



# NAČRTOVANJE PRIMESTNIH OBMOČIJ: OD SPALNIH NASELIJ DO TRAJNOSTNIH SOSESK

# SUBURBAN DESIGN: FROM “BEDROOM COMMUNITIES” TO SUSTAINABLE NEIGHBORHOODS

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## IZVLEČEK

*Eden od pomembnih izzivov v razvoju primestnih območij je uprašanje monofunkcionalnosti. Primestna oziroma suburbana območja se pogosto razvijajo kot spalna naselja z velikimi stanovanjskimi nepremičninami, pri čemer je na območju nekdanjih vasi, ki so obdajale mesta, navzoč proces širjenja mest in primestnih satelitskih stanovanjskih sosesk. V prispevku so obravnavani nekateri pristopi k urbanemu oblikovanju, katerih posledica je neprimerna raba zemljišč na obrobju mest in pojav tako imenovanih spalnih sosesk. Predstavljena je primerjalna analiza treh primestnih območij za mesto Niš v Srbiji: velike stanovanjske soseske Krive Livade, razširjenih sosesk Podvinik in Vinik ter območja nekdanjih ruralnih naselij Komren in Gornji Komren. Kakovost urbanističnega oblikovanja je ocenjena na podlagi meril, ki se nanašajo na fizične in funkcionalne vidike urbane strukture: centralnih urbanih funkcij, gostote prebivalstva, javnih površin, namenjenih centralnim urbanim funkcijam, in prometne ureditve. V hipotezi raziskave domnevamo, da je monofunkcionalnost neprimerna obliko prostorskega razvoja in da mesto potrebuje policentrično urbano strukturo. Kot dober model urbanega območja so predlagane tradicionalne zgoščene soseske s središčem, ki podpira območja za pešce in ponuja raznolike funkcije.*

## KLJUČNE BESEDE

primestna območja, velike stanovanjske soseske, širjenje mest, satelitska naselja, prostorski razvoj, stanovanjske soseske

## ABSTRACT

*One of the main issues in the current suburban development is mono-functionality. Suburban formats that mainly function as “bedroom communities” are large housing estates, urban sprawl and suburban satellite housing – former villages surrounding large socialist cities. This paper deals with some urban design principles which encourage unsustainable usage of land at the periphery of cities and cause the “bedroom community” phenomenon. A comparative analysis is performed of three suburban areas where the issue of mono-functionality was/is present, located within the administrative area of the City of Niš, Serbia: large housing estate in Krive Livade neighbourhood, sprawling neighborhoods Podvinik and Vinik, and former rural settlements Donji Komren and Gornji Komren. The quality of urban design is evaluated using four criteria related to the physical and functional component of urban structure: central urban functions, population densities, public spaces adjacent to central urban functions, and neighborhood traffic. The initial hypothesis of this research is that the mono-functionality represents an unsustainable form of development and that the city needs a polycentric spatial structure. The traditional compact neighborhood with a center, which is pedestrian oriented and has a diversity of uses, is instated as a good quality urban area model.*

## KEY WORDS

suburbia, large housing estates, sprawl, satellite housing, mixed-use

## 1 INTRODUCTION

It is very difficult to single out one definition of suburbia, since it is a familiar and complex concept. According to Mumford (2006), suburbia is formed simultaneously with the city, but as a separate social community divided from the city not only by space but also by class stratification. Maksimović (1980) defines suburban area as the territory that surrounds the city, usually organically attached to the urban area in Master plans. In defining suburbia, Hall (1974) uses the following determinants: low population density that significantly reduces the possibilities of establishing social interactions, and a poor quality of life regarding retail and entertainment, adding subsequently one more determinant: auto-dependence in the last 30 years (Hall, 2009). Dunham-Jones & Williamson (2011) find typical suburban form both within and outside the urban border, which is characterized by: low-density, segregation of uses, objects set back in a landscape they dominate, dendritic road pattern with dead ends and culs-de-sac, car-dependency, private buildings as dominant spatial figures and poorly designed public spaces. It can be stated that all definitions of the term suburbia refer to districts at the periphery of cities.

The second half of the 20th century was marked by explosive demographic growth and high degree of urbanization, due to the influx of population from rural into urban areas (Stanilov, 2003). The suburbia as we know it today appeared, in various formats which greatly depend on the social system of the state, political system and market conditions. Stanilov (2003) establishes four basic types of suburban form, stating that this does not conclude the list: *planned new towns, informal settlements, edge cities and urban sprawl*. Similar forms are also instated by other authors: in the socialist city suburban development takes the form of large housing estates, as a type of planned new towns (Hirt & Kovachev, 2006; Nedović-Budić, et al., 2006); current suburban growth in the post-socialist city takes the form of capitalist sprawl (Tammaru, et al., 2009; Sykora & Ourednicek, 2007); edge cities are found in the outskirts of large metropolitan areas in regions with highly developed economies (Garreau, 1992); informal settlements in peri-urban areas are most associated with urban poverty (Deda & Tsenkova, 2006). From the standpoint of this research, the stated typology of suburban forms should be supplemented by an additional format that is of concern for post-socialist cities in Europe – former villages surrounding large cities. These settlements are nowadays located within the administrative boundary of the cities, within the so called city region (Sykora & Stanilov, 2014). They are in various stages of transformation from rural to suburban and represent a specific form of *suburban-rural satellites*. Rural origins and lack of planned development distinguishes them from satellite new towns. Genesis, development circumstances and urban structure distinguishes them from sprawl. The city and its suburban settlements are dealt with together as an urban area, since they are strongly connected (Zavodnik Lamovšek, et al., 2008).

Nowadays, certain deficiencies in suburban planning can be observed in various types of suburban environments, as well as the problems they generated in physical-spatial, functional and socio-economic structure (Dinić, 2015). One of the biggest problems suburbia faces nowadays is mono-functionality, most often the inexistence of any other urban use except the residential one. Such development models result in suburban neighborhoods that are merely “bedroom communities” to their inhabitants. Suburban forms that have been functioning only as city “bedrooms” ever since their emergence are large socialist housing estates and urban sprawl. In the first suburban type the mono-functionality was planned, while in the case of sprawl it was spontaneously developed. The issue of mono-functionality is also present with

suburban satellites - former villages. It doesn't date back to the settlement origins, but is a consequence of the loss of functions due to development circumstances. In other suburban types it is possible to avoid the "bedroom communities" scenario.

In contemporary planning theory, a polycentric spatial structure, or deconcentration of functions from the city center to secondary centers within the administrative territory of a city, represents the only sustainable form of development when it comes to positioning central places. So far, in the ongoing transformation of metropolitan areas in the post-socialist Central and Eastern European countries (CEE), the formation of subcenters outside of the metropolitan core, in a hierarchical network, is not fully articulated (Stanilov & Sykora, 2014). In this regard, the initial hypothesis of this research is that mono-functional suburban settlements cause conflicts in the city development patterns and that there is a significant correlation between the existence of a center and suburban settlement performance. Although mono-functionality represents the main reason for the lack of vitality, some other urban design principles also encourage "unsustainable" use of land in the urban periphery, causing the phenomenon of "bedroom communities". Therefore, the aims of this study are: 1) to establish specific spatial and functional features of urban design that produce the same/ similar problems in suburban settlements – "bedroom communities" and 2) to propose guidelines for shaping suburban settlements based on the identified elements. Characteristics of suburban design are explored on the basis of the established criteria of suburbia's physical and functional structure and their indicators, which are outlined in the second part of the paper.

## 2 METHODOLOGY

This paper determines the characteristics of the stated suburban types – "bedroom communities", by using empirical research, literature review and practical experience. The research is based on a comparative analysis of three suburban neighborhoods of the post-socialist city, where the issue of mono-functionality was/ is present. The analysed suburban forms are located within the administrative area of the City of Niš, which is a typical post-socialist city and the third largest city in Serbia. Cases are chosen based on the following criteria: 1) a typical suburban neighborhood/ segment – spatial entity which is representative of its type within the established typology of suburban forms, and 2) suburban neighborhood/ segment has a minimum population of 2.000, which corresponds to the smallest spatial-functional residential unit.

The first case is a planned new segment of the City of Niš from the socialist period - large housing estate in the Krive Livade neighborhood. It was built in the 70's, in what was then the outskirts of the city (Figure 1A). Sprawling neighborhoods Podvinik and Vinik, located outside the urban boundary of Niš, were chosen as the second suburban form. The analysed area at the foot of the hill Vinik was formed in the 70's as a settlement of weekend cottages, which were later transformed into permanent homes. New low-density residential development also occurred in this area (Figure 1B). The third analysed suburban type is a zone of two rural settlements, Donji Komren and Gornji Komren in the immediate vicinity of Niš (Figure 1C). This suburban extension generates post-socialist sprawl. All three examples of suburban settlements, despite the diversity of urban form and structure, generate similar problems and manifest similar shortcomings in the usage of space, and therefore make a suitable basis for the analysis of urban design features of "bedroom communities".

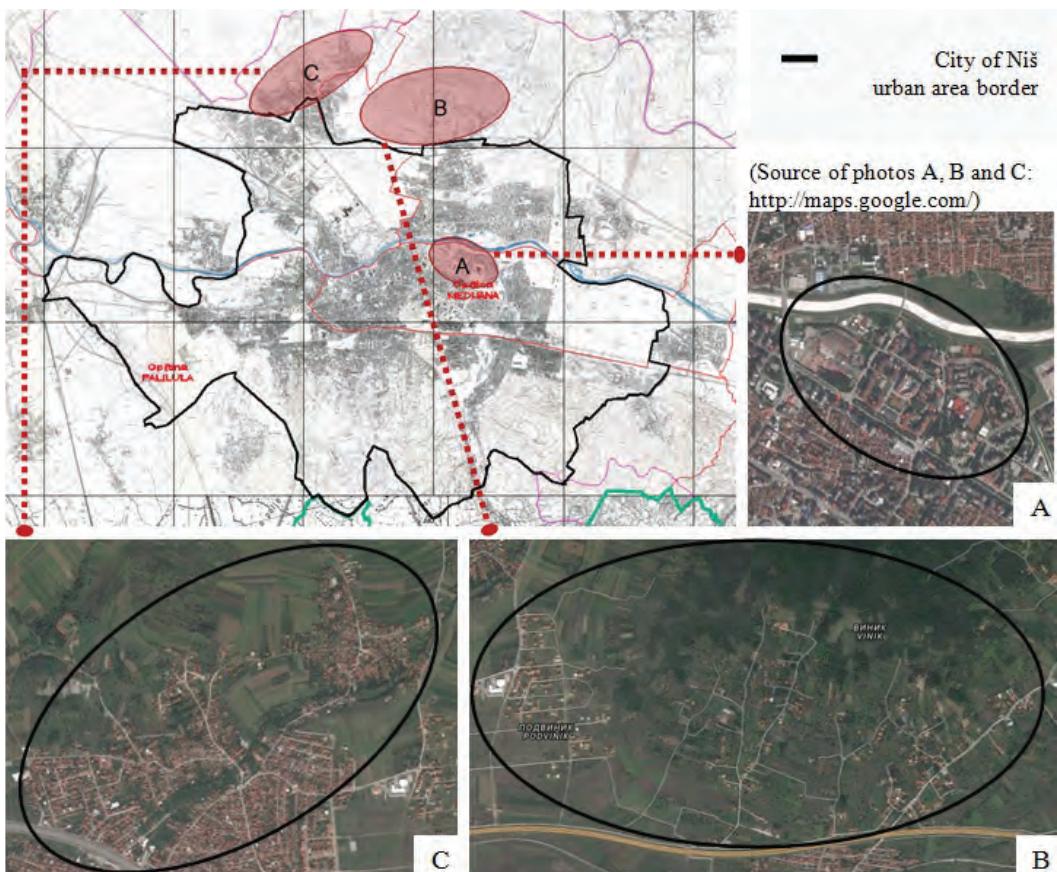


Figure 1: Different suburban forms in the administrative area of the City of Niš and their location. A) Large housing estates, Krive Livade; B) Urban sprawl, Podvinik and Vinik; C) Suburban-rural satellites Donji Komren and Gornji Komren.

In order to evaluate the quality of urban design of the listed suburban forms, this research uses four criteria relating to the physical and functional component of urban structure: 1) central urban functions, 2) population densities, 3) public spaces adjacent to central urban functions, and 4) neighborhood traffic. These criteria reflect the cause-and-effect relationship between suburban design features of and the quality of central zones in suburban areas. Each criterion is evaluated on the basis of measurable indicators (Table 1), with four value-levels established for the evaluation of indicators. A border value is determined for each indicator.

In the functional sense, the first important criterion of suburban design is the existence of *central urban functions* in the neighborhood, whose indicators are diversity and integration. Diversity of uses considers the presence of public services (education, health, government, religious), commercial facilities (retail, services, catering, tourism, business), cultural-entertainment and sports facilities (open, closed), as well as their concentration in relation to the gravitating population. Physical integration monitors the allocation of these uses: mutual integration of central urban functions considers the existence of a hub of activity - the neighborhood center, while the integration of central urban functions and housing

observes the presence of lower-ranked centers. In evaluating the functional integration, mutual integration of central urban functions is assessed on the basis of their compatibility, while the integration of central uses and housing is seen as mixing the uses vertically. In evaluating the central urban functions criterion, *synthesized score* of indicators is determined, based on the sum of sub-indicator evaluation and on the established border values. Each of the value levels is assigned a certain number of points: negative points are awarded to the levels very unfavourable (-2) and unfavourable (-1), while the positive points are awarded to the levels moderately favourable (+1) and very favourable (+2).

In other criteria, evaluation indicators are implemented directly. In the physical and spatial sense, the basic characteristic of suburban form design is the *population density* criterion. A border value between favourable and unfavourable density is set at 100 inhabitants/ha, which represents the value required for a sustainable bus line. Population density of 21 inhabitants/ha is adopted as the lower limit of low-density areas with individual buildings (Drobne, et al., 2014; Dinić, 2015). As insufficient densities and densities that are evenly spread out do not support the development of central uses (Llewelyn-Davies, et al., 2009), uniform distribution of density is considered negative, while the formation of density/activity nodes is considered to be positive. The next important characteristic concerns formation of *the public domain adjacent to central functions*. Regarding this criterion, a positive evaluation is given for the following: existence of pedestrian spaces for gathering and establishing social contact (even if they are spontaneously formed and unorganized), integration of central uses and public space, and intensive use of public space. And finally, the last key criterion concerns *neighborhood traffic*. In considering its indicators, the border value of accessible distance from public transport is established at 800 m or a 10 minute walk (Llewelyn-Davies, et al., 2009). The urban matrix with culs-de-sac and no pedestrian links is assessed as very unfavourable, while cases when links exist but are not clearly defined are evaluated as moderately unfavourable. Pedestrian links to the center are favourable when streets are organized into interconnected networks and when there is a continuity of pedestrian scenery, and very favourable if pedestrian links furthermore interconnect all public spaces in the settlement.

The evaluation is performed for the current condition of settlements, taking all transformations into account. The scores indicate the extent to which indicators affect the individual criteria. The impact of these criteria on the quality of urban design is discussed next, both for each criterion singularly and all criteria in interaction. Based on this analysis, the paper discusses basic principles in structuring the centers of suburban neighborhoods.

### 3 SUBURBAN DESIGN

Suburban forms - “bedroom communities” have very different genesis and development circumstances, which caused the specific urban design. The characteristics of suburban design of “bedroom communities” are examined and the assessment of urban design quality is performed (Table 1).

**Large housing estates** (hereinafter **LHE**) were constructed at the periphery of cities in the first decades after WW2, according to the CIAM principles of urban planning. These housing estates were planned and built as master-planned communities, in the form of massive urban extensions at the urban edge (Sykora & Stanilov, 2014). Districts were created with large volume structures in a free-standing manner, using the same monotonous and multiplied forms, with huge setbacks and large green areas between

buildings. Socialist housing estates had some urban attributes regarding density and building typology, but they also featured certain typically suburban characteristics, such as peripheral location and emphasis on residential uses (Stanilov & Sykora, 2014).

Table 1: Evaluation of urban design quality in various suburban forms.

Urb. design criterion	Indicator	Suburban form			Established border values
		LHE	US	SRS	
Central urban functions	Diversity	■■	□□	□	<i>Synthesized score</i>
	Public services	■■	□□	■	-8 to -4
	Commercial facilities	■■	□□	□	-3,9 to 0
	Culture-entertainment	□	□□	□□	0,1 to +4
	Sports facilities	■■	□□	■	+4,1 to +8
	Integration	□	NA	□	<i>Synthesized score</i>
	Physical-mutual	■	NA	■	-8 to -4
	Physical-with housing	□	NA	□	-3,9 to 0
Population densities	Functional-mutual	■	NA	□	0,1 to +4
	Functional-with housing	□□	NA	□	+4,1 to +8
	Value	■■	□□	□	<23 23 - 100 101 - 200 >200
	Distribution	□	□	■	uniform distribution with density nodes
	Share	■■	□□	■	non-existent greenery only unorganized, greenery planned square, greenery
Public spaces adjacent to central functions	Integration	□□	NA	■	isolated from central functions no integration poor integration good integration
	Usage	■	NA	□	active passive
	Public transport	■■	□	■	>1.200 m (15 min) >800 m (10 min) <800 m (10 min) <400 m (5 min)
	Pedestrian links to center	■	□□	■	non-existent ill-defined, unsafe pedestrian scenery exists interconnect all public spaces

*Synthesized score:* □□ very unfavourable; □ unfavourable; ■ moderately favourable; ■■ very favourable

LHE – large housing estates; US – urban sprawl; SRS – suburban-rural satellites; NA – not applicable

**Urban sprawl** (hereinafter **US**) in post-socialist cities began late, in the 90's of the 20th century. Referring to the research of various authors, Sykora & Stanilov (2014) state that, since the mid-90's, suburbanization has become the predominant mode of urban growth not only in post-socialist metropolitan areas, but in medium-sized cities as well. As a result of a growing public preference for detached single-family houses with private yards, a substantial amount of new residential development occurred at the suburban

periphery (Stanilov, 2007). Hirt & Stanilov (2007) mention another phenomenon in the case of Sofia, where many of the original summer cottages in the so called „villa zones“ abutting many of the peripheral villages, have been converted into permanent residences. Sprawling suburbs often still lack basic public facilities, local centers and infrastructure.

During socialist period, **suburban-rural satellites** (hereinafter **SRS**) were separated from the urban edge by the agricultural belt. These villages were joined with city territory in the 60's and 70's, in order to increase the share of urban population in the country and secure the reserve of land for future urban growth (Stanilov, 2007). The existing network of rural settlements surrounding post-socialist cities is stated as the most important historical and cultural reason of suburbanization and urban sprawl (Couch, et al., 2007). After the collapse of socialism, sprawling development leads to physical merger of urban areas and surrounding villages, so the boundaries between villages and sprawl are now difficult to establish (Dinić, et al., 2014).

### 3.1 Uses

**LHE.** The concept of the socialist housing estates is based on CIAM principles of modern city planning, but it is also infused with ideas from the Perry's Neighborhood Unit concept (Stailov, 2007). In socialist planning theory, each component of such an estate should have been served by corresponding public services according to established standards, in order to ensure equal living standard to everyone (Stanilov, 2007). The reality, however, was different - planners either significantly reduced the people needs for services, or deliberately postponed the construction of non-residential facilities in order to keep the cost low (Hirt & Stanilov, 2007). Therefore, LHE were mono-functional by plan and with a relatively modest degree of public services. Local centers were not completed as planned or their construction had never even begun.

Regarding the analysed neighborhood of Krive Livade in the period of socialism, in addition to public services (school, kindergarten, local office), commercial facilities are present to a small extent (services, daily retail, market place). Due to low concentration of uses and lack of diversity, these facilities have not contributed to the creation of local centers. A Community recreational center for the entire high-rise housing zone was planned in the large green area of undeveloped land, but it was never created. After the fall of the socialist regime, development of consumer and producer services quickly followed the establishment of market economies (Sykora & Stanilov, 2014). In Niš, every kind of urban growth was being supported if it brought investments and new jobs. In the analysed area, possibilities for the change of use and implementation of new facilities were created. New construction of small retail and service facilities in green areas occurred, which had temporary character at first, and were later verified as permanent objects in planning documents. The construction of the church in park area followed next. Outside the former center, green/ undeveloped land is being occupied by commercial development and new housing in a drastic and uncontrolled manner, with new buildings lined along main roads and mainly auto-oriented (Figure 2). There was also a spontaneous change of use of the ground floor premises in a large number of residential buildings - residential and utility spaces were transformed into small retail and service facilities. Today there is a diversity of uses and a high concentration of non-residential facilities in the analysed case, but the integration of new uses has not been achieved, nor has the context-appropriate spatial frame been created.

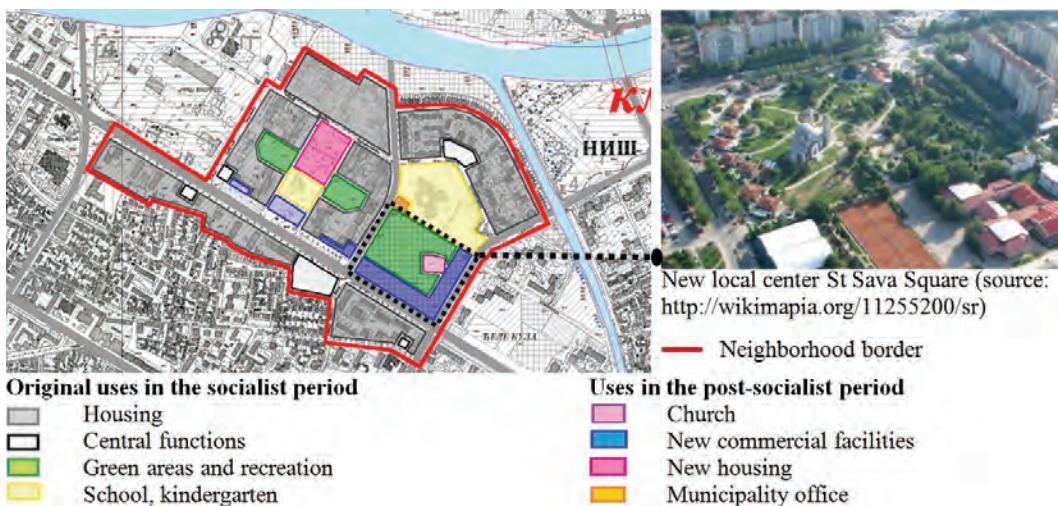


Figure 2: Uses in analysed neighborhood of Krive Livade, Niš, in socialism and after the collapse of socialism.

**US.** In the post-socialist city, the massive spread of housing beyond the urban edge occurred as a result of many different factors: increase of commercial facilities at the expense of residential uses within the urban core, the restitution of land, the relaxation of land development controls, the establishment of an open land market and the diversification of the housing choices (Stanilov, 2007). Tammaru et al. (2009) note that new development occurs in the form of scattered mono-functional settlements on former agricultural land, adjacent to the existing urban fabric or completely independent of it. Boundaries between urban and rural become unclear.

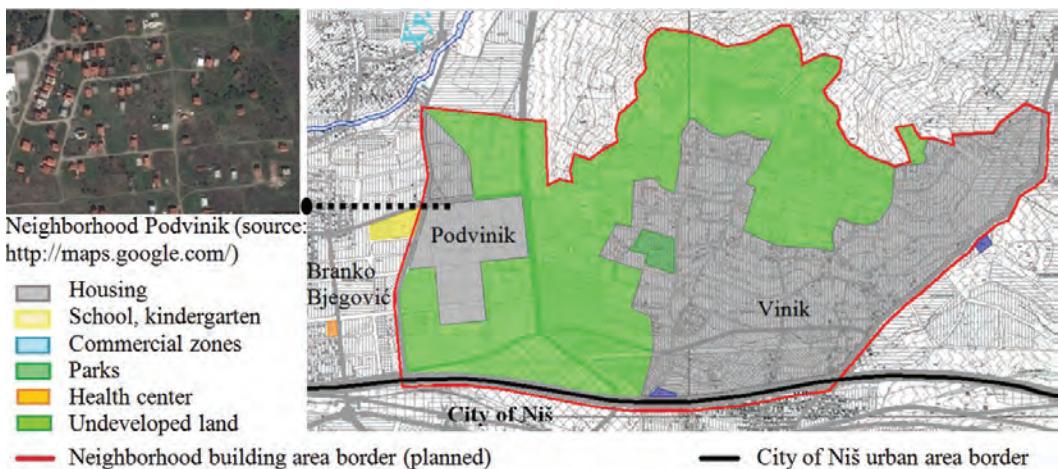


Figure 3: Uses in the analysed urban sprawl segment Vinik and Podvinik, Niš administrative area.

The residential zone of Vinik includes two suburbs in expansion, Vinik and Podvinik. Most of the objects in both neighborhoods were constructed without building permits, so there is no adequate infrastructure in the area. This is solely residential zone (mainly individual buildings on large plots), with no other

amenities, not even a local store. Development of commercial facilities has only just begun along the major roads (Figure 3). Basic urban needs of denizens of Vinik zone are partially met in the neighboring settlement of Branko Bjegović (health center, school, kindergarten, local retail). These facilities are pedestrian-isolated from housing. All other urban needs are met in the city and residents are dependent on cars. The integration of uses doesn't exist. The deconcentration of commercial activities has not yet happened in this area, since the construction of office and retail facilities unfolded in those peripheral areas of the city where the necessary infrastructure was already provided. Planning documents are trying to control sprawl in this area by increasing residential densities, providing public services and creating local centers in both neighborhoods (MP of Niš, 2011).

**SRS.** The population of these settlements is no longer engaged in farming, but commutes to the neighboring city because of work or education. Majority of suburban-rural satellites, which are nowadays covered by the City Master plan, have retained rural physiognomy, but are treated as urban settlements that will absorb the future demographic growth. The increase of motorization has enabled greater distances between the places of dwelling and working, but it has also allowed for most of urban needs to be met in the city. SRS originally had a mixture of different uses (unlike LHE and US which never had it), but lost some of those uses along with their original character after the annexation to the city. The diversity and share of central urban functions are very low.

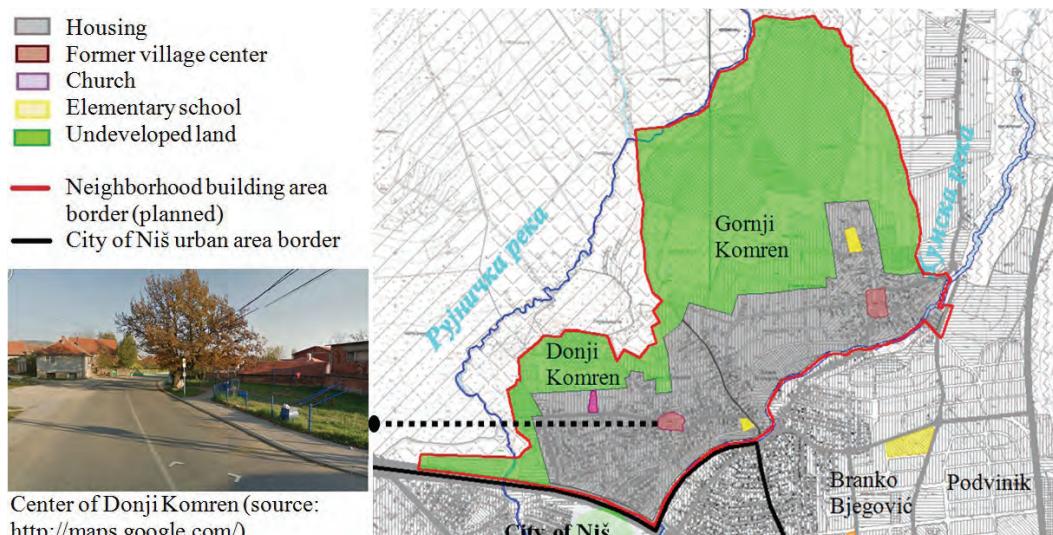


Figure 4: Uses in suburban-rural satellites Donji Komren and Gornji Komren, Niš administrative area.

In the case of suburban settlements of Donji Komren and Gornji Komren, the remains of former village centers are evident. Although these settlements have already developed spatial and structural features of urban settlements, their centers have not undergone this transformation and continue to decline (Figure 4). The center of neighborhood Donji Komren has lost a part of commercial uses (retail), while the center of Gornji Komren has lost the cultural use too (Community Cultural Center is not in use). In the center of Gornji Komren there is only one market for daily supply, a local office and a children's park, the integration of uses is weak. In the center of Gornji Komren there is a

shop, a bar and a park, there is no integration. There are no catering or tourist facilities that would support establishing social contact in the neighborhood centers. Most urban needs are met in the city. After the fall of socialism, the principal development was carried out in the sprawling settlements adjacent to the city. Planning regulations of the City of Niš are nowadays trying to control sprawl by anticipating new central urban functions in dispersed zones, extinguishing the center of neighborhood Donji Komren.

### 3.2 Population densities

**LHE.** In market economy, population densities are determined by location: the farther from the city center, the land is cheaper, residential use is more dependent on land factors and densities are lower (Buckley & Tsenkova, 2006). As opposed to that, in socialist cities population densities are higher in LHE zones away from the city center, than in some closer city areas. This spatial-economic illogicality is explained by the fact that socialist cities had larger public areas at their disposal, as the state owned the land, so its market value was of no concern (Hirt & Kovachev, 2006). In LHE, densities are uniform and built forms are evenly distributed (Llewelyn-Davies, et al., 2009), which results in uniform and monotonous areas and prevents the creation of viable activity nodes. The case of Krive Livade neighborhood, former socialist periphery, corroborates the high value of population density (Table 2) and its uniform distribution on one hand, and low-density of non-residential uses and their concentration in isolated low-rise buildings on other hand. In such a setting, high population densities could not provide good grounds for diversified uses and higher share of central urban functions.

**US.** Even though the phenomenon of sprawling suburbia occurred in Eastern Europe much later than in Western Europe, it unfolded following the capitalist sprawl model. However, compared to their Western counterparts, residential developments in the CEE suburbs are denser and less spread-out. Such a development pattern is a result of several factors: limited level of public financing for infrastructure extensions, high price of land, lower levels of personal incomes and slower rate of residential decentralization (Stanilov, 2007). Residential suburbanization is taking place at a slower rate because it isn't caused by large urban growth in metropolitan areas - it happens mainly through the spatial redistribution of population within metropolitan areas (Sykora & Ourednicek, 2007). Very low levels of population density in the analysed case indicate the beginnings of suburbanization in this area, and do not provide sufficient support for non-residential uses at the local neighborhood level (Table 2). The planning documents in this area provide for further urban growth, with greater densities of both residential and non-residential uses (MP of Niš, 2011).

**SRS.** Population densities in former villages surrounding socialist cities were sufficient enough for normal functioning of these settlements. Agriculture, as a principal activity, provided existence for the denizens and generated a critical mass for other uses. Annexation of rural and suburban districts by the city stimulated extinction of agriculture and produced the daily migrant phenomenon (Bjelikov, 1978). In this period, majority of rural denizens abandoned the villages and organized their housing in the city, and the population density in villages decreased. Today, after significant expansion of urban boundaries, rural settlements are much closer to the city and are again suitable for dwelling. Altered social

circumstances and transition to market economy ended the social practice of an “obligatory free flat for everyone”. Descendants of the former rural population working in cities now often restore abandoned property or build new buildings on their estates, due to proximity of jobs. Suburban-rural satellites of Niš are characterized by constant demographic growth, which especially intensified in the 80's, as is the case with the suburban zone of former villages of Gornji and Donji Komren (Dinić, et al., 2014). The case of Komren zone corroborates the satisfactory values of population densities in SRS nowadays (Table 2), which are the highest in the settlements gravity centers.

Table 2: Population densities of various analysed suburban forms.

Suburban form	Case	Population (inhabitants)	Area (ha)	Population density (inhabitants/ha)
<b>Large housing estates</b>	Neighborhood Krive Livade	13.000	45	289
<b>Urban sprawl</b>	Neighborhoods Podvinik and Vinik	2.000	150	13
<b>Suburban-rural satellites</b>	Komren zone, neighborhoods Gornji Komren and Donji Komren	2.800	84	33

### 3.3 Public spaces

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**LHE.** In socialist cities most of the land was publicly owned, which resulted in great presence of public areas pervading the entire urban structure, and in large surface areas of public spaces themselves (Stanilov, 2007). Public spaces in LHE had no commercial uses whatsoever. Urban design was modest, which is somewhat the result of the lack of an adequate spatial frame, but also the lack of finances. Therefore, public spaces in socialist cities were not intensively used, nor did the public space have an important role in shaping the centers of local communities. In the period of socialism, the analysed neighborhood of Krive Livade was characterized by large and modest public spaces, as well as a vast unorganized green area which was intended for the creation of a local center. There was no integration of public space with those few central uses, nor the integration of the planned central area with other public spaces. The post-socialist period is characterized by commercialization of public space and transformation of urban form. Central park area was transformed into a square, due to a large amount of new construction (Figure 2). Even though the introduction of new facilities helped to form a local Community center, a proper character of the place was not created. The transformation does not result in a balanced ratio of built-undeveloped land, significantly privatizes the space and artificially creates multi-functionality, where there's only room for profitable facilities. The concentration of uses and users far exceeds the capacity of space.

**US.** The new suburbs of the post-socialist city, located between the city and the nearby former villages, not only lack infrastructure, but have no public spaces at all, not even basic amenities such as playgrounds (Hirt & Stanilov, 2007). In sprawling neighborhoods the habit of walking is altogether abandoned due to huge walking distances, and thus the focal points of pedestrian traffic - the open and public spaces - disappear. This makes social contact very difficult. The only public spaces are located in the surrounding neighborhoods. In the analysed case of Vinik suburbs in Niš there are no public spaces within the residential zone (Figure 3).

**SRS.** In socialist period, social interactions in the villages nearby large cities were the most intensive in the area of public facilities, most often a church, a community cultural center or a local shop in the village center. Even though public spaces were not characterized by good urban design, they represented a place of gathering for the locals. The pedestrian way of moving about and a relatively small number of inhabitants that all knew one another played a crucial role in the vitality of public spaces. Settlements mostly had a vital village center. After annexation of villages by cities, the usage of public space in them was reduced, and village centers began to deteriorate. The development of motorization and establishment of public transportation lines have enabled the population to satisfy most of the urban needs in the city, which reduced everyday walks and potential for establishing social contact. The case of Komren area shows the lack of adequate physical framework to support social interactions, which is one of the consequences of low concentration of central functions (Figure 4).

### 3.4 Traffic

**LHE.** Communication infrastructure in socialist housing estates was of generous dimensions, and large urban blocks were adapted for car use, which was all a result of strict planning standards. Due to the unclear boundaries of public space, pedestrian and vehicular paths got mixed and public spaces were occupied by parked cars. This phenomenon escalated in post-socialist period due to new construction and new facilities. LHE were always well served by public transport. Pedestrian traffic was developed but didn't encourage social contacts - stretches along LHE served only the basic function of motion. In the analysed neighborhood of Krive Livade, in the post-socialist period, an attempt was made to create street scenery by constructing new commercial facilities along the property lines. Even though pedestrian links to the neighborhood center are now better defined, the pedestrian character of space is jeopardized by the increased parking needs for the new facilities.

**US.** Since typical suburban development nowadays involves vast areas under detached single-family housing, owning a car is a necessary precondition of suburban life. Many of the former peripheral villages surrounding socialist cities that have served as nucleus of post-socialist suburbanization, are connected with public transit, but the level and quality of this service is significantly below the aspirations of new suburban residents (Stanilov, 2007). Therefore, a rapid increase in the level of motorization occurred. The haphazard, low-density pattern of suburban growth has limited public transit options to the growing suburban areas (Hirt & Stanilov, 2009). The case of zone Vinik shows low population density and auto-designed environments, which do not allow walking or serving suburbia with the public transport, as well as they favour the segregation of uses.

**SRS.** Regarding the tradition of well-developed public transport in CEE cities, all suburban-rural satellites in the vicinity of the city are mostly served by public transport (Stanilov, 2007), regardless of population density value. However, its quality is questionable – the case of Komren settlements illustrates that departures are not frequent. Transport is conceived mostly to meet the needs of daily commuters to the city. Those inhabitants of the satellites that can afford a car, have one. It is supposed that the use of individual transport would be higher if the socio-economic situation were better. Pedestrian traffic in the analysed settlements is well-developed, which is a rural habit in the usage of space, but was reduced with the loss of central functions.

## 4 DISCUSSION

It can be stated that these three very different physical forms share some common characteristics of urban design that produce the same problems in all three formats. In the cases analysed, a segregation of uses is performed between the residential zone and the area of central facilities, while residential zones themselves have a small concentration of central uses, or do not have them at all. Attempts have been made in LHE to introduce new facilities in order to increase diversity, but these interventions are not sufficient since new uses do not generate high-quality spatial-functional relations with the existing surroundings. Non-residential uses aren't present in US, while housing is spread out across a vast surface in isolated mono-functional zones. SRS are constantly losing non-residential uses, traditional links between uses and former neighborhood character, with all urban needs being satisfied in the nearby city. Therefore, mono-functionality and poor integration of urban functions represent the main factors in creating the settlements of insufficient vitality – "bedroom communities".

The conditions for social interactions outside the apartment are to some point created in LHE, due to high population density and good provision of public spaces. In spite of that, a lack of activities is evident in these housing estates, which is a result of modest urban design, poor provision of urban furniture and insufficient definition of space (both on the ground level and in the vertical plane). Newly built commercial facilities are isolated from public spaces and do not contribute to their shaping, and can often visually clutter the area. This feature of LHE points to the fact that the indicator of population density is not a crucial determinant for the neighborhood quality and sustainability. On the contrary, the excessive concentration of tenants produces social conflicts and increases parking needs. Urban sprawl however has entirely different characteristics compared to the previous suburban form – densities are insufficient for any kind of social interaction. With LHE and US there is no continuity in streetscape and no adequate spatial framework for vital public spaces and establishing social relations. The buildings are positioned at a certain distance from the property line, as freestanding, with no physical relations to the adjacent structures. In SRS, despite better population density, favourable allocation of central facilities in the village center and the existence of public spaces (all of which are rural heritage), during the village-to-suburb transformation there was a decline in concentration of central functions and a loss of gathering habit. Public spaces are not used intensively in either of these suburban forms.

All analysed suburban forms are generally auto-oriented. The example of LHE confirms that the traffic patterns that are conducive to the vitality of suburbia are grid street system and well-developed public transport, while the lack of active street fronts and non-integrated public spaces cause undeveloped pedestrian traffic. Stimulation of individual car traffic has a very negative effect, which in the case of sprawl results in large distances and makes walking impossible. Despite the diversity of shape and population density, both suburban formats, LHE and US, develop auto-oriented commercial strip along major roads, surrounded by parking lots and pedestrian unfriendly. In SRS, the state of traffic can be described as moderately favourable, primarily due to the developed public transportation and the traditional planning principles on which these settlements were based, including pedestrian character. At this point in time, new development in areas between the city and its satellites should be implemented very carefully, due to the currently prevailing scenario of "shrinking cities", or cities that are experiencing population losses. The rise of standards in post-socialist societies can very easily result in the scenario that even

remote villages, at a 30 minute-ride from the city, become very desirable places because of their contact to nature and higher privacy, just like sprawl settlements. For this reason, improving public transport on the entire city territory must be taken into account, in order to stimulate sustainable transportation models and avoid the excessive use of individual vehicles.

## 5 CONCLUSION: HOW TO AVOID THE "BEDROOM COMMUNITY" SCENARIO

Cases treated in this paper show that mono-functionality of suburbia and strict segregation of uses lead to adverse development models. Vitality of suburban neighborhoods requires diversity of uses, which is the first but not the only condition of their sustainable development. Experiences in LHE revitalization show that the mere increase in density of central facilities is not a measure sufficient enough to create *genius loci*, or a distinctive character/ spirit of the place (Rossi, 1996). The problem of implementing central content is much more complex, and involves urban economy, sociological aspect and especially, the issue of urban design. When it comes to allocation of uses, in cases of sprawling settlements it is evident that isolated residential zones are not a good solution. Therefore, the implementation of mixed-use development in suburban zones seems to be the best development model, with carefully balanced mixture of central functions and housing as the principal use. Retail, shaped as small local shops within walking distance from housing, must be encouraged in suburbia, for it generates everyday visits and ensures vitality (Gupta, 2008).

Establishing a proper value of urban density parameter in suburban areas is very important. Low population density at the periphery considerably increases the cost of construction and makes public transport impossible. High suburban densities are not economically justified. Therefore, moderate density values are recommended in suburbia, which create a critical mass of people in the street, increase safety and enable the creation of the *genius loci*. Low densities do not support the implementation of mixed use development, but high densities alone are not sufficient to provide vitality. Furthermore, for a suburban settlement it is essential to create an attractive and picturesque neighborhood center with mixed uses, in a space of human proportions, which is well-integrated into the surroundings via pedestrian and car links (Llewelyn-Davies, et al., 2009). The use of public spaces (street, square, park) is preferred, which should be attractive pedestrian-oriented focal points integrated into the network of pedestrian paths. Residents of suburbia must have a place for establishing social contacts outside their home. The presence of public spaces also contributes to the safety of the environment.

Traffic design favouring mixed-use development requires public transport and a grid network with street scenery which allows walking. Establishment of public transportation lines to the suburban districts is necessary. Pedestrian trails and biking treks (especially towards the neighborhood center) are multiply useful as they interconnect public spaces, encourage social contacts and contribute to a healthy way of life.

In order to achieve the sustainability of suburbia, in the process of planning it is most appropriate to use the traditional planning principles of a compact town: pedestrian character of space, local services, diversity of uses, small shops and services at a walking distance from residence, low-rise structures which interact with the environment, district center with a strong *genius loci* and good designed public spaces for establishing social contact. Efficient usage of land and infrastructure is achieved through moderate density values and development of public transport. Synergic action of all these elements of urban design is necessary for sustainable suburban neighborhoods, which will be more than a "bedroom community" to their denizens.

## References:

- Bjelikov, V. (1978). Stanovanje u gradu i regionu. Beograd: Prosveta.
- Buckley, R. M., Tsenkova, S. (2006). Urban housing markets in transition: New instruments to assist the poor. S. Tsenkova and Z. Nedović-Budić (Eds.), *The urban mosaic of post-socialist Europe: space, institutions and policy* (pp. 173–194). New York: Physica-Verlag HD. DOI: [http://dx.doi.org/10.1007/3-7908-1727-9\\_9](http://dx.doi.org/10.1007/3-7908-1727-9_9)
- Couch, C., Petschel-Held, G., Leontidou, L. (2007). *Urban Sprawl in Europe: Landscape, Land-Use Change and Policy*. Oxford: Wiley-Blackwell. DOI: <http://dx.doi.org/10.1002/9780470692066>
- Deda, L., Tsenkova, S. (2006). Poverty and inequality in Greater Tirana: The reality of peri-urban areas. S. Tsenkova and Z. Nedović-Budić (Eds.), *The urban mosaic of post-socialist Europe: space, institutions and policy* (pp. 151–170). New York: Physica-Verlag HD. DOI: [http://dx.doi.org/10.1007/3-7908-1727-9\\_8](http://dx.doi.org/10.1007/3-7908-1727-9_8)
- Dinić, M., Đurić, J. & Mirković, P. (2014). Rural settlements in suburban landscape of the post-socialist city – Niš case study. *Landscape Transformations - International interdisciplinary student conference: Conference proceedings* ISBN 978-80-01-05676-9 (pp. 136–143). Prague, October 2014.
- Dinić, M. (2015). Restruktuiranje centara suburbanih naselja – mogućnosti unapređenja modela od funkcionalnog zoniranja ka mešovitim funkcijama. Doktorska disertacija. Niš: Građevinsko-arhitektonski fakultet Univerziteta u Nišu.
- Drobne, S., Žaucer, T., Foški, M., Zavodnik Lamovšek, A. (2014). Continuous built-up areas as a measure for delineation of urban settlements. *Geodetski vestnik*, 58 (1): 69–102. DOI: <http://dx.doi.org/10.15292/geodetski-vestnik.2014.01.069-102>
- Dunham-Jones, E., Williamson, J. (2011). *Retrofitting Suburbia: Urban Design Solutions for Redesigning Suburbs*. New Jersey: John Wiley and Sons Inc.
- Garreau, J. (1992). *Edge City: Life on the New Frontier*. New York: Anchor Books.
- Gupta, P. K. (2008). *Creating Great Town Centers and Urban Villages*. Washington, D.C.: Urban Land Institute.
- Hall, P. (1974). *Urban and regional planning*. Harmondsworth: Penguin.
- Hall, P. (2009). Introduction. P. Hackett (ed.), *Housing and growth in suburbia* (pp. 3–6). London: The Smith Institute.
- Hirt, S., Kovachev, A. (2006). The changing spatial structure of post-socialist Sofia. S. Tsenkova and Z. Nedović-Budić (Eds.), *The urban mosaic of post-socialist Europe: space, institutions and policy* (pp. 113–130). New York: Physica-Verlag HD. DOI: [http://dx.doi.org/10.1007/3-7908-1727-9\\_6](http://dx.doi.org/10.1007/3-7908-1727-9_6)
- Hirt, S., Stanilov, K. (2007). The perils of post-socialist transformation: Residential development in Sofia. K. Stanilov (Ed.), *The Post-Socialist City: Urban Form and Space Transformations in Central and Eastern Europe after Socialism* (pp. 215–244). Dordrecht: Springer. DOI: [http://dx.doi.org/10.1007/978-1-4020-6053-3\\_11](http://dx.doi.org/10.1007/978-1-4020-6053-3_11)
- Hirt, S., Stanilov, K. (2009). Revisiting Urban Planning in the Transitional Countries. Regional study prepared for Planning Sustainable Cities: Global Report on Human Settlements. [http://www.archive.spia.vt.edu/ SPIA/docs/shirt/Revisiting\\_Urban\\_Planning\\_in\\_the\\_Transitional\\_Countries.pdf](http://www.archive.spia.vt.edu/ SPIA/docs/shirt/Revisiting_Urban_Planning_in_the_Transitional_Countries.pdf), accessed: 28. 10. 2015.
- Llewelyn-Davies, Baxter & associates (2009). *Priročnik za urbani dizajn*. Beograd: Prograf i Orion Art.
- Maksimović, B. (1980). *Urbanizam – teorija prostornog planiranja i uređenja naselja*. Beograd: Naučna knjiga.
- Mumford, L. (2006). *Grad u istoriji: njegov postanak, njegovo menjanje, njegovi izgledi*. Beograd: Book & Marso.
- Nedović-Budić, Z., Tsenkova, S., Marcuse, P. (2006). The urban mosaic of post-socialist Europe – Introduction. S. Tsenkova and Z. Nedović-Budić (Eds.), *The urban mosaic of post-socialist Europe: space, institutions and policy* (pp. 3–20). New York: Physica-Verlag HD. DOI: [http://dx.doi.org/10.1007/3-7908-1727-9\\_1](http://dx.doi.org/10.1007/3-7908-1727-9_1)
- Rossi, A. (1996). *Arhitektura grada*. Beograd: Građevinska knjiga.
- Stanilov, K. (2003). Introduction: Postwar growth and suburban development patterns. K. Stanilov and B. C. Scheer (Eds.), *Suburban Form: An International Perspective* (pp. 1–12). London: Routledge.
- Stanilov, K. (2007). Political reform, economic development and regional growth in post-socialist Europe. K. Stanilov (Ed.), *The Post-Socialist City: Urban Form and Space Transformations in Central and Eastern Europe after Socialism* (pp. 21–34). Dordrecht: Springer. DOI: [http://dx.doi.org/10.1007/978-1-4020-6053-3\\_2](http://dx.doi.org/10.1007/978-1-4020-6053-3_2)
- Stanilov, K. (2007). Housing trends in Central and Eastern European cities during and after the period of transition. K. Stanilov (Ed.), *The Post-Socialist City: Urban Form and Space Transformations in Central and Eastern Europe after Socialism* (pp. 173–190). Dordrecht: Springer. DOI: [http://dx.doi.org/10.1007/978-1-4020-6053-3\\_9](http://dx.doi.org/10.1007/978-1-4020-6053-3_9)
- Stanilov, K. (2007). Democracy, markets, and public space in the transitional societies of Central and Eastern Europe. K. Stanilov (Ed.), *The Post-Socialist City: Urban Form and Space Transformations in Central and Eastern Europe after Socialism* (pp. 269–284). Dordrecht: Springer. DOI: [http://dx.doi.org/10.1007/978-1-4020-6053-3\\_13](http://dx.doi.org/10.1007/978-1-4020-6053-3_13)
- Stanilov, K., Sykora, L. (2014). Postsocialist Suburbanization Patterns and Dynamics: A Comparative Perspective. Stanilov, K. and Sykora L. (Eds.), *Confronting Suburbanization: Urban Decentralization in Postsocialist Central and Eastern Europe* (pp. 256–295). Chichester: Wiley-Blackwell. DOI: <http://dx.doi.org/10.1002/9781118295861.ch9>
- Sykora, L., Ouredníček, M. (2007). Sprawling post-communist metropolis: Commercial and residential suburbanisation in Prague and Brno, the Czech Republic. Dijst, M., Razin, E. and Vazquez, C. (Eds.), *Employment Deconcentration in European Metropolitan Areas: Market Forces versus Planning Regulations* (pp. 209–234). Dordrecht: Springer. DOI: [http://dx.doi.org/10.1007/978-1-4020-5762-5\\_8](http://dx.doi.org/10.1007/978-1-4020-5762-5_8)
- Sykora, L., Stanilov, K. (2014). The Challenge of Postsocialist Suburbanization. Stanilov, K. & Sykora L. (eds.), *Confronting Suburbanization: Urban Decentralization in Postsocialist Central and Eastern Europe* (pp. 1–32). Chichester: Wiley-Blackwell. DOI: <http://dx.doi.org/10.1002/9781118295861.ch1>
- Tammaru, T., Leetmaa, K., Silm, S., Ahas, R. (2009). Temporal and Spatial Dynamics of the New Residential Areas around Tallinn. *European Planning Studies*, 17, 3: 423–439. DOI: <http://dx.doi.org/10.1080/09654310802618077>
- Zavodnik Lamovšek, A., Drobne, S., Žaucer, T. (2008). Small and medium-size towns as the basis of polycentric urban development. *Geodetski vestnik*, 52 (2), 290–312.
- Master Plan of Niš. (2011). *Zavod za urbanizam Niš, Službeni list grada Niša br. 43*.



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