4.6 SPECIAL DESIGN CONSIDERATIONS

4.6.1 SKYLINE TREATMENTS

Skylines and ridges are always visually sensitive and should be treated on a large scale. A strong forest cover should be maintained either by not logging at all or by a form of selective logging (see below), or else should be cleared sufficiently to reveal the shape and scale of the hill top. This option can only be used in landscapes where bare hilltops are found naturally. If logging does cross a skyline, it should do so in a saddle, not on the apex of a ridge or on a slope where visual tension can result.

In this landscape the large unit is out of scale (too big) and of poor shape, while the fringe along the skyline is far too weak. This practice should not be repeated. Meanwhile only marginal improvement can be made now without removing most of the forest from the hill. This is a focal, short distance view and is obviously prominent with the snow. Nelson Forest Region.

The fringe left standing on the skyline creates a vertical edge right on the summit of the hill. This is the most awkward place possible to break the skyline and should always be avoided. Such edges are also prone to windthrow.

In this example a weak fringe and a poorly shaped and scaled harvest unit combine to produce a very intrusive effect. Huy 33, Kamloops Forest Region.

Possible alternative: the trees on the skyline should be removed and extra logging carried out to improve the shape and scale. Fairly spiky shapes are appropriate on this broken terrain.
A clear cut unit creating a problem near the skyline due to a narrow fringe left which is out of scale. Narrow units and narrow retained belts like this should be avoided. Lumby, Kamloops Forest Region.

Possible alternative: although creating more impact now, this solution once greened up will restore the scale for the future.

A good example where a clearcut has taken a whole cap off to reveal a strong feature which looks as though it should be naturally bare. However the lower margin is a little too horizontal and at the right the edge could slip into a deeper saddle as it does on the left. By contrast the unit on the left of the picture leaves a narrow cap with an awkward horizontal margin beneath. Salmon Arm, Kamloops Forest Region.

Possible alternative: this sketch shows how the bare cap could look more natural, and how the retained cap could have been designed.
4.6.2 ROADS, TRAILS AND OTHER SITE DISTURBANCES

After the layout of shape and scale of clear cut units, it is the impact of roads, trails and the logging residues that attract the most criticism. It is undeniable that the costs of infrastructure needed for logging is a sensitive part of the overall equation, and that unit shapes must be designed so that they can be efficiently harvested. It is no good if a well designed unit can only be harvested if a maze of secondary trails is needed to access complicated areas. Equally, it is unacceptable to resort to geometric shapes if road and trail construction is to be kept to a minimum.

Even though there are lots of trees left on this harvest unit, the multitude of trails spoil its appearance. These may cause other problems such as erosion. This effect must be avoided, if need be by more clearance and better unit design to avoid complex harvesting patterns. Vernon Forest District, Kamloops Region.

The logging trails on this harvesting unit create a very intrusive effect which lasts a long time unless restored. Williams Lake, Cariboo Forest Region.

This logging debris lies close to a public highway. The untidy appearance and the impression of 'wasted timber' create an unnecessarily bad impression. Hwy 37, Prince Rupert Forest Region.
The landing in the foreground of this view should be reinstated so that its shape, the bulldozed banks and logging residue do not linger on after the rest of the unit has greened up. Nazko, Cariboo Forest Region.

Logging debris has been kept to a minimum in this roadside unit which reduces the visual impact considerably. Consider good housekeeping like this as an integral part of logging operations in foreground areas. Fort St John Forest District, Prince George Forest Region.

Light logging debris and a flush of herbaceous plants has reduced the impact of logging in the immediate foreground. Ellis Creek, Kamloops Forest Region.
• Clearly some terrain and some harvesting systems are more forgiving. Rolling terrain and small tree size can enable wheeled vehicles to travel over the site using frozen conditions to avoid site damage. In such circumstances the shape of the block and the layout of the road networks are fairly flexible.

• At the other extreme, large tree size and difficult terrain may justify the use of helicopters in which case the site will be left scar-free.

• Of the systems used to harvest steep ground with a large average tree size, snorkels and hoe-chuckers present few problems. Grapple yarders should be able to harvest most shapes as long as there is some flexibility in the operating team with regard to moving the rig, especially the use and position of mobile back spars.

• If the method of progressing the yarding is to move the grapple yarder along the road together with the mobile back spar on a parallel track, then geometric shapes will result. Therefore, there needs to be a little more effort and expense used to move the mobile back spar and to use trees as back spars where more complex shapes are desired. Given that larger units may be possible if they are well designed, then scale economies may well work out to advantage.

• In other circumstances, skyline systems should be used, ideally fitted with locking carriages. These have a longer reach to enable some of the more extensive shapes to be reached and also have some sideways reach to extract from shaped side margins of units and from thinner areas.

• Alternatively, helicopters can be used in combination with the above to extract the less accessible areas.
A comprehensive plan looking at the pattern of units and phases of harvesting over a number of years should be drawn up. This gives companies a chance to plan their extraction machinery to suit the volumes and conditions, making it more worthwhile to invest in skyline or helicopter yarding facilities and skills than otherwise might appear.

The road network, a major investment, is clearly sensitive in terms of length per unit of volume felled. However, the after effects of poor road construction on difficult terrain need to be addressed on more grounds than visual quality. The scars produced by the side-casts, landslips and excavations for hairpin bends look ugly as well as causing siltation and water pollution. Where roads are planned and constructed to take account of environmental needs from an early stage, any additional costs are usually modest. Mistakes can be very costly to reinstate.

While the major landslip is natural, the road lines and their slides would persist while greenup takes place. The upper road is more intrusive and should be restored and planted over as soon as possible. The slips should be restored if possible. The lower road will blend in sooner than the upper one because tree growth is faster. Vancouver Forest Region.

Old roads which have colonised with alder. Even when second growth is well advanced the road lines stand out in this way. Logging some of the alder to break up some of the lines would help. Inside Passage. Vancouver Forest Region.

The principal visual considerations are the position of the road in the landscape, the shape of the vertical and horizontal alignment and the treatment of the cut and side cast. Visualizations of proposed roadlines are essential although difficult, since the route will invariably be amongst the trees, and the final detailed route is often not set until the road is under construction.

- The selection of the routes for forest roads should be unobtrusive. The routes should be chosen to make as much use of landform as possible - less visible areas, folds or benches in the landform or elements such as areas of broadleaves which are not going to be felled.

- Avoid, if possible, small-scale landscapes with strong *Genius loci*. Roads should always be kept well clear of wildlife habitats where they may break the continuity of the canopy or ground vegetation.

- Focal views, water edges, waterfalls and watercourses of particular quality should be crossed at the least visible point. High standards of design and construction must be achieved in these sensitive locations.
The visible parts of the road should be in scale with the landscape. Roads should not run close to the skyline for long stretches and should cross skylines as near as possible to the lowest point or in a slight hollow.

- Steeper slopes should be avoided even if stable, as should large areas of cut and side cast in narrow valleys.

- The general alignment should be diagonal to the slope as far as technical constraints permit. Where there are a number of possible routes they should be sketched from the main viewpoints and compared.

- Landings and turning points should be sited, as far as possible, where natural gradients provide space and not positioned on prominent spurs or ridges. This is important on steep ground where large areas of fill are needed.

- Like other lines in the landscape, the shape of the road affects its appearance. The line should curve gently and blend with the landform, inflecting downwards on convex slopes and rising slightly in hollows and valleys. The latter is important in ensuring that roadside drains do not discharge directly into watercourses (see various provincial and regional guidelines on road construction specifications).
Ideas for designing the roads into the landscape.

The cut and side casts can appear ugly because of their geometric shapes, exposed mineral soils, light raw colours, and large scale. Alignment planning should minimise cut and fill to reduce costs and it also reduces unsightly appearances. As well as end hauling to remove the side casting, the profile of the cut needs attention to prevent it from becoming too regular.

- Cuts can be made less intrusive by imitating a natural profile. Where rocks are soft, cuttings should be made with rounded banks and tops sloped off to ease vegetation establishment right down to the edge of the ditch. This avoids overhanging turf which can cause a dark shadow line.

- Cuttings in harder rock should avoid precisely even faces. Strong irregular shapes more akin to natural rock outcrops should be the aim. The natural bedding of the rock can show through, introducing variations in light and shade, and providing ledges where debris can collect and plants become established.

- Similar measures apply to borrow pits and quarry faces.

A road pattern in a rocky landscape. It has some impact but less because of the high visual absorption capability. Vancouver Forest Region.

Some work on the larger cuts to make them look more natural and restoration on other areas to break the line would be sufficient for the lower level roads while the upper ones should be restored as far as possible.
Re-establishing vegetation on spoil is another useful treatment, but the type of vegetation needs to be carefully chosen. Grass seeding may change an intrusive shape from grey to bright green unless the surrounding vegetation is identical in colour. Reinstatement of roads to natural profiles by replacing the side cast material on the benches causes similar effects which may last for a long time.

The close view of this large scale road cut creates a visual impact. If not revegetated quickly, the impact will last for a long time. Continuous erosion following frost may cause natural colonization to be slow. Prince George Forest Region.

This road cut has been vegetated with clover. This covers the scar quickly but may cause problems for native plants in their attempt to colonise the slope, due to competition.

4.6.3 UTILITIES

Powerline and other service corridors require open space, the visual impact of which depends on the width of clear ground required. Narrow gaps for pipelines or low voltage local powerlines need not be unsightly provided they do not cut vertically across contours or follow the line of sight from important viewpoints. High voltage lines require greater widths and the resulting ugly, parallel-sided corridors are very often a much greater eyesore than the towers carrying the line.

A powerline, straight and parallel which contrasts sharply with the natural, interlocked shape of the lake nearby. An aerial view shows the dramatic shape which would only be evident from end views on the ground.
The impact of the poles can be great close up but at a distance it tends to be the shape of the corridor which has greatest impact.

Design of new powerline corridors should have regard to:

- **Visual sensitivity.** Keep the line away from landscapes of high quality, or which affect or are seen by large numbers of people, as far as possible.

- **Position.** There will be less visual impact if the line follows depressions; in particular, the line should not pass directly over or close to a hill summit and divide it into two similar parts, but should cross the skyline where it dips to a low point.

- **Direction in relation to landform and views.** Alignment should be diagonal to the contour as far as possible and should not follow the line of sight of important views. If possible the line should be inflected up hollows and down in ridges.

While the routing of new corridors is the responsibility of BC Hydro, nevertheless there is an impact on the forest and a loss of its natural quality. Their design can be an important part of the complete landscape.

Powerline route planning requires different options to be considered in terms of aesthetic merit and cost. In assessing options sketches should be used in which the design is set out, in broad terms at least. Different routes allow different standards of detailed design to be achieved and the two cannot be separated.

- **Within the forest** the powerline should seem to pass through a series of irregular spaces. The trees should appear to meet across the open space in some places so that the corridor does not split the forest completely.

- **While allowing for the safe engineering requirements** to avoid damage from falling trees or flash-over in wet conditions, an even width of corridor is not obligatory because trees can be planted closer to the line opposite towers than in mid span, where the line hangs lower and swings more.

- **Smaller shrubs and trees can be grown closer still,** as an extension of the forest edge towards the powerline. This edge should be designed to create irregular spaces with irregular tree heights, avoiding vertical edges.

- **The aim should be a corridor of varying character and width,** swinging from one side of the line to the other, taking care to avoid irregular but parallel edges or irregular but symmetrical space.

*Typical engineering requirements near powerlines.*
There are also examples of existing powerlines which have a negative impact on the landscape. Some of these are problems because of both the alignment of the line and the way the corridor is treated. While it is not usually possible to change the alignment unless the line is rebuilt or upgraded, there are improvements which can be made to the corridor shape. This may well involve radical reshaping of the edges at the right scale for the landscape, together with more flexible management of the resulting space to avoid the severe contrast commonly found.

The steps in designing service corridors in the forest are:

1. Prepare plans and sketches to show limits of restrictions on the presence of trees and shrubs, and to show visual forces in landform.

2. Identify areas where the forest edge can be placed nearest the line so that forest appears linked across the corridors.

3. Design irregular corridors at the right scale to create asymmetric spaces.

4. Design irregular groups of smaller trees and shrubs to link across the space.

5. Where appropriate, plan logging units to link with the corridors and create greater irregularity.

In addition, the impact of the towers can be reduced by painting them matt dark olive where they are seen against a backdrop of forest.

Pipelines for oil and gas require similar routes and corridors. They possess two advantages over powerlines. Firstly, the routes can change direction more frequently so that the alignment can vary, secondly there is no visible structure in the corridor itself so that a much more natural result can be obtained.
A dome shaped convex hill where the triple powerline corridor is positioned for maximum visual intrusion, breaking the skyline at the apex of the summit. The shape is parallel and perpendicular to the contour. Near Castlegar, Nelson Forest Region.

A solution by logging to reveal a more organic asymmetric shape composed of diagonals solves the major problems.

Landform analysis.

Additional improvement can be made by planting shrubby species in places, especially right under the cables if possible to break up the corridor and restore unity in the landscape.
A landscape of rough textures and broken landform. The powerlines cross in a reasonable place on the skyline. The landscape offers some possibilities to obtain a better blend of the lines into it.

Landform analysis.

A solution by improving the shape and diffusing edges to reflect the textures will help to absorb the lines into the landscape. Some shrubby species beneath some of the line in places creates more interlock.
A powerline running alongside a lake creating a slightly diagonal line which dissect the landscape horizontally.

Landform analysis.

Possible solution.
4.6.4 FOREST HEALTH

Insect pests and fungal diseases frequently attack areas of forest. In the name of good hygiene or on the grounds of salvaging timber, or in order to prevent the spread of pests and diseases, it is common practice for such areas to be harvested using clear cut or partial cut silvicultural systems.

- Examples exist where such clearances have resulted in rectangular openings which look exactly like a timber harvest. It is possible to take a less draconian approach and to carry out logging in such a way that the forest is barely disturbed or else the texture blends with the rest of the forest.

- The design of such areas should start with the outline of the affected area traced on a perspective photograph. This basic shape can then be tested to see if it is acceptable or else modified to fit the landform as described above.

- A few sound trees can be felled or less infected ones left to help increase the quality of design. Selective logging to leave healthy or risk-free trees is likely to produce the best results.

*This unit was felled to salvage timber after a pine beetle infestation. It has become rectangular and looks out of place. Prince George Forest Region.*

*In this example a beetle infestation was dealt with by removing the infected trees together with stressed ones which presented a risk. The result is an organically shaped patch of variable density which blends in very well. Prince George Forest Region.*
An area of forest in a highly sensitive landscape which has been infested with spruce budworm. Logging could have a serious effect on the visual quality unless properly designed.

Landscape character analysis.

Proposed solution. Selective logging of diseased and at risk trees are taken within a designed shape. Sufficient cover is maintained to present a forested appearance.
4.6.5 SILVICULTURAL PRACTICES

There are examples of old cut over or logged areas which have 'brushed up' with broadleaves such as aspen and birch to the extent that it is silviculturally desirable to remove this and replace it with productive conifers.

- If the old clear cut was originally geometric in shape and did not fit the landscape, then the visual result of clearing the brush will be exactly the same as if it were recently felled and may provoke the same adverse reaction. This can be avoided if the clearance work takes landscape design into account.

- The design may seek to extend or enlarge the site beyond the former boundaries in the same way as proposed for rehabilitation of more recently felled areas described in section 4.7. The presence of the brush, possibly mixed with established conifer, enables the result to be considerably softened by retaining a percentage of cover, particularly in groups of variable density nearer to some of the edges. This overstorey can be removed once visually effective greenup has been achieved.

- These operations also provide the opportunity to reduce the impact of former roads and trails which often brush up with very dense growth so that their lines are still evident years after they have been abandoned. (see Section 4.6.2).

Site preparation following harvesting needs thought, especially if broadcast burning is normally employed. For a variety of reasons this is not used as much as it was so that more complex shapes, islands, groups and individual trees left within units need not prove the problem for burning they once might have. The risk of escaping fires, fringe burns and the impact of scorched earth itself should be considered for their visual impact.
4.6.6 PRIVATE LAND OWNERSHIP BOUNDARIES

In some areas the forest landscape comprises crown forest land above areas of private land or else includes islands of private land such as Crown Mineral Claims. The boundaries, if adopted as edges to harvesting units, may often result in geometric, angular shapes which conflict with the landform. If private owners can be persuaded to cooperate with the Ministry of Forests or licencees, then there may be the opportunity to adjust such shapes. Another option is for harvesting units to be designed within the boundary so that small areas are left unlogged to soften the shape. If the private owners cut their trees then the retained parcels can also be cut.

The vertical straight line up the foreground slope stands out as an intrusive shape. The owner to the left has harvested many of the trees on his land while the owner to the right has not. Shuswap Lake, Kamloops Forest Region.

A diagrammatic example demonstrating how some private land boundaries may create visual problems if logging follows them.

If a boundary to logging is designed within the Crown land close to the ownership line and following landform, the visual problem can be avoided. Such retained areas can only be logged if the private owners below do so.