

PRESERVING PANORAMIC VIEWS ALONG MOTORWAYS THROUGH POLICY

11.1 INTRODUCTION

Motorway design is not merely a matter of pure functionalism. Naturally, its main purpose is to accommodate efficient transportation to and from a large number of places. However, aesthetic aspects and landscaping are historically also connected to infrastructure design.

Especially in the early days of motorway construction, much attention was paid to how it could fit in with the existing landscape. From time immemorial, people have enjoyed travelling, not in the least because of panoramic views from the road. It can hardly be a coincidence that the relationship between road design and landscaping goes back such a long time (for some international references, see: Appleyard, Lynch, and Myer, 1964; CPRE, 1971; Enis et al., 1973; FHWA, 1990; Jellicoe, 1958; and for the Netherlands, see Anoniem, 1971; Het Nederlandse Wegencongres, 1964; Landinrichtingsdienst, 1991; Overdijkink, 1941).

US and German motorways are often referred to as examples of design combined with landscaping, and can be traced back to the visual language of English landscape gardening of the 18th century (Jellicoe, 1958). These types of motorway networks often offer the combined experience of a fast route to certain destinations and beautiful scenery along the way. In the United States, examples are the motorways in the North American landscape that run to and from National Parks. Jellicoe (1958) even classified the design of these motorways as one of the

three great North American contributions to modern landscapes (the other two being National Parks and the comprehensive landscape). Today, US motorways are still considered as gateways to the North American landscape experience. The US National Scenic Byways Program expresses this promotional role most vividly ¹.

In Germany, much planning effort has gone into providing travellers with a good sense of the landscape that surrounds them (Jellicoe, 1958). Instead of providing the shortest connection between two points, German motorways were designed to form the most elegant connection possible. The country's main economic centres were connected directly to nearby cities, while motorways connecting to other main centres passed through open landscapes (Rekitté, 2003).

In the Netherlands, attention was also paid to integrating motorways into the landscape. In 1915, the then Minister of Water Management, Cornelis Lely, appointed the Department for Dutch Nature Reserve Management (*Staatsbosbeheer*) as an advisory body for motorway design. Its main tasks were to ensure unity in design, and to integrate aesthetic values into the design process. At this time, Dutch architect A.H. Wegerif also pointed out the aesthetic and idealistic values of motorways. Wegerif wanted an advisory committee to be set up, consisting of aestheticians, comparable to today's Commission for Architecture and the Built Environment, which advises on building aesthetics. In 1933, such an advisory committee, named Roads in the Landscape (*De Weg in het Landschap* (WIL)) was set up by a private organisation called *De Bond Heemschut*, to preserve Dutch cultural heritage. Its task was to promote good landscape design around the Dutch road network, and to improve the already spoiled road landscapes (Meurs, 2003).

Influenced by the Department of Roads of *Staatsbosbeheer* and the *WIL* committee, the archetypical Dutch motorway was created: a straight line that runs through man-made landscapes, lined with regional vegetation, spatially grafted onto the environment by means of landscape design (Meurs 2003: 423).

The advice of *Staatsbosbeheer* to the Dutch Directorate-General for Public Works and Water Management was not free of obligations. In the years that followed, it became more and more difficult to maintain a certain measure of unity in the design of the Dutch motorways. Due to reorganisations at *Staatsbosbeheer*, the centrally organised Department of Roads was dismantled and its tasks redistributed to regionally organised offices of the Directorate-General for Public Works and Water Management. To bring motorway design back on track, the then Minister of Transport, Public Works and Water Management, Tineke Netelenbos, set up a special professorship in the 'The aesthetics of mobility' and awarded this chair to architect Francine Houben. Francine Houben tried to rigorously change the functional approach to motorways that had been causing a rapid decay of the attractive Dutch motorway views (Nijenhuis and Van Winden, 2007). She coined the concept of *aesthetics of mobility*, advocating the notion that

the infrastructure system had, in fact, become the largest public space within the Netherlands, and that this deserved the same effort in planning and design as was being awarded to city squares, parks and the famous Dutch polder landscape (Houben, 2003). From the 1990s, large-scale urbanisation of motorway zones set in, with employment and business-related land use in those areas doubling or even tripling, compared to national averages (Hamers and Nabielek, 2006). In addition, new housing development sprang up close to motorways, often protected from a motorway's negative aura by noise barriers.

Motorways were initially built *outside* cities, and intended to connect them. Nowadays they are an integrated part of the urban landscape. In the Dutch context of high-density land use with a scarcity of open spaces, the challenge of motorway design is shifting from attempts to fit the infrastructure into the landscape towards moulding spatial developments to fit the motorway. This is presenting policymakers with a challenge, as new motorways are rarely being constructed, while urbanisation is an ongoing process. As early as 1928, Professor J.H. Valckenier (Delft University of Technology) wrote about infrastructure's magnetic effect on urbanisation; the fact that traffic attracts buildings seems to be a law of nature (Meurs, 2003). The question is how to preserve the once so carefully designed and highly valued panoramic views from the motorway.

The second section of this chapter sketches the background of this Dutch policy dilemma. Urbanisations along motorways have led to a cluttered landscape. Policymakers, therefore, are attempting to get a grip on urban developments along motorways, to protect the open landscape. The chapter's third section gives a definition of panorama, to provide policymakers with a basis to handle the concept of a motorway panorama. In the subsequent section this definition is elaborated, and a practical method is presented for identifying motorway panoramas, using GIS techniques. The fifth section discusses the results of the identification of motorways panoramas in the Netherlands. The sixth section describes how motorway panoramas are incorporated in Dutch spatial planning. This is followed by concluding remarks.

Despite the fact that this chapter focuses on the Netherlands, the presented method can also be applied in an international context. And although the Dutch policy agenda of wanting to prevent spatial clutter across the landscape carries a strong national connotation, the preservation of open landscapes deserves wider attention.

11.2 CLUTTERED LANDSCAPES ALONG MOTORWAYS: A POLICY PROBLEM

The exact moment is difficult to pinpoint, but sometime around 2006 a societal debate was started, in which, next to a general dissatisfaction with Dutch spatial design, the clutter along

motorways was also identified as one of the more urgent problems (see e.g., Toorn, 2007). The Dutch newspaper *De Volkskrant*, for example, initiated an Internet discussion on the Dutch spatial agenda². In an interview, Chief Government Architect Mels Crowwel (Hulsman, 2007) explicitly named cluttering of the landscape along motorways as one of the problems. The monotonous succession of business parks along these motorways had caused Dutch cities to slowly grow into one (corridor formation). Although there are undeniable advantages to building alongside the infrastructure, it seemed as though the balance between economic dynamics and human experience had been lost. The magnetic pull of infrastructure had created a ribbon of urbanisation, causing the contrast between ‘city’ and ‘countryside’ to disappear. The time had come for a government vision on urbanisation along motorways and preservation of scenic panoramas. The past defensive tradition of wishing to keep cities compact seems to have had a contrary effect. Development along motorways had continued without being based on clear choices. The planning device that reads “decide where development is to take place and where it is not – and do a proper job” (Hamers and Nabielek, 2006) would benefit many rural-urban (‘rurban’) areas that are struggling with expanding commercial areas and new housing estates. In line with this device, a planning strategy was developed to protect Dutch motorway panoramas (Hamers and Nabielek, 2006; Houben et al., 2002; VROM, 2006; Zelm van Eldik and Heerema, 2003). In taking on the integral task related to motorway environment, the Minister for the Environment decided in 2006 to develop a structural concept for the motorway environment. This structural concept explicated the generic policy on panoramas and motorway zones in the National Spatial Planning Act (Dutch Lower House (*Tweede Kamer*) 2006/2007, 29 435, no. 187). With the arrival of a new Environment Minister, the plans for motorway panoramas were incorporated in the policy programme Cooperation Agenda for an Attractive Netherlands (*Samenwerkingsagenda Mooi Nederland*) (VROM, et al., 2007). Apart from the development of this structural concept, its support base, the project on Route Design of Motorways (*Routeontwerp van Snelwegen*) was also extended³. This project worked on construction proposals for a number of Dutch motorways, on the one hand, and on a coherent (design) approach for the motorway environment, on the other. Although different organisations have adopted the panorama concept, there is no common understanding of what a motorway panorama is exactly, nor of how it could be protected or even developed. In order to define a commonly accepted, objective, verifiable and reproducible definition of the motorway panorama concept, an integrated project on research and design had to be set up (Piek et al., 2007). An important part of the project consisted of the development of a methodology for helping the Dutch Ministry of Housing, Spatial Planning and the Environment (VROM) to create a vision on motorway environment structure. In order to do so, regular meetings were held during the run of this project, between the Ministry of VROM, Route Design of Motorways, and the PBL Netherlands Environmental Assessment Agency.

11.3 DEFINITION

Policymakers were in need of a definition of ‘motorway panorama’ for practical applications. A panorama should be recognisable, valued and identifiable on a map. Over the years, several research efforts have been made to explore motorway views. The majority of these studies have assessed the scenery preferences of motorway users, local residents and experts on motorway scenery (Evans and Wood, 1980; Wolf, 2003; Hartig et al., 2003; Parsons et al., 1998; Eby and Molnar, 2002; Ulrich, 1974). Although the results from these studies indicate that, generally speaking, vehicle occupants probably enjoy motorway panoramas, the panoramas themselves have never been the focus of these studies, nor do these studies define panorama dimensions (length, depth, time).

A totally different approach was taken by the aforementioned Francine Houben. She developed a method for analysing the daily visual experience of motorists, by using four cameras to record the views as seen from an individual car, travelling along motorways leading into the main cities of the Randstad. This covered a distance of 153 kilometres, from Delft, to The Hague, Leiden, Amsterdam, Utrecht, Gouda, and Rotterdam, and ending back in Delft (Houben et al., 2002; Houben, 2003). Such data collection and processing is very time consuming. Therefore, it is unsuitable for identifying motorway panoramas along *all* the Dutch motorways.

An operational definition of a (motorway) *panorama* starts with the neologism ‘panorama’ (taken from the Greek, meaning ‘all seeing’). Panorama refers both to the realistic and the impressive, spectacular effect of immersion – in other words, to the visual experience offered by various media. The main reason why the word ‘panorama’ is used for describing different phenomena is that the term, in fact, denotes a form of abstraction. According to Verhoeff: “...*the term panorama is primarily used to refer to specific characteristics related to vision: the experience of limitless visual perception, wherein the spectator has a wide choice of directions to look in*” (Verhoeff, 2007: 9). The car window acts as a screen, giving the viewer a ‘cinematic experience’ (Neutelings, 1988). In order to apply the panorama concept to motorways, two conditions must be met. Firstly, there should be an unblocked view of certain dimensions. Secondly, the view should contain something worth looking at.

Motorway users will not be able to experience wide panoramic views if geological structures, buildings, trees or other physical barriers are located too close to the road. In order for travellers to experience a motorway panorama, the unrestricted view should have certain dimensions.

In their research on workable methods for analysing, classifying and evaluating landscapes, Van der Ham, Iding and Van der Veer determined different perception criteria for distinguish-

ing landscape elements (e.g. Van der Ham and Iding, 1971; Van der Ham, 1972; De Veer, Buitenhuis and Van het Loo, 1977). A measure used by these researchers for determining the necessary depth of field was derived from research by Jacobs and Way (1968). This research showed that the average maximum distance for determining a certain landscape type was 1000 metres. To be able to determine specific landscape components, 500 metres was the average maximum distance.

These criteria apply to a static view of the landscape; their value is limited to the dynamic view of a motorway traveller. Not only the depth of field should be taken into account, but also the distance along which the view exists. Based on fieldwork with the use of photographs, taken at 1.30 metres above the road surface (the average eye level of motorway travellers), we were able to confirm the findings by Jacobs and Way, which state that the minimum visual depth is 500 metres perpendicular to the road. For the Netherlands, with its mostly flat land surfaces, this covers approximately 80% of the projected landscape. The stretches of motorway along which a visual depth of at least 500 metres is unobstructed, is limited – also due to vehicle speed. Assuming safe driving speeds and based on field experience, the minimum ‘visibility time’ for motorway surroundings was set at five seconds. Given a maximum driving speed of 120 kilometres per hour, this would equal approximately 175 metres.

Not every motorway view qualifies as a panorama; in addition to the minimum dimensions of a view, the scenery should also be impressive. This implies that motorway panoramas can only be identified at local or regional levels. Since the landscape determines the panorama, it should be staged at full scale. In addition to features that are ‘indigenous’ to certain landscape types, panoramas may also contain aspects that are foreign to it. Examples include wind turbines, works of art, structural works and other eye-catching landmarks. Minimum view dimensions vary per landscape type and depend on features unique to that area. Large-scale landscapes, such as the Dutch polders, require larger ‘stages’ than smaller scale agricultural landscapes that are richly decorated with hedges and clumps of trees. Similarly, when the scenery contains a changeover from one type of landscape to another, the dimensions should be large enough to convey this occurrence to the motorway traveller. To offer road users a panoramic view, it is important that both indigenous and foreign landscape features are not only of the right size and composition, but also in the right sequence, relative to a vehicle’s viewing distance and travelling speed, and to each other.

In view of all of the above, we defined a motorway panorama as an unobstructed view of a discernable landscape of at least 175 metres wide by 500 metres deep, which includes all the features unique to that area. Or, put as a conditional proposition: if landscape types and their unique features could be identified within a delimited view, this view is panoramic. In a subsequent step we developed a reproducible method for determining motorway panoramas, based on this definition.

11.4 METHOD

The most difficult part of applying this definition is that it requires a further delimiting of the exact dimensions of a view. Apart from academic research, useful insights about how to delimit a view also can be gained from handbooks and instruction manuals for motorway design. A report that is often cited from the literature on roads and landscaping is *Visual Impact Assessment for Highway Projects*, published by the Federal Highway Administration (1990) of the U.S. Department of Transportation. It details the viewshed or 'visible area' that is affected by the construction of a motorway. According to that report, the viewshed is defined as the surface area visible from a given viewpoint and/or all the surface area from which the view could be seen. The composite viewshed from a motorway can be mapped by identifying the unobstructed view from successive motorway viewpoints using height information on landform, land cover and man-made development relative to the height of motorway viewpoints.

Our method has been elaborated on the viewshed analysis as it is specified in the Federal Highway Administration (FHWA) guide. Although the 1990 FHWA guide mainly proposes to use the (composite) viewshed analysis to identify the area that is affected by motorway construction, it could also be used to map motorway travellers' views and panoramas. Early viewshed analyses were carried out using paper and pencils. Our research, however, turned to GIS-based (Geographical Information System) viewshed mapping to analyse motorway views and the visible time of areas within these views. Our approach is more similar to that of the cumulative viewshed (Wheatley, 1995). This is like a so-called 'visuallandscape' (Llobera, 2003) that results when the viewsheds from multiple cells in a digital elevation model (DEM) are calculated and added together (the ultimate cumulative viewshed, where viewsheds from each cell within the DEM are added together, is known as the inherent or total viewshed (Llobera et al., 2004; Lee and Stucky, 1998)). In the case of motorway views, viewsheds are calculated at regular intervals along a motorway and subsequently added together to obtain a cumulative viewshed.

The delimited view is an important aspect of motorway panoramas. This view is delimited not only in space but also in time, as motorway travellers pass the view at a particular speed. From the results of cumulated viewsheds calculated at regular intervals along a motorway, we were able to calculate what we call the *visibilitime* of a view (the view as delimited by space and time). To calculate this *visibilitime*, three parameters need to be taken into account. The first parameter is the *physical barriers in the environment*, the second is the *traveller's viewing constraints*, and the third is the speed at which the view is passed, the *time-related viewing constraints*.

Physical barriers in the environment are a combination of buildings, vegetation, noise protection barriers and other objects. Together, these make up a 3D landscape of the Dutch motorway

zone. To create a digital landscape model (DLM) representing this 3D landscape, several data sources have to be combined. Ground level data is obtained from the *Actueel Hoogtebestand Nederland* (AHN) a digital elevation model of the Netherlands⁴. Data on the buildings and vegetation, which might block the view from the motorway, were taken from topographical maps 1:10,000, available from the Dutch Topographical Service of the Land Registry (Topografische Dienst Kadaster, 2005). Information on noise-protection barriers was obtained from the AVV, the Dutch advisory service for traffic and transport. Each type of barrier was assigned a certain height above ground level according to the AHN.

In addition, there are human limitations to the motorway traveller's view. We assumed that motorists would only look straight ahead and to the right when driving, and that the first 20° of their field of vision would be obstructed by other traffic. The natural field of clear vision of a fixed eye is 60° (Haak and Leever-van der Burgh, 1980), and as people can turn their heads by no more than 90° in either direction, we assumed a viewing angle of 20° to 120° ($90 + 60/2$) in relation to the direction of travel. The viewing height from the car was set at 1.30 m, and the line of sight was limited to 7 kilometres (to save on calculation time). In our calculations, atmospheric attenuations have not been taken into account. The distance between two viewing points was set at 5 metres.

Furthermore, a motorist's impression of a view is limited by vehicle speed. In the cumulative viewshed, each visible grid cell was ascribed a value, equal to the number of viewing points from which the grid cell would be visible. Because even distances were used, we were able to draw conclusions on the length of time that each grid cell would be visible, in relation to vehicle speed. By coupling time to grid-cell visibility, the 'visibility time' of a view could be determined. In the GIS system, we calculated the spatially constrained view for every 5 metres along a motorway, in the direction of travel. As motorists experience views while driving at certain speeds, this distance of 5 metres could also be expressed in time. The minimum value that can be scored is 1, being given to each grid cell as it is visible from a single point along a particular motorway. At 120 kilometres per hour a motorist covers a distance of approximately 35 metres per second (equal to seven analysed viewshed points). A grid cell with a score of 1, therefore, is within a motorist's view for one-seventh of a second, but cannot consciously be observed within this time frame. When we verified this method in actual practice we found that an area would need to be in view for at least five seconds in order for the view to be registered. The visible area was calculated and checked from the position of the motorway, as well as from the position of the landscape. In this way, we dissected the first part of the relationship in an objective, controlled and reproducible manner: the delimited part of open space. This allowed us to depict where views, and thus potential panoramas, were located along the entire motorway network. See Figure 1, for an example of a visibility map.

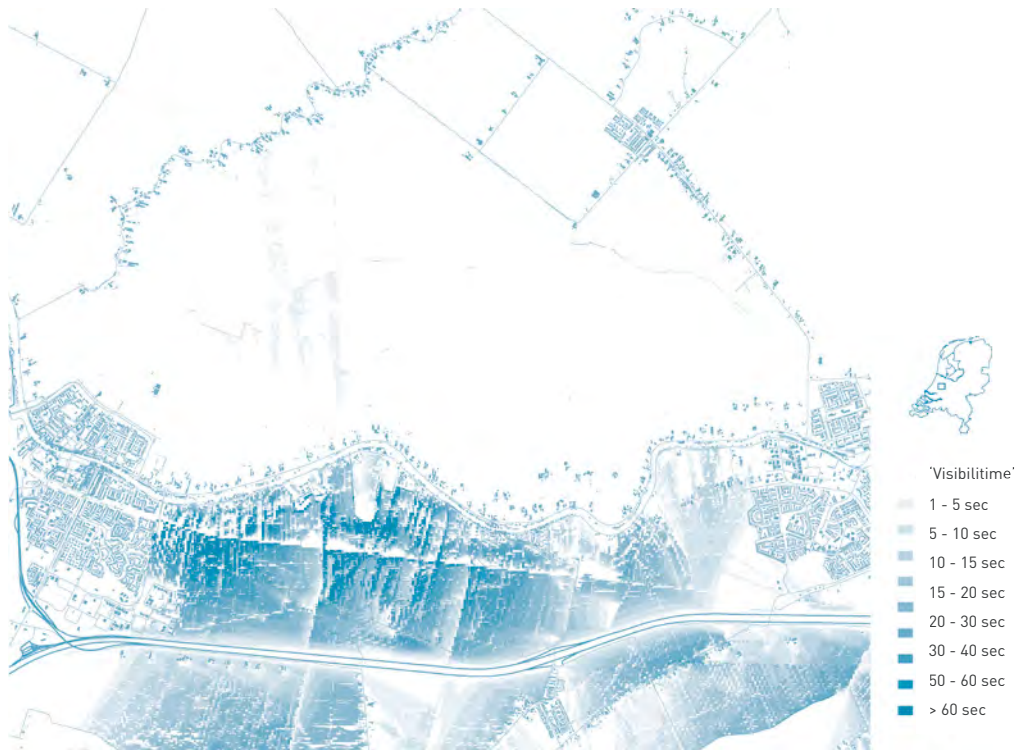


Figure 1
Visibilitime of the motorway view between Bodegraven and Woerden

And then there is the matter of subject; *what* is seen. In order for a view to be regarded a panorama, it must offer something worth looking at. The landscape determines the nature of a view. It consists of generic components and features that are unique to a certain location. Generic components are associated with the type of landscape. For instance, peat reclamations are distinctive because of their long, narrow plots of land, the canals and waterways built for drainage, and the rows of trees lining some of the roads. If these components are still in place and visible from the motorway we speak of a recognisable landscape. In our definition, the importance awarded to landscape recognition flows from the National Memorandum on Spatial Planning (*Nota Ruimte*) (VROM, 2004) and the Agenda for a Vital Countryside (*Agenda vitale platteland*) (LNV, 2004). Both these policy documents consider the cultural landscape an important starting point for the (re)design of the Dutch landscape (LNV and VROM, 2006).

The valuing of what is seen is more arbitrary than the results from GIS analyses that determine which part of the landscape is seen and for how long. People consider a landscape worth

looking at for several reasons. Therefore, to indicate what makes a view interesting, we distinguished five categories. The combination of GIS analysis and whether or not a landscape fits into one of the five categories would determine if a certain view could be labelled as a panorama.

The first category describes a landscape's uniqueness. An example of this type of landscape is the view from the *Afsluitdijk*, (a dam carrying the A7 motorway), which separates the IJsselmeer from the Wadden Sea.

The second category describes landscape views that are spectacular because of great variation. For example, the hills of Limburg and the view from the A348 motorway along the meandering river IJssel.

The third category describes landscapes with views that are regarded as highly valuable because they show the transition from one type of landscape into another. An example of this is the view along the A12 motorway, coming from Germany, just past the town of Zevenaar. On the right-hand side of the road, the view stretches across river bends and riverbanks towards a lateral moraine landscape.

The fourth category describes landscape views that can be labelled as 'special' because of their context. For example, in strongly urbanised areas, views containing the last remaining open spaces can be awarded a special value.

The fifth and last category describes landscapes that contain specific elements, but are not rare. In this type of landscape location-specific features can turn views into panoramas. These elements could be indigenous to a certain landscape – such as the row of four (historic) windmills (*de molenviergang*) that were used to drain the Tweemanspolder, south of Zevenhuizen. Features could also be less historic, such as the large inflatable cows scattered hither and thither across the landscape; a creation by landscape architect Adriaan Geuze.

Figure 2 shows the discernable landscape in the motorway view between Bodegraven and Woerden. The view could be categorised as a panorama in the fifth category because of the visible characteristics of peat reclamation (with its ditches). Furthermore, the view also belongs to the fourth category, as its context is special because of the open connection between the northern and southern parts of the Green Heart.



Figure 2
The discernible landscape in the motorway view between Bodegraven and Woerden

11.5 RESULTS AND DISCUSSIONS

We started our study by determining the number of views of at least 175 metres long that could be found along the Dutch motorways. In total, we found 1,753 views of varying dimensions. To determine which of these views could be considered panoramic, we would have had to scale down to each individual view level in order to recognise its particular landscape components. However, because of the large number of views this was unfeasible. Instead, we determined which of the views had quality potential, based on the map ‘Cultural and natural key landscape qualities’ (Snellen et al., 2006). This map provides an indication of whether a certain view is likely to contain a recognisable landscape and its components. According to this map, the Netherlands holds 231 of such views, together totalling nearly 440 kilometres in length, which have either highly visible, cultural and natural key landscape qualities, or potentially recognisable landscape components. These views, therefore, are the ones most likely to meet the panorama criteria. Most of these cultural and natural key landscape qualities can be found in views along motorways that run through the Green Heart, South Limburg, Flevoland and Friesland, and along the A7 and A9 motorways in the province of North Holland.

Apart from matching views and landscape qualities, we also looked at planned building developments within the resulting viewsheds. After all, important in the discussion on landscape cluttering were the corridor formations along motorways, which cause open views to disappear. Of the 1,753 views counted in the Netherlands in 2003, 880 appeared to be threatened by planned building developments. Of these 880, perhaps a third of the development plans could possibly be adjusted as these had not been legally finalised yet, and the panorama notion could still be taken into consideration. This became clear after we compared the development plans – both housing and commercial – in the New Map of the Netherlands (*Nieuwe Kaart van Nederland*, version of November 2006), to the map of national views (Piek et al., 2006: 28).

To determine the degree to which potential views would fit in with government policy, we looked at view locations bearing in mind the existing, so-called national policy categories. Dutch Government spatial policy has been established in the National Memorandum on Spatial Planning (VROM, LNV, VenW and EZ, 2006; final, approved version). In this Document a number of area categories have been distinguished for nature areas and landscapes of national interest. The number of threatened high quality views that lie within this ‘green’ spatial network, equals that outside of this network. Therefore, the national policy that is aimed to protect landscapes, does not seem to cover threatened views. However, if it is the government’s aim to also protect motorway panoramas, the above analysis could lead to a focus on the protection of views with high cultural and natural key qualities outside of this green spatial network.

11.6 MOTORWAY PANORAMAS ADOPTED IN POLICY

The method for identifying (potential) motorway panoramas was used for creating the Structural Concept for the Motorway Environment ‘A good view of the Netherlands’ (*Structuurvisie voor de Snelwegomgeving ‘Zicht op mooi Nederland’*) (VROM, 2008). This structural concept has a basic, generic function, relating to all motorways; it has to make local and provincial administrators aware of the importance of motorway panoramas. In the first instance, this vision is aimed at the prevention of landscape cluttering along motorways. In addition, ideas from the route design programme are being applied to large-scale motorway maintenance.

Secondly, the structural concept has appointed nine National Motorway Panoramas. The Ministry of VROM indicated that these nine panoramas had to be located within the different National Landscapes named in the National Memorandum on Spatial Planning. In addition to this criterion, community consultation also played an important role in the final selection of the nine national motorway panoramas. In this consultation, citizens were asked to indicate (on-

line) the locations of what they considered were the most appreciated views from motorways (Bureau KLB, 2007). In support of the spatial demarcation and descriptions of the qualities of the National Motorway Panoramas, and at the request of the Ministry of VROM, the PBL Netherlands Environmental Assessment Agency carried out a detailed viewshed analysis to determine the visibilitime for twelve of these panoramas, as selected by citizens.

It is not the intention to disallow all spatial development within the national panoramas, but rather that, just as for the other national landscapes, a ‘yes, provided that’ regime is followed. ‘Provided that’ refers to the requirement that key landscape qualities are to be maintained or fortified. Provincial administrations are to apply and implement these stipulations. Beside the qualities indicated by government for all the national landscapes, motorway panoramas need to meet some additional quality criteria. One obvious example of such an additional quality would be an open view of the landscape from motorways.

As the nine appointed motorway panoramas are part of national policy, the Inspectorate of the Ministry of VROM monitors whether spatial developments would go against the ideas of the structural concept. In April 2009, the Inspectorate published an overview of plans for developments within the areas of the nine national panoramas (VROM Inspectorate, 2009). The maps on visibilitime are the basis for an analysis of whether there are development plans that possibly could damage motorway panoramas. At this time, apart from one exception, none of the plans appear to be damaging, and some spatial initiatives even have been qualified as having a positive effect on their particular landscapes. In addition, a number of small activities still have to be assessed. Municipalities also consider these landscapes to be valuable and are in favour of protecting and reinforcing landscape qualities. Nevertheless, plans are being made for housing developments, business parks and infrastructural works that could have a negative effect on these national panoramas. Central government may need to formulate actions, in cooperation with provinces and municipalities, on how to manage these situations. Finally, the Inspectorate of VROM has pointed out that developments that take place just outside of the panorama areas as indicated in the policy map, could also have their influence on these panoramas.

11.7 CONCLUDING REMARKS

In our study we have defined motorway panoramas, and developed an objective and reproducible method for operationalising them. This fitted in well with policy discussions, and the research, to some degree, was used to formulate policy on motorway environments.

In the actual practice of spatial developments, however, it has proven difficult to manage the landscape quality of ‘openness’. Especially close to motorways, where spatial pressures of

urbanisation are great. The approach to motorway panoramas is based on the view from the road; it must be noted that this approach is only one of many. There are other interests, such as in commerce, housing, or ecology that affect motorways and their surrounding areas.

NOTES

- [1] See: <http://www.byways.org/learn/>
- [2] See: <http://www.ruimtelijkeagenda.nl/>
- [3] The project Route Design of Motorways was one of the 'major projects' in the Architectural Document 'Ontwerpen aan Nederland' (Designing the Netherlands) (Ministries of OCenW, VROM, VenW and LNV, 2000), and initially focused only on the A12 motorway. See: <http://www.routeontwerp.nl/>
- [4] See: <http://www.ahn.nl/english.php>

REFERENCES

- Anoniem (1971) *Weg en landschap, Preadviezen congresdag 1971*. Vereniging Het Nederlandse Wegencongres, The Hague.
- Appleyard, D., Lynch, K., and Myer, J. R. (1964) *The View from the Road*. Cambridge, Massachusetts. Massachusetts Institute of Technology.
- Bélangier, P., and Lago, D. (2003) Highway Surface A Brief History of the United States Interstate and Defense Highway System In: Houben, F., and Calabrese, L.M. (ed.) *Mobility: A Room with a View*. Rotterdam, NAI Publishers, pp 397-410
- Bohemen, H. D. van (2004) *Ecological Engineering and Civil Engineering Works. A Practical Set of Ecological Engineering Principles for Road Infrastructure and Coastal Management*. Delft, PhD Thesis Delft University of Technology.
- CPRE (1971) *Roads and the landscape*. London, Council for the Protection of Rural England.
- Bureau KLB (2007) *Snelwegpanorama's een burgerconsultatie*. The Hague.
- Eby, D. W., and Molnar, L. J. (2002) Importance of scenic byways in route choice: a survey of driving tourists in the United States. *Transportation Research Part A* 36; 95-106
- Enis, R., Kenyon, V., Gilboa, E., and Shalit, A. (1973) *The road and the landscape*. Haifa, Technion Research and Development Foundation Ltd.
- Evans, G. W., and Wood, K. W. (1980) Assessment of environmental aesthetics in scenic highway corridors. *Environment and Behavior* 12; 255-273
- FHWA (1990) *Visual impact assessment for highway projects*. Washington, Federal Highway Administration, Publication No. FHWA-HI-88-054 (first printing 1979 by ASLA, the American Society of Landscape Architects)
- Friedberg, A. (1993) *Window Shopping: Cinema and the Post-modern*. Berkeley, California. University of California Press.
- Haak, A.J.H., and Leever-Van der Burgh, D. (1980) *De menselijke maat: een studie over de relatie tussen gebruiksmaten en menselijke afmetingen, bewegingen en handelingen*. Delft, Delftse Universitaire Pers.
- Hamers, D., and Nabielek, K. (2006) *Bloeiende Bermen. Verstedelijk langs de snelweg*. The Hague/Rotterdam, Ruimtelijk Planbureau/NAi Uitgevers.
- Hamers, D., and Nabielek, K. (2006) Along the fast lane. Urbanisation of the motorway in the Netherlands. In Wang, C. Sheng, Q., and Sezer, C. (ed.) *International Forum on Urbanism 2006 in Beijing: Modernization and regionalism: Re-inventing urban identity*. Delft, International Forum on Urbanism, pp 274-281
- Ham, R.J.I.M. van der, and Iding, J.A. (1971) *De landschapstypologie naar visuele kenmerken, methodiek en gebruik*. Wageningen, Landbouwwuniversiteit Wageningen.
- Ham, R.J.I.M. van der (1972) *Voorlopig verslag van een onderzoek naar de beleving van het landschap met behulp van groeps waarnemingen*. Wageningen, Landbouwwuniversiteit Wageningen.
- Hartig, T., Evans, G. W., Jamner, L. D., Davis, D. S., and Gärling, T. (2003) Tracking restoration in natural and urban field settings. *Journal of Environmental Psychology* (23); 109-123
- Huhtamo, E. (2004) Peristrepic Pleasures: The Origins of the Moving Panorama. In: Fullerton, J. and Olsson, J. (ed.) *Allegories of Communication: Intermedial Concerns From Cinema to the Digital*. Rome, John Libbey Publishing, pp 215-248
- Hulsman, B. (2007) *Afslagje hier, baantje daar. Gesprek met rijksbouwmeester Mels Crouwel over de 'verrommeling' van Nederland*. In: *NRC Handelsblad* 3 februari 2007
- MNP (2006) *Verrommeling in beeld. Kaartbeelden van storende elementen in het Nederlandse landschap*. Bilthoven, Milieu- en Natuurplanbureau.

- Het Nederlandse Wegencongres (1964) *Weg en recreatie*. The Hague.
- Houben, F. (2003) A Room with a View. In: Houben F., and Calabrese, L.M. (ed.) *Mobility: A Room with a View*. Rotterdam, NAI Publishers, pp 23-71
- Houben, F., Weightman, M., Jongejan, B., Hoete, A., Verlaan, J., Koeleman, M., and Maagdenberg, T. (2002) *Holland Avenue 2002/2030. Research Road Atlas*. The Hague, Ministerie van Verkeer en Waterstaat.
- Jacobs, P., and Way, D. (1968) *Visual values of landscape development*. Cambridge, Massachusetts, Harvard University.
- Jellicoe, G. A. (1958) *Motorways - their landscaping, design and appearance*. London, Town Planning Institute (Fourth Rees Jeffreys triennial lecture)
- Landinrichtingsdienst (1991) *Landschap van wegen en kanalen*. The Hague.
- LNV (2004) *Agenda vitaal platteland*. The Hague.
- Meurs, P. (2003) Parkways and Polderways. In: Houben F., and Calabrese, L.M. (ed.) *Mobility: A Room with a View*. Rotterdam, NAI Publishers.
- Neutelings, W. J. (1988) De ringcultuur. Een studie naar het Ringmechanisme. *Vlees en Beton* (10). Mechelen, Laat-XXe-eeuws genootschap voor architectuur en stedenbouw.
- Nijenhuis, W., and Winden, W. van (2007) De diabolische snelweg, over de traditie van de mooie wegen in het Nederlandse landschap en het verlangen naar de schitterende snelweg in de grote stad. Rotterdam, Uitgeverij 010.
- OC&W, Ministry of, and VROM. Ministry of (2000) *Ontwerpen aan Nederland, architectuurbeleid 2001-2004*. The Hague.
- Oettermann, S. (1997) *The Panorama: History of a Mass Medium*. Cambridge, MIT Press/Zone Books.
- Overdijkink, G. A. (1941) *Langs onze wegen*. Heemschutserie [no. 11]. Amsterdam, uitgeverij Allert de Lange.
- Parsons, R., Tassinary, L. G., Ulrich, R. S., and Grossman-Alexander, M. (1998) The view from the road: Implications for stress recovery and immunization. *Journal of Environmental Psychology* 18; 113-140
- Piek, M., Middelkoop, M. van, Breedijk, M., Hornis, W., Sorel, N., and Verhoef, N. (2007) *Snelwegpanorama's in Nederland*. The Hague/Rotterdam, Ruimtelijk Planbureau/NAI Uitgevers.
- Rekette, J. (2003) 'Straight-Curve-Straight' or 'The Undulated Line' - the Dilemma of Rationality and Aesthetic Dogma. The Origins and Aesthetic Principles of Motorway Construction in Germany up Until 1945. In: Houben F., and Calabrese, L.M. (ed.) *Mobility: A Room with a View*. Rotterdam, NAI Publishers, pp 385-396
- Sullivan, W. C. and Taylor Lovell, S. (2006) Improving the visual quality of commercial development at the rural-urban fringe. *Landscape and Urban Planning* 77; 152-166
- Toorn, M. van (2007) *Project Nederland*. Amsterdam, Augustus.
- Ulrich, R. S. (1974) *Scenery and the Shopping Trip: The roadside environment as a factor in route choice*. Michigan, University of Michigan (Geographical Paper No. 12).
- Veer, A.A. de, Buitenhuis, A., and Loo, H. van het (1977) *Vergelijking van Nederlandse Methoden van landschap-kartering en hun toepassingsmogelijkheden*. Wageningen, Stichting voor bodemkartering.
- Verhoeff, N. (2007) *Panorama behind glass: framing the spatial and visual design of highways*. Webpaper: http://www.rpb.nl/upload/documenten/Panorama_Behind_Glass.pdf
- VROM, Ministry of (2004) *Nota Ruimte*. The Hague.
- VROM, Ministry of (2008) *Zicht op mooi Nederland. Structuurvisie voor de snelwegomgeving*. The Hague.
- VROM-inspectie (2009) *Negen nationale snelwegpanorama's. Ruimtelijke ontwikkelingen in beeld*. Arnhem
- VROM, Ministry of, LNV, Ministry of, V&W, Ministry of, and EZ, Ministry of (2006) *Ruimte voor ontwikkeling. Deel 4: tekst na parlementaire instemming*. The Hague.
- VROM, Ministry of, LNV, Ministry of, and EZ, Ministry of (2007) *Samenwerkingsagenda Mooi Nederland*. The Hague.
- Wolf, K. L. (2003) Freeway roadside management: the urban forest beyond the white line. *Journal of Arboriculture* 29 (3); 127-136
- Zelm van Eldik, D. van, and Heerema, P. (2003) *Kompas voor het Routeontwerp*. Delft, Ministerie van Verkeer en Waterstaat, Dienst Weg- en Waterbouwkunde.