implement the following rules to ensure that NFI Woodland is correctly identified as such. Any deviation from the original 2010 NFI Woodland Map rules is referred to in italics.

4.2.4.1 Orchards

NFI Woodland includes **traditional** orchards. These are recognisable as groups of fruit or nut trees planted at low densities (generally <150/Ha, >8m spacing) in permanent grassland that is grazed or cut for hay. Trees are usually of varying age structure, with an abundance of standing and fallen deadwood. Scrub may be present on unmanaged sites. Young trees and newly planted orchards managed in a low intensity way also fall into this category.

NFI Woodland does **not** include **commercial** orchards intensively managed for fruit production. These are comprised of short-lived dwarf or bush fruit trees planted at high density (generally <3m spacing) in permanent grassland that is mown, usually with strips of bare herbicide-treated ground running along the tree rows. Commercial orchards are classed as **Non-NFI** land.

The 2010 NFI Woodland Map included all orchards, irrespective of type. Surveyors must implement the new rules as outlined and reclassify commercial orchards as Non-NFI land.

4.2.4.2 Tree nursery and short rotation coppice (Biofuel) crops

NFI Woodland does **not** include tree nurseries or short rotation coppice plantations. These are classed as **Non-NFI** land.

Short rotation coppice is an energy (Biofuel) crop which usually consists of densely planted, fast-growing, high-yielding varieties of willow, or less frequently poplar. The coppice stems are mechanically harvested every 3-5 years, typically cut and chipped in a single operation, or baled.

Figure 4- 2: Harvesting of poplar into bales

Figure 4- 3: Willow Biofuel crop

The 2010 NFI Woodland Map included tree nursery and coppice crops. Surveyors must implement the new rules as outlined and reclassify these crops as Non-NFI land.

4.2.4.3 Christmas tree crops

NFI Woodland includes areas where Christmas trees are planted in a **mixture** with timber species (to provide an early financial return) or broadleaves (as a "nurse" crop to enhance broadleaf stem form).

NFI Woodland does **not** include crops grown specifically and **purely** as Christmas trees. Such crops may be sited within an existing woodland block (in a separate fenced-off area, sometimes beneath a powerline), in nursery holdings or on agricultural land. These areas are classed as **Non-NFI** land.

Christmas tree crops are traditionally Norway spruce, or various species of pine or fir (Scots pine, Lodgepole pine, Nordman fir, Noble fir amongst others). The crop is densely planted at 1-1.2m spacing, with regular paths allowing access for management. Trees are grown on a 4-10 year cycle. They are characteristically compact/bushy (maintained by pruning/shearing) and are generally <1.8m tall.

The 2010 NFI Woodland Map included Christmas tree crops. Surveyors must implement the new rule as outlined and reclassify areas known to be managed purely for Christmas trees as Non-NFI land.

4.2.4.4 Temporarily unstocked woodland areas

NFI Woodland includes temporarily unstocked woodland areas such as:

- Clearfell sites cut within the last 10 years
- Windblown crops
- Failed crops planted within the last 15 years and <20% stocked
- Burnt crops where >80% of the trees have been killed by fire
- Freshly-cut coppice crops
- Ground prepared for planting e.g. ploughed, mounded, scarified etc.

4.2.4.5 Shrub land

NFI Woodland includes areas of shrubs containing **≥20%** canopy cover of **tree species and Shrubs Acting as Trees combined**, or the potential to achieve this through maturation of the existing trees species (saplings and seedlings included).

NFI Woodland does **not** include areas of shrubs containing <20% canopy cover of tree species, **unless** the area of Shrubs Acting as Trees, when added to the tree canopy cover ≥20%.

Note that the canopy cover of "**Shrubs Acting as Trees**" does count towards tree canopy cover. For the purposes of the NFI, a shrub is deemed to be acting as a tree when it displays the morphology of a tree i.e. it has a single, self-supporting main stem ≥4cm diameter (measured at 1.3m above the ground) and a definite crown.

The 2010 NFI Woodland Map included areas of Shrub Land (defined as "scrubby vegetation where low woody growth seemed to dominate a likely woodland site") but excluded pure areas of rhododendron or gorse that were not totally enclosed by NFI Woodland. Surveyors must implement the new rules as outlined and reclassify shrubby areas as Non-NFI land where appropriate.

In the example overleaf, a pure area of gorse originally included within the 2010 NFI Woodland Map has been re-classified as Non-NFI land during field survey.

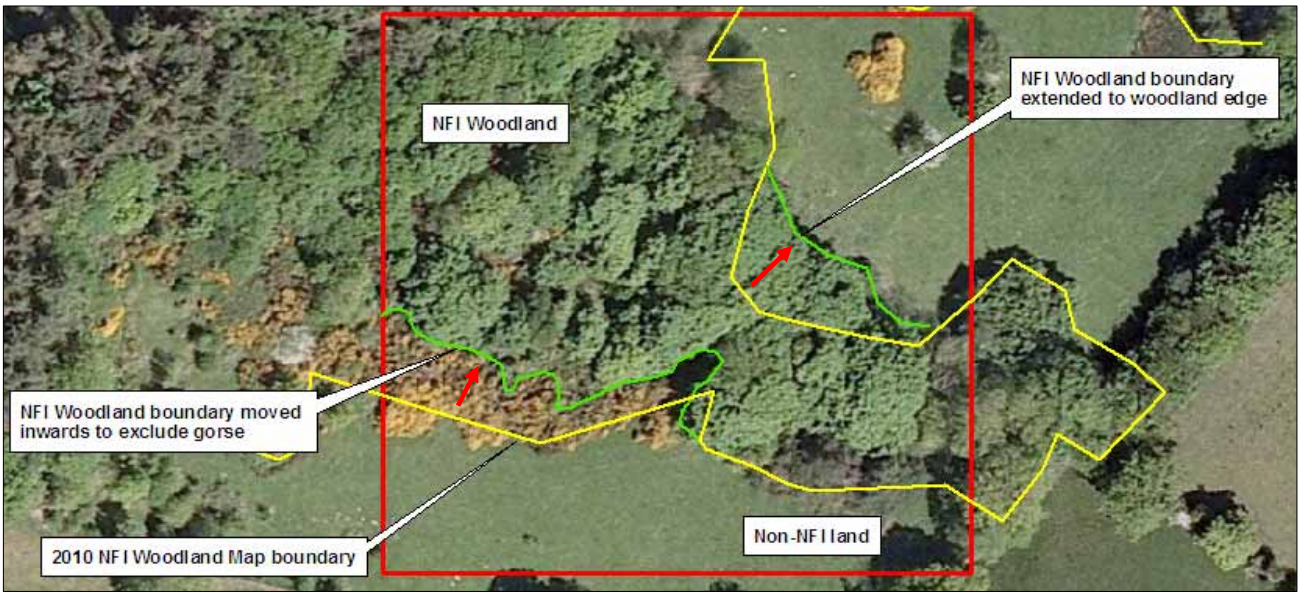


Figure 4-4: Shrub land

4.2.4.6 Open areas (holes) totally enclosed by NFI Woodland

An **Open** area is defined as land with <20% tree canopy cover and **no** potential to achieve this through maturation of any existing trees (seedlings and saplings included).

NFI Woodland does **not** include open areas totally enclosed by NFI Woodland that are ≥0.5Ha in extent **and** ≥20m wide. These are classed as **Non-NFI** land.

The 2010 NFI Woodland Map included all holes of any size that were totally enclosed by NFI Woodland. Surveyors must implement the new ruling as outlined and reclassify open area "holes" as Non-NFI where appropriate.

In the example overleaf, an open area of grass originally included within the 2010 NFI Woodland Map has been re-classified as Non-NFI land during field survey. The surrounding woodland polygon is ≥0.5 Ha in extent and ≥20m wide and so still qualifies as NFI Woodland.

In cases where all/part of the surrounding woodland polygon is no longer ≥20m wide, it must be reclassified as Non-NFI Woodland. The remaining woodland aarea then needs to be re-assessed to ensure that those woodland areas ≥20m have an area ≥0.5ha.

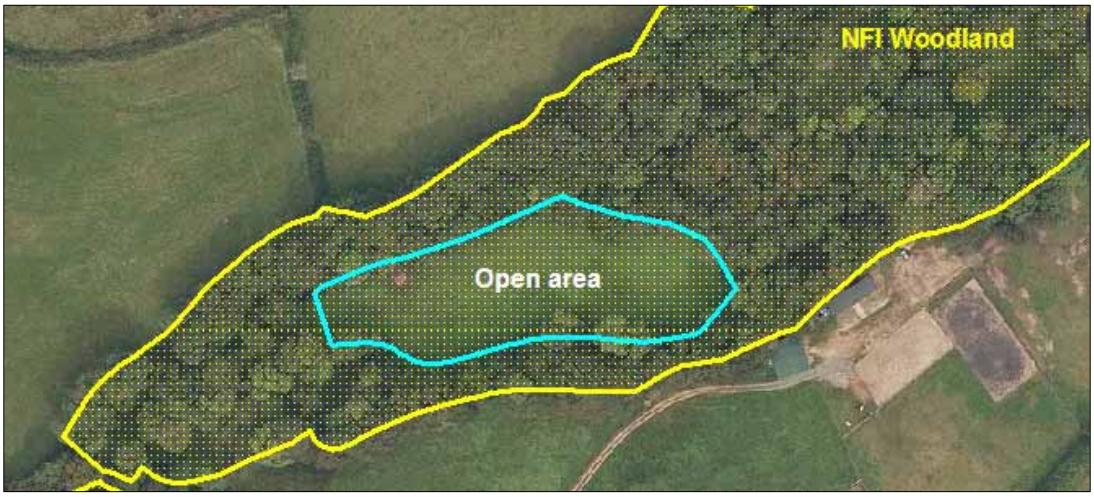


Figure 4- 5: Open Areas within woodland (Gaps)

4.2.4.7 Open areas (gaps) at the edge of NFI Woodland

An **Open** area is defined as land with <20% tree canopy cover and **no** potential to achieve this through maturation of any existing trees (seedlings and saplings included).

NFI Woodland includes open areas at the edge of woodland, where the gap created in the woodland edge is **<20m** wide **and** the open area is of a woodland landuse (e.g. a woodland glade, deer lawn etc.).

Where the gap created in the woodland edge is <20m wide and the open area is **not** of a woodland landuse (e.g. agricultural land, moorland etc.), the open area is classed as **Non-NFI** land.

NFI Woodland does **not** include open areas that create a gap in the woodland edge ≥20m wide.These are regarded as a continuation of the adjoining **Non-NFI** land.

The 2010 NFI Woodland Map included open areas at the woodland edge, where the gap created in the woodland edge was <20m wide. Surveyors must implement the new ruling as outlined and reclassify woodland edge gaps as Non-NFI land where appropriate.

In the example overleaf, an open area of agricultural land originally included within the 2010 NFI Woodland Map has been re-classified as Non-NFI land during field survey.

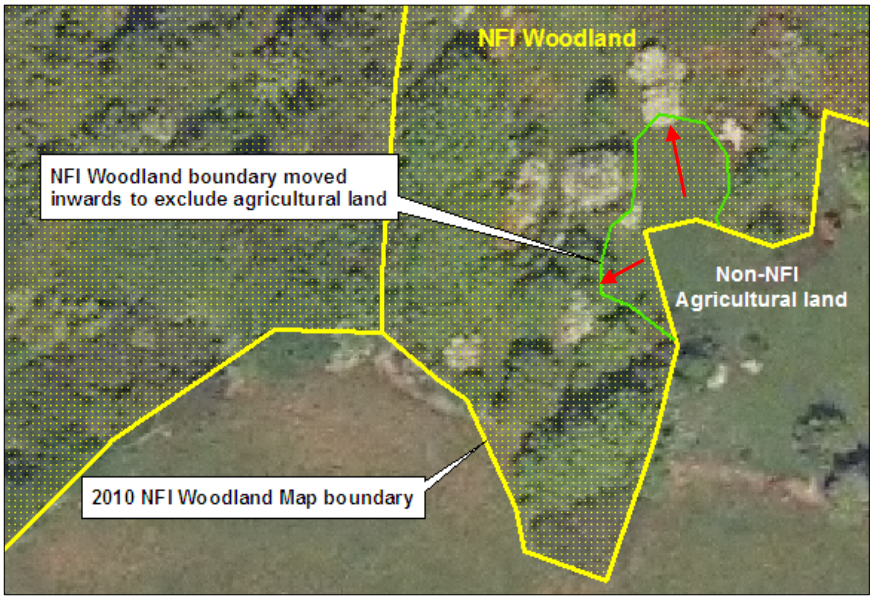


Figure 4- 6: Open areas at the edge of woodlands

4.2.4.8 Sealed roads and driveways

NFI Woodland does **not** include sealed (tarmac or concrete) roads and driveways, regardless of width. These are classed as **Non-NFI** land.

The 2010 NFI Woodland Map excluded sealed roads where visible from aerial photography.

In the example below a tarmac driveway originally included within the 2010 NFI Woodland Map has been re-classified as Non-NFI land during field survey.

Figure 4- 7: Sealed roads and driveways

The woodland polygon south of the driveway is <0.5Ha in extent, so is reclassified as Non-NFI Woodland.

Figure 4- 8: Re-classifying woodland

4.2.4.9 Unsealed roads, tracks and driveways

NFI Woodland does **not** include unsealed ("metalled") roads, tracks and driveways ≥20m wide **and** ≥0.5Ha in extent measured across the NFI Woodland polygon. These are classed as **Non-NFI** land.

Unsealed ("metalled") roads are those surfaced with hardcore, rubble or coarse chippings. They include the better quality forest roads maintained for use by vehicles, as well as minor forest roads that are little-used and left to nature. This category also includes metalled farm tracks and driveways.

The 2010 NFI Woodland Map excluded unsealed forest roads and farm tracks ≥20m wide and ≥0.5Ha in extent where visible from aerial photography.

4.2.4.10 Unsurfaced tracks and rides

NFI Woodland does **not** include unsurfaced tracks and rides ≥20m wide **and** ≥0.5Ha in extent measured across the NFI Woodland polygon. These are classed as **Non-NFI** land.

A ride is a muddy or grassy corridor created to give access through woodland. This category also includes unsurfaced farm tracks, firebreaks, Greenways and Bridleways.

The 2010 NFI Woodland Map excluded unsurfaced tracks and rides ≥20m wide and ≥0.5Ha in extent where visible from aerial photography.

4.2.4.11 Operational railway tracks (any gauge)

NFI Woodland does **not** include operational railway tracks and sidings of any gauge, or the adjacent embankments where these conform to the definition of open land. These areas are classed as **Non-NFI** land.

Open land is defined as land with <20% tree canopy cover and **no** potential to achieve this through maturation of any existing trees (seedlings and saplings included).

The 2010 NFI Woodland Map excluded normal gauge railways only. Surveyors must implement the new ruling as outlined and class all operational railways as Non-NFI land.

4.2.4.12 Disused railway tracks (any gauge)

NFI Woodland does **not** include disused railway tracks and sidings of any gauge, or the adjacent embankments, that conform to the definition of open land and are ≥20m wide **and** ≥0.5Ha in extent measured across the NFI Woodland polygon. These areas are classed as **Non-NFI** land.

Open land is defined as land with <20% tree canopy cover and **no** potential to achieve this through maturation of any existing trees (seedlings and saplings included).

The 2010 NFI Woodland Map excluded normal gauge railways only.

4.2.4.14 Rivers and canals

NFI Woodland does **not** include rivers and canals ≥20m wide **and** ≥0.5Ha in extent measured across the NFI Woodland polygon. These are classed as **Non-NFI** land.

A river is defined as a natural watercourse at least 5m average width, which flows towards the sea, a lake or another river.

The 2010 NFI Woodland Map excluded rivers and canals ≥20m wide and ≥0.5Ha in extent where visible from aerial photography. This width ruling meant that very often part of a river was excluded from the NFI Woodland Map, while other parts were included.

4.2.4.15 Overhead powerlines (all voltages)

NFI Woodland does **not** include overhead powerlines of any voltage, where the trees beneath are managed to remain clear of the line and the wayleave is ≥20m wide **and** ≥0.5Ha in extent measured across the NFI Woodland polygon. These are classed as **Non-NFI** land.

NFI Woodland **does** include overhead powerlines where the trees beneath do **not** require management to remain clear of the line e.g. the trees are in a steep ravine and so will remain clear of the line even at maturity.

*The 2010 NFI Woodland Map excluded overhead powerlines ≥20m wide and ≥0.5Ha in extent where visible from aerial photography. Surveyors must implement the new ruling as outlined and reclassify powerlines as **NFI** land where appropriate.*

4.2.5 NFI Woodland mapping rules

Surveyors must implement the following rules to ensure that NFI Woodland is correctly identified and accurately mapped within the Sample Square. Any deviation from the original mapping rules employed in creation of the 2010 NFI Woodland Map is referred to in italics. The NFI Woodland mapping rules include a degree of subjectivity, so naturally there will be slight discrepancies between where the surveyor perceives a NFI Woodland boundary to be on the ground and the position shown on the 2010 NFI Woodland Map.

Generally, surveyors should accept the original 2010 NFI Woodland boundary where it makes sense on the ground and is only slightly adrift. Where the original 2010 NFI Woodland boundary is clearly incorrect or significantly adrift, surveyors should map according to what is seen on the ground, following the NFI mapping rules as outlined.

4.2.5.1 NFI Woodland external boundary

The 2010 NFI Woodland Map rule: Ordnance Survey MasterMap (OSMM) features used as woodland boundaries because of the better fit with the agricultural "Integrated Administarion and Control System" (IACS).

Original Mapping Rule: Snapping to OSMM - Where the MasterMap boundary is coincident with the woodland boundary on the image, or within 10 meters of the perceived edge, then the MasterMap boundary should be followed.

- This resulted in some trees and thin bands being ignored. Single trees outside the woodland boundary are covered in the "Small Woodlands" Survey.

The figure below shows the woodland/IFT/IOA boundary is within 10 m of an existing MasterMap® line. In this example, the boundary is snapped to the MasterMap® line.

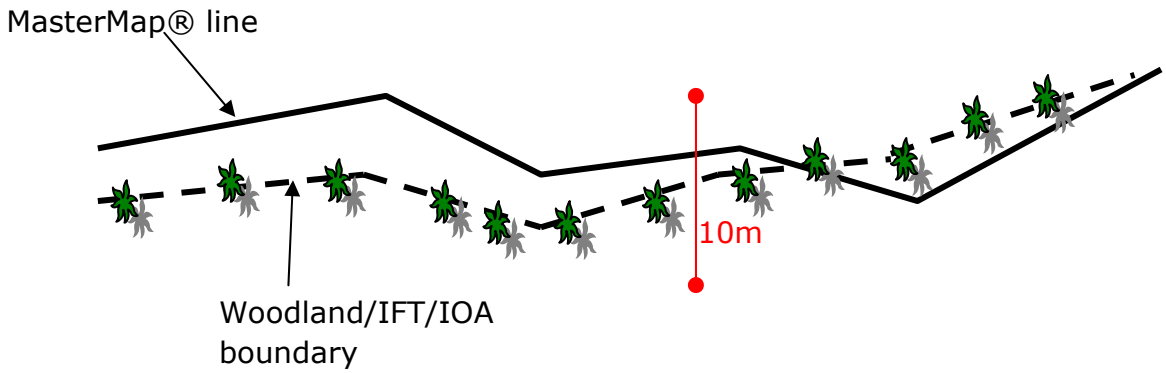


Figure 4- 9: Original Mapping Rules - OSMM parallel and within 10m of woodland edge

Original Mapping Rule: Where the OSMM line deviated by >10m from the woodland edge, mapped along the tree stems (not along the edge of the canopy or drip line) or where the boundary is different, it needs to be captured by digitising along the perceived edge of the tree trunks where possible (rather than the canopy edge).

The woodland boundary is > 10 m and/or crosses over the line in such a way as to give a completely different shape from the MasterMap® line therefore the woodland boundary is not snapped to MasterMap®

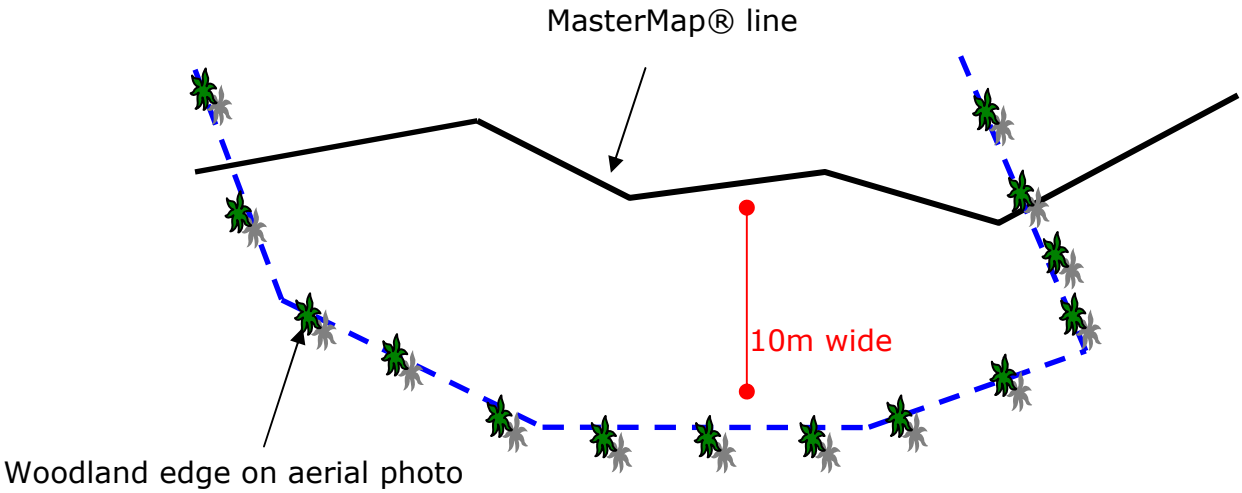


Figure 4- 10: Original Mapping Rules - OSMM not parallel and/or within 10m of woodland edge

4.2.5.2 NFI Woodland protrusions

NFI Woodland by definition must be at least 20m wide. However, stubby protrusions <20m wide and <20m long are considered to be part of the NFI Woodland and so are mapped as such.

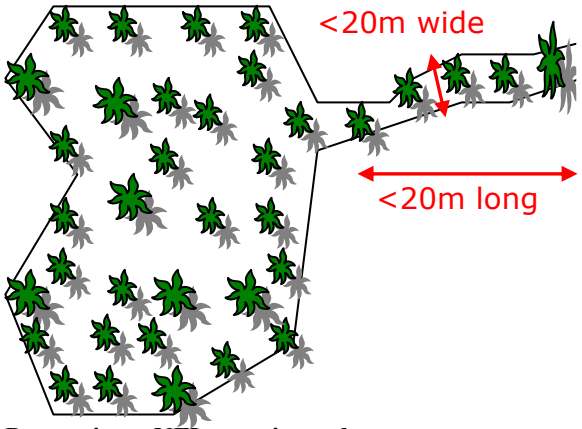


Figure 4- 11: Woodland Protrusions: NFI mapping rule

Where the NFI Woodland protrusion is <20m wide for ≥20m, it is chopped off along the dashed blue line at the point at which it narrows to <20m. The chopped off part is classed as Non-NFI Woodland.

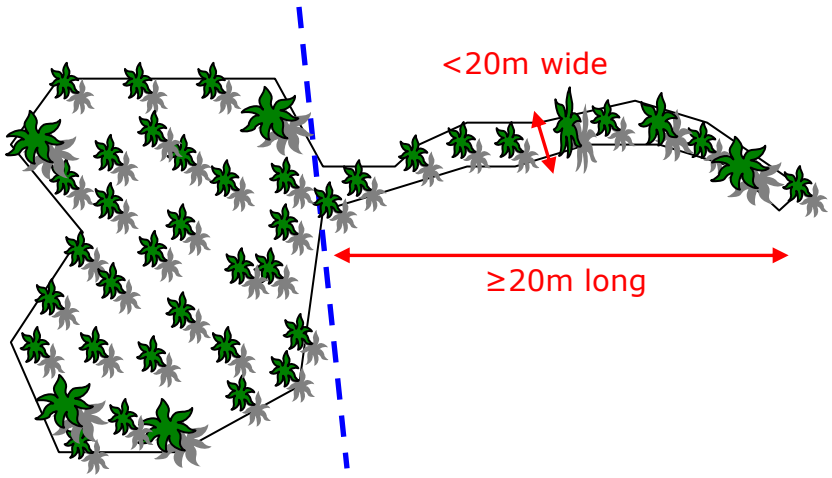


Figure 4- 12: Mapping rule for NFI Woodland protrusion <20m width and ≥20m long

NFI Woodland corners are **not** chopped off where they narrow to <20 wide.

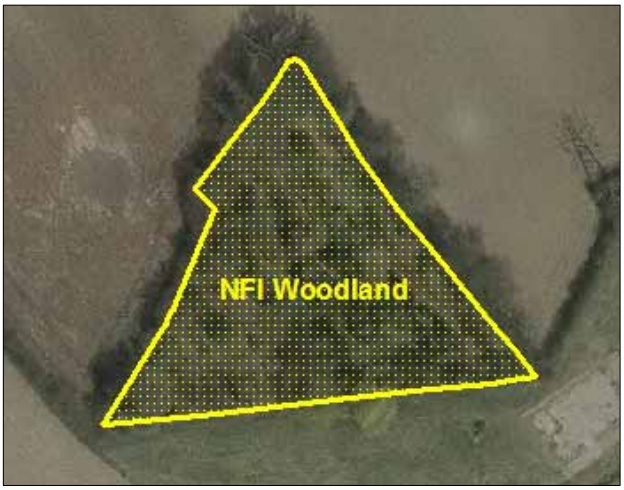


Figure 4- 13: NFI woodland corners – mapping rule

4.2.5.3 Connecting bridges ("necks") between woodlands

The minimum width for woodland is 20m, although where woodlands are connected by a narrow neck of woodland less than 20m wide, the wooded bridge may be less than 20m in extent.

Where a small, continuous section or narrow neck of woodland is connected to two NFI Treed areas (giving a shape akin to an hourglass):

Bridge <20m wide for <20m = then capture as part of the woodland area.

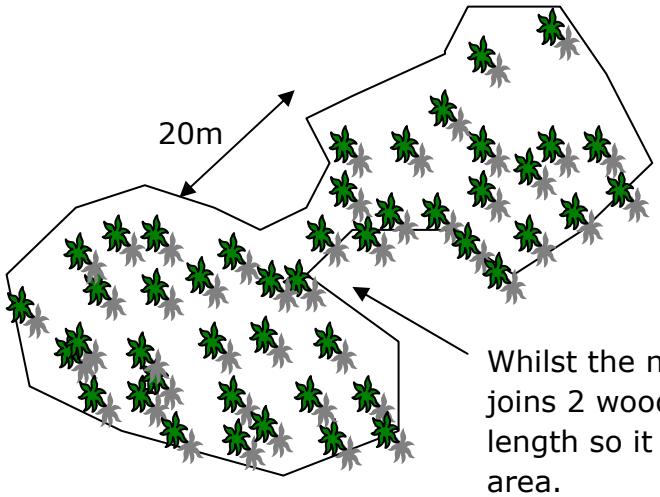


Figure 4- 14: Woodland neck connecting two NFI Woodlands

Whilst small area of woodland (excluding the bridge) must be ≥20m wide they can be less than 0.5ha. When connected together the entire area must be ≥0.5ha for the woodland to be considered NFI.

4.3 Distinguishing between Treed and Open areas

Surveyors must break NFI and non-NFI land down into mappable Treed and Open Sections.

4.3.1 Treed Areas

Land that has at least 20% tree canopy cover, or the potential to achieve this, through maturation of the existing crop of trees (saplings and seedlings included) are considered

treed. Where shrubs have the morphology of trees (Shrubs Acting as Trees) these count towards the 20% canopy cover. Do not make assumptions about survival rates (e.g. losses to pests, diseases, mammal damage etc.) or future management interventions.

Treed areas include temporarily unstocked areas, such as:

- Clearfell cut <10 years ago.
- Windblow pockets.
- Failed crops: planted within the last 15 years and <20% of the appropriate management table stocking.
- Burnt crops: high forest where >80% of trees have been killed by fire.
- Ground prepared for new planting.

Unusual treed areas include:

- Glades with a sufficient scattering of tree seedlings or saplings.
- Traditional orchards (Habitat = Traditional orchard).
- Wooded gardens with sufficient tree canopy cover.

Treed areas **do not** include horticultural/arable crops, such as:

- Nursery crops.
- Biofuel crops (short rotation crops such as willow coppice).
- Intensively-managed commercial orchards.

4.3.2 Open (Non-treed) Areas

Land that has <20% tree plus Shrubs Acting as Trees canopy cover, and no potential to achieve this through maturation of the existing crop of trees, Shrubs Acting as Trees, tree saplings and tree seedlings.

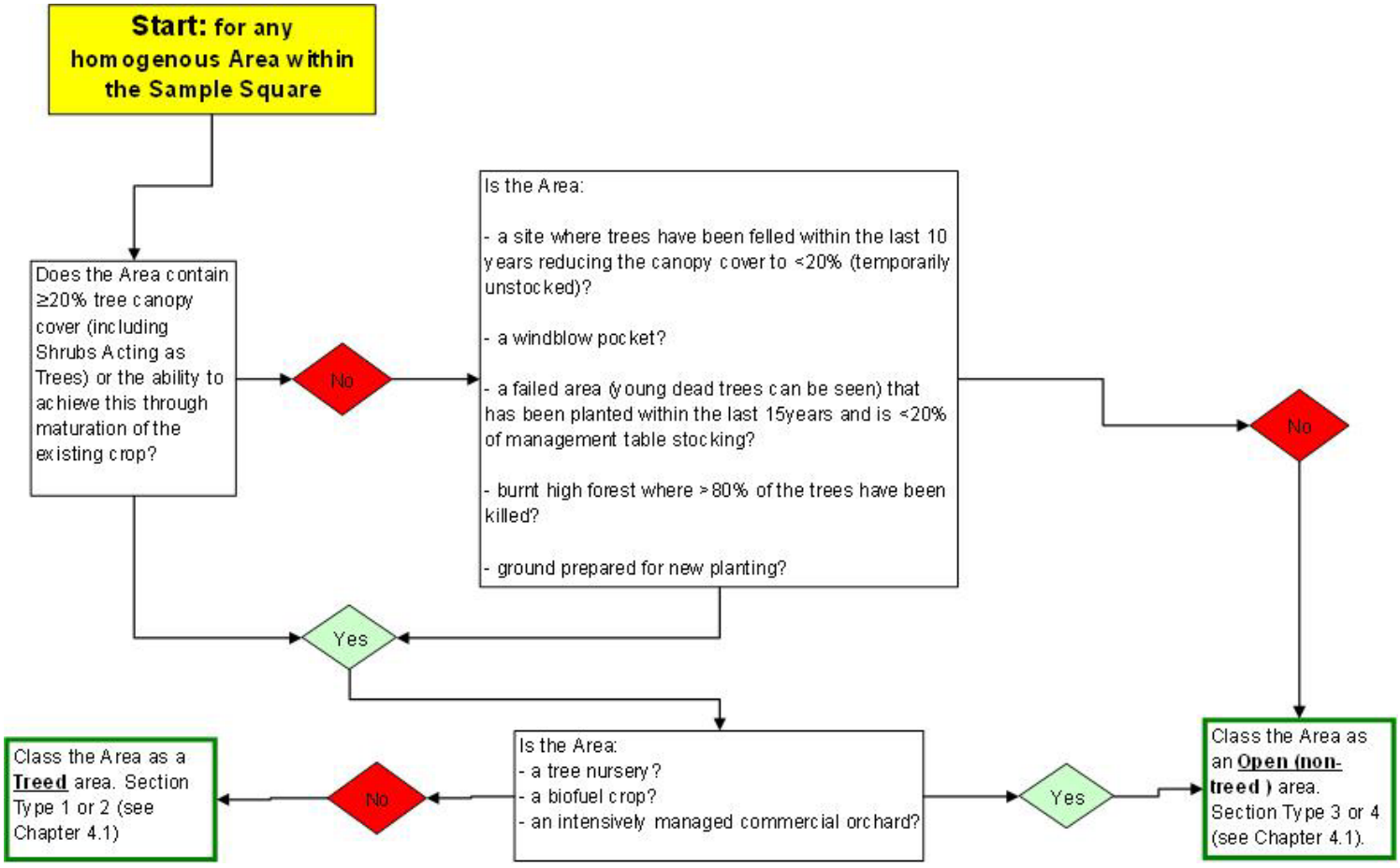
Non-treed areas include:

- Clearfell which, after 10 years, has not achieved at least 20% stocking of tree species and/or shrubs acting as trees through planting or natural regeneration.
- Glades with patchy or dense cover of shrub species, but has <20% canopy cover of the Shrubs Acting as Trees and trees combined.

Non-treed areas also include horticultural/arable crops, such as:

- Nursery crops

- Xmas tree crops
- Biofuel crops
- Intensively-managed commercial orchards



Flowchart 4-1: Treed vs. Open Areas

4.3.2.1 Definition of permanent open space

For the purposes of the NFI, we differentiate between permanent open space (which must be recorded so that it can be deducted from the NFI GB Woodland total area) and temporary open space (which must not be recorded).

Permanent open space is defined as land that will never, under the existing circumstances and if left alone, become woodland.

Easy determinations of permanent open space are large areas of concrete, tarmacadam etc., recorded as urban and road etc. More difficult determinations would be, for example, grassed open space between trees and here it is important to identify what area will never come under canopy once the existing trees have grown to maturity. This can be established by looking at the existing crop and predicting mature canopy closure. If any "gaps" remain, then these gaps would be classed as permanent open space and should be recorded as such.

4.3.2.2 Definition of temporary open space

Temporary open space is defined as land that is open now but could potentially come under canopy cover either through colonisation or canopy spread.

For example, grassed open space between trees that will sooner or later, in this rotation, become under canopy, are recorded as temporary open space. These temporary canopy gaps will be accounted for in the stocking density assessment.

4.4 Classification of land beneath Linear Features

4.4.1 Sealed roads

A sealed road is defined as a road surfaced with a tarmacadam or concrete. This category includes public roads and private driveways.

- **Always** class as these areas **permanent** open space because they are effectively unable to grow trees.

4.4.2 Unsealed roads

An unsealed road is defined as a road surfaced with hardcore, rubble or coarse chippings. These are also termed "metalled" roads.

4.4.2.1 Maintained unsealed roads

Roads that are maintained. This category includes the better quality forest and estate roads, and private driveways.

- **Always** class as **permanent** open space because they are effectively unable to grow trees.

4.4.2.2 Unmaintained unsealed roads

Roads that are no longer maintained. Typically these are heavily-vegetated, but there will be evidence that the road was surfaced at one time. This category includes minor forest roads that are little-used and left to nature.

- Where the road is deemed to be part of a woodland, class as **permanent** open space if **at least 50%** of the road is open to the sky i.e. not obscured by the overhead canopy. If <50% of the road is open to the sky, do **not** class as open space i.e. the road is regarded as a continuation of the adjacent treed area.

4.4.3 Unsurfaced tracks and rides

A ride is defined as a muddy or grassy corridor created to give access through woodland. This category also includes unsurfaced farm tracks, firebreaks, Greenways and Bridleways.

- Where the ride/track is deemed to be part of a woodland, class as **permanent** open space if **at least 50%** of it is open to the sky i.e. not obscured by the overhead canopy. If <50% of the ride/track is open to the sky, do **not** class as open space i.e. the area is regarded as a continuation of the adjacent treed area.

4.4.4 Railway tracks (any gauge)

4.4.4.1 Operational railway tracks

Always class the tracks and sidings as **permanent** open space because effectively unable to grow trees. The embankments should be classed as a treed/open area.

4.4.4.2 "Disused" railway tracks

- Where the disused railway track is deemed to be part of a woodland, class as **permanent** open space if **at least 50%** of the railway track is open to the sky i.e. not obscured by the overhead canopy. If <50% of the disused railway track is open to the sky, do **not** class as open space i.e. the railway track is regarded as a continuation of the adjacent treed area.

4.4.5 Rivers, streams and canals

A river is defined as a natural watercourse at least 5m average width, which flows towards the sea, a lake or another river. If the watercourse is <5m average width, it is classed as a stream.

- Where the watercourse is deemed to be part of a woodland:

    a. class as **permanent** open space for rivers and canals
    b. Streams: if lined with concrete class as permanent, if lined with natural materials class as permanent if >50% of the stream is open to the sky.

- Class as **NFI** land where the watercourse cuts through **NFI** woodland and is <20m average width, bank-top to bank-top.
- Class as **Non-NFI** land where the river cuts through **NFI** woodland and is ≥20m average width, bank-top to bank-top.

4.4.6 Overhead powerlines (all voltages)

An overhead powerline is defined where there is a wayleave associated with electricity pylons.

- Where the powerline is deemed to be part of a woodland, class as **permanent** open space if the trees beneath are managed to remain clear of the line.
- Where the powerline is deemed to be part of a woodland, do **not** class as permanent open space if the trees beneath do **not** require management to remain clear of the line e.g. the trees are in a steep ravine and so will remain clear of the line even at maturity. In such cases, the powerline is regarded as a continuation of the adjacent treed area.

4.5 Minimum Section Size

A Section must be comprised of either:

a) a single polygon at least 0.05Ha in extent, or
b) two or more separate but identical polygons ("multi-parts"), each at least 0.01Ha in extent and which sum to at least 0.05Ha.

Sections and individual multi-parts must be at least 5m average width, although an exception is made for certain Non NFI Non-treed Sections.

Non-NFI land should always be mapped separately to NFI land where possible. To facilitate this, the minimum size for a Non-NFI Section is 0.01Ha where the remainder of the square is NFI land. For example, if a Non-NFI tarmacadam road runs the entire length of the Square, but the road margin extends only 1m into the Square, and the remainder of the Square is NFI woodland, then the Non-NFI polygon should be mapped out as a separate Section, even though only 0.01Ha in extent.

Normal rules apply to situations where the total extent of NFI land within the Square is <0.05Ha i.e. the NFI land must not be mapped out as a separate Section (but can instead be recorded as an NFI "Component Group" within the adjacent Non-NFI Section, as outlined below).

Always double-check that each of the mapped Sections is at least 0.05Ha in extent (exceptionally 0.01Ha for certain Non-NFI Sections). The software will automatically calculate Section area but does not alert surveyors when the area is <0.05Ha. Squares containing Sections less than the minimum permitted size will automatically fail Quality Assurance Assessment and be returned for re-survey.

Homogenous areas too small to map as discrete or multi-part Sections should be identified as "Component Groups" and included in either the most similar adjacent section or the largest adjacent Section if no adjacent section is similar (e.g. a small area of oak adjacent to a section of Sitka spruce and a section of Douglas fir. Neither adjacent section is similar so the oak is included in the larger section. **See Chapter 7.0** for a fuller discussion of Component Groups.

4.6 Summary of Sectioning Procedure

Insert Summary Flowchart

4.7 Section Boundaries

4.7.1 Boundary lines

There are three methods, described in priority order, for determining where the boundary line should be drawn within the Square when creating Sections:

1. Where landuse or habitat changes, e.g. at the interface with non-woodland areas
2. The "drip line" (or the potential drip line when a young crop matures)
3. Sphere of Influence

4.7.1.1 Square boundary

This is an artificial boundary imposed by the sampling methodology and does not take into account any land features, only geographical location. In nearly all Sample Squares the Square boundary will divide Sections arbitrarily. When carrying out Mensuration plot work within a Section and a circular plot crosses the Square boundary line, all the area of the plot that would have been in the Section had the Square boundary not existed is assessed.

4.7.1.2 Landuse changes: the interface with/between land that is non-woodland

Where the tree canopy extends over an area that could not support trees (e.g. open water, a road, a quarry etc.), the boundary of that non-woodland area is taken as the Section boundary. This rule takes precedence over the drip line and it is generally a more objective boundary than interpreting the drip line boundary. It is not subject to change over time to the same extent as the drip line. The branches of the treed Section do not determine that the open water or road below it is a forest as it is not the PRINCIPLE landuse; the open water or road is the predominant landuse.

Where Landuses overlap

Where a non-treed area is overlapped by another non-treed area

- Permanent non-treed areas take precedence over temporary non-treed areas:

  - E.g. where a tarmacadam/metalled road, or railway, and a powerline cross, the tarmacadam road is mapped and the powerline is therefore truncated by the road. Note that a Linear Feature for the entire length of both the road and the powerline individually, still need to be mapped.

- A powerline crosses a river: the river takes precedence
- A wayleave crosses agricultural land: the agricultural land takes precedence but the wayleave is still mapped as a Linear Feature.
- Where there are two Permanent or Temporary Landuses (e.g. a road crossing over a railway) map the uppermost Landuse.
- A powerline over a minor road (unsealed) or ride where the ground vegetation is actively managed for the powerline – the powerline takes precedence. If in doubt about the active ground management then the powerline will take precedence.
- Tarmacadam/metalled road, or railway, over a river/ride: road/railway takes precedence.
- Where a treed area is overlapped by a non-treed area:
  - Road/railway: a flyover above a Christmas tree crop – the road/railway takes precedence.

<u>Powerlines:</u>

- A powerline through a wooded gorge where the trees are not affected by the powerline then the woodland takes precedence.
- A powerline where a wayleave is cut through NFI areas (the ground vegetation actively managed to prevent tree growth) the powerline takes precedence.
- A powerline over a Christmas tree plantation: Christmas tree area takes precedence.

4.7.1.3 Drip line

To establish a treed Section boundary in the vast majority of cases the drip line (of the uppermost storey) will be used. The drip line is the furthest tip of the widest branch in the crown; the last point from which the tree can drip if wet.

- **If two treed sections have drip lines that cross over each other use the centre line of the cross over.**

An area of ambiguity is where to locate a drip line boundary for a young crop. In this instance the Section boundary is located where the surveyor thinks the drip line will be upon maturity of that crop. For example if a young crop is planted on ground prepared for planting it makes sense for the Section to contain the entire area prepared for planting rather than trying to map to the drip line of newly planted or young trees.

Surveyors have to be careful not to mistake areas deliberately left unplanted and which would be classed as Open for areas the drip line may extend to. Using a planted area next to a road as an example, surveyors may find a 10m strip left open (no trees planted) between the planted site and the forest road. This strip may be to encourage greater biodiversity of flora and fauna and even when the crop matures it will be obvious that this is an open strip.

4.7.1.4 Sphere of influence

This is probably the least likely method to create a Section boundary as it is the least likely situation to occur, especially in production forests. However, it holds greater importance in many respects as we wish to know about how tree storeys influence the land around them. It is more subjective than the other methods and harder to implement correctly.

In some crops, seed tree stands for example; the upper storey is sparse but still exerts an influence over the storeys below it.

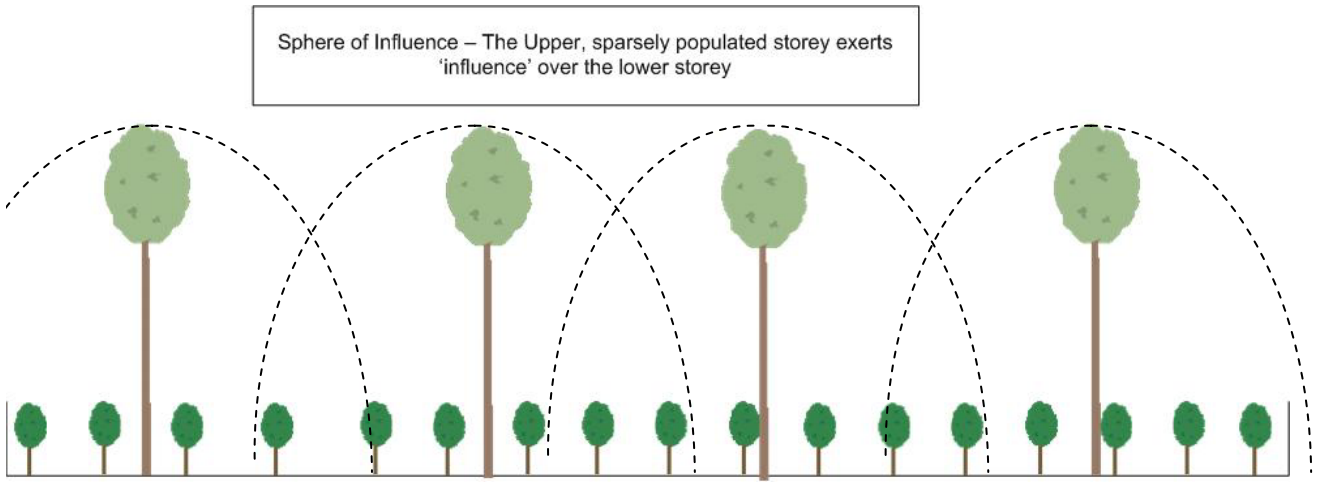


Figure 4- 15: Sphere of Influence.

The dotted lines denote one tree length, a useful rule of thumb when assessing the Sphere of Influence exerted by this storey.

Surveyors must consider the Sphere of Influence of the uppermost canopy, in that how far does, and can, a sparsely occupied upper canopy hold claim to a lower storey, before we declare it is too far away from the lower canopy trees and is in a different section? Generally the rule here is one tree length from the nearest uppermost canopy tree.

In exceptional circumstances this distance can be extended if the surveyor decides that the upper canopy trees, even though sparse and more than one tree length away are still having an impact upon the lower storey, enough to influence the growth of the lower storey. An example of this would be:

- Light competition
- Shelter
- Microclimate (humidity, gaseous composition)
- Physical protection from predation
- Proximity to next upper storey tree or trees

In these instances longer than one tree length distance may be appropriate. Ultimately this is a more subjective assessment than drip line or landuse changes.

4.7.2 Multiple storeys and silvicultural systems

Where there are multiple storeys of trees occupying one area of land the drip line rules can become more complicated to implement. It is then necessary for the surveyor to determine the extent over which the storeys are working together as a Component Group and specifically over how far the uppermost storey extends its influence.

The extent of the Component Group is determined by the maximum extent of the storeys within it. If the Component Group is large enough to be a Section, then a Section boundary must be drawn in.

The following scenarios will help to clarify the rules.

In Figure 4 - 16 the upper and lower storeys are working together as a Component Group of sectionable size. The drip line of the upper storey is used to determine the Section boundary.

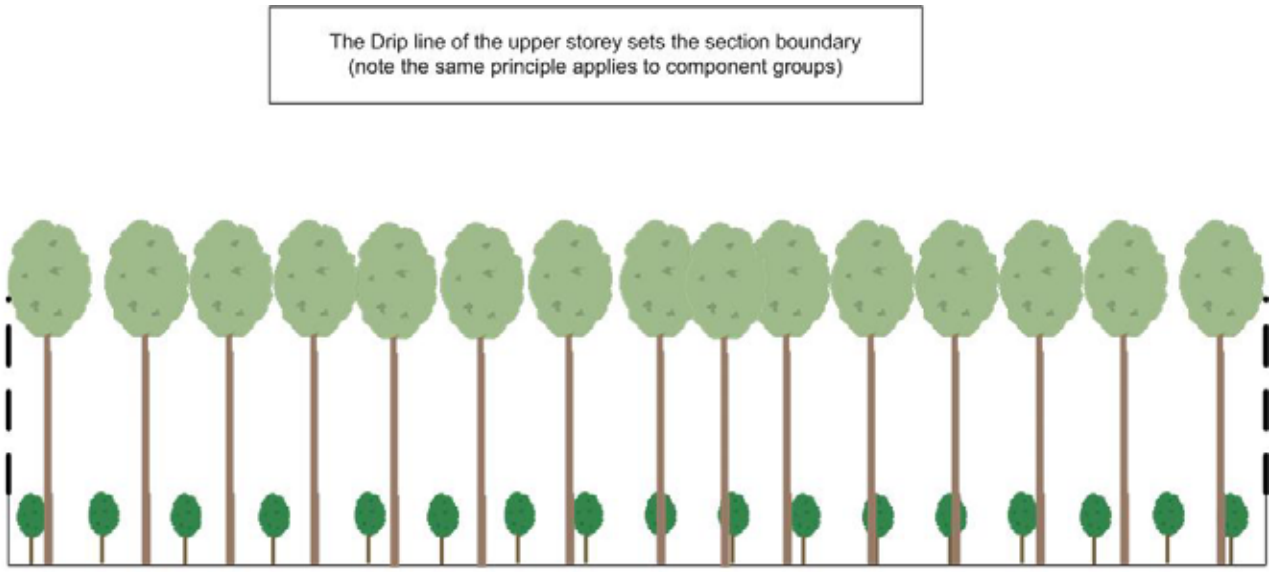


Figure 4- 16: Drip line of the upper storey is used to determine the Section boundary

In Figure 4 - 15 the sparse upper storey is exerting an influence over the lower storey, such that the 2 storeys are working together as a Component Group, and this is of sectionable size. The drip line of the lower storey is used to determine the Section boundary.

In Figure 4 - 17 the clustered upper storey is exerting an influence over the lower storey, such that the 2 storeys are working together as a Component Group, and this is of sectionable size.

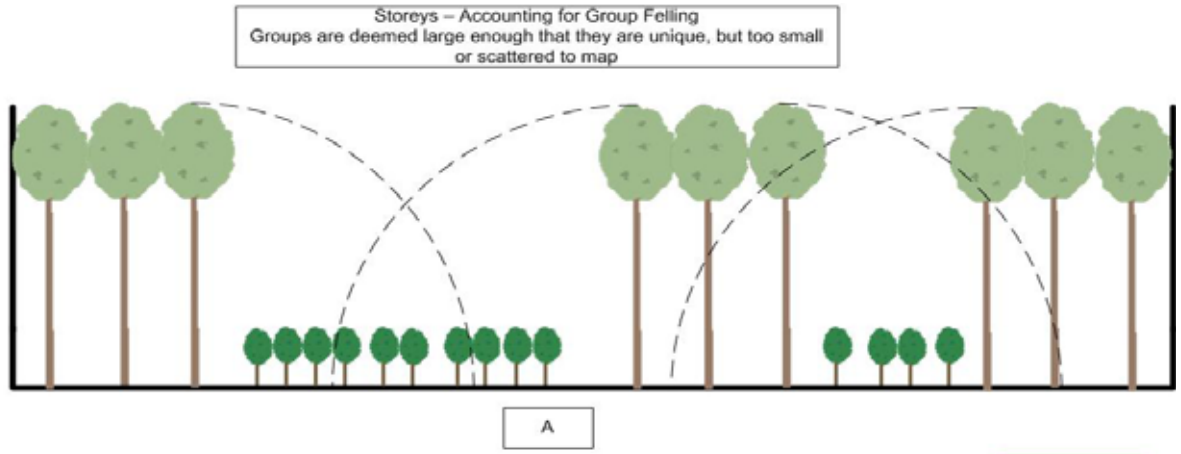


Figure 4- 17: A single Component Group across the Section.

The upper storey can be said to be extending its influence (the dotted curves) over the lower storey.

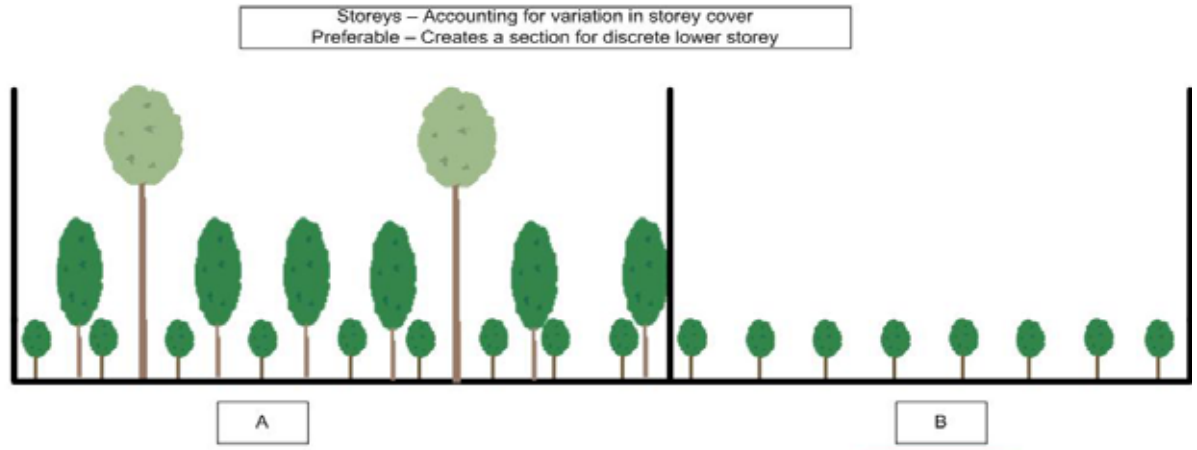


Figure 4- 18: Section border locations

In Figure 4 - 18 the upper, middle and lower storeys are working together as a Component Group of sectionable size (A), and the single-storied area is also of sectionable size (B). The drip line of the lower storey on the left hand side of Section A is used to determine the Section boundary on that side and the middle storey of the section is used to determine the section boundary on the right hand side.

Section/Component Group Boundary examples for:

2. Treed area abutting non-treed areas:

    a. Agriculture:

        i. Fence/wall – boundary follows fence/wall line
        ii. Unfenced – boundary follows tree stem line (face of), this takes into account the field margin which is part of the agricultural habitat.
        iii. Ditch/Woodbank - boundary follows ditch/Woodbank on the agricultural side.

    b. Roads, tracks and rides (sealed and unsealed) – to face of tree stems UNLESS where the road, track or ride has associated with it a:

        i. Fence/wall/hedge – map to fence/wall/hedge
        ii. Ditch – map to centre of ditch
        iii. Non-treed verge:

            1. If ≥5m wide on average and ≥0.05ha, map verge as a separate Section using the road edge/centre of ditch, as appropriate (ditch takes precedence over road edge), as the roadside boundary

            2. If the verge is too small to section separately, include as a Component Group of the road and map as appropriate to fence/wall/hedge/field/face of tree stems etc.

    c. Railway lines – Map to associated fence/wall

    d. Water bodies (rivers/open water):

        i. Where trees grow down to the waters edge map to the waters edge otherwise:

        ii. map to the bank top, or the waters edge where there is no bank top, UNLESS the water body has associated with it a:

            1. Fence/wall/hedge - map to fence/wall/hedge

e. Quarries – where there is a fence/wall associated with the quarry, map to this boundary otherwise map to edge of excavation.

f. Wayleaves - map to face of stems of treed sections and/or edge of non-treed sections where these abut the wayleave. Wayleaves should have parallel borders following powerlines, gas lines etc.

g. Glade – map to face of stems.

3. Treed area abutting Treed areas:

a. If two treed sections have drip lines that cross over each other use the centre line of the cross over.