

The Vesterbro Project

Gašper Žemva, AD10 - URB 9, June 2009



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2.1 The bull sculpture on Vesterbro

Summary

This Thesis Project deals with the street of Vesterbro in the Danish city of Aalborg. The street is one of the most important ones in the city because it links the city centre to an important southbound road and one of the two northbound bridges across the Limfjord. The problem is that the street accommodates large amounts of motor traffic and this makes some sections of the street unattractive for pedestrians.

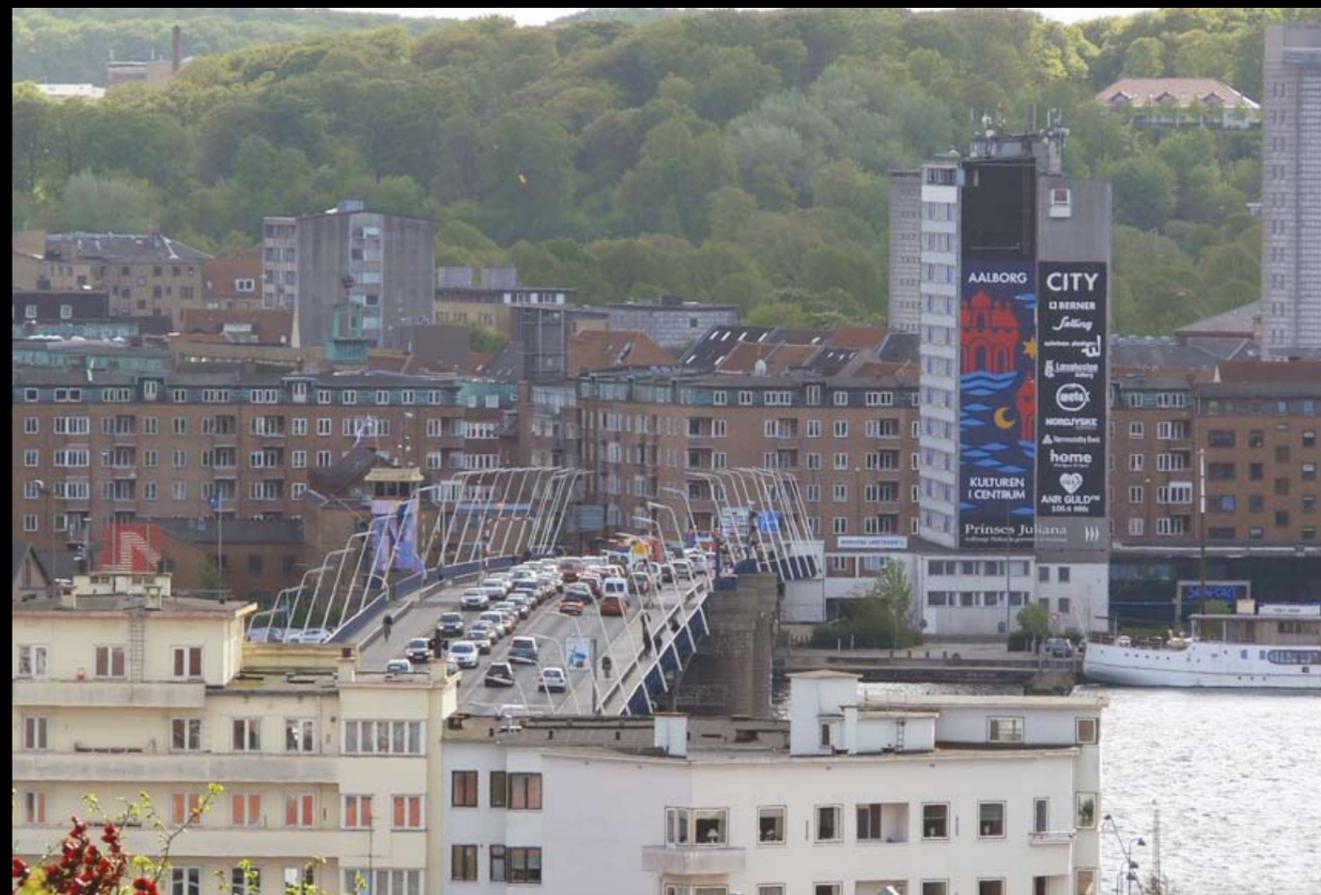
The report tries to see whether such a condition is favourable for the city by examining the city's former and current urban development strategies.

Vesterbro's functioning concept is modernistic and this means that in some areas this concept competes for space with the city's new "knowledge and culture" urban design concept. It is not the aim of the project to eliminate the modernist functioning of Vesterbro. It is making it coexist with the new city development strategy.

Because the street has a vital role for the city's traffic behaviour, creating a more pedestrian friendly environment - which is important for the new city design concept - is not an easy task. Any attempt to widen pedestrian spaces could result in a collapsing traffic environment on some sections of Vesterbro.

However there is an option that has probably not been tested before: the street could be designed in such a way to accommodate more cars in times of rush hour traffic and allow for leisurely walking when there are not that many cars around. This type of traffic organization would be enforced with the use of retractable bollards.

The report ends with the conclusion that reconstructing a part of Vesterbro with 'flexible sidewalks' would be in the interest of the current city design strategy and the citizens of Aalborg who walk on this street. With traffic calculations presented in the final part of the report, it can be noted, that the altered design of Vesterbro would not make the street's motor traffic grind to a halt.



3.1 Aalborg on the farther side of the Limfjord. The bridge - Limfjordbroen connects Noeresundby and Aalborg

Introduction

The theme of the Thesis project will be based in the Danish city of Aalborg.

The city of Aalborg is, with 160.00 inhabitants, the fourth largest city in Denmark (<http://www.aalborgkommune.dk/Borgerportal/Engelsk/About+our+city/default.htm>, 10.02.2009).

In its more than 1000 year history the city has experienced continuous growth in population, urban development and infrastructure.

The city is accessed by roads from all sides. One of these roads has a more important role than the others. Its name is Vesterbro and it is part of the corridor which connects Aalborg to the biggest urban centres of Denmark. Additionally it provides an important access point to the Limfjord bridge which spans the Limfjord which cuts Aalborg municipality in half.

At first glance the street is well equipped for handling motor traffic but is less inviting for pedestrians. One of the signs of this is that the street supports many car lanes but sidewalks are at some point only about one meter wide. Being such an important street it might be good if it was more attractive to other users besides motorists.

The report will try to examine why Vesterbro has been developed into its current state by considering strategies which guided the growth of the city and its history. Then an analysis will consider if the street really is more inviting to car users than pedestrian users.

Furthermore the analysis, combined with the city-development strategies and the theories underlying them, should allow us to decide whether a more inviting street for pedestrians would benefit the city or not. If it is concluded that a more pedestrian friendly street would be beneficial to the city, then the report will try to influence such development by suggesting a design solution for Vesterbro.

The Development of Aalborg

In order to understand the street of Vesterbro, we first need to see how it fits into its context. Its context would be the city of Aalborg. A geographical and historical mapping of Aalborg will follow.

Geography

Aalborg is situated in the northernmost region of Denmark. It is placed on the southern part of the Limfjord - the biggest Danish fjord, that cuts the peninsula of Jutland into two parts. This area along the Limfjord is historically attractive for settlement because the fjord is narrowest here. Aalborg Harbour is the main port along the fjord.

The area surrounding the city is more or less flat and suitable for agriculture.

The major employers in the area are: tourism related businesses, educational institutions, the military air base, the seaport, telecommunications and cement industry.

History

Due to the narrowness of the fjord and hills that offered defence, the area has seen settlements since the year 1000 AD. The first to build their settlement in the Aalborg area were Vikings. They occupied a hill north of the fjord.

Many towns were established on areas where there had to occur a change in transport methods. Aalborg was no exception. The Limfjord presented a line where cargo and passengers had to change their method of transportation. To cross the fjord they had to embark on a ferry. There is the point where the settlement of Aalborg was founded in the 12.th century (Vagnby, 2009). In the 14.th century it received city rights (<http://www.aalborg.dk/Engelsk/default.aspx?ctrl=1689&data=133%2c2191885%2c3194&count=1>, 26.03.2009).

The city had good transport options because of water transport and a fertile hinterland. The combination of these two had a major impact on industrial growth. In a matter of centuries small workshops developed into first industries. The most prominent industries were: shipbuilding, quarrying, tobacco and alcohol industries.

Because industries required bigger spaces to create new production halls, they moved to the city fringes. The best places for them were close to the fjord, because of transport reasons. New railroads were constructed to support these sites.

In the times before industrialization it was usual that workers



4.1 Denmark in Europe



4.2 Aalborg in Denmark



4.4 Central Aalborg



4.5 Countryside around Aalborg



4.6 Aalborg with the Limfjord cutting it into two parts

lived in the vicinity of their workshops. When industries began to move to the fringes of the city, the workers also began to move. The first workers quarters were constructed close to the new industrial areas (Vagnby 2009).

This led to an increase of the movement of people. Together with expanding production this created a need for increased traffic capacities. To allow a faster and easier transport of people and goods the first vehicle bridge was constructed across the fjord. This was a pontoon bridge, built in 1865 (Kiib, 2007: 32).

It can be noted that economic growth goes hand in hand with infrastructure development. The easier flow of goods and people stimulate the economy to grow even further.

Old industries grew and new ones like meat and chemical industries were established. This enabled the population to grow. This led to even more infrastructure development.

Historically the city's urban tissue was structured in such a way that east to west corridors were far stronger than north to south ones. This can be perhaps explained with the fact that the old city was wider in an east-west direction than it was long in the north-south direction. So to enable easier mobility in the north south direction two major breakthroughs were made: the Østerågade and Vesterbro breakthroughs. In order to create them, the old city structures that lay in their paths had to give way. Both of these new streets were lined with architecture of their times.

Østerågade was established in order to ease the flow of people from the main train station to the ferry embarkation point. In those days land transport was not as efficient as water transport. For example people living in this area would not go to the capital Copenhagen by train, but by ferries. This can be explained with the fact that at this time there was still no railroad bridge connecting Jutland to Zealand. The buildings on the street were given for those times widely

used classicistic facades (Vagnby, 2009).

The other notable breakthrough was Vesterbro. In addition to easing mobility curbing unemployment with this public work was on the agenda (Christensen in Nielsen, 2006: 12). Like in Østerågade the buildings lining the street were lined with for those times contemporary facades. These were the 1930ies, so the facades were given a functionalistic look.

At its northern end the street went across the new Limfjord bridge. The reason for creating the new bridge was technical. The old pontoon bridge had less lanes, was more difficult to open for ships and sometimes even floated away. As Vesterbro was always the main access point to the city from the south, its unhindered continuation towards the north and the new location of the bridge were justified.

The population was rising and the industries were expanding. To enable further economic growth a civilian and military airport was established north-west of the city.

Before 1938 Denmark had no planning design policies. The main aim of city design before this date was enabling infrastructure developments (Kiib, 2009). Afterwards changes were based on various urban policies which were changing over the years. These changes were influenced by various theories and their economical context.

The age of motorization began. People began moving out of the crowded cities into the suburbs and thus expanding the city in all directions (Vagnby, 2009). Motorization demanded more and wider roads. In order to handle the increase in traffic a motorway was built. It connected the city in a north-south corridor to all larger Danish cities and beyond. Important to note is the fact that the motorway went also below the Limfjord and established the second motor-traffic link across it.

Aalborg continued its policy of growth by expanding to

the east. Between the sixties and seventies the extensive residential area of Aalborg East was established. In a bid to create more high profile enterprises a part of East Aalborg became a university campus. The creation of Aalborg University enabled the city and region to cope with the incoming industrial downturn.

The energy crisis in the seventies made a profound change in the then already criticized city planning. New developments were now generally less car-dependant. Urban sprawl was discouraged and public transport became a high political priority.

To curb car dependency, new bus lines, bike lanes and pedestrian areas were established. The city was made more attractive for non-motorized users.

After the big political and economical changes in the nineties many industries in the city found it more profitable to move their production into eastern countries. Some of the industries that did not move closed down. This left the city with many brown field areas and considerable unemployment.

In order to support economic development, the university grew and stimulated the creation of knowledge-based enterprises and a highly skilled workforce.

These strategies enabled the regional economy to stay competitive, but still there were many brown-fill sites devoid of any activity.

In a bid to stay visually attractive and stimulating and thus competitive with other cities, the municipal authorities have decided to reclaim these brown-fill sites - many located on both sides of the Limfjord (Kiib, 2007: 27).

By reusing them the city established a connection with the water and created attractive residential and leisure areas. Brown-field redevelopment is today still underway, because of the extensiveness of the disused industrial estates.

Growing population numbers and economic growth are pushing the levels of traffic even higher up. The response to this was the strengthening of the city's public transport with a bus-route realignment and the establishment of local train services.

The second response to growing traffic was the planning of a third connection across the Limfjord. This would be a motorway which would bypass the city on its western edge and establish a motorway ring around the city (Kiib, 2007: 26, 32).

There is a strong opposition to this project because the motorway would cross areas with a considerable natural value. It is stated that the city would need a new connections across the fjord because otherwise rush-hour congestions across the two existing connections would become very heavy. As an alternative to the new motorway a third underwater tube could be added and thus the capacity of the motorway increased.

In the long run, the population of Aalborg is set to grow one percent over the next 40 years (Kiib, 2007: 26)

Conclusion:

The city of Aalborg has seen considerable growth in its more than thousand year history. As it grew its need for more transport also grew. Housing, industry and infrastructure developed concurrently.

The last years have seen the biggest changes in the city - sociological and physical. It is predicted that over the future years Aalborg will be revitalising its existing areas instead of expanding to new ones.



5.1 Aalborg from the south



5.2 Aalborg from the north



5.3 Boulevarden breakthrough



5.4 Vesterbro breakthrough

Strategies of Development

The modern history of urban design in Aalborg was shaped by different strategies which were implemented in various parts of the city. Understanding these strategies will help us comprehend the historical development of Aalborg more clearly.

A strategy is a plan of action designed to achieve a particular goal. Strategies can be applied in various fields such as business, military, social and physical development strategies. The goals of strategies can be different, for example increasing profits, enjoying life, ensuring stability and so on.

A common goal of cities is to enable a prosperous life to its citizens. The municipality in charge can benefit prosperity of its citizens by enabling social righteousness and creating an economically stable environment which creates economic growth.

If we limit ourselves to Aalborg we can see that over the second half of the 20th century there have been three main strategies of accommodating economic and urban growth. These strategies were put down in the General plan of Aalborg. This document usually sets general and specific guidelines for the development of the city. It is interesting that Aalborg led the transformation of the discourse of urban planning in Denmark through planning and action (Kiib et al, 2004: 18).

As briefly mentioned before, prior to 1938 Denmark had no urban planning laws. The growth of urban structures derived from the growth of infrastructure. Typical planning questions

of those days were for example locating a new harbour and railway. Then the city was allowed to grow around it (Kiib, 2009).

The first strategy aimed at accelerating the creation of a welfare society by enabling equal consumption opportunities for the whole population. These opportunities encompassed the consumption of housing, goods, education, employment and therefore enabling everybody to choose in a democratic and political way to create their own lifestyles and careers. The realisation of the welfare society was linked to the modernistic idea of creating effective cities through zoning and accessibility. This resulted in massive city growth, housing and infrastructure creation (Kiib, 2007: 25).

The second strategy is opposing its predecessor. Because of the oil shock in the seventies and the general unpopularity of for those time contemporary urban design, the general plan predicted a halt in city growth. All development was now to be concentrated in the older existing parts of the city. It was now built for pedestrian and historical experience, higher densities and better public transport. This strategy was more environmentally and socially sustainable than its preceding one (Kiib, 2007: 25).

Economical changes in the nineties led to a general update of the second strategy. Sustainability remained the main topic, but the pedestrian experience morphed to include vibrant, urban city design, which would please the 'creative class' as propagated by the popular Richard Florida. Let us now have a closer look at these strategies.



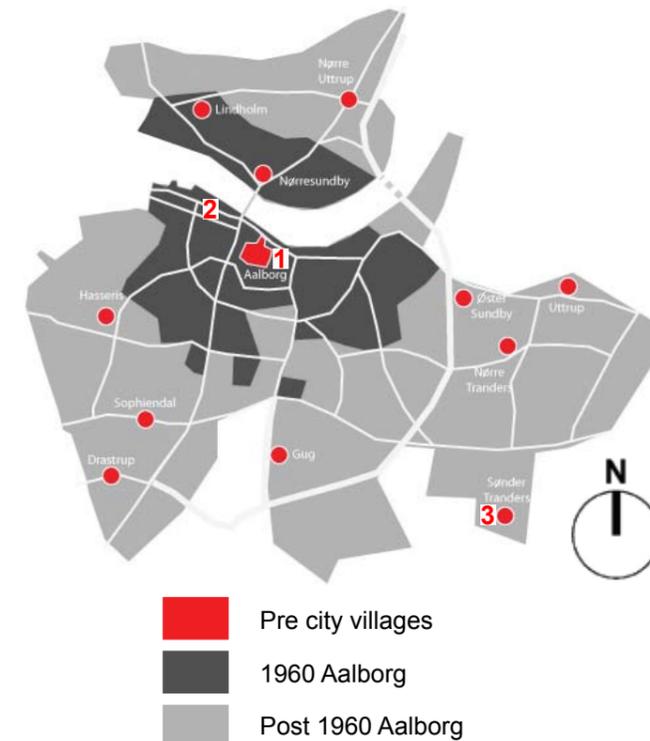
6.1 The medieval core



6.2 Industrial area



6.3 Old surrounding village of Sønder Tranders



Before 1938 and up to 1960

Infrastructure

The main priority up to 1960 was infrastructure development. This was formalized in 1938 when Denmark accepted its first planning laws (Kiib, 2009). When infrastructure was built, the city could use it for its new development.

If there was demand for industrial or housing areas they were built and the city grew.

Let us have a look at which parts of the city were built in such a way:

The medieval core

The beginnings of such development started with the medieval city which was based next to natural infrastructure - the fjord. There the city grew in an organic way with its population. The paths which formed the city lay in a predominant east-west direction, with paths leading outside the city running from the south-west to the south east.

The development of the medieval core took place from approximately 1040 and in the present only minor architectural and urban interventions happen here.

It is composed of dwellings, workshops, religious and government institutions. In later years the majority of workshops have moved out and are now replaced by shopping and leisure facilities (Vagnby, 2005).

Old surrounding villages

They have been established in a similar time as the medieval core of the city. These villages consisted of farms. They sold their produce in the city.

Their current use is mostly residential. Later on they became parts of the city itself.

Industrial areas

In the time of the industrial revolution some workshops expanded into industries. They needed bigger plots of land to be able to produce larger quantities of their products. Therefore the industrial areas were positioned outside the city but as close as possible to good transportation. The best option for transport was still by ship (Vagnby, 2009).

Infrastructure breakthroughs

As mentioned earlier: In order to ease the difficult city movement from north to south, two important roads were constructed. The older one running from the train station to the fjord and the younger one from the main southern city access to a new bridge spanning the fjord. Both of these breakthroughs mark the significance of different transport modes which were in use in the times of the roads establishment (Vangby, 2009).

The 1960' strategy

Functionalism

The time after the second world war saw many political and economical changes across the world. Noticeable was the growth of the global economy and living standards. The main urban design theme of these times was the promotion of consumption, accessibility and mobility.

In order to keep up with the changes happening across the world Aalborg Municipality started drafting plans for the future of the city from 1945 onwards. The plans were presented in 1951 and afterwards they were being implemented. It states that Aalborg will have: "More city, better infrastructure, better housing and more consumption" (Kiib, 2007: 25). This axiom was put into action in 1973 in the General Plan for Aalborg

(Kiib 2007: 25). The overall plan was to develop a ribbon-band city. This idea derived on a smaller scale from Ebenzer Howard's Garden City and on a larger scale from the Danish H-city strategy connecting all Danish cities and beyond. Development would be positioned along two ribbons, running in a north-south and east-west way (Kiib et al, 2004: 18). These ribbons overlap at the southern shopping area, and the university campus is positioned on the east-west ribbon, while the historical city is placed on the north-south ribbon.

Such a plan demanded a large infrastructure development. This is the period of the city's largest growth. The design promoted efficiency and equal accessibility of living and production and education. Use of zoning strategies increased car dependance but on the other hand separated industrial from living areas (Kiib, 2007: 25).

Urban sprawl

As a result of growing car ownership, the city expanded in all directions along the two ribbons. Urban sprawl is attractive to citizens because of its low density and closeness to nature. On the other hand it creates a lot of commuting traffic.

Southern shopping area

The shopping area of "South City" was established in these times. It was created as a "relief centre" in order to decongest the historical centre of the city. It is located strategically at the junction of the two development ribbons (Kiib, 2007: 25).

University campus

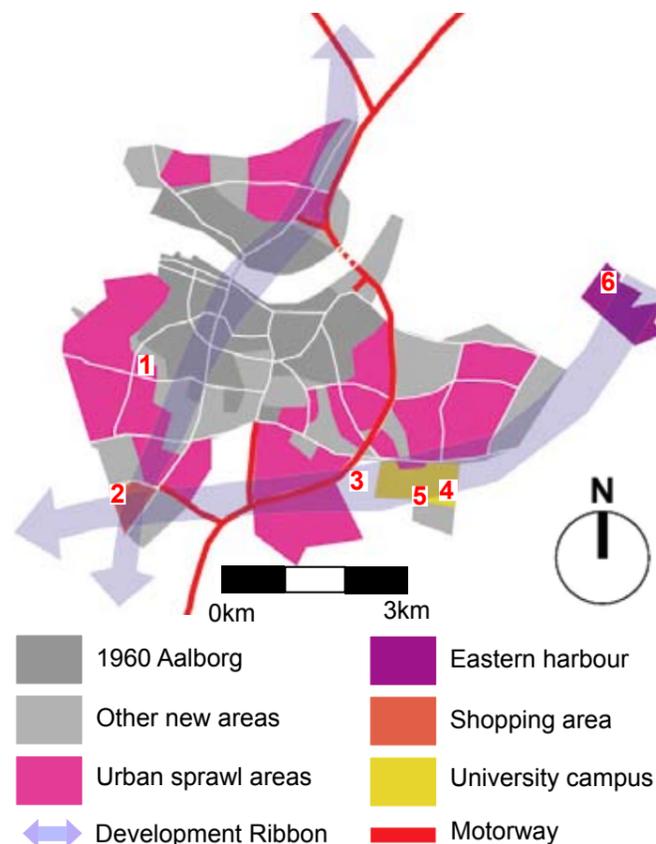
Aalborg university was established in the year 1974 in order to construct the welfare society by enabling more students to receive higher education. It was located on the east-west ribbon (Kiib, 2007: 25).

Eastern Harbour

Aalborg Harbour was moved to the eastern outskirts of the city in order to allow it to grow even further. It is positioned on the end of the east-west ribbon. It is a part of the larger industrial zone (Kiib, 2007: 25).

The Motorway

Aalborg received a modern link to the rest of Denmark in 1969. It is part of the H-City concept. This improved mobility in the city as well in the country. The motorway established a second motorized connection under the Limfjord. It runs in the eastern part of the city, separating the older city developments from the newer ones (Kiib, 2007: 25).



7.1 Urban sprawl



7.2 Southern shopping area



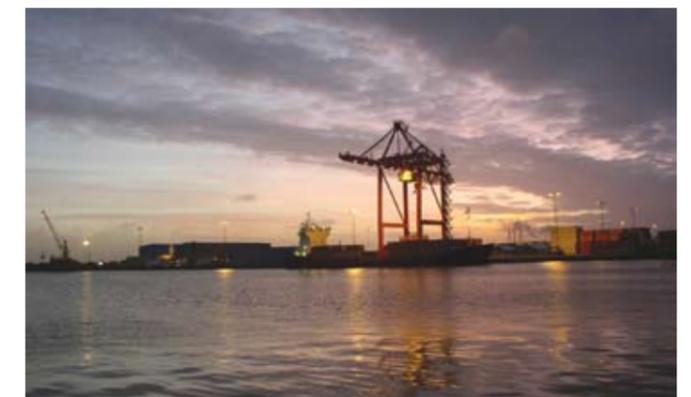
7.3 The motorway



7.4 The campus is an example of green field monofunctional planning



7.5 The university campus



7.6 The Eastern harbour



8.1 Courtyard renovation



8.2 Postmodern architecture infill



8.3 The Kennedy square park establishment



8.4 The Louisegade square establishment



8.5 Boulevarden street reconstruction



8.6 Algade pedestrian street

The 1980' strategy Postmodernism

Big changes happened to the urban design strategies of the eighties. It can be said that these were the result of the oil crisis in the seventies and postmodern design movement, which was an answer to systematical errors of the previous functionalistic planning period.

The results of these two phenomena can be recognised as the new planning strategy that was formulated in the eighties: 'Not more city, but better city' (Kiib, 2007: 25). This strategy aims to revitalise the existing parts of the city, thus lessening the need for city expansion. This led Aalborg into more ecologically sustainable development by means of increasing density, promoting public transport and urban regeneration (Vangby, 2005: 40). The inner city was made attractive for the pedestrian - so as to lure him out of his car - with the use of the 'city beautiful' technique.



8.7 Suburban postmodern development

Pedestrian streets

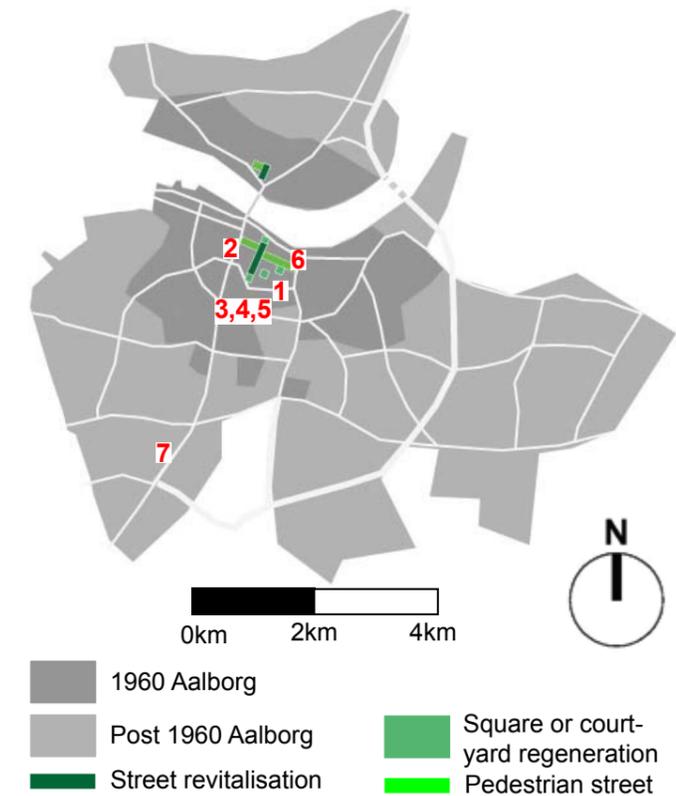
Three new pedestrian streets were established in Aalborg: Bispensgade, Algade and Torvegade. They were established in a move that would make the city centre more attractive for its citizens on foot. Also other minor streets have been closed down to traffic or have been narrowed to allow more spaces be used for pedestrians. Two such small squares are located in Vesterbro.

Squares

A four lane street in front of the main train station has been closed and turned into a reconstructed John F Kennedy Square. Also other minor squares have been established, together with many courtyard restorations.

Boulevarden and Østerågade reconstruction

Østerågade was closed for cars, so that only buses and delivery vans may use it. Along with Boulevarden, the street surfaces and sidewalks have been reconstructed with quality pavement. Quality urban furniture has been set up on the street.



2005 strategy: Knowledge and culture based city

In the nineties the outsourcing of industry to countries with cheaper labour accelerated and this left the city with many empty sites. As the majority of these sites were located next to the Limfjord a redevelopment of the defunct sites into residential, culture and leisure areas would enable the city to densify itself and also connect itself to the river. All of this led to the postmodern city design strategy of the eighties to be updated. It now aimed for "Culture-oriented Urban Regeneration [with] facilitating infrastructure for new knowledge based industries" (Kiib, 2007: 25). The goal of creating a knowledge and culture city is making the city more attractive for business and workforce after the extensive loss of industry. The creation of diverse and active areas that promote human interaction would according to some theories generate further regional economic growth. This strategy is similar to the city's postmodern design strategy: it still aims for a dense pedestrian friendly city, however it concentrates its attention on empty brown-fill sites, specially on the waterfront.

Let us have a look on how was this strategy implemented.

Waterfront development

The once derelict waterfronts are now being redeveloped as residential, educational and leisure areas in order to densify the city and make it more stimulating for its users. Special buildings include a House of music, mixed use former power plant and museum. All of these buildings and places have a mission to reconnect the city to the Limfjord.

The development is occurring on both sides of the fjord, both on the western as well as on the eastern sides. Construction has been finished closer to the city centre, and is spreading to its edges (Kiib, 2007).

The Vision of Aalborg

It is important to note that the strategy of 2005 provided the framework for the Vision of the city. It states: "We are aiming from an industrial city to a 'knowledge and culture' city... We wish to have a diverse city with active urban life... The eventful city with a great variation of attraction and sensory impressions" (Kiib, 2007: 26).

The aim is therefore to make a lively city, that would entertain its existing or future citizens and thereby keep them from moving out to other more attractive cities. Under certain theories this would attract businesses to settle in the city.



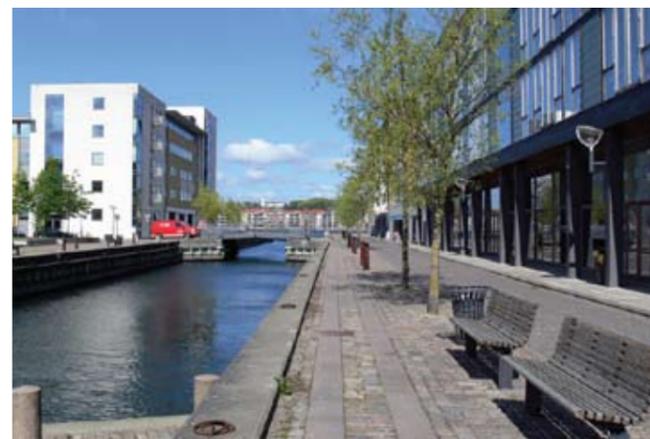
9.1 Waterfront promenade development



9.2 These industrial areas are scheduled to be replaced by new mixed-use development



9.3 The new Aalborg slogan reads: "Aalborg loves the world". It represents the city's openness to global knowledge and culture



9.4 Residential waterfront development



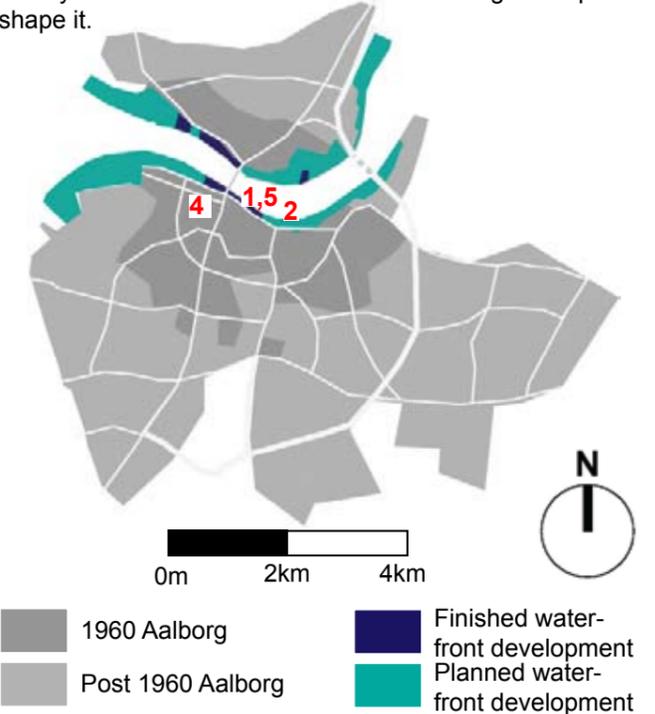
9.5 Knowledge and culture facilities (museum and a faculty) on the waterfront

Conclusion

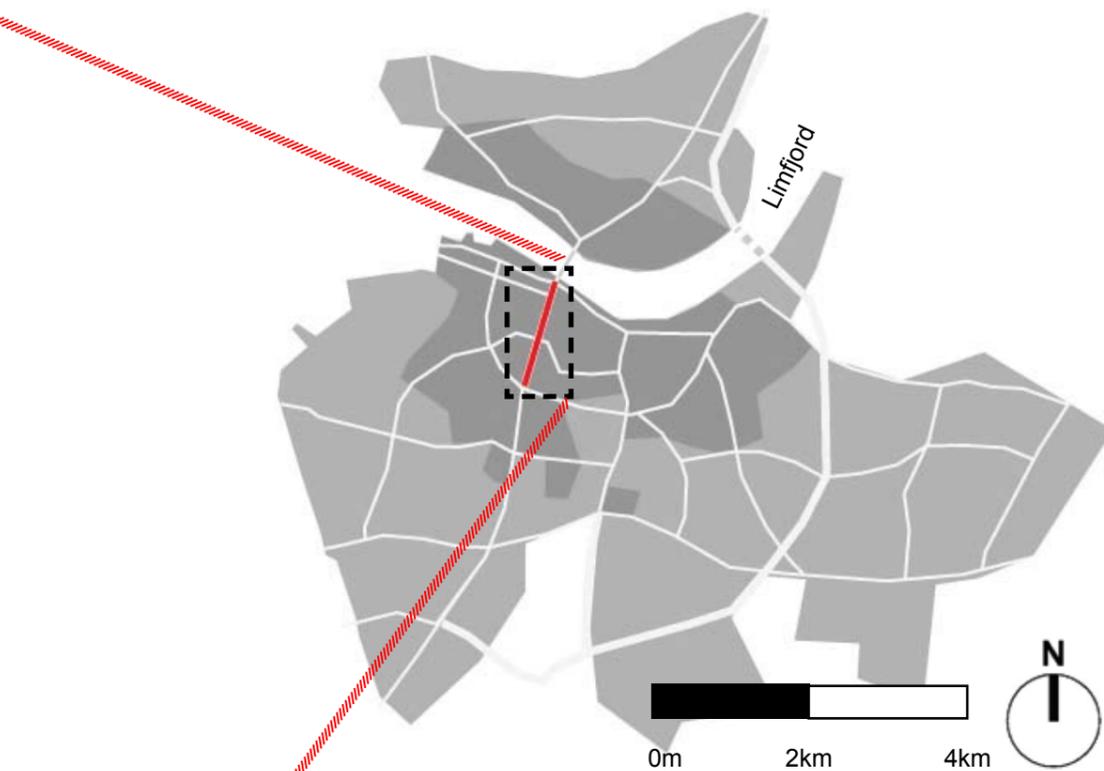
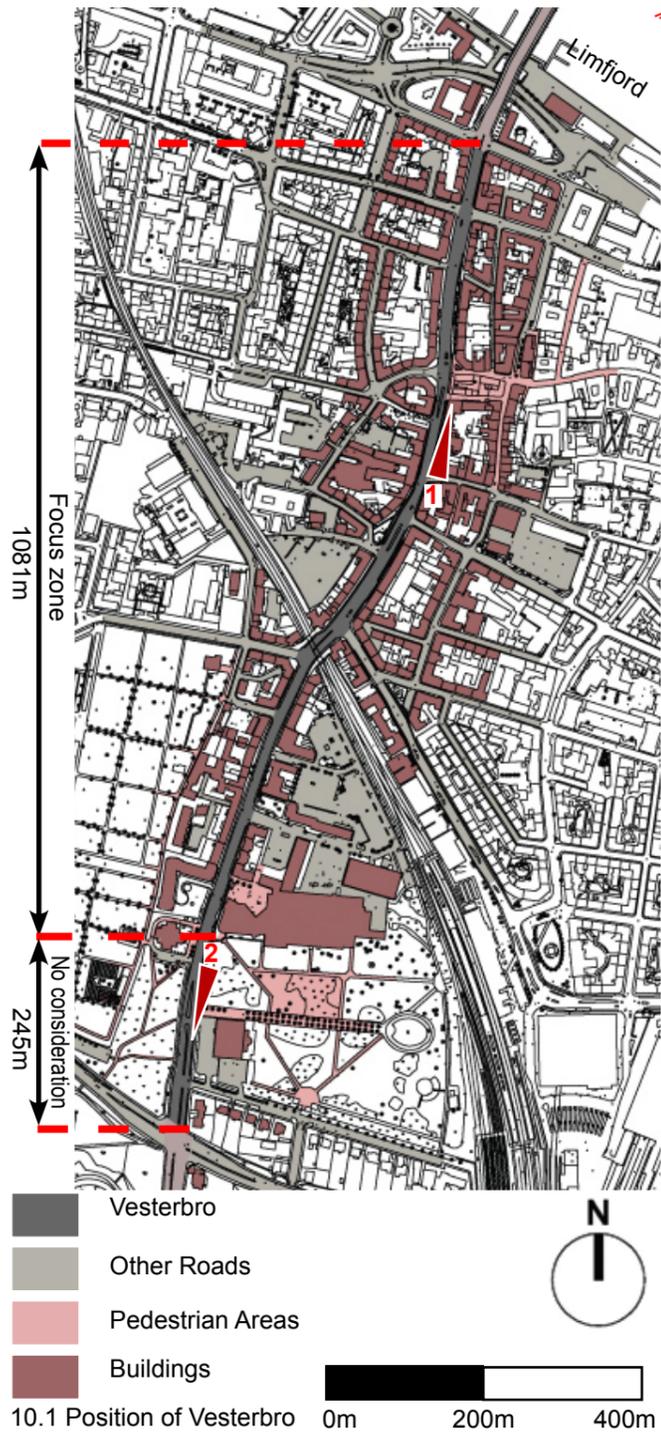
All up to the sixties Aalborg experienced moderate growth which was based mainly on the provision of infrastructure. In the sixties this growth became more organized, accelerated and by becoming so, helped create a society with equal access to goods and services of consumption. The method urban design of Aalborg undertook was based on the functionalist and garden city.

This period lasted until the eighties when the expansion of the city turned inwards. New development was less damaging to the environment, and had a community-building potential. It was based on the pedestrian experience. Twenty years later it was morphed into a new strategy. The city was still made to be more dense and attractive for pedestrians, but the aim is to make a culture and knowledge based society which would be inviting new citizens and enterprises. The inner city development scheme was extended and intensified with many new harbour front areas as Aalborg is aiming to be a diverse, active and stimulating city.

Now that the history and the strategies of the city's development have been considered we can now turn our attention on Vesterbro. We will begin by considering its history and how the above mentioned strategies helped to shape it.



Introduction to Vesterbro



Vesterbro is a main traffic artery of the city. It is positioned on the edge of the medieval city and is part of a north-south corridor. Its central position in the city enables it to be the main connecting point between the northern and southern parts of the city.

The street is 1326 metres long. As it continues to head north it crosses the Limfjord bridge and goes the northern half of Aalborg - into Nørresundby. There it continues its path towards the northernmost corners of Jutland. Following the road southwards one would reach the main Danish cities and go beyond the country.

The Limfjord bridge is one of the only connections across the fjord and Vesterbro is the only main road accessing the bridge from the south. This makes it a bottleneck which, because of heavy traffic, morning and evening rush hour congestions are generated on a daily basis.

The larger part of the street is constructed as a four lane road and the rest is a three lane road, with the middle one acting as a turning lane.

The street passes through a densely populated area. Buildings line the edges of the street almost throughout its entire length. The only openings in the street facades are made at junctions with other roads and railroads. Southwards the urban tissue is less dense, and buildings there are standing alone.

Buildings lining the street are predominantly residential with various shops, agencies and restaurants in their ground floors. Special institutions include a church and an exhibition centre.

The street provides the main access to four central parking areas for cars. These are vital for the functioning of the city.

The street ends on its southern side with the city's ring road. The corridor of Vesterbro continues southwards, but now under a different name. This means that Vesterbro forms a connection between the city's ring road and the only multiple use bridge in the city. Beyond the bridge lies Nørresundby and on the southern side is Hobrovej. As stated before Vesterbro



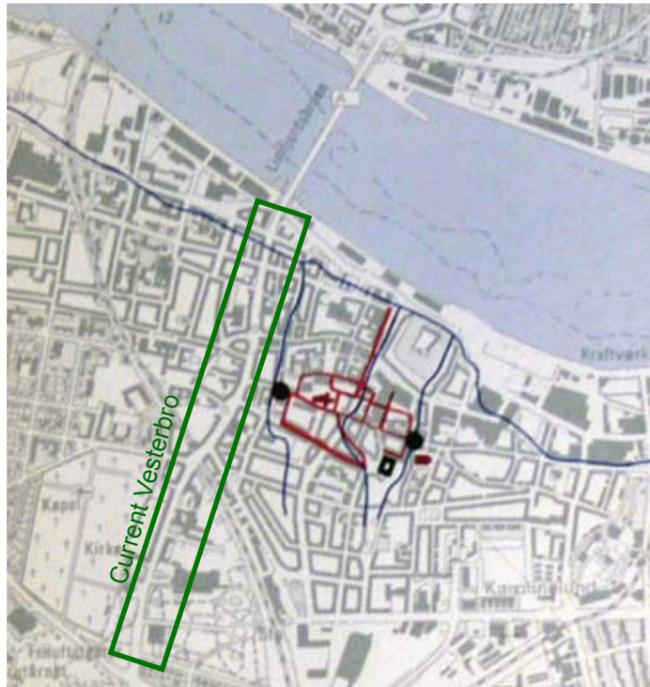
10.2 The focus zone is built up in a highly dense way



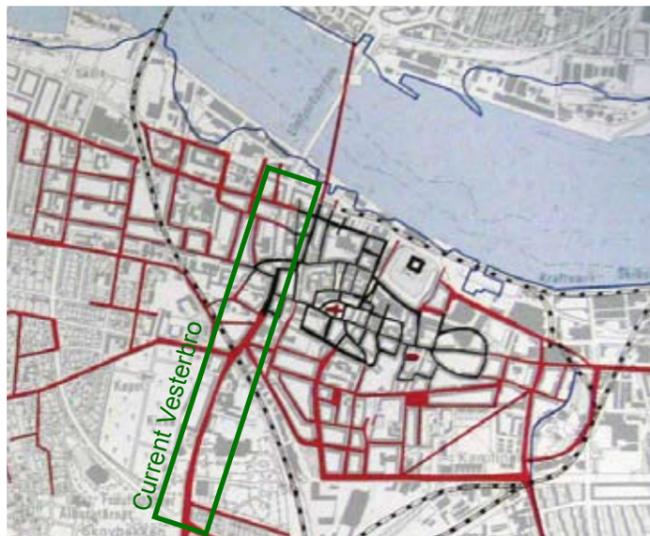
10.3 The area with low building density will not be considered

is situated in two environments: the traditional dense city and a low dense park environment in its southern part. The part of the street located in the dense area experiences a 'conflict' between car users and pedestrians, which is part of an overlap between the modern and postmodern city development concept. The southern part of the street, located between two parks does not provide such an overlap between concepts because of its low density, which makes it a typical modernist street. This will limit the focus of the project because we are only interested in the city areas which show the overlap of the modern and postmodern concept. The part of the street located in the low density park area thus falls out of our consideration. In order for us to create a deeper understanding of the developments of Vesterbro we will now have a closer look at the historical development of street.

History of Vesterbro



11.1 Aalborg in 1475. Note the gates (marked as black dots). The western gate crosses the Western River (Vesterå) with the Western Bridge (Vesterbro).



11.2 Aalborg in 1900. The black lines represent the existing roads and the red ones represent new roads built in this period. Note that Vesterbro ends halfway between the rail crossing and the fjord bridge.

Before 1930

Historically the course of Vesterbro was not the same throughout the years. Its name which means Western Bridge derives from the fact that it approached the central city from the West by crossing the river of Vesterå with a bridge and a city gate (Vagnby, 2009).

Vesterbro linked the city of Aalborg to its neighbouring cities in the south. From its beginning at the former Vesterå gate it began its way southwards in its more or less current corridor in the direction of Hobro and Aarhus (Vagnby, 2009).

In this time Vesterbro had no link to the Limfjord - it ended with Vesterå street, from where people could either go to the centre-most parts of town, to the ferries that would take them to the farther side of the fjord (Vagnby, 2009).

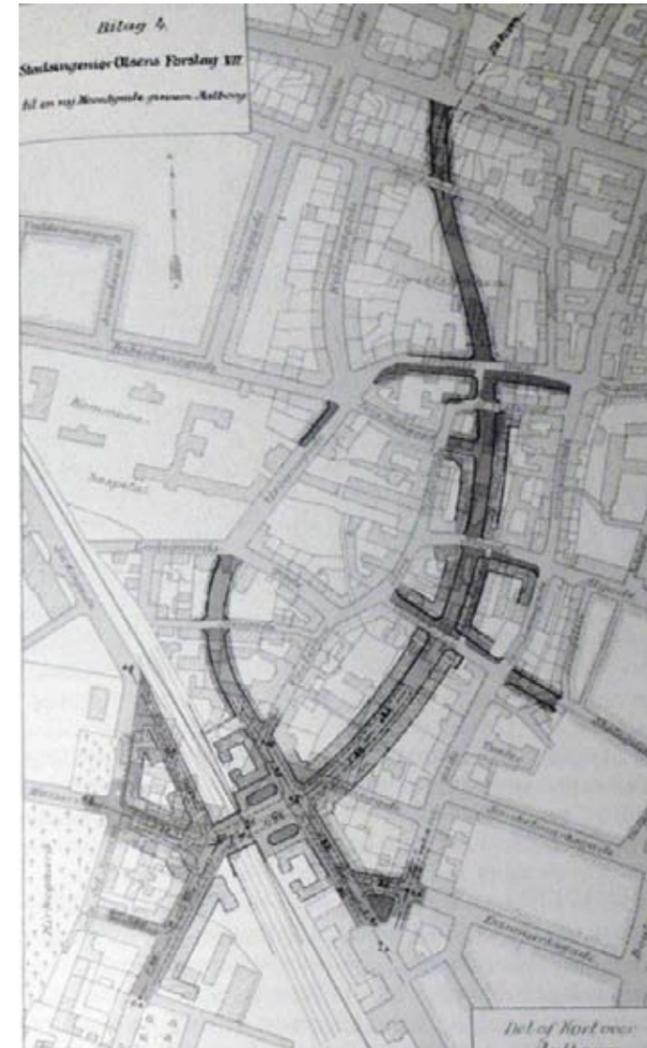
At that time the city had no bridge, but after its construction in 1865 it eased the flow of people and goods. However the bridge still had technological limitations: it could only enable a limited traffic capacity, and its use was problematic in winter times when ice floating on the fjord broke the bridge formation, causing parts of it to float away (Vagnby, 2009).

In the year 1913 a decision was made to replace the old bridge with a permanent crossing. It was decided that the crossing should be linked to the road system with a large new road. By demolishing a part of the old city structure this new bridge could be connected with the main access road of the city, Vesterbro. In Addition to easing movement in a north-south direction in a structure with more east-west connections, the development would be a mark of progress of the city and at the same time would limit the high unemployment of those days (Christensen et al, 1990).

It was intended that the street would become the major high street in Aalborg, used both for transit and commerce (Christensen in Nielsen, 2006, p.12).

Between 1930 and 1960

The redeveloped Vesterbro cut through the city's tissue. On the existing section buildings were pushed back to create a new street facade. On the new part of the street existing buildings were pulled down in order to make space for the new corridor. It took time for new buildings to rise. The buildings were built in the architectural style of those times: functionalism. On the street space there was enough of space for thorough traffic, car parks and pedestrians. Shops



11.3 The first plans for the reconstruction of Vesterbro



11.4 Aalborg in 1940. Vesterbro is now extended.

and fuel stations lined the sides of the street. It now crossed the railway with an overpass. Linking the old Vesterbro with the bridge strengthened the connection on this north-south corridor. It became one of the main city streets (Vagnby, 2009).

Between 1960 and 1980

By this time all buildings on the street have been completed. In the vicinity a new parking house was established. Increase in traffic and changes in traffic organisation led to marking traffic lanes (Vagnby, 2009). Central and some of the side street parking areas were abolished in order to make Vesterbro a four lane street. In its central area however, the street is not wide enough to allow for four lanes, therefore there are only three lanes, with the central one being a turning lane.

The change of Vesterbro into a four lane street along the majority of its length is therefore the most significant change in these times.

Between 1980 and 2000

Not many changes occurred on the street since the 1960. The street widening at the junction with Stengade has been, on the western side, transformed into a pedestrian area. This was also done with the closure of Jens Bangs gade for cars. Together with a newly-built post modern building it now forms a pedestrian square.

As a traffic calming measure the intersection with Korsgade was cancelled with cutting the latter street into two and creating two dead ends (Christensen et al, 1990).

After 2000

In current times the only changes done to the street area were the construction of a parking house close to the congress centre and the installation of signs signalling the availability of car parking spaces across the city. This lowered the amount of traffic made by people trying to find available parking spaces (Aalborg Kommune et al., 2009:3).

The projects affecting the street area in the future are a new parking house that will be built at the junction of the street and the bridge, and the south western parking area of Gåsepigen enlargement (Aalborg Kommune et al., 2009:4).

The Municipality also aim to reduce the traffic speed on Vesterbro between Prinsensgade and Borgergade junction to 30km per hour (<http://www.aalborgkommune.dk/Borgerportal/Serviceomraader/Trafik+og+veje/Planer+og+rappporter/Hastighedsplan.htm>, 11.02.2009).

Theoretical framework

The reduction of traffic speeds on Vesterbro can be perceived as an approach of the municipality to alleviate negative impacts of the street's large traffic volumes. This could make the street more attractive and so allow for more diversity, which the vision of the city and its newest strategy are aiming for. But motor traffic is still very important in the case of Vesterbro. This can be seen with the increasing number of existing and future parking areas in the street's vicinity.

Conclusion

Vesterbro is a very old street. As its name suggests, it was probably established along with the first city gates with its bridge over the Vesterå river. From there it followed its current course towards the south.

The biggest change to the street was the its expansion and extension to the new fjord bridge in the thirties. This lifted Vesterbro to be one of the most important streets of the city. All subsequent changes done later to the street area are less striking. They were the reorganization of the street to a predominantly four-lane street in the sixties and some pedestrianization and traffic-calming measures in the eighties.

After the millennium the amount of parking lots close to the street has increased and will continue to do so. Also measures to reduce traffic numbers with the use of parking displays have been taken.

This means that the whole history of Vesterbro is marked with efforts in accommodating increasing amounts of motor traffic. Some efforts have been made or will be made to make it more attractive for pedestrians, but still motorists have the highest priority.



Physical changes to the street were done according to various urban design strategies.

To be able to make a sensible analysis of Vesterbro itself, we have to understand the theories that have been guiding these various strategies. The theories considered below will be presented according to the strategies they influenced.

The pre-strategy period

As stated before Denmark had no official planning policy before 1938 (Kiib, 2009). Before this time all city development was subject to infrastructure construction. The city expanded only to parts that were supported by infrastructure. All the way from the city's foundation this was one of the principles of city growth. When new technologies such as railways and motor cars appeared the question was where should the infrastructure to facilitate them be located. This led to the before mentioned urban breakthroughs of Boulevarden, and Vesterbro and Strandvej. These were inner-city infrastructure developments. With the rising population in Denmark ([http://www.nationalbanken.dk/C1256BE9004F6416/side/Monetary_Review_1_Quarter_2000/\\$file/s49.gif](http://www.nationalbanken.dk/C1256BE9004F6416/side/Monetary_Review_1_Quarter_2000/$file/s49.gif)) the city also had to allow for external growth. Therefore new infrastructure that would support housing development was built east, south and west of the city.

Soon after the end of the second world war the new concept of city design was aimed at providing equality by allowing equal consumption of housing, goods, education, services, careers, political and democratic resources to the whole society (Danielsen et al, 2004: 18).

So in order to allow equal consumption of the above mentioned goods and services, a lot of construction would have to take place in order to make scarcity a thing of the past.

The city would need to grow physically in order to enable a well functioning consumer society and a new urban planning strategy was called for. Theories and case studies were studied beyond Denmark's borders.

In those times two urban planning theoretical models were gaining importance: Le Corbusier's Radiant city model and Ebenezer Howard's Garden City model. We will first have a look at the older strategy, created by Ebenezer Howard.

The functionalist strategy - Influenced by Ebenezer Howard

The Urban Designer Ebenezer Howard aims were social. His idea was to create examples of balanced communities, which would not experience overcrowding neither uncontrolled sprawl. New communities would benefit from "fresh air, sunlight, pleasant vistas and quiet nights" (Mumford in Larice, Macdonald, 2007: 49). Environments that allowed for the above mentioned phenomena were becoming increasingly rare in his days. Further on societies would be strengthened with supposedly increased cooperation and companionship between individuals. With the introduction of green belts uncontrolled expansion of cities would be halted and thus the distinction between town and country would be strengthened. He divided areas of the city into zones such as housing, industrial, nature and shopping zones. When it came to housing his preferred type was individual housing, not placed far apart. With eliminating congestion he would also lower land values and thereby pave the way for metropolitan reconstruction. His guiding aim was to vitalize urban life and allow for intellectual and social improvement of rural life.

He kept his ideas on a diagrammatic level as he was aware that every site is unique and would demand different design (Mumford in Larice, Macdonald 2007: 44-53).



12.1 Vesterbro accommodates large traffic flows



12.2 Functionalist housing development



12.3 Infrastructure development was the focus in the 30'



12.4 Example of Howard inspired garden city development

The ideas of Howard materialized in Aalborg in the form of new housing, shopping, educational and industrial satellite developments, where they would be placed in greenfields, with an encircling or partial green belts and interconnected with infrastructure. Such examples are the university campus and the 'South City' shopping centre.

The functionalist strategy - Influenced by Le Corbusier

The sixties strategy was also in part influenced by one of the most influential architecture and urban designers, Le Corbusier.

The ideas which underlined his theories were also social: housing should be made more affordable, everybody should have equal access to natural amenities and also have more free time. He believed in the expansion of society and its cities.

The way to achieve cheaper housing was to implement standardization and simplification of housing. This would weaken the diversity of housing, but would speed up their construction by incorporating housing elements of same sizes, shapes and material. This allowed a larger amount of housing to be built in shorter time. The larger amount of housing would then bring their prices down to a decent level.

To allow equal access to nature for everyone Le Corbusier propagated that buildings should be built vertically rather than horizontally. This would ease up space and allow for parks to be established on the empty grounds. Access to nature would benefit the physical and mental wellbeing of everyone. To achieve this the density of the city tissue would be lessened to a great extent. There would be a change from small spaces being in between large buildings, to small buildings being in between large spaces (Guiton, 1999).

More free time for everybody to enjoy would be created by more efficient urban design. The measures that would en-

able this would be to strengthen the road system as much as possible. Corbusier perceived that allowing traffic to flow faster would reduce the time spent in everyday commuting. But to make driving easier, roads would have to be as straight and wide as possible. He believed that this is a necessary step to take in order to enable cities to be as efficient as possible. He explains: "The obsolete framework paralyzes city development. Industry and commerce will be strangled by backward cities." He continues: "Traditionalism, in larger cities, obstructs the development of transport, cramps and disables activity, kills progress, and discourages new ideas. The decay of old cities and present day working pressures are causing physical and mental illness (Le Corbusier in Guiton, 1999: 94)".

Another way of promoting efficient use of times was the creation of mono-functional zoning. Le Corbusier planned this to extend only for industrial areas, while other uses could be mixed with residences.

Le Corbusier's influence in Aalborg can be seen in the drive to make housing accessible and affordable to a wider society with a large upswing in housing development. This led to the most intensive period of growth the city has ever seen. Like Howard, he was an opponent of residential sprawl, because in his vision it lowered the efficiency of ideal dense cities - there were more buildings on open space and an even larger need for supporting infrastructure.

To allow for efficient movement of people and goods, many roads have been widened and new ones have been built. The most prominent new road was the motorway with its underwater connection to the northern side of the fjord. Some major streets were converted into four-lane roads. Such are Vesterbro, Hobrovej, and Østre Allee. All of these run in a north-south direction. Two new four lane streets were also created: Nyhavnsgrade and the ring road Østre Allee.

Efficiency of uses was also strengthened by the implemen-

tation of zoning policies. Some city areas were devoted to single uses, the biggest being shopping, industrial and education zones. It can be noted that industrial zoning is promoted by Howard's and Le Corbusier's theories but mono-functional shopping and educational areas do not fit Le Corbusier's vision. He aimed for diverse non-industrial uses of city areas but at the same time he wanted cities to be congestion free.

The new relief shopping centre in the south is in accordance with the latter aim: it aims to lessen the crowds in the city centre - which it still does, because a significant amount of all shopping purchases are made in this part of the city.

Also with the aim not to increase the crowds in the city centre, the university was built in the south-eastern outskirts. Industries were established in industrial zones. One such case is the new Eastern harbour (Kiib, 2007: 26).

Conclusion

Both of the theories were merged into the Aalborg city strategy. Howard's theories had an influence on the positioning of new developments and on their internal organization, while Le Corbusier's theory had a profound influence on the infrastructure organization of the city but with equally strong influence on the internal organizations of new developments. Under the 'more city' strategy, Aalborg experienced its biggest growth in history. The new developments were built for car-dependant users which needed speed to arrive at their destinations. Roads were widened or newly-built while park areas remained accessible to all. Housing, shopping, education and industrial zones were established. A new urban landscape with plenty of natural areas was created.

All of these implementations had in Aalborg and other cities that developed in this way, strong and sometimes negative effects on society and the environment. This was shown

with the onset of the oil crisis in the seventies and post modern design rebellion. This led to an increase pressures to change the way we build cities to a more socially and environmentally sustainable way (Kiib, 2007: 26).

Between 1980 and 2000

As mentioned in the previous chapter changes in society and economy had an impact on urban design. Population growth slowed down and ecological awareness became important. New built housing construction fell to 20% of pre-1970 levels. If before city growth spread considerably out of the city, it was now turned inwards. Community sovereignty were now on the schedule. This period is market as the post modern rebellion. The theories of Jane Jacobs and Allan B. Jacobs had an influence on the shaping of the postmodern urban strategy of Aalborg.

The realization of the functionalistic city plan of the previous design period was postponed from the year 1973 to 2000, with a new emphasis of enabling community life and protecting the environment, with the goal of making a welfare city. The 1986 city plan thus became a hybrid between functionalistic and community planning (Danielsen, 2004: 24)

The postmodern strategy - influenced by Jane Jacobs

Her theory argues that modernist urban planning was destroying the social environment of the city with the implementation of low density single use areas. This made walking less pleasant which led people not to walk on streets but to drive cars instead. This in turn created traffic congestions which led to increased traffic surfaces which at least visually if not physically destroyed built-up environments even further. Smaller numbers of people using the streets for walking resulted in blight and higher crime rates because people stopped performing their 'passive surveillance of street areas'. All of this led to creation of slums, which created a bad image of the city and were costly to regenerate.



13.1 Modern garden city 'satellite' development



13.2 Le Corbusier inspired residential development



13.3 Massive infrastructure development



13.4 Large monofunctional shopping area

She ended with the thought that cities with a poor urban design enable a poor social environment which leads to poor economic city performance (Jacobs, 1992).

Her book sent shock waves throughout the urban design community and it did not take long for the theory explained in her books to take roots in actual design.

In order to make community friendly cities these strategies were suggested by Jane Jacobs: creation of mono-functional, low-density sprawl had to be discouraged. Urban life outside of buildings had to be promoted and car dependency would have to be diminished with the enabling of higher city densities. These higher densities with mixed uses would then result in economically feasible public transport and creation of 'walking distance' design.

Designing with the 'walking distance' concept in turn promotes non-motorized travelling as cycling and walking. And most important: city areas would have to be made visually and socially attractive to the pedestrian.

So the main point of Jane Jacobs was that contemporary urban design should aim for high densities, appropriate concentration, short distances, mixed uses, socially attractive streets and maintenance of neighbourhoods. This would be more or less the complete formula of creating lively communities and economically strong cities (Jacobs, 1992). The last point of making socially attractive streets is explained very broadly and here the topic was taken up by Allan B. Jacobs, who went to further lengths in explaining what makes pedestrian friendly cities.

The postmodern strategy, influenced by Allan B. Jacobs

He calls on urban designers to create roads or areas that will enable leisurely walking and promote physical comfort, are interesting to look upon, are spatially defined by buildings or perhaps trees, are designed with quality materials and will be well maintained. It is also important that buildings along these streets and squares complement each other in height



13.1 Community centre at Skipper square

and that they show their uses. These are the qualities that good public spaces should have.

Additionally qualities or elements that contribute but are not absolutely necessary are: trees, definition of spaces by marking their beginnings and endings, diversity and density, special details, creation of widenings or places which subdivide streets into shorter sections.

The new city strategy designed in the eighties is influenced by these theories.

First and foremost urban sprawl has been discouraged. Effort has been put into making better public transport by implementing many new bus routes and creating a suburban train service on the railroad.

Pedestrian areas have been established in an effort to increase pedestrian attractiveness of the central city area. These are Bispensgade and the Algade corridor south of the fjord and Torvegade in Nørresundby.

Effort has also been given into creating pedestrian friendly mixed use streets by high quality pavement and street furniture. Such a case is the Boulevarden corridor, the western part of Nyhavnsgrade and in a short section, Vesterbro.

In the outer areas of the city, physical community creation was encouraged with the construction of local centres with local communities.

In the broad perspective the development of the city was strongest in community creation, with most design effort being put into the historical city, while infrastructure gains from the past were kept as they were.

After 2000

As industries kept moving out, the city had to secure itself from stagnation due to the loss of jobs. Therefore new industries would have to be attracted to the city. These new industries of the post industrial or information age are the



13.2 Square establishment at Toldboden

so called knowledge based industries that rely on a highly educated workforce and add high added values to their products.

As already stated the main reason for traditional industries to move out of the country is that industrial workforce is cheaper in developing countries, which can make such offshoring companies much more competitive. Countries with an expensive workforce usually have to compete with such companies by generating higher added value. This is the competitive edge of developed countries, such as Denmark.

The knowledge-culture strategy influenced by Richard Florida

The trick may be to attract a highly skilled workforce and here the urban theories of Richard Florida regarding the creative class apply.

The idea is that creative people are the lifeblood of creative and knowledge based industries. And potential workforce will draw industries to cities. If the city was made interesting enough for its residents not to move to other cities and if it attracted even more people to relocate to it, than knowledge based industries would base themselves in the city area and offset the decline made by industries moving out of the country. The driving force of creativity are in Florida's mind the three T's: Technology, Talent and Tolerance. The more of the three T's the city enables, the better. Important to note is that creative people are drawn to places that allow for diversity (<http://www.youtube.com/watch?v=khQ9BaXZAJM>, 29.03.2009).

The postmodern strategy acted on strengthening local communities throughout Aalborg with emphasis on the city centre and now the new strategy of 2005 aimed for making the city centre even more attractive for everybody.

But how does the city relate to the three T's? The local community in Aalborg seems to be quite tolerant; while



13.3 New waterfront development

technology and talent are being developed by the university and other educational institutions. Functional and social diversity exists in the city.

Florida argues for urban design which would create spaces open for multiple uses which would attract all societies. Diversity and liveliness are the two main points of his theory. The Aalborg city strategy is working along these theories. The municipality are enhancing diversity by creating places and buildings with diverse design and a multitude of possible uses. This should give extra boost needed to make Aalborg a more interesting city to live in. This goes along with the previously mentioned city vision which aims for a 'knowledge and culture city' with active urban life and a city that would be eventful with a great variation of attraction and sensory impressions (Kiib, 2007: 26).

Most of the development is now based at the extensive waterfront area, previously occupied by many industries. All effort seems to have been put into this part of the city. Museums, schools, libraries, parks, promenades, student dormitories, residences, music halls, indoor and outdoor sports areas, multi purpose halls and shopping centres are being built on different sites along the waterfront with more functions being joined in single buildings.

Kiib noticed that such development turned the city centre of Aalborg into a theme park, composed of an Entertainment city with restaurants, bars and cinemas, a Culture city with museums, galleries and music institutions and a Recreation city with many recreational facilities in western Aalborg. This makes central Aalborg the public meeting space of the entire city. The original component of the historical city - production - has been eliminated in order to provide a theme park for exposure and enjoyment (Kiib, 2004: 28).

As mentioned before the 'knowledge and culture' strategy resembles the postmodern strategy by promoting inner city growth and lively pedestrian friendly spaces.



13.4 Creation of multi use spaces for diversity and liveliness

Conclusion

The postwar development of Aalborg is influenced by global urban design theories. The initial main concern, before the creation of official urban design strategies, was infrastructure creation. In the sixties creating liveable and numerous housing, industries and other institutions was joined with extensive infrastructure creation to support the city. The city grew, but in its expansion it caused damage to some communities and the environment.

The subsequent post modern rebellion tried to halt the degradation of the environment and strengthen the social life of the city. The development of the city was but for some exceptions turned inwards. Attention was given to pedestrians and other environmentally sustainable modes of transport. The new millennium saw the city try to create attractive, diverse, multi use places and buildings. This could draw new and retain existing inhabitants, which would attract knowledge based industries, which would compensate for the loss of offshoring industries. Effort is being given into the provision of education, entertainment, leisure facilities and housing and focus was kept on inner city growth and the pedestrian experience.

The connection between flow, friction and street uses

Flow and friction are important for a functioning of a street. Streets are, and have always been, spaces of flows. Flows would mean the ease it takes to reach someone's destination. Friction is the counter force of flows; it would hamper the ease of flows. Street friction would be created for example with wider sidewalks on the expense of traffic lanes, traffic calming measures and so on. For example a dead end street would create large friction and flows would be very weak; while on the other hand a motorway accommodates little friction and flows are strong.

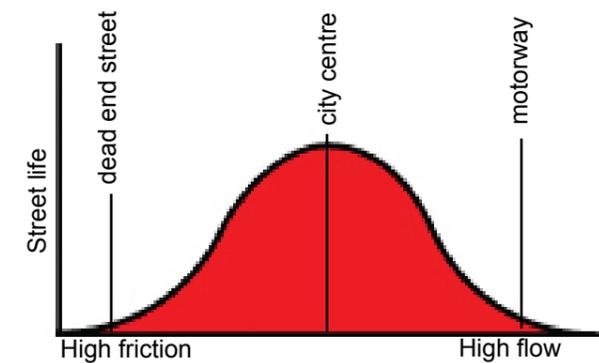
Spaces which have high friction like dead end or narrow streets experience only small amounts of street life, because people there cannot get far and so prefer to use other streets. On the other hand a space of high flow such as a very wide street produces negative effects such as noise and space consumption which also hampers street life.

Therefore street life has the opportunity to develop in spaces that have more or less an equilibrium between flows and friction.

This does not mean that the connection between street activity flow and friction is automatic; street activity also requires sufficient density in functions and people living or working in the area.

Jan Gehl came to a conclusion: "If the speed of movement is reduced from 60 to 6 kilometers per hour, the number of people on the streets will appear to be ten times greater, because each person will be within visual range ten times longer". He continues by stating that: "Slow traffic means lively cities" (Gehl, 2006: 77).

Gehl found out that also motor traffic amounts and not only motor traffic speeds contribute to outdoor quality deterioration. This was confirmed by a study, carried out by



15.1 Connection between flow, friction and street life

Appleyard and Lintell in San Francisco (Gehl, 2006: 34).

Of course the amounts of traffic are relative according to the size of the street. For example the famous Champs-Élysées in Paris handles a lot of traffic but it is still a lively street for a pedestrian. This is because of the various outdoor activities the street enables and the large spaces for pedestrian movement it provides. With enough space, pedestrians are less likely to feel disturbed by the large amounts of traffic. Therefore this street enables flows and friction, with none of them overpowering the other.

It seems the aim of modernism was to enable as much flow as possible, but not many people seem to have been aware of the negative impact of such measures. Postmodernism and the current 'knowledge and culture' city design concept try to add some friction to the flow in order to stimulate street life. They do not aim to slow flow down, because it seems known that too much friction would hamper street life.

Street life, which is produced by a combination of its flow and friction, is central in the postmodern city development concept and also quite important in the 'knowledge and culture' concept. Both strategies aim to stimulate the development of street life in Aalborg.



15.2 High friction (this dead end street) results in not many street area uses



15.3 Moderate flow and friction result in street area uses



15.4 Very high flow results in few street area uses

Analysis of Vesterbro

Now that the strategies, theories and history of Vesterbro have been considered we may turn to analysing Vesterbro itself. To make the analysis clearer we shall use the before mentioned theories as guidelines. We may find out to which theory does the street apply best, and this will be our point of departure for seeing whether Vesterbro could be improved.

We will begin with the pre-modern infrastructure strategy, and will continue with the functionalistic, postmodern and knowledge-culture strategy.

The infrastructure strategy

Vesterbro was built because of the need for infrastructure. As mentioned: in the very beginning it linked the city to the villages south of it and went further on to larger cities. When replacing the old pontoon bridge was discussed a decision was made to link the bridge with the most important street heading south. The point of linkage would be Vesterbro. From that point Vesterbro is an important part of the corridor running from the southernmost to the northernmost part of Denmark. It was constructed as one of the widest central city streets of that time. The width of the street is between 17 and 25

metres, with the narrowest point being in front of the heritage Phoenix Hotel, in the middle of the delimited Vesterbro. It can be said that the major part of today's street position and the buildings along it are the result of the infrastructure strategy of the thirties.

The functionalist strategy

As Vesterbro is located in the existing central city parts it has no relation to the theories of Ebenezer Howard of the creation of new garden cities. We will therefore focus on the theory of Le Corbusier. But similar to him, Corbusier was more focused on the expansion of cities or inner city restructuring as was the case of his Paris proposal. The only connection between his theories is the link between infrastructure and his aim of allowing for more leisure time for workers.

More free time with more efficient traffic flows

In order to give people more free time, Le Corbusier believed that they would have to spend less time in motor traffic congestions. Therefore he called on the creation of streets that would handle as much traffic in the shortest time (Guiton, 1999). Thus the number of lanes on Vesterbro increased to

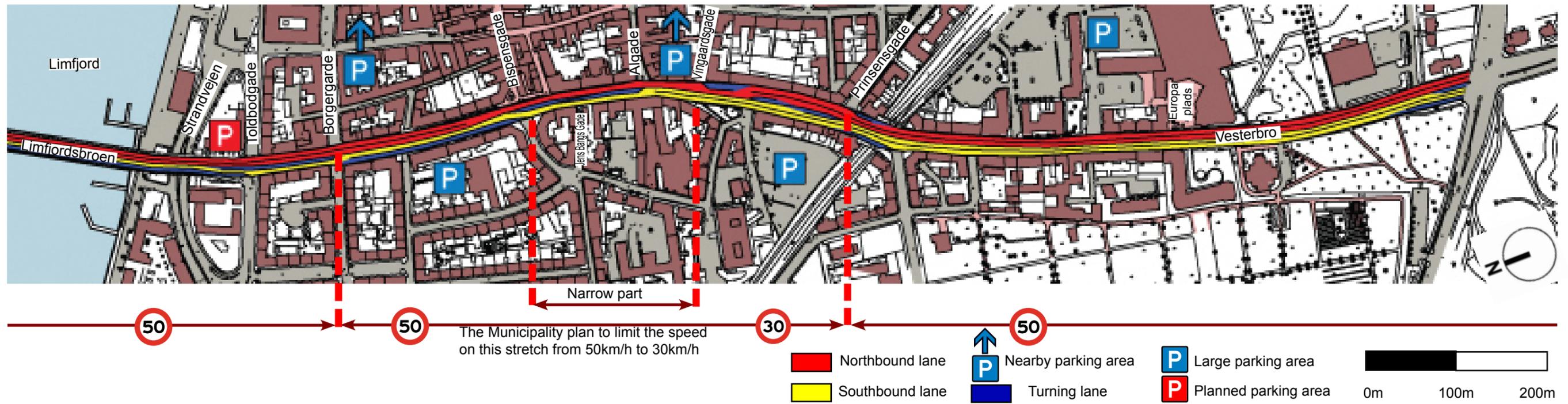
handle more traffic. Officially the street handles 21,000 cars per day and has a capacity of 35,000 cars (Myrup, 2009). This figure is now so high that daily morning and afternoon rush hour congestions take place. But after the rush hour the street is easily negotiable and passable by car, however it still sees constant use throughout the day, with less usage occurring only late in the evenings and during the night. A reason for such high usage is that it is one of the two existing motor traffic connections across the fjord. There are two driving lanes per direction in the southern half of the street. In the middle part between Vingaardsgade and Bispensgade the road is narrowed down to three lanes, where the middle lane is used for turning. Elsewhere extra turning lanes are added in intersections, almost all of which are controlled by traffic lights. From Bispensgade northwards, there are two northbound driving lanes opposed to one southbound and a turning lane. The street is also equipped with parking-availability displays which help reduce traffic generated by drivers on 'parking space hunts' between the five nearby parking areas. The speed limit is 50 km/h throughout the street.

It can therefore be stated that Vesterbro handles motor traffic well. But if traffic levels continue to rise - and they are projected to rise - congestions at peak hours might become more problematic.

Summary

Vesterbro's strong point is traffic handling. Because it is a crucial point of entry for the city centre, or other areas along this north-south corridor, there is a great need to keep traffic flowing efficiently. However it is not uncommon that the traffic slows down in long queues.

If the influence of the thirties' strategy was the construction of the street itself, then it was the sixties' strategy to adjust the street to handle more and more cars with an increased number of traffic lanes.



The postmodern strategy

It is important to note that the postmodern rebellion was based on creating spaces that would be more socially attractive and in some cases more environmentally friendly. The perception of the preceding modernism was now heavily discussed. People thought that modernism did not care enough for communities. Additionally the aesthetics of modernism were now ill-perceived. As modernism was not good thought of, the periods that preceded it were beginning to become more and more popular. This is why postmodern designers in many cases looked back at the past and took inspiration from it. As Vesterbro was built in the time preceding modernism, there

should be no surprise that the street fulfils many demands of postmodern theorists.

We will turn to the theory of Jane Jacobs and Allan B Jacobs who state what does it take to make a great city and great streets.

The main demands streets have to fulfil are allowing for leisurely walking, physical comfort, creating visual attractiveness and spatial definition, allocating quality materials, ensuring good maintenance, complementarity, transparency, fitting with urban furniture, creating beginnings and endings, diversity and density, special details and creating places.

Density of the built up area

The central area of Vesterbro is built up quite dense. The majority of buildings have six floors, including the ground floor. Here and there are few older buildings reaching three or four floors. The southern end of the street is bordered by equally tall buildings, however in most of the area there is only one line of such buildings. The street gives the impression of being densely built, but if a wider area is taken into account, it will be shown that this is not the case. The southern area of Vesterbro has almost no buildings and thus provides low density, and the northern edge of this street is boarded by the fjord which also has no building density.

These low densities have a negative impact on functional and social diversity and therefore also on visual attraction and leisurely walking, all of which will be discussed further on.



17.1 There is no building density on the Limfjord



17.2 The northern half of Vesterbro is densely built up



17.3 The southern half of Vesterbro supports low density



17.4 South Vesterbro boasts large parks



Leisurely walking

To enable leisurely walking, getting from one point to the other has to be comforting, pleasing, safe and enlightening (Jacobs, A. 1993: 271). Walking through Vesterbro is in the majority of its length enlightening because of quality architecture and art located on the street. In most cases it is easy to walk on it. The street is also linked to the western pedestrian area, which allows for unrivaled quality leisurely walking.

However there are problematic issues which limit the leisure of walking on Vesterbro. Loud noise is frequently caused by heavy motor traffic. Problematic are the areas where sidewalks are too narrow for more pedestrians to use. On these areas pedestrians have to use bike lanes, which is uncomfortable because it can be dangerous. Sidewalks are also used as parking areas for bikes and business signposts, which should not be a big issue, but it becomes one, when

pedestrians cannot move easily because of them. Additionally the southern and northern end of Vesterbro appear 'gloomy'. The reason for their dark and dull appearance lies in the issue of facade maintenance, and the area's social and functional diversity, which shall be discussed later on. Insufficient density of the built up area is also a contributor for such a state.



18.1 The sidewalk is obstructed by various objects



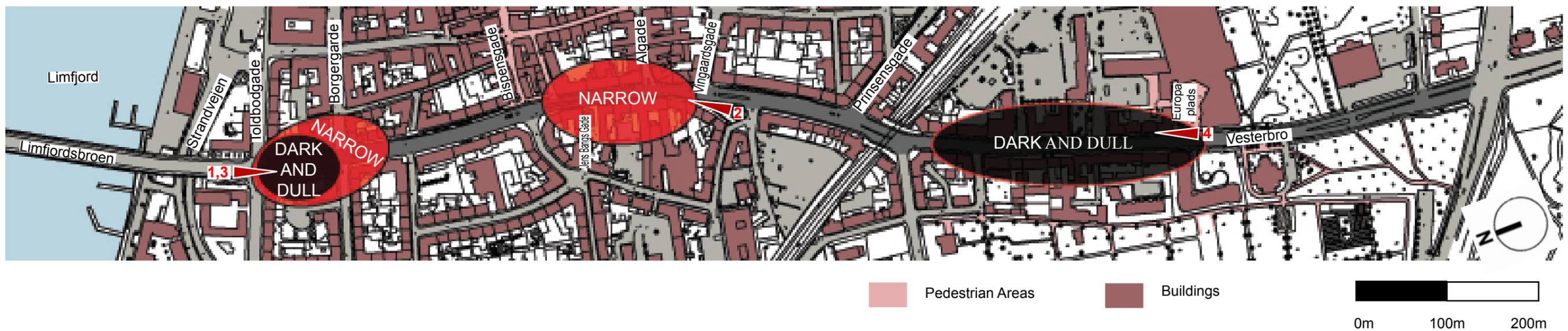
18.2 Pedestrians are pushed onto bike paths



18.3 The northern end of Vesterbro appears dark and dull



18.4 The southern end of Vesterbro appears dark and dull



Pedestrians numbers

Pedestrians are found in their greatest numbers in the central part of Vesterbro, between the end of the pedestrian street and the bus stop. This zone of intense pedestrian movement becomes dispersed towards the north and the south. The amount of people walking across the Limfjord bridge and the extreme northern part of Vesterbro is similar to the amount of people walking along it in south of railroad overpass.

It would be interesting to think that empty stores are the result of weak pedestrian flows, but this does not appear to be the case since empty stores can be found even on the most populated stretches of the street. A reason for this could be that the stores throughout the whole street have a hard time competing with the stores on Aalborg's two main pedestrian streets, which have enormous amounts of pedestrian traffic compared to Vesterbro.



19.1 The central part of the street is busy with pedestrians



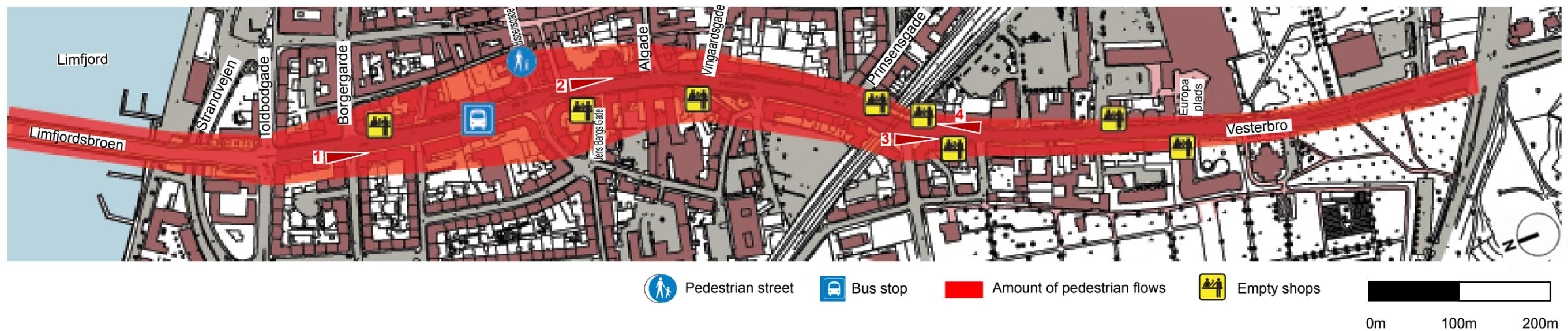
19.2 Pedestrians are squeezed together



19.3 The southern part of Vesterbro sees few pedestrians



19.4 Some businesses have closed down



Physical and social diversity

Functionally the street area is more diverse the closer it gets to the city centre. Throughout its length it accommodates a large amount of multifunctional buildings. Most of these have ground floors used for retail and services and the upper floors used for residences and in a few cases offices. The ground floor retail business are composed of food, clothes, furniture and specialised stores, while service businesses are made of conference and event halls, small casinos,

bars, tattoo stores, hotels, a church, a gym, banks, housing agencies, barbers and funeral stores. The southern parks can accommodate leisure activities. The closer we get to the central part of Vesterbro the greater the variety of ground floor business we shall see.

Functional diversity accelerates social diversity, which attract more people into using a street (Jacobs, A.: 1993: 303). There is a larger variety of stores at the central part of the street and this is because the density of the area here is highest.

Here is also where the pedestrian street, which supplies Vesterbro with a constant flow of people, ends. Areas of greater social diversity are also where people are more likely to stop and use the public outdoor space. Such is a bus stop close to the pedestrian street and multi purpose halls on the southern part of Vesterbro. However these halls - a congress centre, a cinema and church - receive infrequent use, but when they do receive it is possible to see more people using Vesterbro, which brings social diversity levels up. Thus the

most functionally and socially diverse part of the street is close to the pedestrian street.

Both types of diversity add to visual attraction of the street but this will be discussed further on.



20.1 This bus stop generates social diversity



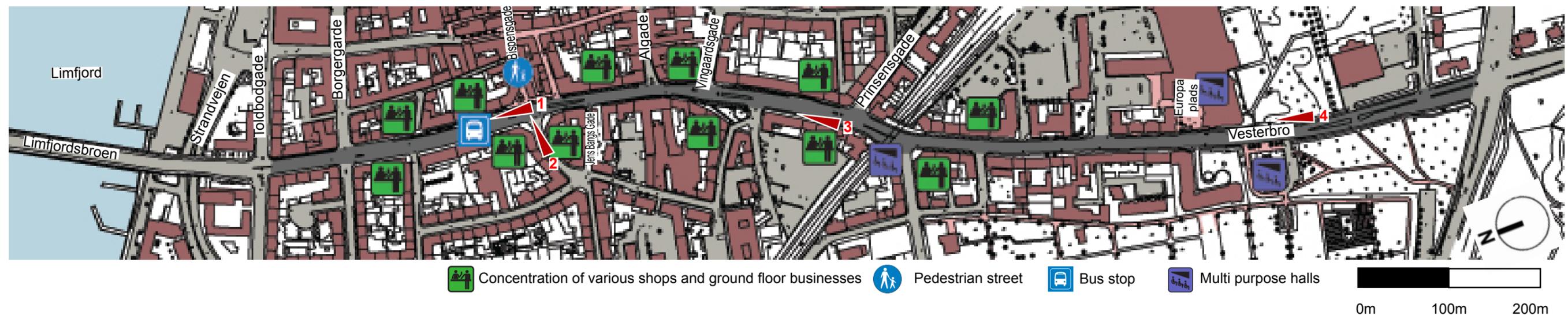
20.2 The pedestrian street emits many users onto Vesterbro



20.3 The central part of the street is used by various businesses



20.4 Most events occur in the Congress Centre



Details

Special details such as statues and street furniture add to visual attractiveness and additional uses of outdoor spaces (Jacobs, A. 1993: 299).

On Vesterbro public art in the form of statues and fountains is visually attractive and it also adds a message: it tries to bring people closer to art and so educate them (Vagnby, 2009). Benches on some of the squares invite people to stay longer on the streets. Trees add to the visual complexity of the street

and at the same time make a division between motorized and non-motorized users, making the later ones feel safer. Most of the buildings are built in styles that have details which are interesting to look at. Some even have statues or striking commercial signs on top of them. All of these elements are spread evenly throughout Vesterbro.

Visual attractiveness

Visual attraction is a result of the street's maintenance, functional and social diversity, and has an impact on leisurely walking (Jacobs, A. 1993: 281). The street does not overload the senses with too much information. The most visually pleasing objects for pedestrians are objects that move: these are cars (when they do not move too fast), pedestrians and preferably moving shadows caused by objects such as trees. Various shop fronts are also visually interesting. The majority

of buildings along the street have strong artistic, aesthetic and cultural value and are because of this listed as heritage. (Aalborg Kommune, 1994: 52).

Parks at the southern end appear pleasing to the eye because of their association with nature. The areas that were mentioned as dull and dark appear less visually attractive. These are the extreme northern part and the part south of the railway overpass. Other areas appear visually attractive.



21.1 Almost all functionalist buildings are listed as heritage



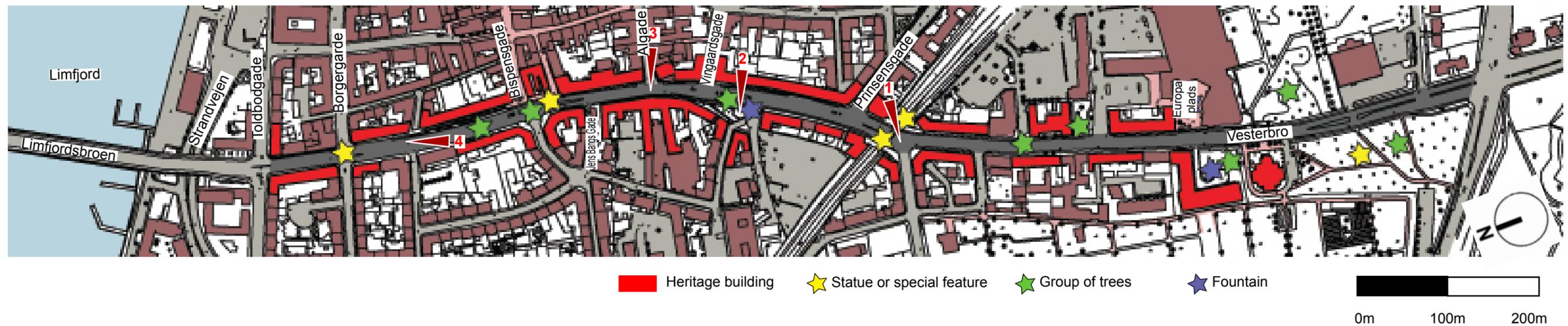
21.2 There are three fountains along Vesterbro



20.3 Older buildings are also listed as heritage



21.4 Some buildings have special features



Transparency

Transparency means that streets signal in an apparent way the transition from a public to a semi-public or private zone. This means that street users have a sense of what lies behind a building facade: is it a shop or a residential building (Jacobs, A. 1993: 286).

Shops and restaurants in Vesterbro create a transition zone of shop windows and outside displays, but there is almost no space to create a semi-private space in the form of outside cafe areas on sidewalks because of their narrow-

ness. Only on widenings in squares is there enough space for businesses to use the outdoor space. On the narrow stretches of Vesterbro, businesses that put signs in front of their doors impede pedestrian flows by forcing them to step onto bike lanes. Again this is not the case on the squares along Vesterbro. Residential and commercial buildings signal their use with doorways and signs of habitation such as curtains, lights, furniture or shop items behind their windows.

Transparency has more opportunities to manifest itself on

street widenings, while on narrow parts of the street it can hinder pedestrian traffic. Transparent are the functions of buildings: residences, ground floor businesses and ground floor apartments.

However intensity of transparency is not equal throughout the length of the street. In the central parts shops have big windows towards the street, and in this way they interact with it and provide visual attraction. In the northern and specially the southern part transparency is not as strong. Here shops in ground floors are replaced by residences and offic-

es, which lie behind walls with smaller windows. Here these programmes do not interact with the street and bereave it of some visual attractiveness and diversity.

However sometimes there is a clash between maintaining architectural heritage and promoting transparency. Some businesses create shop fronts that do not match the architecture of their host building, and this can create a aesthetical clash.



22.1 This part of the street enables limited transparency



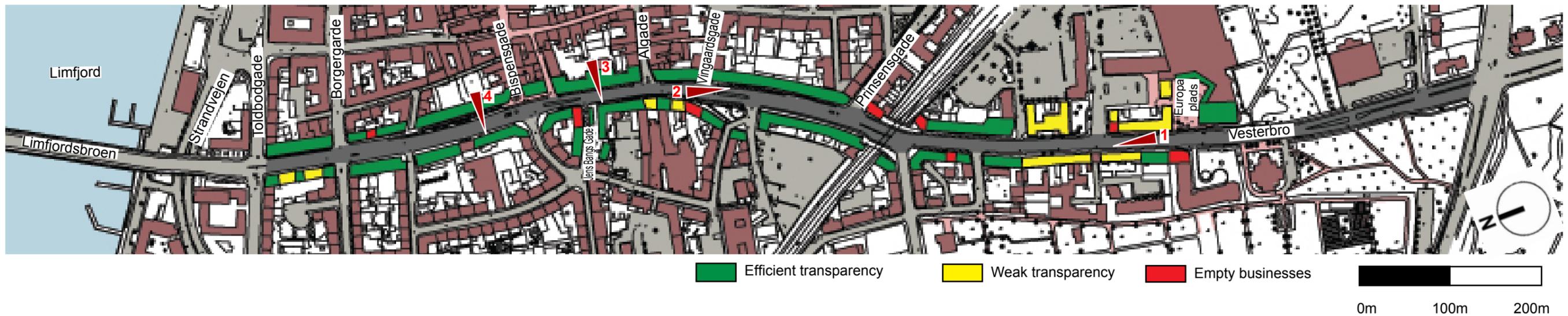
22.2 This part of the street enables efficient transparency



22.3 Transparency combined with heritage



22.4 Transparency in conflict with heritage



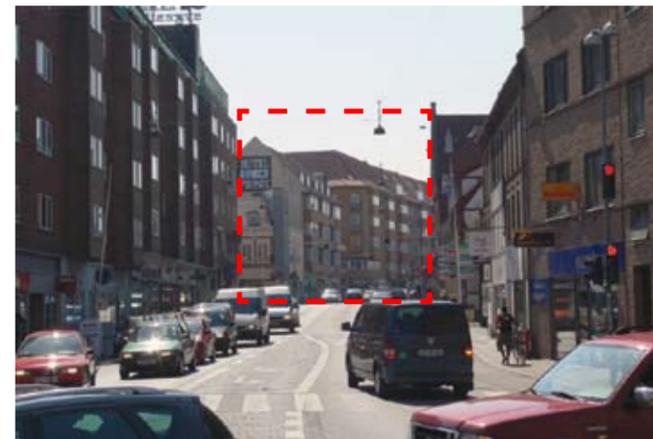
Spatial definition

Definition describes our perception of a space being a place with physical limits. If users perceive a space as an enclosed street or square, then the place is defined. Following the theory of Allan B. Jacobs it can be stated that the delimited street area is defined by a street width to building height ratio of 1:1 to 3:2 (Jacobs, A. 1993: 277). Views are bounded by buildings throughout the majority of the street area. This is not the case at the southern ends of the

street, buildings are faced too far apart to create a feeling of being on a dense central city street. However the numerous trees that are planted on all sides of the street create an impression of definition, which is not as strong as in the dense part of Vesterbro. However the southern part of Vesterbro is beyond the focus zone, and will thus not be considered. This means that the street of Vesterbro is spatially defined throughout its length inside the focus zone.



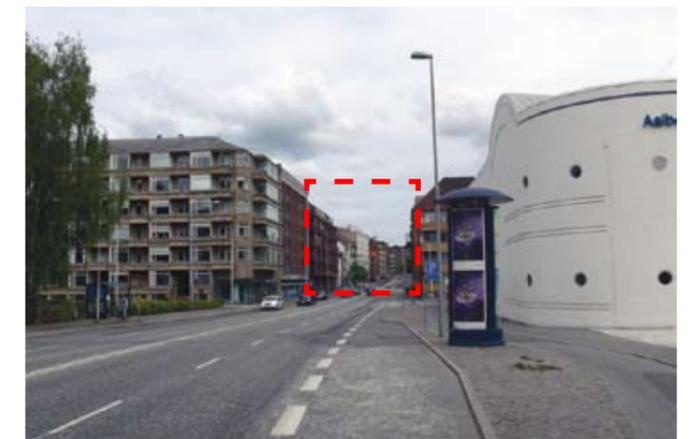
23.1 The street width to height ratio here is 3:2



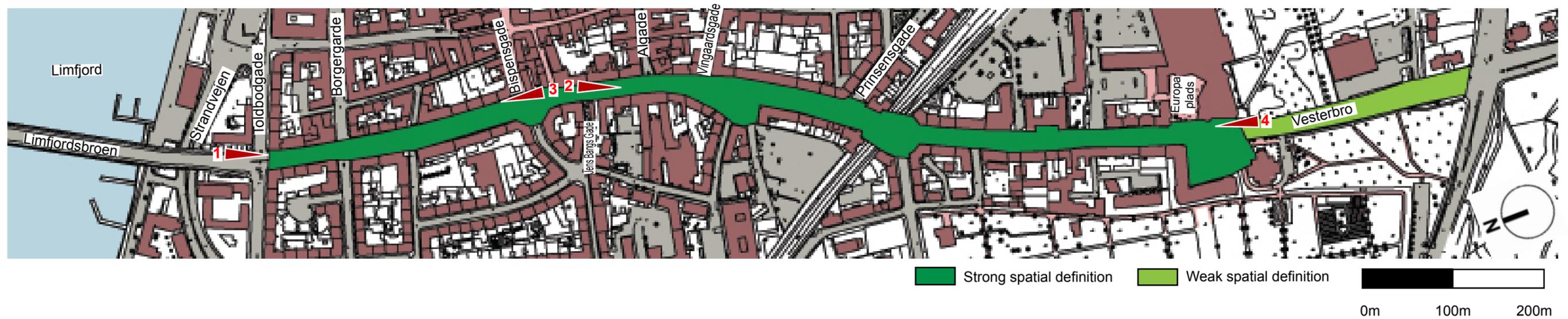
23.2 The street width to height ratio here is 1:1



23.3 The street width to height ratio here is 3:2



23.4 The street width to height ratio here is 1:1



Complementarity

Complementarity describes the level of facade and building height differences between buildings. The greater the variation in materials and colours, the smaller the complementarity will be. The same applies to building height as jumps larger than one storey will harm complementarity. The variation in building style is supposed to be of lesser importance (Jacobs, A. 1993: 288).

The buildings along the delimited Vesterbro predominantly complement each other in terms of facade material: white, yellow, red and green render; yellow, red, dark red and white brick, zinc cladding, copper and wood are used. Complementarity is weaker around Jens Bangs and Frederikskilde street because of height differences. Around the first is a group of three storey buildings which complement each other, but also produce jumps in building height when they join the predominantly six storey buildings all around

Vesterbro. The second area consist of a less homogenous group in terms of height. These buildings rise from four to seven stories in short distances, which creates jumps in between buildings. However these jumps are not as striking because they are mostly limited to one floor. The extreme cases of varying building heights are the high rise buildings at the northern and southern end which rise six and ten floors above the average six storey buildings. But they are outside the focus zone.

The majority of buildings have the same amount of floors and the same material - brick. This makes Vesterbro a highly complementary street with only smaller areas of lesser complementarity.



24.1 The hotel tower in the southern end breaks the street's complementarity with its height



24.2 These buildings also break the complementarity in height and building style. Materials are in most cases conform to each other



24.3 Buildings in central Vesterbro are complementary in terms of heights and materials



24.4 Some heritage buildings weaken the complementarity by having different heights and materials



Maintenance

A walk through Vesterbro does not make the best impression of its buildings. This is because most of the buildings are old and have sustained much weathering and traffic pollution. Most facades appear to be in an acceptable state, but there are many, mostly in the southern and northern part, which would require some form of restoration. Apart from looking worn and dirty they tend to absorb a larger amount of light,

making the street look dull and dark. Additionally, previously mentioned empty stores are located in buildings with less well maintained facades. Some facades, mostly in the central area, have received restoration and it seems that this helped lift the visual attractiveness of the street. This is shown in the area next to Vingaards street, where there is significant pedestrian activity without any empty business or shop. In general the bad states of facades contribute to a dull and

dark feel on the southern and northern portions of Vesterbro. This contributes to making parts of the street visually less attractive for its users (Jacobs, A. 1993: 290).



25.1 Some facades are well renovated



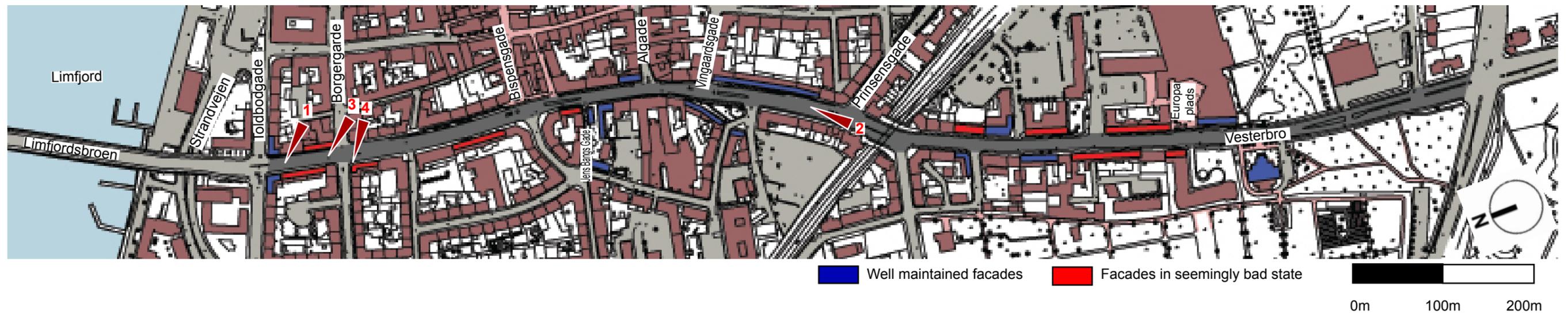
25.2 A case of good facade renovation



25.3 Numerous facades are not in a good shape



25.4 Facades and details could be cleaned



Beginnings and endings

The beginnings and endings of Vesterbro are marked by high rises and nature - in one case by the fjord and the other by parks. These help people orientate and perceive the boundaries of the street (Jacobs, A. 1993: 295). Additionally the dense parts of Vesterbro are marked with so called gates, both on the northern and southern side. Here the visitor of the city knows that he has entered or left the centre of Aalborg. The street is also marked by a 'midpoint' - the railroad overpass, which marks more or less the middle distance between the two ends of Vesterbro by generating slopes necessary for crossing the railroad.

Places

Long streets can have brakes such as plazas, public spaces or widenings. They provide stopping spaces, reference points and places of activity. They help breaking down the experience of the street into smaller segments, which makes distances seem psychologically shorter (Jacobs, A. 1993: 301). Vesterbro has four squares or places, dividing

the street into five sections, making the psychological street distances seem shorter. It is interesting that out of six 'places', four have vacant stores for rent. These squares see some activity in terms of cafe life, sitting and walking with almost no events happening on them.



26.1 The beginning of the dense part of Vesterbro and the inner city are clearly marked by buildings standing close together



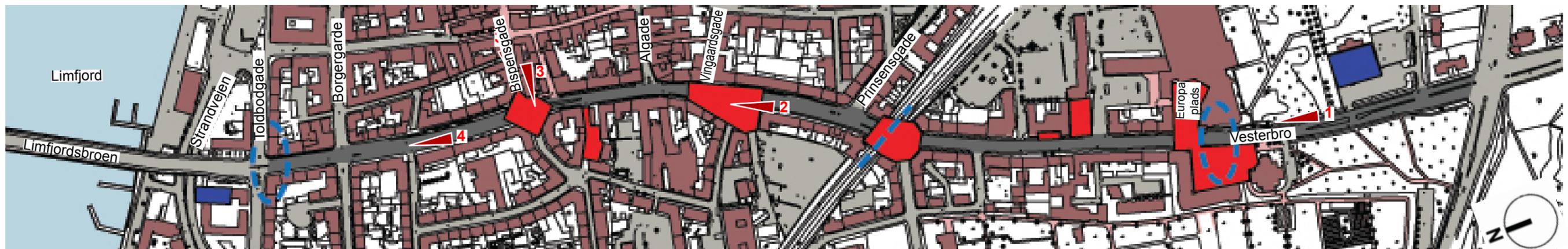
27.2 The Gåsepigen (Goose Girl) square



26.3 The Vesterport (West Gate) square



26.4 The residential tower marks the northern end of the street



Overpass as the 'midpoint' Buildings marking the beginning of the Dense part of Vesterbro Towers marking both ends of Vesterbro Places or squares on Vesterbro

0m 100m 200m

Summary

Postmodernism was a style that found the concept of modernistic urban design a mistake. It created a new interpretation of how outdoor urban space should be created. However many of the new concept's guidelines were taken from styles preceding modernism itself. As Vesterbro was built before the onset of modernism it must not be a surprise that the street fulfils meets many of the postmodern demands without having receiving almost any postmodern implementations. The only postmodern implementation was the semi-pedestrianization of Gåsepigen Square and the closing of Jens Bangs Street.

Density of the built area is sufficient in the northern half of the street, while in the southern half it is insufficient. Leisurely walking is more easily achieved in some central parts of the street, while in the rest it is not as pleasing. Functional and social diversity are strongest in the central part of the street and become weaker towards the edges of it. The whole street accommodates many heritage buildings and street details are dispersed evenly throughout it.

The delimited street appears visually attractive throughout its entire length with the exception of the southern part and northern end.

Transparency is stronger in the northern than in the southern half of Vesterbro.

The street is spatially defined across its entire focus area.

The street is complementary, except for two smaller areas of diverse building heights.

There could be many improvements in the area of maintenance. The majority of buildings look acceptable, with some good cases of restoration. However there it is a big number of buildings that would require maintenance, and these harm the good image of Vesterbro.

Places are dispersed equally throughout the street, and together with its noticeable beginning and ending help people orientate themselves.

The majority of people using the street are also in the central part of Vesterbro.

The knowledge-culture strategy

The strategy of creating a "city of knowledge and culture with active urban life, many events and great variation of

attraction and sensory impressions" (Kiib, 2007: 25) is related to the postmodern city development strategy. Both strategies strive for increased density, providing for leisurely walking, functional and social diversity. The difference between them is that the 'knowledge and culture' strategy focuses on developing brown-fill sites, specially on the waterfront, and tries to create a vibrant social community in order for the city of Aalborg to withstand the massive loss of industry (Kiib, 2007:27). In terms of social and physical diversity and leisurely walking, the same findings apply as with the postmodern concept. It must be noted that there was no development in Vesterbro under the current 'knowledge and culture' concept.

The overlap between the concepts

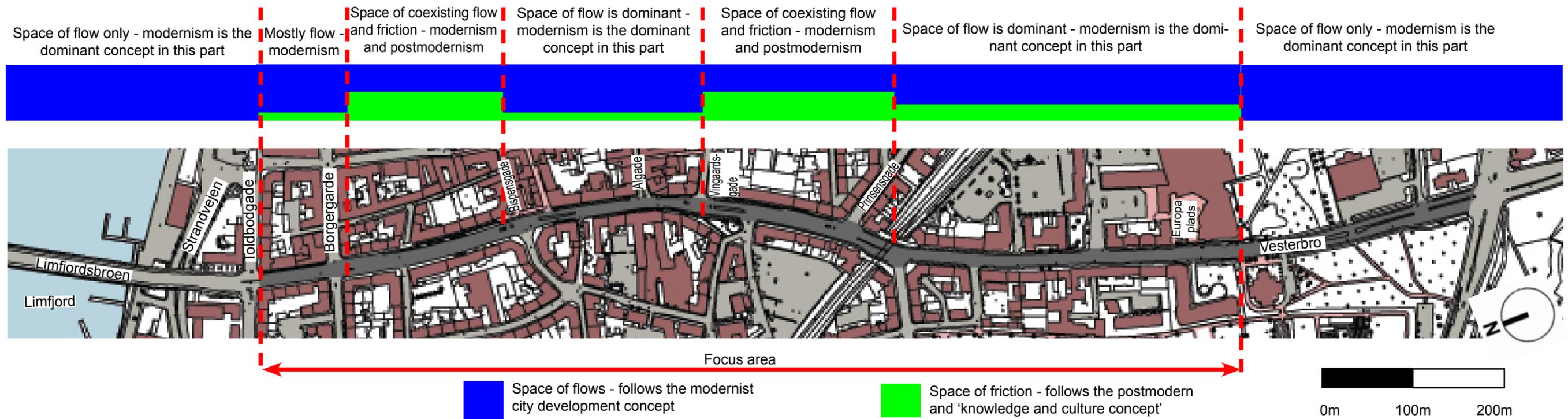
On one side, the older modernistic concept promotes speed, capacity and efficiency of motorized traffic flows, and on the other side there are the postmodern and knowledge-culture concepts which focus their attention on the pedestrian experience.

Modernism promotes flow, while postmodernism and the 'knowledge and culture' concept promote friction alongside

flow.

The street enables both flow and friction. On some central areas both are equally represented, while on the two narrowest parts and the south of the railroad overpass the spaces of flows dominate the spaces of friction. The most extreme cases of the spaces of flow pushing out the spaces of friction are in front the Phoenix hotel and at the northern end of the delimited street. As stated before street life is generated where there is an equilibrium between street flow and friction. One without the other cannot generate street life. In Vesterbro the areas which are too narrow to allow for spaces of friction appear to follow the modernist and not the postmodern or 'knowledge and culture' concept. This means that Vesterbro is a predominantly modernist street with two areas of coexistence with the postmodern concept.

As stated before the different city development concepts have to work hand in hand with each other. None of the older concepts are out-dated or out-performed to such an extent that they should be eliminated. All of them are crucial for today's functioning of Aalborg. This means that it is in the city's interest that it enables a coexistence between



the different concepts where such conditions exist.

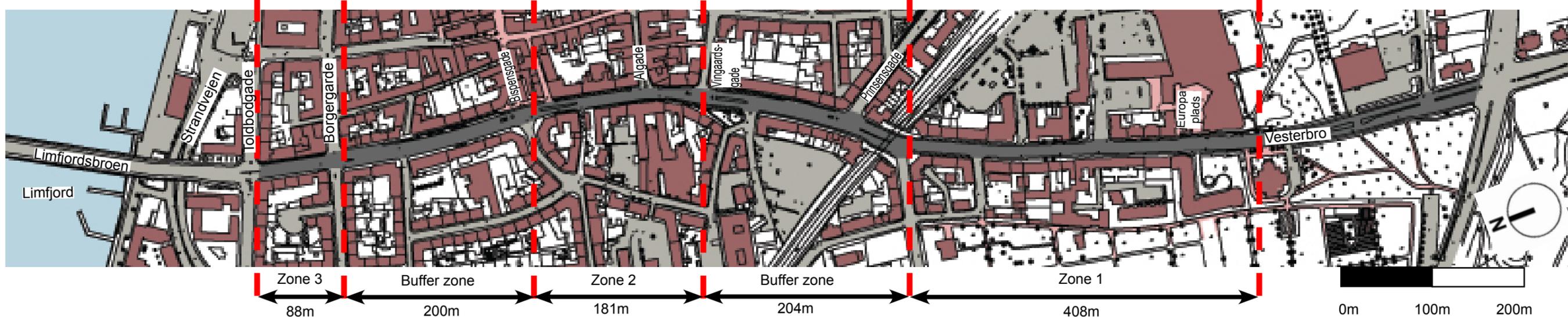
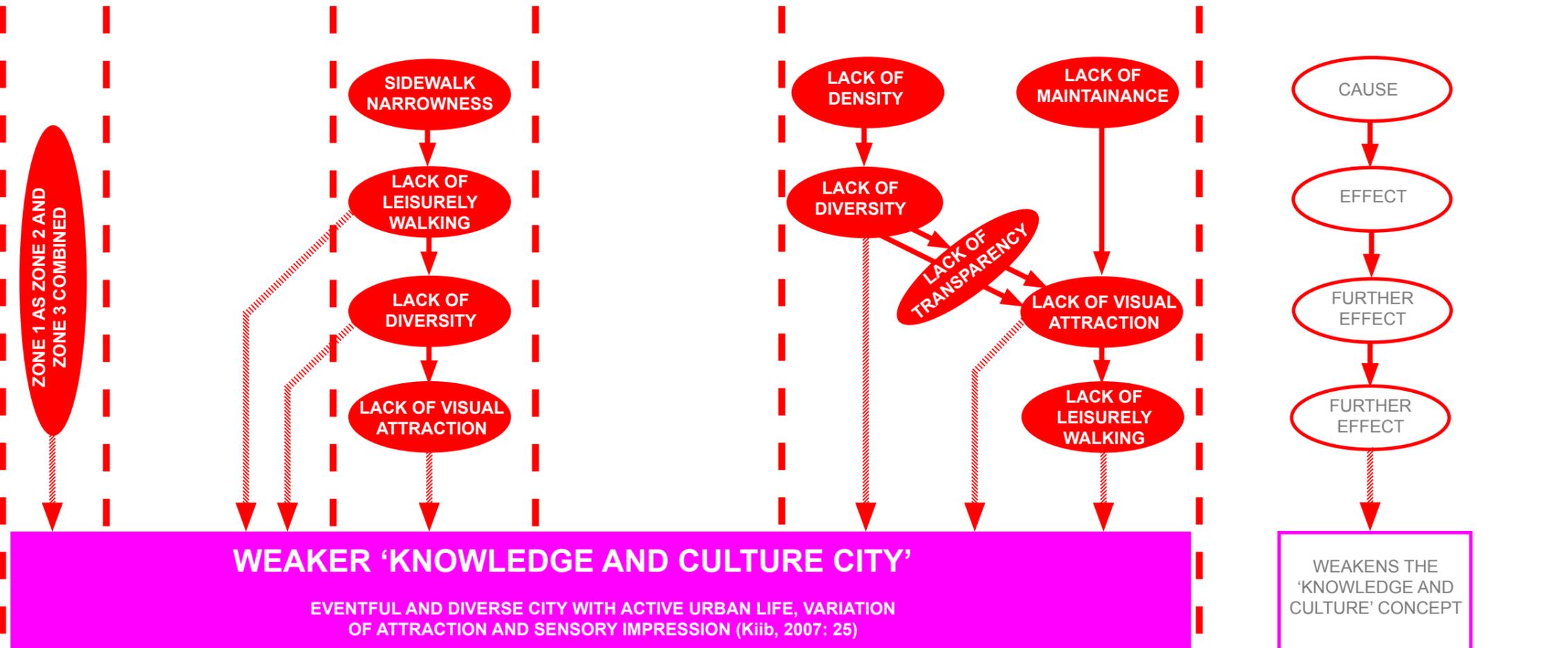
Cause and Effect

As it was shown in the analysis, Vesterbro has many areas where it could receive improvement. But some of the problems are related in a cause and effect way. It is possible that some of the weaknesses of the street might be fixed by solving another weakness. For example if some area lacks visual attraction and the possibility of allowing for leisurely walking, both of these problems could be solved by only fixing the lack of visual attraction. This is because if an area is displeasing to the eyes, it will also feel less comfortable to walk in.

Therefore the task is to find which problems are related and which of them are at the top of the cause-effect relationship.

The causes

The main causes for Vesterbro's problems seem to be: lack of density, lack of maintenance, and sidewalk narrowness. These problems occur



in different parts of the street and each cause has its consequences:

The southern part and the northern end of Vesterbro seem to have the most problems. South of the railroad overpass, two problems seem to persist: one is lack of building maintenance and a lack of building density. Let us name this part 'Zone 1'.

The lack of building density in the area creates a lack of functional and social diversity, which accelerated by the lack of transparency harms the area's visual attraction, which harms the chances of leisurely walking.

The lack of building maintenance also weakens the area's visual attraction also resulting in less opportunities for leisurely walking.

In the central area of Vesterbro the case is different. Let us call this area 'Zone 2'. It is located between the pedestrian street Bispensgade and Vingaardsgade. This area has one problem: its sidewalks are too narrow. Sidewalk narrowness is very harmful to leisurely walking, which has a negative impact on social diversity, which can also be harmful on functional diversity. As in the case before, the lack of social and functional diversity creates a less attractive image for the user of the street.

The northernmost end of the street has the most problems throughout Vesterbro. Let us call it 'Zone 3'. It is short, located between Strandvejen and Toldbodgade, next to the Limfjord. Its cause for problems are the same as in Zone 1 and Zone

2 combined: it has lower building density, its buildings lack maintenance and its sidewalks are narrow. If the causes are the same as in the previous cases, then the effects of these are also the same.

Between the three zones are areas which do not have particular problems but are affected by the unpopularity or popularity of their neighbouring Vesterbro parts. Let us name these areas 'Buffer zones'.

The lack of physical and social diversity, visual attraction, and possibilities of leisurely walking have a negative impact on the eventful, diverse, attractive and impressive 'knowledge and culture city of Aalborg' which the Municipality aim to create. Therefore solving the causes of these problems is in the interest of the Municipality and its citizens.

The solutions

The causes of the problems have now been identified. But are all of them solvable?

The building densities in the northern part of Vesterbro - Zone 3 - cannot be increased without replacing heritage buildings because there is almost no leftover space. The rest is covered by the Limfjord.

The building densities in the area of Zone 1 - south of the railway underpass can be increased, but this would require a large study of the area. Such a task is too wide for this report.

Zone 1 and 3 also have the problem of insufficient building maintenance. This is not such a tough problem as densifying an entire area. If worn-out facades would be renovated, the building's respective areas would be appear more visually attractive. This solution should not be difficult to implement, wherever it would be needed.

Zone 2 is hampered by its sidewalk narrowness. This problem is more challenging because it is not possible to simply expand the sidewalk due to the demands of motor traffic (see Appendix, page 37). In times of rush hours many lanes are occupied by heavy traffic. Making a traffic bypass and thus relieving the street of some of its traffic which goes through the whole street - from the bridge to the southern ring road - might work but it would likely require a new bridge across the Limfjord and its new or widened access road would have a major impact in the tissue of the historical Aalborg. In the municipality itself there is an intensive debate whether Aalborg needs a new bridge across the fjord and where it should be placed. But if it was constructed and it took some of Vesterbro's traffic, then sidewalk expansion could be an easier task. A new connection across the fjord is therefore a subject which is too wide for this report, which means that we will not consider creating a bypass for Vesterbro's traffic.

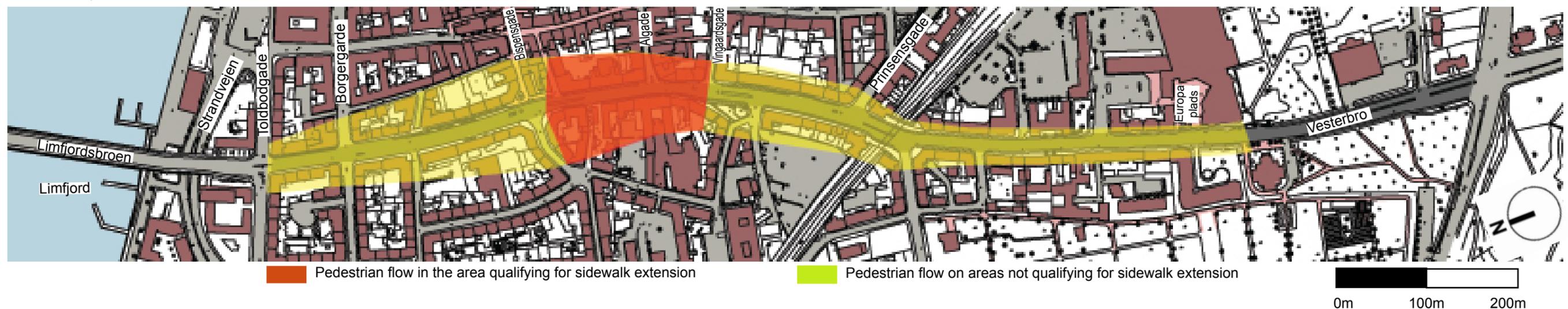
The buildings on the sides of the street are heritage, which makes its widening impossible. But this solution leaves open one option. What if the motor traffic lanes which are not needed in out-of-rush-hour times are temporarily converted to

sidewalks? Could the sidewalk overlap with a driving lane like a space of friction temporarily overflowing to a space flow? Where would the area of implementation be? An answer for this question would be formed by the flow of pedestrians and sidewalk narrowness. Pedestrian flows on Vesterbro are highest between Borgergade in the north and Prinsensgade in the south. The area that would require sidewalk expansion lies between Vingaardsgade and Bispensgade where there seems to be enough pedestrian demand. This would boost leisurely walking, social, even perhaps physical diversity and thus visual attraction in this area. Elsewhere sidewalks are sufficiently wide to their accommodate pedestrian flows at current levels.

This seems like an interesting concept and we will consider it more thoroughly.

Conclusion

As all other streets Vesterbro's main function is and was allowing swift flow of traffic. In modernist times these flows became accelerated with the organization of traffic lanes. As it was constructed in times prior to the onset of modernism it retained many of the values which the postmodern movement found to be central in their agenda. As modernism's point of focus is the car user and the postmodernism's combined with the 'knowledge and culture' concept's is the pedestrian, the two focuses exclude each other in some areas - for example a pedestrian street versus a suburb - and overlap and still function effectively in others (see picture 15.2). Where there is limited space, they can compete, with one concept being



stronger. Usually the stronger concept is the modernistic one, but there are some cases where the postmodern concept is the stronger one. Such a case are pedestrian streets in Aalborg.

This is the case in Vesterbro: where conditions for implementing the postmodern or 'knowledge-culture' concept exist - the most important condition is high building density - it may or may not compete with the modernist concept of enabling fast, frictionless flows. The two concepts compete on the narrowest part of Vesterbro - between Bispensgade and Algade and coexist in the two 'buffer zones' between Borgergade and Prinsensgade. Elsewhere on the street the modernist concept is the strongest.

The difference is that on the street modernism aims to create spaces of flow, while postmodernism and the 'knowledge-culture' strategy aim to create spaces of meaningful friction.

Strengthening the postmodern concept on Vesterbro by creating spaces of meaningful friction would strengthen the city's policy of creating a diverse, eventful, stimulative and impressive urban environment. The problem why this concept cannot be fully implemented is the street's wideness which does not permit more space to be left over to pedestrians. This is because it is one of the main inner city streets and also one of the two spanning the Limfjord.

Besides big construction projects which might eliminate the street's need for its large capacity and cost a lot of money, there is one option of where the street could be redesigned in such a way that places of flows and friction would overlap. This would mean that when there is a demand for car capacity, the street would have more lanes, and when there is need for pedestrian activities, the sidewalks would be wider. This is an option that would deserve consideration. The main question here is:

How can sidewalks in this part of Vesterbro be expanded?

Problem Definition

My argument is that a widened sidewalk in central Vesterbro would boost the street's possibility of allowing for leisurely walking and consequently because of its cause-effect relationship this would improve the street's social and functional diversity and its visual attraction. This would ultimately strengthen Aalborg's 'Knowledge and Culture' city development strategy, which is in the interest of the municipality and quite likely its citizens as well.

To answer the problem definition we must go through the process of design.

Flexible streets seem to be at home in New York. They function in such a way, that some lanes in dense urban streets are temporarily handed over to pedestrian use. This would happen mostly on Saturdays and Sundays. They would be secured by various types of urban furniture and would invite pedestrians to enjoy an expanded pedestrian area.

This concept could be incorporated into Vesterbro. It is clear that Vesterbro is crucial to the traffic functioning of the city. But at certain times it is not used as heavily as in rush hours (see Appendix on page 43). The time when there is not such a vast amount of cars on Vesterbro is from 18:00 to 07:00 and from 09:00 to 14:00 on workdays and during weekends the whole day.

We have an opportunity to imagine a system which would accommodate motor traffic when it is needed (between 14:00 and 09:00) and pedestrians when there is no great need for motor traffic (between 09:00 and 14:00 and whole Saturdays and Sundays).

The system suggested would be created with the use of automatic retractable bollards. When traffic would be heavy, bollards would be submerged and traffic would function as it does today. But when traffic is not as high, bollards would rise and close external lanes for motor traffic. This would encourage pedestrians to take use of the bike lines, thus stimulating cyclists to take use of the closed traffic lane. Pedestrians would therefore feel that there is more space for them, and could start using Vesterbro more to their liking. When a new rush hour would be imminent, the bollards would go underground and traffic would resume to normal.

This proposal can however be implemented only on a short stretch of Vesterbro between Vingaardsgade and Bispensgade. South and north of this area there is no apparent need for wider sidewalks as spaces of flows and friction already more or less successfully coexist. These are the before mentioned 'buffer zones'. Additionally it was confirmed with traffic counts that the narrowing of lanes even outside rush hours in these 'buffer zones' would have severe effects on the flow of motor traffic. Such is the intersection with Borgergade which does not permit any reduction of the number of traffic lanes. (see Appendix on page 50). Additionally elements such as minor road junctions and bus stops would fragment the design into short incoherent parts which would probably make it not work as intended. Therefore the design will be limited only to the part of Vesterbro between Bispensgade and Vingaardsgade.

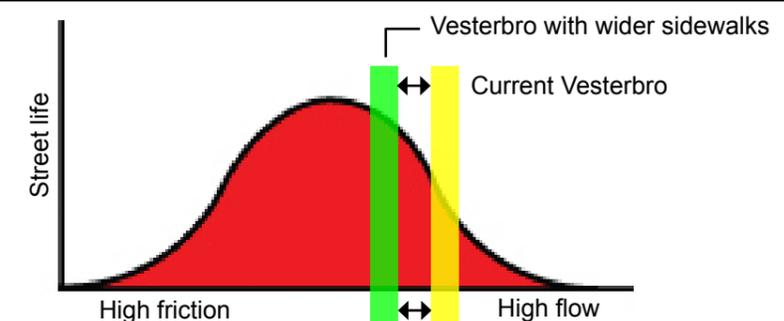
On one side of the street the retractable bollard system will be introduced, while on the other side the existing parking spaces would be eliminated.

In this way a part of the space of flow on Vesterbro would be temporarily and another part permanently handed over to the space of friction.

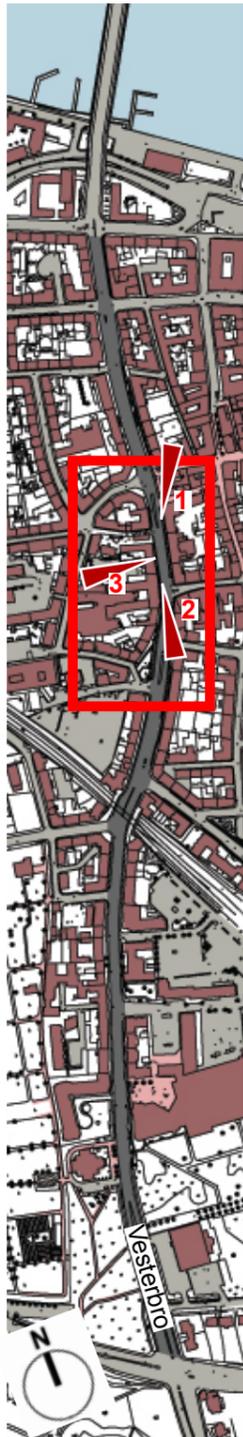
This concept should enable more leisurely walking which would boost physical and social diversity, which would make the area more visually attractive and so the "knowledge and culture" city design concept would be strengthened. This would happen only on the part of Vesterbro where there is not an existing equilibrium between the spaces of flow and friction.

Proposal

30.1 The spaces flow would temporarily become weaker in order for the strengthening of the spaces of friction. This in turn could bring more street life to Vesterbro.



Proposal - Current Situation



This is the current condition of Vesterbro between Vingaardsgade and Bispensgade. There are three intersections inside the design zone. Let us call them the Gaasepigen (Goose girl), Phoenix and Bull intersection. These names come from the landmarks which are located next to these intersections: The Gåsepigen (Goose Girl) Statue in the intersection with Vingaardsgade, The Phoenix hotel in the intersection with Algade and the Bull statue in the intersection with Bispensgade.

The street has three lanes - one southbound and one northbound lane. Between them there is a turning lane, which is at the southern part used for southbound traffic turning left, and in the northern part used for northbound traffic turning to their left.

On the eastern side of the street are parking spaces placed parallel to the street. There is room for eight to nine cars here. It is a short term parking area. Sometimes it is used for delivery vans and trucks, but if there is no space for their parking, then they use a small side-street on the eastern side of Vesterbro, next to the Bull intersection.



31.1 Looking from the northern part to the southern part of the design zone

Usually there is always available parking space in this part of Vesterbro. When there are bigger city events all parking spaces are full. This is also the case on Saturdays and Sundays.

The main city pharmacy, a design furniture store, instrument store, art shop and a supermarket are located on the eastern side of the street. On the other side there is a hair salon, a restaurant, a gift shop, two banks, the heritage Phoenix hotel. Above the ground floor one can find a restaurant, hotel rooms, various offices and apartments.

There is a larger flow of people on the eastern side of the street. This is because this side is connected with the main pedestrian street Bispensgade and Algade, which also leads to one of the most important pedestrian streets in the city.

The western side of the street is connected to the Gåsepigen Square and the Jens Bangs Square. The former sees more pedestrians than the latter one. Both have cafes and art shops.

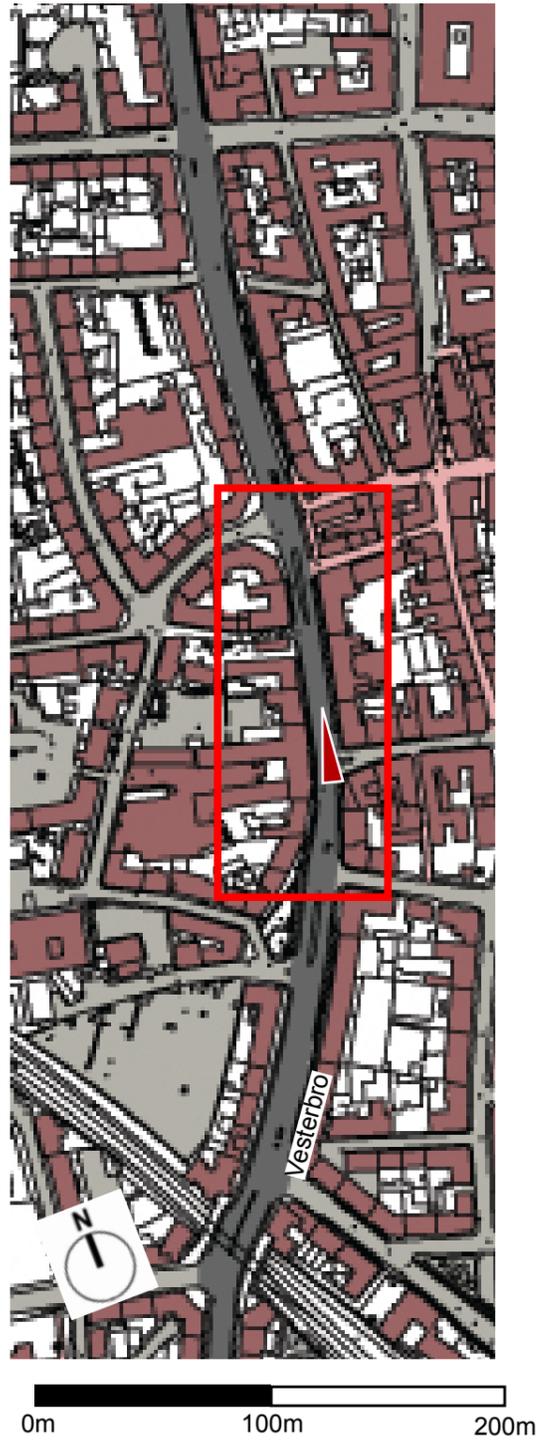


31.2 Looking from the southern to the northern part of the design zone. Photo taken in Phoenix intersection



31.3 Looking from the western to the eastern part of the street

Proposal - Visualization - Bollards up



Proposal - Visualization - Bollards down



This visualization presents the functioning of the 'normal' and 'narrowed' mode of the design. In the normal mode the street functions as today with the exception that the parking spaces on the eastern (left side of the picture) have been eliminated. The emptied space is then consumed by a bike path and an expanded sidewalk.

On the western side (left side of the picture) one of the two southbound lanes is 'flexible'. This means that at rush hour times it is used as a vehicle lane, while outside rush hours it is used as a cycling lane. During this time the remaining southbound lane would be used by all vehicles.

The special status of the lane is marked by red asphalt covering the lane. This should make the arrangement of the street more comprehensible and safe to use.

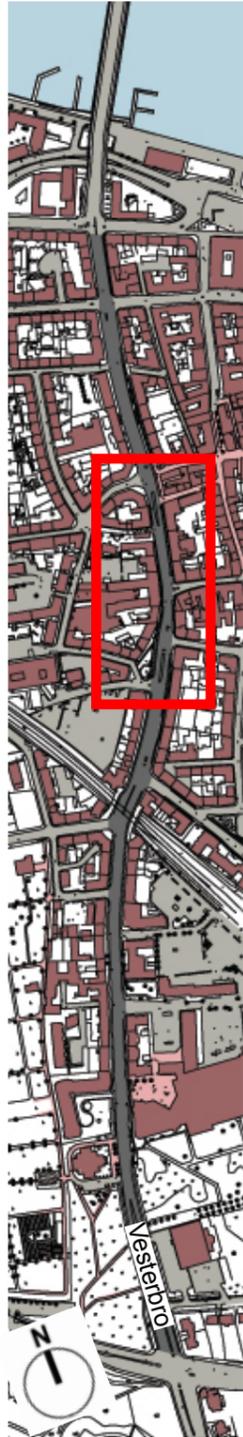
When bollards come up, the flexible lane can start to be used as a bike lane. Cyclists will be able to start using it because there will be a wide ramp in the curb - which divides the existing bike lane from the flexible lane - on every fifteen meters.

With cyclists on the 'flexible lane' pedestrians would be able to use the 'old' existing bike lane as an extended sidewalk.

Existing situation



Proposal - Current Situation



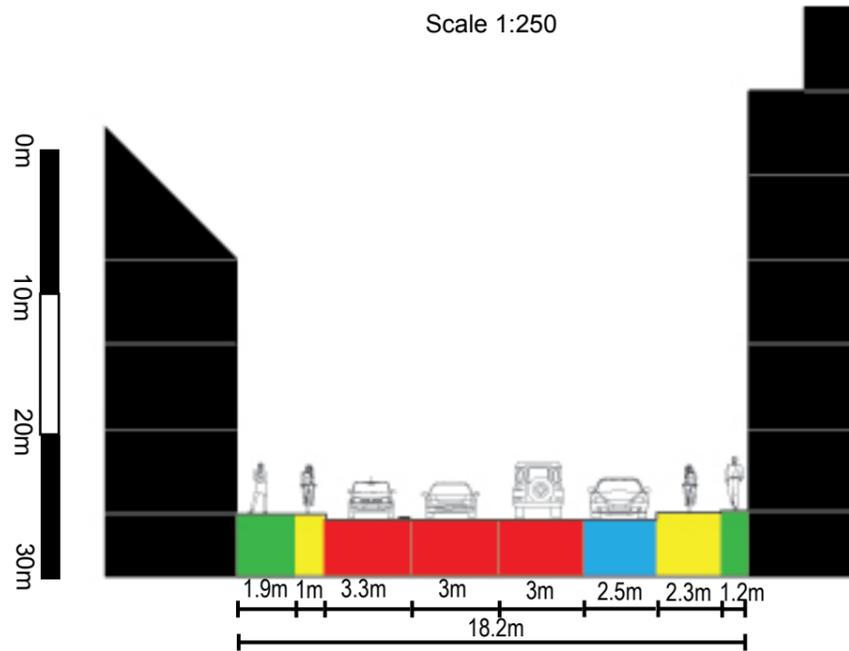
As stated before this part of Vesterbro has three lanes: one southbound, one northbound and one middle turning lane. On the eastern side of the road there is parking space with capacity for eight to nine cars.

Driving lanes have a width of three metres, and the parking lane has a width of two and half metres. The western sidewalk has a width between two and 1.7 metres the adjacent bike lane has one metre. The eastern bike path is wider with more than two metres. This is because it is close to the parking lane and a safety zone is required so that an opening car-door would not hit a passing cyclist. The sidewalk however has only about one meter of width, which is quite narrow.

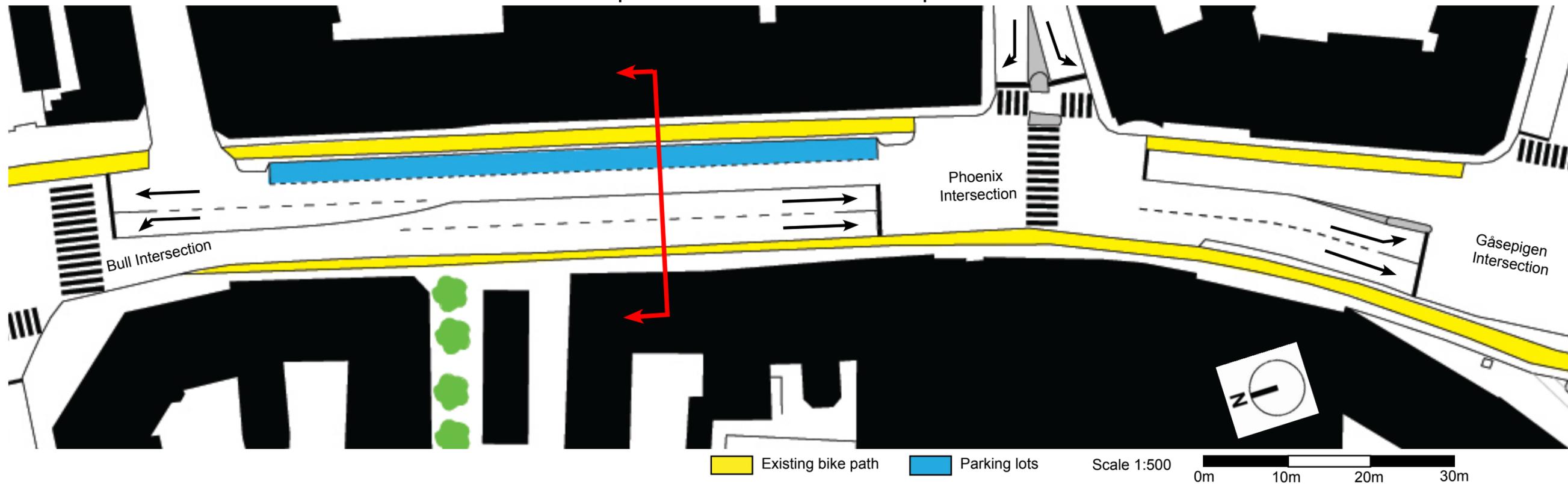
The street between the Bull and Phoenix intersection is 127 metres long. Between the Phoenix and Gåsepigen intersection it is 59 metres long. Together the distance between the Bull and Gåsepigen intersection is 186 metres. All intersections are controlled by traffic lights.



Scale 1:250



- Motor traffic lane
- Parking lane
- Cycling lane
- Pedestrian sidewalk



Proposal - Bollards Up

From 09:00 to 14:00 and whole Saturdays and Sundays

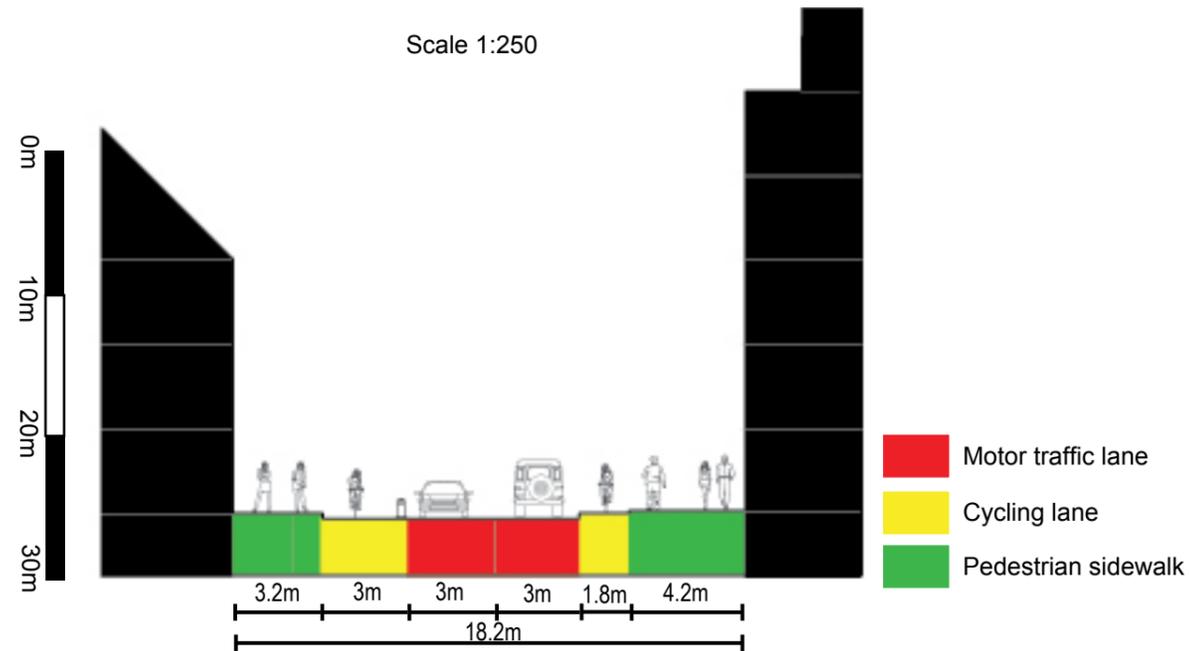
The proposed design would eliminate the parking spaces at the eastern part of the street. If the nearest parking areas of Gåsepigen (147 parking places) and Budolfi Place (190 parking places) are taken into account the loss of eight parking spaces creates only a 2.4% reduction their overall numbers (Aalborg Kommune, 2009: 3).

The southbound lane on Vesterbro would be closed to motor traffic in times outside rush hours. Users heading south would use the remaining southbound lane which is usually used as a turning lane.

The narrowing of the street would begin in the Bull intersection and end in the Gåsepigen intersection.

All intersections would continue to be controlled by traffic lights.

Scale 1:250

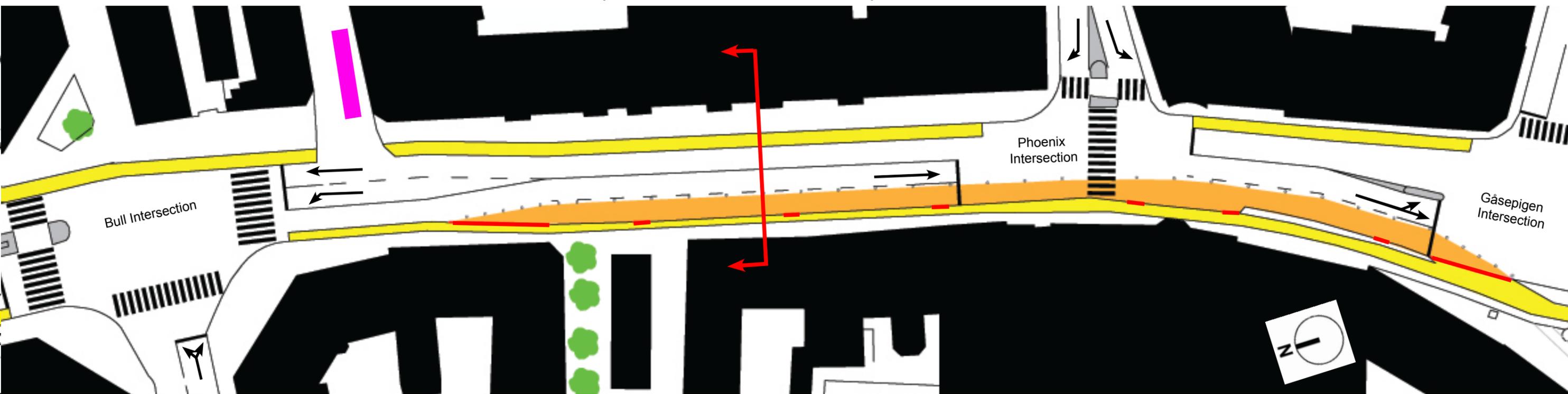


The eastern sidewalk's width would expand from 1.2metres to 4.2metres would be an increase of 350%. The bike path would not require its safety area and its width could be reduced to the standard bike lane width of 1.8 metres.

The western sidewalk's width would expand from 2.2 metres to 3.2 metres, but only when the bollards are up. This would be a 146% increase of width. Otherwise the sidewalks retains its current width of 2.2 metres.

The bike lane's width would expand from 1 metre to 2.8 metres because it would take the space of the closed traffic lane. This would be a 280% increase in the bike lane's width. When bollards are down the bike path will go back to its current position and its current width.

Shop delivery vehicles would use the small side street on the eastern side of Vesterbro. Some delivery vehicles already use this area today, if all existing parking spaces are taken. This change would be permanent and independent from the bollard system.



— Bike ramp Existing bike path Driving lane temporarily converted to bike path Space for delivery vehicles Scale 1:500 0m 10m 20m 30m

Proposal - Bollards Down

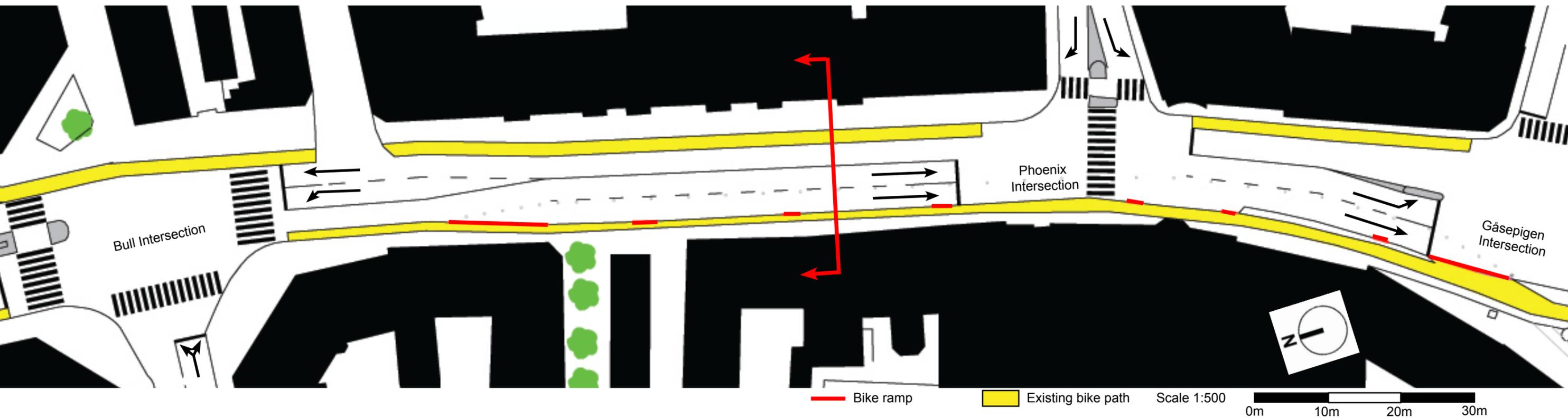
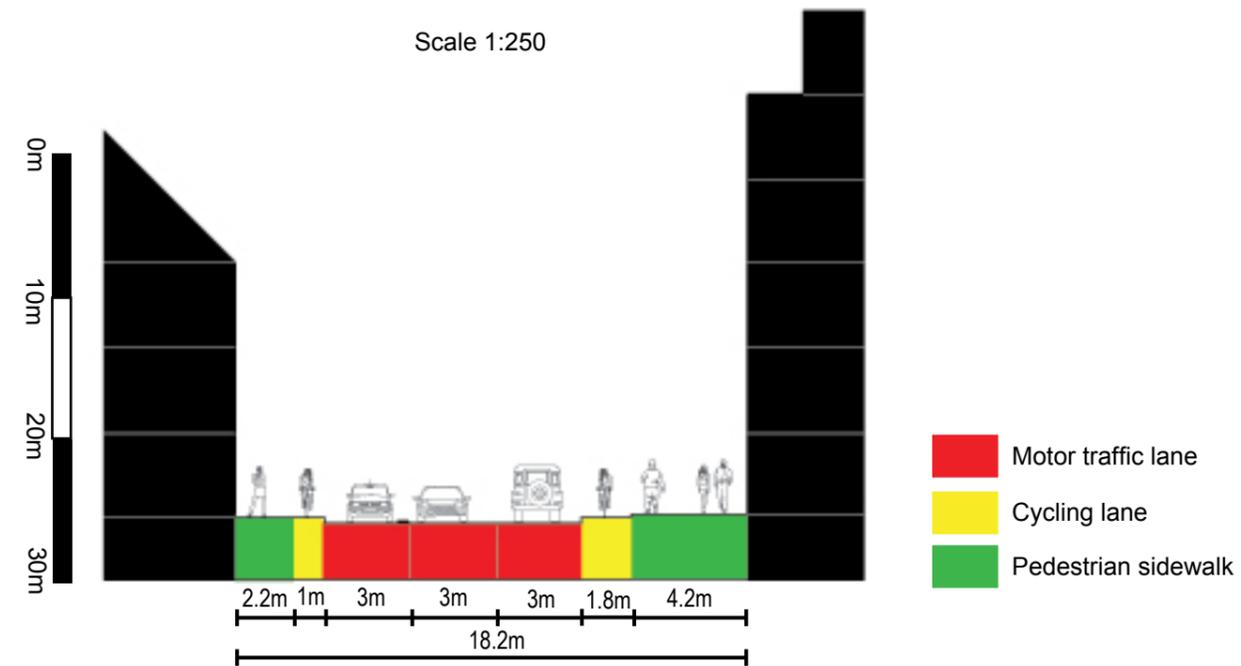
From 14:00 to 09:00 on workdays

When bollards submerge the street would again function as it does today with the exception of the parking lane, which is eliminated. There would be one southbound, one northbound and a middle turning lane.

All intersections would continue to be controlled by traffic lights.

The eastern sidewalk's width would remain expanded from today's 1.2 metres to 4.2 metres which is still the same increase of 350%. The bike path retains its 1.8 metres.

The western sidewalk and bike lane would return to the same state in which they are today with the sidewalk going from 3.2 metres to 2.2 metres and the bike path going from 2.8 metres to 1 metre.



Proposal - The change between the two 'modes'

A crucial time for the design is the interchange between the 'narrow' and 'normal' mode in Vesterbro. Because bollards are emerging or submerging there exists a danger of street accidents.

The system of traffic lights would help make a safe transition from the normal to the narrow mode of the street. When bollards would be coming up, traffic lights on incoming southbound lanes would glow red and by doing so they would keep traffic out of this stretch while bollards continue to rise safely. Northbound traffic would be unaffected by this change and would keep moving. With the southbound lanes empty, bollards could rise safely without hurting anybody.

When bollards start moving up or down they would start blinking with their integrated red LED lights. They would also have a sensor system which would pause their movement if there was an object above them.

Additionally traffic lights in the southbound lanes in the Gåsepigen and Phoenix intersection would have to be flexible in order to adapt to the change of the usage of lanes. With LED technology this should not be a difficult task to achieve.



When a left turning lane becomes a left and straight going lane the traffic lights would adapt and show in which directions drivers can turn in any particular lane. When a straight lane becomes a cycling lane, the traffic light above this lane simply turns off.

This system should make the interchange between the two modes safe and comprehensive for all users of the street.

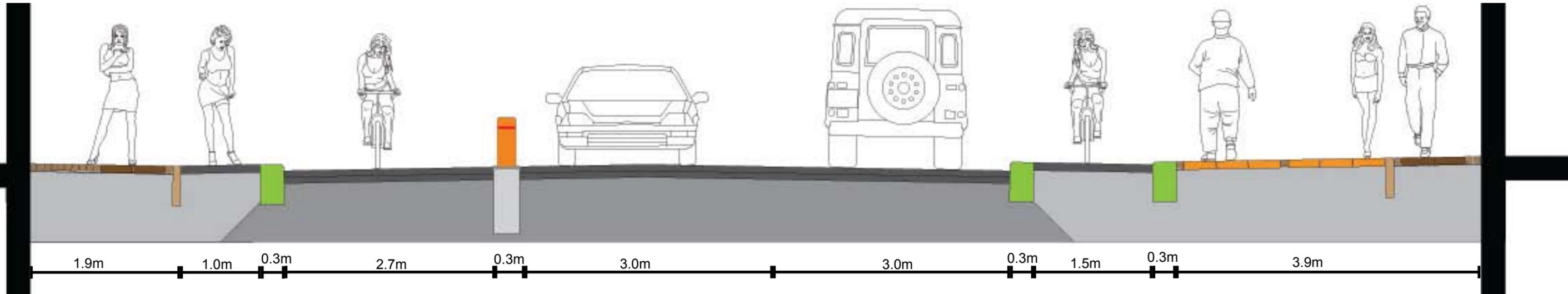
Finally with the westernmost lane free of motor traffic, cyclists would be able to see that they can safely move on to the empties lane. But most likely the initiative for this would have to be made by nearby pedestrians. When they saw that the bike lane shifted onto the now-empty lane, they would start using the available bike lane next to them as their sidewalk.

When a rush hour was imminent bollards would start blinking again and the most southern ones would start submerging. The submerging of bollards would continue northwards, making sure that no trap or dangerous situation was created for car users. This would stimulate cyclists to come back to the 'old' cycle path. And finally the street would function again as it does today.

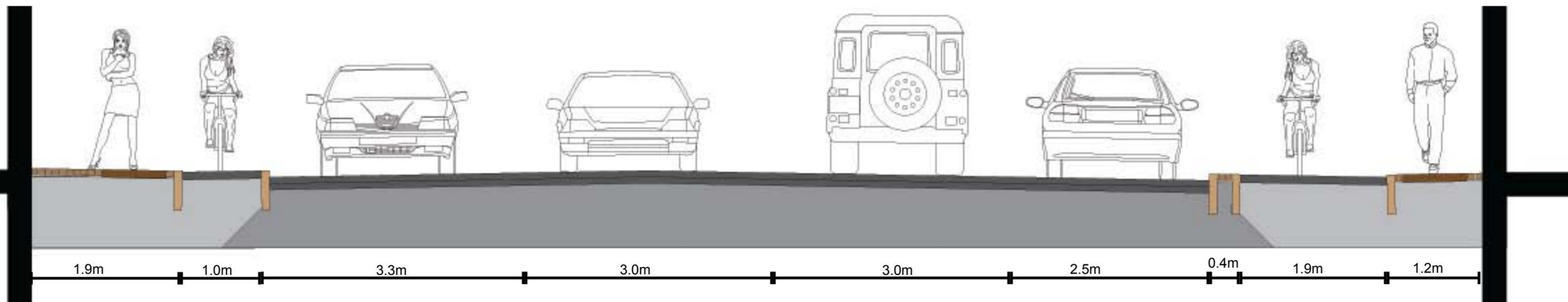


Proposal - Sections (Scale 1:50)

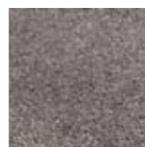
Proposed section (bollards up)



Existing section



Existing cobblestones



Asphalt



Existing curb stones



Retractable bollard



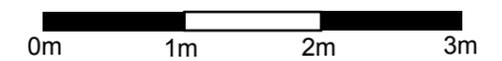
Existing pavement slabs



Proposed pavement stones



Proposed curb stones



The proposed design retains all existing pavement material where possible. This is because all existing material is still in good shape and there is no need for replacing it.

Proposal - Materials



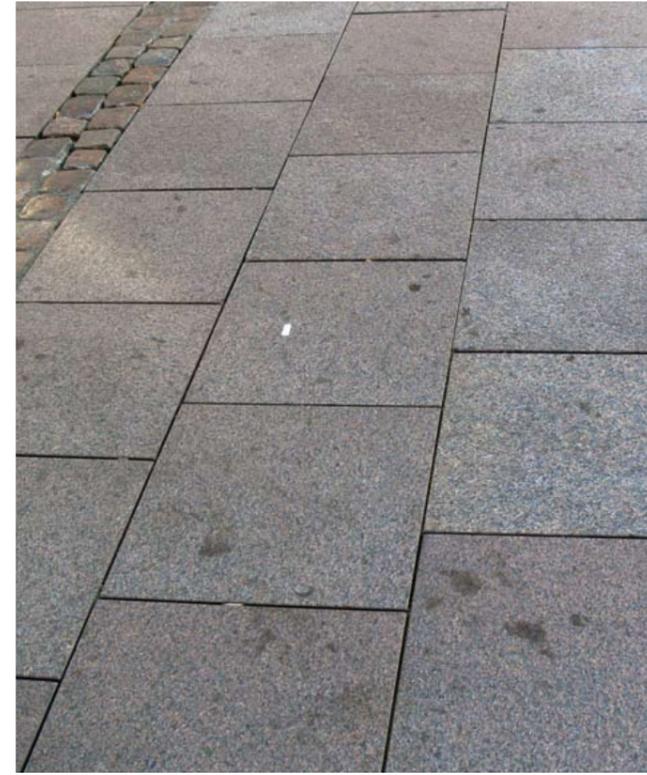
Red asphalt

Red asphalt would be used in order to make clear where the special 'flexible' lane is. All lanes which would use red asphalt as their surface would temporarily shift between vehicle users and cyclists. This is a measure that would try to prevent accidents on Vesterbro by trying to make the special status of the lane as clear as possible. Additionally, during the times when bollards are up, it will signal where cyclist are safe to cycle and motorists are not. Further on the colour of the asphalt relates to the cor-Ten steel bollards, the reddish pavement stones and the red brick facades which are the most often used facade on Vesterbro.



Retractable bollards

Bollards would be fitted with red LED lights which would blink when they are submerging or emerging. They would also be fitted with signs showing that a driving lane was converted into a cycling lane. They would be controlled by a computer system, which would bring them up or down at predefined times. Additionally all of them would submerge in cases when emergency vehicles have to pass and they could also be brought up if there was a special event on the street. They would be made of Cor-ten steel. This is because weathered metal would fit in nicely with the surrounding brick facades on Vesterbro and the red asphalt of the 'flexible lane'. Additionally such bollards are already used in Østerågade which means that a clear image of the city's urban furniture could be retained.

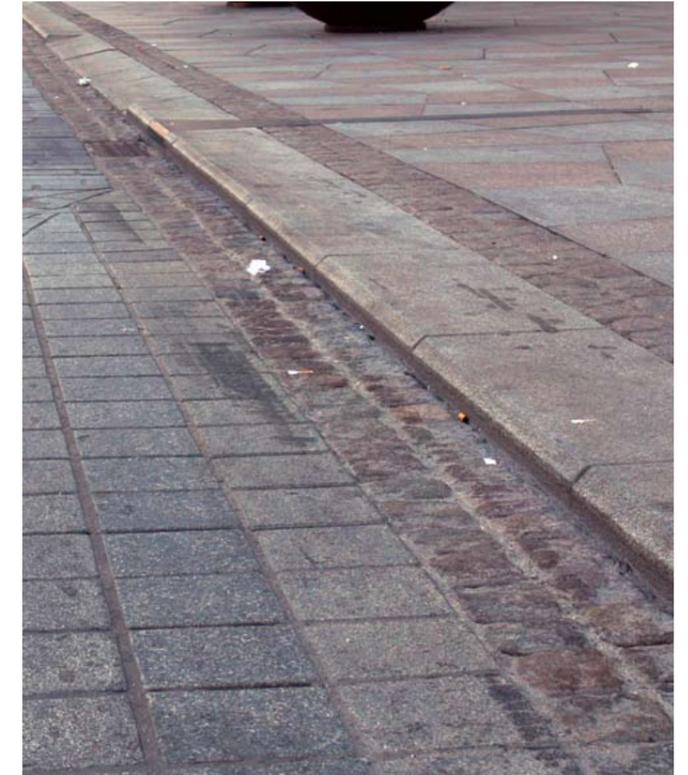


Pavement stones

Such pavement stones are already used in the reconstructed Bull intersection and in the pedestrian Bispensgade street. Their colour shifts between light red and blue. They are quite suitable for sidewalks because they would help create an image of a well maintained outdoor space.

They would be used only where sidewalks would be permanently or temporarily expanded. The existing stones covering today's sidewalks are in good shape and it would be wasteful to replace them. It is necessary that there is no height difference between the old and new material.

To ensure pedestrian safety, these new pavement stones would not be placed on the part of the street where the bike lane temporarily becomes a sidewalk. When bollards are submerged cyclists and pedestrians must see which lane they can use. But when bollards are up, pedestrians will not care whether they are walking on asphalt or stones until there is no height distance between them. Such a case can be observed on a disused bike lane in central Aalborg, where pedestrians are not aware that they are using it.



Curb stones

Such curb stones are already used in the reconstructed Østerågade street in Aalborg. Their colour shifts between light red and blue and they fit it with other pavement stones used in the city. Their width permits the creation of ramps, which are crucial for the safety of cyclists. There would be two metre wide ramps on every fifteen metres on Vesterbro. This is because when bollards start submerging it will be vital that all cyclist abandon the temporal bike lane they are using and head back to the 'old' bike lane. These ramps are important for the flexibility of cyclists.

These stones would be used on both the western and eastern part of the road. The two meter wide bike ramps would be placed only on the western part of the road.

Conclusion

With the heavy amounts of traffic there are few other options to stimulate the development of the current 'knowledge and culture' city development strategy in Vesterbro without bypassing its heavy motor traffic flows. Perhaps a bypass would be an easy, but costly solution to create a more receptive environment for Vesterbro traffic lane reductions. But as mentioned, a bypass with a new bridge across the Limfjord is still being heavily discussed by authorities. Therefore we are left with the heavy traffic on Vesterbro.

It is necessary to repeat why are good pedestrian conditions so important for the functioning of the 'knowledge and culture' city development concept, which aims for a "diverse, eventful city with active urban life, great variation of attraction and sensory impressions" (Kiib, 2007: 26). Gehl explained:

It is important that all meaningful social activities, intense experiences, conversations, and caresses take place when people are standing, sitting, lying down, or walking. One can catch a brief glimpse of others from a car or from a train window, but life takes place on foot. Only on "foot" does a situation function as a meaningful opportunity for contact and information in which the individual is at ease and able to take time to experience, pause, or become involved (Gehl, 2006: 72).

The design described above would help transfer places of flows to places of friction, where the opportunities for contact, exchange, experience and participation, which Gehl mentions, occur.

It is quite likely that widened sidewalks in central Vesterbro would boost the street's possibility of allowing for leisurely

walking. This would in effect improve the street's social and functional diversity and its visual attraction. The possibility for leisurely walking, social and functional diversity and visual attraction all help strengthen the Municipality's 'knowledge and culture' city development strategy. Therefore such development would be in the interest of the Municipality, its vision and quite likely its citizens as well.



42.1&2 The Aalborg Carnival is one of the most popular events happening once a year in central Aalborg. The parade goes along Vesterbro, where motor traffic is temporarily suspended

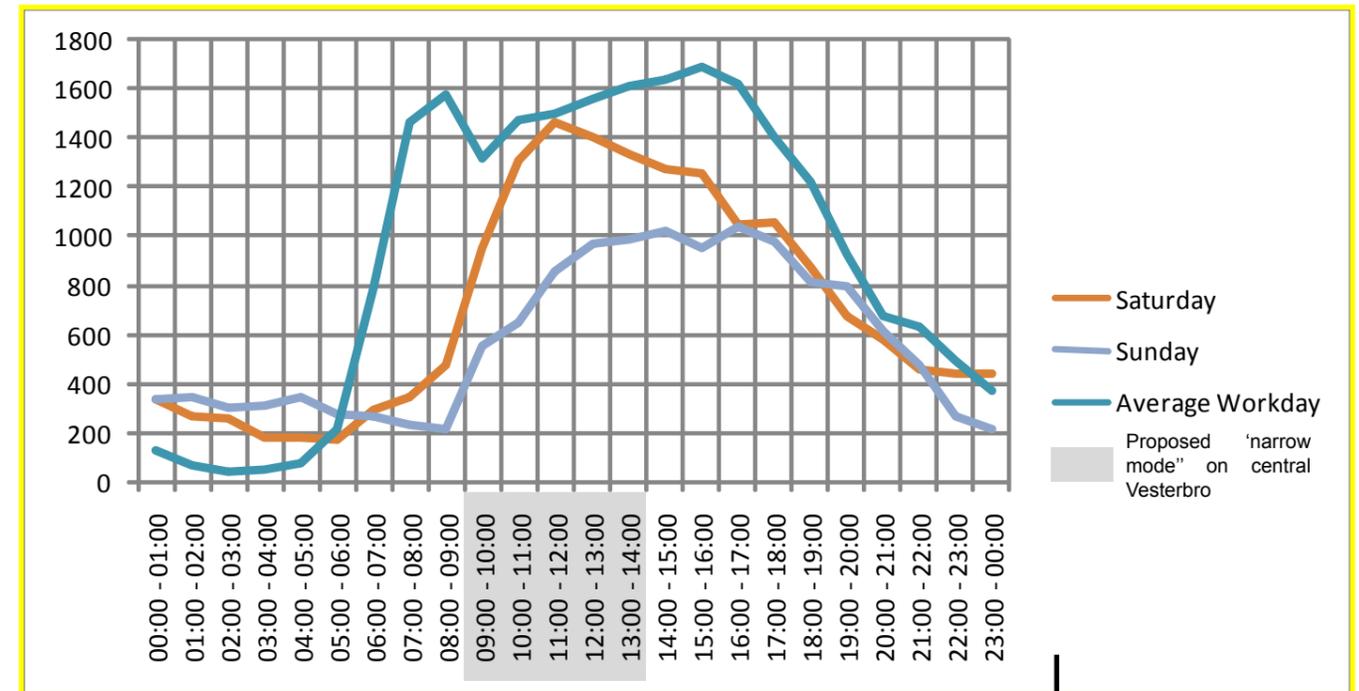
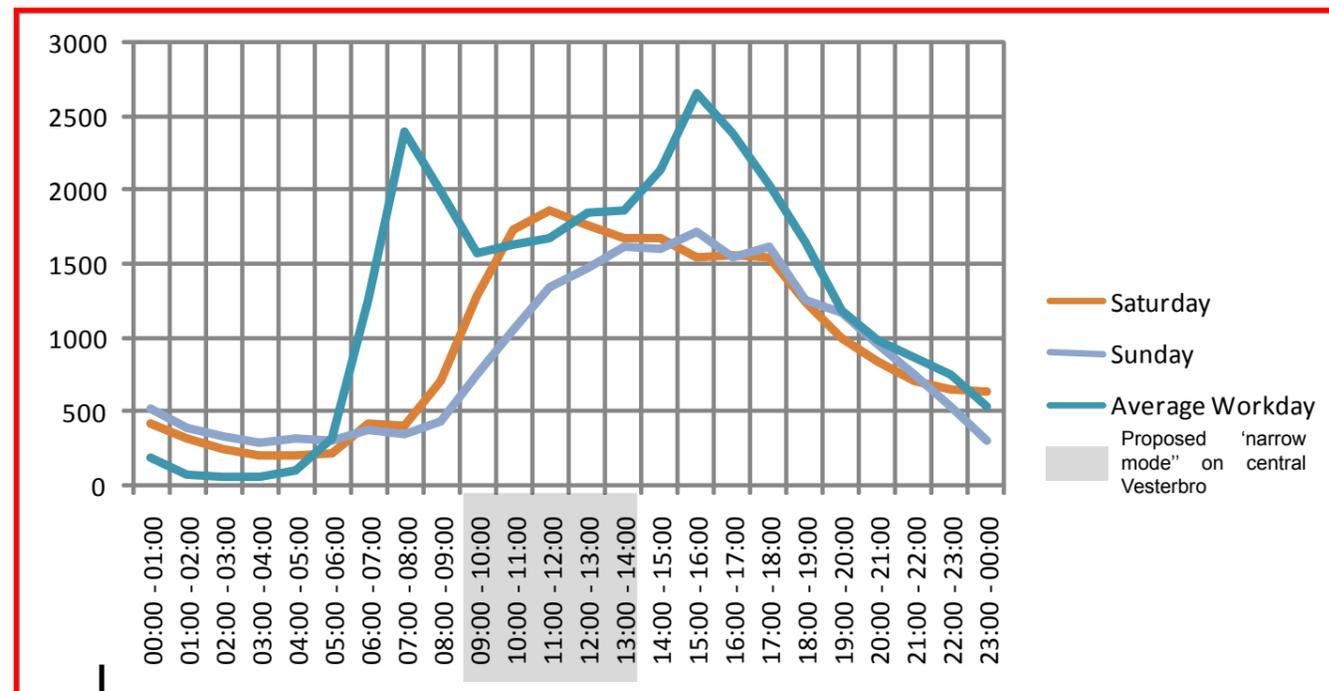
Appendix - Traffic Counts

To plan changes to intersections on Vesterbro a traffic analysis had to be made to make sure that the traffic situation would not spin out of control. The analysis was made by combining municipal traffic counts with traffic counts on site and with the help of a computer programme DanKap, issued by Vejdirektoratet, the Danish Road Directory. First of all, it had to be seen how does the amount of vehicles change per hour and per day in one week. This information

was kindly supplied by the Municipality of Aalborg. Their traffic counts were made on the northern point of the Limfjord bridge and on the southern end of Vesterbro. Seeing the traffic numbers a few conclusions could be made. First, the amount of vehicles per hour was similar in every working day. On the Limfjord Bridge count there were two distinct rush hours reaching their peaks between 07:00 to 08:00 and 15:00 to 16:00. Further on traffic was not as heavy on

Saturdays and was lightest on Sundays. This information enabled setting the times for when Vesterbro would have more and less traffic capacity. The previously stated rush hour times on working days between 07:00 to 09:00 and 14:00 to 17:00 would be the time when the street has to enable a large traffic capacity. Furthermore the municipal traffic counts acted as a context when manual traffic counts on specific intersections took

place. They helped make conclusions on how do the gained results fit into the broader traffic situation in Vesterbro.



Appendix - Gåsepigen intersection - Today/Bollards down

Taking the traffic counts

Traffic counts were taken on four intersections, all of which were later on considered in the design phase. Only two of them were changed as the results of the traffic counts proved vital for the delimitation of the design area.

The process of counting traffic was made of standing in the intersection and counting traffic issuing from a street for ten minutes. All traffic heading into all directions on every separate lane would have to be counted in ten minutes. This does not mean that the whole intersection was considered in only ten minutes. To make things easier, only traffic which was issuing from one street was counted during this ten minute period. This means that to consider a three street intersection, ten minutes would be required for each street and this would bring the total time of traffic counting up to thirty minutes.

If the street had more lanes, directions would be noted according to lanes the vehicles took. Vehicles were divided into cars and vans, trucks and busses, long trucks and motorbikes. When traffic issuing from all branches of the intersection was done it was important to note how the intersection functioned. This was done by analysing intersection phases.

Intersection phases are intervals of green and red lights on

an intersection. Traffic lights control these phases. Phases come in various combinations. But usually it goes that if an intersection has two phases it means, for example, that traffic going northwards would have a green light in phase one, while in phase two it would have a red light. After this phase the sequence or signal cycle would repeat itself and the green light would come on. Therefore a phase is a combination of traffic lights which organize traffic flow within an intersection. A phase is a part of a broader signal cycle, which repeats itself once it is completed.

When all data was assembled it was transferred into the computer programme DanKap, issued by the Danish Road Directorate. The programme demands these data: the amount of traffic counting time, the amount of all vehicle types per traffic lane, the phases the intersection produces, time between the intervals, pedestrian and bicycle flows and the speed limit. These are the basic data the programme requires to produce results but more data can be still inserted.

The programme makes a calculation on how much of a traffic lane's capacity is used, the average waiting time it takes to get through the intersection and how many cars would be lined up before an intersection in less than five

percent of cases.

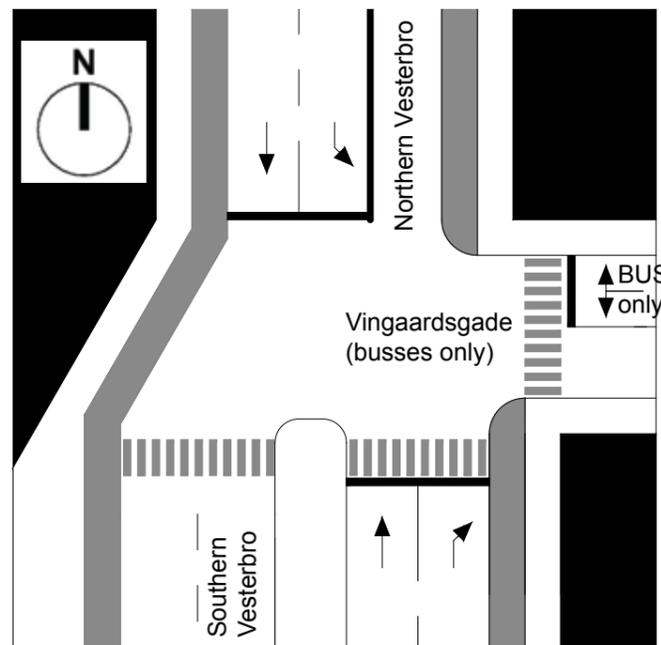
The most important result is the lane's capacity usage. Below 85% is a good result, above 85% traffic can slow down and create queues (Bro, 2009), while above 100% the lane's capacity is exceeded, and queues are inevitable. We shall start with the southern intersection of Gåsepigen (or Goose Girl).

Gåsepigen Intersection

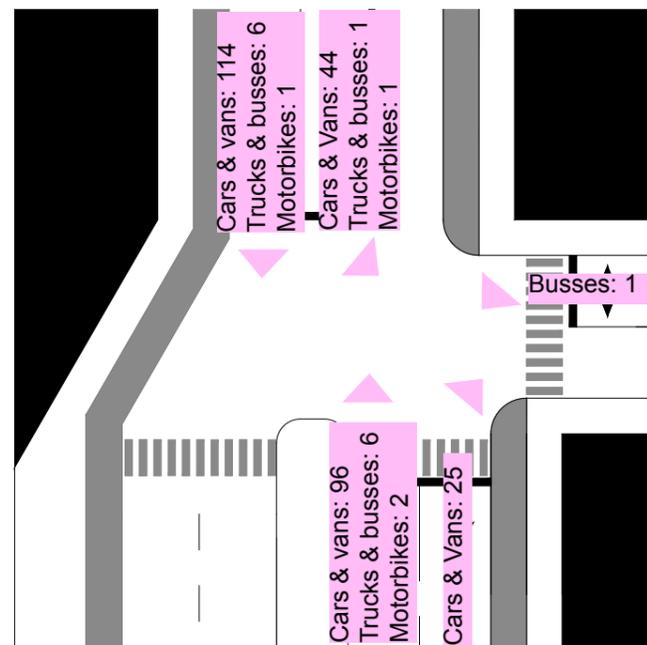
Duration: 10 minutes, beginning at 12:36 on Monday the 17.th of May 2009

The traffic count was made in between the two rush hour peaks, showing how the intersection would be affected if one lane was closed down.

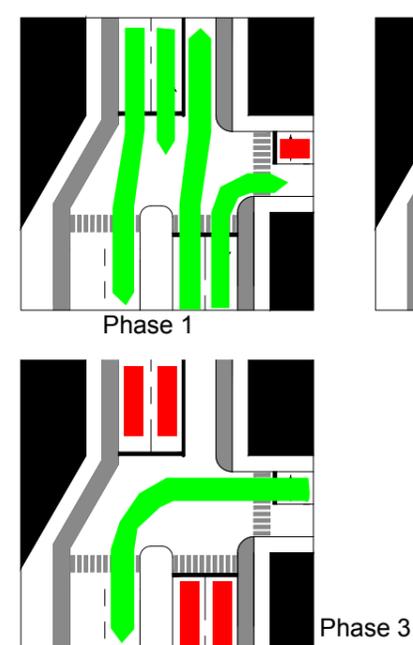
The traffic analysis showed that in the existing intersection there are moderate traffic flows in all directions except from Vingaardsgade to Vesterbro because this is a bus-only lane. The intersection is controlled by traffic lights which create three phases. The highest capacity usage per lane is from south Vesterbro to Vingaardsgade with 78%, followed by north Vesterbro going south with 58%. All other lanes are have their capacity usage under 46%. Thus the intersection experiences moderate traffic even during off-peak hours.



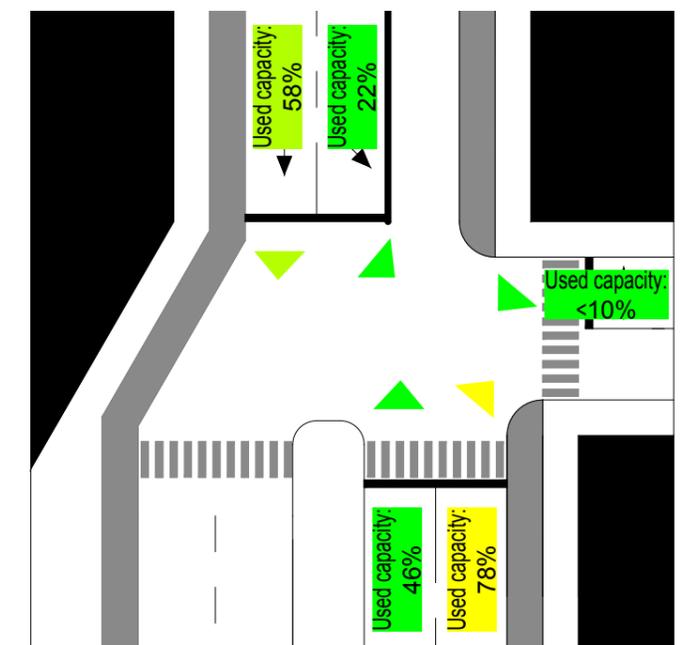
Traffic lane layout in the existing intersection



Amount of vehicle types per traffic lane



Phases in the intersection



Capacity usage per traffic lane in the existing intersection

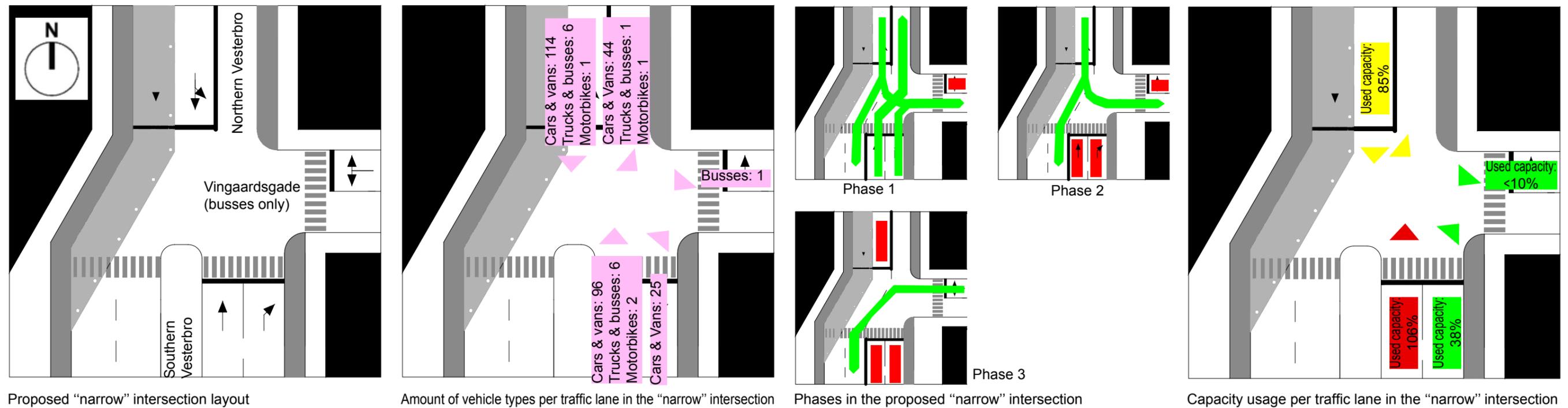
Appendix - Gåsepigen intersection - Bollards up

The Narrowed Gåsepigen intersection

With the street in the proposed “narrow mode” one north Vesterbro lane heading south would be taken out of use, with the remaining lane handling all directions. With the same amount of traffic, this lane would see its capacity usage rise to 85% which could be problematic. The south Vesterbro lane turning to Vingaardsgade would see its capacity usage fall from 76% to 38% while the other lane heading north would rise from 46% to 106% meaning that it exceeded its capacity. The south Vesterbro lane heading north would see its capacity usage fall to 38% from 46%. The organization of the intersection would remain controlled by three phases as today.

When bollards would be submerged the intersection would function as today.

The analysis shows that temporarily eliminating one traffic lane would have a strong effect on the traffic passing from north to south Vesterbro and back. The amount of cars heading north from Vesterbro would be a little too high for the traffic lane to handle at once. But the exceeded traffic capacity is not so problematic that it would prevent the design from being implemented in this intersection.



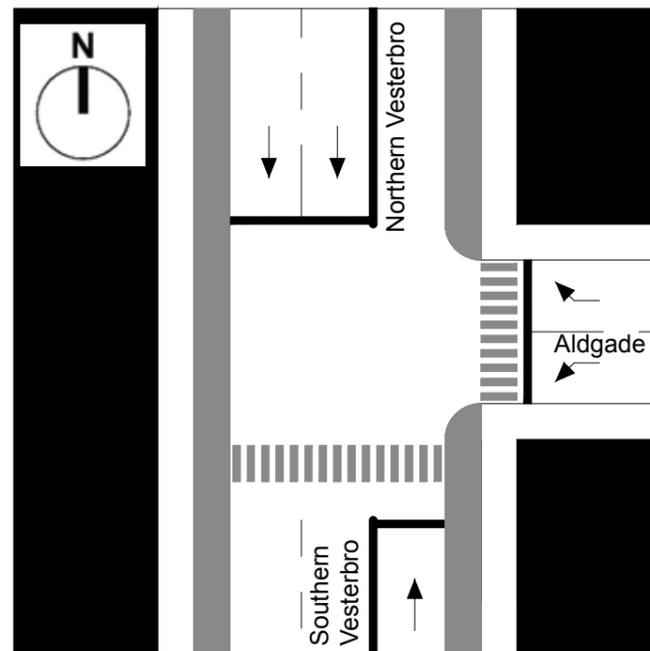
Appendix - Phoenix intersection - Today/Bollards down

Phoenix Intersection

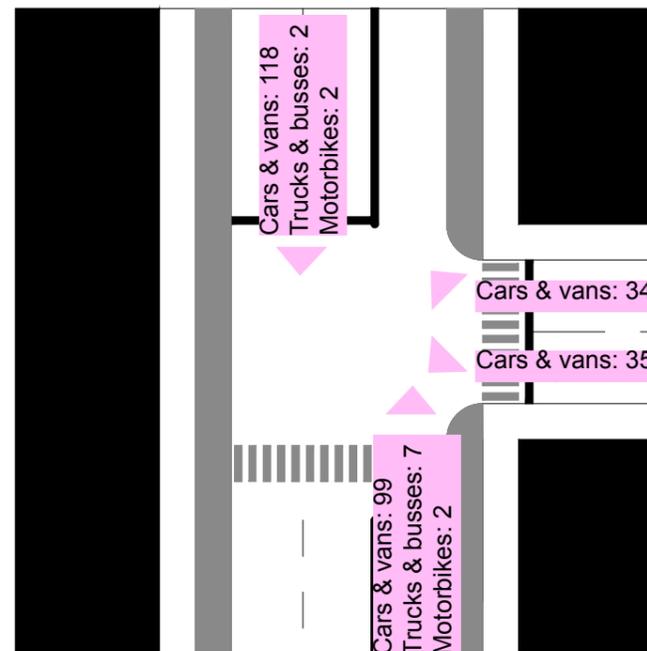
Duration: 10 minutes, beginning at 12:06 on Monday the 17.th of May 2009

The traffic count was also made in between the two rush hour peaks, showing how the intersection would be affected if one lane was closed down.

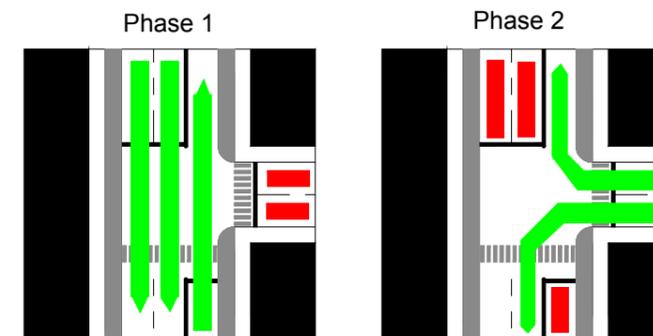
The traffic analysis showed that in the existing intersection there are moderate traffic flows in all directions except into Aalgade which is a one way street. The intersection is controlled by traffic lights which create two phases. The highest capacity usage per lane is from Algade to south Vesterbro and north Vestrbro with 60% each. The south Vestebro lane heading north sees 51% capacity usage and the two north Vesterbro lanes heading south see 23% capacity usage each. This means that the intersection does not carry very heavy traffic during off-peak hours.



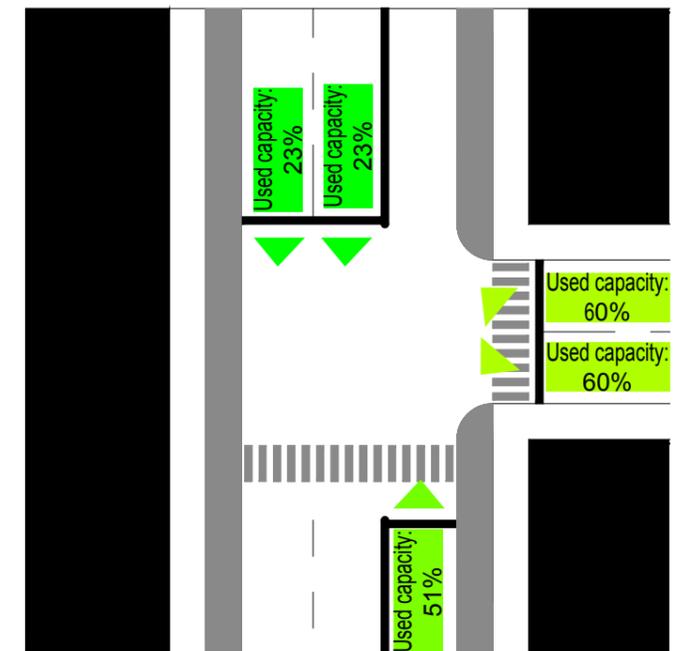
Existing intersection layout



Amount of vehicle types per traffic lane



Phases in the existing intersection



Capacity usage per traffic lane in the existing intersection

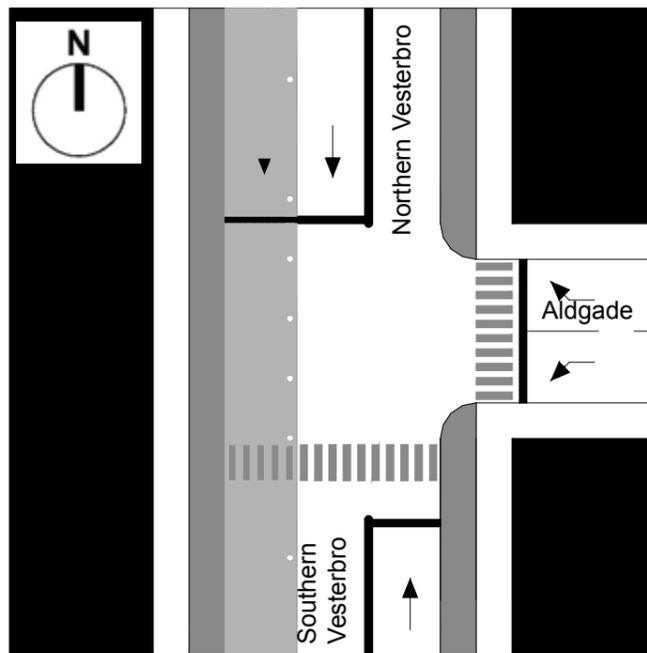
Appendix - Phoenix intersection - Bollards up

The Narrowed Phoenix intersection

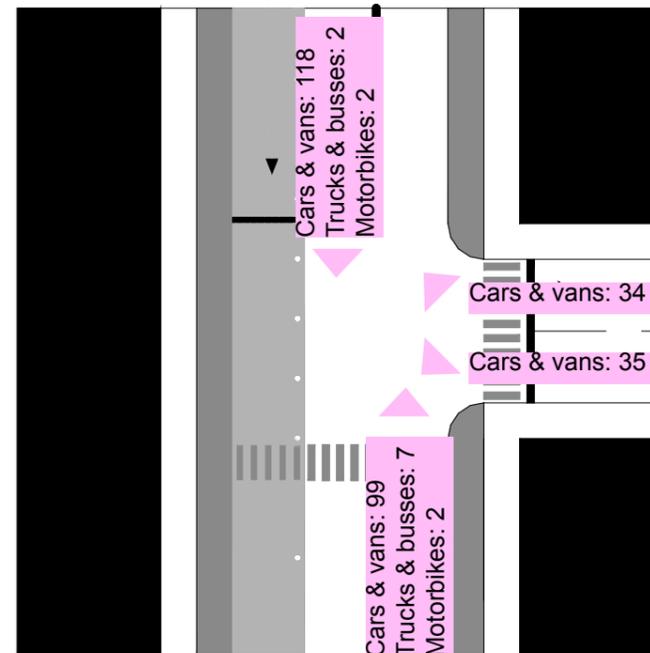
With the street in the proposed “narrow mode” one north Vesterbro lane heading south would be taken out of use along its entire length, with the remaining lane handling the only remaining direction. With the same amount of traffic, the remaining lane would see its capacity usage rise from 23% to 46%. The south Vesterbro lane heading north and both Algade lanes would keep their current usage capacity. The organization the intersection would remain controlled by two phases as today.

When bollards would be submerged the intersection would function completely as today.

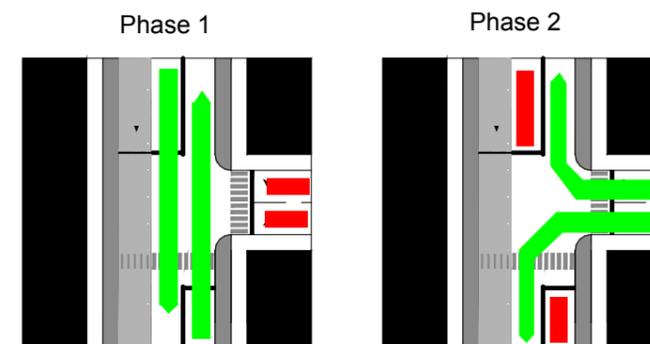
The analysis show that narrowing down this intersection during off-peak times would not have severe effects on this intersection, which means that the design can be implemented on this intersection.



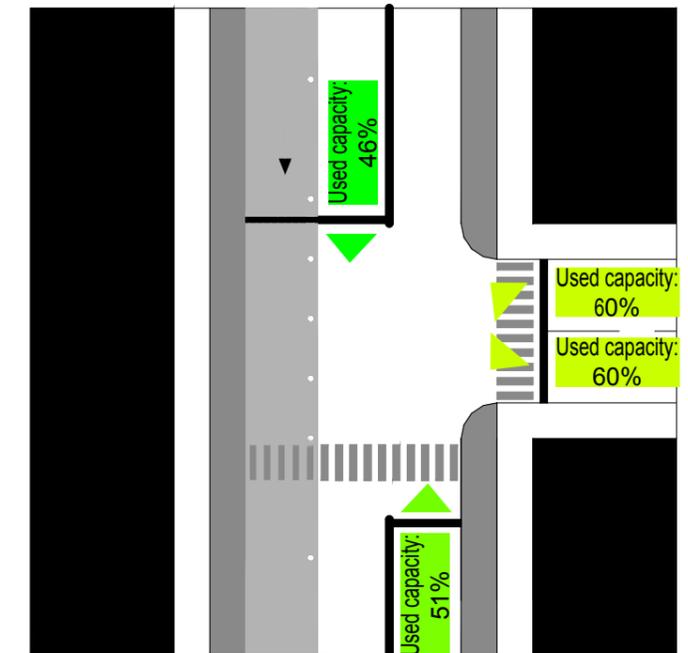
Proposed “narrow” intersection layout



Amount of vehicle types per traffic lane in the “narrow mode”



Phases in the proposed “narrow” intersection



Traffic lane capacity usage of proposed “narrow” design

Appendix - Bull intersection - Today/Bollards down

The Bull Intersection

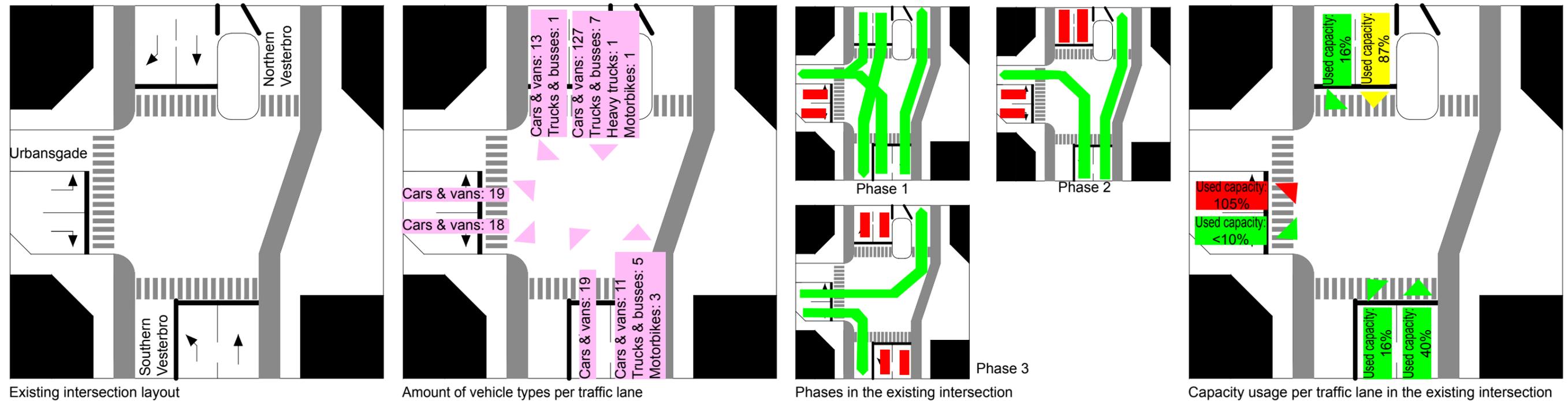
Duration: 10 minutes, beginning at 11:45 on Tuesday the 18.th of May 2009

The traffic count was made in between the two rush hour peaks, showing how the intersection would be affected if one lane was closed down.

The traffic analysis showed that in the existing intersection there are moderate traffic flows running in a north-south direction on Vesterbro. The Northbound lane has 40% usage and the southbound lane has 87%. Lanes from south and north Vesterbro turning to Urbansgade are both little used with 16%. However Urbansgade already exceeds its traffic capacity with 105% on its left turning lane. Its right turning lane sees less than 10% capacity usage.

The intersection is controlled by traffic lights which create three phases.

This means that there already are congestion problems even at off-peak times on Vesterbro. Problematic are the southbound Vesterbro lane and the left turning Urbansgade lane. Along with other factors this fact acts as a deterrent from implementing the design at this intersection.



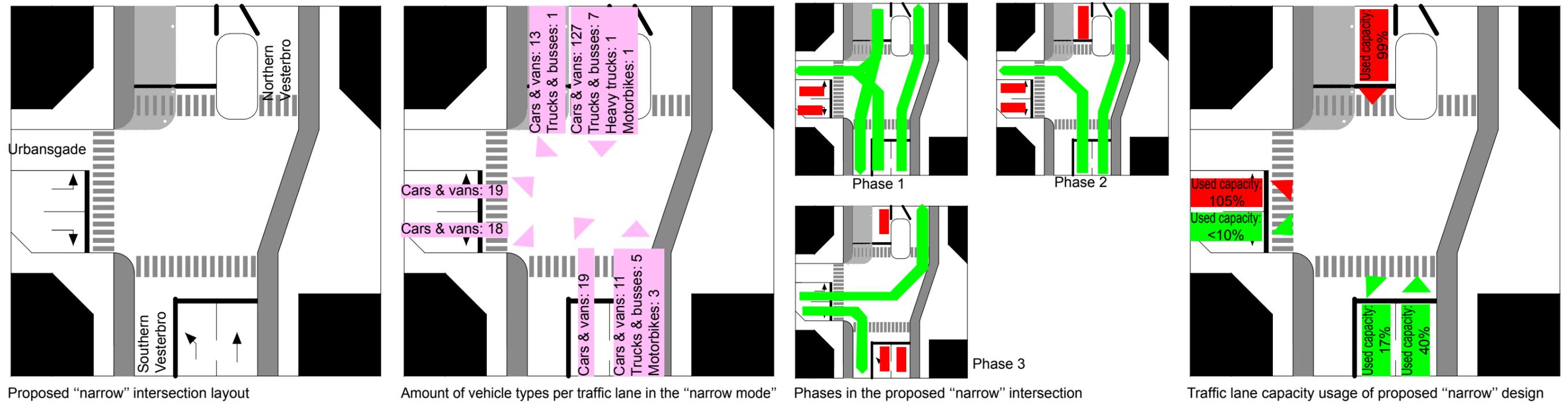
Appendix - Bull intersection - Bollards up

The narrowed Bull Intersection

With the street in the proposed “narrow mode” one north Vesterbro lane heading south would be taken out of use, with the remaining lane handling the remaining traffic. With the same amount of traffic, the remaining lane would see its capacity usage rise from 87% to 99%. Queues are bound to happen here. The south Vesterbro lane heading to Urbansgade would see its usage rise from 16% to 17%, while the northbound lane would see its usage unchanged. However Urbansgade would see its capacity usage unchanged, which means the existing problems would not get solved.

The organization the intersection would remain controlled by three phases as today.

The analysis show that narrowing down this intersection during off-peak times would worsen Vesterbro’s traffic situation by deepening traffic problems on Urbansgade and southbound Vesterbro. This fact contributed to the dismissing of the design on this intersection and further up north from it.



Appendix - Borgergade intersection - Today/Bollards down

The Borgergade Intersection

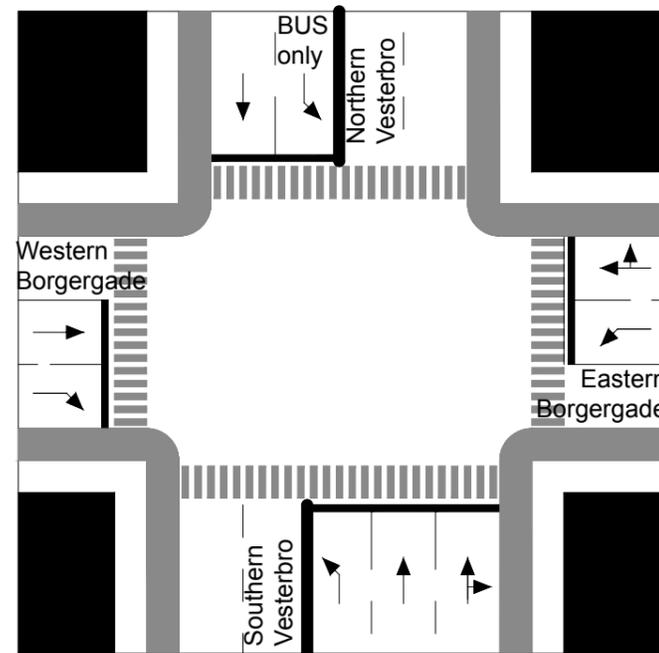
Duration: 10 minutes, beginning at 13:05 on Friday the 22.th of May 2009

The traffic count was made in between the two rush hour peaks, showing how the intersection would be affected if one lane was closed down.

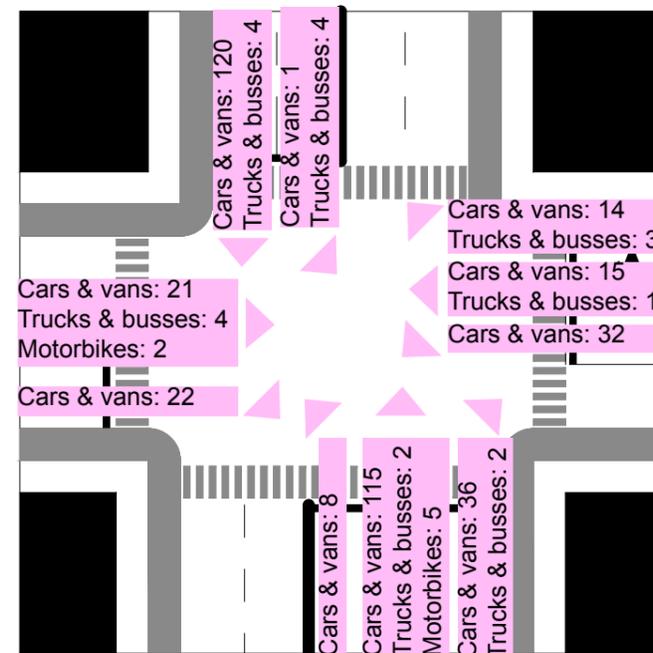
The traffic analysis showed that in the existing intersection there are moderate traffic flows running in a north south direction on Vesterbro and heavy flows running in an east-west direction on Borgergade. Also lane capacity usage on Vesterbro is generally smaller then on Borgergade. Lanes on Vesterbro running straight have 39-53% capacity usage with left-turning lanes having 13% and 12% usage. Both eastern Borgergade lanes have usage of 84% and 90% opposed to 39% and 59% of western Borgergade.

North Vesterbro has one southbound lane and one bus-only lane heading to eastern Borgergade. No cars may turn to western borgergade. Also no cars may turn from western Borgergade northwards.

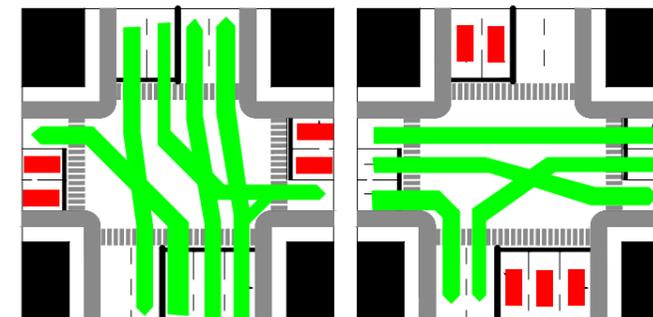
The intersection is controlled by traffic lights which create two phases. There are no traffic problems at off-peak times on Vesterbro but eastern Borgergade is near its critical capacity usage levels. This fact acts as a deterrent from implementing the design at this intersection.



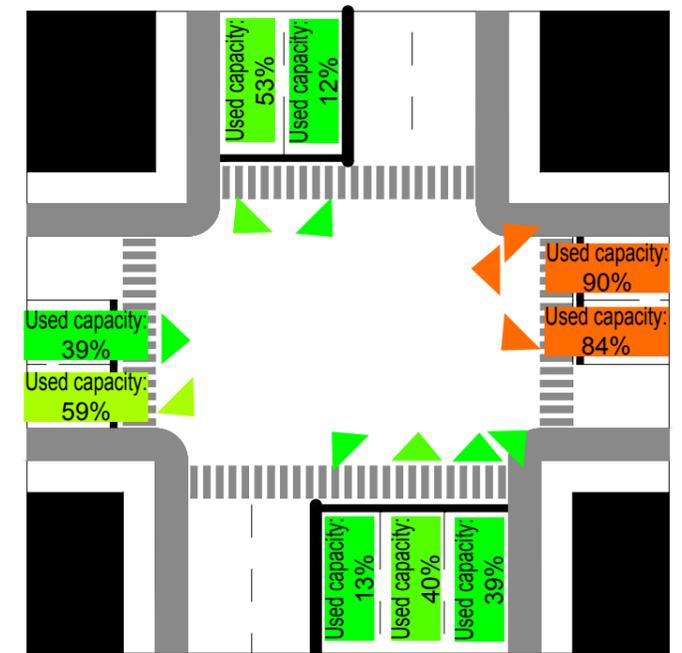
Existing intersection layout



Amount of vehicle types per traffic lane



Phases in the existing intersection



Capacity usage per traffic lane in the existing intersection

Appendix - Borgergade intersection - Bollards up

The narrowed Borgergade Intersection

With the street in the proposed “narrow mode” two outermost north and south Vesterbro lanes would be taken out of use, with the remaining lanes handling all the traffic. This would have certain implications on the remaining lanes.

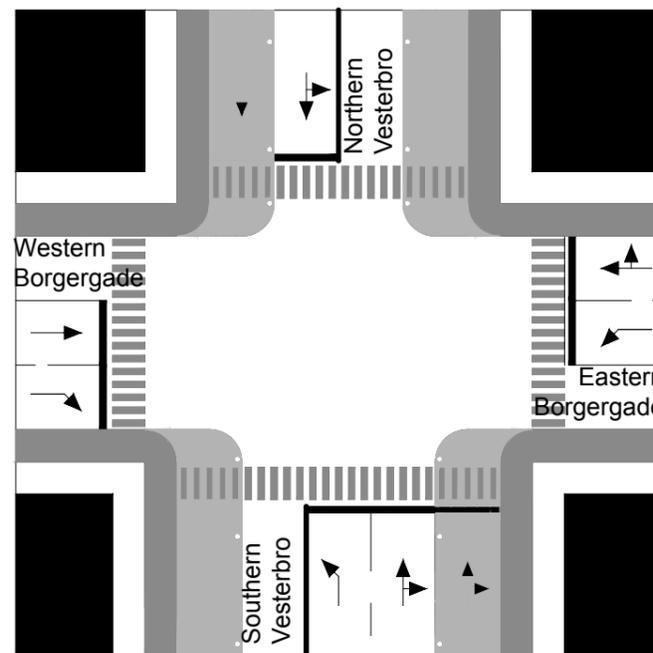
The remaining southbound north Vesterbro lane would see its capacity usage unchanged, while the south Vesterbro’s middle lane’s usage would rise from 40% to 73%, and its left turning lane fall from 13% to 12%.

Capacity usage on eastern Borgergade would rise from 84% and 90% and to 107% and 126% which means that these lanes exceed their capacity. Western Borgergade’s lane’s would see their capacity usage rise from 59% and 39% to 79% and 48%.

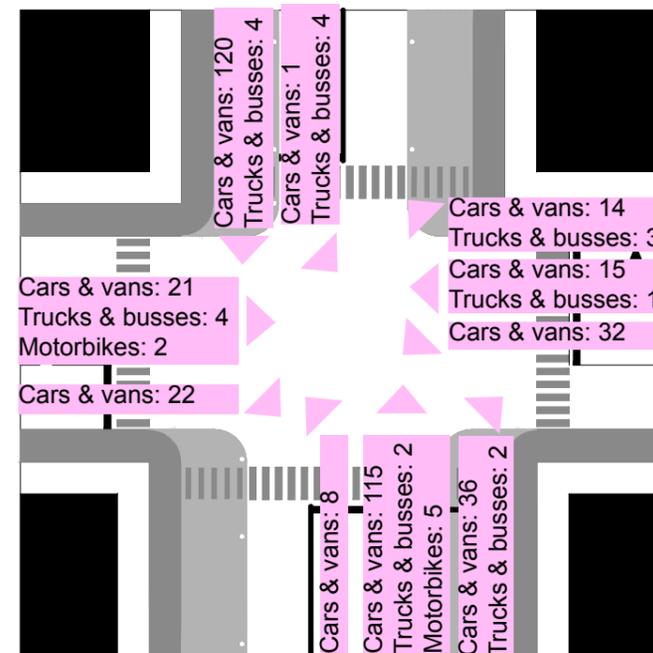
The organization the intersection would remain controlled by two phases as today.

The analysis show that narrowing down this intersection during off-peak times would have a severe effect on traffic coming from eastern Borgergade, while western Borgergade will be less affected. Otherwise Vesterbro’s remaining lanes usage would not significantly increase. The severeness of the traffic deterioration on Borgergade is a sufficiently strong argument to dismiss the proposed design on this part of Vesterbro.

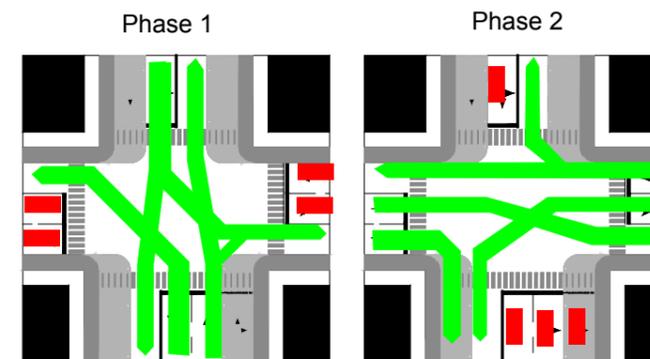
It must be noted that the same results would be made if the north Vesterbro lane organization remained as it is today, that is with one southbound and one bus lane heading east, and two lanes heading for the opposite direction, north. Therefore this intersection cannot receive even minor changes to its traffic organization.



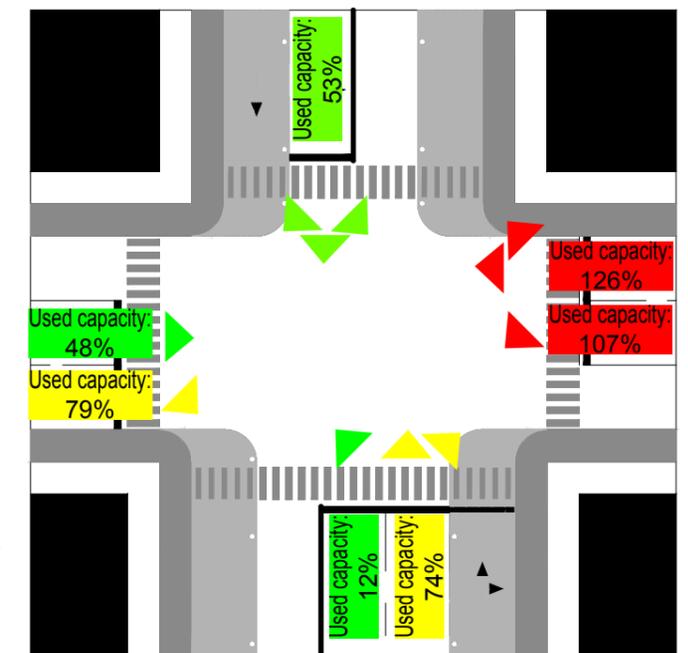
Proposed “narrow” intersection layout



Amount of vehicle types per traffic lane in the “narrow mode”



Phases in the proposed “narrow” intersection



Traffic lane capacity usage of proposed “narrow” design

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