A HIGH SPEED TRAIN IS COMING TO TOWN

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29.1

0 Abstract

This article sets forth the result of a case study of a town called Halden in Norway addressing the impact of a high speed rail link through a Norwegian border town. Halden is located in an area of Norway. It was an important government and fortress town with wealthy and ambitious inhabitants. Several significant buildings were developed and are still found in the town today. Because of six town fires, Halden has been through several phases and transformations in the past. Today, a new transformation is about to occur in the town in the form of a high speed rail link between Oslo and Gothenburg. The new line will reduce by half the time required for the journey between the two cities. Apart from the speed the main characteristics of such line are the need to connect the terminals by as straight a track as is possible therefore following the existing railway line is not an option. This means that the spatial structure of whole town will be affected. Consequently it presents an opportunity to restructure the town to both accommodate the new railway and improve the urban environment. The opportunity for change would be both beneficial and welcome, but it is important that no historical buildings are disturbed and that valuable land is not destroyed. The paper presents a research project undertaken with the help of the authorities in Oslo and Halden. A space syntax analysis was undertaken of the existing pattern of space in the town and a series of potential restructuring possibilities in the future. In order to examine in detail the attitude of the local population a questionnaire was used to elucidate criticism of the existing town and comment of the need and opportunities for the future.The paper will demonstrate how quantitative and qualitative methodologies like space syntax and surveys can contribute to urban improvements in a town facing a transformation of this scale. It will also discuss and clarify the quantity of change needed for the city centre. To outline the opportunities available, a list of different scenarios are defined. The research involves fourteen possible design solutions for a new town structure, but only a selection of the extremes will be discussed in the article. Then the general criteria for a good movement pattern will be discussed. Through intensive research, a list of important criteria are developed on the subject change of routes and each criteria has adopted a valuation number or a code to be able to make the research as resourceful and realistic as possible. In conclusion, the questionnaire will be valued up against the space syntax analysis to find the strongest strategic potential for the town. A diagram will then define the result of the research. Finely, the result will be compared with the existing situation and local values will be discussed. This is done to find the best solution in balancing between what is needed and the cost to do it.

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1 Introduction

Throughout Scandinavia at this time there is considerable new infrastructure being built and planned, including new road and rail bridges connecting Denmark's is-

lands and across the Kattegat to join Denmark with Sweden. Planned for the near future is a high speed rail link between Oslo and Gothenburg which will half the time required for the journey between the two cities. Apart from speed the main characteristic of such line is the need to connect the terminals by a straight a track as possible. Following the existing railway line is not an option. This has implications for settlements lying along the route. They are either by passed or have a new track laid straight through them.

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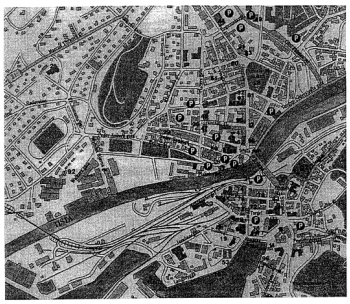
The border town of Halden in Norway is a possible stopping place on the border and so the line will pass through this town sometime before 2007. This means that the whole town structure will be affected and consequently there is an opportunity to restructure the town to accommodate the new railway and improve the town. A research project was undertaken with the help of the authorities in Oslo and Halden which a detailed examination of the demanding physical situation of the town as a starting point. Space syntax analysis was carried out of the existing situation and a series of possible future restructuring possibilities were developed. In order to examine in detail the attitude of the town's people to the future a questionnaire was used to elucidate criticism of the existing town and comment of the needs and opportunities for the future (see figure 1).



F . 1. H . .

1.1 H .

Halden is situated on the River Tista, where it enter the picturesque Iddefjord. The town is dominated by the Fredriksten fortress, a national monument, which attracts about 200,000 visitors per year. It is a wonderful backdrop to the town, especially attractive when floodlit. This border town was fought over many times in the past and was latter rebuilt in an attractive French Empire style where recent buildings are of a high standard. The town has a population of 26,000 inhabitants, covers an area of 640 km2 and is a typical industrial town with timber refinement as the most important industry. In addition to that, the town has about 70-80 small and medium sized companies and highly regarded educational institutions with research centres of high quality (see figure 2.).

F . 2. . . R- .

1.2 N

The people of the town are optimistic about the industrial development of the new paper factory, the transformation of the riverside, the Conservation and development of the harbour area, an immense tourist infrastructure and the development of the centre as a more people friendly town.

Halden today is recognised to have two inner centres, one on the north side and one on the south side, divided by the River Tista. On the north side, the main street has been changed from a heavy trafficked street to a pedestrian walk. The street is characterised by shops, offices, institutions, and outdoor activities. This street is called Storgata and is the most marked axis on the north side. There has also been created an inner centre on the south side, where the settlement was first started. Since there was more space for further development on the north side, this became the largest and busiest inner centre. The south side inner centre is less used compared to the north, but is as pleasant as the north, and perhaps even more interesting. This is because the south side contains the market, the harbours, the fortress, many interesting buildings and all transport interchange.

The separation between the north and south side has not always been like this. The transformation happened during the 60's, when the streets in the town could not cope with the increasing number of vehicles. Before the 60's the town had one main axis in the inner centre, namely Storgata. This axis stretched from the town park on the north side to the harbour area on the south side, as one straight line. During this period the town was characterised to have just one centre. Before 1964, a low profiled bridge connecting the two sides of the river formed the town's strong axis. It was considerably easier to walk from the north to the south side during this period.

The whole area changed in the 60`s. The old bridge was demolished, and a new four lane bridge developed to the east. Today, the bridge symbolises what went wrong thirty years ago. The low profiled, well- integrated bridge was replaced by a curving, over-sized limb, and forever emphasize the result of an unsuccessful transplantation. The basic town structure was damaged as it lost a key connection.

The route of the fast rail link however cuts off the new bridge on the south side of the river and this proposal has resulted in the need to examine a new structure for the town.

To clarify the quantity of change needed for the town's inner centre, a list of problems had to be discussed.

The need for change is there because:
- Two separated inner centres do not work well in a small town like Halden.
- The town has poor links between its different spaces.
- Attractive spaces are completely deserted.
- Some spaces are recognised to be of poor quality and not up to today's needs.
- The town suffers from the need for more green areas.
- Some existing areas limit the town's opportunity of expansion.
- Spaces today have too seasonal a usage.
- The main pedestrian system has a poor movement pattern.

1.3 O . .

The planning process is active in both Oslo and Halden. NSB (Norwegian Government railway company) in Oslo and Halden planning department tried to solve the problem together. NSB developed two solutions for a railway link in the town. One on the north side and one on the south side, but both solutions were in conflict with the Halden planning office's interest. This was because both solutions needed two bridges for the train to cross the town, and that destroyed valuable land and buildings. A third solution was offered whereby the railway needed just one bridge. This solution had a plan were no valuable land or buildings were destroyed and was welcomed by both parties. This solution became the new plan for the railway and is concentrated on the south side where a transport interchange centre can be developed on the railway property.

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Since the planned railway is interrupted by the town bridge that was built in 1964, major transformation will occur in the town. This will also create opportunities to correct what went wrong in the 60`s. Halden's planning office greatest concern is mainly how this new railway will affect the town and the town's surroundings. It is also important that several criteria were taken into consideration including the technical possibilities, cost, historical buildings and that valuable sites were not destroyed.

The opportunity for change would be both beneficial and welcome. To clarify the amount of opportunities for change, a list of different events had to be discussed. Opportunity for change were present because of:

- new railway system planned for the town's inner centre.
- new road system planned for the inner centre.
- new pedestrian walk under development.
- new transport interchange centre is planned on the south side.
- new spaces to be developed in the inner centre.
- shopping centre of 15000 m2 planned along the north side of the river.
- new developments of the town's education system.
- new developments of the town's industry.
- new hotel to be developed on the inner harbour area.

A central part of the research activity is to develop an effective strategy or design. This will detail the most suitable methods of investigation, the nature of the research instruments, the sampling plan and the types of data as quantitative or qualitative. The research design forms the framework of the entire research process. The process of research is often subject to many sources of bias, therefore the methods of research and data collection most suitable for this project have been carefully analysed and selected .

2 Space syntax analysis

2.1 I . .

Space syntax is the representation and interpretation of spatial system in settlements and buildings. Architects and urban planners are sculptors of spaces and it is important that they have tools with which to analyse and predict what is and what will be a good space. A good space, according to the creators of space syntax, is one that is

used, and therefore there is a likelihood of encountering other people. Secondly, a good space is one that has a "global" relation to the rest of the urban development or building. That is to say that other parts are accessible from the space being analysed. At a local level a space may be successful if it is quiete pedestrianised, has local facilities and has a sense of place. Its success at a global level will depend on its integration to the rest of the town.

2.1.1 I .

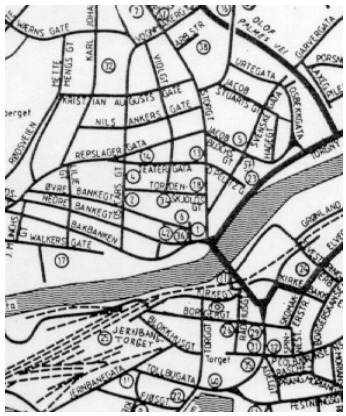
Because the system is different from other parts, it is possible to use integration values to reveal the global structure of the system. The integration core of a settlement will be the pattern made by the highest10% of most integrated lines. This integration core will produce a pattern of how the inside of a settlement can be reached from the outside and where the greatest possibilities of movement are likely to occur. It has been claimed that in a well working town, the integration lines are the best indication of movement and location of people. The rest of the town becomes easily accessible for the integration core and more encounters with others are likely to take place.

If we also take the bottom 50% of integration values and their respective lines, and to show them on the axial map, an idea of how the less integrating lines join the more integrated ones emerge. Along the more integrating lines there are larger convex spaces and these lines will be of a more public nature while the less integrated lines will show the more private domain of the settlement.

(W D).

2.2 T .

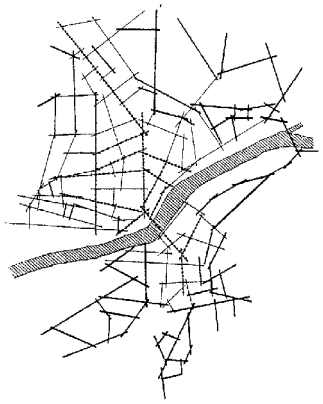
Halden has developed, as many other towns and cities, with settlements on both sides of a river. The river obviously create problems for the natural movement pattern in the inner centre. This problem can be solved by creating the right connections crossing the river. This research involves 14 different solution of crossing the river, but only a selection of the extremes will be discussed.



Space syntax analysis of the existing street map shows that the integration core is quite good on the north side of the river, but is recognised to be quite poor on the south side. The 10% low mean depth (10% most integrated lines) is concentrated along Busterudgata, down the pedestrian route Storgata and follow the town bridge on the south side, see figure 3.

On the existing street map, we find that 12 streets have 10% low mean depth on the north side and only 2, except from the town bridge, on the south side.

The 50% high mean depth (50% less integrated lines) is here concentrated along the edge of the town's inner centre. These axis are highly concentrated north-east, south-east and south, see figure 3.



F 3. 10% , 50%

An examination of five of the created solutions is used to demonstrate how the town can be restructured and develop better options for the town structure in the future.

2.2.1. N . 8

This solution has deleted the existing connection east, the town bridge and 4 new axis has been developed. In addition to that, 3 new axis has been created on the south side. This is done to create a new road system in the town. This change make no significant difference to the10% low mean depth. On the north side, we still find it concentrated along Storgata, Busterudgata, but is now joining the main axis on the south side, see figure 4.

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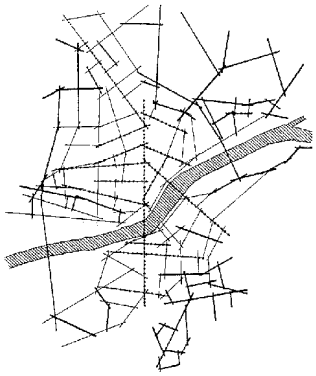


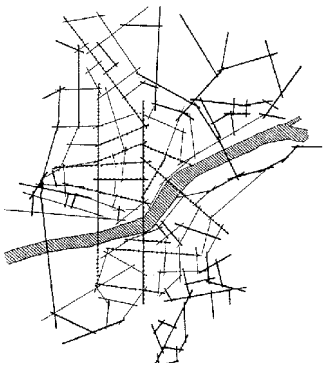
F . 4. 10% . , 50%

On this map we find that 11 streets have 10% low mean depth on the north side and 5 streets on the south side.

If we look at the 50% high mean depth it is here concentrated north-east, north west and south-east, see figure 4.

2.2.2. N . 9

This solution has still the far east connection deleted and the 3 new axis still added, but a connection between Oscars gate and Jernbanegata is developed. This create a new difference of the 10% low mean depth. On the north side the low mean depth is now found along Storgata, Busterudgata and the strong axis along Oscars gate is back. On the south side the low mean depth is concentrated along streets like Torggata, Elvestredet and Borgergata, see figure 5.



F . 5. 10% . , 50%

On this map we find that 11 streets have 10% low mean depth on the north side and 5 streets on the south side.

Compared to street map 8, the 50% high mean depth is very similar. The high mean depth is still concentrated north-east, north west and south-east, see figure 5.

2.2.3. N . 10

This solution has deleted the connection between Olaus Peltz gate and Elvestredet, but except from that the street map is the same as map 9. This solution make a difference on the east side of the town. On the north side the 10% low is now concentrated along Storgata, Busterudgata and the strong axis along Oscarsgate. On the south side the low mean depth is concentrated along Torggata, Kirkegata and Borgergata, see figure 6.

On this map we find that 10 streets have 10% low mean depth on the north side and 5 streets on the south side.

Compared to street map 9, the 50% high mean depth is very similar. The high mean depth is still concentrated north-east, north west but now highly concentrated south-east, see figure 6.

This is another solution where the connection between Oscars gate and Jernbanegata is deleted. But the connection between J. Munchs gate and Jernbanegata, Olof Palmes

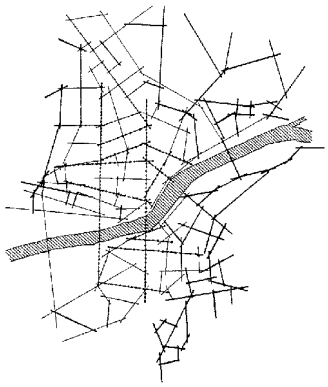
vei and Grønland and Storgata and Torggata is still there. The town is now back to having just one main axis again and the 10% low mean depth has disappeared along Oscars gate. On the north side the 10% low is now concentrated along Storgata and Busterudgata. On the south side the low mean depth is concentrated along Torggata, Kirkegata, Borgergata and Tollbugata, see figure 7.

On this map we find that 10 streets have 10% low mean depth on the north side and 5 on the south side.

29.7

Compared to street map 10, the 50% high mean depth is very similar. The high mean depth is still concentrated north-east, north west and highly concentrated south-east, see figure 7.

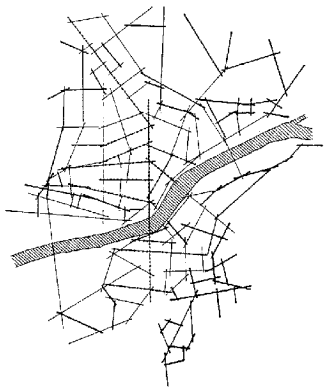
The solution for this map has changed the town structure completely, this happened when the connection between Storgata and Torggata was deleted. The 10% low is now concentrated along two axis on the north side and east on the south side. On the north side the 10% low is now concentrated along Storgata, Olaus Peltz gate, Oscars gate. On the south side the low mean depth is concentrated along Elvestredet and Ohmes square, see figure 8.



F , , 6. 10% , 50%

On this map we find that 12 streets have 10% low mean depth on the north side and 3 on the south side.

Compared to street map 11, the 50% high mean depth is different. The high mean depth is now concentrated north-west and highly concentrated north-east, south and south-east, sthe methods of research and data collection most suitable for this project, see figure 8.

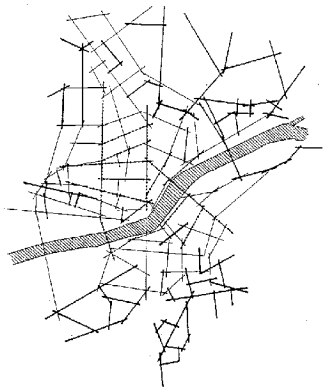


F , , 7. 10% , 50%

2.3 D

Roads have always represented an important influence on the location and growth of urban societies, but there has been little appreciation of their significance in the structural development of cities and towns. And yet transport arteries have a well defined place in the history of urban design. This factor has an impact on the future development, because roads and streets are such essential elements of design.

The challenges facing land use and transport planners are immense. Collective transport alone cannot solve future traffic problems, and tunnels cannot do away with cars completely. A new type of differentiation is necessary, with distinct functional grading. Architects and engineers will have to start to co-operate again. All urban development must be based on a visionary attitude to the town's aesthetic qualities and possibilities. When the new road system comes to town, it must do so as part of an aesthetic and functional whole.



F , , 8. 10% , 50%

Criteria and working methods have gradually been developed with the goal to create a better understanding of the working process and the foundation for the quality of the analysis. It is important to note that this is done in regard to the relation to human movement pattern and the usage of the towns public space.

The quality of the public space in the view of the pedestrians, seems to be of a central and especially important factor for term 'quality' of the public space. This term also seem to be considered by a summer-only perspective. Scandinavian towns are mainly characterised by two seasons. One long dark and grey winter and a vigorous, green, light and lovely summer. A typical winter in Norway is an indoor season with many creative activities, schools, courses and social engagements. As a contrast to the winter season, the summer is the season for spontaneous, informal activities and having the liberty to experience adventures. The summer season's specific activity pattern is highly valued in the Norwegian culture. The attractive urban activity is concentrated on this season. This season is so important that we can say, if the town work during the summer season, it will probably continue to work throughout the year, as well. That is the reason the summer season is commonly chosen as a basis for the valuation of a public space.

General criteria for a good movement pattern.
- The opportunity to walk in the town.
- Pedestrian system that connect important areas.
- The opportunity to walk in good movement pattern with few interruptions of crossings and traffic.
- Clear pedestrian structure, easy to find.
- Opportunity to walk freely without crowding.
- Good climate.
- Create interesting facades on the lower part of the buildings.
- Create good conditions for the disable.
- Create a continuous pedestrian system.
- Create a walking system in the town's inner centre.
- Develop more and better sitting arrangements.
- Exploit the waterfront.
- Exploit sunny areas and avoid shadow.
- Good option and quality of street furniture and details.
- Quality of walking and mixture of function.
- Opportunity to change direction.
- Access for all and lasting environments.
- Controlling change and joining all together.

3 Result of the space syntax analysis.

All aspects of the above criteria will be considered in the urban design, but local criteria will be added to meet the town's need. It has now established the situation and the purpose of the town today. It is important to note that the opinion of this author alone does not make the survey realistic enough. To be able to solve the psychological and the aesthetic problem in the town, a questionnaire was designed. 220 questionnaires was sent out, with 150 respondents. This was a structured questionnaire consisting a series of formal questions designed to attract answers of limited response, and several open-ended questions that were given to the inhabitants of age between 10-61+, both sexes and mixed marital status.

The questionnaire was concentrated on the inhabitants weekly habits, their general

feeling concerning the inner centre, the movement pattern and their usage of spaces. They was also asked questions like, what they liked and disliked most in different areas in the centre. The main goal of this questionnaire was to let the inhabitants contribute to the result. This is very important for the town's future since the inhabitants are its main user.

It is important to note that the space syntax analysis can be estimated with different criteria and that will change the result. The criteria is commonly changed to meet the towns different needs. By research a list of important criteria has been developed on the subject "change of routes" and each criteria has adopted a valuation number to make the research as resourceful and realistic as possible. The valuation number has been developed by the questionnaire and sound research of the town's values (see criteria for change of route, page 14.). Information regarding these methods are available at the ECA Heriot-watt University.

Since the old four lane town bridge has to be torn down, and new connections to be developed, it is important to note that every connection crossing the river is an expensive task in a small town. Of course, as more connections are added, the movement pattern will increase, but it is important to find the right balance between what is needed and the cost.

Criteria for change of route:

- Good connection between two pedestrian routes. (value 8.)
- Let people that are located on the north side reach the harbour area on a shortest possible way and "vice, versa". (value 7.)
- To be able to extend the shopping or the town's venues area. (value 8.)
- Be able to create more people and tourist walk routes. (value 8.)
- Improvement of spaces in the town's inner centre. (value 9.)
- Transportation of goods from industrial areas to the outer harbour and the railway area. (value 6.)
- Let the public safety operate more effectively. (value 8.)
- Locating the transport interchange into one area. (value 7.)
- The opportunity to develop new areas. (value 9.)
- The connection between the two sides must be well integrated with the new railway system. (value 9.)
- Create a pedestrian route that is not interrupted too much by the vehicle system. (value 9.)

It is important to note that the map with the highest value give the best result. The result shows that the street map with the lowest value is the existing. The existing street map has a value of 14, and this result make it clear that the existing situation in Halden is not adequate for a reasonable movement pattern, see figure 9.

Value below 65 cover the map: 1, 2, 3, 13 and 14.
Value between 65-72 cover the map: 4, 5, 6 and 12.
Value between 73-77 cover the map: 7, 8, 9, 10 and 11.

The research ended with an interesting result whereby the street map 8 had the

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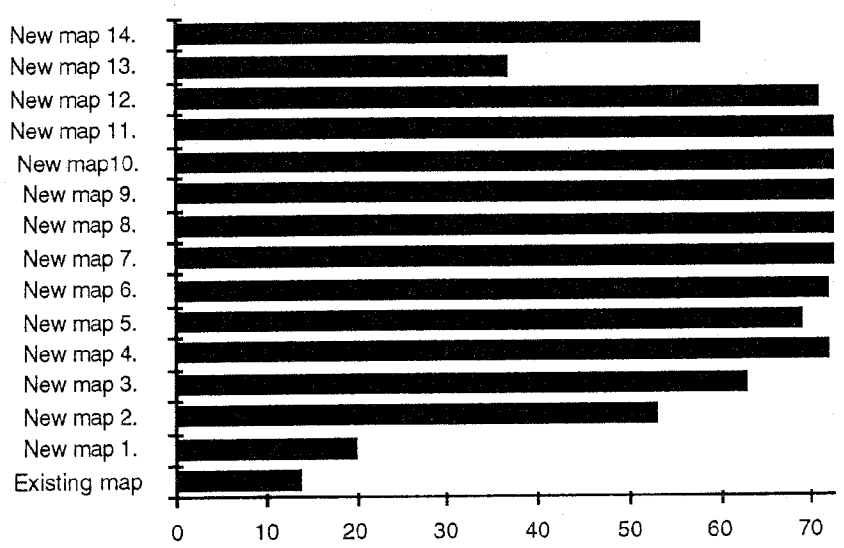
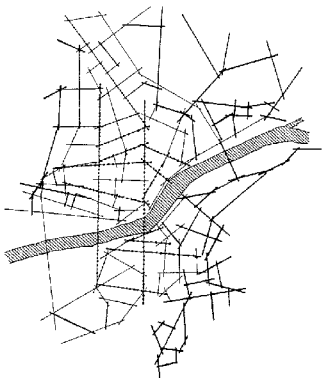


F . 9.



highest score with a value of 77. This solution has two pedestrian routes and two vehicle routes which seems adequate for the size of Halden. The interesting part is that it was not expected to find that the east connection was the best result for the town. It is now important to look at the street maps with highest scores and compare that to needs of the town. Street map 9 has a value of 76, but this solution has 5 connections crossing the river. This seems to be too many connections compared to what is needed. Street map 11 has a score 74, but this solution has one pedestrian crossing only, so this seems to be of inferior interest. We know that the wish for expansion is to the east, where the new shopping centre will be developed shortly. With that in mind, the street map 10 with the score of 74, seems to be appropriate solution for the town's movement pattern, see figure 10.

F . 10. 10% . . , 50% . .

If we take a look at the final result in figure 10 (the new street map 10), we find the best solution which coincides with the wishes of the inhabitants. This solution has two connections that have 10% low mean depth. We also find that these two connections provide two strong axes in the town. The two strong axes are several times connected with other axes that contain 10% low mean depth and that create an improved movement pattern in the centre. This will also give the pedestrians several options to create their own movement pattern. The two remaining connections are concentrated on the edge of the centre and will then work well as a car route. Finally, it is important to locate the heavy traffic outside the centre to be able to create a good environment along the new pedestrian system.

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