City fortifications and the form of European cities, with special reference to Croatia

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Abstract. *Developments on the sites of bastion fortifications are often well-designed expansions of city cores with mainly public buildings, representative residential buildings and public spaces. The transformation of bastion fortifications in the Croatian towns of Karlovac and Osijek in the early-twentieth century resulted in the creation of urban landscapes that can be compared in their characteristics with similar areas in major cities such as Frankfurt, Hamburg and Copenhagen. Developments in these two towns are comparable to those in the nineteenth century in many parts of Europe. They are inner fringe belts forming boundary zones between historically and morphologically distinct housing areas.*

Key Words: city fortifications, urban transformation, public buildings, fringe-belt concept, Croatia

The transformation of bastion fortification zones in European towns in the nineteenth century resulted in some of the most important urban achievements of the time. Well-known examples such as Vienna, Frankfurt, Bremen and Brno show that the spaces created in place of former bastion fortifications are frequently well-designed extensions to city cores containing mainly public buildings, representative residential buildings and public civic spaces. This pattern of transformation of fortifications significantly influenced nineteenth-century town planning and had a strong influence on the transformation of some towns in the twentieth century. The aim of this paper is to use the towns of Karlovac and Osijek as examples of Croatian towns where such transformation of bastion fortifications was realized in the early-twentieth century, and to demonstrate that the spaces created in place of the former fortifications have similar characteristics to those of transformations of bastion fortifications in other European and Croatian cities during the nineteenth century.

Construction of bastion fortifications in European cities

The medieval fortifications of European cities, comprising high defence walls and towers, lost their purpose in the late-fifteenth century owing to the development of military techniques, particularly the use of gunpowder and the improvement of firearms. In the early-sixteenth century a new type of bastion fortification system was developed and built in many places. This new type was influenced by the treatises and theoretical studies of Italian and Central European Renaissance theorists dealing with ideal city concepts, and was an answer to the requests from state rulers for

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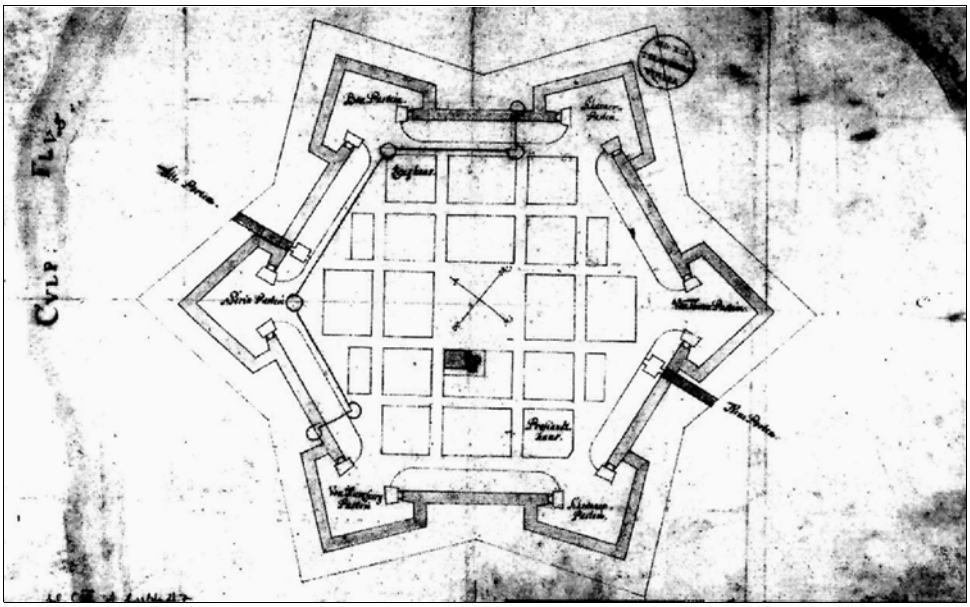

Figure 1. Karlovac in 1579. Source: Žmegač (2000, p. 114).

more efficient defences. A pivotal moment in the further development of military fortifications was Charles VIII's invasion of Italy in 1494, after which the inadequacy of medieval fortifications to withstand gunpowder artillery brought about an increased development of bastion fortifications (Duffy, 1979). In contrast to mainly vertical medieval walls, bastion fortifications are markedly horizontal, with complex ground plans. They are constructed in materials different from those used in medieval fortifications, generally being of stone and brick combined with earth to absorb the impact of cannon balls. The first bastion fortifications were built in Italy at the end of the fifteenth century. From the early-sixteenth century the construction of bastion fortifications spread across Italy, and then Italian builders helped the diffusion of such systems across Europe.

The wars of religion strongly influenced the construction and development of the bastion type of fortification system both on Europe's borders (for example in Croatia, which represented a first line of defence against the Ottoman Empire) and in its centre, as in France during the French wars of religion between 1560 and1630 (Wolfe, 2000, p. 320). During four centuries, between the fifteenth and eighteenth centuries, bastion fortifications strongly defined the form of European cities, having both a practical and a strongly expressed symbolic meaning. They were also an important accompaniment of European overseas expansion (Parker, 2000, pp. 573-604).

Owing to Croatia's geopolitical position at the crossroads of the civilizations and cultures of East and West, the construction of bastion fortifications there started simultaneously with the first European examples and lasted until the nineteenth century: Karlovac was founded in 1579, for example, and Palmanova, Italy, in 1593 (Figure 1). During three centuries of almost continuous warfare, a strongly defended border between the Habsburg and Ottoman Empires was established in the area of continental Croatia. This frontier consisted of a great number of bastion type fortifications, which were either modernized medieval fortifications (Varaždin, Križevci, Osijek) or newly constructed fortifications (Karlovac). The most important fortifications were built during the eighteenth century, mostly following Vauban principles of fortification architecture. The fortifications built during this period are the strongest and most complex fortification constructions in conti-

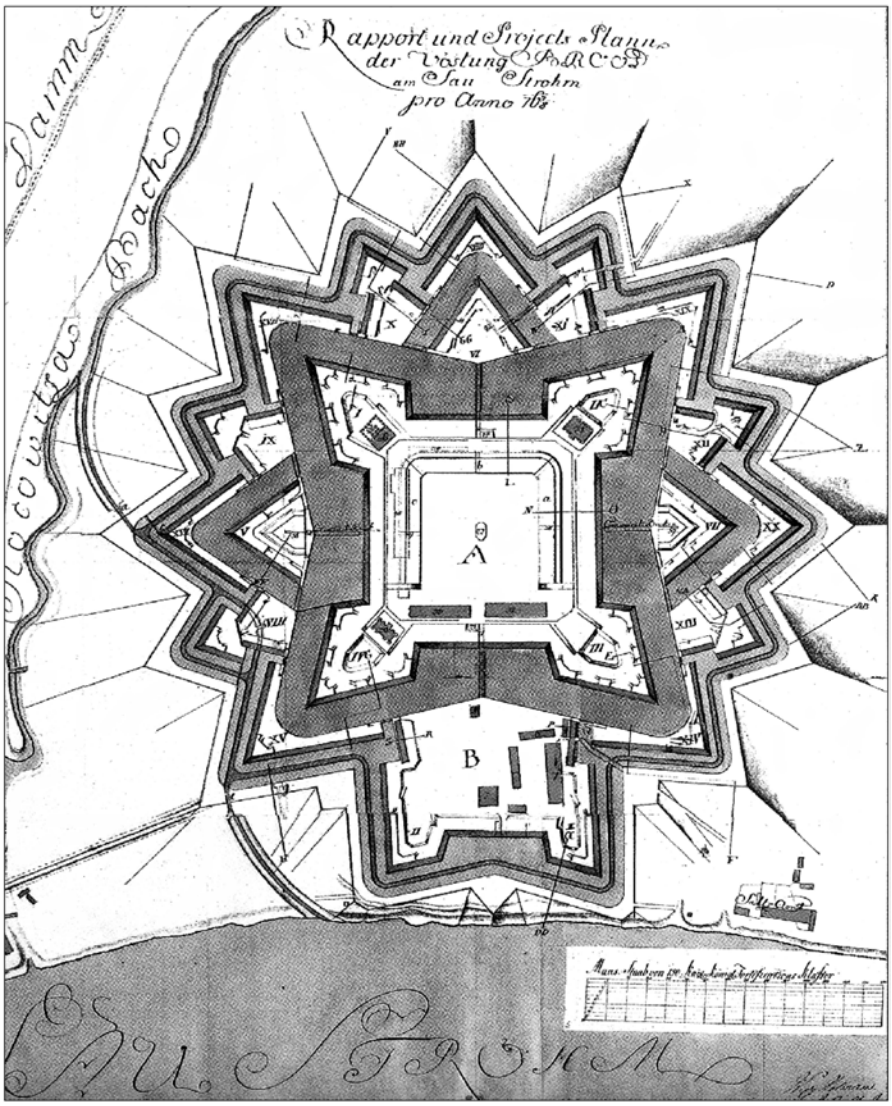

Figure 2. Slavonski Brod in 1768. Source: Marković (1994, p. 142).

nental Croatia and are characterized by a complex system of stone or brick elements (Figure 2). With the exception of some alterations and renovations of fortifications (Osijek, Karlovac), which continued throughout the twentieth century, the construction of bastion type fortifications in the area of continental Croatia ceased in the middle of the eighteenth century (Žmegač, 2000, p. 36).

The transformation of bastion fortifications in European cities

As a result of changes in the geopolitical situation in Europe, coupled with changes in warfare caused by the modernization of firearms, the bastion fortifications of European cities lost their purpose. In the early-nineteenth century there was a need for their integration into the urban fabric. With the widespread levelling of fortifications during the nineteenth century new spatial possibilities appeared in European cities, both for connecting what had been separated parts of the town, and in creating new, very valuable building land in city centres.

The transformation of bastion fortification zones in European towns in the late-nineteenth and early-twentieth centuries resulted in well-

Figure 3. Location of Osijek and Karlovac within continental Croatia.

designed extensions of city cores. Such urban transformations, creating new urban qualities and new town identities, are often named *ring-concept* transformations.

The term *ring concept* is used to mean a model of transformation employed in the planning of spaces created in place of bastion fortifications in nineteenth-century European towns. At the time of the planning and realization of such transformations the *ring concept* had not yet been defined, but a great number of spaces created in that way possess very similar urban characteristics. The areas created in place of bastion fortifications became reserve spaces for future public spaces. When the old city cores became too cramped for the new functions of the town centre, this space enabled town extensions to be created (Knežević, 1996, p. 313).

The fact that the areas of cities created in place of former fortifications represent clearly defined morphological regions (Conzen, 1975) dominated by various institutions, public utilities and open spaces, indicates that these spaces are in fact fringe belts (Kristjánsdóttir, 2001, p. 114; Whitehand, 2001, pp. 103-9). If they are the innermost of two or more fringe belts, Conzen (1960, pp. 58-65) refers to them as inner fringe belts. These zones represent a hiatus in the growth of the residential areas of the city and, because of their designed public open spaces and buildings, they create a new identity and a new urban quality for these towns.

The transformation of bastion fortifications in the towns of continental Croatia

The bastion fortifications in continental Croatia (Figure 3) lost their purpose in the nineteenth century because of the reduced Turkish threat, the shifting of the Habsburg Empire defence frontier farther to the east, and the change in warfare resulting from further artillery modernization. The development of industry, traffic and trade, mainly in the towns (Zagreb, Varaždin, Osijek, Karlovac and Koprivnica), brought about the creation of a new middle class (burghers). This new class became the main factor in the creation of public spaces, especially public parks (Hajós, 2007, p. 70; Bojanić Obad Šćitaroci and Obad Šćitaroci, 2007). The fortifications within the city limits became an obstacle to urban development and, as a result, in the early-nineteenth century there was a growing initiative for their demolition and the inclusion of the newly created areas in the urban fabric. In most cases this was realized in the late-nine-

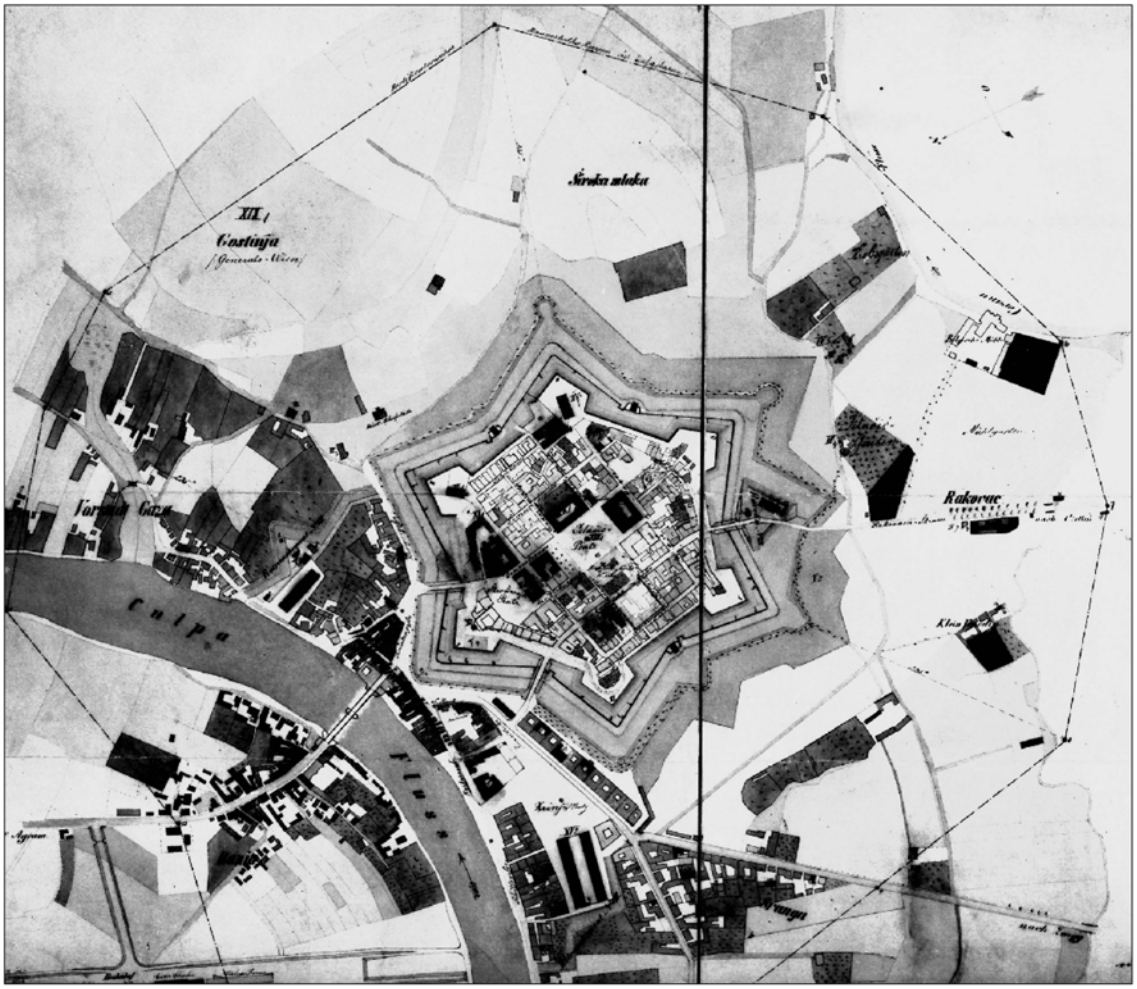

Figure 4. Karlovac in 1863. Source: Gradski muzej Karlovac (Karlovac City Museum).

teenth century, but in Karlovac and Osijek, as a result of their important strategic position and unstable geopolitical situation, the transformation of the fortifications occurred as recently as the early-twentieth century.

Karlovac

The construction of Karlovac's fortifications took place within 10 years, between 1579 and 1589. During the following period, up to the middle of the nineteenth century, because of the marshy land, unsuitable for foundations, and repeated floods and fires, there were frequent periods of constructional activity. This involved maintaining and renovating both the bastion fortifications and the houses inside the walls, but it did not result in any significant changes in the layout of the bastions. A more significant change to the original plan of the fortifications occurred at the time of the great renovation of the fortifications between 1739 and 1777. The last construction works on the fortifications took place between 1839 and 1850 (Figure 4). The Karlovac fortifications remained intact until 1926 because of military regulations forbidding any construction inside the fortification area. The only exception to that rule was the creation of the Promenada, a continuous tree-lined promenade, created in 1861 on the glacis area, and soon to become one of the main public spaces. Similar promenades were created on the site of bastion fortifications in the late-eighteenth and early-nineteenth centuries in Bremen, Linz, Graz,

Figure 5. Karlovac in 1999. Source: Republika Hrvatska, Državna geodetska uprava (Republic of Croatia, State Geodetic Administration).

Lucca, Szeged and other European towns. After the laws forbidding any construction in the fortification zone were abolished in 1925, the fortifications were partially demolished, but this was not followed by any significant new construction. As a result, the layout of the fortifications has mostly been preserved.

The transformation of the fortification zone mostly took place between 1926 and the middle of the twentieth century. New construction took place in the western part, where blocks were built in place of the bastions. At the same time two new blocks were built between the sites of the two bastions, in the curtain wall area. An army barracks was built in the east inside the fortification's fosse, and a school building was constructed in the south fosse area. Two new streets were formed in place of the former bridge entrances over the fosses, linking the city core and the suburbs. The most important element of the transformation is the connection of the town centre to the suburbs by a continuous ring of parks created in place of the bastion fortifications. For the most part, the outline of the former fortress was preserved (Figure 5).

Osijek

The historical development of the bastion fortifications and town of Osijek, today's centre of the eastern part of continental Croatia, can be followed from the time of the liberation of the medieval town from Ottoman

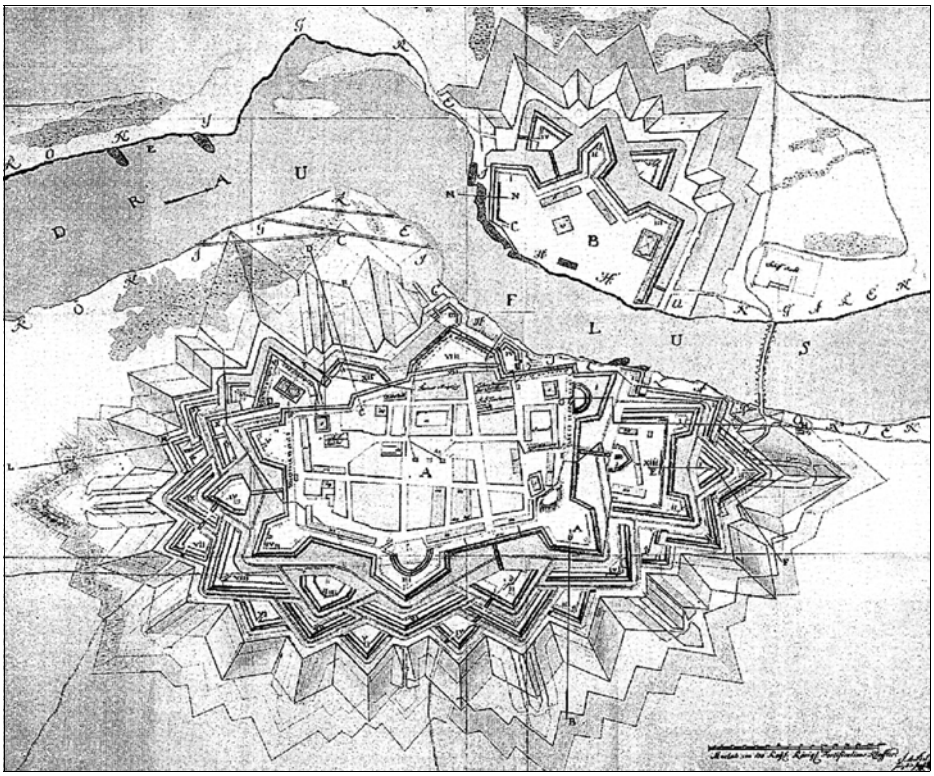

Figure 6. Osijek in 1784. Source: Mažuran (1996).

rule in 1687.

The first modernization of the town fortifications took place in the late-seventeenth century when, in place of the former Turkish towers, the bastions and additional external fortification buildings were constructed. This improved the efficiency of the defence system. During this modernization the walls were covered in durable materials (brick and stone). A second renovation and modernization followed in the early-eighteenth century. The ground plan of the fortifications was defined by 1720 and, with only small changes, was preserved until its demolition in the twentieth century. There was one exception: a change to the ground plan was made in the northern defences where, after the regulation of the River Drava and the creation of embankments on the former marshy land, three new bastions were built by 1750. The bastion fortifications (covering 80 ha) that had been constructed by the end of the eighteenth century enclosed a city core covering only 15 ha (Figure 6).

After 1923, transformation of the bastion fortifications of Osijek was guided by a clear plan. A system of park spaces and public buildings was constructed in place of the former fortifications. Over 3 years (1923 - 1926) the bastion fortifications were almost completely demolished. The whole transformation process was realized in 20 years (by the middle of the twentieth century). The first step in this process was taken with an international design competition in 1925. The first prize went to the Vienna landscape architect Albert Esch. Following his proposal, but in a reduced form more appropriate to the social and economic conditions and the context, the idea of a park *ring* in place of the fortifications was implemented. Most of this park framework was created in the 1930s when an existing park in the western part of the former fortifications was extended and three new parks created in the south-western part. The parks in the south-eastern part of the former fortifications were created only in the late-twentieth century. In contrast to the western and southern parts, the site of the eastern part was, immediately after

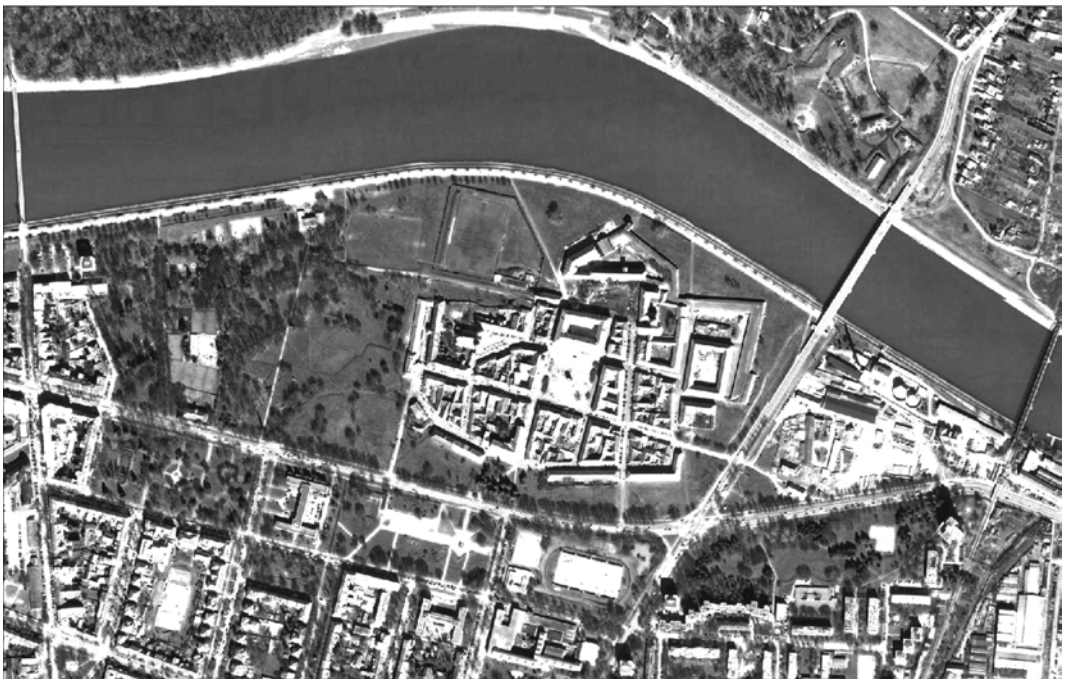

Figure 7. Osijek in 2001. Source: Republika Hrvatska, Državna geodetska uprava (Republic of Croatia, State Geodetic Administration).

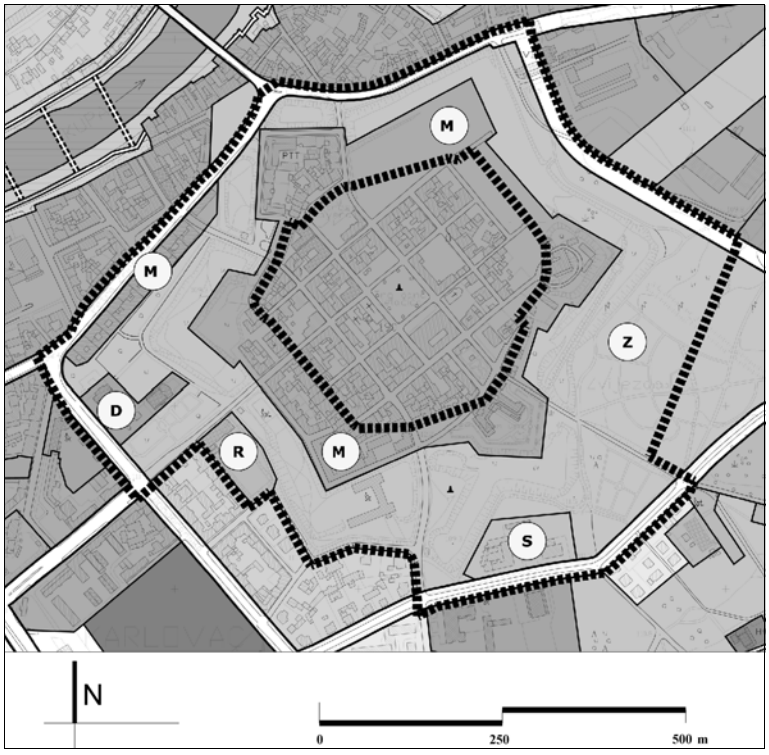

Figure 8. Land use in place of bastion fortifications in Karlovac according to the Karlovac master plan (2007). The thick broken lines are the boundaries of the analysed area. D – public buildings; Z – public green space; R – recreation; M – mixed use; S – residential.

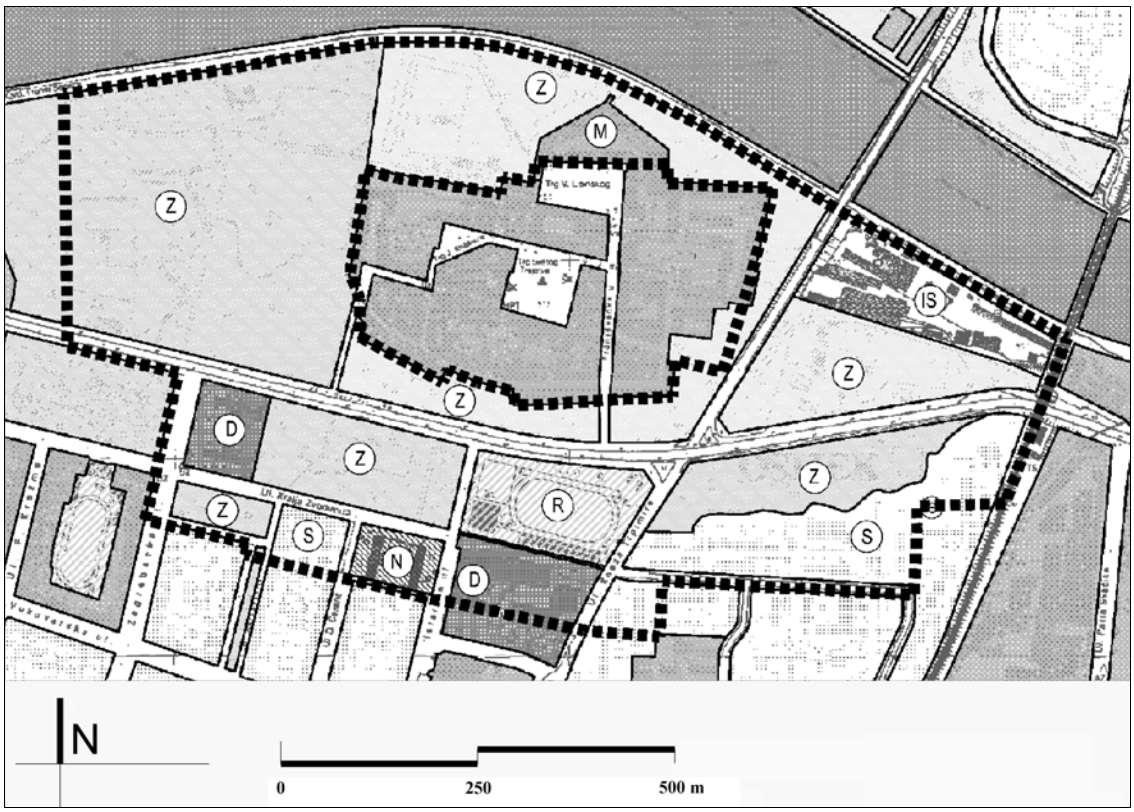

Figure 9. Land use in place of bastion fortifications in Osijek according to the Osijek master plan (2006). The thick broken lines are the boundaries of the analysed area. D – public buildings; Z – public green space; R – recreation; M – mixed use; S – residential; IS – utilities; N – military.

demolition of the fortifications, degraded by the introduction of industrial land use. This industrial land use has been maintained until today. After the demolition of the 80 ha of bastion fortifications, only the north-eastern part, containing the Eugene bastion and the Water Gate, was preserved. Not only were the fortifications almost completely erased but the new construction and the new street lines completely obliterated the former fortifications plan. As a result, the elements of the former fortifications are not easily recognizable, though the configuration of the park belt in the western and south-eastern part gives a broad indication of their extent (Figure 7).

Characteristics of the spaces created in place of the bastion fortifications

The land use of the spaces created in place of the bastion fortifications is evident from the drawings in the master plans of Karlovac and Osijek (Arhitektonski fakultet Sveučilišta u Zagrebu, Zavod za urbanizam, prostorno planiranje i pejsažnu arhitekturu, 2007; Zavod za urbanizam i izgradnju d.d. Osijek, 2006). Of the area developed in place of the fortifications in Karlovac, 64.6 per cent is taken by parks and recreational areas (Z and R), 1.9 per cent by areas with public buildings (D), and 32.2 per cent by mixed and residential use (M and S) (Figure 8).

A similar situation occurs in Osijek where the parks (Z) and recreational areas (R) occupy 63.4 per cent of the area formerly occupied by the fortifications, areas with public buildings (D) 4.6 per cent, mixed and residential use (M and S) 10.1 per cent and infrastructural areas (IS) and areas of special use (N) 6.2 per cent (Figure 9). Thus in both towns the master plans show some two-thirds of the area as

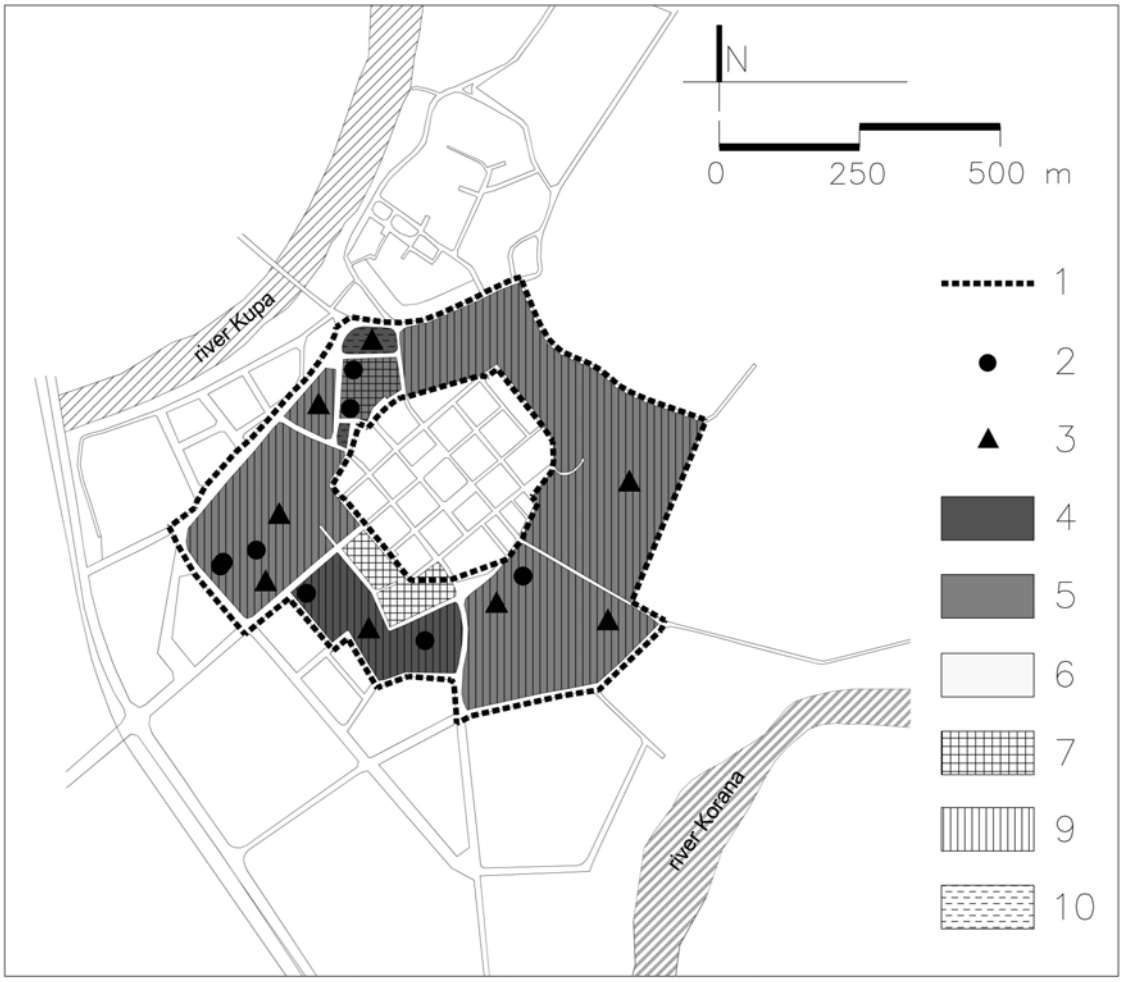

Figure 10. Characteristics of the spaces created in place of the bastion fortifications in Karlovac in the early-twenty-first century. 1 – boundaries of analysed area; 2 – mainly cultural, religious, medical and educational buildings; 3 – public squares and parks; 4 – public buildings and/or public spaces; 5 – mixed use; 6 – other uses; 7 – block structure (unbroken building frontage along perimeter road, with buildings occupying more than 50 per cent of insula); 8 – more than 50 per cent of area built up, but discontinuous building frontage along perimeter roads; 9 – less than 50 per cent of area built up, and discontinuous building frontage along perimeter roads; 10 – insula without buildings.

being occupied by some kind of public land or public building.

The master plans show the situation existing at the beginning of the twenty-first century, but they also include elements of planned land use. An analysis of just the existing situation was also carried out (Krajnik, 2007, pp.206-3). The method is based on an analysis of the predominant structure and land use of each town *insula* created in place of the fortifications (an *insula* being defined as an area surrounded by at least three roads). According to the analysis carried out using this method, the sites of the former bastion fortifications in Karlovac (Figure 10) and Osijek (Figure 11) at the beginning of the twenty-first century were mainly not built up and the extent of the former fortifications is clearly legible.

The wider context

In a wider study using this method (based on identical types of data for each town) a structural and functional analysis was carried

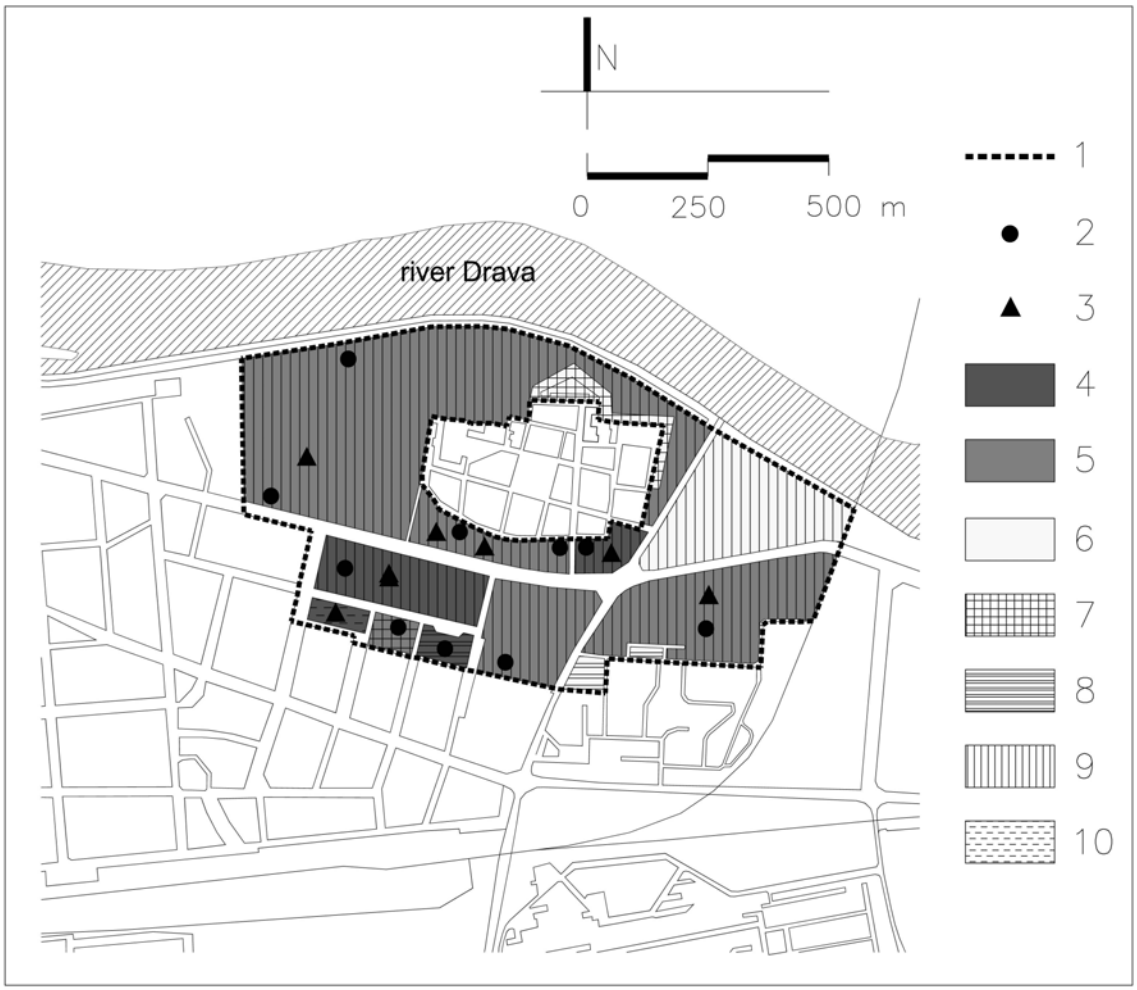

Figure 11. Characteristics of the spaces created in place of the bastion fortifications in Osijek in the early-twenty-first century. For key see Figure 10.

out of the spaces created in place of the bastion fortifications in seventeen European towns in the nineteenth and early-twentieth centuries (Krajnik, 2007). The towns were Vienna, Bremen, Brno, Frankfurt, Geneva, Graz, Karlovac, Klagenfurt, Copenhagen, Mainz, Osijek, Riga, Varaždin, Wroclaw, Würzburg, Zittau and Zürich. Several types of urban spaces were identified according to their structural and functional characteristics. The results reveal that, in their structural and functional characteristics at the beginning of the twenty-first century, the developments that replaced the bastion fortifications in Karlovac and Osijek in the early-twentieth century belong to the type found in thirteen of the seventeen analysed towns. The transformation of the bastion fortification areas in these two towns in the early-twentieth century resulted in zones with concentrations of public buildings and public spaces similar to those in the corresponding areas of most European cities during the nineteenth century. Karlovac and Osijek were products of the same urban model (the ring model) as many European towns and cities.

Conclusion

The former bastion fortification zones in Karlovac and Osijek retain the characteristics of an inner fringe belt, forming boundary zones between historically and morph-

ologically distinct housing areas. These zones include large areas of public space (parks and squares) interspersed with large institutional and landmark buildings of architectural note. In both cases these are zones with a sparse road network and a low incidence of radial roads (cf. Whitehand, 2001, p. 105). In both towns at the outset of the twenty-first century the zones formed in place of the bastion fortifications have identities that clearly distinguish them from the urban areas in which they are embedded.

The inner fringe belts in Karlovac and Osijek can also be related to the economic conditions of their origin. Whitehand in his land-rent theory (1972a, pp. 52-3; 1972b) associates the creation of fringe belts with slumps in residential building. In Croatia, in addition to the effects of slumps in residential building, the design of the areas formed in place of the fortifications in the early-twentieth century was also marked by the financial inability of municipalities to implement the planned transformations. A good example is the transformation of the Karlovac fortifications. In this case the municipality offered its wealthy citizens the fortification land free but on condition that they demolished the fortifications at their own expense in order to build housing and also to create public parks.

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References

Arhitektonski fakultet, Zavod za urbanizam, prostorno planiranje i pejsažnu arhitekturu (2007) *Generalni urbanistički plan grada Karlovca* (Grad Karlovac, Karlovac).

Bojanić Obad Šćitaroci, B. and Obad Šćitaroci, M. (2004) *Gradski perivoji Hrvatske u 19. stoljeću* (University of Zagreb, Zagreb).

Conzen, M. R. G. (1960) *Alnwick, Northumberland: a study in town-plan analysis* Institute of British Geographers Publication 27 (George Philip, London).

Conzen, M. R. G. (1968) 'The use of town plans in the study of urban history', in Dyos, H. J. (ed.) *The study of urban history* (Edward Arnold, London) 113-30.

Conzen, M. R. G. (1975) 'Geography and townscape conservation', in Uhlig, H. and Lienau, C. (eds) *Anglo-German Symposium in Applied Geography, 1973* (Lenz, Giessen) 95-102.

Duffy, C. (1979) *Siege warfare: the fortress in the early modern world, 1494-1660* (Routledge, London).

Duffy, C. (1985) *The fortress in the age of Vauban and Frederick the Great, 1660-1789* (Routledge and Kegan Paul, London).

Giedion, S. (1947) *Space, time and architecture* (Harvard University Press, Cambridge).

Gutkind, E. A. (1964) *International history of city development: urban development in Central Europe* (Collier-Macmillian, London).

Gutkind, E. A. (1965*) International history of city development: urban development in the Alpine and Scandinavian countries* (Collier-Macmillian, London).

Gutkind, E. A. (1972) *International history of city development: urban development in East-Central Europe – Poland, Czechoslovakia and Hungary* (Free Press, New York).

Hajós, G. (2007) *Stadtparks in der österreichischen Monarchie 1765-1918* (Böhlau, Wien).

Knežević, S. (1996) *Zagrebačka zelena potkova* (Školska knjiga, Zagreb).

Kostof, S. (1992) *The city assembled: the elements of urban form through history* (Thames and Hudson, London).

Krajnik, D. (2007) 'Urbanistička preobrazba bastionskih utvrdjenja', unpublished PhD thesis, University of Zagreb.

Kristjánsdóttir, S. (2001) 'The integration of architectural and geographical concepts in urban morphology: preliminary thoughts', in Scheer, B. C. (ed.) *Proceedings of the International Seminar on Urban Form, September 5-9, Cincinnati, Ohio, USA* (University of Cincinnati, Cincinnati) 113-15.

Le Halle, G. (1983*) Précis de la fortification* (PCV Éditions, Paris).

Marković, M. (1994) *Brod* (Matica Hrvatska, Osijek).
Marković, M. (2001) *Hrvatski gradovi na starim planovima i vedutama* (Antun Gustav Matoš, Zagreb).
Mažuran, I. (1996) *Od turskog do suvremenog Osijeka* (Školska knjiga, Zagreb).
Mollik, K., Reining, H. and Wurzer, R. (1980) *Plannung und Verwicklichung der Wiener Ringstrassenzone* (Franz Steiner, Wiesbaden).
Parker, G. (2000) 'The artillery fortress as an engine of European overseas expansion, 1480-1750', in Tracy, J. D. (ed.) *City walls: the urban enceinte in global perspective* (Cambridge University Press, New York) 386-418.
Pepper, S. (2000) 'Siege law, siege ritual, and the symbolism of city walls in Renaissance Europe', in Tracy, J. D. (ed.) *City walls: the urban enceinte in global perspective* (Cambridge University Press, New York) 573-604.
Stübben, J. (1890) *Der Städtebau* (Arnold Bergstrasser, Darmstadt).
Tracy, J. D. (ed.) (2000) *City walls: the urban enceinte in global perspective* (Cambridge University Press, New York).
Whitehand, J. W. R. (1972a) 'Building cycles and the spatial pattern of urban growth', *Transactions of the Institute of British Geographers* 56, 39-55.
Whitehand, J. W. R. (1972b) 'Urban rent theory, time series and morphogenesis: an example of eclecticism in geographical research', *Area* 4, 215-22.
Whitehand, J. W. R. (2001) 'British urban morphology: the Conzenian tradition', *Urban Morphology* 5, 103-9.
Whitehand, J. W. R. and Morton, N. J. (2003) 'Fringe belts and the recycling of urban land: an academic concept and planning practice', *Environment and Planning B, Planning and Design* 30, 819-39.
Wolfe, M. (2000) 'Walled towns during the French wars of religion', in Tracy, J. D. (ed.) *City walls: the urban enceinte in global perspective* (Cambridge University Press, New York) 317-48.
Zavod za urbanizam i izgradnju d.d. Osijek (2006) *Generalni urbanistički plan grada Osijeka* (Grad Osijek, Osijek).
Žmegač, A. (2000) *Bastioni kontinentalne Hrvatske* (Institut za povijest umjetnosti, Golden Marketing, Zagreb).

Gianfranco Caniggia, architetto romano: conference held in the Facoltà di Architettura 'Valle Giulia' and the Accademia Nationale di San Luca, Rome, Italy, 9-10 May 2008

This long-awaited conference on the architectural and theoretical work of Gianfranco Caniggia was, for the academic community in Rome, in some ways an acknowledgement of a debt forgotten for 20 years. After Caniggia's death, just a few mentions of his work appeared in the architectural literature in Italy, with the remarkable exception of the observations of the distinguished historian Manfredo Tafuri: he pointed out that Caniggia was not proposing a regressive utopia, but a fertile, rigorous method of investigating the roots of a common architectural language that involved posing questions more than providing solutions.

Caniggia's research and didactic work were commonly suspected of proposing a sort of 'archaeology of city and territory' that was unsuitable for present-day conditions. A previous conference on Caniggia, held in July 2002 in Como, was well attended by ISUF members, but attracted few participants prominent in Italian architectural circles. The conference in Rome, in contrast, could be regarded as in many respects a turning point in the appreciation of Caniggia. A number of eminent architects and historians discussed the vitality and substantive contribution of his work.

Among the opening speeches, Bededetto Todaro's had special significance. As Dean of the hosting faculty, he pointed out to the many architects and students who filled the main hall, that Caniggia had provided an unusual way forward in contemporary architecture: the study of the city as a rational, continuous flow of transformations. This was, he said, an alternative to the current stream of spectacular designs without roots, which is the contemporary 'language plague', to use Italo Calvino's words.

The first session, chaired by Giuseppe Strappa, was held in the main hall of the Facoltà di