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Picture on the front cover. Photo: Gunnar Britse

ROADS BELONG IN THE URBAN LANDSCAPE

THOMAS JUEL CLEMMENSEN

Abstract

Roads are often associated with a fragmentation or splintering of landscapes and their natural connectivity; particularly in relation to 'green infrastructure' they are often considered problematic elements that rupture and barricade. Conversely, as part of larger networks, roads can be considered important elements in the creation of new, 'green infrastructures' that can qualify urban landscapes in terms of improving their overall porosity and connectivity. This argument will be unfolded and substantiated in this article through theoretical reflections which conceptually re-locate road networks in the urban landscape, supported by relevant reference projects that illustrate the potential of road networks as a platform for 'green infrastructure'.

Introduction

In spite of being a characteristic feature of all urban landscapes, road networks seldom attract much attention among architects involved in urban planning and landscape architecture. One reason can probably be found in the dominance of the zoning approach to planning, where road planning easily becomes isolated and reduced to a matter of traffic management and transport economy (Clemmensen, 2008a; 2008b). Another possible reason could be, as suggested by Christopher Sawyer, that road networks like other infrastructures are conceived 'outside' the more visually oriented domain of landscape architecture at a much larger and more abstract territorial scale. This is not to say that infrastructure does not operate within the landscape, it obviously does, but rather that it does not originate there. According to Sawyer, infrastructure is conceptually located elsewhere and thus is not strategically accessible to landscape architects working only in the realm of landscape. As a consequence infrastructure often becomes something landscape architects work around rather than engage with and alter (Sawyer, 2004).

If Sawyer is right, how can we as landscape architects engage with road networks in profound ways that move beyond the purely visual and pictorial? Is it possible to conceptually re-locate road networks in the landscape? In the following, these questions will be addressed by discussing different understandings of landscape and its relation to infrastructure and it will be claimed that 'roads belong in the urban landscape', a claim that echoes John Brinkerhoff Jackson's essay *Roads Belong in The Landscape* (1994). Furthermore, it will be argued that road networks can be considered important frameworks for creating new 'green infrastructures' that can qualify urban landscapes in terms of improving their overall porosity and connectivity.

In order to strengthen this argument three different 'sites' that relate to contemporary road networks, and which hold potential in relation to the development of 'green infrastructures' in urban landscapes, will be presented: The *roadside* will be described as a parallel network with a capacity to connect otherwise isolated fragments – an idea which references the concept of the parkway. The *super grid* will be presented as a pertinent way to organise the interface between 'urban' and 'rural'. Last but not least, the fine network of minor roads – the *sponge* – will be described as a platform for site-specific development without 'fracture'. The potential of each of these sites will be exemplified by reference projects working in a cross-disciplinary field between landscape architecture and urban planning.

Infrastructures and landscape

How should we understand the relationship between infrastructures and landscape? This question has occupied Sawyer who employs a distinction between *landscape* and *territory* as a basis for his considerations. As explained above, according to Sawyer, it is not easy for landscape, when considered as a concept related to visual perception, to accommodate infrastructure, as the latter is imagined in relation to a larger and more abstract territorial scale. This does not mean that infrastructure does not operate in the landscape, it clearly does, but rather that infrastructure does not originate there. At the conceptual level, infrastructure is located outside the landscape and is thus not strategically accessible to landscape architects who solely work within the landscape domain; this means that infrastructure to a greater extent becomes something immovable and 'difficult' that they work around rather than work with. This lack of coupling to the conceptual plan of infrastructure means, according to Sawyer, that landscape architects continue to be very much occupied with the visual qualities of the contrast between infrastructure and landscape, or *the machine in the garden*, as Leo Marx describes the desire to accommodate infrastructure in the landscape (Sawyer, 2004).

With regard to making infrastructure strategically available to the landscape architect as something to work with and not just around, there are, according to Sawyer, a number of important approaches that can briefly be summarised as follows: 1: in order to better understand the space in which infrastructure operates, traditional boundaries between city and country have to be broken down; 2: a recognition of the fact that infrastructure often exists in a conflict-ridden field between divergent interests, which necessitates the ability to be able to mediate between these interests; 3: a more comprehensive level of observation, which addresses territory and makes infrastructure visible and understandable; 4: obtaining a better understanding of landscape by shifting the focus from the shape of the landscape to the processes that generate its form (ibid.).

Gary Strang, who describes infrastructure *as* landscape, presents a similar set of considerations concerning the relation between infrastructure and landscape. In relation to the way Leo Marx, in 1964, presented the idea of 'the machine in the garden', Strang observes that current conditions create a situation in which the machine becomes inseparable from the garden; or in which the garden and the machine are completely intertwined (Strang, 1996). In doing so, Strang does not refer to the formal characteristics, but to the functional integration between infrastructure and a constructed landscape, which relies on infrastructure for its preservation. In spite of the fact that we rely on these constructed landscapes, our attitude to the underlying infrastructure, according to Strang, has, to a higher degree, been characterised by denial rather than by respect. Most often architects are given the task of hiding, screening

and camouflaging infrastructure in order to maintain an image of the pristine natural surroundings of our past; only very rarely are they asked to consider infrastructure as an opportunity for, and a basic component of, giving shape to a city or an entire region (Sawyer, 2004).

The applicability of this relationship to the road network is confirmed by observations from the Netherlands, a country otherwise known for its highly constructed landscapes. Michelle Provoost is puzzled by the way Dutch motorways are built with a view to adapting to and harmonising with the landscape, as if the two were polar opposites, the one artificial, and the other natural. In contrast to this, Provoost claims that the construction of roads can be seen as an opportunity for shaping an entirely new city or a new landscape (Provoost, 2002). Poul Meurs makes a similar point when he has problematized the way discussions in the Netherlands are characterised by out-dated arguments that do not take into consideration developments in the relationship between the road network and urban development. According to Meurs, the task is no longer to adapt the road to the landscape, but to design a landscape of mobility in which infrastructure; urban development and landscape are combined (Meurs, 2003).

In seeing infrastructure as landscape, Strang argues for an approach that attempts to render infrastructure and the natural landscape coexistent, performing several different functions. He would like architects to be more like farmers who depend on the architecture of natural systems; similarly he would like infrastructure to be more like well-functioning fields which are used not only for food production but fulfil several different purposes, such as, for instance, providing a seepage surface or a resting place for migrating birds. By thinking in supplementary functions, public infrastructure, with its relatively large budgets for construction and renovation has, according to Strang, a huge potential for improving urban areas and regional landscapes on a scale that architects usually only dream about (Strang, 1996).

The aforementioned considerations concerning the relationship between infrastructure and landscape affect important aspects of a more contemporary understanding of landscape. Whereas Sawyer's contraposition of landscape and territory contributed to identifying a distinction between the visual and the procedural, Strang's description of infrastructure as landscape contributes to identifying a distinction between the artificial and the natural. According to James Corner these oppositions are tightly interconnected. Corner describes how our understanding of landscape is characterised by a pictorial or scenographic impulse, with the result that the physical appearance of the landscape is, over time, separated from the causes of its shape. In this way the artificiality of the landscape is masked over time and gradually comes to appear as something natural (Corner, 1999b). Corner is critical towards

this connection between landscape and 'nature', because the result will be that the landscape functions as an antithesis to the urban; an additional aspect or supplement derived from a nature which exists outside and which has no buildings, technology or infrastructure (Corner, 2006). In order to improve the foundation for a more critical arrangement of the shaping of landscape, Corner wishes to direct attention towards the processes, which are involved in the creation and transformation of the actual landscape. This means that the visual aspects will be toned down compared to the productive aspects – what landscape can do, and how it works over time, become more important than the appearance of the landscape. In this perspective, the landscape is to a greater extent seen as an active instrument for the enrichment of culture than as a passive product of culture (Corner, 1999a).

The qualification of urban landscapes

Before explaining how road networks can be considered important frameworks for creating green infrastructures that can qualify urban landscapes, it needs to be clarified what 'qualifying' means in this context and how that is related to a more contemporary meaning of the concept *landscape*. Here the thoughts of John Brinkerhoff Jackson (1909–1996) and Thomas Sieverts, who both have been involved in the study of urban landscapes through a lifetime, seem appropriate.

John Brinkerhoff Jackson has described landscape as a synthetic space or a man-made system of spaces superimposed on the face of the land, which functions and evolves to serve a community (Jackson, 1984). In relation to this definition, Jackson distinguishes between three types of landscapes: Landscape One which refers to the very complex and changing landscape of the early middle ages, a landscape without memory or vision regarding the future; Landscape Two which is rooted in the renaissance and which refers to a landscape of clear and permanent borders; and Landscape Three which refers to the contemporary every-day landscape characterised by characteristics of Landscape One as well as Two. On the one hand, Landscape Three continues to be dominated by the understanding of landscape connected with Landscape Two, which, due to its emphasis on the visual and its insistence on homogeneous spaces and unambiguous boundaries, has difficulties accommodating and recognising the vitality and diversity of the everyday landscape as a quality. On the other hand, the everyday landscape is similar to Landscape One with regard to its informal nature, its lack of interest in history and its basic utility-oriented and unscrupulous use of the environment (ibid.). This tension can, for instance, be seen in the so-called Danish Motorway Tradition; in this tradition the visually oriented adaptation of the road to the landscape (Two) is increasingly compromised by a new everyday landscape (Three) containing different types of areas designated for commercial use, which, in the words of Marcel Smets, are created on the

basis of their own mercantile logic (Smets, 2001). According to Jackson, it is essential to the qualification of Landscape Three that Landscapes One and Two find their balance and that, in this respect, it becomes possible to define a landscape which can accommodate the variability of every-day life as well as the political infrastructure of a stable order. This, how-ever, demands that we let go of the out-dated forms and ideas connected with Landscape Two (Jackson, 1984).

Thomas Sieverts has a similar approach to the concept of balance; he describes the process of qualifying urban landscapes as a development from an 'impossible order' to a 'possible disorder' (Sieverts, 2007). In con-nection with this, Sieverts describes how this approach to qualification is an intermediate position between two professional 'camps' – either passionate opponents or euphoric supporters of the development of ur-ban landscapes. The opponents represent a fundamental rejection of the forms which the current dynamics of urbanisation assume, and insist on retaining the idea of the traditional centre-oriented European city with its clear contrasts: centre – periphery, developed – undeveloped, signifi-cant – not significant. This is all very much reminiscent of Jackson's cha-racterisation of Landscape Two. Conversely, the supporters celebrate the non-specificity of the urban landscape and see the lack of identity as a liberating factor. From their point of view urban potential is enabled by the fragmentation of landscape, where uncertainty and openness pro-mise unlimited freedom and opportunity. In this way it is reminiscent of Jackson's characterisation of Landscape One.

Sieverts position on qualification originates in the work of Vera Vicen-zotti, who has described how the term wilderness is used as a metaphor for the urban landscape with both negative and positive connotations. For the opponents (the conservatives) the wilderness, and its disorder, represents a threat to the existing order and it's meaning; for the suppor-ters (the progressives) the wilderness represents a detachment or libera-tion from inherited understandings of order (Vicenzotti and Trepl, 2009). This nuanced approach makes it easier to understand how Sieverts, in his description of a movement from an impossible order to a possible disorder, expresses to a greater extent a desire for a new order which has been freed from conservative conceptions of order (a feature of Land-scape Two) rather than an actual desire for disorder (a feature of Land-scape One). In this way the approach to qualification, which Sieverts is a representative of, can be seen as an attempt to formulate new possible orders, based on the fragmented character of urban landscapes rather than impossible ideals; orders that recognise and incorporate a degree of disorder that is a consequence of the autonomy and self-organisation that seems to characterise its development.

Road networks and the qualification of urban landscapes

What role can the road network play in relation to the qualification of urban landscapes? When landscape is understood and approached as a synthetic space or a man-made system of spaces superimposed on the face of the land, the road network can be described as an integrated part of the landscape. In his essay *Roads Belong in the Landscape* (1994) Jackson reminds us that roads should not only be identified with movement between places, but that they are places in themselves and will always be involved in the development of the landscape – in the modern landscape no other space has been so versatile.

When seen in relation to Jackson's idea of qualifying Landscape Three through a sort of balance between the qualities that characterise Landscape One and Two, the road network holds a special potential. On the one hand, the road network, in a literal sense, forms a basis for massive self-organisation, related to the 'system of automobility' (Urry, 2005), and thus contributes to creating the conditions for the growth of a highly complex and changeable landscape – a landscape somewhat similar to Landscape One. On the other hand, the vast majority of the road network is part of public infrastructure and is planned, managed and administrated by public authorities, the same authorities which, from the absolutism of the renaissance to today's governmental planning apparatus, have been setting out visions for a landscape with clear and permanent boundaries – a landscape somewhat similar to Landscape Two. For instance, it is evident when reading The National Planning Report for Denmark 2010 that the Danish government wanted 'a clear boundary between city and country' (Miljøministeriet, 2010). Such an objective could rightly be described as 'good intentions' against 'incontrollable cities' (Nielsen, 2008), but it is also true that public planning continues to hold the potential to protect urban landscapes against excessively utility-oriented use. In this way road networks seem to take a special position in relation to the ability to mediate between the qualities that characterise Landscape One and Two. The fact that in many European countries the greater part of the road network is still the responsibility of public authorities and is a public domain opens an opportunity to involve the road network as a tool for planning-related efforts to qualify urban landscapes. However, this presupposes that the road network is seen as more than a purely traffic-related and transport-economic affair. The first important aspect in relation to the architectural strategic potential of road networks is, consequently, concerned with a consideration of additional functions for road networks, so that they, in the words of Gary Strang, may become similar to well-functioning fields which serve multiple purposes. It would thus become possible to take advantage of the relatively large budgets for construction and renovation already connected with road networks, and increases the yield from these public investments.

Another important contribution to the architectural strategic potential of road networks is related to the transgressive nature of road networks. Crossing various zones and other administrative boundaries, road networks exist as an infrastructure for the system of automobility and as an organisational fabric for the system of spaces, which, according to Jackson, constitute the landscape. It is precisely the fact that networks use organisational logics different from those of zone planning which opens up new possibilities for breaking with the rigid thinking linked to Landscape Two. Based on Sievert's description of the qualification of urban landscapes as a movement or shift of focus from an impossible order to a possible disorder, road networks might be considered as organisational platforms for a possible (dis)order based on different ordering principles than those related to zoning. When seen in relation to the crucial role the development of modern road systems have played in relation to supporting the integration of urban and rural environments, which characterise urban landscapes (Clemmensen, 2008a), it seems natural to see the organisational properties and characteristics of the road network as an alternative or a supplement to the rigid ordering principles of zoning.

Possible sites of architectural intervention

As indicated in the introduction, the zoning approach to planning has not left much room for ideas about spatial organisation based on networks. This lack of attention apparently recurs when it comes to the way architects consider 'sites of architectural intervention'. For example, Keller Easterling has described how architects seldom defines sites of architectural intervention in a way that will permit exploration of organisational or network architecture, and calls for greater attention on the relation between organisational procedures and the production of space (Easterling, 1999). In a similar way, one could call for a greater attention on the relation between the organisational properties of road networks and the production of space in urban landscapes. Which organisational principals can be identified and what are their potentials in relation to the qualification of urban landscapes? In particular, what might improve their degree of connectivity[1] and porosity[2], both of which can be identified as key objectives in relation to the qualification approach to urban landscapes (Clemmensen, Daugaard and Nielsen., 2010)? In an attempt to answer these questions we will revisit three well-known sites. The answer is neither unequivocal nor exhaustive but should be regarded as a conceptual opening and an attempt to illustrate how road networks could function as framework for green infrastructure.

The wayside as parallel network

Benton MacKaye (1879–1975), who was deeply engaged in American planning in the first half of the 20th century, developed the idea of the wayside as a special partition within planning with active boundaries

1 Interconnection between the different elements in urban landscapes is essential if they are to function as coherent domains reflecting common interests. This becomes increasingly important as urban landscapes accommodate both global elements that follow global rules and local elements that serve the living and working worlds of the local area (Sieverts, 2008, p. 263). Connections that function across scales or levels of influence and double coded zones that work as 'glue' between different elements have the capacity to support the connectivity of urban landscapes.

2 Bernardo Secchi and Paola Viganò use the term 'porosity' to explore and question how different spatial structures can absorb movement and change: «Porosity varies in different materials, and is a function of their make-up, structure, form and design.» (Secchi and Viganò , 2009, p. 29) Porosity contains and combines two sets of objectives: reducing barriers in urban landscapes, and improving their permeability in order to ensure unhindered flow for pedestrians and cyclists as well as flora and fauna. The overall purpose is to maintain an openness and 'availability towards changing collective and individual rhythms' (Viganò, 2007).

and an extensive organisational range. According to Mackay, the ribbon of neutral no-mans-land adjacent to all major roads, also known as the 'right of way', could be considered to be a critical conduit between towns and wilderness or recreation and could be designated in ways that affected all the surrounding land as well as the experience of driving on the roadway. The creation of a national highway system automatically resulted in the parallel formation of a diverse national network of wayside-landscapes (Easterling, 1999). Similar considerations are found in the concept of the American parkway – the idea of parallel networks in a linear park-landscape. For example, William Whyte (1917–1999) saw great potential in the American parkway in terms of creating new spatial and recreational connections. Yet unlike MacKaye, Whyte had a more visual-aesthetic appreciation of landscape and his recommendations have largely supported the goals of environmentalists and preservationists as cautions against wasting or abusing land (ibid.). This demonstrates how the concept of the parkway was never fully developed, and to a large extent has been reduced to a matter of creating scenic roads in contrast to the dirty reality along the American highways.[3]

The idea of the wayside as a site of parallel landscape networks might hold an even greater potential today, as the diffuse and complex patterns of everyday life in fragmented urban landscapes does not seem to be matched by a corresponding degree of connectivity and porosity; intensively cultivated fields, major roads with limited access, and isolated urban enclaves are increasingly posing a challenge. The wayside with its large interface could potentially be an important site of exchange between the many disconnected elements. It could also serve as an additional ecological network, which, together with the existing network, will form a more comprehensive and fine-meshed system, integrating and connecting a greater variety of environments.

The project *GREENfrastructure – skovrejsning i infrastrukturelle og by-nære landskaber* (2004) serves as an inspiring example of the potential of a parallel landscape network in relation to motorways (figure 1). In this project Stefan Darlan Boris develops an alternative afforestation concept which breaks with existing tendencies to use afforestation in a kind of screening or camouflage strategy. Instead of being a background, Boris brings the forest into the foreground as a mediating element in dialogue with the surrounding landscape on three different levels: *The Forest*, *The Forest Park* and *The Forest Garden* (figure 2). *The Forest* represents the intention of creating an overall continuous landscape network to benefit biodiversity, and it is planned as natural forest with a low cultural imprint. *The Forest Park* is designed in a way that supports the visual qualities of the landscape and is given a moderate cultural imprint. *The Forest Garden* is thought of as a site in close dialogue with the activities in the local everyday landscape, which in time will have a high cultural imprint (Boris, 2010). In this project, the motorway is transformed

3   John Brinckerhoff Jackson was critical about this trend, which stood in stark contrast to his own understanding of the landscape as a living and dynamic place: «You may gather that I am not enthusiastic about the current beautification program. I am not. I recognize the goodwill and patriotism of its instigators, and I recognize the need for order and control in the American landscape. But I am convinced the basic philosophy of this crusade is little more than a collection of tired out middle-class platitudes about the need for beauty, greenery and the wickedness of bad taste.» (Cited in Easterling, 1999, p. 118).

from a potential barrier to a central spine in a linear park, which uses the wayside in an attempt to turn the back into the front. The wayside is not only utilised as a physical connection and a framework for future development, it also becomes the site that renders the surrounding urban landscape accessible as a meaningful place (figure 3). In this way the project represent a line of thinking with great development potential in relation to the concept of green infrastructure.
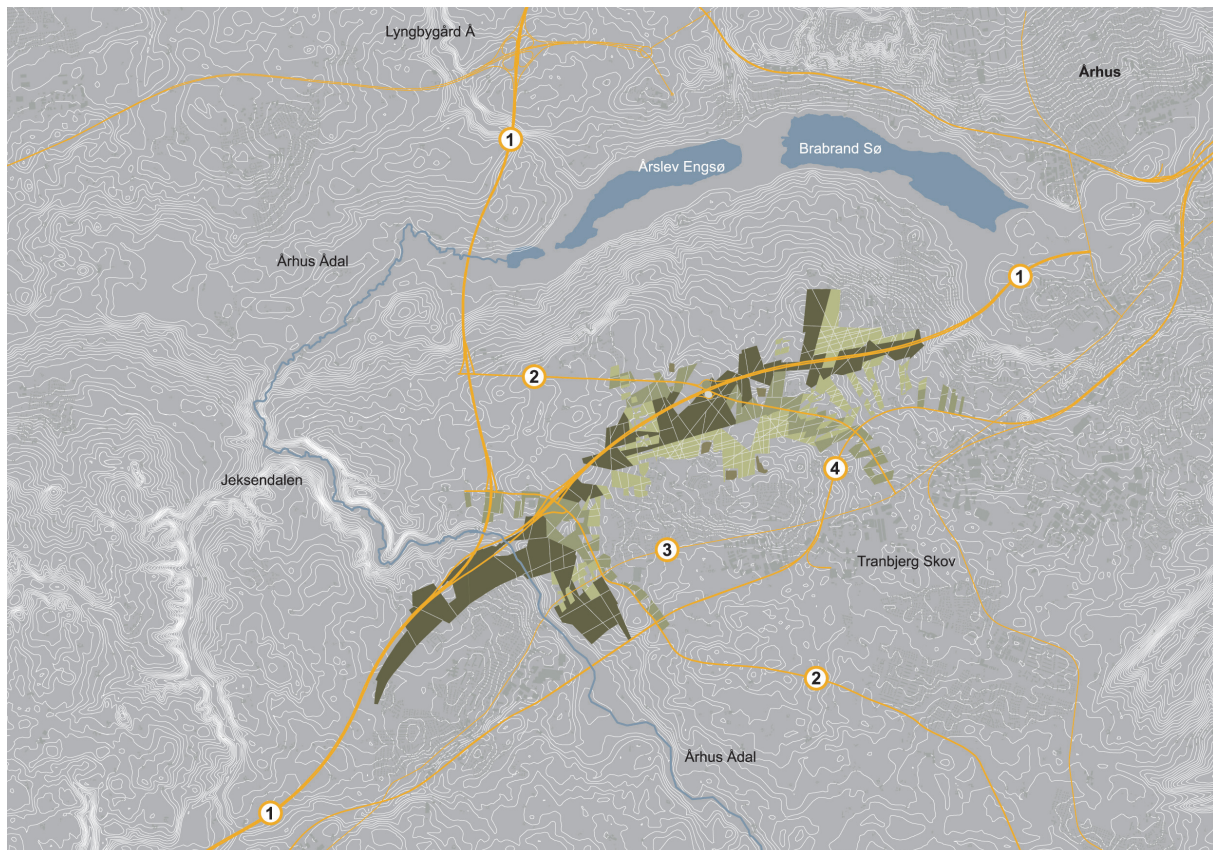

The super grid as urban-rural interface

Another important site for architectural intervention is linked to the structure of road networks and its influence on the organisation of the city. According to Albert Pope, it is possible to identify two fundamental forms of organisation – the open *grid* and the closed *ladder* – which respectively create the foundation for a continuous centrifugal development or a discontinuous centripetal development. In the latter case, the city is developed as a number of independent urban forms defined in contrast to the surrounding space. In relation to this distinction between grid and ladder, the *super grid* can be defined as an hybrid form of organisation where the closed ladders are inscribed in an overall open grid – a combination of continuous centrifugal development or a discontinuous centripetal development (Pope, 1996).

Figure 1
Overall plan from the project GREEN-frastructure – skovrejsning i infrastrukturelle og bynære landskaber (2004) in which Stefan Darlan Boris develops an alternative afforestation concept that breaks with existing tendencies to use afforestation in a kind of screening or camouflage strategy. In this project the wayside is utilised in the creation of a parallel landscape network in relation to a motorway southwest of Aarhus, Denmark. The numbers on the plan refer to the hierarchy of roads, which is used to inform the design. The three different green colours refer to the three different levels in the project: The Forest (dark green), The Forest Park (green) and The Forest Garden (light green) (Stefan Darlan Boris).
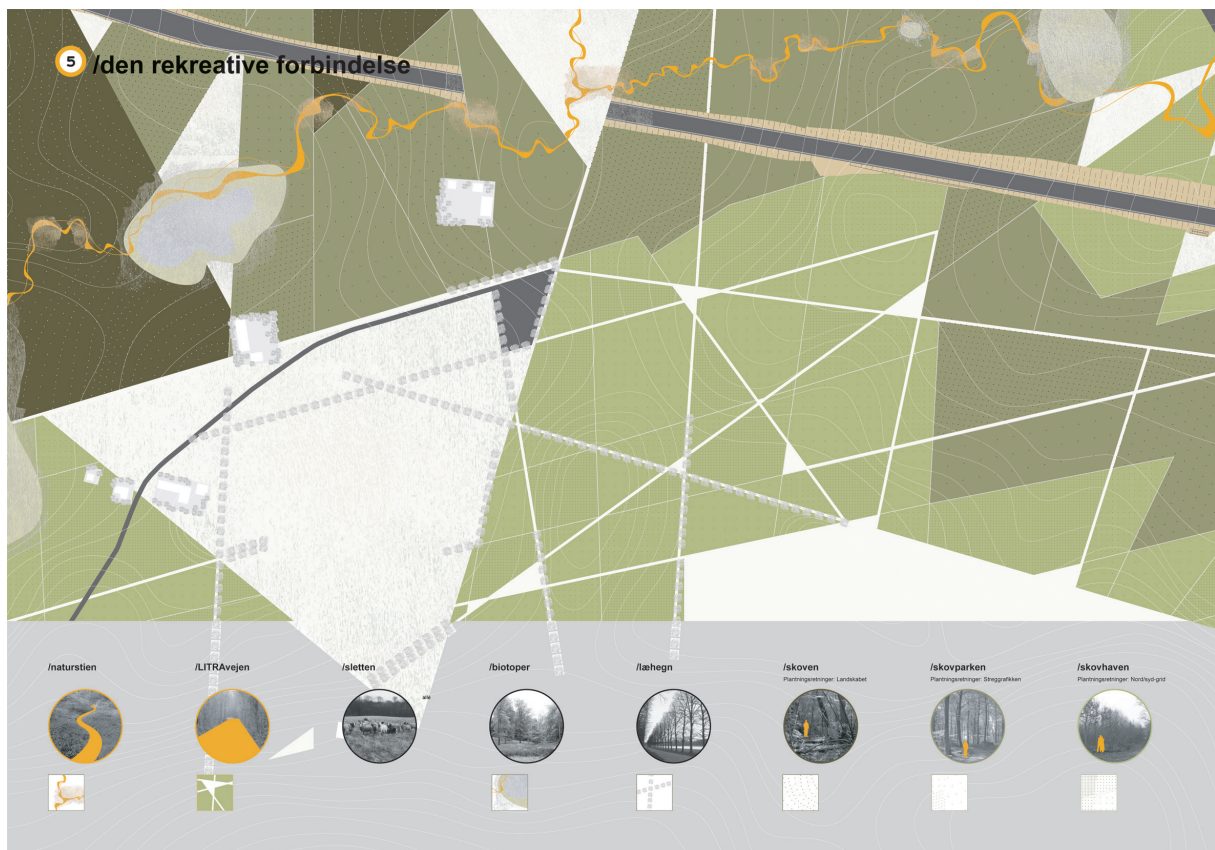
One of the finest examples of the use of the super grid in the organisation of a larger urban development is found in the 1969 master plan for the English new town of Milton Keynes (figure 4–5). Here the overall grid secures equal accessibility across the entire area and minimises the risk of traffic blocks, the ladders secure placid environments without through traffic and easy access to recreational qualities at a lower level. With this combination the inhabitants gain a freedom to move across the area and harness all of its qualities – each inhabitant has the freedom to combine his or her own unplanned neighbourhood (Rasmussen, 1994). A linear network of parks, which secure important connection across the area, also supports this freedom.

Like other urban development plans from the same period, the master plan for Milton Keynes has since been criticised for promoting urban sprawl and car dependency, and planning schemes that utilise the road network to combine qualities associated with urban and rural environments seem to have disappeared. However, the reality of today's urban landscapes reassembles the kind of urban life that the master plan for Milton Keynes was intended for; the car has become the preferred mode of transport and most people move around freely and assemble their own 'neighbourhood' as they see fit. The most significant difference seems to be that it happens without an overall plan or vision.

Figure 2
Detail plan from the project GREENfrastructure – skovrejsning i infrastrukturelle og bynære landskaber (2004). Instead of just being a buffer between the motorway and the surrounding urban landscape, locating the forest in the background, Boris brings the forest into the foreground as a mediating element in dialog withe the surrounding landscape on three different levels: The Forest (dark green) represents the intention of creating an overall continuous landscape network to benefit biodiversity and is planned as natural forest with a low cultural imprint. This part of the green infrastructure helps connecting existing biotopes in the urban landscape. The Forest Park (green) is designed in a way that supports the visual qualities of the urban landscape and is given a moderate cultural imprint. The Forest Garden (light green) is thought of as a site in close dialogue with the activities in the local everyday landscape, which in time will have a high cultural imprint (Stefan Darlan Boris).
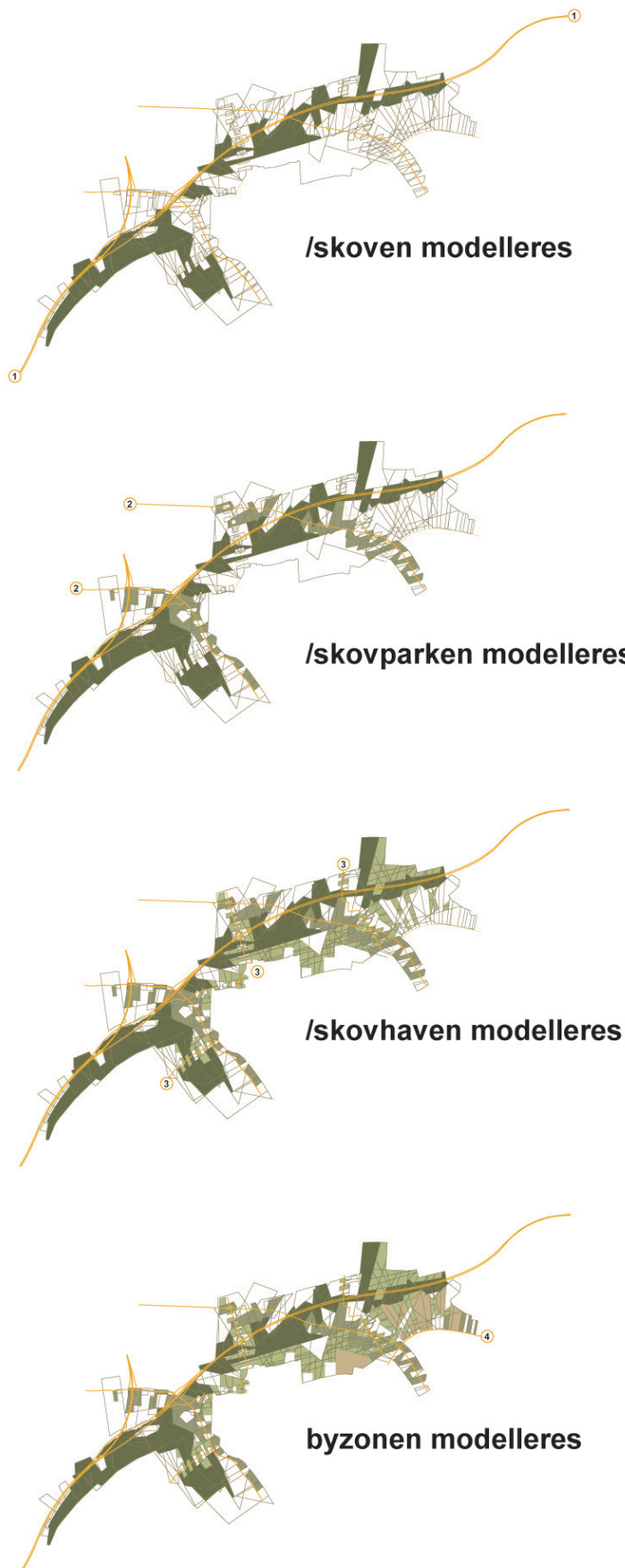
/skoven modelleres

/skovparken modelleres

/skovhaven modelleres

byzonen modelleres

Figure 3
Diagrams from the project GREENfra-
structure – skovrejsning i infrastruk-
turelle og bynære landskaber (2004)
explaining the different stages in its
development. From the top: The Forest
is shapes, The Forest Park is shaped, The
Forest Garden is shaped and new areas
for urban development are shaped.
In this project the wayside is not only
utilised as a physical connection and a
framework for future development, it
also becomes the site that renders the
surrounding urban landscape
accessible as a meaningful place
(Stefan Darlan Boris).

Figure 4
Illustration of the road layout and green infrastructure in the master plan for new town Milton Keynes in England (1969). The new city is organised and structured around a so-called super grid (shown in black/V3), which is intended to give the inhabitants maximum freedom to move across the area and harness all of its qualities (Philippe Renoir).

In this respect, the super grid could be an appropriate organisational framework for today's urban landscapes – a way to organise the urban-rural interface in more qualified ways. As part of my PhD-project *Vejnettet og det urban-rurale landskab* (2008), this idea was tested in an exercise concerning a small section in the growth region of East Jutland, Denmark. The main idea was to illustrate how future urban development and expansion of the road network could be organised in a way that benefits, rather than compromises, the connectivity of urban landscapes. Instead of solving existing and expected traffic problems through a continued expansion of the motorway system, it was proposed to upgrade and expand the network of secondary roads to forms a super grid, which could support the diffuse commuter pattern in the region (figure 6). Similar to the master plan for Milton Keynes, the super grid is also used as a framework for green infrastructure – structures which support the urban-rural interface – in this case by utilising the space in between the 'closed ladders' and the 'open grid' in order to protect environmentally sensitive areas of river valleys from development and secure ecological and recreational connections. In each of the superblocks surrounding

the river valleys, the existing tertiary roads are converted into a network of recreational connection with restricted motor traffic. Future development is oriented towards and directly connected to the secondary roads of the super grid in order not to compromise the river valleys as an important green infrastructure.

The 'sponge' as local connector

In relation to the project *Water and asphalt – the project of an isotropic territory* (2006), Bernardo Secchi and Paola Viganò have studied the fine-grained infrastructural networks that characterise the 'territories of dispersion' in Italy. These networks, which are both ubiquitous and isotropic but also site-specific and adapted to the local geography and culture, are characterised as 'sponges' because of their sponge-like structure. In relation to their studies, Secchi and Viganò identify a problem in the way these 'sponges', which are often developed and expanded gradually over a long period of time, are increasingly regarded as being insufficient compared to contemporary needs and ideas of efficiency. New urban and infrastructural initiatives often ignore the inherent qualities of the 'sponge' by introducing a different logic based on hierarchisation, fragmentation and homogenisation (Viganò, 2008).

In Denmark, these sponge-like infrastructures can be identified in the fine-grained network of minor roads which connects the countless houses, farms and villages in rural areas. Today, many of the areas with dispersed settlements are part of larger urban landscapes, and the fine-grained network of minor roads constitutes an important connection

Figure 5
The vision for new town Milton Keyens (1969) was to develop a city which was greener than the surrounding landscape. This meant that 20 % of the site was devoted to the development of an extensive green infrastructure, which should secure important landscape connections ahead of the actual urban development. Milton Keynes also became known as the 'Forest City' (Walker, 1994) (MKDC).

Figure 6
The super grid as organisational framework for new green infrastructure in urban landscapes. This idea was tested in an exercise concerning a small section in the growth region of East Jutland, Denmark, as part of the PhD-project Vejnettet og det urban-rurale landskab (2008). The main idea was to illustrate how future urban development, afforestation, and expansion of the road network could be organised in a way that benefits rather than compromises the connectivity of urban landscapes. Instead of solving existing and expected traffic problems through a continued expansion of the motorway system (top map – blue lines), it was proposed to upgrade and expand the network of secondary roads to form a super grid (top map – red and black lines), which could support the diffuse commuter pattern in the region. Similar to the master plan for Milton Keynes, the super grid is also used as a framework for green infrastructure. The super grid is used to both organise the planned afforestation in a forest network (middle map), which in some areas can be colonized by new urban enclaves, and to transform tertiary roads in the river valleys into a network of recreational paths (bottom map) to protect the environmental sensitive valleys from further development (author).

between the diversity of different locations. At the same time, there is a tendency for new road infrastructure and single-family housing developments to be organised in way that ignores and compromises the qualities of the fine-grained network of minor roads, apparently because these interventions, as pointed out by Viganò, follow very different logics.

Based on these considerations it makes sense to recognise the fine-grained network of minor roads – the sponge – as an important site for architectural intervention in relation to the qualification of urban landscapes. By utilising the specific qualities of the 'sponge' in relation to the on-going transformation of these landscapes, it becomes easier to create site-specific development without 'fracture' – development which is based on what is already there and has worked for years (ibid). In this way, the 'sponge' addresses a central problem in urban landscapes; that of au-

Figure 7
Schematic plan from the project Byudvikling og trafikal infrastruktur i Østjylland (2007), which was an exploration into new concepts for the organisation of future urban development and transport infrastructure in the growth region of East Jutland, Denmark. According to this particular plan and concept, the future urban development is concentrated in a number of new urban landscapes (green and brown colours) in relation to an infrastructural spine with two parallel motorways (thick black lines) with one motorway being new (dotted). Areas marked with a red square were subject to a more detailed proposal (see figure 8) (author).
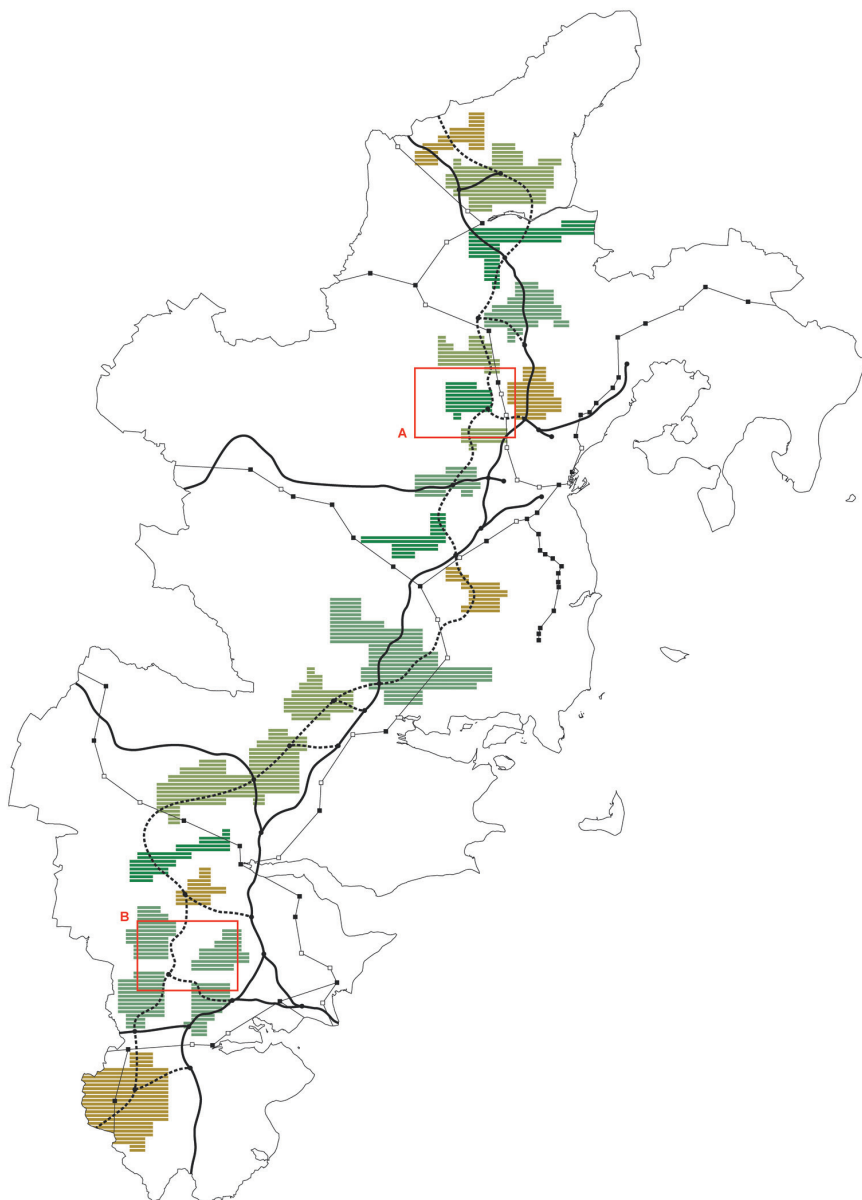
tonomous new systems new systems being super imposed on existing systems without any form of exchange that contributes qualitatively to the landscapes (Sieverts, 2007).

This type of approach can be identified in the concept and schematic plan for the organisation of the growth region of East Jutland, Denmark as described in *Byudvikling og trafikal infrastruktur i Østjylland* (2007). In this project future urban development is concentrated in a number of new urban landscapes in relation to an infrastructural spine with two parallel motorways (figure 7). Two examples illustrate how new urban landscapes could be organised in relation to the existing conditions, and one of these implement a form of organisation which utilises the existing fine-grained network of minor roads. In this example, this network is linked directly to the motorway by a loop, which will dramatically increase overall accessibility to the area. Part of the 'sponge' forms the basis of a number of linear housing developments which, in combination with an extensive afforestation program, can be expanded and subdivided (figure 8). By utilising existing infrastructures, important connections between new and existing developments in the area are secured, and the green infrastructure of new housing developments is woven into the existing landscape and forest structure. In relation to the green infrastructure of the new housing development, the 'sponge' makes it possible to optimise the length of the fringes of the forest – a highly valued quality for housing.

Figure 8
Illustrations from the project Byudvikling og trafikal infrastruktur i Østjylland (2007), which explores how the fine-grained network of minor roads – the 'sponge' – can be utilised in the organisation of a new urban landscape. The new motorway (thick red) connects to the existing road network (orange) by a loop (thin red). New developments are proposed along existing roads (light grey) and future forest roads (light green). New forest (green) is proposed in relation to existing forest (dark green) (author).

Conclusion

The three cases above all address the link between the organisational properties of road networks and the production of space, in particular in relation to the concept of green infrastructure. They illustrate how road networks can be conceptualised as a framework for green infrastructures which can qualify urban landscapes, mainly in relation to the creation of structures that can mediate meaningful connections between the different systems within urban landscapes. In this way, roads can become elements associated with porosity rather than fragmentation.

The three cases also indicate that earlier ideas and visions about the relationship between infrastructure, landscape and territory might gain a new relevance. For example, it has been suggested that architect Frank Lloyd Wright's (1867–1959) comprehension of the importance of the road network in *Broadacre City* (1935) completely anticipated how most people today use these networks (Dupuy, 2008). The parallels between Wright's ideas about life in *Broadacre City,* where the only real centre were the family's individual home, and the way life unfolds itself in contemporary urban landscapes can be striking. However, there is at least one very important difference; the widespread carpet of urban landscapes in contemporary Europe as well as North America is not the result of comprehensive visions and master plans created in the minds of architects and planners. On the contrary, they are the result of countless decisions, visions, plans, dreams, etc., which in a positive way reflect the diversity of free and democratic societies.

This is not to say that we cannot learn something from these cases in which transport infrastructure is integrated in the way 'city' and 'landscape' are being conceptualised and planned. The fact that huge parts of the road network continue to be constructed without architectural visions of the organisational dimension suggests the importance of developing new perspectives which can match issues of traffic management and transport economy. By regarding the road network as a structural tissue, which, for better or worse, has been involved in the evolution of urban landscapes, it becomes possible to develop visions retrospectively. Visions, which are about seeing the potential in the existing road-conditions, and which, on this basis, create the framework for green infrastructures, can qualify urban landscapes by increasing their overall connectivity and porosity. To do this, architects need to challenge road planning as an autonomous discipline.

Acknowledgement

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