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INTRODUCTION

Forests should be planned and managed in a way which enhances the landscape. Given the impact of forestry on the landscape, in terms of aesthetics, environment and culture, measures are required which ensure overall positive results and avoidance of damage.

The objectives of the FORESTRY AND THE LANDSCAPE GUIDELINES are as follows:
- To ensure a positive relationship between the forest and the character of a given landscape as a whole - *to achieve balance of landcover.*
- To optimise aesthetic effect through the integration of forests with landscape - *to complement landscape integrity.*
- To minimise visual conflict and the loss of characteristics - *to retain and/or increase existing character and diversity.*
- To mitigate adverse impacts of forest operations, including harvesting - *to mitigate visual conflict.*

While the FORESTRY AND THE LANDSCAPE GUIDELINES set out a wide range of measures forest owners can employ in relation to the landscape, it is recognised that some may be impractical for individual forests, due to land ownership pattern, location and other set factors. However, where a degree of flexibility exists, forest owners are required to implement those landscape measures which can be applied effectively to their property.

Landscape planning and design should take particular account of the primary viewpoint from which the forest can be seen.


The FORESTRY AND THE LANDSCAPE GUIDELINES have been developed through extensive consultation with a wide range of relevant parties. They set out sound and practical measures based on the principles of Sustainable Forest Management (SFM), and are firmly rooted in the best available information. The guidelines will be kept under review to facilitate amendment in the light of new research findings.

To ensure the successful implementation of SFM in Ireland, it is important that forest owners adhere to the guidelines and undertake all work in a way which is compatible with the protection of the environment.

The guidelines describe a range of measures intended to cover all situations relating to forestry and the landscape. Not all of the measures outlined will be applicable to every site. However, it is the responsibility of forest owners to identify and apply those measures which are appropriate to their particular forest.

The FORESTRY AND THE LANDSCAPE GUIDELINES apply to all grant-aided projects and to all activities associated with a Felling Licence. Any breach may result in the forfeit of grant aid and premium payment or the withdrawal of a Felling Licence.

It is essential that all forest workers and machine operators involved in any forest operation are made aware of and understand the guidelines, all relevant environmental issues relating to the site, and working practices which minimise environmental disturbance. All operators should have contact telephone numbers onsite for all relevant agencies (Local Authorities, Regional Fisheries Boards, Dúchas The Heritage Service, National Museum of Ireland, Garda Síochána, etc.) in case of accidental damage to aquatic zones, archaeological sites, important wildlife habitats and other environmental features.
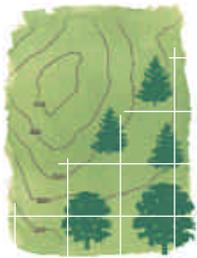
RESPONSE TO LANDSCAPE CHARACTER

Ireland's landscape character varies considerably in regard to both landform and landcover. Any approach to forest landscape planning and design should therefore deal with the forest in the context of the surrounding landscape, and aim at achieving a sympathetic response to the distinctive landscape character of that given location. The FORESTRY AND THE LANDSCAPE GUIDELINES provide recommendations for various forest development scenarios and for four distinct landscape character types commonly found in Ireland, namely:
i.   rolling moorland;
ii. rolling fertile farmland;
iii drumlins;
iv. mountain and farmland complex.

PLANNING AND DESIGN CRITERIA AND FACTORS

Forest landscape planning involves managing the effect of forests and forest practice on the landscape character. Forest landscape design refers to the desired appearance of the forest in relation to its context.

The aesthetic planning and design of forest landscapes can be divided into four criteria to which certain factors relate (see Table 1). Four of these factors (scale, size, arrangement and location) relate specifically to landscape planning. The remaining (shape, pattern, proportion, edge, margin, texture and colour) are relevant to design.

Table 1. Forest landscape planning and design, with associated criteria and factors.
Extent concerns the amount of forest cover in relation to the area viewed.

|	*Forest landscape planning*		*Forest landscape design*	
Criteria	Extent	Disposition	Configuration	Composition
Factors	Scale Size	Arrangement Location	Shape Pattern Proportion Edge	Margin Texture Colour

•   *Scale:* Overall area of forest cover as a percentage of the landscape. It is a major factor in determining whether an existing landscape character is preserved or obliterated. As scale is a strategic criterion in considering change in overall landscape character, it is not used in the guidelines.
•   *Size:* Area covered by individual forests, whether small, medium or large. The greater the area, the more likely the forest is to be dominant in the landscape.

Disposition focuses on where forests are in the landscape and how they relate to each other.
•   *Arrangement:* Relationship in terms of proximity or separation of distinct forest plots throughout the landscape, ranging from clustered to scattered.
•   *Location:* Position of a forest in a landscape, e.g. whether it is situated on upper or lower ground.

Configuration concerns the design of the forest itself as it relates to its immediate context.
•   *Shape:* Outline of the forest as a 'footprint', ranging from angular to curved.
•   *Pattern:* The combination of canopy (solid mass) and open space, and their relative areas.
•   *Proportion:* Area of individual components of the forest (e.g. compartments, open spaces, projections, recesses) in relation to the surrounding landscape.
•   *Edge:* The layout of trees at the immediate juncture of the forest and adjacent open ground, both internal and external. Edge treatment could range from dense (comprising continuity of closely spaced trees) to open (where tree spacing varies and an open structure is created).
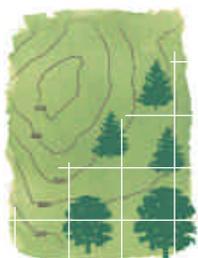
Composition completes the basis for design by establishing the structure and content of the forest canopy. It is concerned primarily with species and age class.
- *Margin:* The peripheral zone in relation to species, whether monoculture or mixed, uniform in height or multi-layered.
- *Texture:* Three-dimensional variation of the canopy surface created by species and age diversity.
- *Colour:* Chromatic variation involving, for example, the subtle differences between different conifer species or the stronger contrast between conifers and broadleaves.

> Open spaces are unplanted areas necessitated by management operational requirements or by FORESTRY AND WATER QUALITY GUIDELINES, FORESTRY AND ARCHAEOLOGY GUIDELINES and FORESTRY AND THE LANDSCAPE GUIDELINES. They include ridelines and firebreaks, forest roads, turning bays, landing bays and associated margins, together with buffer zones adjoining aquatic zones, exclusion zones adjoining archaeological features, and unplanted spaces included for landscape purposes.

PLANNING AND DESIGN FACTORS FOR VARIOUS FOREST DEVELOPMENT SCENARIOS

Examples of how and where planning and design factors can be applied are provided below, concentrating on a range of forest landscape issues experienced in Ireland.

SIZE

In some situations, forests are too small in relation to the scale of the surrounding landscape. Achieving successful integration of small plots presents a considerable challenge, particularly on open ground.
- Create a visual link with surrounding landscape elements. For example, a generous broadleaf margin of varying width and linked in with nearby hedgerows could be used.
- Shape the forest with projections and recesses which reflect the proportion of the surrounding landscape context.

ARRANGEMENT

Due to the pattern of land ownership in Ireland, forests on hill or mountain sites are often established as long narrow belts running uphill in isolation. Where a number of these are planted in close proximity, the resulting 'ladder' effect involving alternate strips of forest and open ground creates a disjointed landscape.

The ideal solution is to plant the land separating adjacent forests, i.e. to undertake forest infill. However, where such land does not become available for planting, establishing a relationship between the forest and unplanted ground becomes critical. This can be achieved through: pattern variation, e.g. by creating open spaces in the canopy and recesses along the edge; and consideration of margin, colour and texture, by using species which relate to the colours of the open ground, e.g. the colour of larch during the dormant season relates well to mountain landscape.

LOCATION

Due to land ownership and/or site productivity, forests are sometimes located mid-slope on open mountainsides. Failure to visually connect such forests with other landscape features such as field boundaries, streams, gullies or rock outcrops creates the impression of the forests 'sliding' downhill. This effect is further strengthened if the forest is lopsided or imbalanced on the mountain slope, as viewed from, for example, a public road or settlement.

Where possible, extend the plot in the direction of the above mentioned landscape features. It may also be necessary to consider pattern, proportion, edge and margin to directly relating the forest visually to its surrounds.
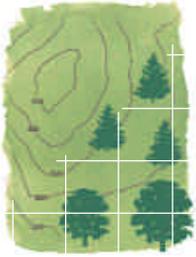
SHAPE

As with the above design factors, the shape of forests in Ireland has been primarily determined by land ownership. Given that fields or properties are invariably angular in outline, resulting forests often resemble 'blocks' on the landscape. This may create an adverse visual impact, particularly on open mountainsides.

The most effective solution is to break down the angular geometry of the forest plot through recessing and curving corners, leaving some areas unplanted and softening edges by incorporating 'outliers', i.e. outlying groups and single trees.

Angular shaped compartments defined by, for example, straight ridelines, should also be avoided. Where possible, ridelines should run along the contour and should not be in line with the main view.

Angular forest blocks in visual conflict with open, flowing moorland.

PATTERN

Due to lack of variation, forests sometimes resemble homogeneous 'blankets' in the landscape, without variation of pattern. Such forests can often conceal the underlying pattern of the ground surface produced by, for example, rock, vegetation and water.

- The creation of open spaces within the canopy is particularly important in the case of large forests on mountainsides. These open spaces might include attractive rocky outcrops, land incapable of supporting a commercial crop, or areas where planting is curtailed or undesirable, e.g. areas in the vicinity of aquatic zones and archaeological sites and monuments (see FORESTRY AND WATER QUALITY GUIDELINES and FORESTRY AND ARCHAEOLOGY GUIDELINES).
- If no such features exist to prompt variety of pattern, open spaces should still be created at locations where they will be easily perceived externally. Ensure that these open areas are large enough to enable their continued visibility as the forest matures.
- Plant a mixture of species carefully located throughout the canopy to reflect and highlight existing ground surface patterns.


Improvement in shape achieved by the breakdown of angular geometry through curving shapes.

PROPORTION

Occasionally, the proportions of features such as compartments, open spaces and recesses do not correspond with the proportion of other features in the surrounding landscape, and therefore fail to establish a visual relationship.

Forest without variation or canopy openings, blanketing surface pattern.
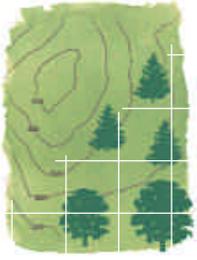
Forest with clearings which partially reveal underlying surface patterns.

- In a mountainous landscape, the area of different species compartments should reflect the area of vegetation patches such as heather, grass and bracken.
- In a farming landscape, the area of open spaces and recesses should relate to that of nearby fields.

EDGE

Successful design of the forest edge is critical, particularly when viewed at close proximity from, for example, a road or house, or when located adjacent to an attractive feature such as a lake or river. It is essential to avoid creating a solid forest 'wall' and to provide views into the interior. There are several ways of opening the forest edge.

- A diffuse edge can be created by pulling the forest back from the site boundary and by creating a zone of loosely scattered trees or 'outliers', using wide spacing and low growing species such as rowan and birch.
- The incorporation of particular species into the forest margin can also enhance edge appearance. For example, the inclusion of self-pruning or lightly branched conifers such as Scots pine or larch into the margin can be of great benefit, by increasing visibility into the stand.
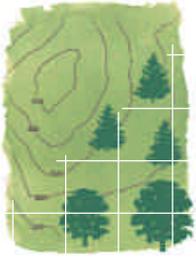
Edge defined by clear-stemmed Scots pine, providing views and light into the forest interior.

MARGIN, TEXTURE AND COLOUR

Some forests, mainly in upland areas, are occasionally regarded as being monotonous, due to the lack of colour or textural variation of both the margin and the main forest body. The primary objective concerning margin, colour and texture is to introduce an appropriate level of species variation.

Margin

The forest margin, i.e. the peripheral zone of the forest, can be enhanced by introducing species and age class diversity. Swathes comprising broadleaves or broadleaf/conifer mixtures can be very effective, particularly when extended with irregular finger-like projections into the main forest body.

Texture

Variation of texture throughout the canopy is achieved through age and species diversity.

Colour

Colour variation is primarily achieved by using different species. Broadleaf groups mixed with conifers achieve the greatest effect in terms of colour variation. Colour variation can also be created among conifers, including pine (relatively dark green), Sitka spruce (grey/blue green), Norway spruce (green) and larch (light green). The use of larch and broadleaves in a predominantly conifer forest creates a bold contrast, particularly during the dormant season.

Colour contrast of fenced unplanted areas with adjacent grazed land

Loose open-structured edge comprising variation in age classes and outlying trees.

A strip of land is often left unplanted between the forest and the boundary fenceline. This strip is particularly visible on mountainsides, widening where recesses into the forest margin are created. A strong colour contrast usually results between the fenced unplanted area and the immediately adjacent open ground, due to the absence of grazing in the former. Such contrasts can be reduced considerably by encouraging the growth of outliers and intermittent scrub.

ROADSIDES

Forests located very close to the roadside often present a continuous solid conifer wall. In order to provide visual variety and stimulation for road users, design along roadsides should aim to create a sequence of varying spaces and to provide views into the forest interior.

The following useful solutions to roadside design can be combined or used individually, depending on the length of the road adjoining the forest:
- For selected sections, set the forest back on one or both sides of the road at generous but varying distances.
- Prune and thin stems to provide filtered views into the forest.
- Use trees which have clear stems or light foliage, e.g. Scots pine, larch and birch, to facilitate visibility and to encourage the development of attractive green undergrowth.
- Create open spaces close to the forest edge but just behind a narrow strip of stems, drawing the eye through this filtered strip to the space beyond.

Blocking views along roadsides

A common criticism of forests along roadsides is that they block views of the surrounding landscape. This is particularly frustrating where there is a sense of the possibility of panoramic or attractive views, such as that experienced at the brow of a hill. In scenic areas or along scenic routes, it is therefore necessary to retain a reasonable number of views throughout the full rotation, for the benefit of road users.

WATERBODIES

The same principles which apply to roadsides are also relevant to aquatic zones, including streams, rivers and lakes. An informal natural layout and the inclusion of native riparian trees also play a major role in promoting aquatic ecosystems. See FORESTRY AND WATER QUALITY GUIDELINES regarding the creation and appropriate treatment of associated buffer zones.

HOUSES

Houses and other buildings such as churches and schools can be visually isolated by closely located forests.
- Planting should be kept 60 m from dwellings and associated buildings, unless the owner agrees to a closer set-back distance.
- Set-back distance is most critical when a building is surrounded by forest on two sides or more. Where adjoining properties are 0.2 ha or less, it is recommended that planting be kept back 30 m from the property boundary.
- Wider edge spacing and the incorporation of lower growing broadleaves such as birch and rowan will soften the forest edge.
- In the case of existing forests, the pruning and respacing of edge trees should be considered to allow more filtered light into the forest.
- Forest developers should liaise with the owners of neighbouring properties, to resolve in advance any potential concerns.

Right: Subtle colour and textural variation with optimum effect at short viewing distances using contrasting conifers and broadleaves.

Left: Autumnal colour variation achieved by mixing broadleaves and conifers, including larch.
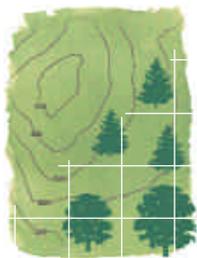
FOREST LANDSCAPE PLANNING AND DESIGN FOR DISTINCT LANDSCAPE CHARACTER TYPES

The following outlines forest landscape planning and design for the four distinct landscape character types commonly found in Ireland: rolling moorland; rolling fertile farmland; drumlins; and mountain and farmland complex. The forest owner can identify which character type his/her property is situated within, and then apply the planning and design measures specified for that character type.

ROLLING MOORLAND

Landscape interpretation: Many mountain slopes in Ireland are sweeping and extend as open, expansive and undulating moorland. Many existing forests in such areas have tended to be angular in nature, because of their straight boundaries. Due to poor site conditions and exposure, they have inclined to be of limited species and age diversity, resulting in a severe visual impact on the landscape.

Size: The preferred approach in relation to forest size is to respond to the openness of this landscape character type by developing large forests, as small forests can appear isolated.
Arrangement: The most preferred arrangement is continuous.
Location: Forests should typically be located on lower ground and on mid-slopes, avoiding higher peaks and ridges. Where possible, ensure that forests are kept far enough downslope to avoid creating a narrow strip of bare ground between forest and ridge.
Shape: Angular shapes should be avoided. Create fluid shaped forests which respond to changes in landform and emphasise streams, valleys, rocky knolls, ridges and open space.
Pattern: Where possible and using open spaces, the overall forest canopy should reveal the underlying variation and pattern in landcover and landform.
Proportion: The area of individual recesses and projections must reflect the proportions of open landscape and be sufficient to be visible from middle distances.
Edge: Sharply defined and dense conifer edges should be avoided where possible. A gradual transition from forest to open ground can be achieved by establishing generous zones of outliers varying in width, planting density and species.
Margin: The margins could comprise two different species intermixed in drifts in a non-linear and relaxed fashion.
Colour: Where possible, a mix of species should be used to increase colour variety. Larch and broadleaves are particularly useful for their winter colour.
Texture: Enhancing the texture of the forest canopy can be achieved by using a species mix based on underlying soil conditions and/or encouraging age class diversity.

ROLLING FERTILE FARMLAND

Landscape interpretation: This landscape type is a man-made 'working landscape'. The rolling hills are characterised by a patchwork of clearly defined fields with farmsteads and houses scattered throughout. These fields are typically under pasture or tillage. The scale of the landscape is usually relatively enclosed. Soil fertility should allow broadleaf plantations, with a potential for silvicultural systems other than clearfelling.

Size: If the existing strongly-defined patchwork character is to be maintained, smaller or medium sized forests would be more appropriate than large.
Arrangement: Extensive continuous forests throughout would result in loss of landcover pattern, whereas well-dispersed smaller areas will ensure enhancement.
Location: The location of forests can affect the apparent continuity of the landscape and can help to emphasise landform by concentrating on hilltops or along dips between hills.
Shape: The shape of forests in rolling fertile farmland can be defined by the characteristic angular patchwork landcover pattern. More curving shapes can also enhance these landscapes, especially for larger forests.
Pattern: A benefit of allowing original field shapes to determine forest pattern is that the 'memory' or mark of the previous landuse is retained.
Proportion: Relatively large forests should not appear as a block leaning on or supporting the adjoining fields. Instead, they should be broken by indentations proportionate to the fields.
Edge: Straight edges are acceptable in these landscapes, provided they do not comprise 'solid walls' of conifers which would be out of character.

Rolling moorland.

Left: Open, bright and varied forest edge along roadside achieved through pruning, thinning, clearings and variation of stem spacing.

Overleaf: Meandering forest edge with generous sweeping recesses and stems pruned to varying heights.

Margin: The characteristic broadleaf hedgerows provide the inspiration for margin. Their survival will depend upon the provision of sufficient space.

Colour: Whether conifers or broadleaves are used, a significant proportion of the species should be deciduous.

Texture: The use of broadleaves and conifers such as firs and pines will significantly enhance forest texture. Age diversity will also ensure textural variation.

DRUMLINS

Rolling fertile farmland.

Landscape interpretation: The typical continuity of small rolling hills with wet inter-drumlin flats, combined with a close network of fields and hedgerows, creates a small scale, intimate and visually complex landscape. Many fields have reverted to rush and scrub in recent years. Soils on drumlins are typically gleyed and thus limit species choice.

Size: Smaller forests usually appear well integrated within the grid-like pattern of hedgerows. Care must be taken to ensure that this pattern is not obscured by large forests.

Arrangement: The integrity of character can best be retained by an even scattering of forests.

Location: It is particularly important to provide open ground around houses and farmsteads. Otherwise, location is usually not critical.

Shape: Forests in these landscapes, even when shaped with straight lines, may appear more curved. This is due to the rolling slopes. Therefore, angular shaped forests can be accommodated.

Pattern: Small open spaces are desirable in large plantations covering many drumlins. Where forests cover several fields, the original hedgerows should also be retained as broadleaf swathes, to reflect the pattern of the surrounding landcover. Where necessary, these hedgerows should be thickened with additional broadleaves or larch, in order to ensure their survival.

Proportion: The relatively small fields on drumlins establish proportions for forests. Therefore, unless the forest is substantial, large recesses or projections are not critical.

Edge: Due to their importance in drumlin landscapes, hedgerows should not be removed but incorporated as ready-made edges. Where the forest extends down into inter-drumlin flats and lake shores, a generous swathe of suitable broadleaves should be used.

Margin: Where broadleaves do not already exist in field boundaries, they should be established as margins comprising species typically found in the area.

Colour: The relationship of the forest to the surrounding drumlins in regard to colour relies considerably on the incorporation of broadleaves.

Texture: A concentration of broadleaves on lower ground might aesthetically enhance the landscape, not only by adding texture but also by emphasising each drumlin hill.

Typical drumlin landscape.

MOUNTAIN AND FARMLAND COMPLEX

Landscape interpretation: Landscapes comprising mountain moorland on upper ground falling through marginal land and on to farmland at lower levels, are very common in Ireland. The farmland will usually comprise either rolling hills or a plane of patchwork fields which sweeps up forming a continuum with the open mountainside. The strip of marginal land running between these two landcovers is typically identified by bracken, rush and scrub.

Size: Generally, the size of forests should reflect that of moorland rather than the small scale of agricultural fields. Larger areas of cover, therefore, are more desirable.

Arrangement: A continuous covering of forests is preferable on higher ground, with more scattered plantations on the lower farmland.

Location: It is important to set back forests from peaks and ridges as well as houses and farmsteads. Otherwise, location is usually not critical.

Shape: Where it extends up into open moorland, the forest should respond in a relaxed rounded way. On lower slopes, internal shapes should reflect those of the adjacent agricultural fields.
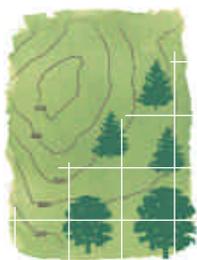
Pattern: Where possible, hedgerows should always be retained. These broadleaf bands can form compartment boundaries and can ascend right through the forest to link with the open moorland. On higher slopes, the forest should be patterned with some open spaces.

Proportion: The 'patchwork quilt' of fields should help determine the proportion of open spaces, recesses, projections and subdivisions within the forest.

Edge: The edge should become more diffuse and open structured as elevation increases. Straighter

delineation is more acceptable along the edge flanking agricultural fields.

Margin: Strive for diversity of species throughout, especially on lower ground where soils are better.

Colour: Species selection should respond to the tapestry of different colours of moorland and farmland by incorporating broadleaf species and larch.

Texture: Where possible, avoid even-aged forests of limited species. The retention of hedgerows will introduce textural variation and visual interest.

LANDSCAPE RECOMMENDATIONS FOR FOREST HARVESTING

Each of the different stages in the forest rotation brings about changes in the landscape. Clearfelling is perhaps the most critical of these, as it results in the rapid removal of tree cover and the sudden exposure of scattered brash, soil and boulders. Outline landscape guidance concerning clearfelling for each of the four landscape types is provided below.

Mountain and farmland complex.

ROLLING MOORLAND

In moorland, where ground is often barren and visually exposed, clearfelling can create a severe adverse landscape impact. This usually results from the clearfell area being too large, angular and visible. Where windthrow considerations allow, clearfelling should be phased and felling coupes rounded in shape.

ROLLING FERTILE FARMLAND AND DRUMLINS

Clearfelling in farmland and drumlins is typically not as sensitive as it is on moorland. The sense of landscape utility through farming activities lends an ethos of human process and change, thus increasing acceptability.

MOUNTAIN AND FARMLAND COMPLEX

Small forests located along the interface of mountain moorland and farmland and with an area roughly equivalent to two or three times the local field size, can usually be clearfelled without undue adverse visual impact. Harvesting should be phased in larger plantations. Felling coupes located close to farmland can be angular in shape. Those at higher elevations should be more curvilinear, and can be somewhat larger than those lower down the slope.
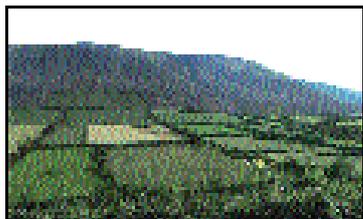
BRASH

Brash left onsite after clearfelling can be very unsightly, particularly if the forest flanks a scenic route. Where possible, brash should be screened from view. Clearfelling should be carried out early in the season, to facilitate reforestation and to allow the site to 'green over' quickly.
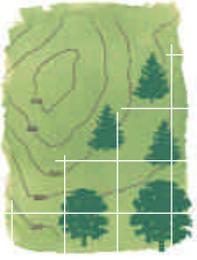
ALTERNATIVE SILVICULTURAL SYSTEMS

The use of group, selection and shelterwood silvicultural systems will usually mitigate the negative landscape impact of harvesting. Where windthrow considerations and site conditions allow, these systems should be considered, particularly for sensitive locations.

PUBLIC REASSURANCE

It is important to inform and reassure the public, including the local community, interest groups and adjoining residents, that disturbance arising from felling is temporary in nature and that the forest will be replanted within a short space of time. Such reassurance can be communicated using well-designed signage and through informal dialogue. Such communication clearly demonstrates that the land owner cares about local concerns, and helps to raise the level of public awareness and understanding of forestry operations and practice.