



Instructions

Roads and the Cultural Environment



Directorate for Cultural Heritage

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E6 Kvam. Photograph: Arve Kjersheim, NIKU



Norwegian Public Roads Administration

DIRECTORATE FOR CULTURAL HERITAGE

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Preface


The cultural environment is the landscape which has been influenced by man - cities, towns and villages. We often take our surroundings for granted and assume them to be unchanging, but they are constantly altering. Having lived for thousands of years in and indeed dependent upon nature, our society has altered dramatically in the last 150 years. The majority of us live in cities and towns and now only a minority live in the country. Machines have made our lives easier. They have enabled us to make major changes to the cultural environment in a short space of time. Mechanisation and greater efficiency in agriculture have altered the landscape of the countryside. The expansion of the transport network has left its own, visible tracks. Cities and towns have grown enormously.

Our history and evolution can be read in the cultural environments which surround us, in burial mounds from the Bronze Age, in mediaeval churches, in the stone walls surrounding our fields, in the street plans in our cities, in the fishing ports and in magnificent and imposing buildings. Our cultural environment tells our history but in a way which requires interpretation. The cultural environment is our physical history book.

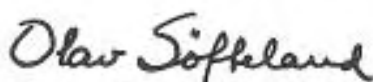
Modern road transport is a vital condition for today's high standard of living. A well-developed road network is necessary for effective transport. Since the 1970s, the majority have had access to a car. It is seen as a general social benefit, giving individuals the freedom to choose where to live and work, and to travel. This has led to a huge increase in the amount of traffic, which in turn means that the standard of many roads and streets is too low in relation to modern requirements and the amount of traffic. Many local communities still lack good connections to the road network. There is, therefore, still a great need for road construction and improvements.

Road construction means change. Roads change the landscape, the town and the city, both directly and indirectly. They change our physical history book - irrevocably. Our own age has a right to be included in this history book, but space is limited. If we put something in, something else must often be taken out. This must be done with consideration and respect for the traces left by our ancestors.

This handbook deals with roads and their relationship with valuable cultural environments and historic monuments and sites. It gives an insight into the assets which surround us in the cultural environment and offers examples of how road construction can be adapted to existing cultural environments. The handbook has been produced jointly by two directorates. It is our hope that the handbook will provide greater knowledge and a better understanding of each other's fields, tasks and assets. We believe in close co-operation from the first planning phase until the road is complete. In this way, unnecessary conflict can be avoided. We are convinced that the physical result of road construction will then be better.



Director General for Directorate
for Cultural Heritage



Director General of Public Roads

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Summary

What are cultural monuments and cultural environments?

The Cultural Heritage Act defines cultural monuments and sites and the cultural environment as follows (chapter 1):

"Cultural monuments and sites are all traces of human activities in our physical environment, including places connected with historical events, beliefs or traditions."

"Cultural environments are areas where historic monuments or sites form part of a greater entity or context."

The Act gives a further definition: "According to this Act, monuments, sites and cultural environments which are valuable historically, culturally or architecturally, can be preserved."

This is a very comprehensive definition. The challenge in the relationship between road development and the preservation of cultural monuments lies in evaluating the cultural monuments and cultural environments against other interests.

An important dividing line in the Cultural Heritage Act is the year 1536 (the Reformation). Monuments and sites which date from before 1536 are automatically protected and are described as automatically-protected cultural monuments.

Monuments and sites which date from after 1536 are called post-Reformation cultural monuments and can be protected by invoking a protection order. Some monuments and sites more than 100 years old are automatically protected. Underwater shipwrecks more than 100 years old are also automatically protected.

Examples of pre-Reformation monuments and sites and cultural environments are dwelling places, graves, hunting facilities, iron extraction constructions, churches, churchyards, cult sites and remains of mediaeval towns. Many such sites lie hidden below the surface and are difficult to discover. Only a small fraction of

these automatically-protected monuments and sites are known today, perhaps as few as 5%.

Trading posts, fishing ports, lighthouses, industrial sites and factories are examples of post-Reformation cultural environments. Farms, with their cultivated lands and grazing areas, are other forms of cultural environments. Cities and towns have also expanded since the Reformation.

The Roads Department itself has a number of valuable cultural monuments. Most typical are old bridges and early roads such as the "King s roads". The first road in Norway was built in 1624 between Hokksund and Kongsberg. There were also "roads" before this date, but they were paths and were used by people on foot and on horseback. Traces of these can be found in the form of depressions in the earth and are called sunken roads.

The cultural environment is what has been created by human hands in our surroundings and forms a vital framework for human life, behaviour and activities.

When roads and historic sites meet

It is easy to concentrate on major new road projects and the effect they have on the cultural environment. Modern requirements for road standards lead to major incursions into both countryside and buildings in many places. Historic monuments and sites and cultural environments must dictate the terms for the development of areas and places. It is therefore a challenge to find routes which disturb valuable cultural environments as little as possible. It is important to take time in the planning process to find the best possible adaptation between roads and cultural environments. In particularly valuable cultural environments this may involve a reduction in standards or employing solutions which are more expensive. This is illustrated by examples in chapters 3 -7.

Major road projects, particularly ferry-free links and ring roads also indirectly affect the cultural environment, because of the resulting changes to the road and transport structure. This leads to growth in some areas and stagnation in others. Both will eventually lead to significant changes in the cultural environment (chapter 2). It is important to be aware of this in the planning process and particularly at the clarification and district sub-plan levels.

Minor projects, such as alterations to crossings and streets, widening and straightening roads and building cycle paths and pavements, may also have a major impact on historic monuments and sites and cultural environments (chapters 8 - 13). Large amounts of traffic can actually destroy cultural monuments through vibration and pollution. Old wooden houses may suffer cracks in the wallpaper, windows and walls. Maintenance measures such

as salting, spraying and snow ploughing up against wooden buildings can destroy buildings which should be preserved.

What is valuable and what should be preserved?

The Cultural Heritage Authority has moved from an object-oriented viewpoint to an overall viewpoint, and is a vital element within environmental protection (chapter 14). Cultural heritage is a "non-renewable resource". The work is based on five principles drawn up by the Bruntland Commission:

- sustainable development
- environmental protection as a cross-sector responsibility
- the sector principle regarding independent responsibility
- the before and after principle
- cost efficiency

Sector responsibility implies that all sectors of society, including the Public Roads Administration, are independently responsible for managing historic monuments and sites and cultural environments in the best possible way for current and future generations. Protecting monuments, sites and cultural environments requires that certain elements must take priority over others. In dealing with the preservation of historic monuments and sites and cultural environments, such monuments, sites and environments are usually given one of the following classifications: national asset, regional asset or local asset.

Monuments and sites dating from before 1537 are automatically protected by law. Dispensation can be granted for intrusions into such sites as a part of the planning process. In such cases, the developer must pay for any excavation work.

Post-Reformation monuments and sites and cultural environments can be protected by invoking a protection order. This will only be possible for some sites or environments which are of national importance. Protection is also possible by designating the area "protectable" in accordance with the Planning and Building Act (PBL). Nonetheless, a large number of valuable monuments, sites and cultural environments will not receive any form of protection. Protection must be ensured through use. Thus it is important that framework conditions are formulated for rational use, i.e. so that new road projects do not make the desired use difficult to achieve.

In evaluating the preservation value of historic sites and cultural environments, a total evaluation must be made of a number of different sub-values, of which the first three are the most important: representivity/rarity, variation/ homogeneity, authenticity, identity value, symbolic value, historical source value, age,

environmental value, educational value, beauty value, artistic value and use value.

Co-operation and the planning process

In accordance with the Planning and Building Act (chapter 15 and 16,) the Cultural Heritage Authority is the hearing authority in road planning. This will ensure that cultural interests will be best served. If important monuments, sites and environments are threatened, objections to the plan may be made. However, it is better to avoid conflict wherever possible. This can be achieved through close co-operation between developers, the Cultural Heritage Authority and the district council from an early phase, at all planning levels.

It is particularly important to co-operate early in the district sub-planning level. It is at this stage that the route is chosen, and many of the consequences for the cultural environment are decided. At this level, the planning area may be so extensive that it is impossible to carry out comprehensive archaeological surveys. It is a major challenge for the Cultural Heritage Authority to evaluate the probability of finding archaeological remains at a later stage. At the same time, cultural environments within the planning area must be registered and their protection status evaluated.

The main challenges for the road planner are to:

- **Be aware of and understand the values inherent in the existing cultural environment, in co-operation with the Cultural Heritage Authority.**
- **Allow cultural monuments and cultural environments to influence new construction and improvements to existing roads and streets.**

Figure 1.1: Dwelling from the Early Bronze Age. The banks of the wall, scarcely visible in the rectangular site, rise above the ground around the figure in the middle of the house. From Rennbu, Sør-Trøndelag. Photograph: Kristian Pettersen



1 Cultural environments, and historic monuments and sites

Introduction

"*Historic monuments and sites* are all traces of human activities in our physical environment, including places connected with historical events, beliefs or traditions." This is the definition given in the Cultural Heritage Act. It is a very far-reaching definition, including everything surrounding us which has been created by human hand, from the first dwellings to today's constructions, and forms an important framework for human life, behaviour and activities.

An area where historic monuments or sites form part of a greater entity or context is called a *cultural environment*. It is important, when dealing with the concept of cultural environment, that historic monuments or sites are not just seen as individual objects, but that their context as a whole is important for their value as historic monuments and sites, such as a farm with its associated fields and outlying pasture land, or a town on the coast with the links between dwelling house, boat house, jetty and the sea as an industrial route. There is a close connection between the cultural environment and the landscape.

The task of the Cultural Heritage Authority is to ensure that society safeguards a selection of historic monuments and sites and cultural environments which display the typical, the best and the unusual from different eras in all areas of the country. Together, they will tell future generations how the country has developed since it was first populated and contribute to the general development of the cultural environment in a positive way.



Figure 1.2: Burial mounds at Male in Møre og Romsdal. The road runs through the burial ground, but today it would have been routed outside it. Photo: Anne Trine Hoel

Historic monuments and sites from early times, that is, before the Reformation in 1536, are automatically protected by the Cultural Heritage Act and are called *automatically-protected historic monuments and sites*. These include dwellings, graves, hunting facilities, iron extraction facilities, churches and cult sites, together with remains of mediaeval towns. Sami monuments and sites more than 100 years old are automatically protected by law. Underwater shipwrecks more than 100 years old are also automatically protected.

Historic monuments and sites from 1537 onwards are called *post-Reformation monuments and sites*. Example of these include trading posts, fishing ports, lighthouses, industrial sites, farms, crofts and other buildings of a high architectural standard. The Road Sector itself has a number of valuable historic monuments and sites, such as the "King's roads", various ancient bridges, coaching stations, old fillingstations etc. Examples of typical historic monuments and sites and cultural environments can be found in this chapter. Chapter 14 deals with the prioritising of assets in evaluating the preservation status of historic monuments and sites and cultural environments.

Typical historic monuments and sites and cultural environments from early times (circa 10,000 B.C. - 1537 A.D.)

Dwellings. During the Stone Age, dwellings were caves, tents and simple huts. Today, implements are often all that are to be found on the sites of the oldest dwellings. A normal construction method for the first types of houses used wooden frameworks of massive logs with thick layers of turf or stone for insulation and walls. The wood is long gone. The sites can sometimes be identified by low turf mounds in the terrain, but usually there are no visible remains of the dwellings. By scraping away the uppermost layer of earth, remains of the old framework can be seen in the form of dark, round patches (*post holes*). A great deal of historical material can be found in and around dwelling areas. Fireplaces may indicate how food was prepared and what implements were used, and charcoal can indicate the date. The midden on the edge of the dwelling area shows what the inhabitants ate, and what kinds of materials they used for weapons and tools.

Typical locations for early dwellings are along the coast line, on river terraces in the valleys, in towards the crest of a hill and at

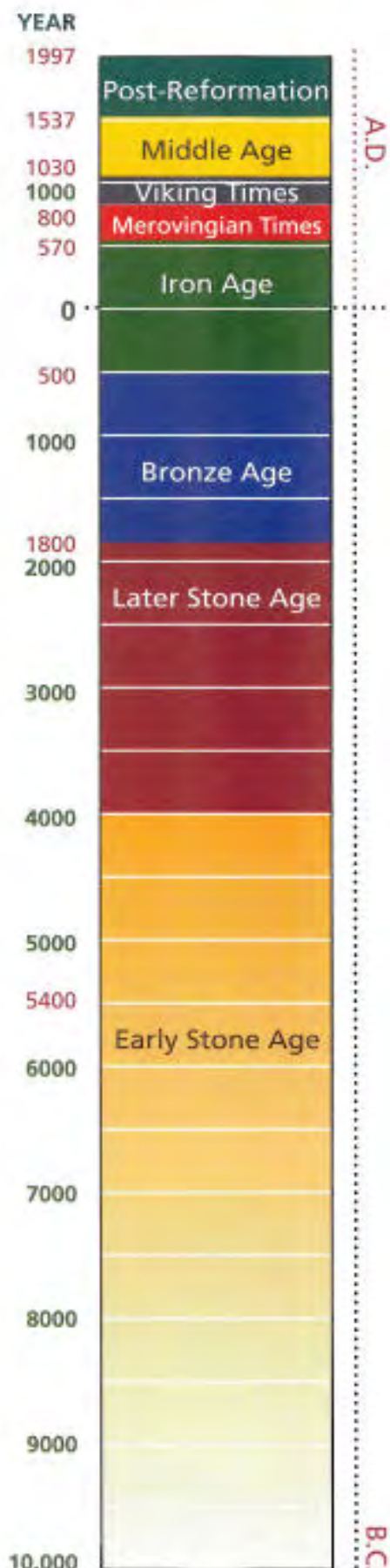


Figure 1.3. Timescale



Figure 1.4. In the reindeer grounds in Northern Norway, large hunting pens were used, where the animals were scared or hunted into the pen, which could be an enclosure, a cliff or a lake. Large numbers of reindeer could be caught and slaughtered. Special storage pits were constructed to store the meat at the hunting site. This Sami hunting pen is at Noaidecearro on the Varanger peninsula, and has a diameter of circa 130 m. It is one of the largest Sami cultural sites. Photograph: Hans Kr. Eriksen

the back of moraines, always in areas with well-drained land and very often in sheltered spots. Outside the dwelling areas, other evidence from the period can be found, such as areas where stone and other materials were worked. These *find sites* offer valuable insights into ways of life and the way in which the area was utilised.

Graves. The practice of burying people in *burial mounds* goes right back to the Stone Age. The burial mounds were often constructed so that they were easily visible from routes used at that time, along the coastal paths or beside important paths or routes. The burial mounds could also be used to mark a property. The biggest burial mounds are the chieftains' burial mounds from the Bronze Age and the Viking era. There are also simple *flat graves*, which are very difficult to discover. In other places, numerous graves are clustered together in *graveyards*. Along the coast, graves can be found in the form of grave cairns, large and small piles of stones, often on bare rock.

Hunting facilities. In order to make hunting more effective, hunting pens were developed at an early stage. One form of hunting pen is the hunting trap, or pit, systematised with guiding fences made of branches with stones lying in between. Such constructions can be found in areas of forest, in the mountains, and, in Finnmark, on beach terraces along the coast. The majority of such hunting constructions of which we are aware probably date from the Middle Ages but this method may have been used in the Stone Age.

The hunting pens were constructed in the animals' migration paths, very often the same migration paths which are used today. New road construction in outlying pasture may come into conflict with such remains, because of their huge area. In



Figure 1.5 Excavated iron extraction plant with smelting oven in the centre of the picture. From Helgesvollen, Levanger. Photograph: Lars F. Stenvik



areas where animals migrate today, there is a good chance of discovering unknown hunting pens. Indications of such pens can be mounds in the terrain and stone walls in outlying pasture.

Early industrial remains. Quarrying was already known as far back as the Stone Age. Stone was used for weapons and work tools. Later, cooking pots were made from soapstone and millstones from other forms of rock. Tar making was another industry. In recent years, cave depressions, used in the manufacture of oil from seals and whales, have been discovered along the coast. Iron extraction sites are perhaps the best-known. They are based on bog iron. Typical signs of iron-bearing bogs are rocks which are a reddish-brown colour, and an oily film on the water. Such a construction comprises a kiln (for making charcoal) and ovens. The oven was often dug down into the hillside, lined with stones and lay on the edge of a slope close to the bog. Today, the sites are overgrown and covered with grass and are difficult to discover.

Cult sites and churches. We know that the earliest sacred sites or sacrifice sites may have been groves, lakes or hills, ideally located high up in the landscape. This is a feature of worship which has its roots far back in the days before man started building special houses for the sacrifice ceremony. In the Later Iron Age, the fertility cult was succeeded by the cult of the Norse gods, where the sacrificial ceremony took place in a temple which could be a separate building or a part of another building.

Figure 1.6. Alstadhaug church occupies a commanding position on a ridge between the Trondheimsfjord and Eidsbotn. The church is surrounded by a graveyard and the vicarage. Together with the agricultural land surrounding it, they form a complete cultural environment spanning many centuries. Levanger, Nord-Trøndelag.

Photograph: Kolbein Dahle.



Figure 1.7 Thirteenth-century site reconstructed on the basis of archaeological research on the site of the Public Library in Trondheim.
Illustration: Snorre Bjerck.

With the introduction of Christianity, the Church grew to be a considerable power within society. The payment of tithes to the Church gave the Church enormous economic wealth. This is mirrored in the form of the churches and in their central location in the landscape. Thus it is important to safeguard not only the church itself, but also the cultural landscape which surrounds it, including the churchyard, vicarage or manor house.

Mediaeval cities. The oldest cities in Norway are Trondheim, Tønsberg, Sarpsborg, Oslo and Bergen. The cities have undergone growth, stagnation and conflagration. New houses and streets are often built on the ruins of old houses, so that remains from the Middle Ages are invisible today. Several thick layers of remains from earlier constructions (*cultural layers*) may be hidden beneath the surface. When existing streets and roads are to be rebuilt or expanded, there may be a conflict with remains of streets and houses from the Middle Ages. Little remains in Norway of our mediaeval cities, and any remains which come to light are given high priority.

Figure 1.8 Herandsholmen, outside Herand in Jondal, Hordaland. One of the best preserved and most authentic old inns. Photograph loaned by the County Conservation Officer in Hordaland.



Figure 1.9 One of the few remaining cluster farms, with its associated cultivated land and a pollarded tree in the foreground. Hawrå farm, Hordaland. Photograph: Svein Nord.



Typical post-Reformation historic monuments and sites and cultural environments (from 1537 A.D. to the present day)

Coastal culture. Our coastal culture has many aspects, from fishing stations on the islands to the old trading posts. Here, the cultural environment is influenced by a combination of agriculture and fishing. It contains the history of how people used and managed natural resources both on land and at sea. The oldest trading posts had trading privileges and were operated by townsmen from the 1700s until the last century. They bought fish and sold goods to the fishermen. Coaching stations and inns were located one old Norwegian mile (11,295 metres) apart. Here, those travelling by sea could change oarsmen. After the liberalisation of trade in 1842, the coaching stations were often run in combination with trade. After all, they had originally been built as social meeting points. The biggest inns were used for law cases, council meetings and other official meetings.

Farming. Farms comprised a number of buildings, each with its own particular function (cow barn, hay barn, forge, wash house etc.). The buildings were laid out around a courtyard. The most usual forms were cluster formation, row formation, square formation, double formation and outspread formation. Along



Figure 1.10 Farms which should be preserved as a part of the living neighbourhood society surrounded by cultural monuments and sites, including cave paintings. Hegra, Nord-Trøndelag. Photograph: Kolbein Dahle.



Figure 1.11 View of Alvæn, Hordaland, by Johan Christopher Johnsen, 1808. Industry started here as early as 1620, based on easily-available hydropower and good harbour conditions. A unified site with factories, main buildings and workers' housing.
Reproduction(photo): Egil Korsnes



Figure 1.12 The Cathedral of the Arctic Ocean and the Tromsø bridge are examples of new constructions which have become important symbols for the town of Tromsø.
Photograph: Ulf Haraldsen.

the coast, fishing was a vital part of economic life. There, the boathouse was an important element in the farm. Each small farm often had many small parcels of land which lay mixed up with other small farms as a result of earlier landdivision. As a result of the comprehensive re-allocation of the land at the end of the 1800s, these parcels of land were redistributed and brought together for each individual small farm. As a rule, the buildings were moved out from the common courtyards to the new agricultural area.

Traditionally, fields and enclosed pastures lay close to the farm. Further afield were the outlying fields, hayfields and woods. A continuous flow of nutrients went from the large pasture areas and hayfields to the fields, via the livestock. Long-term pasture and hay production have created a landscape with a greater variety of species than it had originally. Therefore, great natural and cultural environment values are connected with ancient cultivation areas, which can be regarded as biological historic monuments and sites (such as hayfields, heather moors and leafy hillsides).

The introduction of artificial fertilisers and the general industrialisation of agriculture have led to major changes in the agricultural landscape in the form of levelling the land, damm-

ing streams and cultivating woodland. Old stone walls, clearance stones and belts of vegetation have disappeared. The transition from general farming to cereal crops in flat areas has also altered the landscape. Ancient meadows and pastures, invaded by scrub and trees, are being planted, cultivated and fertilised. Old, characteristic forms of cultivated land have largely disappeared or exist only in fragments. It is therefore important that these are safeguarded.

Industrial environments. Hydro power was brought into use very early on for mills and saw mills. During the 1600s, mining began on a large scale, which led to the founding of towns such as Kongsberg and Røros. With the growth of industrialisation in the 1800s came a new economic foundation. Great emphasis was often placed on giving industrial buildings an imposing exterior, and many of them stand out as elegant, monumental buildings. Initially, industry was located in the vicinity of waterfalls (for hydro power) and raw materials. Workers' housing was often built close to the factory. Together, these form a complete cultural environment.



Figure 1.13 The map shows the square lay-out of Kristiansand, as it was planned in 1642. In spite of city fires, demolition of buildings and the construction of roads and harbours, the quadratic format remains much as it was originally planned. Map from the 1600s, reproduced with permission from the National Map Authority.

Figure 1.14 Sami sacrifice circle in Varangerbotn. Photograph: Arve Kjersheim, Directorate for Cultural Heritage

Monuments. Most cultures have used monuments to express or symbolise power, knowledge or belief. Well-known buildings such as the University, the National Theatre and the Royal Palace in Oslo were all important symbols in the development of Norway as an independent nation. Similarly, monuments can be found which are important for regional and local history and identity.

Cities. A number of buildings and other constructions in cities are protected or worth preserving, either alone or in groups. Important historic traces and central elements in this cultural environment include street plans, parks and green areas. Together these form a complete city structure. City areas are dealt with in greater depth in chapter 7.



Figure 1.15 Risalléen in Ås, Akershus. Photograph: Amund Vik.



Figure 1.16 The ancient traffic route, the sunken road, visible as a ditch in the ground. Borre, Vestfold. Photograph: Tom W. Skarre

Sami historic monuments and sites and cultural environments. Sami cultural monuments and sites more than 100 years old are automatically preserved by law. Examples are dwellings, hunting facilities, farms etc. One element in Sami culture is the worship of nature. Nature was regarded as having a soul and being alive. Mountains, rocks and lakes had "life" and could help people if only they worshipped them and offered sacrifices to them. Traces of this can be found in the form of sacrificial stones, sacrificial circles and labyrinths. Mountains and other natural formations may also have been holy places.

Parks and gardens. Gardening knowledge came to Norway during the Middle Ages through the monasteries. In the cultivated areas around monastic ruins, there is often an unusual variety of species which is valuable both from a biological viewpoint and as evidence of our cultural history.

The ideals of the Renaissance gardens, with their symmetric and geometrically-constructed form, reached Norway during the 1500s and 1600s. Not until the beginning of the 1700s did it become common for the wealthy upper classes to have elegant gardens. At the same time, gardens were being created which emulated the impressive French baroque gardens. The French baroque gardens were constructed strictly on symmetric axes. House and garden together formed a complete composition. In Norway, the baroque garden was simpler in form. All that the majority could afford was to plant avenues of trees. Later came gardens in the English landscape style, with winding footpaths, creepers and bushes. Vicarages, old manor houses and large farms may all have very old gardens.

Public city parks date from the end of the last century. Together with gardens and other green areas, they form the city's green infra-structure. These green areas are valuable both biologically and from a recreational point of view, and may also be of value for our cultural history.

Roads as historic monuments and sites

Right up to the Middle Ages, the "roads" were scarcely more than paths which were laid where the ground conditions were best, in gravelly areas, on bare rock, along ridges and in places where it was easy to cross rivers and lakes. These appear today



Figure 1.17 Part of a log bridge at Fisknes, Steinkjer, Nord-Trøndelag. Photograph: Kolbein Dahle



Figure 1.18 The Pilgrims' Way over Dovre to Trondheim is now gradually being restored and marked out. It follows one of the routes which is believed to have been used in the Middle Ages by pilgrims en route from Østlandet to Trondheim and Nidaros Cathedral. The picture shows Krogskogen on the stretch between Oslo and Ringerike. Photograph: Directorate for Cultural Heritage



Figure 1.19 Prior to 1850, roads were usually laid dead straight, paying little attention to gradient. "The Main Bergen Road" over Fillefjell was built as a carriage way between 1791-1792, and it was possible to travel from Lærdalsøyri to Østlandet by horse cart. Maristova, Fillefjell, Sogn og Fjordane. Photograph: Ulf Haraldsen

Figure 1.20 After 1850, roads were constructed with gentler gradients. In steep terrain, roads were constructed with sharp bends, and often with imposing dry stone walls. Lærdal, Sogn og Fjordane. Photograph: Ulf Haraldsen.



Figure 1.21 Following the First World War, aesthetics and landscaping were increasingly included in road construction. One of the ideals was the American "park way". Illustration from Sylvia Crowe: *The Landscape of Roads*.





Figure 1.22 The E18 at Lysaker, Akershus. The top picture shows the road formation at the beginning of the 1960s. It was constructed to a high architectural standard, well-adapted to the surroundings. Photograph: unknown. The lower picture shows the same stretch of road in 1996. Increased traffic and other standard requirements have led to the widening and rebuilding of the road. The road construction with its neighbouring buildings now resembles architectural chaos. Photograph: Amund Vik



Figure 1.23 Engerodden coaching station was once an important artery in a cohesive network of permanent coaching stations. The coaching station is situated at Sperillen, alongside the road between Ringerike and Valdres, and was used as a coaching station from 1866 to 1924. The building also played an important role in local society, as it was used for municipal council meetings. After the coaching regulations were abolished in 1924, Engerodden was converted to a boarding house and was later moved to the Norwegian Roads Museum at Øyer in the 1980s. Photograph: The Norwegian Roads Museum.



Figure 1.24 There are very few old filling stations and service stations left. This filling station from the 1950s in the Modern Movement style has recently been preserved. Luster, Sogn og Fjordane. Photograph: Birger R Lindstad, NIKU.

largely in the form of sunken roads. The paths became depressions in the ground due to rain and erosion. In wet periods, the paths were difficult to use, and very often people walked alongside them. Thus, parallel *sunken roads* were formed. In marshy areas, log bridges were used, tree trunks which were laid across the marsh to make it more accessible.

The roads developed from tracks to paths with a certain minimum width. This was laid down in Magnus Laga-bøter's land law from 1270, but had been a legal tradition as far back as the Viking era. The law required the farmers to maintain the roads. The King required a road network to keep his kingdom together. His servants, clergy, pilgrims and tradesmen were those who travelled most in the Middle Ages. Travel along the road network took place for the most part on foot. Only the wealthiest had horses and could ride. Travel with horse and cart was scarcely practical on the road network of the time, even though carts were known in Norway as far back as Viking times.

The first official road was built in 1624, from Hokksund to Kongsberg, to facilitate the transport of silver from Kongsberg to Copenhagen. In the 1700s, roads were built following French models, as straight as possible. In the undulating countryside of Norway, this could lead to steep hills. From 1850, roads were laid which followed the line of the terrain, so that gradients decreased and it became possible to transport heavier loads. In steep terrain, roads were built with very sharp corners. The standard road width was 4 metres, but in difficult terrain this was reduced to 2.5 metres.

At the beginning of this century, roads were suitable for horse and cart and low levels of traffic. They became inadequate for the increasing amount of traffic in the inter-war years. The width of the roads was expanded to 5-6 metres on the main roads. Increasing attention was paid to aesthetics and to landscaping, and the American "parkway" became one of the ideals. Another example where emphasis was placed on adaptation to the landscape and vegetation are the German motorways from the inter-war years.

After the relaxation of controls on the import of vehicles in 1960, there ensued a huge increase in car sales with a corresponding increase in traffic. The car allowed everincreasing numbers of people to travel. The road network and its supporting structures were not suited to such an increase in traffic. This led to problems in performance and also a large increase in



Figure 1.25 This signpost, dating from 1901, has been moved from its hiding place on the old road to national road 705, on the border between Selbu and Stjørdal. Photograph: Per Løvaas.

Figure 1.26 This arched stone bridge from 1922 was too weak and narrow for modern traffic. The desire to maintain the impact of the old bridge on the landscape was taken into consideration when deciding upon the location of the new bridge. The new bridge was constructed on the north side, where it was least visible from the surroundings, although a counter-argument said that it should be placed on the south side. The old bridge is now used as a foot- and cycle path. Gaulfoss bridge, FV 475 Melhus, Sør-Trøndelag. Photograph: Jens Gjervold.

the number of accidents. New principles for road planning were introduced to counter these problems. The main elements were separation of the traffic groups and differentiation within the road network (main roads, collector roads, local roads), and more stringent access-policies, as well as standardising solutions and road equipment.

Travellers have always needed services en route in the form of food and lodgings for themselves and "fuel" for horses and cars. During the 1800s, a network of coaching stations was established along the official road network. They were located at regular distances and offered food, lodgings, fodder and fresh horses.

With car traffic came an increased need for road services. Petrol stations and garages appeared as new functions. In the early days of motoring, great attention was paid to architectural style, often inspired by classicism (pillars, portals etc.) During the 1950s and 1960s, the car symbolised all that was modern and future-oriented, and services were constructed in the artistic style of the



Modern Movement. The enormous growth in car traffic in the last 20-30 years has led to comprehensive redevelopment or demolition of the earliest petrol stations. Now, only a few remain. It is therefore a challenge to safeguard those which remain to be able to document an important and more recent epoch in our history. Recently, a 1950s petrol station was preserved.

Evidence of earlier times can be found alongside roads and paths. In earliest times, it was common practice to throw stones or branches onto piles (cairns) for luck on one's travels. Old milestones, border stones, signposts etc. can be found, dating back to the first days of the public road network. These are indicators of our cultural history. Old street lamps, railings and other street and road equipment often do not meet today's standards and have largely disappeared. The few which remain are an important part of the cultural history of our roads.

Bridges are vital elements in the road network and are often representative structures. Old bridges represent good craftsmanship and the art of engineering. At the same time, they are often located in exposed and dramatic parts of the countryside. This makes them important elements in the cultural environment, and often valuable historic monuments and sites.

Throughout history, road builders have created a number of valuable historic monuments. Ever-increasing requirements for road standards make the development of the modern road network the biggest challenge for the road department's own historic monuments and sites.

Further information:

Directorate for Nature Management: Old roads and paths, DN-handbook 5. In Norwegian only.

Directorate of Public Roads. Designing bridges. Handbook 164. In Norwegian only.

2 Transport and the cultural environment

Main problems

Transport and the cultural environment. Some important historical watersheds.

Figure 2.1 In earlier times, it was common practice to haul boats across the countryside to avoid exposed stretches of open sea. Old dwellings and other traces of activity can be found at such places. The place-name is often an indication of local activities. Dragseid, Aure.
Photograph: Pål Aage Nymoen.



Right up to the last century, small, open boats were the dominant form of transport along the coast. Journeys could be fraught with danger, especially when crossing open sea. Wherever possible, sea-farers would haul their boats many hundreds of metres across the countryside to avoid exposed stretches of sea. In other cases, much time could be saved by unloading cargo on one side of an isthmus, transporting it across and then continuing with another boat. Where there was traffic across an isthmus, it could be worthwhile settling there. Later, trading vessels became larger and were equipped with sails. Thus it became both easier and safer to sail across open stretches of sea. The isthmuses lost their significance in relation to coastal traffic.

The big sailing ships brought with them new harbour requirements. Harbours needed to be sheltered, yet near the sea and good wind conditions. Outer harbours were constructed in places with these assets. Here, cargo was loaded and boats took on board new supplies. Whole societies grew up around these outer harbours. Later saw the arrival of the steam boats, which could go right into the towns and harbours, whatever the wind conditions. The outer harbours were no longer so important and were hit by depression and depopulation.

With the development of the postal system and the mining industry came an increased need for roads from the 1600s onwards. Nonetheless, until 1750, only a small part of Norway



Figure 2.2 Lyngør, Aust-Agder. The outer harbour reached its peak during the sailing boat era of the 1800s. With the arrival of the steam boats, the port lost much of its reason for existence. It became almost deserted and was threatened with extinction. Stagnation and depopulation meant that the physical environment changed little over many years. Rescue for this complete cultural environment came in the form of the attraction of the old port as a holiday area. New use has ensured that the port is preserved. Lyngør is described as Europe's best-preserved town. Photograph: Arve Kjerseim, Directorate for Cultural Heritage.

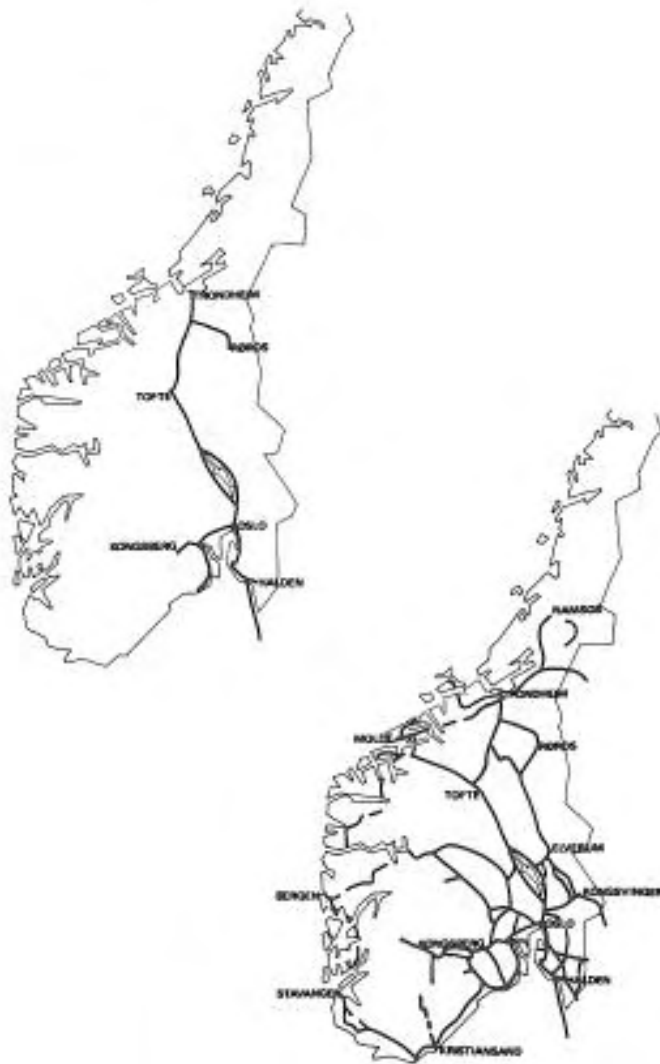


Figure 2.3 The road network in 1750 and in 1850. Illustration taken from Dag Bjørnland: Inland travel since 1800 (TØ).

Figure 2.4 Fjærland, Sogn og Fjordane. The town centre has grown up around the steamship quay and the ferry terminal. Shops, hotels and houses are all located here. The town was laid out along the fjord to provide good harbour conditions. The main access to the town was from the water. The alternative was crossing the mountains or glaciers on foot. With the construction of a new trunk road between Jølster and Sogndal at the end of the 1980s and the beginning of the 1990s, a road was laid to Fjærland through a tunnel. The road

crosses agricultural plateaux on the floor of the fjord valley. The ferry route has closed and today the town centre lies on the edge of today's main transport artery - the road. Will the centre of balance shift to the town's new transport nerve-centre - the cross-roads? A petrol station and a glacier museum have already been constructed here.

Photograph: Camera Bergum.





was covered by roads. From 1750, road construction took off and in the years up to 1850 the main foundations of the Norwegian road system were laid. The major change in Norwegian society came from 1850 onwards. Industrialisation made its appearance and the natural household economy began to disappear.

A number of steamship routes were established from 1850 onwards. The first ones covered the coast between northern Norway and Bergen, and were vital for the transport of fish for export. At the height, some 4-5000 steam ships plied the seas between 1300 ports of call in the whole of Norway. Transport along the whole of the coast and into the fjords became significantly better and formed the basis for the transport of fish and agricultural products to the cities. Towns along the coast with good harbours and good connections to the surrounding countryside experienced the greatest growth and immigration.

The development of the roads and railways had a corresponding significance inland. Initially, roads and railways were seen as supplementary forms of transport. Roads were built to stations and steamship quays, and to places which trains and boats could not reach. Steamship routes were established across large lakes. Traffic and communications development formed the basis for growth in towns and cities, particularly around railways stations. This growth, centred on the station, continued well into the inter-war years.

The coming of the car at the turn of the century and the steady development of the road network made long journeys easier. In the 1920s, the car was so reliable that it was vital for transport over long distances. The introduction of the diesel engine in the

Figure 2.5 Lierbyen, Buskerud. The town of Lier had a station on the Drammen line and a narrow-gauge branch line to Sylling, where there was a steamboat connection across the Tyrifjord. The town expanded to include shops, houses, school and a local government system. The branch line was narrow gauge and did not survive very long. It was too onerous to off-and on-load goods in Lier, where the railway was standard gauge. In addition, the bus company took most of the passenger traffic when it was set up in 1927. The Lier branch railway was dismantled in 1936. The Drammen line was altered in 1973. Now, no trains run to Lierbyen. Parts of the old Lier line and the east-bound Drammen line have been converted to hiking trails. The course of the railway still remains as a visible historic track, and can be perceived to the right of the picture. Its new use ensures its maintenance. Photograph: Fjellanger Widerøe.

1930s had a considerable effect on bus transport and particularly on freight transport by road. At the start of the 1950s, people were still largely dependent on public transport, horses, bicycles or pedestrian transport. Thereafter, the number of cars and the amount of road traffic increased greatly. The road network expanded from 45,000 km in 1960 to 60,000 km by 1965.

Both topography and fjord and sound crossings presented major challenges for road construction along the coast and the fjords. Many of the old steamship routes were replaced by roads combined with ferry transport, particularly after the Second World War. Ferry connections formed the basis for new growth in many places. Ferry terminals often occupied a central spot and took over the role of the steam-ship quays. Increased car traffic and greater ferry capacity led to an increased need for service areas by the quay side and for wider roads through many towns (see chapter 3).



Figure 2.6 Kaupanger, Sogn og Fjordane. The ferry terminal at Kaupanger has been moved to Mannheller and the trunk road built around the outside. Much of the economic industry had already moved from the original town, and lies close to the new road and to new residential areas a couple of kilometres away. The old ferry terminal has become a "backwater". The county municipality and the municipal council held an architectural competition to find new development ideas. Photograph: Ulf Haraldsen

Where roads and cultural environments meet

The development of better road connections to islands and remote fjord communities has continued over the last thirty years, including numerous bridge and tunnel projects. Steamboat quays and ferry terminals have lost their original significance. Transport of goods has moved from sea to road and the traditional pattern of transport has changed. This has building and land-use related consequences and places alter. Coastal communities turn their backs to the sea. By taking a deliberate stance on this, it is possible to safeguard the valuable elements of the original cultural environment, as well as having a positive effect on the areas. This requires close co-operation between the Roads Administration, the municipality, the county and local interested parties.

Major traffic growth in densely-populated areas has led to poor access and a number of road traffic accidents in many places. In a number of areas, the solution has taken the form of the construction of by-passes to take through traffic away from the city centre, city areas and towns. Areas have been freed of unnecessary traffic. In old residential areas which were in danger of decline due to the amount of traffic, this has led to revitalisation. Business areas in the centre have also been positively affected by the by-passes, through better accessibility, the opportunity to create pedestrian zones etc.



In recent years development has shown that by-passes attract businesses. Companies find that a good roadside location is good advertising and means easy access by car. Cross roads where by-passes and busy approach roads meet are particularly attractive sites for shopping centres. Easy access, free and plentiful parking and everything under one roof are all advantages of a shopping centre. Liberal land-use policies and competition between municipalities has led to a massive shopping centre construction in recent years, which in turn can bring about an undesirable increase in the amount of car-traffic.

When one town expands, it is often at the expense of another. With the development of shopping centres on the outskirts of a town, the old town centre often suffers. Its economic basis is reduced and this can result in stagnation and recession. The result can be a decline - decline in the oldest parts of the town which may have cultural environments which should be preserved. New roads lead to new break-ups of areas. The size

Figure 2.7 Biri centre obtained its by-pass at the end of the 1960s, with the alterations to rv 4, and the E6. A new trotting track was built partially on landfill in Lake Mjøsa in the first half of the 1980s. This led to the development of a new two-level cross-road which opened the way for other businesses at the cross-road. Shopping centres, a petrol station, a roadside inn offering accommodation and other businesses soon followed. Biri has changed dramatically. Photograph: Fjellanger Widerøe.

Figure 2.8 Skarnsund bridge, Nord-Trøndelag. The bridge was awarded the Beautiful Roads Prize in 1994. The jury remarked in its decision :
* The bridge represents a majestic and elegant construction in the landscape. The impressive art of engineering, its adaptation to the landscape, its shape and colour bring a new quality to the area. The symmetric composition is well-adapted to the character of the area."
Photograph: Sverre Finstad.

and suitability of the remaining areas are decisive for their potential use. Badly thought-out division of cultivated land can lead to arable areas lying fallow, or such areas being used for other purposes and the disappearance of a valuable cultural environment.

The road itself has a strong structural effect on the development of towns and cities. It is therefore vital that the new routes should be an integral element in town and land-use planning. The town planner Harald Hals put it this way in the 1920s: "Roads form the skeleton of the town plan." He regarded traffic systems, town planning and land-use as one and the same.



Future cultural environments

This short historical perspective shows that cultural environments are constantly changing. Changes in social conditions lead to changes in requirements and use. Some things disappear, others remain and new things are added in a continuous process. The choices we make today will influence the future and the cultural environments of the future.

The cultural environment alters slowly as certain elements are removed and others are added. Although small measures may be scarcely noticeable, in time their sum can have a major impact. It is important to be aware of this. Change, or the threat of change, is easier to see when dealing with major measures, such as new roads.

We must adapt to change. Development cannot be stopped, but it can be controlled. The character and consequences of change can be influenced. The Cultural Heritage Authority's desire to preserve valuable aspects of cultural environments of earlier times makes change a major challenge. Valuable historic monuments and sites and cultural environments can only be preserved in exceptional circumstances. The most important basis for protection is active use.

New roads create new conditions for the cultural environments. The close interplay between roads and cultural environments will lead to changes in land use with consequences for the cultural environment. Factors such as new functional conditions, land use, land division, economics, changes in the ability to compete, the amount of traffic, proximity and noise all influence the development of the cultural environment. Pollution, traffic vibration, dynamiting and ground water depressions can damage valuable historic monuments and sites such as buildings and bridges.

The Cultural Heritage Authority is working to ensure that future generations inherit a representative selection of historic monuments and sites and environments which are intact, and to ensure that the cultural environment in general is developed in a qualitatively good manner. The aim is to preserve the most important sources of our history.

The Roads Department as a developer has its own major responsibility for taking cultural environments into account in its work. Planning roads takes many years. The most decisive

resolutions regarding principles and choice of route are often made early in the process. It is therefore a great advantage to bring in other sectors at an early stage in the planning process, so that they have the opportunity to influence the proposal which is being developed. The municipality plays a central part in this work, as it has formal jurisdiction, in accordance with the Planning and Building Act.

Co-operation during the planning process increases the chances of finding satisfactory solutions, solutions which take into account both roads and historic monuments and sites. The Cultural Heritage Authority's knowledge of historical processes and their physical results is valuable knowledge and should be taken into account.

However, active participation in the planning process expands the role of the Cultural Heritage Authority from managing existing historic monuments and sites to influencing the cultural environment of the future in an active way.

Road construction and road traffic have created disadvantages for and damage to cultural sites, monuments and environments. Sections of the national road network have been mapped through registration of "problem zones" - zones along the national road network which are affected by noise, pollution, traffic safety, cultural environments, natural environments or the visual landscape. Some of these problem areas will be improved in the years to come. New road projects also allow earlier mistakes in relation to historic monuments and sites and cultural environments to be rectified.

What will be the historic monuments and sites and cultural environments of the future? History has shown us that constructions which have been built with thought and quality become valuable in later years. This is also a central element in the Cultural Heritage Act: "According to this Act, historic monuments and sites and cultural environments which are of historic or architectural value can be protected." An understanding of the site, its history and its special features is therefore an important condition for achieving a successful result. The planning process will show whether adaptation and submission are the right answer, or whether the answer is to bring something quite new to the cultural environment. Whatever the answer, quality in construction is decisive for both the result and the cultural environment of the future.

3 The Cultural Environment of the Coast

The Norwegian coastal landscape changes vastly from south to north, from the skerries of the Skagerak coast and beaches with islands and holms, to mighty coastal mountains up towards Troms and the sparse and exposed grand-scale landscape in Nord-Troms and Finnmark. Settlements are usually to be found by the sea and beaches, but typical for the country are small and medium-sized towns with rich building traditions. There is a close interplay between settlements and the resources of the sea.

The main problems which are dealt with in this chapter are sound crossings and conditions in coastal towns. On larger, flat islands there are often large cultivated areas. The problems here mirror the problems involved in road construction in rural communities in flat parts of the country (chapter 6). On islands or open stretches of coast with a narrow coastline and steep mountain sides, the challenges in the relationship between road and cultural environment are often very similar to those encountered in road construction in fjord areas (Chapter 4).

The coast offers many traces of a long cultural history. Old dwellings lie close to earlier shorelines, often on the few gravel deposits which are to be found. Land movement has varied along the coast, and gravel terraces can be found at heights ranging from a few metres to almost a hundred metres above today's sea-level. These are areas where roads can be built and rock extraction is possible.

The sounds have always attracted man, because of their rich fishing grounds and good crossing points. A great deal of history may lie both above and below the ground. Burial mounds from

Figure 3.1 Coastal landscape.
Illustration: Tom Dyring.



the Bronze Age and from the Viking era are easily visible on the coastal landscape. It can be harder to locate burial mounds on holms and skerries. Small piles of stones on bare rock may indicate burial mounds.

Contact with the sea is vital for the cities and towns along the coast. Good harbours, proximity to shipping quays and the resources of the sea are all vital conditions for the foundation of a town. Quays and harbours, warehouses and boathouses are therefore very important elements in the cultural environment of coastal towns. In many places, ferry terminals are located in the town. Increased traffic leads to a greater need for service areas and wider streets. These are often requirements which the town cannot meet without drastic measures. On the other hand, moving or closing a ferry terminal can lead to towns losing a vital part of their lives and their centre of balance is displaced. (Chapter 2).

The old trading posts along the coast and the inns tell an important historical story. Today, they are to be found in the centre of the towns, but also in more remote places alongside the old shipping



Figure 3.2 Zoned and altered and aligned route for road and bridge across Kirkholmen. The site of the old churchyard lies in the area marked "Mediaeval churchyard." Illustration: Norwegian Public Roads Administration, Sør-Trøndelag

quays. Coastal industry also brought other industries such as shipyards, rope works, fish-handling plants, distribution plants etc. Many of these are now no longer in use, but nonetheless are sources of knowledge and understanding of our history. They are often of significant historical and architectural interest, even though they may be neglected and decayed.

Example 1. Crossing sounds. Åfjord, Sør-Trøndelag.

Stokksund Sound lies between Stokkøya and Revsnes on the mainland in Åfjord municipality. The island of Kirkholmen lies in the sound, where rv 723 ends at the ferry terminal at Revsnes. The ferry goes from there to Stokkøya and to Linesøya further out. In 1995, 320 people were living on Stokkøya, compared with 360 in 1988. The municipality has allocated considerable resources for creating new jobs at Kirkholmen and Revsnes.

A bridge connecting Kirkholmen and Stokkøya has been planned, which will give Stokkøya a permanent land connection. The cost is estimated at NOK 82,200,000. Although the project is of low cost-benefit value, it is realistic from the regional policy viewpoint.

A bridge connection means that the county must take over the responsibility for the ferry traffic to Linesøya, at an annual cost of around NOK 5,000,000. Expanding the current ferry service from 13 to 17 round trips per day, as an alternative to the bridge, would cost NOK 450,000.

Kirkholmen is designated as an industrial zone in the local development plan. The name indicates that there may have been a church here in days gone by. Today, there is a church at Revsnes. There was a great deal of activity on Kirkholmen between 1917-20, in connection with herring fishing, when many buildings and factories were constructed. Oral history sources state that at that time well-preserved wooden coffins and skeletons were found in the clay-rich soil. Written sources indicate that there was a church here in the Middle Ages. The churchyard therefore probably dates from the Middle Ages and thus is automatically protected by law.

When the local development plan was under discussion, the Cultural Heritage Authority did not have accurate knowledge about the mediaeval churchyard. The Directorate for Cultural Heritage drew attention to the fact that the heritage authorities must be informed if automatically-protected historic monuments and sites were found in connection with the execution of the plan.

Later, it was discovered that the churchyard lay within the area. Even though this was first realised after the plan was approved, it could not be assumed that dispensation for intervention in a historic site would be granted in accordance with the Cultural Heritage Act.

When planning the bridge, it was necessary to carry out drilling for the bridge's foundations. Originally, the intention was to drill 23 holes, with a diameter of 5-10 cm in three areas where the foundations could be laid, each 50m². This would have meant a significant depreciation in the archaeological value of the surroundings, which would have had implications for any later excavations. For this reason, the Directorate for Cultural Heritage was unable to approve this work. The Norwegian Public Roads Administration developed a proposal for a less comprehensive ground survey, which was accepted by the Directorate for Cultural Heritage. It consisted of 6 holes with flushing and 18 holes with light equipment without flushing, 22 mm in diameter. The alternative would have been to carry out archaeological excavations before the ground survey.



Figure 3.3 Kirkholmen, with the zoned and altered routes (solid line). The mediaeval churchyard lies in the foreground of the picture. The areas nearest the water on both sides were previously built upon. Photograph: Svein Bomberg.

More recently, the Norwegian Public Roads Administration, in close co-operation with the Directorate for Cultural Heritage and the municipality, has altered the alignment across Kirkholmen to avoid conflict with automatically-protected historic monuments and sites. The revised route requires that the course of the road be moved up to 60 metres. The result is more technically complex for the road construction, and meant that the municipality had to revise a closed land division case. The advantage is reduced conflict with protected monuments and sites. Further delay and associated excavation costs involved are also avoided. The alterations were included in the revised local development plan in 1996. It was approved on the condition that the zoning provisions would include a requirement for archaeological excavations (monitoring) when the work starts.

Example 2. Widening the road to the ferry terminal. Skånevik, Hordaland.

The town of Skånevik lies in Etne municipality and is an old trading post with an inn. Rv 48 runs through the town to the ferry terminal in the centre. From here, there is a ferry route to Utåker in Kvinnherad municipality, where rv 48 continues to Husnes and Rosendal. There is an average daily traffic (ADT) of 1400 vehicles, but summer traffic is considerably higher (2,100 vehicles per day). The road is narrow where it runs through the town, with buildings right on the edge of the road. Nonetheless, there have been few accidents. The speed limit is 50 km per hour.

In developing the local development plan for the whole town, the County Roads Office originally wanted to standardise the main road to a width of 7.5 metres. This would have meant the demolition of a number of houses to make way for the widened road. The unity of the centre area would have been reduced. Many of the houses were themselves of historic interest.

In the planning process, the County Roads Office reduced its original requirement regarding the width of the road. It was agreed that the road width should be 5.5 metres, with a pavement on both sides of the road. As a result, no houses had to be demolished. In addition, a building set-back limit of 6 metres from the centre of the road was introduced, which means that houses which are rebuilt following a fire must be situated behind the building set-back limit. The stretch of road is also now being evaluated for development as an "environmental street".

Figure 3.4 Skånevik town centre seen from the approach road from the north. Old, valuable buildings lie right next to the narrow main road. The road was zoned, with a width of 5.5 metres and with a pavement on each side, to avoid demolition. Photograph: Katrine Myklestad.



Figure 3.5 Skånevik town centre, seen from the north. "Gjestgiverstaden" is one of two remaining houses from the old trading post and inn. The house was built at the end of the 1700s. Photograph: Katrine Myklestad.



4 The cultural environment of the fjord landscape

The typical fjord landscape has forest-covered mountain sides which form clearly-defined "walls" in the landscape. The landscape of the fjords is often on a grand scale. Buildings lie close to the water, often along a narrow shore zone. Higher up the mountainside, the terrain becomes steeper. In Vestlandet and northern Norway, the wooded mountainsides turn into mountain terrain. Properties are usually narrow strips of land starting by the water and running up the sides of the fjord valley, often as far as the mountains. The roads run close to the built-up areas and at right-angles to the properties, but along the terrain. Clusters of dwellings and towns are often found on the fjord valley floor and at the mouths of branch valleys. The options for new routes are limited.

In inlets and fjord valleys, the land is often flat and easy to cultivate. This encouraged agriculture from an early period. At the same time, these places are the meeting point for land and water. Contact between land and water formed the basis for trade, and towns grew up close to the water. Boat houses and shanties are therefore important parts of the town's construction.

With the construction of roads along the fjords, the towns have found themselves at the cross-roads between the coastal route and the traditional arteries into the valley. This has been a further reason for the growth of these towns. In recent years, the shoals between the inlets and sandbanks have often been filled in, which is an advantage for road construction, industrial areas etc. It can be difficult to plan new roads in such areas without severing important historic links between the town and agricultural areas or

between towns and the sea. At the same time, these are often vulnerable areas from the point of view of environmental conservation.

Relatively little has been found to indicate human habitation and activity in the fjord districts from prehistoric times. It is assumed that Man probably lived closer to the coast, and fished and hunted inland and in the mountains. Seasonal migration led to travel on the fjords. Typical areas which offer evidence from this period are the fjord valley floors and the mouths of side valleys, just above the ancient shore lines and on river terraces.

Marginal conditions for agriculture in many fjords, particularly to the north, have made fishing a vital pre-condition for settling along the fjords. Multi-purpose use has been a dominant principle for settlements right up until the present day, and the landscape still bears the imprint of this. Down by the shore lie the boat-houses. Further up is the farm, with its farmhouse and out-buildings, surrounded by fields. Further up still are the summer cow byres and hayfields. The hillsides above were used for pasture. Summer dairying in the mountains, and hunting were important elements in the local economy. This connection can be read in the landscape through the location of the buildings, the distribution of strips of land, fences and farm boundaries which run up the mountain side from the sea.



Figure 4.1 Fjord landscape.
Illustration: Tom Dyring

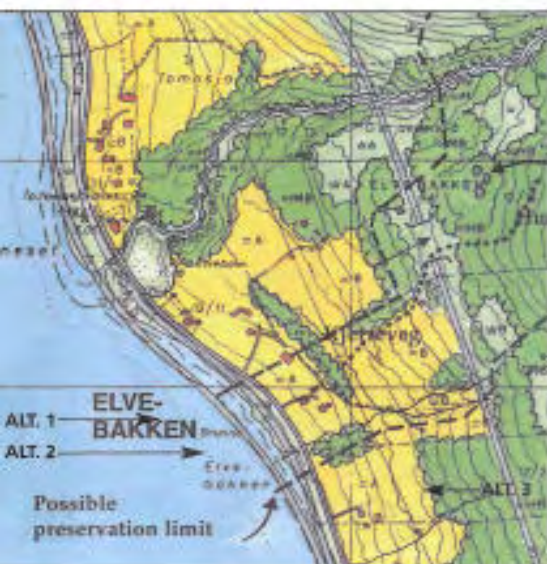


Figure 4.2 Tomasjord, showing alternative routes and the extent of the area which could be protected as a cultural environment

When roads were built at the end of the last century and the beginning of this century, they were constructed following the terrain near buildings. Where no major changes have occurred in recent years, the road is often seen as an integral aspect of the cultural environment today. The roads are often narrow and winding with numerous access points, which mean that the standard is too low in relation to modern requirements regarding traffic safety and access. Road widening and straightening curves can conflict with cultural environments and aesthetics, since such measures often expand and alter the road significantly. New routes which follow the terrain may break the traditional connections in the cultural environment from sea to mountain.

Example 1. The E 8 at Balsfjord, Troms

Background

The E 8 links Tromsø with inner Troms and with the E 6 at Balsfjord, and forms part of the trunk road network. The stretch along Balsfjord is typical for settlements of northern Norway and of cultural landscapes in fjord areas. The farm of Elvebakken is situated by the Tomasjord river, and is intact regarding the traditional use of land from fjord to mountain. The Sami have a long tradition of using the side valley as summer pasture for reindeer. Above the farm lie hunting pens, which are automatically protected by law. The farm and its surrounding cultural environments have been evaluated for protection. Improvements to the E 8 came into conflict with this valuable cultural environment.

Road and traffic data

There are buildings right alongside the road, with direct access to the main road, on long areas of this stretch. There is no provision for cyclists and pedestrians. The speed limit is 60 km per hour, and the average daily traffic (ADT) is around 2,000 vehicles.

Description of alternative routes

Alternative 1. The shore zone

The road could be laid along the beach zone on in-fill. The shoreline would alter dramatically. This would have a negative effect on local cultural history, since it would break the connection between the farm and the water, which was the original reason for settling there. The areas between old and new roads often turn into unused wasteland and spoil the cultural environment. Seen from a distance, it would look like a continuous in-fill along the shore. The line would also be very negative from the aspect of nature conservation.

Alternative 2. Improving the existing road

Initially, this would appear to be a suitable alternative from the cultural history angle, since the existing road would be utilised. Straightening out bends, sound barriers, foot and cycle paths and reconstruction of access roads would, however, bring about major interventions. They would clearly necessitate widening the road, which would affect the cultural environment so much that its value would diminish considerably.

Alternative 3. Upper route

This route would run further up the hillside in less steep terrain. Steep terrain and the danger of rock falls limit the height at which the route can be laid. Rock fall barriers must be built on parts of the road. This route would not affect the buildings, but runs through areas of the summer pasture land. At Elvebakken, this route comes into conflict with the hunting pens and breaks the connection between the coast and the mountains (summer pastures for reindeer).

Figure 4.3 This magnificent cultural landscape comprises the fjord, the agricultural belt and the mountains which rise up behind it all. The Sami have a long tradition of using the side valley as summer pasture for reindeer, on their way from inland regions to the coast. Huge boulders are to be found here, each with its own name on the map, and four protected hunting pens. Any intervention requires special dispensation. The environmental tunnel will also be here, maintaining the connection between the agricultural lands and the side valley. Photograph: Ulf Haraldsen.





Figure 4.4 Elvebakken is an authentic group of farm buildings from the turn of the century. There are few such environments which remain so intact. Thus, the farm has been protected, together with its boathouse, surrounding lands, summer cow byres, pasture lands and the links with the mountainside. The existing road lies between the boat house and the farm buildings. The width of the road and its curvature are adapted to the landscape. The road forms an integral part of the cultural environment. Photograph: Ulf Haraldsen.

Alternative 4. Tunnel

This alternative is similar to alternative 3, but includes a 350 metre-long tunnel past Elvebakken. The extra cost (in relation to alternative 3) lies in the region of NOK 25 -30,000,000, including circa 250 metres landslide superstructure. This alternative solves the most significant problems for the Cultural Heritage Authority, and also deals with landslide problems by using a tunnel with a landslide superstructure. On the negative side, the travel experience will be diminished, and part of the road will run through a long and deep cutting through the rock.

Solution

The County Roads Office recommended alternative 3, and the Cultural Heritage Authority registered its objection to this. They in turn recommended alternative 4, with the tunnel. The Norwegian Public Roads Administration considered the extra costs of this alternative to be too high in relation to the main plan which had been approved earlier. Following inspections and adjustments of the line in alternative 3, a compromise has been reached. The route will be laid deeper in the terrain and an environmental tunnel will be built along an 80 metre-long stretch of the road.

Comments

Many of the causes of conflict were due to the fact that historic monuments and sites were not clarified at the main planning level, but were first taken into account in the local development planning process. The estimated costs from the municipal sub-plan (previously the master plan) may strongly influence the project later on.



Figure 4.5 The distinctive cultural landscape and building environment status of Øksendalsøra in Møre og Romsdal, make it an area of great national importance. The road today runs between the buildings along the shore and the flat, agricultural land further inland. The planned improvements to the road will largely follow the current course past the town, but the proposed two-level crossing of the county road creates a visual barrier which weakens the coherence of the cultural environment.

Photograph: Terje Fugebnes

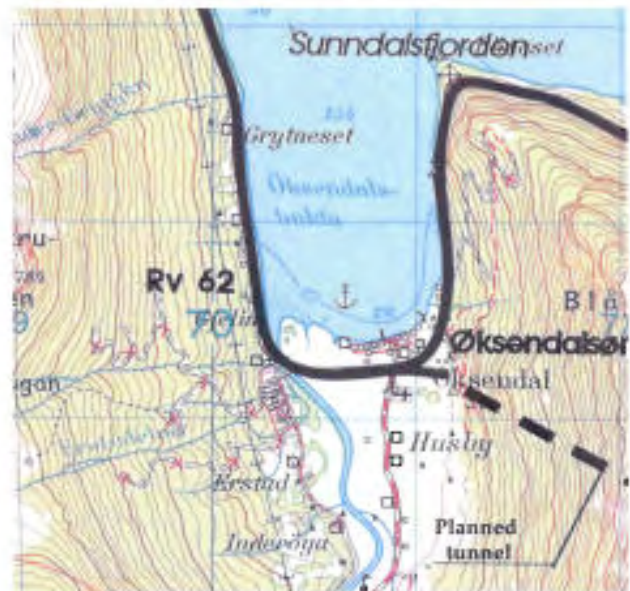




Figure 4.6 Batnfjordsøra in Møre og Romsdal is a young town in the context of a cultural environment. The town has grown up around a cross-road and is a typical town of the 1960s and 1970s, representative of that era's politics and planning policies. Narrowing the road area, better-organised parking, tree-planting and the general development of space have given the town a noticeable visual lift and provided a higher quality to the general cultural environment. Lower speed limits and better conditions for pedestrians and cyclists have reduced the disadvantages that road traffic brings. Photograph: Jim Bengtson.

Example 2. Tema fjord valley floor

Alterations to roads on fjord valley floors and inlets are a common problem across the whole country, not only in the fjord districts but also further out along the coast and inland by the lakes. There are often towns or settlements in these areas. It is not possible to formulate a standard solution for this problem. Local conditions such as the road network, traffic, the cultural environment, the natural environment, buildings, land use etc. must be taken into account in finding a suitable solution. Some typical situations and examples of solutions are given below.

Roads on the landward side of towns

If the road is moved on the inside of a town, a by-pass may be needed for main road traffic. By combining it with a tunnel through to the next branch of the fjord, distances can be reduced. However, this leads to higher construction costs. It is important with regard to the cultural environment that the town's contact with the water is maintained. On the other hand, a barrier is created between the town and agricultural buildings in the valley behind.

Roads through towns

One alternative is to allow the road to continue to run through the existing towns. The challenge then is to reduce the disadvantages which road traffic brings to the town. Rebuilding the road as an environmental street is one possible alternative. A central principle for this solution is that the road traffic conforms to the function and environment of the town. Historic monuments and sites and cultural environmental assets must be clarified through site appraisals.

Infill in the fjord valley floor

Infilling the fjord valley floor has been a common procedure when roads are laid outside built-up areas. Usually, these areas are shallows and are easy to fill. This creates shorter roads. At the same time, municipalities have often filled in these areas to obtain extra space without having to use adjacent agricultural land. Such solutions are often difficult in areas where there is a close relationship with the sea and the cultural environment. The roads become a barrier between the built-up area and the water. In some areas, the openings at the mouths of rivers and creeks are used for pasture. Road construction in these areas can break up the pasture areas in a way which has a negative effect on farming and biological interests. It can also create a visual barrier between farm buildings and the surrounding agricultural landscape.

Road connections further out in the fjord

If the conditions are right, it may be possible to construct road connections further out in the fjord, in the form of either a bridge or a tunnel. Distances for main road traffic can be reduced significantly, but the costs are often high. For the cultural environment along the existing road in towards the fjord, this means that new, comprehensive encroachments can be avoided. The challenge lies in the fjord crossing itself and how this can be landscaped. One disadvantage for towns which lie along the "old road" is that they may lose their economic purpose, and this can lead to negative development for the town, which, after a while, will reflect a cultural environment in decline. Work is being carried out on plans for altering the E 39 east of Fedaa.



Figure 4.7 Valsøybotn, Møre og Romsdal. Islands at the mouth of the fjord make it simple to build bridges linking them with the mainland. This road link has little effect on valuable cultural environments and sites. At the same time, the town of Valsøybotn and the industrial town of Engan are spared road widening, which would have had a negative effect on these valuable cultural environments.

Photograph: Ulf Haraldsen

Figure 4.8 Feda, Vest-Agder, has a particularly valuable cultural environment based on the fjord as a vital communications route. Dwelling houses and the characteristic boat houses create a distinctive cultural environment around the river mouth. Around 1970, the new E 18 was built using a bridge outside the town. Both road and bridge lie close to the church and churchyard, with burial mounds from the Iron Age. The bridge forms a visual barrier between the town and fjord. The diagonal lines emphasise the negative appearance of the bridge. Photograph: Inge Fosselie.



5 The cultural environment of the valley landscape



Figure 5.1 Valley landscape.
Illustration: Tom Dyring

The valley landscape varies from inland to the coast and from north to south, in terms of both the landscape and its cultural history. Many features are common to all areas, however. Typical is the horizontal structure of both the landscape and the main roads, in contrast to the structure of the farms and other properties, which run vertically, from the valley floor to the mountainside. The valley sides are highly visible from the valley floor and vice versa. New road constructions may well be very visible in the landscape, and thus will affect the existing cultural environments.

Inland valleys often have a gentler landscape formation, with sloping valley sides. The floor and side of the valleys are often covered in woodland, while other areas, and especially the side which catches the sun are usually cultivated. In big, open valleys there may be rows of farmhouses along the sunny side, connected to the horizontal-running local roads. For farms, the transverse farm roads up to the mountains have been the most important routes and are important evidence of the economic dependence between farms and summer dairying.

In narrow and winding parts, it is often difficult to build new roads which conform to modern requirements for geometry. These areas are vulnerable landscape areas, since they are very exposed and are dominated by mountains and poor soil, or have noticeable gradients. Such areas are seemingly poor in historic remains, since they are as a rule uninhabited today. These areas may have been used for pasture and hunting, or hydro power may have been used for mills. As much of the remaining agricultural land in the valleys has been re-utilised, remains of buildings and vegetation in such marginal areas can be valuable sources of information about earlier methods of farm management.

The valleys along the coast from Vest-Agder and north to Troms are typically flat-bottomed with river terraces and steep mountain sides which are poorly-suited for cultivation and habitation. Remains of the earliest settlements and graves are found on the river terraces. As the land rose and the rivers sank lower, the former seabed became new terraces and was used for agriculture.

The valley towns are relatively young and have grown up in the course of the last two hundred years. Important localising factors have been communication centres where the valleys meet, and the meeting of valley and fjord or lake. Railways and the location of railway stations have influenced the development of towns, as well as natural conditions such as hydro power (for mills, saw mills etc.) .

Example 1. The E 16 from Håbakken to Stuvane, lower Lærdal.

Background

Lærdal is particularly interesting from the cultural history perspective, since the valley is rich in historic monuments and sites dating from the Bronze Age up to the present day. The valley has been well-documented and registered, and thus gives an indication of what might be found in similar landscapes. Lærdal has been a vital link between Østlandet and Vestlandet for hundreds of years. The remains of four generations of roads can be found in the valley. Parliamentary decisions in 1975 and 1992 decreed that the trunk road between Oslo and Bergen should run through Lærdal. The valley will continue to be an important artery linking east and west. Planning the new route has been difficult and challenging, partly due to valuable historic monuments and sites and cultural environments scattered all over the place. An environmental impact assessment was carried out for the project in 1996.

Road data

The national highway currently has an average daily traffic of circa 1,000 vehicles per day (ADT). Some 15% of the traffic is heavy traffic. There is a considerable amount of tourist traffic in the summer. A huge increase in heavy traffic is expected when the tunnel between Lærdal and Aurland opens in 2001. In some areas, buildings are situated right next to the road, with direct access on to the national highway. The road functions as a local road and as a long-distance road. There are no pavements or foot and cycle paths, even though parts are a school road. The speed limit is usually 80km per hour, with a lower limit in certain areas.

Alternative routes and the effects on the environment

In the search for the final route for the trunk road, a number of different alternatives have been considered. The three main alternatives given below indicate the conflicts with historic monuments and sites and cultural environments which have been considered.

A. River line/ upgrading the existing route

From the mouth of the tunnel at Håbakken, the route crosses the river and follows an old county road to Voll. From here the existing national highway is upgraded. The route goes through burial mound sites from the Iron Age, which characteristically lie in open positions along the edge of the terrace west of Voll. A



Figure 5.2 Alternative routes for the new trunk road in lower Lærdal

number of post-Reformation historic monuments and sites (farms and houses) lie alongside the existing route eastwards, near the road. Improvements to the road, including straightening bends and creating foot and cycle paths and sound barriers will disturb this environment. On the terrace edge at Ljøsno there are burial mounds and traces of Bronze Age and Iron Age settlements. New interventions in the terrace will have a very negative effect on this cultural environment.

B. The middle course

The middle course follows the existing national highway from Håbakken to Voll. Further eastwards, the new route runs through the middle of the valley on the river plateaux, crosses the river at Midtre Ljøsno and thereafter follows the existing route. Widening the existing road west of Voll will affect post-Reformation historic monuments and sites, including a protected vicarage. Negative intervention can be reduced by further revision of the plan. East of Voll, other sites, including remains of Bronze Age dwellings would be affected. This conflict can also be reduced by detailed planning. Further along the Ljøsno terrace, there are the same problems as in alternative A.

C. The route along the foot of the mountains

The route follows the foot of the mountain on the south side of the valley along the whole stretch from the mouth of Tynjadalen, crossing the river at Øvre Ljøsno and then following the existing route. For the most part, the proposed route lies between modern cultivated areas and the side of the valley. Today, it might seem that this area has never been used or has only been used to a small degree in earlier times. However, this is in fact a complete cultural environment with historic monuments and sites and vegetation influenced by the local culture. The area shows farming methods and the use of outlying fields over the years. There are watering ditches, cattle gates/paths, piles of clearance stones and crofts. Burial mounds lie close to the line of the road, and it is anticipated that further automatically-protected monuments and sites will be discovered.



Figure 5.4 The mouth of Tynjadalen. In the foreground can be seen typical vegetation development which results from long-term pasture usage: grassy slopes with isolated juniper bushes. Putting a road through here would destroy this distinctive cultural environment.

Photograph: Ulf Haraldsen

Figure 5.3 Ljosno terrace. Burial mounds have been found up on the edges of the terrace. Traces of human habitation from the Bronze Age, post holes and cooking hollows, have been found in the gravel pits. The cultural layer lies under a two-metre thick landfall. It is probable that many more remains of human habitation may be found in this area. Any encroachment in the terrace would come into conflict with the cultural sites on the terrace, even where it lies outside the roadway. Encroachment on the edges of the terrace may also have major, unsuspected effects on this cultural site.

Photograph: Ulf Haraldsen



The mouth of Tynjadalen forms a complete and distinctive cultural environment, of national importance. Many historic monuments and sites from different periods in a concentrated area make this an area with a high educational value.

Solution

Alternative C, the route along the foot of the mountains, was discarded during the planning phase because of the danger of major conflicts with the cultural environment. Alternative B, the central route, also involves major conflicts. Furthermore, this alternative would also have significant negative effects on plant and animal life and agriculture. Improvements to the current route would seem to be the best solution, that is, alternative B from Håbakken to Voll, and alternative A from Voll to Stuvane.

Figure 5.5 The big farms in Lærdal required plenty of man-power. This resulted in the crofting system, which was widespread in the valley. Remains from the crofting period can be found in built-up areas and in the countryside as here at Halabrekka, a croft surrounded by ancient cultivated lands. The site has recently been restored. Photograph: Leif Hauge.





Figure 5.6 Section of map showing the alternative routes

Figure 5.7 The picture shows a small part of the water course and the existing road. The remains of two farms of historic interest, abandoned during the Black Death, are to be found in this area. Photograph: Tone Høyland Stople.

Example 2. E 134 Teigland -Lauarreid - Håland

Background

This stretch is part of E 134, the trunk road from Oslo to Haugesund. A principal plan for this stretch was approved in 1984. New requirements for trunk roads made it necessary to develop a new principal plan for this stretch. The plan was available for public inspection in 1990 and was adopted in March 1992.

Several of the alternatives which were considered affected Stordalen.

Road and traffic data

The road along this stretch is of a low standard with numerous bends and a road width of 4-6 metres. The stretch is exposed to rock falls and there have been many serious accidents.



Description of the alternatives

Nine alternatives were considered. The most realistic alternatives were alternative 2 along Åkrafjord and alternative 3 through Stordalen.

Alternative 2 included improvements to the existing road from Teigland to north of Rafdal. The terrain is very steep. The route would run through a short tunnel to Rafdal and a long tunnel to north of Sævareid. The route follows the existing road from Sævareid to Håland.

Alternative 3 runs through a tunnel from Teigland to Øyno, the uppermost farm in Stordalen. The route continues along the slopes on the west side of the valley to Lauareid and thereafter along an improved existing road.

The new road must be built as an access-regulated H1 road, 8.5 metres wide and with a dimensioned speed of 80 km per hour.

Description of special cultural environments

Valuable historic monuments and sites lie along both the proposed routes. In alternative 2, they are to be found in the area between Sævareid and Tjelmeland, and in alternative 3, in the whole of Stordalen. Traces from the Stone Age to the current day can be found in the cultural landscape. The stretch from Stordalsvatnet to Øyno forms an unusually valuable cultural landscape. An abundance of historic monuments and sites with a high preservation value, make this area an area of high educational, scientific and aesthetic value. The old country road is itself an historic site and a natural part of the landscape. The dale has lush vegetation, alternating between fully-cultivated land, border zones and rich landslide ground.

Solution

This was a highly controversial road construction case. The County Roads Office was in favour of alternative 3, through Stordalen, while the Cultural Heritage Authority preferred alternative 2. The Directorate of Public Roads chose alternative 2, but their decision was re-assessed by the Ministry of Transport and Communications. The case was settled by the Parliamentary Transport Committee, which decreed that the road should be built in accordance with alternative 2, along Åkrafjord. The project has since been revised.



Figure 5.8 Pollarded ash tree. It was common practice to collect additional feed in the form of leaves for fodder and bark. The new shoots were cut every autumn, resulting in the characteristic thick trunk and a bundle of thinner branches. This tree has not been pollarded for 10-15 years. Photograph: Tone Høyland Stople.

Figure 5.9 Wash house with "running" water. The stream runs right into the house, and exits through the "coffin ditch" in the foreground. This building would not be directly affected by the proposed new road, but it indicates the assets which are to be found in Stordalen. Photograph: Tone Høyland Stople.



6 The cultural environment of flat landscapes

The typical flat landscape encompasses open expanses of agricultural lands. The dominating structure is the dispersed farm. The structure of the properties is partially visible through the vegetation growing along the side of the road at the edge of the properties. On a large scale, the areas seem to be flat or rolling, while on a smaller scale they appear to be gently rolling, with stream valleys and without any clear main structure. Such flat areas are found for the most part in central Østlandet, around the Trondheimsfjord and in Jæren. Similar situations can be found in broad valley bottoms and along beach flats along the coast.

The first agricultural dwellings were caves in south-facing terrain towards the end of the Late Stone Age or at the beginning of the Bronze Age. It is hard to find the remains of those early settlements in today's landscape.

Well into this century, the flat lands were dominated by farms using rotation of crops. The landscape was varied. With the introduction of specialisation and mechanisation in this century, the landscape has altered. Stream valleys have been filled in and the belts of vegetation have gone. Vast expanses of land now dominate. Intact agricultural environments from earlier times are hard to find. They tell us much about our past and are therefore valuable cultural environments.

The transition between town and agricultural landscape is often hard to define, due to development along the town's boundaries and along the main roads. The open landscape offers good views, even from small ridges. New routes are easily visible in this sort of landscape.



Figure 6.1 Flat landscape. Illustration: Tom Dyring.

Example 1. E 134 Øvre Eiker, Buskerud

Background

E 134 is the trunk road from Drammen to Haugesund. The standard of the existing road is low in comparison with current requirements for trunk roads. The stretch eastwards towards Drammen is under development or has already been improved to meet trunk road standards. As part of the municipal sub-plan for the stretch from Hegstad to Kongsberg, a comprehensive report covering historic monuments and sites, cultural landscape analysis and site appraisal for the town of Darbu has been drawn up.

Road and traffic data

The average daily traffic in 1993 was circa 8,500 vehicles per day, of which circa 12 % was heavy traffic. Accident frequency varies from between 0.19 - 0.25, which is normal for a road of this standard. The road carries a mixture of local and long-distance traffic. There is a foot and cycle path along a small stretch of the road. The road is somewhat winding and runs through Darbu. Access points lead straight onto the national highway. Many buildings are subject to noise above the recommended levels.

Alternative routes and consequences for the cultural environment.

The lower alternative (alternative E2) mostly follows the existing road. In order to achieve trunk road standard, a parallel local road must be built. In Darbu, there are plans for an adapted trunk road standard, with a mixture of local and long-distance traffic and a number of one-level crossings.

This alternative involves major encroachments in a cultural landscape area which is of great value. It would strengthen the barrier effect through Darbu, and there would be major negative consequences for some valuable, historic farms which lie close to the road.

The middle alternative (alternative B) lies west of the existing national highway. Large parts of the area lie in wooded terrain. The route crosses just west of Darbu and limits the possibilities for further development of the town. The alternative would be connected to rv 289 at Krekling. The existing national highway would only carry local traffic.

This alternative affects one of the most valuable and vulnerable cultural landscapes in the planning area over a distance of 500 metres. The route would disturb automatically-protected historic monuments and sites and post-Reformation monuments and sites both directly and as part of valuable cultural environments.

The upper alternative (alternative D) lies in wooded terrain west of the existing national road and west of alternative B. This alternative allows for the further development of Darbu. There is no connection to Rv 289 at Krekling, so that there would still be some long-distance traffic on the existing national highway. This route does not affect any particularly valuable cultural landscape areas and has no direct influence on recognised historic monuments and sites. It breaks the contact between some farm environments and outlying fields and former crofts. It crosses Gamle Kongsbergvei, Norway's first public road.

Solution

In this case, the Cultural Heritage Authority and the County Roads Office shared the same concerns. Both recommend the upper alternative (alternative D).

Figure 6.2 E134, Hegstad - Kongsberg. Consequences for the cultural landscape. Illustration from planning material produced by the Norwegian Public Roads Administration, Buskerud

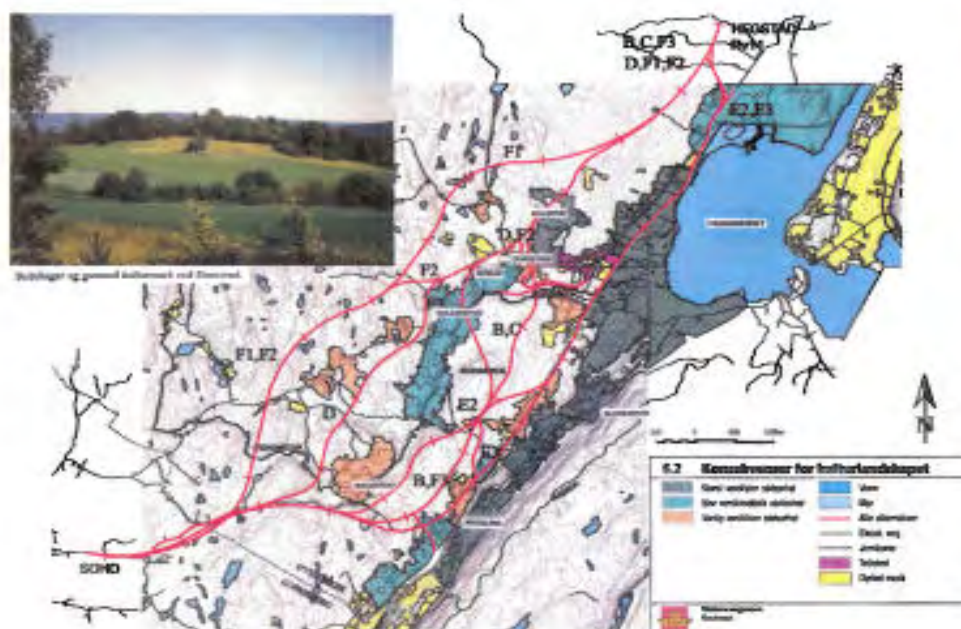


Figure 6.3 E134 Hegstad - Kongsberg. Consequences for cultural monuments and sites. Illustration from planning material produced by the Norwegian Public Roads Administration, Buskerud



Figure 6.4 Perspective drawing of the new E 18 at Bjørgehaugen at Sande, Vestfold. The upper illustration shows the original proposal with the bridge. The lower illustration shows the option chosen, using a tunnel. Illustration: Gullik Gulliksen AVS.



Alt. B: Bridge east of Bjørge, view from the north-east.



Alt. C: Environmental tunnel, view from the north-east.

Example 2. E 18 Sande, Vestfold

Background

The E 18 through Sande is part of the trunk road from Oslo to Kristiansand. The master plan was approved in 1992/1993. The route selected runs through agricultural land from Kobbervikdalen in Drammen to Gutu in Sande, parallel with an improved Vestfoldbane railway. The stretch was opened in the autumn of 1995. Further south, a route was chosen which runs through wooded slopes west of Sande, partially to avoid cultivated land.

Road and traffic data

The average daily traffic is circa 12,000 vehicles per day (ADT). On certain days during the summer, the traffic can exceed 20,000 vehicles per day. There are numerous direct access points on the stretch and it is an accident black spot. Parts of the road lack a foot and cycle path. Some buildings are exposed to traffic noise.

Special cultural environments

Along the stretch which runs from Gutu to the wooded slopes, the planned route crosses a large stream valley and cuts through a cultivated ridge on Bjørge farm (Bjørgehaugen). The ridge has been inhabited for thousands of years and was an traffic artery through Sande. Burial mounds have been registered in this area.

The route will require a cutting about 16 metres deep. The county road which runs along the ridge was originally planned as a bridge over the new E 18. The cutting would have been very visible from parts of the town and would have formed an open wound in the landscape. This would have reduced the value of the cultural environment significantly. Instead, it was decided to lay the road through a tunnel, at an additional cost of circa NOK 15,000,000.

7 Cities and towns

The first cities were built in the Middle Ages. They were compact, with narrow streets (4-5 metres). The dimensions of streets and houses have increased over the centuries, while right up until this century, the streets remained narrow (12 -15 metres) and the cities themselves were compact, with a small radius. The outskirts of the cities lay within walking distance.

With the coming of industrialisation came a huge increase in the size of the cities at the end of the last century. The rapidly expanding working class needed housing, and such houses were built close together on the borders of the cities. This century saw the start of the construction of private houses on the edges of the city.

After the Second World War, there was a new, marked divide in city construction. Motorised transport brought about the realisation of the functional ideas of zone division and more open building. There was a massive influx to the cities and the area expansion was enormous. Land protection interests and topographical conditions often imposed limitations on the continued expansion of the cities. Improvements in public transport and, in particular, increased access to car transport made it possible for the cities to expand into areas much further from the centre, into areas which were less productive. This resulted in transition zones between the city centre and the agricultural and natural areas surrounding it. These areas are neither town nor country.

Compact city areas

The street lay-out tells us a great deal about the history of the city. Buildings were constructed along the approach roads to the cities. This form of construction was later swallowed up by the city, but remains in the form of important streets within the city structure. The structure of the properties is also very significant for city structure and buildings. Even though there have been many changes in building materials and transport systems over the decades, the street structure remains largely intact and is an important historical source.

The type of building and their locations on building plots have also varied from one epoch to the next. Today, they tell us about the building methods of previous generations. Many areas of the cities were built in a relatively short time. Where there has subsequently been no demolition and reconstruction, these districts appear homogenous and give us a good picture of the building environment of their time.

Parks, gardens and other green areas may also be architecturally and historically valuable as living historic monuments and sites. The location and form of such facilities varies from age to age and mirrors the time of their construction.

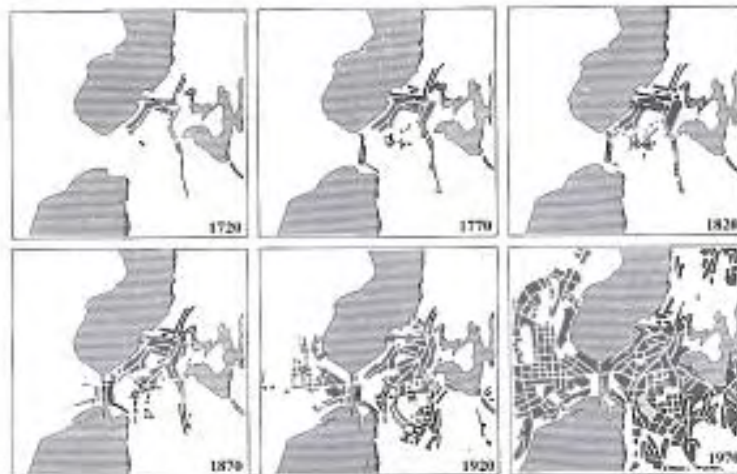


Figure 7.1 The development of the city of Moss over 250 years. The city has expanded along the river and the former main roads. The original road and street network remains largely unchanged. Illustration: Moss Municipality

Many buildings and locations are connected to important historical events, both nationally and locally. Even though such buildings may not always be of particularly high architectural value, they may be historically valuable and therefore are worthy of preservation.

Traditionally, streets are built in towns and cities. The character of a street can be defined as having a close connection with the buildings, which lie along a fixed construction line and create

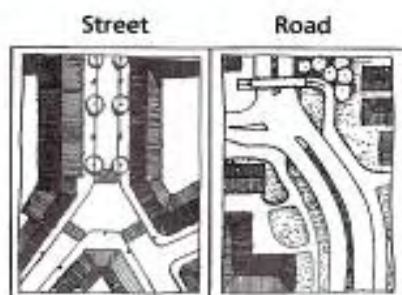


Figure 7.2 Illustration showing the difference between roads and streets. From the RA report no 19, 1991

walls for the street. The street has a symmetric cross-section, usually comprising the road surface, kerbstones and pavements.

Following the Second World War, the pattern has been to build roads, even in city areas. The road's construction is characterised by gentle curves. A typical cross-section would show the road surface, drain or shoulder and a foot and cycle path. The buildings lie detached and are freely oriented in relation to the line of the road.

The huge increase in traffic in recent years has led to many attempts to relieve traffic performance and improve traffic safety. The result has been the demolition of houses and whole sections of city blocks in many places, and a road alignment which does not keep to the original street structure and construction. Green areas and vegetation belts may also suffer. Furthermore, the visual impression is one of chaos through a profusion of street furniture such as signs, gantries, railings, lampposts and traffic lights. In many areas, these have destroyed valuable cultural environments.

City expansion and the increase in car traffic has led to an increase in traffic in all the roads. Many residential streets have become through-roads. The principle of function-differentiated road networks (see chapter 15) was adapted to the existing city areas in the 1970s and 1980s, when large city areas were subject to traffic-re-organisation. This resulted in reduced traffic in many residential areas and made them attractive once again. In combination with public and private urban renewal, this has led to a revitalisation and flowering of many central residential areas. This is an example of preservation through use. The streets which have to carry the main traffic have, however, become less attractive as residential areas. This can eventually lead to decay, demolition or a change of function.

The Middle Ground - the open city

The outer areas of the city - the middle ground - are the areas which lie between the dense city centre and agricultural and countryside areas, which are full of variation and mixtures, functional, architectural and historic. As former agricultural land, these areas have been so remodelled and carved up that the assets of the original cultural environment are lost. As city environments, these areas are often so divided up, loosely dispersed, so dissimilar and with such an unclear structure that as a whole they are of little historic or cultural value.



Figure 7.3 Pilestredet, Oslo. An old approach road to Oslo which is now a part of Ring 1 (ring road). By demolishing a row of houses and constructing new buildings behind a defined building line, there is now room for four lanes. The new street does not run into the centre but turns aside and disappears into a tunnel. Our comprehension of the historic street course has been severely weakened. At the same time, the street form and the heavy traffic it carries have made this street a powerful barrier and a foreign element in this city environment.
Photograph: Amund Vik



Figure 7.4 Kransen, Moss. The expansion of the main road through the town severs old connections and affects valuable buildings. Significant attention to details and damage limitation measures have not succeeded in reducing the effect of a dominating road construction.
Photograph: Ulf Haraldsen

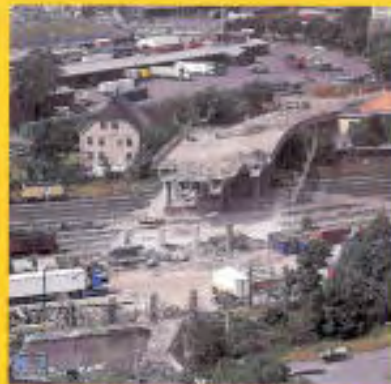


Figure 7.5 Oslo, the Old Town. Norway's biggest communications centre with roads, railways and harbours. Mediaeval ruins, protected buildings and residential areas from the turn of the century were in a state of severe decay, due to huge amounts of traffic. Now the through traffic runs through a tunnel and along a new route outside this historic city area. The Loeng bridge has been demolished to make more room for both inhabitants and the mediaeval ruins. It opens the way for new city development and the chance to recreate previous connections as well as making visible the remains of the mediaeval city. Photograph: Top: Fjellanger Widerøe. Centre and below: Arve Kjersheim, NIKU.



Figure 7.6 Kristiansand. The route of the E 18 was moved to Oddernesvegen in the 1970s, and together with increased traffic, has become a powerful physical and visual barrier through an area which originally was a cohesive city structure. The functionalistic terrace houses from 1939 are of national importance due to their architectural quality and their rarity (architect: Tilo Schoder). There are plans to run the E 18 through a tunnel in this area and the area could then regain many of its qualities as a valuable cultural environment and residential area. Photograph: Gabriel Castro



Figure 7.7 When the route for the improved rv 2 through Kongsvinger was drawn up, great emphasis was placed on adapting it to the existing city structure. The main road network is formed in such a way that there is a pronounced meeting with, and a good connection to, the main streets of the city. Illustration: Norwegian Public Roads Administration, Hedmark

Figure 7.8. Rolvsøysvegen, Frederikstad. A four-lane main road from the centre leading out to a major industrial area. A typical "middle ground" situation. Tight lines, limiting kerbstones and roundabouts with stone sculptures help to make the road (or street) a structured and cohesive element. Photograph: Arve Kjerseim, NIKU.



There are exceptions, such as isolated cultural environments and solitary historic monuments and sites which must be handled with care. It may be important to safeguard these, since so little of the original remains. The main tendency, however, is to see these areas as areas in a state of change - areas which have not yet found their ultimate form.

The challenges of such areas are more problems of design than of preservation. At the same time, these are often areas where one is faced with major road construction tasks, such as ring roads, by-passes or the expansion of radial arterial routes.

The main roads in the city areas are a magnet for new ventures, with the result that new roads will lead to pressure on city development around the road corridors, especially around cross-roads. This creates an opportunity for qualitative improvement of the environment. By adopting a specific attitude to the road, its construction and its influence on the surroundings, new roads can offer a solution for positive expansion and contribute to the development of future valuable cultural environments.

The towns

Norwegian towns vary enormously, from the traditional towns along the coast with narrow streets and buildings standing wall to wall, to post-war towns with open, detached buildings, often localised around the central points in the transport system.

Figure 7.9 The city vision, Bergen 2020 shows ideas and plans for improving a number of city areas in Bergen. The illustration shows the centre of Åsane. By tightening up the cross-road area, the road system becomes easier to use and frees up much space. A "lid" over the central section reduces noise and makes the motorway less of a barrier. Illustration: Bergen Municipality



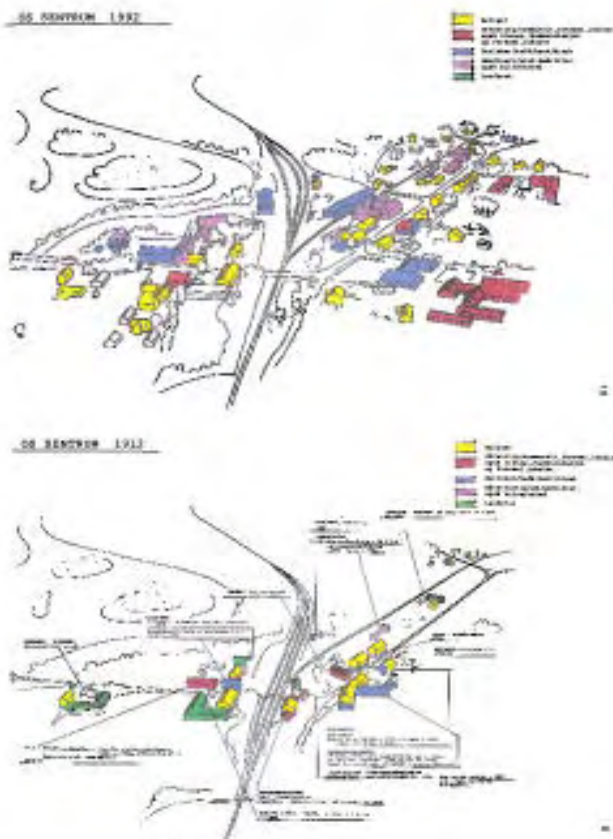


Figure 7.10 The town of Os in Hedmark. From the site analysis carried out in connection with redeveloping the main road to an environmental street. The illustration shows how the buildings, and their use, have developed. Produced for the Norwegian Public Roads Administration by Office by Feste A/S.

Situations and problems relating to roads will vary, depending on the origin of the town. Many problems are the same as those in the cities. One significant difference is that the towns are small. Both buildings and other individual elements are more important for the totality than in the city. Demolishing a few houses, moving a terrace in order to widen the road or filling in a dock area to expand a ferry terminal can radically alter the character of the place. It is therefore important to understand the place and to be aware of its development before forging ahead with new road projects or rebuilding existing structures. A site appraisal should be carried out, even for smaller projects.

Useful information:

Directorate for Cultural Heritage. Historic monuments and sites and transport in city areas. Guidelines. Directorate for Cultural Heritage report no. 19 (in Norwegian) Directorate of Public Roads. Roads and streets. Design guidelines for traffic in cities and towns. Hearing proceedings. (in Norwegian). The Department of the Environment. Site appraisals. Guidelines (in Norwegian).

Town problems are dealt with at several points in this book, including:

Skånevik, Hordaland. Expanding the road to the ferry terminal (Chapter 3).

Kaupanger, Sogn. Ferry terminal replaced by a road (Chapter 2).

Feda, Vest-Agder. New main road between town and fjord (Chapter 4).

Batnsfjordøra, Møre og Romsdal. Road through the town (Chapter 4).

8 Altering roads and streets

The street and road networks will constantly require alterations and improvements as well as new construction. Building relief roads or traffic re-organisation can remove through-traffic from roads and streets. The old road then takes on a new function as a local road. In other cases, specific user groups are given priority, for example, by setting up bus lanes and streets, cycle paths etc. Many of the alterations in recent years have been based on a desire to prioritise residential and business functions through the construction of pedestrian zones, street towns and environmental streets. Traffic-safety and accessibility considerations will also lead to alterations, such as the comprehensive alterations from cross-roads to roundabouts in recent years.

Emphasising other functions or user groups will often lead to something new, both functionally and physically, being added to the existing cultural environment. The challenge here is to find a physical solution with a high aesthetic quality, while showing respect for the cultural history which is to be found in the existing physical environment.

Useful literature:

Directorate of Public Roads: Environmental streets: main report for the environmental street project. (in English)

Directorate of Public Roads. The site and the road. Ideas for environmentally-prioritised through traffic. (in Norwegian).

Figure 8.1 Storgaten, Horten, Vestfold. The street cross-section is restricted and all parking banished from the street. The pavements have been widened and laid with concrete paving stones. Trees, signs, benches and rubbish bins etc. are all located in the "furnishing zone". The line of the street follows the line of the facade and has slight bends

where there are changes in direction. The pedestrian areas in the side streets are raised. Discreet form and use of materials means that the street harmonises well with the buildings. Improving the street has encouraged the redecoration of the facades facing the street. Photograph: Amund Vik.





Figure 8.2 Strandtorget, Tromsø.
The ferry terminal dating from the 1950s is no longer in use. The quay, with its access ramp and portal has been restored and is a valuable legacy of the ferry service of that era. Car parking areas have been rebuilt to form a square, with trees, cobblestones and benches.
Photograph: Ulf Haraldsen.

Figure 8.3 Tvedestrand, Aust-Agder. A few years ago this pedestrian street was asphalted from wall to wall and open to car traffic. It has recently been reconstructed using original materials and the original cross section. The result is an harmonic interplay between street floor and old house facades. Photograph: Amund Vik.

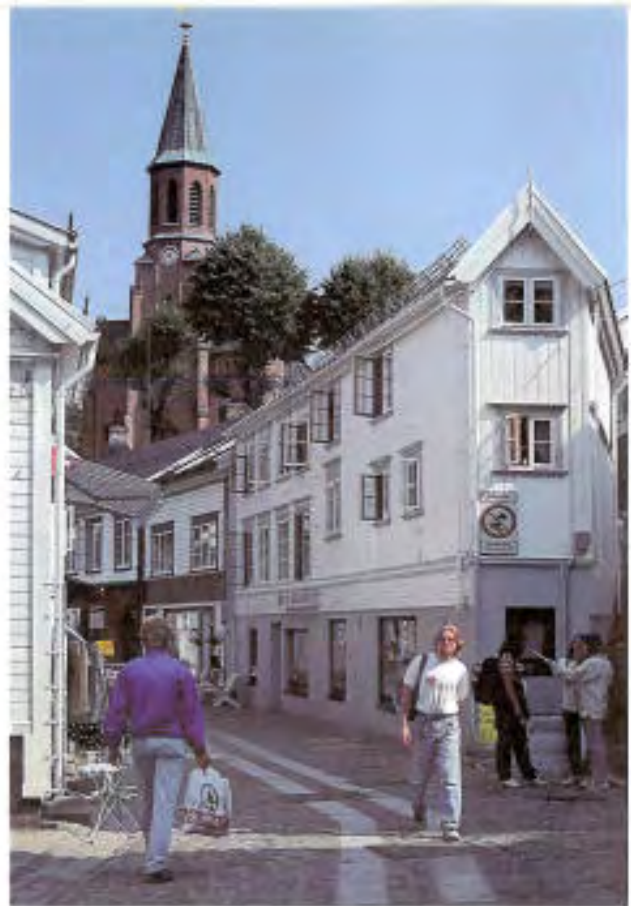


Figure 8.4 Vertidsalmenningen is a central area in Bergen and is part of the county road network. It lies in a city area which has long historic traditions. The buildings on the south side date from the 1700s. Almenningen was altered in 1992 to improve conditions for pedestrians, cyclists and motorists. The pavements were widened and the asphalt replaced with natural stone. New trees were planted and new city furniture and lighting suitable for the city. The street was awarded the "Beautiful Roads Prize" in 1993. The jury stated that: "The street is an unusually good example of the renovation of a city street in harmony with the character and the history of the city. Photograph: Arne Sælen.



Figure 8.5 Rv 410 at Tvedestrand, Aust-Agder. The approach to Tvedestrand from the south runs through a valuable historic area with a number of wooden houses. This section is too narrow to allow for two lanes and a pavement. To avoid demolition, the national highway is here restricted to one lane. Photograph: Ulf Haraldsen.

Figure 8.6 Rv 111, Sarpsborg. Great emphasis has been placed on the alignment, details and the road equipment, in order to adapt this construction to the valuable cultural environment around Hafslund farm. Photograph: Ulf Haraldsen



9 Footpaths and cycle paths

A separate area for pedestrians and cyclists is an important part of the principle governing the functional road network - dividing up the different traffic groups. It is desirable to separate pedestrians and cyclists from motor traffic, first and foremost for reasons of traffic safety and security. This has led to a considerable expansion of foot and cycle paths in the last 20 years.

In recent years, the focus has been on the bicycle as an alternative, environmentally-friendly form of transport in towns and cities. This increased emphasis on the bicycle is reflected in the construction of a continuous cycle path network with high standards and easy accessibility in some cities.

It can be difficult to fit foot and cycle paths alongside existing roads and streets in valuable cultural environments. Such places may be narrow, with little room to spare for a separate cycle path. It can lead to problems such as proximity, "shattered" street space, poor landscaping, walls and in the worst cases, the demolition or moving of houses. The problem is often made worse when the building of foot and cyclepaths are combined with other remedial measures such as sound barriers and the reconstruction of access points. When conflicts with valuable cultural environments arise in planning foot and cycle paths, solutions other than the traditional foot and cycle paths should be sought. These could include lowered standards, reduced speed limits and mixed traffic, reducing motor traffic, moving the cycle route etc.

Useful information: Directorate of Public Roads. Planning for cyclists in towns and cities. Folder. (in English)

Figure 9.1 Ramberg, Nordland.

There is no room for a foot and cycle path between the road (E 10) and the rows of boathouses. It was proposed that the boathouses should be moved across the bay to make room for the foot and cycle path. The cultural environment would have been greatly affected. On the water-side of the boathouses, there is currently a footpath. A moderate improvement to this would create a satisfactory foot-and cycle path connection, and the cultural environment can be preserved. Photograph: Nordland County Municipality.



Figure 9.2 Åmot, Vinje, Telemark.

On this pretty hillside with its farms and old, traditional wooden houses, the foot-and cycle path has been well-adapted to the terrain. It runs independent of the national highway in order to maintain the vegetation and the terrain. The natural stone wall deals with the height difference in a positive way, and is built following local traditions. Railings are avoided.

Photograph: Ulf Haraldsen.



Figure 9.3 Rv 757, Stiklestad, Nord Trøndelag. A pretty, agricultural landscape with large, old farms. Stiklestad occupies a significant place in Norwegian history as a result of the battle here in 1030. The avenue was planted in 1790, and was considered for preservation. For reasons of traffic safety, the road needed to be widened and a foot and cycle path built. The solution was a compromise, where one row of trees was removed and new rows planted on either side of the foot and cycle path.

Photograph: Dagfinn Wie.

Figure 9.4 Ås, Akershus. The row of trees along the county road, the stone walls and the buildings of Ris farm create a beautiful and valuable cultural environment. The coaching station and guest house stood here. The road is part of the Fredrikhaldske "King's road" which was built in the 1700s. The foot and cycle path has been laid through a field next to the avenue, thus sparing this cultural environment from destructive intervention. Photograph: Amund Vik



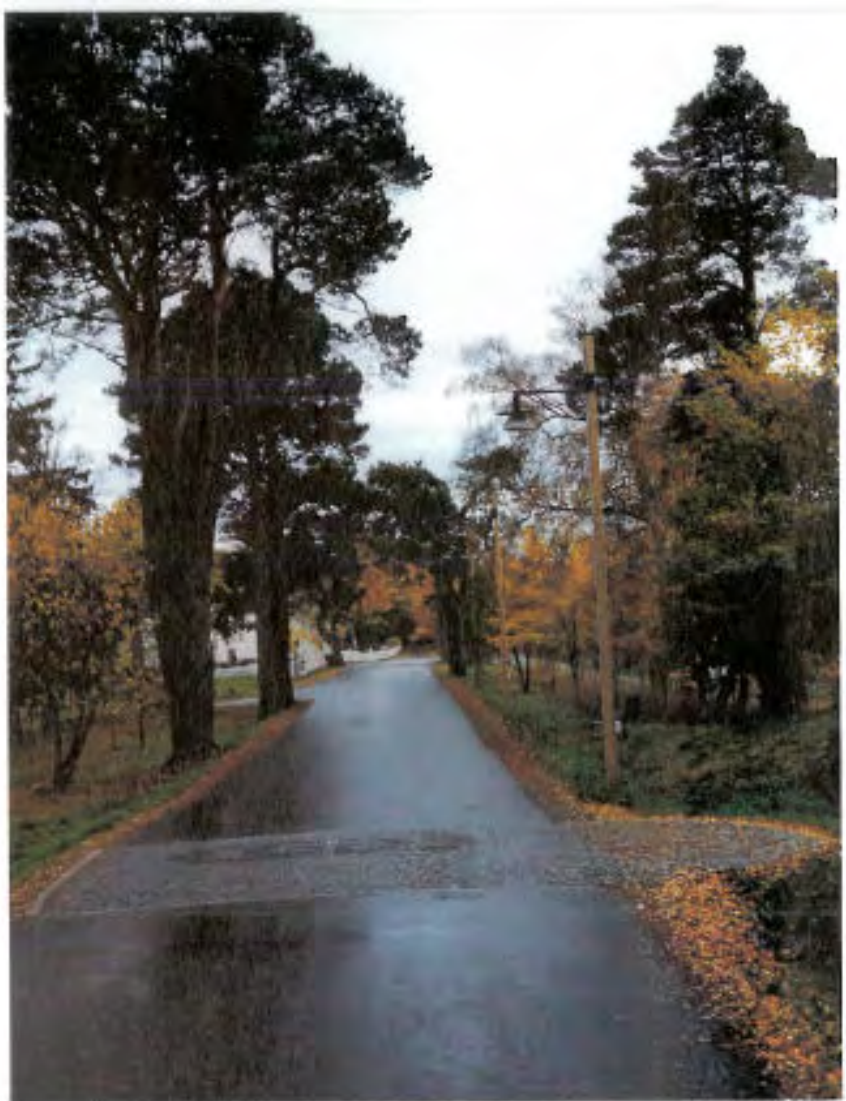


Figure 9.5 Egge, Nord Trøndelag.

The county road is narrow and acts as a school approach road for a large number of children. The area is rich in cultural monuments and sites, including burial mounds, and old valuable trees close to the road. This made it difficult to fit in a traditional foot and cyclepath. Instead, a solution was found which included a reduced speed limit, cobbled speed bumps and a new lighting system using low lampposts. Pedestrians, cyclists and drivers all share the same area. Photograph: Dagfinn Wie.



Figure 9.6 Strømsvegen is an old approach road to Oslo and runs through the built-up area at Vålerenga. Today, the main road traffic runs through a tunnel and Strømsvegen is closed to through traffic. The solution incorporating a cycle lane on both sides, separated from the road by road markings, fits in well in this distinctive cultural environment, which is rich in tradition. Photograph: Amund Vik



Figure 9.7 Rådhusgaten Oslo. A number of buildings from the 1600s lie along the street. Through traffic is diverted through the Oslo tunnel and Rådhusgaten has been altered to a mixed-use street. Even though the number of lanes has been reduced from 3 to 2, the street is too narrow to accommodate both cycle lanes and street furniture zones, as well as pavements and traffic lanes. Photograph: Amund Vik

10 Service areas

The difference between service areas and the rest of the road network is that they are designed for rest and relaxation, not for speed. Here the traveller has time to look around, enjoy the view, and relax. The service area can be designed as a place for obtaining information about the surrounding cultural environment. When deciding on the location of a service area, it can be useful, from the historical viewpoint, to find places where the surrounding cultural environment can be experienced to the full. At the same time, the construction of service areas is an encroachment and may alter the existing cultural environment. This must be taken into account in deciding on both location and design.

Figure 10.1 Rv 5, Sogndalsdalen, Sogn og Fjordane. The service area is located up on the hillside, with a good view over the fjord; the farms and the summer farms on the far side of the fjord. Both design and details are of a high standard. The flagstones along the path are decorated with symbols from Norwegian history and are both original and informative. Photograph: Dagrunn Husum.



Figure 10.2 Forsand service area lies by the side of rv 835 at Sagfjord in Steigen, Nordland. The service area has been designed in consultation with artists and a landscape architect and was praised in the competition for the "Beautiful Roads Prize" in 1994. The jury mentioned in particular "With its special character, this service area stands out as a place with identity and artistic craftsmanship, which gives it a special significance beyond the purely functional. The rough use of natural stone materials taken from the region contribute to strengthening the landscape qualities in the area." Photograph: Gunn Harbitz



Figure 10.3 E6 at Dovrefjell, Sør-Trøndelag. Safety barriers are used to separate the parking area from the road. They spoil the view of the picturesque buildings which make up Kongsvoll farm. This was originally a coaching station. Photograph: Amund Vik



Figure 10.4 E 6, Drivdalen, Sør-Trøndelag. In addition to its primary function, this service area is also a good starting point for those wishing to walk part of the old road at Vårstigen. This is encouraged through the provision of an information board and an underpass beneath the E6. Photograph: Gunnar Tørud.

11 Road equipment and walls



Figure 11.1 St. Croix, Frederikstad.
The noise barrier has been designed to suit the modernistic architecture of the surrounding houses.
Photograph: Ulf Haraldsen

The previous chapters dealt with the way in which the location of roads and streets, their geometry and design fit into the cultural environment, and how they can influence it. The road and its surroundings also require further constructions and equipment in order to function in a satisfactory way for motorists and for those living near the road. Signs, railings, sound barriers and constructions are important elements in the road environment. In many cases these may have a greater effect on the cultural environment than the streets or roads themselves.

This chapter contains a brief presentation of the themes and some actual problems relating to the cultural environment. Further information can be found in the recommended literature.

Sound barriers

Traffic noise is an environmental problem which affects a great number of people. It is important for personal enjoyment and health not to be exposed to noise, especially in residential areas. From the mid-1970s onwards, considerable resources have been spent on noise-remedial measures, and conditions have improved for many people.

Unfortunately, there are many examples where the noise-remedial measures function well, but look ugly. The result has been a visual depreciation of the road environment. The construction of sound barriers can be a major encroachment in the cultural environment. In recent years, greater emphasis has been placed on better architectural design of sound barriers. Adaptation to the location is a vital factor. What may be a "pretty" sound barrier in one spot may not be so pretty in another. The concept of

adaptation to the location also encompasses the cultural history of the area. Thus, in planning noise-remedial measures, historical and cultural assets must be taken into account, alongside aesthetics.

When noise-remedial measures are applied directly to a building in the form of facade insulation, this can cause problems for historic buildings, since windows and panelling have to be replaced. Adaptations and minor rebuilding work may also be necessary inside. When noise-remedial measures are planned for buildings which are worthy of preservation and in valuable cultural environments, architectural advice must be sought in co-operation with the local Cultural Heritage

Figure 11.2 E 18, Drammensveien, Oslo. An old Swiss-style villa of red-painted timber and with a characteristic tower. The noise level outdoors was 70 dBA. In designing the noise barrier, attention was paid to suiting it to the building. Stylistic elements from the house are used in the construction of the screen. Photograph: Bjørbekk and Lindheim A/S.



Walls



Figure 11.3 E 6 Gudbrandsdalen, Oppland. The road lies too close to the old building. The concrete block wall does not suit the building and detracts from the cultural environment. The result would have been better had natural stone been used. Photograph: Amund Vik



Figure 11.4 Tunnelling work for the Fløyfjells tunnel in Bergen entailed major encroachments. Exact registration was carried out beforehand. Later, the park was rebuilt using new materials which were in keeping with the original cultural environment. Photograph: Tone Høyland Stople.

Railing

Figure 11.5 E 18 Søndeled, Aust-Agder. New safety barriers have been erected in front of the elegant rows of guard stones. They are so large that the pretty stone bridge is hidden from motorists.

Photograph: Ulf Haraldsen

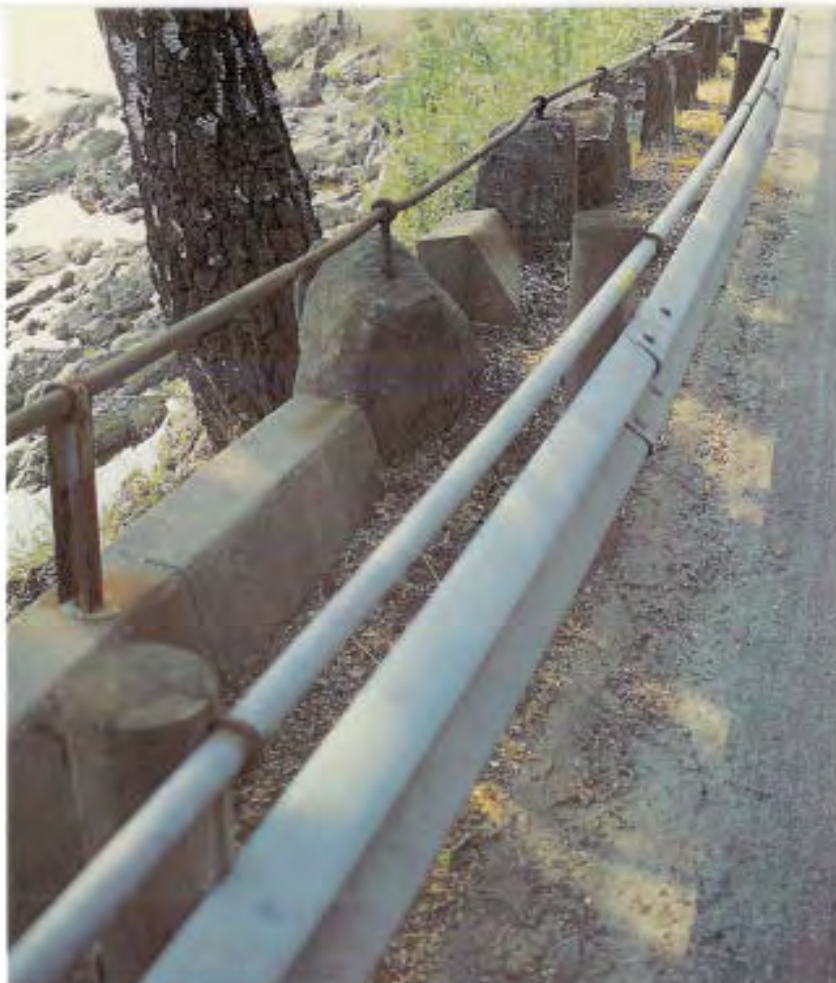


Figure 11.6 Whilst the old guard stone railings no longer meet modern requirements for traffic safety, this solution from Geiranger in Møre og Romsdal follows tradition and fits in well with this pretty cultural environment. Photograph: Anne Trine Hoel



Signs



Figure 11.7 Rv 111, Sarpsborg. The line of vision continues through the archway and into the avenue leading to Hafslund farm. The effect is spoiled by all the road signs which are put up to direct the motorists. Photograph: Ulf Haraldsen



Figure 11.8 Ski Church, Akershus. The sign on the left side of the road spoils the overall impression of stone wall, church and church yard. Is this sign strictly necessary, given that the speed limit here is 50 km/h.? Photograph: Amund Vik

Useful literature:

Norwegian Public Roads Administration, Oslo. Sound barriers in Oslo; a catalogue of ideas (in Norwegian).

Directorate of Public Roads. Handbook no, 182. Dry stone walling with machines. Guidelines (in Norwegian)

12 Maintenance and operation

The forces of nature and the wear and tear of traffic on the roads mean that constant maintenance of the road network is necessary. Every year, NOK 3,5 - 4,000,000,000 is spent on maintenance and operation of the national highway network, which is used for snow clearance, gritting and salting in the winter months, and care of roadside vegetation, asphaltting, ditch clearance and minor improvements to roads and road-related construction during the summer months. The aim is to maintain the standard of the roads, particularly regarding traffic safety and accessibility.



Figure 12.1 Holmestrand Museum, Vestfold. Snow from the main road has been ploughed right up against the walls of the building. There is danger of damage from rot. The archway is protected. Photograph: Inge Lindblom



Figure 12.2 Borgestad, Telemark. Road salting is the probable cause of damage to this valuable avenue. For this reason, the Norwegian Public Roads Administration agreed to stop salting this stretch of road in 1993. Photograph: Per Anker Pedersen

Maintenance measures are carried out without any formal planning process. In the case of ditch drainage and minor improvements, additional space alongside the road edge may be needed. This is arranged directly with the land owner.

Ditch drainage is necessary in order to direct the water away so that it does not seep into the body of the road, destroying the road's carrying capacity and making it dangerous. Superficially, this would not appear to be a problem which would affect historic monuments and sites. However, in some areas, burial mounds may lie right beside the road, and widening ditches may lead to encroachment into automatically-protected historic monuments and sites. It is also important to take trees, buildings, old roads etc. into account. It would be helpful to send an overview of any planned ditch drainage measures and other work on the verges to the Cultural Heritage Authority before the summer season. In this way, possible areas of conflict can be clarified.

Water spray from road traffic and snow lying up against wooden houses can cause rot. Salt from the roads can damage valuable vegetation, stone walls which should be preserved and buildings. Road traffic vibration can also damage buildings.

On the following page there are some examples of possible conflicts between historic sites and road maintenance. Finally, there is an excerpt from the "Report on Norangsdalen. Road culture in the natural landscape" which is a systematic survey including historic assets along the national highway through Norangsdalen and the maintenance routines which take these assets into account.



Figure 12.3 Steinhvelvs Bridge, Søndeled, Aust Agder. Several layers of asphalt, which have not been smoothed down, form uneven, horizontal edges. The road surface is now higher than the bridge's original level. The uneven lines of the asphalt surface are in strong contrast with the stone masons' original precise adaptation. Photograph: Ulf Haraldsen



Figure 12.4 Norangsdalen, Møre og Romsdal. Loose rock from gradient work at other spots along the road has been tipped over an old stone wall. The reason is that the road is too narrow, and is subject to falls of rock and ice from the mountains. Photograph: Anne Trine Hoel.



Just before the tourists disembark from the steam ship Haakon VII.

The horses and carriages are ready and waiting on Øye quay.

Example. Excerpt from "Report on Norangsdalen. Road culture in the natural landscape."

Foreword

Old roads and remains of roads are part of our cultural history. At a time when our roads are constructed using modern techniques, our old road history may easily sink into oblivion. Now and then, it is a good idea to stop what we are doing, not only to look to the past but also to look around us in every direction.

Norangsdalen is a unique valley route; rich in natural and historic experiences. An old route, which itself offers great challenges, winds through the valley. In many ways, time stands still in Norangsdalen. When you stand with this survey report in your hands, the Norwegian Public Roads Administration, Møre og Romsdal wants you to notice that the natural and historic qualities in the valley are well worth preserving for posterity. This will influence the way in which we as a roads authority will act in this valley area.

Paul Bolset

Paul Bolset
Head of development

Arne Johnsen

Arne Johnsen
Head of traffic

Summary

There is an historic atmosphere in Norangsdalen. At the end of the last century, tourist ships came right up to Øye quay. Short but hectic summer seasons created optimism in the tourist industry and many hotels sprang up in the valley. Horse and carriage brought many a famous person along the old route to Hellesylt. But from the 1930s onwards, the tourist trade steadily

diminished, the car began to replace the horse and Norangsdalen became a backwater in comparison with other tourist destinations.

The old road is now designated a national highway. Tourist traffic is on the increase, and after Queen Sonja drove the guests at her Silver Wedding through the valley in 1993, Norangsdalen was christened the "Queen's Way".

Over the years, rv 655 has been the subject of continual improvements. The road through the valley faces new challenges regarding quality and adaptation. This report is primarily a register of the assets in Norangsdalen and a basis for discussion for the framework for measures which will affect the valley. The report concludes by establishing what measures can actually be carried out within this framework. This is an idea of the methods used.

The report has been produced by the Norwegian Public Roads Administration, Møre og Romsdal, by Anne Trine Hoel, who is a landscape architect.

Ragnar Evensen an architect employed by the Norwegian Public Roads Administration, Møre og Romsdal, assisted with the registration work.

Framework for measures in Norangsdalen

Road standard:

Goal: The road should form a natural part of the natural and cultural landscape, in appearance, alignment and standard. The road should be subordinated to the landscape, based on the fact that the road should remain as it is, but with a minimum standard regarding safety and functionality.

Culture/nature/outdoor life

Goal: Norangsdalen will remain an attractive cultural and historic jewel.

Measures:

- Protection: the proposal is that the valley should be a protected landscape area, based on geological conditions and the historic whole, interacting with nature and culture (one of the most distinctive areas in Møre og Romsdal.)

- Land use: Stranda municipality and Ørsta municipality must limit expansion in their areas, in order to safeguard/protect the



valley through the land-use section of the municipal master plan (Planning and Building Act).

- Outdoor life: channel mountain walking by making use of existing paths and parking facilities in hiking areas. Possibly safeguard land/ adapt it for parking areas, hiking areas and set up information boards regarding hiking trails and what there is to see in Norangsdalen. Restrictions regarding recreational diving in Lygnstølvatnet. The simple outdoor life should take precedence.

- Care of the landscape: maintain grazing by sheep and cattle to safeguard the cultural landscape, and to prevent scrub and woodland from taking over.

- Restoration: restore the old road, stream culverts, stone bridges and adhere to the style of construction.

Tourism:

- Goal: Tourists and others should feel welcome in Norangsdalen. Adaptations should be simple and show consideration for the road and the landscape.

Administration:

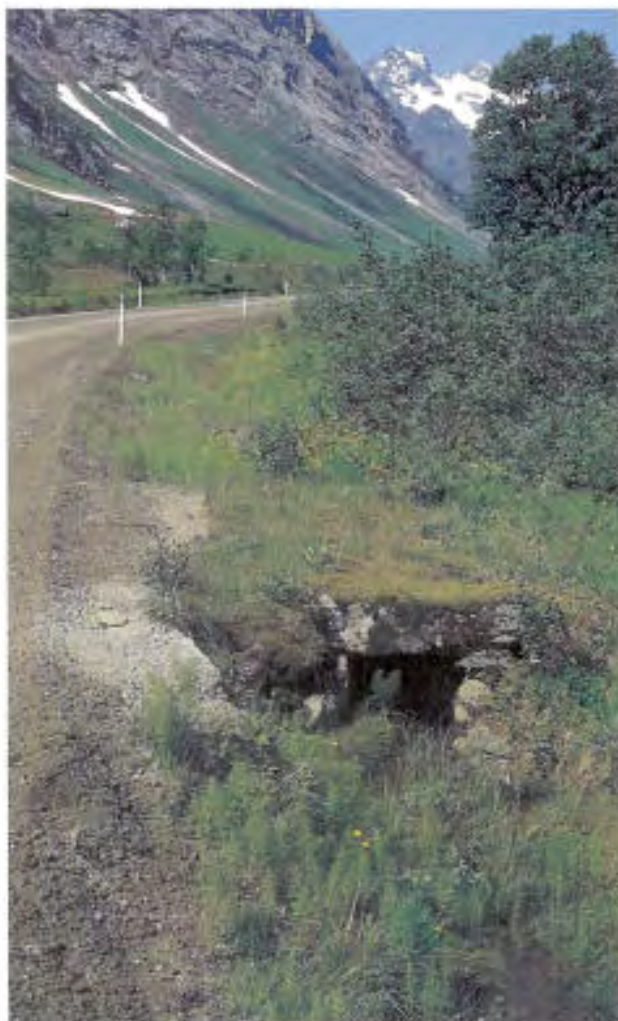
Goal: All users should show consideration and respect for the cultural history and the natural landscape of Norangsdalen.

Measures:

- Project co-operation: a "Contact group for Norangsdalen" should be set up, with representatives from the government, municipality and residents. The group will give advice and set out proposals for the measures.

- The Roads Administration, internal: an internal group within the Roads Administration must be set up to carry out the project.

A good, old-fashioned footbridge is one way to get across the ditch; traffic safety is something else.



The road across the bog is narrow, but a number of passing places have been built. Drainage work has been carried out here, but the choice of materials, and the final appearance leave much to be desired.



13 Construction roads, spoil heaps and quarries

Construction roads, spoil heaps and quarries are important elements in road construction and ones which require space. On the whole, they are temporary measures which are removed when the construction is finished. When such matters are first dealt with at a late stage in the planning process, the chance of finding good solutions is often reduced, since the alignment of the road and its placement in the terrain have already been established. If conflicts with historic monuments and sites occur at this stage, the construction work is often delayed. Therefore it is necessary to look at the needs of the construction process at an early planning stage. In this way, potential problem areas concerning historic monuments and sites can be revealed at an early stage and later conflicts can be avoided.

Spoil heaps are usually permanent. In modern road construction, there are two reasons which make excess material a real problem. The first is the construction of numerous tunnels, which are often long. The second is that the alignment of the road is often sunk into the terrain in built-up areas in order to reduce noise for the surrounding buildings. The location of spoil heaps is a particular problem in the construction of major tunnel projects. These problems must be included when considering the choice of route at a high level, since they may influence the choice of alternative.

Stone quarrying, gravel extraction etc., are often necessary for new roads. They often entail major incursions which are highly visible in the landscape. On the whole, it is usually the aesthetic approach (the visual landscape) which is the most important.

Rock extraction which spoils the effect of an otherwise valuable cultural environment is to be avoided, since it will spoil the effect of the whole.

An important condition in considering new gravel extraction is that the homes of early Man were very often in such gravel lands, since these areas were well-drained. In coastal areas, the probability of finding automatically-protected historic monuments and sites (such as dwellings etc.) on the old shore lines is very high.



Figure 13.1 Lærdal. Sogn og Fjordane. During the construction of the tunnel from Lærdal to Aurland, an old summer road was improved and extended. The cultural environment at the mouth of Tynjadalen is particularly valuable. Great emphasis was placed on retaining as much as possible of the old road, while making any new incursion as gentle as possible. The new dry stone wall is a good example of adaptation to the original walls and the terrain along the summer road. Photograph: Ulf Haraldsen



Figure 13.2 Rallarvegen, from Haugastøl to Flom across Finse, was originally a construction road built during the construction of the Bergen railway. In recent years it has become very popular for cycle trips over the mountains, and minor improvements and maintenance are carried out. This is an example of preservation through new use. Photograph: Ragnhild Hoel.



Figure 13.3 Valdalen, Møre og Romsdal. The gravel quarry is all too visible in this delightful landscape. Photograph: Gudmund Hoel.

14. The Cultural Heritage Authority

Past and present administration

The Directorate for Cultural Heritage, Riksantikvaren (RA), is the advisory and executive body for the Ministry of the Environment on questions concerning cultural heritage management.

The Directorate for Cultural Heritage is responsible for the implementation of the Government's cultural heritage policy. In this connection, the Directorate is the professional supervisor for the county municipalities, the regional museums, the Council for Sami Cultural Heritage and the Governor of Svalbard.

The Directorate should ensure that the district councils consider the historic monuments and sites and cultural environments as important local resources.

The county municipalities and the Council for Sami Cultural Heritage are the regional cultural heritage authorities and in that role are the municipalities' partners in land-use planning matters. Cultural heritage management has become more democratic as the county municipalities' comments on planning matters can be dealt with by the elected county council or by one of its committees. Permission for ventures which threaten cultural environments and historic monuments and sites of national importance must be clarified by the Directorate for Cultural Heritage.

The municipality is the executive planning authority for municipal development plans and local development plans in accordance with the Planning and Building Act and, as such, is responsible for cultural environments and historic monuments and sites.

Ministry of the Environment
Preservation policies and methods
Changes in the law, interpretations, regulations
Main guidelines
Main cases of principle
Budgeting
Cases where the Directorate for Cultural Heritage
has power of decision



The Directorate for Cultural Heritage

Directorate responsibility for all cultural heritage protection which includes administration, implementation and co-ordination. The Directorate is also the advisory and executive body for the Ministry of the Environment.

This includes:

- Protection and dispensation measures*
- Complaints authority for measures decided by the county municipalities and the administrative museums.*
- Administrative responsibility for buildings and sites from the Middle Ages*
- Developing guidelines for:*
 - Criteria for preservation work*
 - Managing cultural monuments and sites in the physical planning process*
 - Care and maintenance work*
 - Information strategy*



Figure 14.1
 Organisation chart showing the Cultural Heritage Authority.

The development of the legislation and organisation of the Cultural Heritage Authority.

The National Romantic Movement, together with the need of the Norwegian people to "find their roots" after some 370 years under Danish rule, created an interest in a distinctively Norwegian architectural style in the 1800s. The Society for Ancient Monuments was founded in 1844, primarily to save the remaining stave churches which were threatened with demolition and sale. The Society eventually expanded its own areas of interest to include farm buildings in inland areas, which were at that time regarded as "the Norwegian building style."

A law was passed in 1905 concerning the remaining monuments, primarily intended to protect burial mounds from amateur excavations. The Directorate for Cultural Heritage (Riksantikvaren) was set up in 1912. At this point, the State took over formal responsibility for the preservation of buildings.

Excavations, research into ancient monuments and the authority to grant dispensation for intervention in cultural monuments were the responsibilities of the archaeological museums. The Law on the Protection of Buildings in 1920 opened the way for the protection of individual objects dating from after the Reformation.

In 1951, the Law on Cultural monuments and sites was revised and renamed the Cultural Heritage Act. This opened the way for the preservation of technical cultural monuments and sites, such as old routes, bridges, road signs etc. Areas around cultural sites and monuments which are connected with their history could also be protected, following the revision of the Law. All mediaeval buildings and remains of mediaeval buildings were now automatically protected.

In 1978, the Protection of Buildings Act and the Cultural Heritage Act were combined to form the Cultural Heritage Act. This included the protection of

all Sami cultural monuments and sites over 100 years old. Previously, shipwrecks more than 100 years old were the property of the State. The work with the cultural heritage authority steadily expanded in line with alterations to the legal framework. The focus turned increasingly upon cultural environments and the connection between cultural monuments and sites and the landscape

The organisation of cultural heritage conservation was altered between 1988 and 1990. The Directorate for Cultural Heritage (formerly Riksantikvaren) became a Directorate and in 1990 took over a number of tasks which were previously the responsibility of the Ministry of the Environment. Consideration of planning cases, together with other tasks were delegated to the county authorities and the Council for Sami Cultural Heritage.

Laws and definitions

The Cultural Heritage Act is the central legal framework for the Cultural Heritage Authority. It provides the foundations for the preservation and management of historic monuments and sites and cultural environments. The purpose of the Act (§ 1) is defined thus:

"The purpose of this Act is to protect historic monuments and sites and cultural environments in all their variety and detail, both as part of our cultural heritage and as an element in the overall environment and resource management. It is a national responsibility to safeguard these resources as scientific source material and as a permanent basis which present and future generations can experience, understand, enjoy and participate in. The intention of this Act must also be taken into account in any decision taken pursuant to another Act which may affect the cultural heritage".

The Act defines historic monuments and sites and cultural environments thus:

"The term *historic monuments and sites* is defined here as all traces of human activity in our physical environment, including places associated with historical events, beliefs or traditions.

"The term *cultural environment*" is defined here as any area where a monument or site forms part of a larger entity or context.

"The Cultural Heritage Act states that "Historic monuments, sites and cultural environments which are of cultural-historical or architectural value can be protected under this Act." Criteria for protection values will be dealt with later in this chapter.

The concept of the cultural landscape is not used in the Cultural Heritage Act. It means the landscape as it has been affected by human activity and is covered by the concept of the cultural environment. The vast majority of landscapes have been affected by human activity. The word cultural landscape is often used about the agricultural landscape, but this is a narrow use of the concept.

Any historic monument or site which pre-dates the Reformation (1537) is *automatically protected* under the terms of the Cultural Heritage Act and is designated *automatically-protected cultural heritage*. Sami monuments and sites more than 100 years old are also *automatically protected*.

Automatically-protected monuments and sites also have a safety zone which extends a minimum of five metres from the visible or known boundary. Underwater shipwrecks more than 100 years old are also automatically protected.

The Cultural Heritage Act can grant permission for ventures which affect automatically-protected monuments and sites and ship finds more than 100 years old if this is important in a development case, such as a road project. The county cultural heritage authority can recommend that dispensation can be granted from the conditions connected to protection status. Decisions regarding dispensation are taken by the county museums or by the Directorate for Cultural Heritage. The costs of any archaeological surveys which may be necessary are to be met by the contractor.

Historic monuments and sites which are not automatically protected can be protected under the Cultural Heritage Act. Such cases require thorough specialist evaluation and documentation. Thereafter, there will be a hearing which may lead to the granting of protection status. This is known as a *protection order*, to distinguish this form of protection from automatic protection.

The Cultural Heritage Act also enables the area surrounding a protected monument or site to be protected, in order to preserve the effect of the monument or site on the environment or to protect scientific interests associated with it (§ 19). An entire cultural environment can also be protected (§ 20) in order to preserve its cultural-historical value. The individual historic monument and sites which make up such an area do not necessarily need to be worthy of preservation, but it is the unity and context in which these sites and monuments are found which together making it worthy of preservation. Travel and industry in such areas can be regulated through such a preservation order.

Only a limited number of valuable monuments and sites and cultural environments can be protected, and these should be those which are the most valuable and most representative. Other valuable monuments and sites and cultural environments can be granted a protection order through the application of the Planning and Building Act, e.g. through zoning as "Special area preservation" (§ 25.6). However, protection is the strongest formal preservation.

The Planning and Building Act is also important for the Cultural Heritage Authority as it ensures co-operation in different planning cases. The Act allows objections to be made to plans which threaten important monuments, sites or cultural environments. If objections are raised, the municipality is no longer permitted to approve the plan itself. If the case cannot be resolved through arbitration through the County Governor, the case is decided by the Ministry of the Environment.

Current goals and values of the Cultural Heritage Authority

The Cultural Heritage Authority has moved from an object-oriented approach to an overall approach and is a vital element within environmental protection. These five general environmental-political principles form the basis of its work:

1. Sustainable development - limits

Historic monuments and sites and cultural environments are non-renewable resources and create environmental qualities. They must be protected and managed for the use of society so that their assets are not lost and their complexity, distinctiveness or representivity does not disappear for future generations.

2. Environmental protection as a corporate responsibility

The Directorate for Cultural Heritage is responsible for formulating national environmental goals for the Cultural Heritage Authority, giving specialist advice regarding environmental demands in other sectors and seeing that these are followed up. The Directorate draws up guidelines and offers guidance for county municipalities and municipalities. The county municipalities and municipalities are responsible for seeing that this is followed up.

3. The sector principle

The individual sectors/contractors are themselves responsible for taking monuments, sites and cultural environments in consideration. They are responsible for evaluating and clarifying consequences and possible alternative solutions for ventures and actions which could bring about the destruction of monuments, sites and cultural environments. The costs must be met by the sector/contractor. The individual sectors are also responsible for their own historic monuments and sites.

4. The before-and-after principle.

Any doubt about the consequences of a venture or action must be resolved in a way which benefits the cultural environment. Before planning and budgeting begins, contact should be made with the appropriate authority. Environmental impact assessments must be carried out for cultural heritage assets in planned ventures. This type of assessment must be an integrated part of all proceedings in accordance with the Cultural Heritage Act and the Planning and Building Act.

5. Cost effectiveness

All levels within the environmental sector are required to work together. The environmental goals must be achieved at the lowest possible socio-economic costs. Other important social goals (employment, economic growth, competitive ability) must not be significantly endangered.

In assessing historic monuments and sites and cultural environments for protection, a number of different conditions or sub-values must be taken into account:

- *Identity value*
- *Symbolic value*
- *Value as an historic source*
- *Age*
- *Authenticity*
- *Representivity - rarity*
- *Variation - homogeneity*
- *Environmental value*
- *Educational value- Beauty and artistic value*
- *Usage value*

There are no exact criteria which state when a monument or site is so valuable that it must be preserved or protected. The evaluation will depend on a specialist evaluation of the individual cases. The importance of the different sub-values will vary between post-Reformation monuments and sites, automatically-protected monuments and sites and cultural environments. When the protection value is clear, it must then be evaluated in relation to other social interests.

Value-assessment of all types of historic monuments and sites and cultural environments will be carried out in conjunction with the planning process, in accordance with the Planning and Building Act. In the case of automatically-protected monuments and sites,

Sub-values

Identity value

The cultural environment or monument or site as an identity-creating element in the surroundings for the local population, a social stratum, an ethnic or religious group, etc.

Symbolic value

The cultural environment, monument or site as a symbol of or for a local environment, a significant event etc.

Value as an historic source

Monuments, sites and cultural environments as sources of knowledge about our past including:

- dwelling and living conditions, social conditions, working life and economic structure
- technical opportunities and limitations within a period, building styles/architectural history, style and taste
- objects or places which have a special place in history by being for example, the first or an early example and thus the norm-giving element in new functions, constructions, technology or style.
- important events or important people

Age

Cultural monuments and sites which predates 1750 are usually worth preserving. If they are well-preserved or if

there are significant remains intact, they may also be suitable for protection.

Monuments and sites dating from between 1750 and 1850 which remain almost unchanged are also worth preserving. Great age within a certain type of monument or site or great age within a limited geographical area will also carry a high age value.

Authenticity

The degree of authenticity of the site, monument or environment from a defined period.

Rarity

Monuments, sites and cultural environments which are rare are designated as being valuable.

Representivity

It is desirable to preserve more common monuments and sites and cultural environments for the future. What may be common today may become rare in the future.

Variation

The value of a cultural environment increases if it has a cultural-historic variation of the age and type of monuments and sites and if it has biological diversity.

Homogeneity

Homogeneity is the opposite of variation. A homogeneous

area is an area with a large degree of uniformity of type or age.

Environmental value, unity and context

Monuments and sites have a high environmental value if they are important for the cultural environments in which they stand by being particularly visible or by being part of a context which should not be broken.

The contexts (structures) which make up a cultural environments and the unity which the structures create are important criteria for environmental value.

Educational value

The ability of the monuments and sites and the cultural environments to illustrate the past in a clear manner.

Beauty and artistic value

The beauty of the monuments and sites and the cultural environments themselves and/or in the context of their surroundings.

Data register of monuments and sites and cultural environments

*Municipalities:
SEFRAK. Building register for buildings from before 1900.*

Any municipal reports/registers of local cultural heritage environments

*County municipality, County Conservation Authority:
Overview of protected monuments and sites and automatically protected monuments and sites.*

*The County Governor:
Register of valuable cultural landscapes*

Directorate for Cultural Heritage, archives: Buildings, protected monuments and sites etc.

the evaluation will be part of a dispensation case, in accordance with the Cultural Heritage Act. A cultural environment can also be protected in accordance with the Natural Protection Act, as a landscape protection area.

The protection value of a cultural monument or site or a cultural environment is designated as being of national importance, regional importance and local importance. In the main, an historic monument or site or cultural environment which is protected or worthy of protection will be of national importance. Nonetheless, cultural environments, monuments and sites of regional or local importance are important in their own areas. These will normally have to be protected through the Planning and Building Act. Local initiatives and actions will form a central part in deciding what should be preserved in the local environment. The road planning process may often be the cause of the start of the preservation process, as it often takes an external conflict to make local people look up and take notice of the cultural environments within their own district.

The Norwegian Public Roads Administration has produced a handbook on impact assessment (handbook 140) which shows the methodology for the assessment of non-economic consequences, including historic monuments and sites and cultural environments (see chapter 15). This is a useful tool in systematising cultural heritage interests in a road planning process.

Overviews of historic monuments and sites are usually to be found with the county municipality or the Sami Council for Cultural Heritage. They have an overview of the known, automatically-protected monuments and sites within their district. The SEFRAK register of buildings dating from before 1900 covers most municipalities. A survey of valuable cultural landscapes within the counties has also been carried out.

One of the problems with automatically-protected monuments and sites is that only a few of them have actually been discovered. They often lie well-hidden beneath the turf or soil. In order to evaluate the chances of finding hitherto unknown automatically-protected monuments and sites, the Cultural Heritage Authority must be able to give a specialist evaluation at a higher planning level. Nevertheless, more detailed surveys may be required when the choice of alignment has been made, and any discoveries made at this stage may lead to another route having to be chosen. Close co-operation at an early stage is therefore highly desirable.

15 The Roads Authority

The Organisation of the Norwegian Public Roads Administration

The terms national highways, county roads, municipal roads and private roads all correspond with the relevant administrative levels. The national highways are financed through the national budget and are administered by the Norwegian Public Roads Administration. The county roads are financed through the county budget. The County Roads Office also acts as the county roads administration. The municipal roads are administered and financed by the municipalities.

The Norwegian Public Roads Administration consists of the Directorate of Public Roads and a unit in each county. The Directorate of Public Roads is responsible for, and co-ordinates the expansion and running of, the national highway network (administrative section) and for developing norms, guidelines, research, development and training (competence section).

Each county unit comprises four departments: development, traffic, production and administration departments.

The Road Development Department has complete responsibility for the individual road projects, including planning, finance, initiatives and quality.

The Traffic Department is responsible for safe and effective traffic development, together with the proper maintenance of the national and county roads network. The department is responsible for ensuring that road users have sufficient knowledge and

Director of Public Roads



Figure 15.1 The organisation of the Public Roads Administration at county level.

The development of the legal framework and the organisation of the Road Authority

The first laws governing roads and road conditions stem from the *Frostatingsloven* and the *Gulatingssloven* (900 - 1274). In chapter 19 of the *Gulatingssloven*, it states that: "Common roads (*thjodveg*) and summer farm roads and all cow paths shall remain as they have been from the olden days." The law further lays down the basis for altering roads:

In *Magnus Lagabter's Land Law* dating from 1274, it states that roads should be circa 5 metres wide at 2 metres height "The farmers were obliged to keep the roads in the condition described above through collective working.

In 1636, Christian IV issued an edict requiring the main roads to be made passable by horse and carriage. At the same time, construction started on navigable roads, known as the *Kings roads*. Road work was compulsory and was supervised by bailiffs, clerks and judges. The farmers were required to provide transport for travellers. The organisation of the postal service in 1647 led to an

improvement in the roads between the major cities and to Copenhagen.

In 1665, two general road master offices were set up, which were later laid down. They were resurrected in 1760 and later expanded to become 4 general road master offices. Military considerations were vital in planning the roads, and soldiers participated in road construction.

In 1824, a new Roads Act was passed which divided the roads into main roads and country roads. Main roads included all roads linking Norway to Sweden, roads between different parts of the country and between cities and approach roads to cities. The government became the deciding authority for main roads. It decided how the work was to be carried out and how the costs would be met.

The County Governor, who was a civil servant, was responsible for running the road administration in his county. A new Roads Act was passed in 1851. Formally, the government retained

responsibility for the roads, but since it depended on grants the government could not make, the decision making authority was in reality transferred from the government to locally-elected bodies. By now, road construction has become so extensive that it could no longer be based on the farmers' contributions. The Act paved the way for putting road construction work out to tender and allowing the Roads Administration to carry out the work itself.

The Directorate of Public Roads was set up in 1864. Government grants and ventures now formed the basis for road construction. A new Roads Act was passed in 1912. This transferred the ownership of public roads to the public through the state, the county or the district.

are sufficiently well-advised before they join the traffic flow, and that vehicles meet requirements regarding safety and the environment. In addition, the department is required to put forward measures for developing the road traffic system in line with society's requirements, based on a knowledge of the state of the road network and future transport requirements.

The Production Department is responsible for the construction and maintenance work on the national and county road network which is done under its own auspices.

Legal framework

All road planning work is done in accordance with the Planning and Building Act (since 1994). The choice of route is usually made through the municipal sub-plan. The final confirmation of the alignment and necessary road area is clarified in the local development plan. The Planning and Building Act is described further in chapter 15. The Roads Act continues to be valid for building set-back limits and access points outside zoned areas.

The goals and values of the Road Authority

The purpose and vision of the Norwegian Public Roads Administration

Today's specialised society is dependent on a good transport system in order to be able to function. The role of the Norwegian Public Roads Administration is to pave the way for essential road transport in an appropriate and effective way. Transport and road projects are not goals in themselves. The *underlying principle* in the work of the Norwegian Public Roads Administration is formulated thus:

The Public Roads Administration is responsible for roads and traffic in working for a better society.

A good road network is regarded by the majority as both good and important, but it creates problems in the form of traffic accidents and environmental impact. The challenge is to solve the transport problems in a way which minimises the disadvantages. The Department has a vision for its work, formulated thus:

- 1. The country is linked together in an environmentally-friendly, safe and effective way.*
- 2. We will contribute towards the creation of pleasant and viable local communities.*
- 3. It is both easy and enjoyable to travel by road.*

4. We are regarded as a competitive and creative department.
5. Our work is characterised by respect and consideration for mankind.

The first two points in particular concern our relationship to the cultural environment and to the Cultural Heritage Authority, and are expanded in the following sub-points:•

- We are working towards environmentally-friendly transport•
- We co-operate across sector boundaries, are involved in important transport questions and show the impacts of road transport on society.•
- Roads are designed to suit the surroundings and with a high architectural quality.•
- We are contributing to positive developments of areas and towns in co-operation with the local population.

The relation to cultural environments and historic monuments and sites is not specifically mentioned. However, the Norwegian road and road traffic plan (94-97) states that:

** However, it is also important to note that the protection of nature and outdoor areas, cultural landscapes and architectural values etc., is an important part of environmental politics.**

These visions were used to form the basis for developing goals for our work, both short-term and long-term. These are carried out through the Norwegian road and road traffic plan (NRRP) and annual budgets. The goals will be determined by finance and decided politically.

Visions are something to strive towards. When they are concretised they may come into conflict with each other. Such conflict may become apparent in the individual road projects. The conflict potential can be reduced by close co-operation and creative idea-finding. This is discussed further in chapter 16.

Some fundamental features in the Road Design Manual.

The Road Design Manual contains requirements, recommendations and guidelines concerning the development of the road network. As a basis, the norms apply to all public roads. The authority to depart from these norms lies with the Directorate of Public Roads for national highways, the county executive board for county roads and the municipal executive board for municipal roads.

The principle of a function-differentiated road network is very important in modern road planning, since the principles

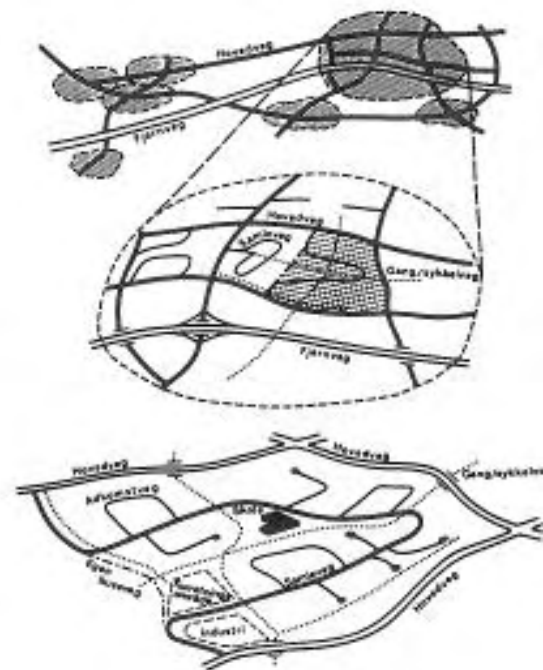


Figure 15.2 Sketch showing principle of the function-distributed road network.

Hovedveg =	Main Road
Fjernveg =	Distant Road
Samleveg =	Collector Road
Gang/ sykelveg =	Footpath and Cycle Track
Industri =	Industry
Bussveg =	Bus Lane
Adkomstveg =	Access Road
Skole =	School
Forretnings- område =	Business Area

Figure 15.3 Accident-frequency for different types of road. Accident frequency means the number of accidents reported to the police per million on vehicle kilometres.

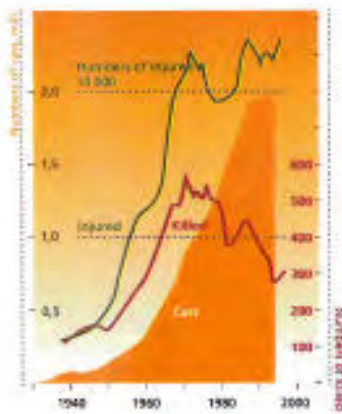
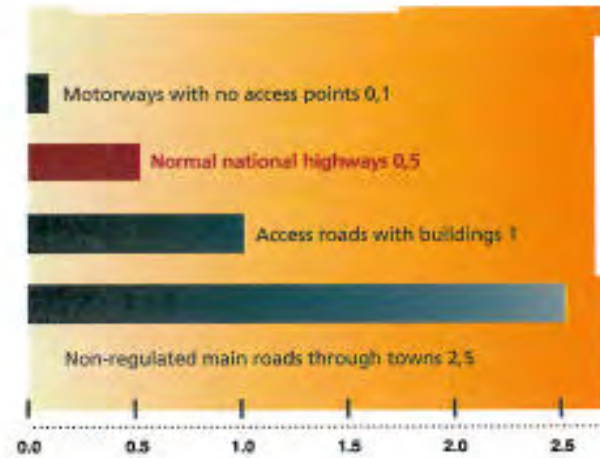


Figure 15.4 The number of vehicle kilometres has increased significantly on the road network. Nonetheless, the number of fatal accidents remains around the same level as it was in 1960. Then there were some 340,000 cars in the country. Today there are over 2 million.

governing separation and differentiation are used as a basis for Road Design Manual 017 "Design of roads and streets."

"Differentiation implies that the road system is divided into road types, depending on the road's function. The background behind road classification is a balance between the road's transport and accessibility functions."

"Separation implies working towards one cohesive road network for motorised traffic and one for pedestrians and cyclists." This is possible in built-up areas and in more extensive areas between important target areas and where mixed traffic creates problems of safety or deviation.

Our view of this principle is more subtle today than it was previously, and new methods have been introduced to reduce traffic problems, such as environmental roads, noise-remedial measures and better adaptation to the surroundings, particularly in cities.

The Road Design Manual, which was introduced in 1993, introduced a principle based on the fact that a road should be of a different shape and dimensions, depending on its location. A city street is different from a country road, both functionally and aesthetically. This is the most important basis for dividing the Road Design Manual into three area types depending on the density of the buildings:

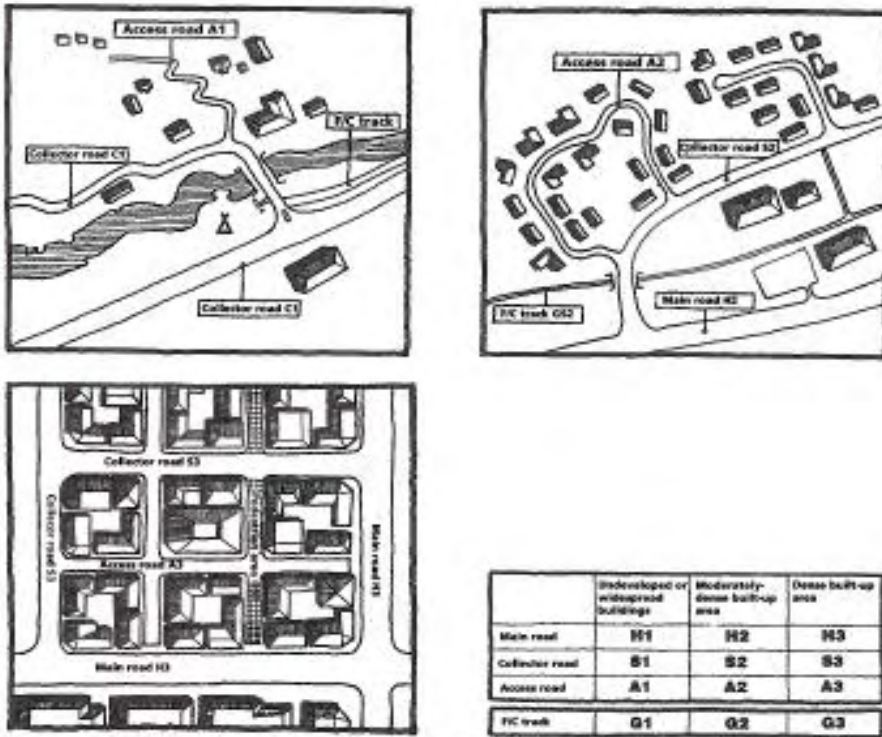


Figure 15.5 The illustration shows area types 1, 2 and 3, and a table showing standard classes.

- Type 1. Areas with scattered development
- Type 2. Areas with medium dense development
- Type 3. Areas with dense development.

In a number of areas, the Road Design Manual describes special requirements for area 3, which differ from earlier norms, and which differ from area types 1 and 2. This allows for adaptations to suit the existing street layout and buildings.

The Road Design Manual operate with four different types of road: main roads (M), collector roads (C) access roads (A) and foot and cycle paths (FC). The most important main roads are also called trunk roads. The requirements for road design vary from one area type to the next, and from one type of road to another. In all, this creates 12 standard classes.

The Road Design Manual opens the way for discretion and evaluation in many situations, and makes local adaptation possible, for example, when necessary due to cultural environment considerations. It is, however, important to distinguish between what is a requirement and what are formulated as recommendations and guidelines. If exceptions are made to concrete requirements and minimum values, this must first be approved by the authority responsible for the Road Design Manual.

16. Co-operation and planning processes

General

All road planning is done in accordance with the Planning and Building Act. The Act forms the framework for the planning and co-operation process for road projects. At the same time, it is an important instrument in the administration of cultural environments and historic monuments and sites by acting as a planning tool for preservation and qualitatively good development of cultural environments and in ensuring co-operation and participation in road planning processes (chapter 15).

The Planning and Building Act allows for the co-ordination of governmental, county municipal and municipal work, and forms the basis for ventures involving the use and protection of resources and development. The purpose of the Act is to ensure that land use and buildings are of the greatest possible benefit to both the individual and society as a whole. This then leads to the need to clarify the consequences for the individual and for different areas of society through the planning work.

The Planning and Building Act gives the government the power to develop national political guidelines (NPG) to ensure that national interests are safeguarded in local planning. The guidelines are not legally binding, but are directives for all planning carried out in accordance with the Planning and Building Act .

National political guidelines for co-ordinated area and transport planning have repercussions on the Norwegian Public Roads Administration's area of work and are therefore a vital foundation for road planning. This means that different transport

alternatives and different alternatives for area development must be seen in context.

The municipality occupies a central position in all planning matters, according to the Planning and Building Act, in that the Act permits municipal-controlled planning authorities.

The Norwegian Public Roads Administration has a special right to develop and promote drafts of overview plans, local development plans and building development plans for road and traffic constructions. The department itself can decide whether to display such plans for public inspection (§ 9-4). The Act sets out requirements for co-operative responsibility and rights for other official bodies.

The rules for handling for the land-use section of the municipal master plan and local development are very similar and require a minimum of co-operation. This is done through announcing the planning work in the start-up phase, ensuring that co-operation is sought with other official bodies and finally the official hearing process (after public inspection).

The Act gives the county municipality, neighbouring municipalities and government departments the opportunity to raise objections to the plan if there is a threat to any significant interests. This is done in conjunction with the formal statement regarding the plan. If the Municipal Council ignores the objections, the plan is sent to the County Governor who normally calls the parties in to arbitration. If an agreement cannot be reached through arbitration, the plan is then sent to the Ministry of the Environment for a decision. This means that if objections are raised, then the municipal council can no longer approve the plan itself.

It is hoped that unnecessary conflict between the Cultural Heritage Authority and the Norwegian Public Roads Administration can be avoided. Often, working together in a way which is closer and more comprehensive than the Act's minimum requirements, will help in this. Disunity and potential conflicts should be expressed as early as possible, so that there is a real chance of finding good alternative solutions.

Environmental impact assessment

The Act, with its associated regulations, states that individual road projects must be subject to an environmental impact assessment.

Road projects which already subject to environmental impact assessment in accordance with the revised regulations are:

- Motorways (Class A and B)
- Roads with investment costs exceeding NOK 400,000,000 over a period of 8 years or less.
- Roads which come under the criteria in § 4 of the regulations, point 1b) -I). These criteria include:
 - Objects or areas which are protected under § 15, § 19 or § 20 of the Cultural Heritage Act, or are temporarily protected under § 22, no. 4 of the Cultural Heritage Act.
 - Known automatically-protected historic monuments or sites, if the Cultural Heritage Authority can prove that the historic monuments and sites form part of a cultural environment which covers a long period of history.
 - Areas where the Cultural Heritage Authorities can prove that there is a high potential for discovering hitherto unknown automatically-protected historic monuments and sites which are part of a cultural environment which covers a long period of history.

Road projects with investments of more than NOK 150,000,000 which require planning preparation under the Planning and Building Act must be subjected to environmental impact assessment, if the project conflicts with one or more established environmental criteria.

The Cultural Heritage Authority must state whether such conflicts actually exist.

Road projects which are subject to environmental impact assessment must first be made public through a statement with proposals for clarification programmes. This is sent to a hearing and is put on display for public inspection. Based on the announcement and comments on this, the assessment programme is drawn up. The environmental impact assessment must be dealt with in the same way as the announcement. The environmental impact assessment for road projects will precede or run parallel with the development of the project plan. It will not be possible to obtain planning permission for the project before the environmental impact assessment is completed and approved.

According to the new provisions, the planning authorities, such as the municipality is responsible for dealing with the announcements, drawing up the assessment programme, and concluding the discussion of the environmental impact assessment. However, this is not the case for trunk roads and new road connections, for which the Directorate of Public Roads will still be responsible.

Municipal sub-plans and county sub-plans

The choice of route is usually made through the municipal sub-plan. If the actual routes run through several municipalities, the choice of route should be done using the county sub-plan.

A number of conflicting views and interests often come to light in the road planning process. It is important that environmental interests, including historic monuments and sites and cultural environments are integrated at the municipal sub-plan level. The most important decisions relating to cultural heritage interests are made at this level in the planning process.

Only a small number of pre-Reformation historic monuments and sites will be known in a planning area before planning work begins. Archive studies and a search through the registers should be carried out early in the planning process. Field registers at a higher level will be necessary in special conflict areas. The planning areas will normally be too extensive to enable comprehensive registration work to be done at an early stage. The Cultural Heritage Authority should, however, carry out a specialist evaluation of the probability of coming across historic monuments and sites in the different parts of the planning area and indicate which areas should be researched more closely.

When the number of potential routes has been reduced, a more thorough field registration should be carried out. In this way, objections to the proposed route due to a lack of clarity concerning automatically-protected historic monuments and sites will be avoided. The Norwegian Public Roads Administration, as the contractor, is required to establish whether the project affects protected historic monuments or sites.

Post-Reformation historic monuments and sites may well be registered in the SEFRAK register. In the majority of municipalities, the register only covers buildings from before 1900. Buildings from after 1900 can also be valuable historic

Site analysis

Site analysis is a method of systematising knowledge in order to understand the history of a particular site, its situation and its future possibilities. It is a tool in physical planning and is particularly useful in forming the basis for planning development, building applications and consequence evaluation.

There are different methods of site analysis, from different viewpoints. Six different methods are described in the Department of the Environment's guidelines:

- Nature and landscape analysis, which includes analysis of the green structure
- Qualitative site analysis, which is a method for interpreting the character of the site
- Realistic city analysis, which is a

method for interpreting the inner context of the architecture.

- Cultural environment analysis, which builds upon the tradition of art history
- Visual methods, such as *Kommuneatlas* (Danish method) and aesthetic city planning

The methods complement each other and together cover four major topics which should be included in a site analysis.

- historical development
- nature and landscape
- organisation of buildings, including roads and street structure
- buildings and other individual elements

For street and road projects, it will often be advantageous to map out Man's use of the site or the surroundings – the life of the site.

The scope of the site analysis must be adapted to the planning project. Care must be taken not to be "all-embracing." The aim of the analysis is to increase our knowledge and understanding of a site in order to be able to discuss its situation and future possibilities.

Further information:

Department of the Environment. *Site analysis - content and method.*

Guidelines (in Norwegian).

Department of the Environment. *Site analysis. 4 example folders* (in Norwegian.)

monuments or sites. Our knowledge of historic monuments and sites and cultural environments within a planning area can be increased through the planning process.

In many cases, it will strengthen previous knowledge about the history of an area and its development. In other cases it may lead to a new or more detailed picture of our cultural history. The result may be a number of new questions and hypotheses regarding the area and its development, which will require further reflection and time for further research. This complicates the evaluation and recommendation of routes for the Cultural Heritage Authority, especially when it must be done within a short period of time.

For the road planners, knowledge of other areas and the road's effects on these will make the planning work more difficult.

For the road planners, knowledge from other areas and the road's consequences for these will make the planning work more difficult. The road planners will need time to look at new problems and understand their scope. This also indicates the necessity for close co-operation at an early stage.

The way in which the route is evaluated can also affect the planning process. The traditional method of finding a route first and looking at the consequences afterwards has clear disadvantages. All themes, such as historic monuments, sites and cultural environments, natural assets etc. should be roughly mapped out and evaluated before alternatives are sought. Thus, the knowledge will be in place to form the terms for the work on the road solutions. Finding alternatives can be done in co-operation with affected municipalities, the county municipality and the County Governor. An ideas forum can be a good start to the planning work.

Specific guidelines have been drawn up for road planning under the Planning and Building Act (T 1057). These require the Public Roads Administration to evaluate alternative solutions, together with an environmental impact assessment as an integrated part of the planning basis.

The Directorate of Public Roads has produced its own handbook on impact analysis which must be used for this. The method in the handbook is divided into calculation of the economic consequences, and evaluation of the non-economic consequences, including monuments, site and cultural environments.

Where the Norwegian Public Roads Administration, as contractor, does not have the appropriate skills to evaluate certain consequences, then the specialist evaluation of the assets of the areas and the scope of the project must be carried out in close co-operation with the appropriate subject specialist (here the Cultural Heritage Authority). However, the contractor (in this case the Director of Public Roads) must take responsibility for the total assessment of the environmental impact, since it forms a part of the whole basis for the Director of Public Roads' recommendations for further political debate. The Cultural Heritage Authority must give its own independent statement before the political debate.

**Environmental impact assessment
The Norwegian Public Roads
Administration's method of ana-
lysis for evaluating road projects.**

Environmental impact assessment is a systematic evaluation of all the relevant advantages and disadvantages which new roads, or projects involving existing road or street networks may incur, irrespective of whether such advantages and disadvantages can be costed or not.

Calculation of costed consequences includes:

- *Time costs
- *Vehicle costs
- *Newly-created traffic usage
- *Disadvantage costs
- *Accident costs
- *Environmental costs (noise and pollution)
- *Ferry costs
- *Operation and maintenance costs
- *Collective traffic costs

Non-costed consequences are divided into the following categories:

- *Transport quality
- *Accessibility for cyclists
- *Local environment
- *Outdoor life
- *Natural environment
- *Monuments and sites
- *The landscape picture

- *Agriculture and fisheries
- *Geo- and water resources
- *Local development plans

The costed consequences are calculated in kroner (NOK). On the basis of this the net usage is calculated. The net usage is the sum of all the positive and negative costed consequences, less the investment costs. If the net usage is positive or equal to zero, the project is deemed as being economic in relation to the costed consequences.

When the net usage is divided into investment costs and alterations to operation, maintenance and ferry costs, the usage cost fraction is obtained. This is used for comparison of alternatives and for prioritising different projects.

The non-costed consequences are evaluated according to set criteria. A consequence sheet has been prepared for each theme to help in evaluations. Firstly, the current situation and characteristics are described with a statement of the assets of the area/object. Thereafter follows a qualitative, verbal description of the scope of the consequences. Finally, a total evaluation of the effect of the consequences is given based on a significance scale (see diagram).

The alternatives are compared with a reference alternative, usually known as the 0 alternative. This is a description of how the conditions on or alongside an existing road system will develop with normal traffic development and without any special measures being made. Finally, all the consequences are compared in a table. The costed consequences are given in kroner and the non-costed consequences with plusses or minuses. Thereafter the net usage and usage cost fraction are calculated in relation to the non-costed consequences, based on different emphasis of goals and groups in society. The analysis should conclude with a justified recommendation of alternative.

Effect of encroachment/alteration established upon the basis of an approximate evaluation of assets in the affected area and the scope of the project.

Small value:
Cultural monuments and sites/environments/landscapes without closely specified protection value (such as common objects in the area) are affected.

Medium value:
Cultural monuments/sites/environments/landscapes which are of regional importance or have been regulated for protection are affected.

Large value:
Cultural monuments/sites/environments/landscapes which are protected or zoned for protection or are of national or regional preservation value are affected.

Large positive magnitude:
Complete or great reduction of traffic on existing roads is decisive in increasing the *value* of an area as a cultural environment/landscape.

Fairly large positive magnitude:
Complete or great reduction of traffic on existing roads helps to strengthen the area as a cultural environment/landscape.

Small/no magnitude:
Few objects are lost or may be reduced in value as a result of close driving or damage from vibration and air pollution; the cultural environment/landscape is only marginally affected.

Fairly large negative magnitude:
Objects/areas are lost or may be reduced in value as the result of close driving or damage from vibration or pollution; the cultural environment/landscape is divided up in a way which severs historic context.

Large negative magnitude:
Objects/areas are lost or their value may be significantly reduced as a result of close driving or damage from vibration and air pollution; cultural environment/landscapes divided up in a way which severs historic context.

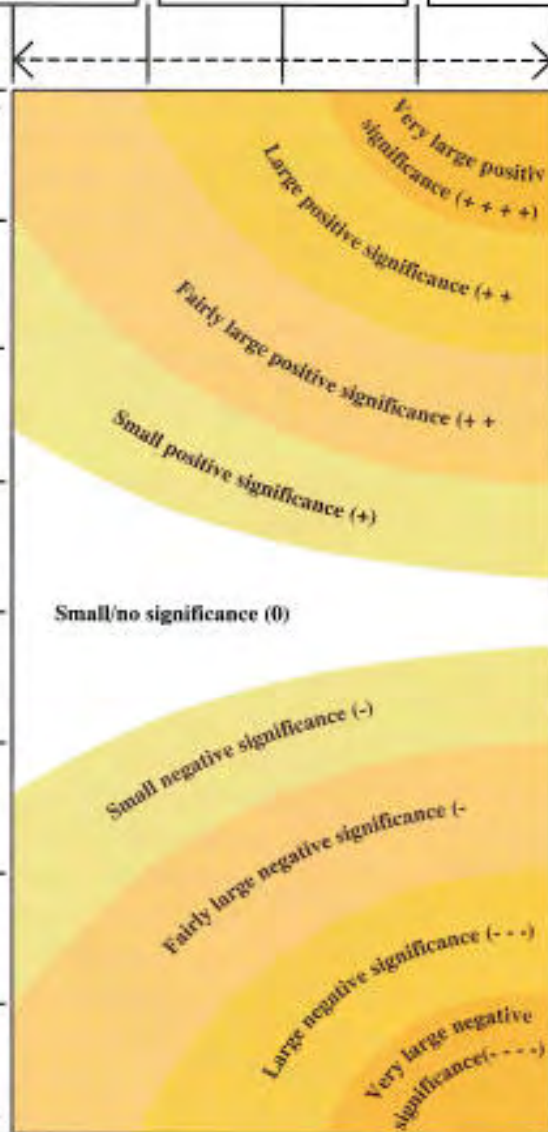


Figure 16.1. Effects on cultural monuments and environment

Main points

1. The Planning and Building Act is the legal basis for road planning and cultural heritage administration, with the district council as a central party.

2. Close co-operation at an early stage between the cultural heritage authority and the Roads Administration clarifies conflict areas at an early stage. This gives more space for finding satisfactory, constructive solutions.

3. Plenty of time and resources should be allocated to finding alternatives and alternative adaptations. Let the district council, the cultural heritage authority and others contribute in these phases, e.g. through an ideas forum.

4. The cultural heritage authority must bring in valuable monuments, sites and cultural environments in the planning area at an early stage. Details of registrations adjusted at planning level and stadium in the planning process.

Local development plans and building development plans

The local development plan lays down the alignment of a road and area usage in detail and is the legal basis for the appropriation of land. The technical and economic aspects of the local development plan are illustrated in a technical detailed plan.

At this level, the Cultural Heritage Authority will be able to influence the development of the plan through registration and/or carrying out investigations, and to clarify questions regarding possible dispensations for encroachments into automatically-protected historic monuments and sites. It is also a basis for the contractor for information regarding the scope and costs of archaeological surveys in connection with the implementation of the plan. The conditions for dispensation for encroachment in automatically-protected historic monuments and sites are included in the zoning provisions in the plan. Normally, this involves archaeological surveys. The costs and the scope of this are met by the client, as laid down in the Cultural Heritage Act.

Building development plans can be used to detail local development plans. This is most realistic for simple local development plans which on the whole have clearly defined boundaries between the zoning targets (simplified local development plans). Building development plans can also be used as the only detail plan where this has been decided in the land-use part of the municipal master plan. The intention is to bring about a simplified hearing procedure for simple operation and maintenance projects along existing roads. The handling of building development plans is simpler than local development plans. Conditions connected with cultural heritage interests are usually clarified at a higher planning level. It is however, important to be clear that in cases where the building development plan follows directly from a land-use part of a municipal master plan, the relation with archaeological historic monuments and sites will first come for clarification in the building development plan. When the local development plan is approved and dispensation for encroachment in automatically-protected historic monuments and sites has been granted, then the necessary archaeological excavations of historic monuments and sites can be carried out. Excavations can only be carried out during the summer months. Should automatically-protected monuments and sites be discovered during road construction work, then the work must stop and the county municipality must be contacted. Special dispensation must be obtained for such sites.

Construction plans/construction phases

The construction plan is the technical plan used to construct the road. It is a more detailed version of the detail plan. All area-related conditions must be clarified through the local development plan. Often, temporary conditions such as construction roads, equipment areas etc. are first considered in the building development plan. These must be clarified in earlier phases.

During the construction phase, it may be helpful to have representatives from the Cultural Heritage Authority present, when excavations are carried out in areas where there is a probability of finding hitherto unknown automatically-protected historic monuments and sites. Automatically-protected monuments and sites which are discovered in this phase must be subject to a dispensation hearing and surveyed before construction can recommence.

Relevant literature (in Norwegian):

- *The Public Roads Administration. Handbook 140. Consequence analysis.*
- *The Public Roads Administration. Environmental impact assesment. Brochure*
- *The Public Roads Administration. PBL manual for road planners*
- *The Department of the Environment. National political guidelines for co-ordinated area and transport planning.*
- *The Department of the Environment. Consequence evaluation. Guidelines.*
- *The Department of Transport and the Department of the Environment. Guidelines for planning national highways and county roads under the Planning and Building Act. (T 1057).*
- *The Public Roads Administration. Pamphlet on contiguous legislation. "The relationship to different special laws in road planning under the Planning and Building Act."*

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**Norwegian Public Roads
Administration**

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*This handbook is a co-production between the
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Norwegian Public Roads Administration.*

*The handbook gives an insight into the assets
which lie all around us in the cultural environ-
ment, and gives examples of how road con-
struction can be adapted to existing cultural
environments.*

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