

AN URBANISM ORIENTED TOWARDS RAIL IN GERMANY AND FRANCE: SELECTED FINDINGS OF THE BAHN.VILLE PROJECT

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ABSTRACT

Transit oriented development has become a topic of high interest in recent years both for researchers and for practitioners. The French-German project Bahn.Ville 2 has the objective of testing the principles of an urbanism orientated towards rail by means of an implementation on two regional railway lines (St. Etienne – Firminy, Lyon metropolitan region as well as Taunusbahn, Frankfurt/Rhein-Main region). This paper is presenting selected results of this implementation on

- innovations in regional planning instruments in France (Schéma de Cohérence Territorial) and Germany (Regionaler Flächennutzungsplan) and their respective impact on a better integration of land-use and transport,
- specific observations on neighbourhood mobility in the station surrounding and propositions for high quality walking environments as well as
- the potential of an observation tool designed to support public intervention on land-use and transport around stations.

The results constitute three original contributions of the Bahn.Ville 2 project supporting sustainable mobility by an urbanism orientated towards rail.

Keywords: transit-oriented development, regional planning instruments, local neighbourhood mobility, processes of implementation

BACKGROUND

Bahn.Ville - a French-German collaboration on rail-oriented urban development

Designing or redesigning cities around rail has become a topic of high interest both for researchers and for practitioners in recent years.

A major French-German action research project has been run in order to develop successful strategies in integrating land-use and transport around attractive regional railways. The Bahn.Ville program in a first phase from 2001 to 2004 has analysed the various interactions of railway supply ("Bahn") and urban development ("Ville") around the railway stations (".") by best-practice analysis and broad empirical investigations on four case studies: the regional rail network of Strasbourg and the Nantes - St. Nazaire link in France as well as the "Voreifelbahn" (Bonn - Euskirchen) and the "Bodensee-Oberschwaben-Bahn" (Friedrichshafen – Ravensburg – Aulendorf) in Germany (see Wulfhorst et al, 2002). The findings and general recommendations on rail-oriented development and intermodality have been summed up in a French-German guideline (Bahn.Ville, 2005). All working papers and communications of this first phase are presented at the project website www.bahn-ville.net.

From the beginning of the research and development project, co-financed within the DEUFRAKO program by the German and French ministries responsible for mobility research (see www.deufrako.org), a second phase of experimental implementation of innovative strategies and measures on two reference sites has been set up.

After a selection process, the Firminy – St. Etienne rail line in the Lyon metropolitan area (Region Rh one-Alpes) as well as the Taunusbahn (Bad Homburg – Brandoberndorf) in the Frankfurt/Rhine-Main region (Land Hessen) turned out to be suitable sites for experimenting and testing the various aspects of rail-oriented urban development.

The two reference sites each are existing railway axis in the greater urban region, but they are contrasting in many contextual conditions. While the Taunusbahn is a 35 km railway line in a mainly rural area in the north of the Frankfurt region (held by the county and operated by a regional railway operator), the St. Etienne-Firminy line is a rather short and partly urban stretch of a TER axis. In the Frankfurt region demographic trends still show population growth with a lot of families moving to the outbound destinations; the St. Etienne region is tackling some challenges in economic transition from the industrial sector to services within the Lyon metropolitan region. St. Etienne as well as Bad Homburg is showing a high density of jobs in the station surrounding, so that these stations serve both as commuter destination and as a hub to link the railway axis towards the centre of the metropolitan region (Lyon, Frankfurt).

One of the key ideas of the Bahn.Ville 2 project is to demonstrate the success factors of rail-oriented development on these two reference sites in order to make them transferable to other regions throughout Europe.

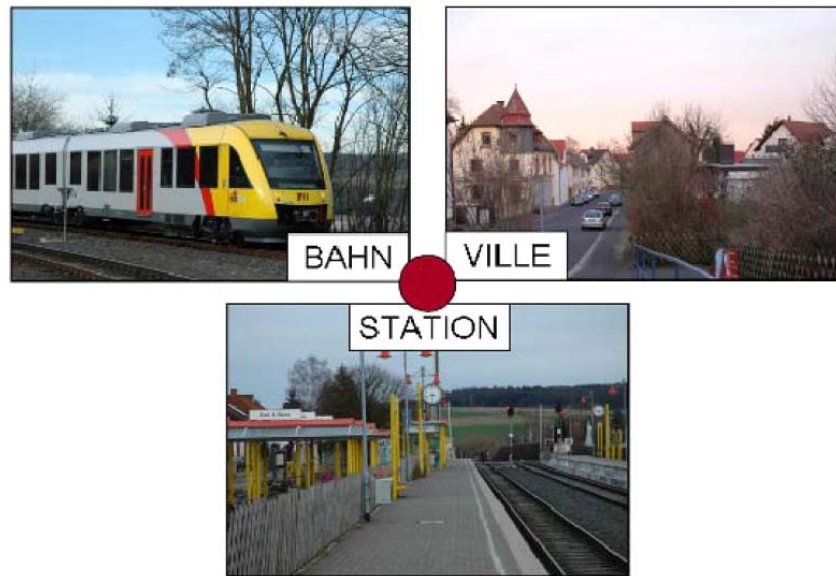


Figure 1 – the “Bahn.Ville approach” – integrating regional railway supply with station development and transit oriented development (photo credits: Pretsch, 2007)

Objectives of the paper

If the principles of a rail-orientated urbanism are rather well established in the academic domain, their implementation in regional and local decision making processes, the urban fabric and intermodal transport services with positive feedback on mobility behaviour remains a difficult task. Strategic planning tools often integrate such principles, as we will see. Nevertheless during the implementation phase these principle are not always respected and the various domains of intervention on the interfaces of urbanism and transport often remain too segmented (see Vuchic, 1999; Kaufman 2003).

Integrated planning and implementation at the regional scale and at local design both constitute major levels of action for sustainable mobility. This is why we have investigated the following two levels within the Bahn.Ville project:

- a) The level of the urban region, to be taken in account for strategies in integrating the different modes of transportation in order to improve the concurrence situation between rail and road supply as well as in order to promote the regional railway system as the backbone for territorial development
- b) The level of the urban neighbourhood as the major local planning level in order to foster transit-oriented development of housing, business locations and services as well as to improve the conditions for slow modes (especially walking and cycling) in the station surrounding. Two sectors will be studied: neighbourhood mobility and land management.

The purpose of this paper, in consequence, is to present selected findings of the Bahn.Ville research program conducted between 2007 and 2010 in France and Germany, with a focus on processes and operational tools on the above mentioned levels of action.

Firstly, the results of comparing the innovative planning instruments on the level of urban regions in France (SCOT - Sch  ma de Coh  rance Territoriale) and Germany (RegFNP - Regionaler Fl  chennutzungsplan) will show the potential, shortcomings and perspectives of regional planning towards rail-oriented development.

Then, knowledge and experience gathered in the field of neighbourhood mobility will be presented, based on detailed qualitative surveys accompanying rail users on their way from and to the station as well as on results from workshops with school children and planning experts. Criteria for high quality pedestrian networks in the station area are set up in a common French-German conclusion.

Finally, the implementation of a land-use observatory is analysed enabling local public bodies to be aware of real estate transactions, so that they can decide to make use of their pre-emption rights within a given perimeter in order to invest in strategic urban functions or to support the development of footpaths within the station area.

Further aspects of the Bahn.Ville project, like the methods of accessibility modelling or the mobility management strategies on specific target groups (non-users, elderly people or new residents) will be discussed in other related WCTR papers (e.g. Stoiber, Mercier, 2010) as well as on the closing conference (to be held 01/02 July in the Frankfurt region, cf. www.bahn-ville2.de; information on the French project part is available on www.bahn-ville2.fr).

Finally, conclusions and perspectives will be drawn on the potential of rail-oriented development towards sustainable mobility.

REGIONAL PLANNING INSTRUMENTS FOR A BETTER INTEGRATION OF LAND-USE AND TRANSPORT

A comparison on new tools in France and Germany

Firstly, we present a comparison of new regional planning tools in Germany ("*Regionaler Fl achennutzungsplan*", RegFNP) and France ("*Sch ema de coherence territorial*", SCOT) and their respective ability to foster and support the principles of the development of a rail-oriented city-region.

Both instruments meet the concerns of structural changes impacting spatial development and transport planning by inter-municipal cooperation. However, the chosen planning tools differ extremely in form, process and implementation issues.

Whereas the German specifications are precise in determination of processes, plan appearance, scale and contents carried out by a planning association, the French approach is a more flexible tool oriented on a framework of guidelines, enabling strategic cooperation but giving the responsibility of implementation to the municipalities themselves.

Implications on the respective processes on developing integrated land-use and transport measures will be discussed. The analysis of the two planning instruments is referring to the specific instruments of the chosen reference sites, which are in Germany the RegFNP in the Frankfurt/Rhein-Main region and in France the SCOT Sud-Loire in the St. Etienne region. The results have been deducted from literature analysis (e.g. CERTU, 2008; Altenburger et al., 2007), comparisons of the respective planning documents and processes as well as on deepened expert interviews in both regions.

Key aspects of comparison

Legislative background and general framework conditions

Already the given legislative background is marking a major distinction between the French and the German inter-municipal planning instrument. Whereas in France, since the "loi SRU" ("*loi relative   la solidarit  et au renouvellement urbains*"), dating from 2001 any agglomeration of more than 50.000 inhabitants needs to set up a SCOT (mostly as a completely new strategy, undertaken in more than 200 agglomerations), in Germany only two regions have experimented the RegFNP on the base of a review of the Federal Regional Planning Act (dating from 1998). This regulation is giving the option of replacing two formal planning instruments by one common document. The very low number of implementations of

this option in Germany mainly is due to the fact that local municipalities have to hand over part of their original local planning competence to regional bodies.

The SCOT Sud-Loire studied in detail has been set up from 2004 (set-up decision) to 2009 (approval). It has been worked out technically by the regional planning agency and judged politically by a special purpose association, that is gathering groups of 117 municipalities overall. The RegFNP of the region Rhein-Main regroups 75 municipalities and has been set up since 2003; it currently shows a draft status and should be approved by the ministry of Hesse by the end of 2010; complicated stakeholder interaction due to the two-fold planning document is slowing down the process.

Political power

The political power of the respective municipal councils or majors on the local level as well as their involvement in the regional planning process, have decisive influence in France and Germany. However, this effect comes to scene on different stages of the planning process.

Whereas in the RegFNP Rhein-Main politic intervention from single municipalities is strong in the development of the plan, for example with reference to the decisions for land-use rights of particular plots or areas, the local French politicians are not individually involved in the process of elaborating a SCOT, but only by represented by groups of municipalities. However, when German municipalities are bound to regional prescriptions in their local planning decisions, French majors still have a higher degree of flexibility.

This is mainly due to the fact, that the German RegFNP replaces the preparatory land-use plan ("Fl  chennutzungsplan") which formulates the specific land-use rights on the municipality level and frames the binding land-use plan ("Bebauungsplan"). The French SCOT rather represents an integrated regional strategy, that afterwards is translated to local urban plans for each municipality (PLU plan local d'urbanisme).

Documents and scales

In Germany, the maps of the RegFNP are the only binding documents for the involved municipalities and by that the core element of the instrument. Contents and appearance are regulated by legal prescriptions. By that, the RegFNP gives the permitted mix of land-use for exact plots and these formal indications should not leave any space for interpretation on the local level. However, compared to the initial scale of classical FNP (1:10.000) the RegFNP indications at a scale of 1:50.000 might cause some problems in fulfilling the expected accuracy (cf. figure 1).

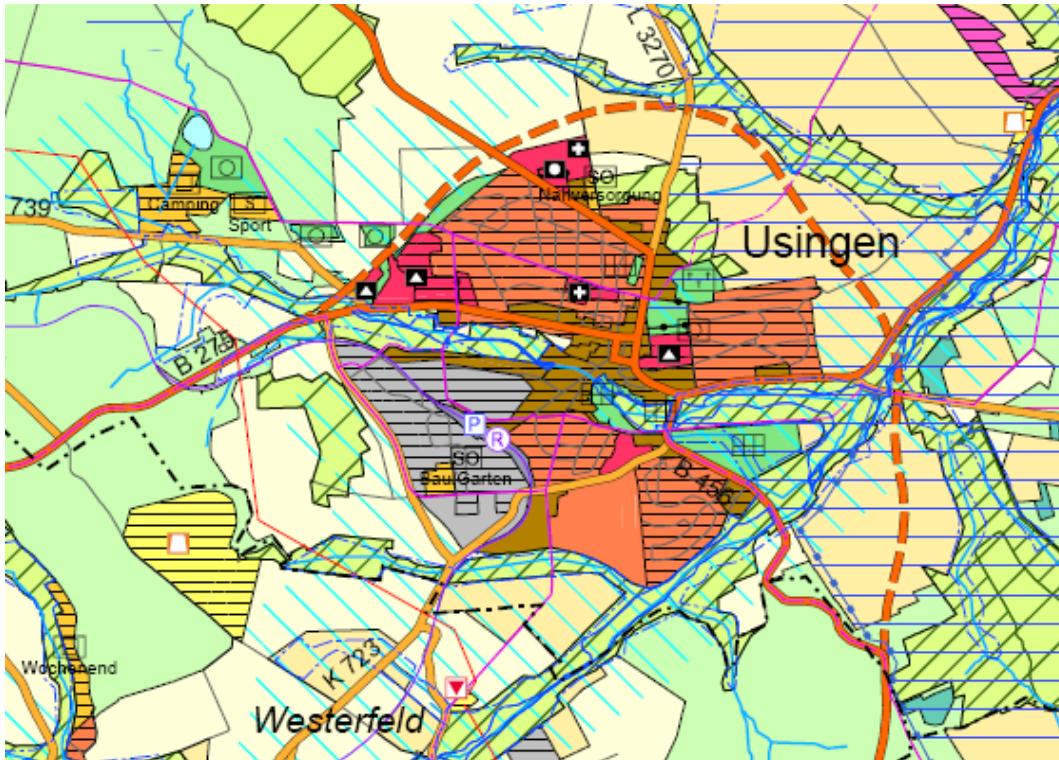


Figure 2: Level of detail in land-use functions indicated by the RegFNP
(Source: Planungsverband, 2009)

Compared to the German RegFNP, the maps of a SCOT remain symbolical. As they are not legally binding, they rather represent illustrative strategies. It is the text that is giving the key orientations of the instrument, based upon a spatial analysis and a set of political targets. The political targets often are transposed consequently to clear text formulations, but as the missing regulations lease to a large variety of SCOTs concerning the level of detail and quality.

Even if the level of detail in a SCOT in general is much lower than within the RegFNP, the SCOT Sud-Loire is providing a specifically interesting instrument in order to frame local settlement development. A “constructible envelope” is indicating a rather cloudy area for future settlement developments (cf. grey zones in figure 2), but within this zone a maximum hectar-contingent is determined for groups of municipalities as well as a minimum urban density which has to be realised, depending on the level of centrality of the municipality.

That means that on the one hand, negotiation on redistribution of the hectar-contingent between municipalities takes part later on the local level, but that on the other hand, urban density is introduced as a major parameter already on the regional level (no indication of density in the German RegFNP).

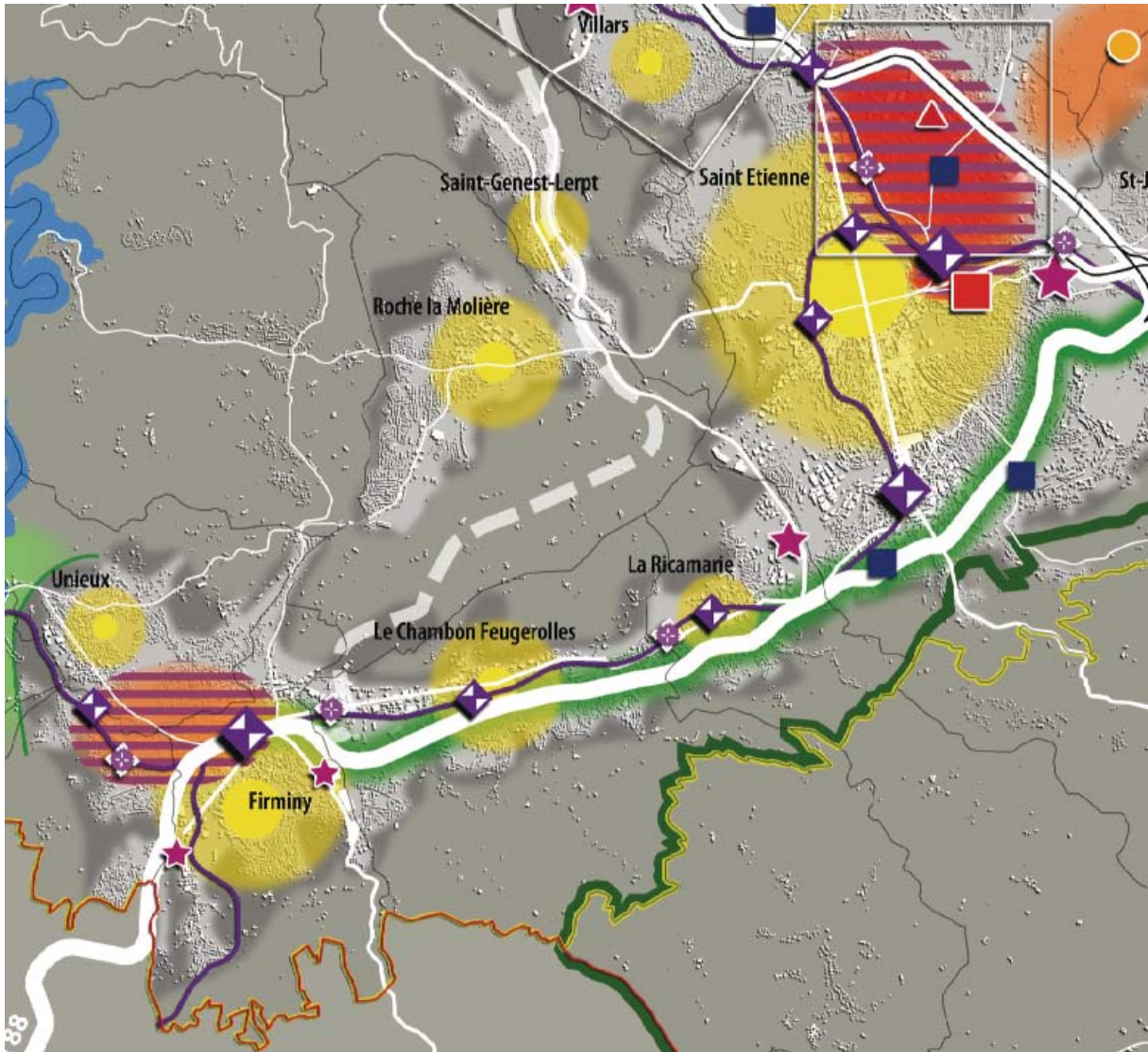


Figure 3: Spatial development orientations given by the SCOT Sud Loire (Source: www.scot-sudloire.fr)

Orientation towards the Bahn.Ville objectives

Within the planning process of the RegFNP Rhein-Main the objective of concentrating settlement development on public transport axis has been weakened by political decisions to a simple orientation towards important transport axis (no focus on public transport). Nevertheless about 50% of all new settlement areas are foreseen within a 1 km catchment around railway stations (shown by a thematic map within the official documents).

In the French SCOT the above-mentioned strategy of hectare-contingents and minimum densities is leading to an allocation of about 90% of the population growth to central places well deserved by public transport. Public transportation supply is considered as a major factor in determining centrality of urban places. Urban functions and transport qualities are defined for specific stations addressing also urban densities in the station surrounding.

Intermediate conclusions

The comparison of regional planning tools in Germany (RegFNP) and France (SCOT) shows their respective ability to foster and support the principles of the development of a rail orientated city-region.

Both instruments meet the concerns of integrating spatial development and transport planning on the level of urban regions. However the chosen planning tools differ extremely in form and process of implementation. Whereas the German specifications are precise in plan appearance, scale and contents, leaving only limited decision on the local level, the French approach is a more flexible tool oriented on a framework of guidelines and strategic recommendations, but giving the responsibility of implementation to the municipalities themselves.

The contribution of RegFNP and SCOT to the "Bahn.Ville approach" is first of all the deeper understanding and coordination of inter-municipal planning, considering regional issues in local land-use decisions as well as references to the railway supply concerning the allocation of land-use functions and urban densities

German regional land-use planning can learn from the more strategic, flexible French approach how to focus on pro-active development, dialogue and communication. French SCOTs will have to be monitored consequently so that local planning documents really relate to the objectives and indications set out on the regional level.

NEIGHBOURHOOD MOBILITY

Linking proximity and distance by a walk to the railway station

In both reference sites studied, neighbourhood mobility has turned out to be a key element in supporting rail-oriented development. High quality in planning for non-motorised transport modes, a vitality and diversity of urban functions in the station surrounding as well urban design principles are of importance to foster the "Bahn.Ville approach".

There seems to be a double-faced objective to link the fast railway system with the slow modes in the direct surrounding. A controversy could be pointed out by this couple of proximity and distance dealing with local attractiveness as well as with short distances and soft modes on the one hand, linked to the fast rail track by the station hubs. But attractive regional railway systems typically show their spatial impacts within the close surrounding of stations. In general, up to 50% of all train users come on foot or by bike to the station. Especially in France, the pedestrian access to the station is about to be rediscovered.

In addition to the regional approaches we have seen before, the local level therefore is a second important level of analysis and action for transit-oriented development. This is why within this paper we focus on the intermodal quality between the railway station and the pedestrian access; other links to Park-and-Ride services or within public transport / para-transit services have been studied as well.

Major investigations have been realised in the French and German case-study on user's perceptions by observations, interviews and workshops with frequent users. Some results and recommendations are presented in the following

"Luxurious" footpaths in France

Methodological approach

Based on the French case-study, one of the objectives concerning neighbourhood mobility is to draw a territorial analysis of certain urban spaces, considered here from a very specific point of view: designing urban spaces in order to foster pedestrian access towards railway stations.

Two complementary approaches were implemented in this diagnostic based on investigations in Carnot and Le Clapier station surroundings in Saint-Etienne:

- a) The point of view of the pedestrians themselves as daily users, who walk through these urban spaces regularly and who therefore are supposed to have an important

empirical knowledge and experience concerning “their” footpath. In order to highlight this specific, tacit knowledge, a survey was conducted by questionnaires including open questions on the perceptions users have during their walk to/from the station.

- b) The point of view of an expert (researcher in urbanism-architecture), who previously didn't know the sites, but who is supposed to be able to formulate an opinion as a conclusion of his own observations on the footpaths covered by all persons questioned during the first approach.

In order to draw conclusions from these two points of view, one single “framework of reference” has been set up as a support for both the elaboration of the questionnaires (first approach) and the “observations grid” used by the expert (second approach). This common framework is based upon a pre-existing “spatial analysis matrix” (Stransky, 2006). Besides the diagnostic itself, the purpose of this methodology is to lead to specific guidelines for improving the attractiveness of the railway station.

Quality as a basic requirement for attractiveness

The pre-assumption of the study is that such attractiveness depends – not only, but also – on the quality of the footpath leading towards the station. In other terms, we suppose that a person will be (strongly?) in favour of using the railway system if the walking conditions offered to get to (and from) the station are “luxurious”. We use this term – which may seem rather excessive – because we are seeking the competition to the individual car; and luxury refers to one of the principle reasons for the predominance of the personal car. However, luxury obviously – as a result of our observations – doesn't have the same significance for the car driver and for the pedestrian. From the point of view of the latter, it refers to what we consider as being the basic properties of a correctly designed footpath, ideally all along the trip, but in any case (imperatively) on its terminal part (including the immediate surroundings of the station and the station itself).

Criteria for satisfactory walking conditions

Basic aspirations of a user during his walk to/from the station are, *as a minimum*, to have the possibility to move in a nice environment, without interruptions, obstacles, detours or clashes, in peace and without any danger, walking along services and shops useful for him, towards a destination (the station) clearly identifiable and which can be easily spotted from a distance.

In consequence, five basic criteria have been dressed:

1. *Atmosphere*: « in a nice environment »
2. *Fluidity*: « without interruptions, obstacles, detours or clashes »
3. *Security (and safety)*: « in peace and without any danger »
4. *Services (offer)*: « walking along services and shops useful for him »
5. *Readability*: « towards a destination (the station) clearly identifiable and which can be easily spotted from a distance ».

The results of the observation *in situ* – case studies investigations based on the spatial analysis matrix mentioned before – show that in terms of « territorial deficiencies » as well as of « territorial assets », a « minimum degree of luxury » can be obtained, if all of these five criteria are reasonably fulfilled. For instance, having the possibility to walk in an environment perceived (visually, auditory, olfactory,...) as pleasant (first criterion) may contribute – as well as each of the four other criteria – to make a car user change his travel mode, at least for accessing the railway station.

But *a contrario*, a deficiency relative to only *one* among these criteria is, according to this hypothesis, sufficient to make a footpath inadequate for the purpose of a « rail oriented urbanism ». Therefore, the five criteria directly lead to a proposal of five « planning principles », which consist in correcting (by different means) every severe deficiency and in taking advantage of every asset, both in terms of atmosphere, fluidity, security, service offer *and* readability.

Consequences for the case-study application

The territorial diagnostic of the specific case-study in the St. Etienne region leads to recommendations that may roughly be summed up as follows:

- At Carnot, the main deficiencies are relative to the station itself (architecture, absence of readability...) and its immediate surrounding (lack of maintenance, « urban cuts »,...), the main assets are found within the spaces of the footpaths (atmosphere, services, « urbanity »,...). The recommendations consist in several proposals for a creation of a « rail station square », grouping and facilitating every modal connections (tram, bus, bicycle, train); spatial solutions to limit « urban cuts » between the station and its environment; architectural solutions to make the station more « readable »; a research of complementarities between services « near » the station and those encountered on the footpaths.
- At Le Clapier, the situation appears, to a certain extent, as opposite to the former one: the main problems concern the footpaths (principally near the station: lack of services, of fluidity, of security,...), the main assets are relative to the station itself (architecture, readability, ...). The recommendations consist in several proposals for taking advantage of architectural assets of the station by correcting its deficiencies in terms of lack of services as well as completing the excellent existing visual relation between « the station » and « the city » by improving the « physical » relation (fluidity, security,...).

These two cases show the implementation of the basic criteria on quite contrasted local contexts. The results prove that, assuming an equivalent methodological approach, application on other stations areas, elsewhere, can be conducted.

Concept development in German reference site

Mismatching of settlement structures and railway station locations

Along the Taunusbahn – as in many regional railway corridors – the location of railway stations doesn't always match with the most important destinations of the train user (schools, jobs, shopping/leisure destinations, ...). The municipalities along the line therefore are asked to develop successful strategies in improving the interconnection between the urban locations and the station – especially in non-motorised transportation.

Four municipalities within the German Bahn.Ville project have agreed to develop integrated neighbourhood mobility concepts with respect to the Taunusbahn as a backbone of the regional corridor. The potentials and challenges from these case-studies are assessed in order to dress up general conclusions and to give recommendations reaching beyond the local application.

The assessment of strategies can rely on a very detailed accessibility measurement and visualisation, providing network based travel times in walking and cycling (see Mercier/Stoiber 2010 for further details). It would be interesting to integrate to these accessibility measurements the level of quality as an important, qualitative perception factor.

Also, in the German case study investigations on user's perception have been implemented, analysed and taken into account for sustainability estimates.

User participation in Usingen

Usingen is one of the locations, where specific concepts and processes have been developed within the Bahn.Ville project in order to improve the situation for non-motorised trips in the station surrounding.

Firstly, a group of school kids has been invited to a workshop in order to point out the daily observations, assets and shortcomings: Dangerous crossings as well as too narrow footpaths towards the station have been major complaints. Secondly, in cooperation with a local consultancy and manifold local stakeholders, a first concept scheme has been elaborated (see figure 4). A key proposition is to improve the quality of the station square – not only as a transport hub with local busses, but also as an attractive urban location enabling intuitive orientation by improving the readability of the urban landscape.

The Bahn.Ville project also has contributed to the revival of the discussion on a bridge project over the rail site in order to link a major activity zone not well connected today (also

for safety reasons). Accessibility measurement and evaluation are well suited to that issue, also in order to judge on the spatial impacts and the potential ridership.

As a result, a framework program for local policy decisions and implementation is developed.

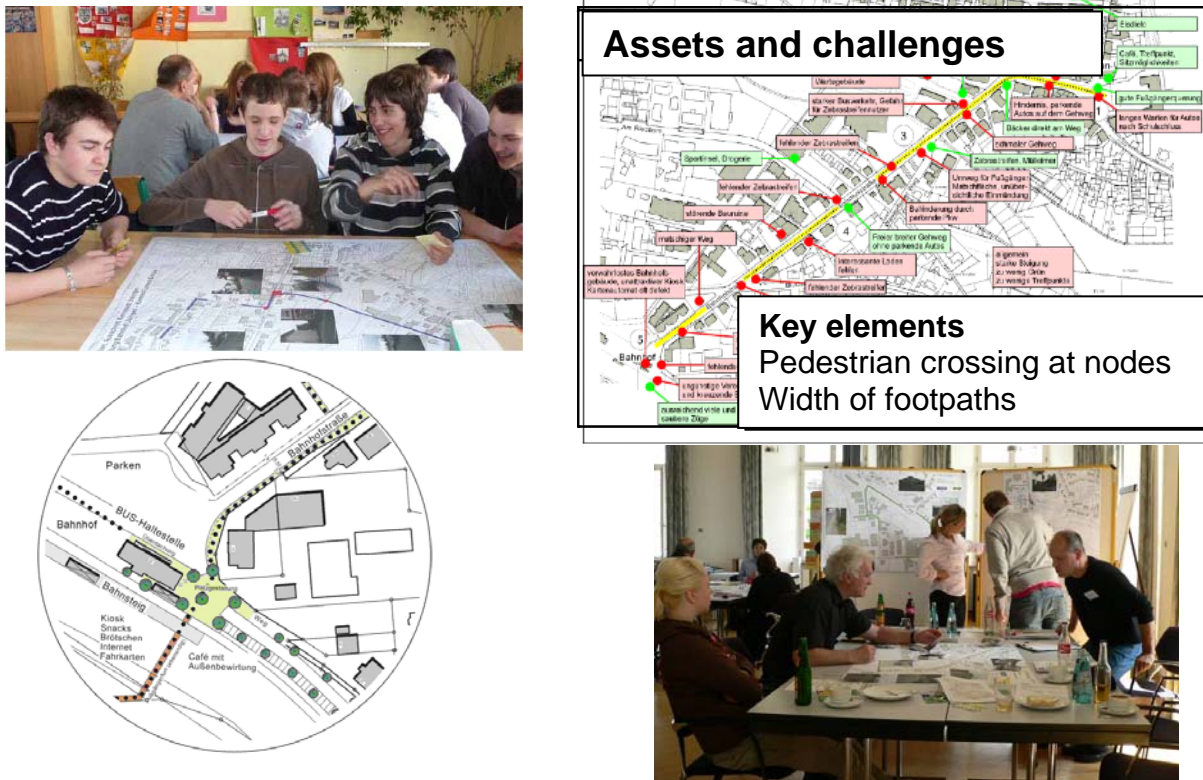


Figure 4: Citizen's Participation and expert workshops help to define strategic elements of neighbourhood mobility concepts (Source/Photos: Pretsch 2009)

French-German conclusions

The investigations in both case-studies have shown a high consistency in major issues for high quality neighbourhood mobility. As a common result, it can be stated that pedestrians need continuity in their walking and prefer animated locations. The five criteria dressed from the French observations (Atmosphere, Fluidity, Security, Service and Readability) are confirmed by the German analysis. They all have to be met. If one of the 5 criteria is not fulfilled, pedestrians won't feel comfortable and probably won't walk to the station but will favour other means of transportation. The result of the surveys done in German municipalities highlights that if one single section of the pedestrian route has a bad image it gives a negative connotation to the whole route. Reciprocally a positive perception of one single section does not lead to a positive perception of the whole route.

In the aim of the generalization of the results, some planning principles can be deduced and confirmed, like

- Provide direct access and reduce dead-ends at the station by stations of 360 degrees,
- Animate public spaces by urban functions to make them attractive,
- Consider simple measures to eliminate conflicts all along the way.

LAND-USE OBSERVATORY

A joint observation of land and transport

After having investigated the issue of urban design in relation with soft mobility to the station, we will focus on a management of land respecting the principles of a rail oriented urbanism. To favor the coordination between territorial levels, between sectors of intervention and between all the key actors involved we have proposed to implement an observation tool on land and transport. This tool is built to be used by public authorities in a decision making context. The tool takes the form of a joint observation system of land-use and transport with specific indicators in each domain and some indicators mixing the two.

From a practical point of view, the implementation of an observation system, associating several actors, producers and users of data, is preferable to an isolated observatory. Observation of these two domains supposes sharing data.

Beyond the basic information that any public actor manages to define its own strategy, there is room for setting up shared observation tools that allow for mutualisation of observation means and for the development of a common language between partners that will constitute the base for their common investigations and diagnostics (Comby, 2004).

An observation system must also be associated with a strong political drive (to guarantee its sustainability), with precise and realistic objectives (adequacy between aims and available means), with up to date and updatable data (a static and not evolving information proves to be hardly usable and quickly erroneous), with relevant territory definition and spatial scales of observation.

The joint land and transport observation system must comply with these principles and fill in three main objectives. It aims at:

- informing the actors in the domains of land management and transport of the situation on the territory;
- allowing for the evolution of the urban projects around stations through interaction between the various fields of competence involved by transport and land use;
- alerting the actors of urban planning of the occurrence of possibilities for evolution of land use.

The main objective is to reveal and to analyse the potential for use development in relation with urban and railway developments.

This can allow for the identification of land opportunities to support urban renewal. It is then possible to oppose the commonly accepted idea that "the peri-urban expansion is an unavoidable phenomenon and the urban planning (urbanism) is impotent when confronted to such a blind roller" (Kaufmann and Jemelin, 2003, p. 330).

Facing the present issues of urban sustainable development and urban renewal, a possible way resides in the development of a railway orientated urbanism. But in order to favour the public transport over cars, it is not sufficient to only increase the transport supply, but an action towards the limitation of the surface dedicated to cars is necessary, through a reduction of car parks for instance. The idea is to oppose the "vicious circle where urban growth is associated with the road network that reinforces the use of automobile. This utilisation is then rooted in the way of life and leads investors and households to favour locations easily reachable by car" (ibid, 1)

To obtain sound results it is necessary to support the consistency of public transport supply, of the management of road accessibility and of the articulation between urbanisation and the development of public transport (Kaufmann et Jemelin, 2003). To deal with these issues, a joint land and transport observation is necessary.

Establishing perimeters for observation

For a relevant observation it is first of all necessary to define adequate observation perimeters. In the Bahn.Ville approach two perimeters were established:

- A buffer zone: a disk centred on the station with a fixed radius. It allows to compute the maximum theoretical potential accessible land (with a distance as the crow flies and a given speed)
- An isochrone: a perimeter based on network distance that matches the reality of mobility constraints (computation based on the layout of the network and a mean speed). This perimeter permits to determine the really accessible land.

The reference points for these two perimeters are the railway stations. From these two methods two perimeter are built: a pedestrians perimeter and a public transport perimeter, each based on a distance, a mean speed and a reference duration:

- A pedestrian speed: 5 km/h which corresponds to someone walking rapidly towards the station on a footpath he/she knows well and use to practise.
- A public transport speed: a mean speed of 15 to 20 km/h according to the urban fabric (respectively dense and peripheral).
- A duration: 10 minutes is the most frequent duration for egress trips to the station whatever the transport mode.

When implemented the method gives the following figures:

- A walkable perimeter of 800 meters around stations (the distance travelled in 10 minutes at 5 km/h gives 833 meters)
- A public transport perimeter of 2,5 km in the dense urban fabric.

The buffer zones are determined according to these principles. The public transport isochrones are based on a duration of 15 minutes to introduce the additional walking time and mean waiting time for the public transport vehicle. It must be noticed that computation concerning public transport are based on timetable information¹.

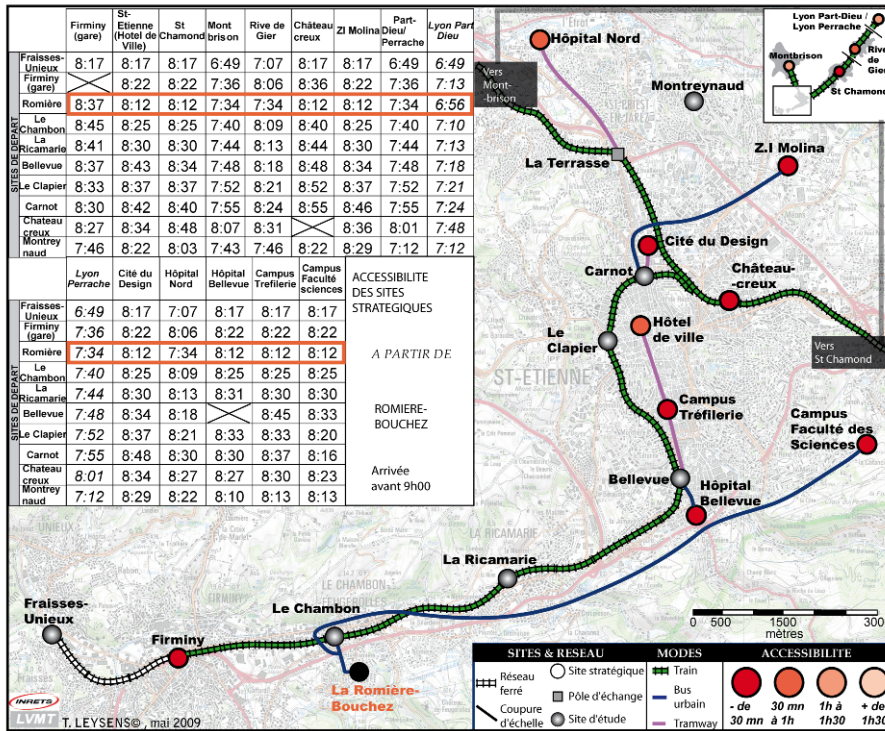


Figure 5: Timetable accessibility measure from the area of La Romière to strategic locations in the urban region of St-Etienne. Realisation: T. Leysens, 2009

The map shows the accessibility (timetable, path and transport modes) to strategic sites (employment sites, study sites, commercial poles, etc.) from an area subject to urban renewal policy, the area of La Romière Bouchez, located in the commune of Le Chambon on the St-Etienne-Firminy railway line. The measure considers an arrival before 9h00 to all strategic sites. The map depicts the transport modes and the paths. In addition a table gives all the departure times from La Romière and from a series of sites located at proximity of Le Chambon in order to develop a comparison.

¹ These computation are based on shortest path algorithm with timetables implemented in a GIS-transport software: MapNod, available for downloading at <http://mapnod.free.fr/>

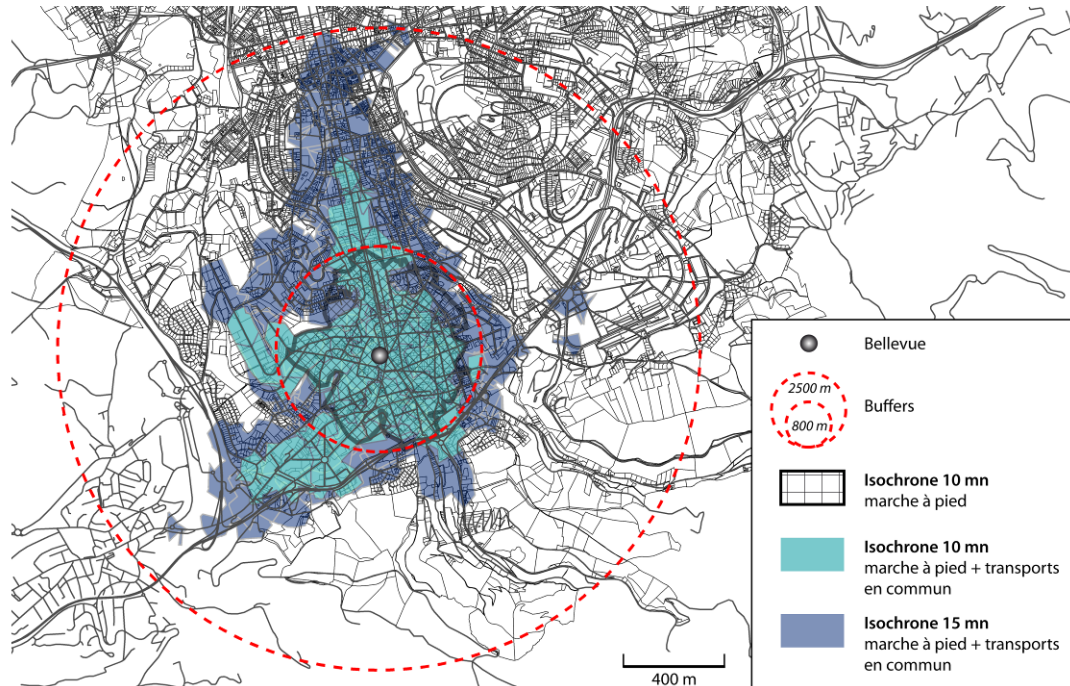


Figure 6: Perimeter and pedestrian and public transport isochrones around the station of Bellevue, St-Etienne; with cadastre background for the real estate analyses. Realisation: T. Leysens, 2009

The perimeter built from a GIS, are superimposed on a land registry map in order to determine the pieces of land that represent a potential for an urbanisation around the railway station. The gap between the potential accessibility indicated by the buffer, and the real accessibility given by the isochrone highlights the pieces of land of interest for urban densification, in case of an improvement of accessibility.

Observing, simulating, alerting.

The implementation phase has shown that the observation system supposes the combination of three functions to cover all the needs expressed by public institutions engaged in an urban project orientated towards rail. A series of indicators dealing with land and transport is attached to each function.

The observation function has for aim to tackle the following questions:

- What are the demographic and economic trends (number of households, of employments, of activities, services, etc.)?
- What is the evolution of the transport network (transport supply, patronage, accessibility, quality of service)?
- What are the land use, real estate and renewal dynamics (land sales, housing sales, vacant housing, renewal operations)

The simulation function has for aim to foresee:

- The increase of land development potential provoked by an improvement of accessibility.

- The potential urban densification around stations

The alert function must allow detecting:

- Pieces of land subject to mutation and/or characterise by high land use potential.
- The articulation problems raised by modifications of railway supply and urban transport supply

In order to illustrate these various functions here are some indicators tested in the St-Etienne urban region here around the Bellevue Station:

Parcelles libres de + de 2ha
en zone U, AU ou ZAC
dans le cercle de 2,5 km

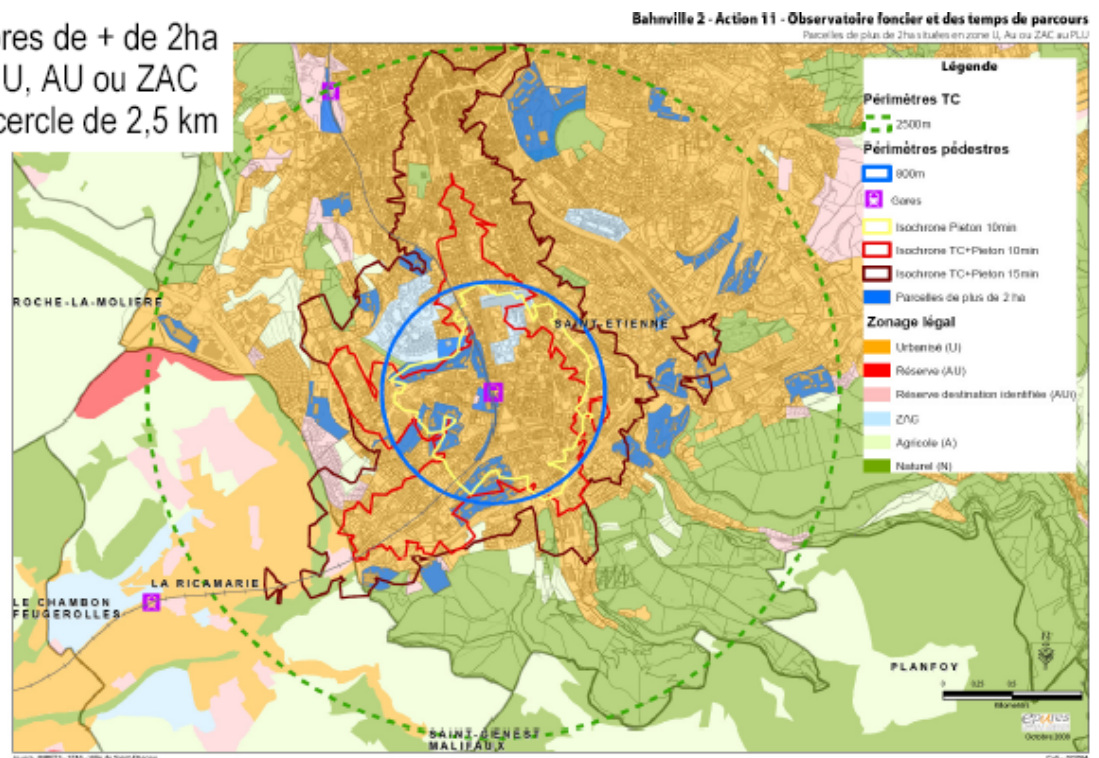


Figure 7: Vacant pieces of land of more than 2 hectares in « urbanisable » zoning (U, AU ZAC according to land use plan PLU) located inside the 2,5 km buffer around Bellevue St-Etienne station Realisation: Epures (Agence d'urbanisme de la r gion st phanoise), 2009

The map shows pieces of land of interest in the aim of urban densification around station. It is an illustration of a joint analysis of land and transport.

CONCLUSIONS

Sustainable mobility by integrated approaches in rail-oriented development

The vision: Sustainability

There is a general interest in the potential of rail-oriented development to sustain in a phase of transition and crises, facing manifold risks and uncertainties like energy scarcity, peak oil, climate change, economic crisis and household budget risks (cf. Wulfhorst, 2010).

Implementing a rail oriented development needs the integration and the coordination of various sectors of intervention, and the coordination of various territorial levels and various key actors, decision makers and inhabitants. The general question posed by the Bahn.Ville approach deals with the implementation of these objectives. We have experienced that France and Germany still can learn a lot from each other in the domain of integrated land-use and transport development; This shared interest in both countries proved to be a fruitful field of scientific cooperation and of mutual learning by sharing experiences from respective errors as well as from best-practices.

Two scales of action ... region and local

The investigations presented as well as the experiences in the two French and German reference sites have shown that two levels of action are concerned, each corresponding to geographical scales, to sectors of intervention, to specific actors and to types of intervention, from strategic planning to urban design.

That is the regional scale for integration of land-use and transport in strategic planning, and the local level for a more detailed and precise implementation of coordinated actions.

Towards a design of successful implementation processes

We presented here analysis in both domains, starting with a comparison of strategic planning tools in both countries in the way they tackle the issue of a rail-oriented urban development. The theory of integrating land-use and transport on the level of urban regions has been developed at least since the 1960's (cf. Hamburg Finger model). The challenge still today is to promote instruments and processes of good governance and successful implementation.

French strategic planning and funding strategies for example show a high degree in integration (design of transport facilities and urban design, integration of spatial policies), but the conditions for implementation afterwards are less strict and, as compared to the German case, a higher degree of flexibility is left to the local decision level (the municipality).

German planning traditions show a high degree in land-use and transport integration, but the project management and funding schemes stay rather sectoral; that is why the decision making processes often still lack a strong intermodal or interdisciplinary perspective.

In consequence, one of the main challenges for the future is how public authorities may be able to manage the manifold processes of planning and realisation.

The second level of analysis concerns the production of urban fabric at the local scale. Concerning a rail oriented urbanism within the station surrounding, in both countries the focus is put on soft modes like walking and cycling in the sense of neighbourhood mobility.

Experiences are presented in this direction. The analysis highlights general criteria (Atmosphere, Fluidity, Security, Service and Readability) for an urban design favoring pedestrian usage. These issues need particular care because analysis revealed the broad negative impact of single elements perceived negatively by users. Principles for urban design of areas around stations include the need for direct access avoiding dead-ends to stations, the need for animated public spaces in the immediate surroundings of stations and the need for simple measures to eliminate usage conflicts on paths.

The other field of action investigated at the local scale concerns the land management. The proposal was to build a cooperative land and transport observatory in order to cross the sectors of intervention as well as the actors and to create a place for sharing an integrated analysis. As a key element a perimeter for observation of such an integration tool in land management has to be fixed: we proposed a 800 meters circle combined with a 10 min isochrone. Three functions are proposed, the observation in itself but also the monitoring of land and transport opportunities and the simulation of projected evolution in the surroundings of stations. Land intervention can then be focused to serve the objectives of urban densification and favoring soft modes paths.

In this perspective, the innovative regional planning tools, the neighbourhood mobility concepts as well as the setting up of an observation tool for public intervention in stations areas constitute three original contributions of the Bahn.Ville 2 project with the purpose of supporting sustainable mobility by an urbanism orientated towards rail.

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