TOURISM, MASS EVENTS AND TRANSPORTATION MANAGEMENT: THE RIMINI APPROACH

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ABSTRACT

A large number of mass events attracting tourists and visitors take place in Rimini every year, but they have negative consequences in terms of traffic congestion. The need to upgrade the local Urban Mobility Plan – UMP - was considered by the local administrators as an opportunity to solve such a problem. The vision behind the Plan was targeted not just at improving vehicular traffic conditions but also at enhancing livability for tourists and residents thanks to the development of an urban rehabilitation process as a framework in which some actions could be implemented to create a more balanced mobility system.
Preliminary analyses of the local transportation demand and supply allowed the development of some scenarios for the UMP: some of the planned interventions have been simulated, including the newly planned roads, in order to assess their suitability to the context, namely in terms of impacts on traffic flows, pollution and safety. A proper assessment of the impacts resulting from the planned interventions was of the utmost importance, since the local land use pattern is typical of a densely built environment with important landmarks, and not much could be left to infrastructural interventions. Such concern resulted in planning the crucial so-called "slow mobility" network (bike routes across the whole urban area, road safety improvements, reorganization of parking facilities, etc.) to avoid conflicts in sensitive areas such as the centre and waterfront.
The lesson learned from Rimini stresses the need, typical of areas "burdened" with popular events and environmental constraints, to manage traffic problems without disregarding priorities, such as the environment, safety and livability.

Keywords: traffic, mobility planning, safety, pollution, urban rehabilitation

INTRODUCTION

Rimini, a provincial town of about 140,000 inhabitants in Northern Italy, has two lives: in summertime it becomes the most renowned seaside resort on the Adriatic Riviera, whereas in wintertime local activities as fishing, manufacturing and business prevail. Even though most of the 1,500,000 tourists who visit the city every year stay from May to September, off-season peak phenomena are also determined by mass events, such as political meetings, live broadcasts, social gatherings, trade activities hosted by the local Fair, mostly occurring during the weekends.

Although the city enjoys being in the limelight, the consequences in terms of traffic congestion phenomena affect the urban area virtually all-year-round. Hence, the need to upgrade the local Urban Mobility Plan - UMP - was considered by the local administrators as an opportunity to solve such a problem.

A co-operation between the Rimini Municipality and the “Sapienza” Department of Hydraulics, Transportation and Roads (DITS) was launched to develop the new UMP, according to strategies and interventions aimed at managing both typical seasonal traffic flows due to everyday activities and peak phenomena.

The paper describes the work carried out to develop the UMP, and namely the tasks undertaken by DITS:

- a preliminary analysis phase (in which traffic surveys and accident analyses have been performed along with the assessments of some problems in the local transit operations), to highlight the main issues the UMP was called to solve;
- the consequent elaboration of the UMP contents, according to two main lines of actions: the promotion of several measures to disincentive private cars (also called “slow mobility”) and an urban rehabilitation process by opening some new roads and pedestrianizing some others. Possible effects on traffic due to such a new development have been simulated and the related impacts on the air quality assessed.

According to the lesson learned in Rimini, the objective of the paper is to stress the importance of coping the transportation management with other important urban priorities (as tourism, environment and livability) to develop an Urban Mobility Plan coherent with the city’s history and image.

THE ANALYSIS PHASE

In 2005, the local modal split was as follows: 59% private cars, 19% two-wheelers, 17% transit and 5% walking (Comune di Rimini 2006); the motorization rate (number of vehicles x 100 inh.) was 90.06 (ACI 2007), one of the highest in Italy. Such a car-dependency required an in-depth analysis of the mobility local habits and recurring patterns, hence a state-of-the-art survey of traffic flows was the starting point of the planning activities. This traffic survey was essential because no recent data on traffic flows were available to perform any further modelling activity or to have a proper knowledge of other important facets, as the high accident rate or the modest attractiveness of the local transit system.

At the same time, local administrators strongly felt that the high accident rates recorded in the last years had to be linked, somehow, to the perceived discomfort due to traffic and congestion.

The traffic survey

Consequently, during the summer of 2007 and the winter of 2008, two surveys were carried out across the whole urban area which was divided into four survey zones, i.e. the city centre (A), the central residential areas (B), the southern beachfront (C) and the northern beachfront (D). Counting operations using inductive-loop traffic detectors were run at each of the 30 previously-selected spots (Figure 1) continuously for three days long; moreover, manual countings at 20 main intersections integrated the automatically-operated survey. Such an integration proved to be essential for the right assessment of motorized two-wheelers traffic, since in some cases the traffic detectors did not detect bikes from mopeds in a reliable way.
The huge amount of data from both surveys have been organized into a series of spreadsheets which allowed easy entry and further elaboration during the following modelling phase.

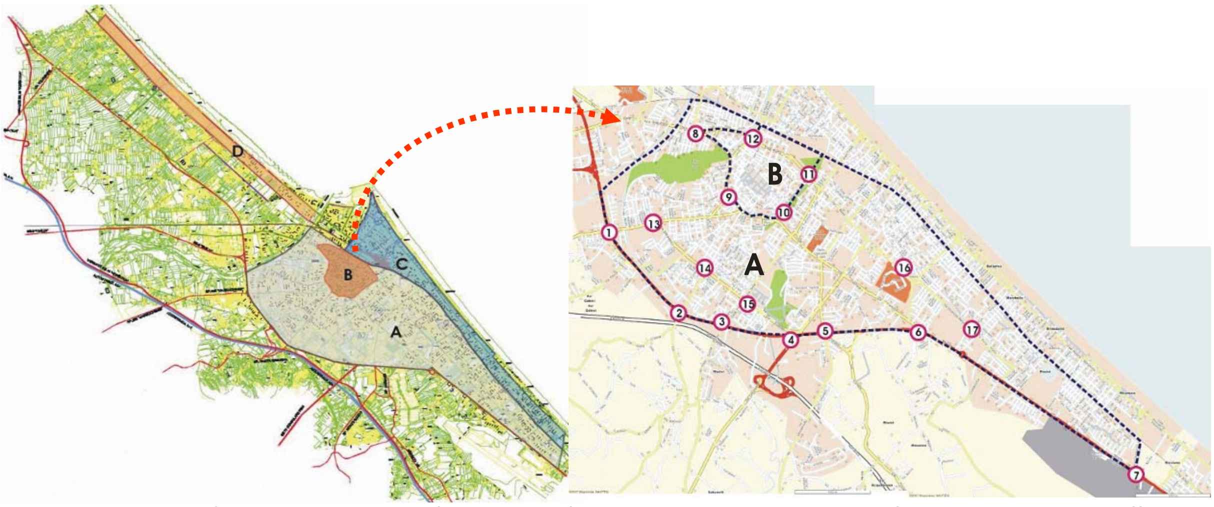


Figure 1 - The four survey zones (left); a detail of zones A and B, where most of the inductive-loop traffic detectors were located (right)

In this way it was possible to assess the location of the highest traffic flows, when and at what time they occurred, the related modal shares, vehicles speed, peak and off-peak periods. The snapshot of the city (Figure 2) was typical of an urban area with mixed land use and different seasonal activities. In general, peak phenomena affect the roads accessing the city centre within the urban area, thus raising the issue of the unsuitability of such roads capacity if compared to the more peripheral ones where congestion rarely occurs. Moreover, the survey highlighted some peculiar features: in wintertime, congestion phenomena also occur close to the Fair facilities and other business areas in the outskirts, namely in the afternoon; in summertime, the beachfront strip and the areas nearby (where hotels and other tourism facilities are located) are “choked” till late hours.

The average traffic flow values range from 14,000 vehicles/day in summertime to 12,000 vehicles/day in wintertime, but along some road sections, and due to special events, peak values around 20,000 vehicles/day have been recorded in both seasons.
Another striking aspect was the high speed level. Indeed, speed above the limits (50 km/h) was recorded at about one third of the survey spots in both seasons, with recurring dangerous situations in summer when data recording vehicles speeding at 70 km/h and above was repeatedly recorded at night. Such an outcome called for a further analysis of the safety level of the road network.

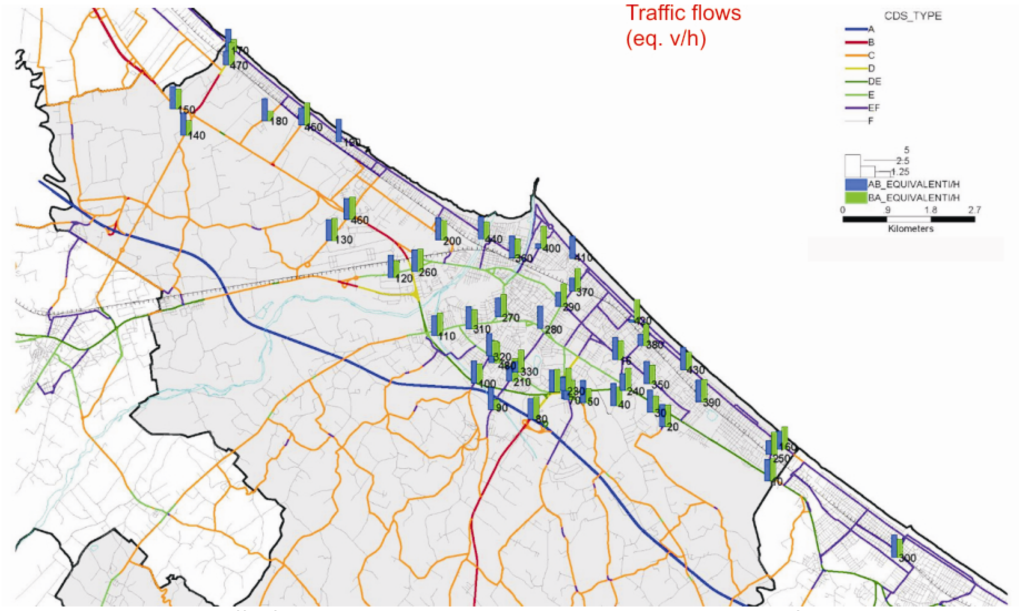


Figure 2 – Traffic flows in the evening peak hour (17h00 – 18h00), Summer 2007

The accident analysis

A cross-analysis between the results from the traffic survey and the accidents location was, hence, the next step. Indeed, in 2003 the city was ranked first in Italy, for accident rate, i.e. 14.92 events per 1,000 inhabitants (Comune di Bologna 2003). In the last years, the situation has improved slightly, but even though other indicators as, for instance, the 2006 Injured Rate which was 137.2 [(injured/events) x 100)] and 2006 Fatality Rate which was 0.67 [(fatalities/events) x 100)], are both below the national average (respectively 139.8 and 2.38), they still call for amendments.
The black spot analysis was carried out thanks to the 2006-2007 database provided by the municipality and served as a case in point to show not only that many of such events (about 6 per day on the whole urban area) obviously occurred where high traffic flows were recorded (i.e. along main access and/or suburban roads), but, in particular, that most of the local roads were affected by a number of accidents, being surveyed there a range from 1 to 10 events per year. The latter finding appears more relevant considering that such streets are mostly low-rise residential ones, with just O/D traffic. However, the worst situations could be detected in typical tourist areas as the beachfront and the south side of the marina (Figure 3) where rates were higher and consequences even worse. Indeed, a focus on the summer

situation (i.e. August 2006 and 2007) stressed that virtually all accidents involving vulnerable users (pedestrians and bikers, i.e. about 9.5% of the total amount of events recorded during the two years) occurred along the beachfront and the areas nearby. Moreover, if injured pedestrians (Figure 4) are considered (the bulkiest category of vulnerable users involved in both years) about 17.2% are under 18 years of age, whereas 32.1% are over 65.

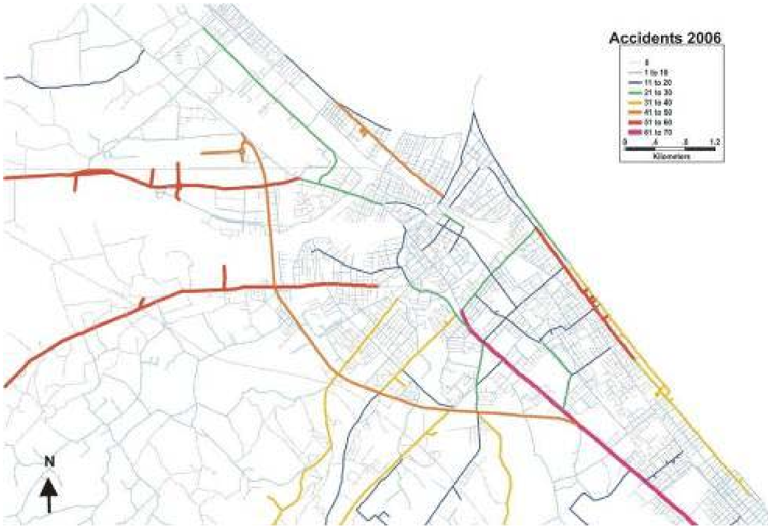


Figure 3 – Location of accidents (all modes) in 2006

Even though relationships between tourism and accidents are well known (Kim, Brunner and Yamashita 2006; Millonig and Schechtner 2006), reasons which turn a leisure area such as the Rimini beachfront into a black spot have been difficult to assess because the municipality database does not record causes of accidents; however the overall analyses of variables, at local level, such as weather and light conditions, quality of road signs, time of the day, level of maintenance of the road highlight the absolute ordinary circumstances in which all the accidents involving vulnerable road users occurred, which leave just one main cause for such accidents: i.e. drivers' or vulnerable road users' unsafe behaviors. The virtually total absence of critical conditions for the remaining amount of accidents involving vulnerable users suggests the assumption of behavioural problems as the main causes for this kind of accidents (Molinero et al 2008).

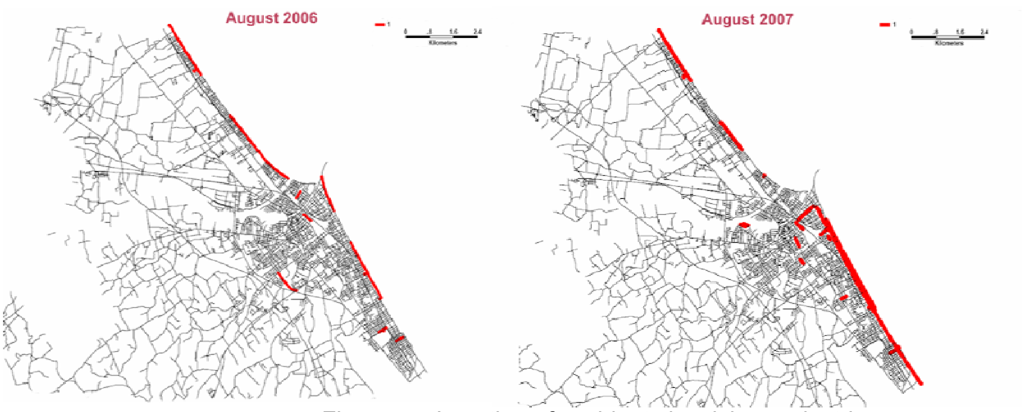


Figure 4 – Location of accidents involving pedestrians

More criticalities

Even though the outcomes from the analyses on traffic flows and accidents were pivotal to start profiling the UMP content, some other mobility matters, still pending, had to be tackled and included in the Plan.

In particular, three main issues called for urgent interventions: the poor transit supply, the scarcity of parking facilities, with consequences on both residential and business/tourist areas, the incomplete bike network.

So far the transit system has played a minor role due to two main competitors in the local modal share: private cars and bicycles; the former because of the aforesaid high ownership rate, the latter because bicycles have always been the most popular mode for hanging around among the locals (due also to the city's flat topography). No wonder then, that what used to be points of strengths have become elements of weakness of the transit system, as the spreading of routes across the whole urban area which turned into "dispersion" once detours and frequency decrease have become more and more regular. Few facts are sufficient to assess the consequences: the main transit network (Figure. 5) has become rather small, just 10.5 % of the whole transit network (554 km long), but it is packed as it concentrates about 56% of the total passkm amount; during the morning peak hour an average of about 13,000 passkm has been estimated, corresponding to an average flow of just 95 pass/h; eventually, the 130 rubber-tired vehicles (buses and trolleybuses) composing the transit fleet are of very different types, not really improving both transit image and public perception of the service.

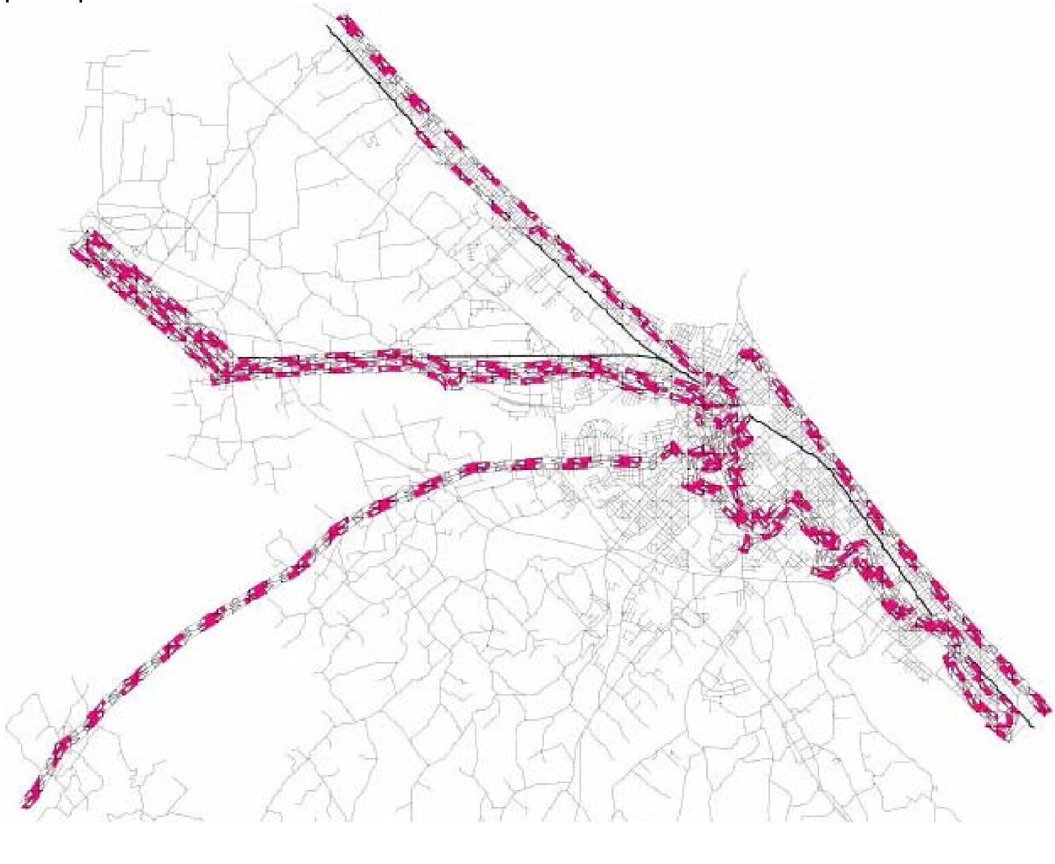


Figure 5 – Main transit network across the Rimini area

Parking is another unsolved problem: the number of on-street parking places is not even comparable to what the real demand requests, especially in the historic city centre where 1,639 parking places are still needed to meet the "one parking place per household" requirement; in more modern areas, as the Marina and the beachfront, the lack of parking lots is made even clearer not only by a number of needed missing places for residents and visitors but also by a poor provision of loading/unloading areas to serve the commercial and tourist facilities.

Last but not least, given the mode's popularity, comes the problem of connecting the 70 km long bike tracks scattered across the whole urban area, to create a continuous bike network; it is worth noticing that re-organization of the bike network could improve not only the overall road safety level, but also increase the attractiveness of some sensitive areas, such as the city centre and the beachfront.

THE NEW URBAN MOBILITY PLAN

Needless to say, the Municipality concerns, according to the above-described outcomes, have been focused on how to improve the traffic situation and the safety levels by providing countermeasures which could prove to be effective under any circumstances (working days, holidays, mass-events) and seasons, but without leaving aside top priorities such as the environment and livability. A prerequisite of such an approach was the revision of the road network, under the regulatory point of view, and the creation of a new road classification consistent with the surveyed functions and traffic flows, size and local environments.

The next step was to outline some general goals for the UMP, coherent with the proposed classification and analysed problems; keywords to synthesize such goals could be "slow mobility" and "urban rehabilitation". The former is a concept which consists of various measures; among them, the creation of a safe and continuous bike network across the whole urban area plus parking management along with some preliminary directions to address transit reorganization may be the most important ones. The term "urban rehabilitation" is even more complex and is based on a twofold issue: the construction of new roads to avoid traffic congestion, and the conversion of some sensitive areas into car-free environments. On this point it is worth noticing that a previous challenge to turn the historical core of the city into a car-free area proved to be successful, hence such further areas pedestrianization was positively saluted by the municipality.

Slow mobility

The vision behind the promotion of non motorized modes and the enhancement of a more efficient transit system is typical of a city which thrives on tourism and business and wants to be labelled as citizen/visitor-friendly. Moreover, actions to disincentive private traffic had to be undertaken considering the different features of the city: the historic centre, the dynamic surrounding areas where a mix of business and residential activities are located, the Marina and the beachfront strip, a real tourist realm.

The approach to solve the parking issue can serve as a case in point to describe how interventions have been studied to provide different solutions tailored to meet each urban area's requirements. On the one hand, the awareness that the demand in the city centre will be always unmet because of the unsuitability of the built environment (it must be kept in mind that this is an area of Renaissance architecture with very important landmarks, such as Alberti's Tempio Malatestiano) called for the location of few, small residents' parking lots outside the area, besides providing two small underground facilities; on the other hand, thanks to a larger availability of space a number of interchange parking facilities at business and tourist areas have been provided to encourage visitors to park & ride. The concept for the parking program is clear: cars are not essential to reach final destinations, either residential or business, and users are strongly urged to proceed by non motorized or collective modes, once they have left their cars at a dedicated area.

It is clear that the diversion from cars to such other modes cannot be obtained just providing parking facilities and that more robust interventions must be implemented, especially if some trends, as the poor use of transit or the low safety level, are to be reversed. It is also important that each intervention is both resident and visitor friendly, depending on their usual activities patterns, and this is the very core both the bike network and the transit rehabilitation programs are based upon.

The creation of a bike network across the city is rather straightforward and based on a kind of route classification (similar to the one enforced for the roads) as a pre-requisite to design the right facility in the right place. Such a development of appropriate criteria to match and fit the network into the different environments resulted in the design of three kind of tracks, according to space availability and safety standards: type A, i.e. "long-distance" routes across the whole municipal area designed to link main destinations within the municipal boundaries and beyond; type B, i.e. "mid-distance" routes accessing and/or connecting neighbourhoods and eventually type C, i.e. "local" routes for short-distance trips within each neighbourhood. Accordingly, it is expected to have 22 km of brand new routes plus 67 km of extra branches to connect the new to the existing facilities, for a total of a 160 km long, safe network.

Such a measure is coherent with the general concern for safety issues. Moreover the awareness that it is also necessary to slow down traffic mostly along those urban and extra-urban roads where higher traffic flows and accident rates have been recorded, prompted local administrators to design countermeasures even before the UMP was drawn up. The extensive conversion of crossing points into roundabouts as part of a more ambitious goal, i.e. the closure of a ring road around the most central areas, was designed to avoid through traffic and demonstrates such concern.

Interventions on transit require greater efforts; indeed the UMP envisages different actions to turn the current transit system into a more efficient one, starting from the basic needs to compact old routes and lines along some main corridors and revise schedules, accordingly. A second step will be the provision of new connections to the international airport, the new business areas (including the Fair and the Congress Center) and shopping malls, designed to facilitate visitors accessing the city. Summer services will be improved as well, namely night operations, not just to meet the general tourist demand, but, above all, to disincentive the use of private cars to reach nightlife destinations, a habit revealed by the review of the traffic data recorded during the summer traffic flows survey.

The UMP also recommends that from the operational point of view the overall improvement of the service has to go hand in hand with the introduction of ITS tools to manage the fleet as the AVM/AVL and UTC to operate traffic lights priorities along the main corridors.
However, such interventions can be seen as accompanying measures of what can be considered the “backbone” of the new transit system, i.e. the so-called “Metrò di Costa”, a kind of premium express trolleybus service connecting different coastal municipalities and designed to attract all kinds of users (from commuters to tourists) for short-medium distance trips. As the relevance of such mode goes far beyond municipal level, the UMP does not consider it among its priorities, yet it does regard it as a crucial element for the development of any decision (and measure) concerning local transit.

Urban rehabilitation

What has been described so far has been planned to slow down mobility and calls for a general re-design of the road infrastructure. This, in turn, raises the issue of the appropriateness of infrastructural interventions on the Rimini urban area that is an extremely multifarious environment.
The poor availability of space in historic and consolidated areas, which itself constrained the development of the provision of new parking facilities, together with the need to preserve the local landmarks and landscape, conflict with typical functions of a city with a fast-evolving, mixed land use.
Local administrators were aware of such a gap and adopted a very wary approach in approving any possible new infrastructural intervention which, in the future, could result in a kind of “Trojan Horse”, i.e. a mere traffic attractor when making decisions on what has been defined as the “urban rehabilitation” process.
Environmental concerns, cultural heritage preservation, care for tourists and visitors were the main reasons which eventually drove local administrators to cautiously assess which was the proper amount of new road infrastructures to build. Thus, just five new roads were planned to be opened in the outskirts, even though no time frame for that was decided. At the same time, results from the traffic surveys and assessed safety levels suggested the need to reconsider the mobility pattern for some central areas to favor more livable conditions for citizens and tourists. Naturally this called for the pedestrianization of two landmarks: i.e. an area along the beachfront and the historic Tiberio Bridge.
Hence, the general approach has been two-pronged: on the one hand it aims at supporting business and improving accessibility to some newly-developed areas, although the provision of new infrastructures has been kept at a bare minimum; on the other, its goal is to increase tourism and improve quality of life by planning to restrict car access to the city’s most popular spots. In both cases the approach was coherent with the land value (not just under the economic point of view but, above all, in terms of public perception).
Opening new roads can have environmental consequences, as well, and the awareness of such risks called for a general evaluation of pollutant emissions levels in the areas where infrastructural changes have been planned. Needless to say, the attention for the safety level required a qualitative assessment of the future trend of accidents at urban level.

The simulation process

The feasibility of the new infrastructural interventions was studied by a simulation process based on the creation of scenarios thanks to a traffic model (a full-featured GIS model, that was specifically designed for planning management, and on the analysis of transportation systems). The main steps of the process can be summed up as follows:

- Area zoning
- Creation of a Database to support modelling activities
- Supply model
- Demand model
- Traffic flows assessment
- Equilibrium model
- Selection of indicators to assess the reference situation

Area zoning (126 zones, 82 out of them within the municipal area, as in Figure 6) was targeted to identify the local, social and economic framework to study the demand definition.
The supply model was developed, defining the main attributes and the capacity of network links and nodes according to conventional road classification.

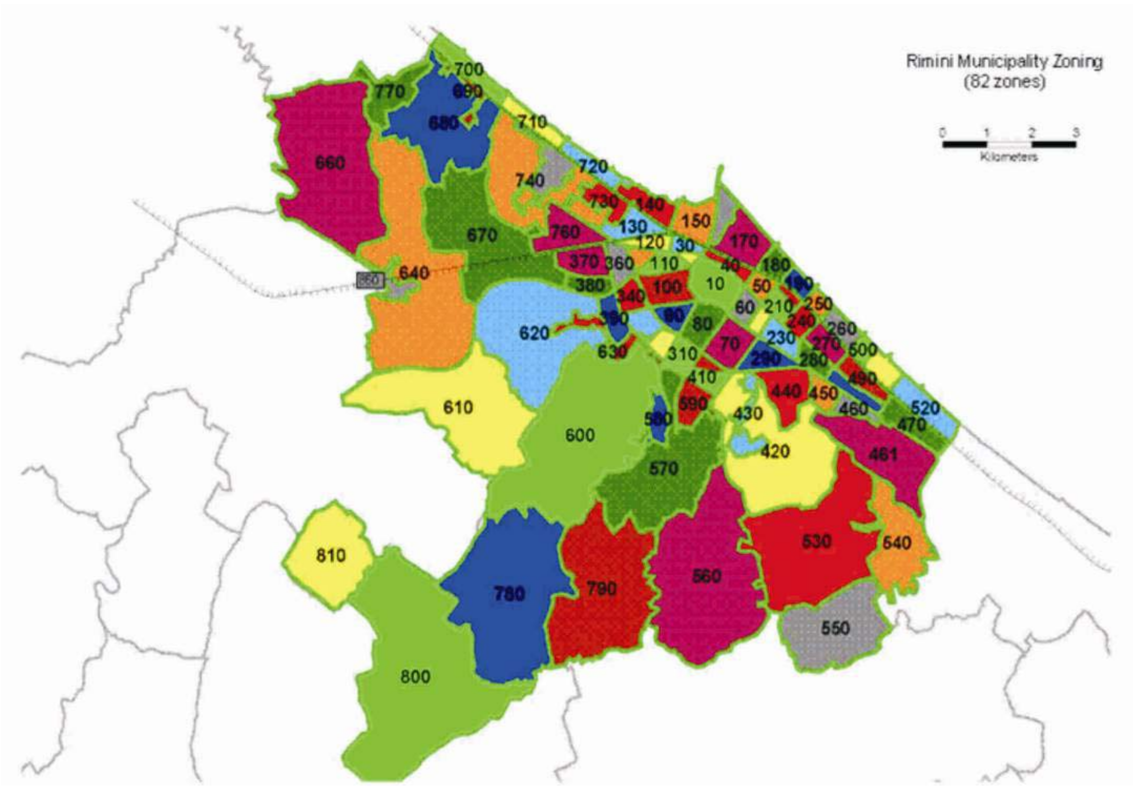


Figure 6 – Area zoning

For the demand model, trips for systematic activities (Home-to-Work and Home-to-School) have been considered, according to the 2001 National Institute of Statistics parameters and census data (Table 1).

Table 1 – Selected socio-economics parameters for the demand simulation

Trip purpose	*Trip generation parameters*	*Trip attraction parameters*	*Transport Mode*	*Peak Period (a.m.)*
Home-Work	Inhabitants	Employees	Automobile and motorcycle	8.15-9.14
Home-School	Students	Educational Employees	Automobile and motorcycle	8.15-9.14

Facts and figures gave a picture of some recurring mobility patterns as commuting (see desire lines in Figure 7), which in spite of what can be expected in an area with mixed land use and high motorization rates, does not play a relevant role, since about 66% of the total amount of trips to school or work in the morning peak hour (8h15 – 9h14) occurs within the municipal area.

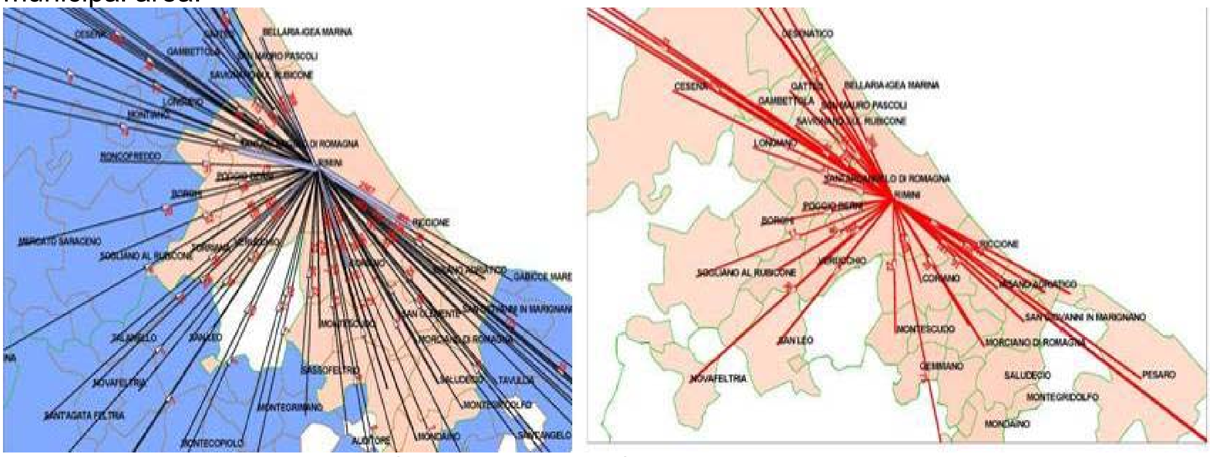


Figure 7 – Desire lines for trips accessing (left) and egressing (right) the municipal area

Even though it could be assumed that these are short-distance trips, the related modal share (Figure 8) confirms that Rimini's citizens' preference for private cars (59%), compared to transit (12%), is overwhelming and that non motorized modes are good competitors (17%, walking included). In addition to the previously assessed modest role played by transit, also the poor functions of both school and company buses, used respectively by about 3% of the school population and 0,4% of the total amount of workers, is worth noticing.

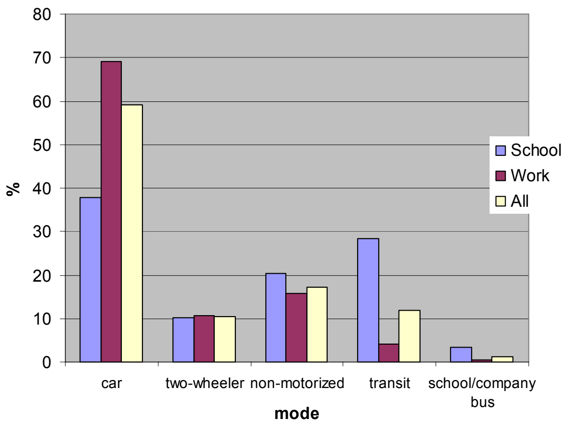


Figure 8 – Modal share in %

The traffic survey was used to calibrate the demand model and thus obtain a more reliable picture of the traffic flows on the whole network. Results confirmed what had been initially assumed when generally assessing the surveyed traffic data, i.e. congestion phenomena occurring namely along the roads accessing the city centre, and in summer also along the beachfront (Figure 9) .

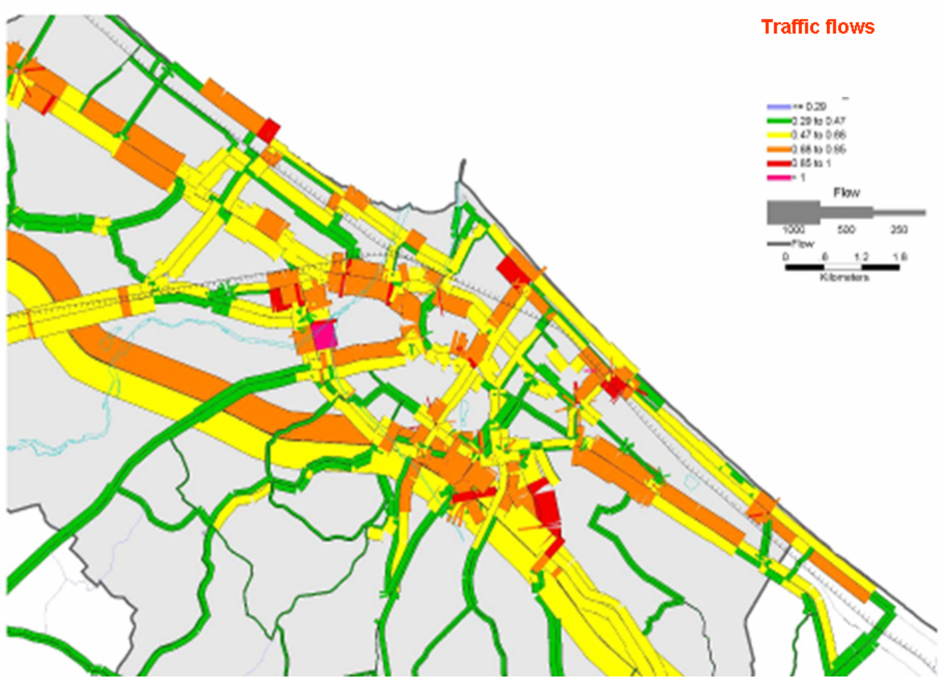
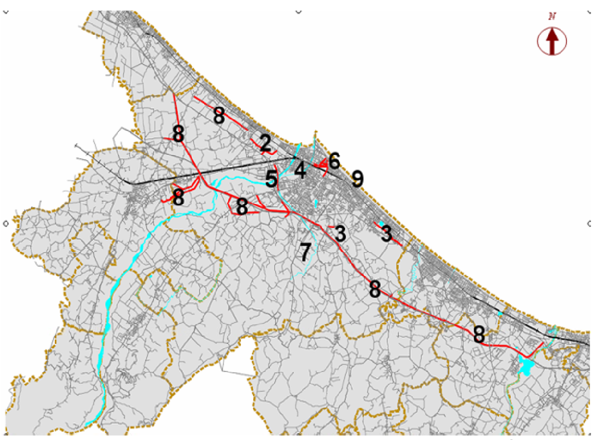


Figure 9 – The model calibration, congestion phenomena, summer period

The last step was the simulation of each of the proposed interventions (i.e. the five new roads and the two pedestrianized ones) creating a set of 10 scenarios, one for each intervention (Scenarios 2 to 9, see Figure 10) plus a reference scenario (Scenario 1) and a final one (Scenario 10) where the impacts resulting from the simultaneous implementation of all the measures were simulated.



Scenarios:	*Interventions*
1	Reference scenario
2	New connection Via Sozzi - Via Coletti
3	New Via Roma and connection to Provincial Road Coriano – Montescudo
4	Pedestrianization of the Tiberio Bridge
5	New connection Tonale – Emilia - Marecchiese
6	Scenarios 4 + 5
7	New connection Provincial Road Coriano - Montescudo and State Road 72 Rimini RSM
8	New State Road n. 16
9	Pedestrianization of the beachfront (Lungomare Di Vittorio and Lungomare Murri)
10	Sinergy of Scenarios from 2 to 9

Figure 10 – Location of the scenarios with the new interventions

According to Scenario 1, as already stated, congested situations occurred on the city accessing roads (State Road 16 Adriatica, State Road 9 Emilia and the Highway 14 Adriatica), and at more central areas; congestion in the latter is often due to the unsuitability of such critical road sections (e.g. Cerchia dei Bastioni), typical of historic, urban patterns which were not “born” to meet high traffic flows demands. This is also another facet of why no options other than pedestrianization could be recommendable for the most critical cases, i.e. the Tiberio Bridge and the beachfront (respectively Scenarios 4 and 9).

The simulation of the new infrastructures

Each Scenario (hence each measure) proved to be rather successful, since traffic congestion decreases generally, although in some cases it just shifts to the areas nearby, but to a minor extent. However more relevant achievements can be accomplished by the synergy of all the interventions (Figure 11), since the most sensitive areas, in other words the city centre and the beachfront (namely on the southern strip) become even more decongested.

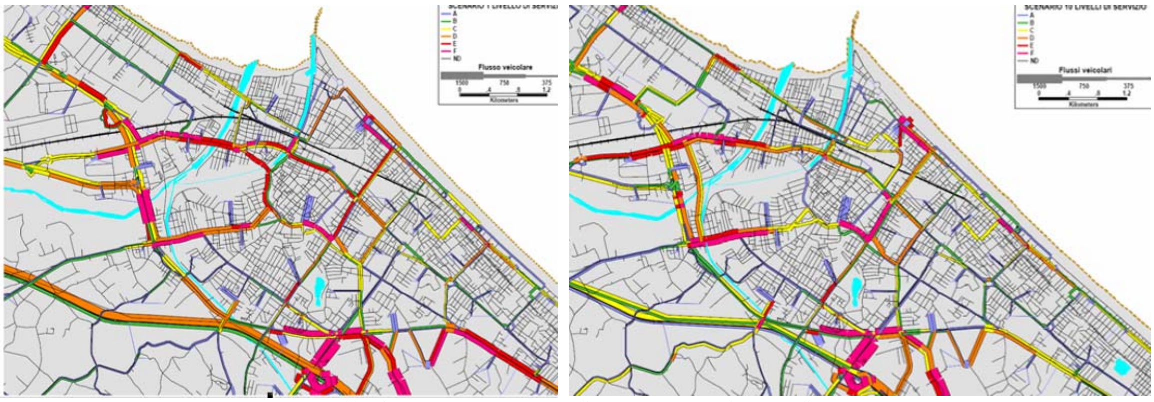


Figure 11 – Traffic flows according to Scenario 1 (left) and Scenario 10 (right)

Two samples of the two kinds of interventions (opening of a new road and pedestrianization) are described, to explain the simulation process. In the first case, i.e. the opening of new Via Roma (Figure 12) linking the Airport and other facilities, can prove to be effective provided proper circulation schemes are organized in the area.
Indeed, since new Via Roma was aimed at removing private traffic from State Road 16 Adriatica, such a goal can be accomplished only conveying the traffic from the State Road 16 Adriatica to such a newly-opened one and preventing residual traffic flows across the surrounding roads.

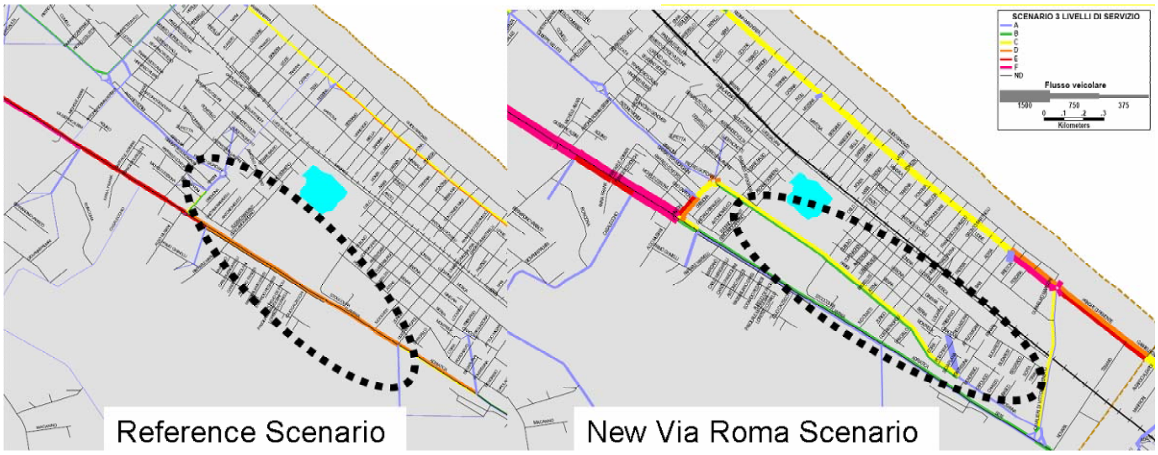


Figure 12 – The opening of new Via Roma according to the reference (left) and simulated opening (right) scenarios

A similar lights-and-shadows situation can be found in the second case, i.e. the pedestrianization of Lungomare Murri (Figure 13) which, together with the pedestrianization of part of Lungomare Di Vittorio, create a car-free environment along the most renowned area of the beachfront. Also in this case, the priority was to restrict private car access, consistent with the surveyed safety problems, and the simulation seems to prove its feasibility; however, closing such a strip to cars without creating a proper route to access the area, which is recommendable in view of typical seasonal flows of both motorized and non motorized modes, could result in a bottleneck along the non pedestrianized beachfront links.

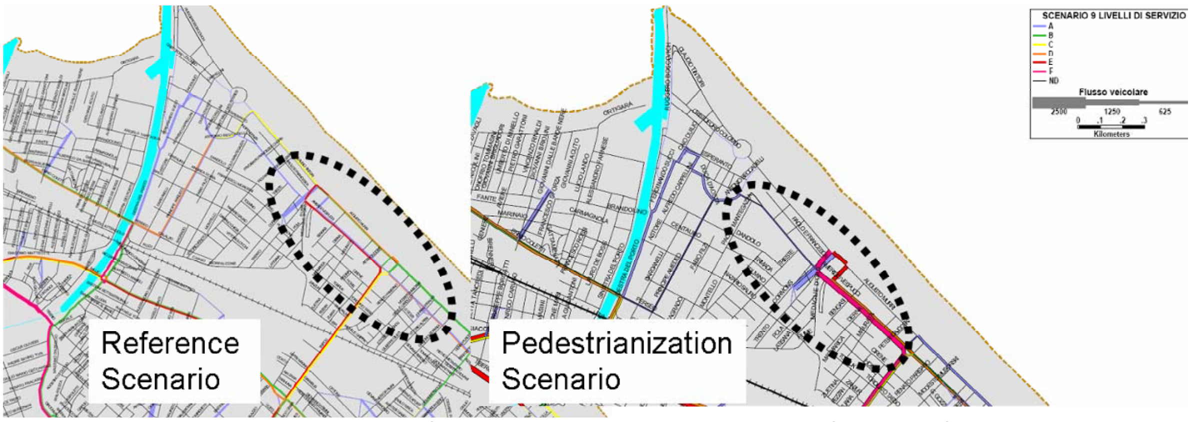


Figure 13 – The pedestrianization of Lungomare Murri according to the reference (left) and simulated pedestrianization (right) scenarios

The lesson learned from such simulations raises the question whether it would have been more appropriate to also consider the role transit could have played; indeed, so far such an analysis could appear to have been run with a cavalier lack of any assessment about the influence due to any other mode. In principle the objection could be valid, but the underlying reason of such an approach should be searched for in the local administrators' will to have a quick (and reliable) answer to what would happen in case of no-intervention on the local transit schemes (which basically means no new operations in case of opening new roads); however, planners and administrators are well aware that should any decision also involve transit (as it is soon expected from the release of the Transit Plan) and non-motorized modes, any positive effect described so far will be magnified.

The simulation of the environmental impacts

On the contrary, no shadows can be cast on the environmental benefits resulting from the new interventions. Each local infrastructural change is matched with a better air quality level; from the simulation of the so-called "emission package" (i.e. PM_{10} and CO_2 emissions in g/h), the best achievements (- 30% of both emissions levels) have been achieved by the pedestrianization of the Tiberio Bridge; the addition of a new link improves the situation along the Via Adriatica and Via Flaminia (as for the opening of new Via Roma Scenario) close to the airport area, plus the addition of another new road not far from the Fair facilities (Scenario 2) entails similar benefits.
Such calculations have been based on simulated traffic flows, dividing the circulating fleet per emission standards according to the Italian Automobil Club - ACI 2007 data (the majority of registered vehicles are EURO III, EURO IV and EURO V); emissions E_p (1) for each pollutant and per vehicle class have been estimated according to the SINANET methodology (2007):

$$E_p = fe_{pjk} \text{ x } N_j \text{ x } Perc_{jk} \qquad [g/h] \qquad (1)$$

N_j number of *j*-class registered vehicles (units)
fe_{ijk} emission factor per *p* – pollutant, *j*-class of registered vehicles and *k*-driving cycle (g/vkm)
$Perc_{jk}$ trip length for the *j*-class of registered vehicles and *k*-driving cycle during the peak hour (km)

The assessment of the safety levels

The requested assessment of the safety level following the new interventions has been more qualitative, given the lack of detailed historical data on accidents. However, regressions from available data and basic assumptions, such as the current endorsement of penalty points on driving licences (which is expected to play an important role in changing some common behavioural problems as speed and drink driving), along with drivers becoming accustomed to the new completed interventions within a reasonable time frame (one year), provided good indications about the possibility to virtually halve the total amount of accidents (from 5.7 to 3.2 events/day) by 2015 (Figure 14).

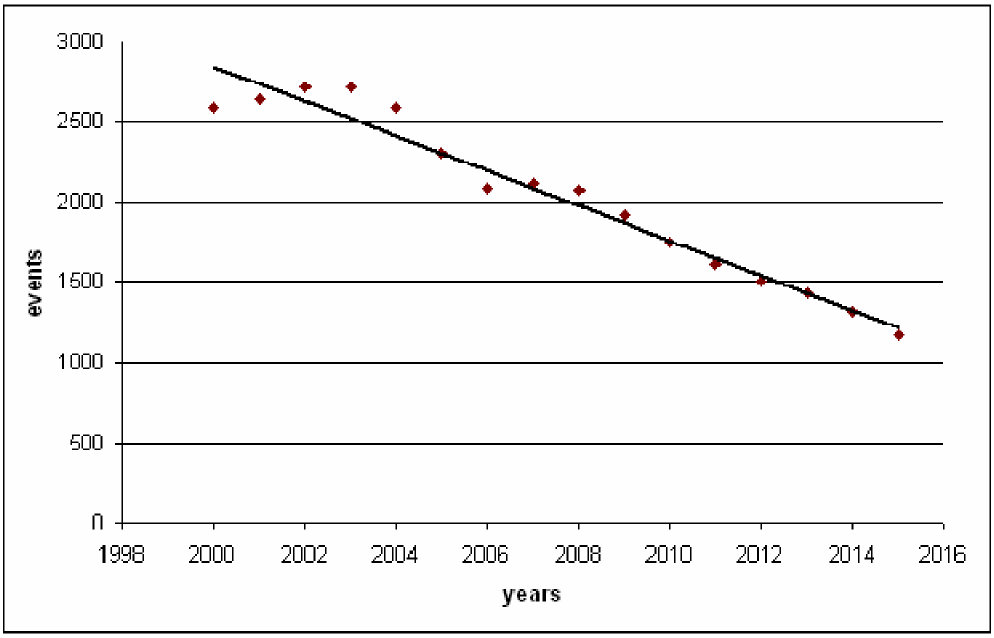


Figure 14 – 2000 – 2015 estimated trend for accidents

CONCLUSIONS

The Rimini case study stresses the need, typical of areas “burdened” with popular events and environmental constraints, to manage traffic problems with a mix of approaches: on the one hand careful assessment of the provision of new infrastructures, and, on the other disincentives to the use of private cars by restricting private car access to the most sensitive zones. Among the latter, the simulation of the pedestrianization of the city landmarks seemed to accomplish positive results in terms of reduced congestion and pollution, in spite of the event-catalyst role usually played by these areas, even though major efforts are required to manage all the traffic components; however, good results in terms of traffic reductions seem to be achievable across the whole urban area (Figure 15).

It is also worth noticing that any decision or intervention included in the UMP has been widely shared thanks to a participation process which has involved local decision-makers, stakeholders and citizens right from the initial planning phases. In the process, participants at all levels have become more and more aware that only a relative optimum could be reached for each solution provided by the plan, but that benefits in terms of improved livability will be achieved for the whole community.

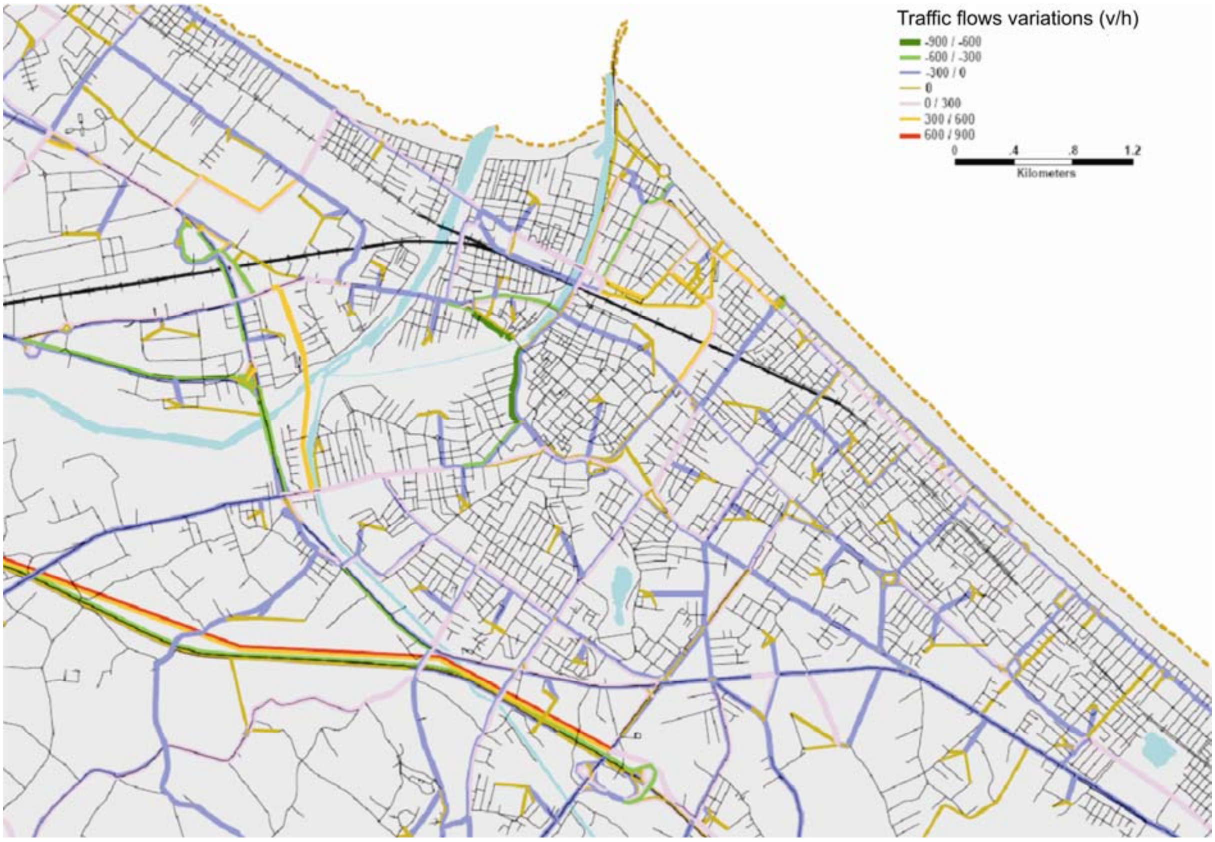


Figure 15 – Traffic flows variations according to all the simulated scenarios

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