Part D - Design & planning tool booklet

Guidelines for the synergetic implementation of upt systems within the urban fabric
Colophon

Master thesis *Socio-Technical Connections*

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Introduction

This booklet is written as a part of the graduation project titled ‘Reconnecting the public transport city.’ From the research performed during this graduation project (literature study, case studies and research by design) a variety of guidelines, goals and demands for an exploitable public transport line have been distilled. These guidelines, goals and demands are summarized within this guideline booklet and is meant to aid the urban designer when implementing public transport lines into the urban socio-spatial fabric.

The variety of guidelines, goals and ambitions are divided into four main topics, being:

1- Public transport network design;
2- Urban Design;
3- Public transport usage and service quality;
4- Urban Planning & Policy.
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1. PUBLIC TRANSPORT NETWORK DESIGN

Goals and demands for an exploitable public transport line

The public transport system has to be competitive to the car in terms of:

> speed;
> efficiency;
> comfort;
> flexibility;
> potential reach;
> experience.

Guidelines for an exploitable public transport line

A. Accomodate high quality and experience quality of movement

B. Accomodate good public transport system connectivity and accessibility

C. High quality public transport

D. Flexibility of the network to adapt to future travel demand
1. PUBLIC TRANSPORT NETWORK DESIGN

A. Accommodate high quality and experience quality of movement

A.1 Provide diverse speed patterns along the line

Figure 1 - Lower speeds in areas where the tram meets other traffic streams, especially slow traffic due to the large difference in mass.

Figure 2 - Reach higher speeds in zones between urban areas (tunnels/bridges) and separate tram lanes from other traffic to allow higher speeds.

Figure 3 - Time-size-rank-rule speed: more stops in zones with a high transport value and lower speeds for safety matter, higher speeds in low-transport-value zones.

A.2 Provide diverse environments along the line (Thematisation of the network)

Different elements should be provided with a distinct character and identity in relation to others. By providing a more varied travel experience, the perceptual distance of the journey can be decreased.

Figure 4 - A variety of landscapes, infrastructural interventions, sightlines and urban environments along tram line 26’s alignment decreases the perceptual distance between the Vinex-neighborhood of IJburg and the central station of Amsterdam.
A.3 Express transport line hierarchy in pt stop design

The network position and functional position of a transport stop should be integrated within the stop’s design. This will provide the transport system’s users with a higher level of perception and comprehension of the network and the places along the network.

Figure 5 - The Homme-de-Fer square tram stop (Strasbourg) is clearly marked as an ‘entrance’ to a center filled with activity and liveliness.

Figure 6 - A tram stop from the same tram line in Strasbourg, the tram line has a more modest character which suits the less crowded urban environment serviced by the tram line.

A.4 Generate entrances/gateways at transition areas

Zones with distinctive identities and high quality transitions between those zones contribute to the network quality and the experience of the network environment. A large part of the population experience the city through the network and experience the variety of mobitpes, instead of the static archetypes (Boelens, 2009).

Entrances or gates can provide a transitions between different areas within the network and enhance the experience of the city. The transition areas between the different functional/physical zones are marked by ‘gates’, which could be infrastructural works like bridges, but also architecture or landscape landmarks.

Figure 7 - The transition areas between the different functional/physical zones are marked by ‘gates’, which could be infrastructural works like bridges, but also architecture or landscape landmarks.
B.1 PT stops need to be positioned at principal infrastructural lines
to create liveliness and to optimize the connectivity and accessibility of PT stops and stations.

Community centers must be served by main streets, traffic should be tamed but not forbidden

Service and commercial activities only flourish on streets that, in functional and structural terms, are principal. These streets carry a lot of traffic, so traffic techniques are necessary for good and functional cycling and pedestrian conditions. Along mixed use areas and centers, vehicles assist to create a sense of liveliness at streets in after hours. (Thwaites, 2007)

Figure 8 - The tram stops at Haveneland-West (IJburg, Amsterdam) are positioned along the island’s main transport axis and crossings of that axis with secondary streets of the urban grid.
B.2 Low average distance to stops

The positioning of PT stops/stations and alignment of PT lines has to be configured in such a way that optimal coverage of the urbanized area is achieved.

Figure 9 - The island size of Haveneiland-West (IJburg) is designed for optimal PT-system coverage.

Figure 10 - Weak PT-system coverage is on the primary causes for the limited use of PT within

Figure 11 - The service reach of Carnisselande’s tram system merely covers a small part of the neighborhood, causing a relatively low influence of PT within the neighborhoods modal split behaviour.

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Figure 12 - pt system characteristics (Bach, 1999)
B.3 Sufficient and efficient inter-modal and inter-route transfer possibilities, to create a flexible and diverse transport system

Public transport systems, in particular rail-bound public transport system, are rigid in the way that they do not offer the virtually unlimited freedom of movement that the automobile offers. For the PT system to be able to compete with the automobile, combinations with other transport modes and networks should be realized. This way a large range of destination can be reached through the PT system in an efficient manner.

Furthermore, a multi-optional and multi-directional PT system is able to overcome defects within the network (on can choose another direction or transport line instead of the jammed one).

Figure 12 - Different networks and transport modi should be accessible along the public transport line.

B.4 Adaptability of the network to future travel demand

The success of a PT investment is depending on it’s ability to grow, adapt and evolve properly. The transport system should be able to adapt to future needs, for instance line and service expansion possibilities.

Due to the increased amount of families with 2 work locations and increased labor-mobility (life-time-jobs are no longer a commodity). Families with children need even more flexible transport systems.

It is therefore wishful that within the development plans possibilities for future public transport connections are left open. If a public transport network is properly linked to other (public) transport networks, the network ‘software’ is more easily to adapt, so that different line services and frequencies can be adopted, to meet the actual travel demands.

If a system is able to accommodate different modes of collective transport (tram/metro/lightrail/train), the flexibility of the system is further increased.
C.1 The PT system has to be comfortable, clean, fast, efficient and of a high design quality to create a positive image and provide a high service quality.

To be able to lure people from the car and to increase the loyalty of the current PT system users, the image and functioning of the system should be of a high quality. People will not

C.2 Safe integration of the PT system within the urban environment.

For the image, safety and quality of the public transport system, a safe integration of PT systems within the urban environment is crucial. Accidents should be prevented and social security must be provided along the PT lines and stations. This subject is further explained within the Urban Design chapter (chapter 2) of this booklet.
C. Provide well sheltered PT stations and platforms.

People waiting at PT stops should be able to shelter against elements like wind, rain and sun.

Figure 13 - Shelter from the elements

Figure 14 - Shelter from the elements
2. URBAN DESIGN

Goals and demands for an exploitable public transport line

The urban space has to be developed and designed in such a way that will optimize public transport usage.

Guidelines for an exploitable public transport line

A. Accommodate a sufficient amount of potential users

B. Accommodate a high level of social security and safety

C. Accommodate a high level of public transport system accessibility

D. Create a high quality urban environment
A.1 High amount of mixed functions and facilities within walking distance of PT stops

Create compact and dense areas, with an increased density near facilities and public transport nodes. Around PT nodes, a high diversity of functions should be provided (Cervero and Kockelman, 1997) (Thwaites et al., 2007).

The presence of retail facilities encourage transit commuting for both residents and workers, because people have the possibility to shop while on their way from transit stops to their homes. Research models (Cervero and Kockelman, 1997) suggest that non-personal vehicle commuting increases up to 75% when convenience stores are located within 500 meters of living locations.

A.2 Attractors spread along the entire length of the line

Transport demand and functional charge should be created along the entire length of the PT line instead of merely at both ends. By doing so, the line will be able to attract more potential users, thus increasing the usage of the transport line and liveliness in the areas which are served by the PT system. This increase transport demand and liveliness has a positive influence on the service quality of the line (the service quality can be higher due to economic attractiveness) but also on the urban development of the areas which are served. Areas with a high amount of liveliness are attractive settlement locations for business and facilities (Alonso 1964; Mills 1967; Muth 1969; Hass-Klau & Crampton, 2004).

Good public transport access for the workforce is crucial to most employers. In many cases this may be the deciding factor for where a business will be located. Examples of large companies (e.g. large financial head quarters) are mentioned to be located specifically close to light rail connections (Hass-Klau & Crampton, 2004).

Figure 15 - Mixed functions around stops

Figure 16 - NOT concentrated at start/end stop

Figure 17 - Functions spread along line
A.3 High dwelling density, in particular within the catchment area of PT stops

Graded density: Use intensity should vary in relation to PT access and pedestrian focused areas. (Thwaites et al., 2007)

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*Figure 18* - Functional charge of different PT systems (Bach, 1999)

*Figure 19* - Mixed functions around stops
2. URBAN DESIGN

A.4 Spread daily transport demand, by accommodating functions which attract PT users during the entire day (and not merely at peak hours)

A diverse functional mix should be realized within the catchment areas of PT systems. No large peaks should occur: low-peak hours should be filled with passengers from nearby schools, dwellings and daytime facilities (desk-function-offices, health care, shops etc.) This will generate transport users outside the typical daily working hours. This guarantees *exploitable public transport* and *public safety outside office hours* (Bach & Hansen, 2001).

A.5 Light Rail and distribution of goods during low-peek hours

Light Rail offers a chance for limited distribution of goods within certain areas along the line. Within low-peek hours there is a left-over of transportation capacity on the network, the same can be said about man-hours for the people working for the transport companies.

If a light rail stop is designed as a ‘goods-transfer’ stop to storage containers of shops and companies along the tracks, these stores and companies can be provided with goods without congestion. Personnel not driving the light rail can perform or assist with this task (Bach & Hansen, 2001).

*Figure 20* - Prevent one-way-traffic in peak hours

*Figure 21* - Prevent one-way-traffic in peak hours (Bach & Hansen, 2001).
B.1 ‘Eyes-on-the-street’ and liveliness to create social security at and around PT stops.

PT stops have to be overseeable places so that ‘eyes on the street’ can provide these places with a certain amount of social security. Entrances to blocks and functions focused to the public space combined with proper lighting are crucial aspects to create safe PT spaces.

B.2 Predictable, linear system

Trams are rail bound systems which makes them predictable in terms of motion. The rail and a suiting street profile (which can be used to accentuate the tram line by color or street patterns) help to predict the movement of the tram (CROW, 2007). Intersections with other transport means should be clearly marked and, if necessary, guarded.
2. URBAN DESIGN

C. Accommodate a high level of public transport system accessibility

C.1 High quality (preferably radial) slow traffic routes to pt stops

to accommodate and stimulate slow traffic movement within the urban environment, and also from and to public transport stops.

The share of bicycle within of modal split up to 1600 meters from a train station is approximately the same as within the R=500 m radius. This indicates that extra large residential areas with a safe, direct cycle network encourages environmental friendly mobility (see figure 30) (Bach, 2006).

The city grid shows the pattern of roads and routes leading to a stop. In a more grid-like pattern, the distance to a stop gets bigger on a virtual diagonal line. If at least a part of the pedestrian and cycling routes towards a stop is radial, the usability and reach of a stop will grow bigger.

Important is the consistency of the network and the continuity of linkages. It is not necessary to connect every square to another, but a conscious definition of entrances and continuities within the network.’ (Smit; Van der Hoeven; Van der Spek, 2008)

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Figure 30 - Bicycle share within the modal split remains a constant factor until 1600 meters from the (train) station (Bach, 2006).

Figure 31 - High quality slow traffic routes

Figure 32 - Slow traffic routes in Ypenburg (left) and IJburg (right). Breakthroughs in facades provide direct routes for pedestrians.
C. Accommodate a high level of public transport system accessibility

C.2 High PT stop/station accessibility due to safe feeder routes and crossing to stops

A highly accessible PT system means increased attractiveness of the system. Usage of the PT system will also be more attractive for vulnerable user groups such as children and elderly people. A shift from individual traffic towards more collective traffic can only occur when the transport to and from the stops served by public transport is efficient and comfortable. This means that the urban designer has to design efficient, sheltered and safe bicycle/pedestrian routes to and from stops. Transferring spots with long waiting times, public unfriendly crossings and above all unsafe crossings and transfer points will breach each attempt to lure potential users towards collective transport (B.Bach, 2001)

C.3 Increase amount of bicycle storage at PT stops to enlarge catchment area.

Good and sufficient bicycle storage facilities will stimulate cycling as a feeder mode towards PT systems.

Figure 33 - Station accessibility

Figure 34 - Increase amount of bicycle storage
C.4 Community centers must be served by main streets, traffic should be tamed but not forbidden (Thwaites, 2007)

Service and commercial activities only flourish on streets that, in functional and structural terms, are principal. These streets carry a lot of traffic and are shared by ‘strong’ and ‘vulnerable’ users. Traffic calming techniques should be used to maintain a positive balance between the different types of users.

C.5 Grid like structure

Paradoxically to the preferred radial feeder lines, a grid can easily be adapted to create car-free areas nearby stations or pedestrian areas. The accessibility of these car-free areas from the grid can be opened and closed at certain times.

C.6 300 m reservation around ‘human-pumps’

A 300 meter ‘reservation’ on both sides of a PT line, stations and shops should be made for pedestrian and cycling routes (which should at least partly be radial) to increase the safety and quality of the public space around those ‘human-pumps’.

Figure 35 Tram, automobiles, cyclists and pedestrians ‘sharing’ the same street in IJburg, Amsterdam.

Figure 36 Profile of the Iburglaan with separated traffic lanes.
C. Accommodate a high level of public transport system accessibility

C.8 Public transport systems as the backbone of the neighborhoods transport system

In the design process, early and continues spatial profiles should be reserved and realized for public transport means with stops in the nodal areas. Busses and bicycles (perhaps tram) used as feeder lines for the main public transport line (in most cases a lightrail/subway line running through the city or district core).

Societal advantages of the stam & feederline concept:
- The attracting/appealing aspect which can attract people ‘from the traffic jams’;
- More people will be moved in an environmental friendly way;
- In city centers: more parking space will be vacant for people travelling longer distances, these users on average spend more money.

It is important to give city centers and new urban extensions a central, environmental friendly axis. This is only possible when there is an intense relation between traffic planning/plans and urban planning/plans.

![Figure 37 - Light Rail as the backbone of the transport system](image)

C.9 Transport to and from stops

A shift from individual traffic towards more collective traffic can only occur when the transport to and from the stops served by public transport is efficient and comfortable. This means that the urban designer has to design efficient, sheltered and safe bicycle/pedestrian routes to and from stops.

![Figure 38 - Journey elements (Van Witsen)](image)
2. URBAN DESIGN

C. Accommodate a high level of public transport system accessibility

**C. 10 Positioning of city gates**

Due to the increased spreading of the spatial character of cities people do not walk or cycle towards a city center. When they come by car or public transport, they want to arrive as close as possible to their primary destination. Parking garages functions as city gates for the city (VVPR 2002-2020). The positioning of these city gates is very important for the performance of this center. The increased rent prices for a crowded pedestrian street are a proof for this effect (Dabinett et. al, 1999).

Parking garages and urban transport stops at both ends of shopping corridors/canals could be a good solution for urban centers that are not big enough to support a shopping circle. These city gates should have a large accessibility without transferring.

**C. 11 Shopping canal or shopping circle**

Halfway their walk within the city people have to walk back to their car or PT stop/station. Therefore a shopping circle can be suggested or shopping malls. However smaller cities do not have the capacity to facilitate a double length urban program, while malls do not contribute to the liveliness and interaction of an urban environment and it’s public transport system.

A collective transport system can be a solution. High quality stops need to be developed at both end of the shopping canal. Light rail can facilitate ‘window shopping’ throughout the length of a shopping street (Bach, 2001).

**C.12 Legible PT stop position by clear and logical stop hierarchy**

Figures 39-40
D. Create a high quality urban environment

D.1 Diverse usage of high quality materials
D.2 Diverse and high quality architecture
D.3 High quality urban plints

For ‘usage quality’ and ‘public safety’ outside office hours plints should contain a broad functional mix. There should be an entrance to the upper housing every 40 meters, located directly at the sidewalks.

For generating self-surveillance (eyes-on-the-street), diversity and intimacy to the streetscape. Entrances should be located at the sidewalks (Thwaites et al., 2007).

Figure 41 - Diverse architecture in IJburg

Figure 42 - Diverse usage of materials in IJburg
2. URBAN DESIGN

D.4 Human scale to provide a safe and pleasant environment

Human character of the transport line and surrounding spaces. The human scale and character is important for the quality and identity of the transport line and its surrounding environment.

D.5 Park, water and green areas should be carefully located, shaped, connected and integrated in city life. (Thwaites, 2007)

Due to the ongoing densification of urbanized areas, the scarce free space should be used for high quality green/blue-areas which can be used for recreational purposes.

Figure 44 - Human scale in Amsterdam

Figure 43 - Human scale in Straatsburg

Figure 45 - Open squares around stops (left) and in-building stops (right)

Figure 46 - Interaction with urban environment Straatsburg (left) and IJburg (right)
D. Create a high quality urban environment
3. PT SYSTEM FUNCTIONING (USAGE & SERVICE QUALITY)

Goals and demands for an exploitable public transport line
Accomodate a high level of public transport system service quality.

Guidelines for an exploitable public transport line
A. Provide a high level of on-time performance
B. Provide diverse and efficient inter-modal and inter-route connections
C. Provide the traveller with realtime and easily accessible travel information
D. Accomodate cycling as a feeder mode
A.1 High PT service frequency

Light Rail contributes to the urban ambience and quality when they service at a high frequency (Bach, 1999).

A high service frequency will decrease waiting times at stops and improve the quality of transferring from one transport network/mode to another. A larger amount of freedom (in time and transfer options) will be offered to the users of the system, which means an increase of the quality, flexibility and comfort of use of the network.

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</tbody>
</table>

Figure 47-A high frequency is desired for the quality of the PT service and the on-time performance of the system.

A.2 High speeds at places with a low transport value, low speeds at high transport value places.

A large amount of stops means a decline of a PT-networks average speed. When higher velocities are reached at spaces with a low transport value the network’s overall average speed will increase. A fast network is more attractive because it provides its users with a larger potential reach.

Figure 48 -Variety in speed patterns

A.3 Reach high speeds where it's safe

These high speeds should only be reached at places where it’s safe to do so. The PT-system should be safely implemented within the public space. This can be done by, for example, traffic lights, separate lanes, separation by fences and clear marking of the different traffic streams by difference in pavement color.

Figure 49 -Safety measures to speed up
3. PT SYSTEM FUNCTIONING (USAGE & SERVICE QUALITY)

A.4 Create a positive image right from the start

The public transport mode needs to work flawless from its beginning to avoid creating a negative image which will take long to overcome.

A good marketing campaign by politicians and the public transport sector before, during and after the development of a new light rail line is crucial for the positive image of the line. A positive image is a powerful promoter for land and house prices (Hass-Klau & Crampton, 2004).

A few examples of marketing techniques:

- Classical advertisement emphasizing the social and environmental benefits of PT. But also by presenting PT as a safe, comfortable and money-saving alternative for the car.
- The attractive fare systems (large discount on month-tickets) are an important aspect of most marketing campaigns.
- Combined tickets with entrances to museums, amusement parks and such.
- Spreading public transport magazines, providing the reader with information about future plans, performance characteristics and current developments.
B.1 Create a collaborative network to enable inter-network (International, national, regional, local) and inter-modal (train, metro, bus, car, bicycle, pedestrian) transfer possibilities

If these systems are combined with the car AND with pedestrian and cyclist traffic, total coverage and flexible and diverse mobility patterns can be realized. However one must take into regard that the different modes will compete with each other. In order to truly function like a coherent system, there must be no competition but partnership -> the transport system should be a monopoly, preferably owned by a government or another sort of non-profit organization.

70%-30% rule
30% of the travelers comes from density and functions around the transport line. The other 70% of the user flow is generated by the connectivity of the transport line to other transport networks and the position the transport line in the transport network (Westrik).

B.3 Facilitate inter-route transfer possibilities (A-B-C, B-C-A, C-B-A)

Market parties and travellers have different interests and views on what they consider to be an optimal network structure. The different interests and demands should be aligned as good as possible.

Potential reach

Accessibility is not a quantity to be maximized, the degree of choice is what counts after a satisfying level of accessibility is attained: the so called potential reach (Lynch, 1981).

Figure 50 -Inter-model (left) and Inter-network (right) transfer possibilities.

Figure 51 -Inter-route transfer possibilities (Van Nes, 2002)
3. PT SYSTEM FUNCTIONING (USAGE & SERVICE QUALITY)

C.1 Digital information signs

Provide the traveller with real time and easily accessible travel information

C.2 Optimal ICT integration

To optimize user comfort and efficiency of the transport system. (Zimmerman and Horen, xxx).

Figure 52 - Digital information signs in IJburg

Figure 53 - Integration of the PT network in different ICT applications
D. Inner-vehicle bicycle facilities and bicycle storage facilities at PT stops

To increase the usage of sustainable transport means to and from PT stops and to increase the service area reach of the PT system. Allowing on-board bicycle storage will increase the efficiency of travelling for a large amount of the travellers and so increase the network quality.

*Figure 54 - Bicycle storage on PT vehicle*
Goals and demands for an exploitable public transport line

> Influence model-split behavior towards public transport usage
> Spread daily transport demand

Guidelines for an exploitable public transport line

A. A PT system which meets the mobility demands of its potential users.
B. Optimal integration of the PT system within the urban fabric;
C. Urban planning policy;
D. Spin-off effects beneficial for the urban climate;
E. Market wish vs. designer’s freedom.
A.1 User and stakeholder involvement which enables people to relate to the tram line (or PT system in general) and to see that the system suits the demands of the actual users (desired potential reach, travel patterns).

A well suited and appreciated PT system is likely to increase the percentage of people that will use the PT system (Boelens, 2009).

By means of regulation and policy the government is able to influence spatial planning and create conditions which can lead to mobility reduction and a change in modal-split. Households and companies can react to this by changing their living and work locations and by changing their mode of transportation. It is however important that households and companies are able to influence the (re)development of urban areas so that a design will be generated which actually meets the demands and wishes of the users. Households and companies should not merely react to policy, but they should be involved in the decision making process and the design process (Konings & Kruythoff, 1996).

The car is an individual mode of transport, and the network on which it can be used is infinite but also has a very detailed grain (almost every house has an excite from a street or garage facility). This is not the case with public transport modes. These public transport modes are often rigid and linear and the user (the people travelling) cannot choose whether to go left or right when they want to. Only by combining the different public transport modes, a coherent and covering network can be established, which can compete with the network of the automobile. It should not be a goal to erase the car from the city, the car should be a partner in the network structure as well. A network will only function as a network if the different modes and links in the network work together. Competition between them is disastrous for the efficiency of the transport network system.

Figure 55 - Inter-route transfer possibilities
4. URBAN PLANNING & POLICY

B.1 Collaborative design involving both urban planning and transport design to create sufficient transport demand for the pt system and an optimal integration of the pt system within the urban fabric.

Both extreme ends of designing disciplines are:
- Traffic and Transportation / Grondzaken designs infrastructure. The spatial island in between the infrastructure can be ‘filled in’ by urban and landscape designers;
- Spatial Development (RO) create an utopian vision, with visually challenging shapes and functions.

The collaboration between the different professions and divisions should be improved, so that more durable plans will be realized. There should be more clarity about what party has the leading influence in particular parts of the process. More vulnerable design goals (soft goals) should play an important part on the beginning of the process the other design goals. When the heavy infrastructure is realized, few design freedom is left over for cycling and pedestrian networks.

B.2 Bottom-Up Design (Order) – Soft design goals first

Soft goals should be implemented in the beginning of the design and decision process. Soft goals are livability, recognizability, social safety, social interaction, (environmental) differentiation, influence modal-split to reduce energy consumption, flexibility in time (of both urban and transport design/usage, zoning and density aimed to realized exploitable PT.

An example of bottom-up design:
1. Localize busy spots (centers, stations, stops)
2. Determine spaces (squares, long lines, vistas)
3. Configure areas (parks, green corridors)
4. Shape the bicycle and pedestrian network (radials, line density, line distance)
5. Choose collective transport
6. Situate other ‘human-pumps’ (parking garages, theaters)
7. Design car network (on the remaining 90% ‘blank’ space, grid, tangential, axial ...) (Bach, 2001).
B. Optimal integration of the PT system within the urban fabric

*Figure 56 - Example of a bottom-up design sequence*
C1 Mixed use and users

To initiate people to move, sufficient housing meeting the variety of demands and levels of ambition of potential inhabitants needs to be realized close to working places. This is also important to be able to develop a healthy mix of housing-career opportunities and different population groups (Konings & Kruythoff, 1996)

C.2 High densities within urban expansion areas

Urban expansion areas with a high density have lower car usage levels then low density areas, and a relatively high level of bicycle, pedestrian and public transport movement. Considering the fact that urban expansion areas will play a considerable part in solving the future demand for new housing, the density in which these urban expansion areas are composed should be an important point to consider.

C.3 Flexible and adaptable urban design and real estate

Due to its lasting impact the urban design should be adaptable to future user demands, like densification. The real estate should be adaptable to future uses as well. Not only in terms of housing but also in terms of facilities.

C.4 Decrease physical & spatial boundaries

(River, high way, train tracks, hills) Boundaries restrain cycling movement and enlarge car and bus movement. They also have a distance-enlarging effect.

Decrease barriers by creating a functional and spatial connection. This can be done by developing along the public transport system but also in combination with slow traffic routes and motorized road based transport modes.

Figure 57 - (source: HKB Architecten) Physical and functional breaching of spatial barriers.
D.1 Stimulating the pt system’s economic spin-off effects

It is hard to guarantee the economic push that light-rail provides to mid-sized regional cores. Positive effects are found, yet they are moderate and often not optimal due to various boundaries (Dabinett et al., 1999). However these effects can be stimulated if:

- The entire track needs to be completed before vehicles can run, it is therefore impossible to ‘get stuck’ with a half-finished product;
- Investors know that a lot of money has been invested to realize a stop, and ass money to this out of the money-makes-money principle. This advantage should be used within the urban planning process;
- additional analysis and monitoring of the actual impact of UPT investment is being performed. Next this data should be used to create models and theories with which can help urban and transport planners to create more meaningful and more efficient urban and UPT plans.
- Urban (compact city) design principles should be researched, developed and implemented to increase the probability of use of public transport line investment.
- there is sufficient public sector push: the public sector should have more influence on land use development along the line and the ability to trigger development. Without these trigger developments very little development occurs along public transport lines.
- a positive image is attained through promotion to attract investors and to gain user confidence.
- transport investments follow (potential) developments, and not the other way around.
- a more cohesive approach towards local policy making with increased stakeholder involvement is used.

D.1 Early availability of high quality pt

The pt system should be operational when a new urban development (in which the new pt system is situated) is developing, and not when it is finished or later. Early availability of a high quality and well functioning pt system is crucial for the likeliness of use of this system. Influencing mobility behavior towards collaborative transport (pt) means is a lot harder when people have already purchased one or two cars. People are ‘forced’ to buy cars if there is no (pt) alternative when they move into the neighbourhood and no alternative is provided to them which can accommodate in their daily mobility patterns. Once people own a car and are used to their mobility patterns it is very hard to ‘lure’ them back into the pt system.
4. URBAN PLANNING & POLICY

E. Market wish vs. designer’s freedom

E.1 Market influence suppressing the designer’s influence

If each house should have green on both sides of the house, the density and activity diversity and variation within a neighborhood is low. The designer is then lacking tools to bundle sufficient potential passengers with the catchment area of PT stops.

E.2 Transport investment follows (potential) development

The proposed alignment must go where development is taking place or will take place and not where it is cheap to build a light rail line. Cooperation with private developers as well as with city and regional planning agencies is crucial when choosing a new alignment (Hass-Klau & Crampton).

E.3 Public sector push and influence

The public sector should have more influence on land use development along the and have the ability to trigger initial developments. Without these trigger developments very little development occurs along new PT investments (Hass-Klau & Crampton, 2004; Dabinett et al., 1999).

Figure 58 (left) ‘market-wish’ of uniform quality and density (right) an example of design freedom in both public transport trajectory as in urban programming to combine density and PT exploitability.
E.4 Choose a PT system that actually meets the needs and demands of its potential users (stakeholder involvement, system that meets the objectives for urban development)

Often decisions concerning public transport investment projects are based on wrong information. Often the effects of public transport investment are overestimated, because of the lack of knowledge about these possible effects. The impact on ridership is easy to check, but the evidence of the effects on other fields of development is very thin. The current political decision system often leads to UPT investments that do not suit the demands and needs of the actual stakeholders. There is a need for new models which includes more stakeholder involvement. (Mackett & Edwards, 1997)
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