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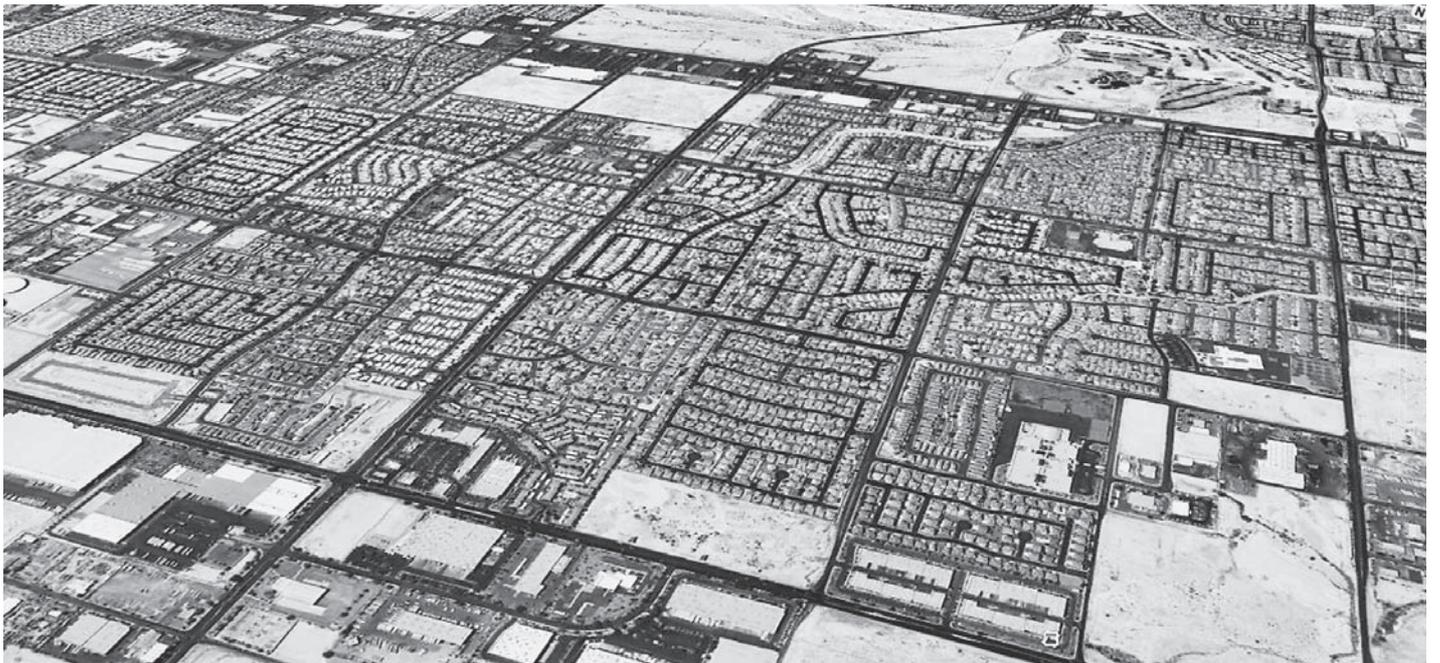
**RESIDENTIAL CONSOLIDATION**  
A SUSTAINABLE APPROACH TO PHYSICAL  
PLANNING AND ECONOMIC DEVELOPMENT

PRELIMINARY COMMUNICATION  
UDC 711.4:330.34

**STAMBENA KOMASACIJA**  
ODRŽIVI PRISTUP PROSTORNOM  
PLANIRANJU I EKONOMSKOM RAZVOJU

PRETHODNO PRIOPCENJE  
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FIG 1. STRONGLY SEGREGATED LAND USES AND THE MULTIPLICATION OF LOW DENSITY HOUSING (AERIAL VIEW OF SUBURBS IN LAS VEGAS, UNITES STATES)  
SL. 1. STROGO RASPOREĐENA NAMJENA ZEMLJISTA I MULTIPLICIRANJE STANOVANJA NISKE GUSTOĆE (POGLED IZ ZRAKA NA PREDGRADJE LAS VEGASA, SAD)



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**RESIDENTIAL CONSOLIDATION****A SUSTAINABLE APPROACH TO PHYSICAL PLANNING AND ECONOMIC DEVELOPMENT****STAMBENA KOMASACIJA****ODRŽIVI PRISTUP PROSTORNOM PLANIRANJU I EKONOMSKOM RAZVOJU**

DENSIFICATION  
ECONOMIC DEVELOPMENT  
HOUSING  
URBAN CONSOLIDATION  
URBAN SPRAWL

DENSIFIKACIJA  
EKONOMSKI RAZVOJ  
STANOVANJE  
URBANA KOMASACIJA  
NEPLANSKA GRADNJA

This paper suggests and outlines an urban consolidation model applied to existing suburban residential areas on a larger scale to correct challenges associated with urban sprawl and address changing urban needs in developed economies. The model was developed to engage, motivate and financially reward stakeholders involved with reoccurring revenue including existing homeowners, developers and city government. While the goal of the paper is not to define specific details related to the application of the proposed model, it does suggest a basic template that could be applied to different urban challenges.

Rad predlaže i ocrtava model urbane komasacije primijenjen u većem omjeru na već postojeća stambena naselja kako bi se korigirali izazovi vezani za neplansku gradnju u razvijenim ekonomijama. Model je razvijen kako bi uključio, motivirao i stalnim prihodom financijski nagradio uključene sudionike, uključujući već postojeće kućevlasnike, investitore i gradsku upravu. Cilj ovog rada nije da definira specifične detalje vezane za primjenu ovog predloženog modela, nego da ponudi osnovni predložak koji bi se mogao primijeniti na različite urbane izazove.

## INTRODUCTION

### UVOD

Urban spatial organization referring to the arrangement of land use, transportation and other infrastructure in urban environments has been commonly observed to have a direct influence on the overall wellbeing of a city or region from the strength of its economy to issues relating to the environment and public health.<sup>1</sup> Because most urban centers develop over longer periods of time, spatial arrangements in cities represent historical layers of influences, policies and practices that can either still exert a positive influence on present day practical needs and add to their distinction or character, or become outdated to changing demands and eventually hinder economic development and social growth in certain areas.

A common phenomenon that has occurred in many urban environments regardless of the level of development is the prevalence of large expanses of residential areas that have been built with little public space and little mixed land use. Although each city has a specific history as to how it has taken on its present form or structure, most urban centers were greatly influenced by early public transportation, the rise of the automobile, strong segregated land uses related to zoning regulations and housing policies or practices that encouraged individual homeownership. The departure from a walkable city and the formation of the suburb began during the Industrial Revolution and accelerated after World

War II, creating a specific lifestyle which in some Western countries, such as the United States became closely associated with the national ethos. The physical areas occupied by many of these suburbs represent important and meaningful locations in the urban context, however many of their existing physical layouts limit further urban and economic development. This paper examines a possible urban consolidation model that can be applied to these existing residential communities to physically reconfigure them to better meet changing urban needs. (Fig. 2)

## CHANGING URBAN LANDSCAPE AND CHALLENGES ASSOCIATED WITH URBAN SPRAWL

### PROMJENA URBANOG PEJSAŽA I IZAZOVI POVEZANI S NEPLANSKOM GRADNJOM

The notion of suburbia has been met with both nostalgia and mixed portrayals throughout the decades. In recent times a more rigorous analysis has been applied to these areas, highlighting some of the negative aspects associated with it and bringing into question issues of long term sustainability. The current debate over suburbia is well documented, however in order to provide some context, the expansion of suburbia as a predominant urban housing typology has made our societies increasingly spatially fragmented and automobile dependent.<sup>2</sup> It has also established an expensive platform for the distribution of utilities and urban services given the low density it is called to maintain.<sup>3</sup> Other negative consequences of expanding urban sprawl include the loss of farmland and wildlife habitats<sup>4</sup>, rising CO<sub>2</sub> emissions from automobile traffic congestion<sup>5</sup>, deteriorated downtown areas<sup>6</sup> and social and economic segregation.<sup>7</sup> (Fig. 3)

1 SCHWIRIAN, 1983: 121

2 FRANK, PIVOT, 1994: 44-52

3 [www.smartcommunities.ncat.org](http://www.smartcommunities.ncat.org)

4 SQUIRES, 2002: 133

5 FULLER, CRAWFORD, 2011: 165-83

6 SQUIRES, 2002: 26

7 [www.migrationinformation.org](http://www.migrationinformation.org)

8 PASSEL, COHN, 2008: i

9 WHO, 2010: ix

10 The City of New York, Department of City Planning, 2006: 1

11 [www.articles.latimes.com](http://www.articles.latimes.com)

12 [www.blog.thedetroithub.com](http://www.blog.thedetroithub.com)

13 GLAESER, 2011: 41

14 [www.washingtontimes.com](http://www.washingtontimes.com)

15 GLAESER, 2011: 64

16 GLAESER, 2011: 66

17 Larger scale land readjustment or urban consolidation models have been suggested for informal residential

These factors become even more compelling when one considers population projections over the next few decades and the role that urban centers will be called to serve. For example, a Pew Research Center study predicts that if current trends continue, the United States will have a population increase of about 92 million driven mostly by immigration by the year 2050 which is about a third of its present, most recent total population of 303 million.<sup>8</sup> The World Health Organization anticipates that 70% of the world's population will live in cities by 2050<sup>9</sup>, putting a significant strain not only on the built environment, but on natural resources as well. New York City alone is projected to grow from over 8 million people in 2000 to 9.1 million in 2030, an increase of 1.1 million or 13.9 percent.<sup>10</sup> Urban land is becoming scarce and new trends such as micro apartments in mega cities are beginning to appear.<sup>11</sup> However the real challenge will not be how to increase housing density in expanding urban areas, but how to grow urban centers in a balanced fashion. As cities increase housing, the need for more open and recreational spaces, public facilities and infrastructure will be greater as well. A new increase of population will also greatly influence the complex movement of people, goods and services. Sensible planning policies and practices should take precedence as available physical space becomes all the more constrained.

On the other extreme however, are also the cities in economic and population decline. Although much of the decline can be attributed to a range of issues from a lack of diversified economies, mismanaged public funds, aging populations and other factors, one observation that can be made about many of the cities in decline is their vast physical size in comparison to the low populations that currently maintain them. In the case of Detroit, Prof. Dan Piterra of the University of Detroit

settlements in different parts of the developing world. Negotiation conditions vary widely and are uniquely crafted on a case to case basis. In these situations, land developers are typically given the right to redevelop an area in exchange for providing housing for existing homeowners and enhancing infrastructure. The new developments are usually a mix of commercial and residential properties. What is different in the proposed residential consolidation model is its intentional inclusion of homeowners and city governments as receivers of dividends in the property investment company to motivate stakeholders in developed economies and the emphasis on improving the quality of public spaces and facilities through a tax incentive enabling a more robust change in the physical environment. The proposed model was designed to be commercially interesting to developers as it alleviates the capital burden and allows development in areas of high land values; appealing to city governments as a source of reoccurring revenue and a way to acquire attractive public land without capital and motivating for homeowners who would be provided new housing without a payment, a better configured neighborhood and passive income.

Mercy noted that it is possible to fit three major US metropolitan areas (Boston, Manhattan and San Francisco) totaling 116.96 square miles into the geographical surface area of Detroit totaling 139.1 square miles. What makes this comparison noteworthy is the population comparison of those three urban areas combined (population: 3,076,660) versus that of Detroit (population: 844,993).<sup>12</sup> With over a third of Detroit's population living below poverty<sup>13</sup>, the weight of maintaining such a large infrastructure with a low and aging tax base is a crushing economic reality. Plans for aggressively downsizing city limits in Detroit, including the demolition of some 10,000 houses in remote areas to sustain a smaller infrastructure and rehabilitate the tax base have already been made.<sup>14</sup> The idea of "shrinking to greatness"<sup>15</sup> can be a prudent approach in rehabilitating a city to be more attractive, less dangerous and less expensive to maintain.<sup>16</sup> (Fig. 4)

## RESIDENTIAL CONSOLIDATION

### STAMBENA KOMASACIJA

Residential consolidation is a type of urban consolidation or land readjustment strategy intended to physically restructure larger residential areas in a way that would better meet changing urban needs in more developed economies.<sup>17</sup> In traditional urban consolidation, a property developer usually purchases and develops an infill designated property at market value typically from a single owner entity that can be institutional or commercial. If the market cost of the property is too large to compensate, the developer can include the previous owner as a stakeholder in the newly constructed property investment. The same is true for infill developments of residential properties. Compensated homeowners are either provided fair market value for their properties as is the case of collective sale, common in Singapore, or can be compensated with newly constructed residential property, a typical practice in Hong Kong. An infill development will increase the residential and commercial capacity of a given area but will generally be limited in providing the public needs of a community such as more recreational spaces, schools or other public facilities. Because of its unpredictable development, traditional infill development has been criticized for creating more traffic congestion, overloading existing infrastructure within urban centers and incorporating architecture that aesthetically does not fit into the existing urban fabric.<sup>18</sup>

Unlike traditional urban consolidation, residential consolidation takes into account the wider needs of the community given the change in density including the need for more

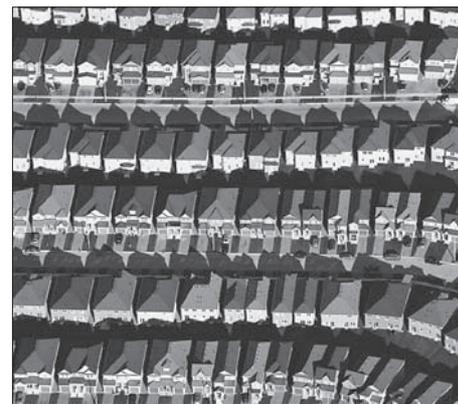


FIG. 2. AERIAL VIEW OF A LOW DENSITY RESIDENTIAL DEVELOPMENT IN MARKHAM, ONTARIO, CANADA WITH LITTLE PUBLIC SPACE AND MIXED LAND USE

SL. 2. ZRAČNI POGLED NA STAMBENI RAZVOJ SREDNJE GUSTOĆE U MARKHAMU, ONTARIO, CANADA, S MALO JAVNOG PROSTORA I MJEŠOVITE UPOTREBE ZEMLJIŠTA

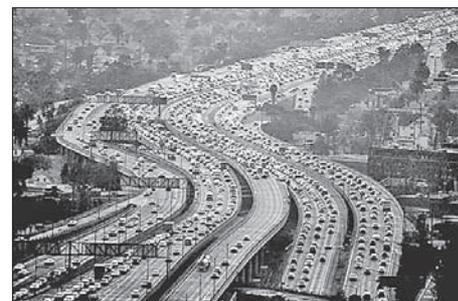


FIG. 3. HOUSING DEVELOPMENT POLICIES AND PRACTICES HAVE A LONG TERM IMPACT ON VIRTUALLY ALL ASPECTS OF URBAN LIFE FROM TRANSPORTATION INFRASTRUCTURE TO THE ENVIRONMENT AND PUBLIC HEALTH (HIGHWAY IN LOS ANGELES, CA, USA)

SL. 3. POLITIKA STAMBENE IZGRADNJE IMA DUGOROČNI UTJECAJ NA VIRTUALNO SVE ASPEKTE URBANOG ŽIVOTA OD INFRASTRUKTURE PRIJEVOZA, DO EKOLOGIJE I JAVNOG ZDRAVSTVA (AUTOCESTA U LOS ANGELES, CA, USA)

FIG. 4. THREE MAJOR US METROPOLITAN AREAS SUPERIMPOSED ON THE SURFACE AREA OF DETROIT  
SL. 4. TRI GLAVNA METROPOLITSKA PODRUČJA SAD-A SUPERPONIRANA NA POVRSINSKOM PODRUČJU DETROITA



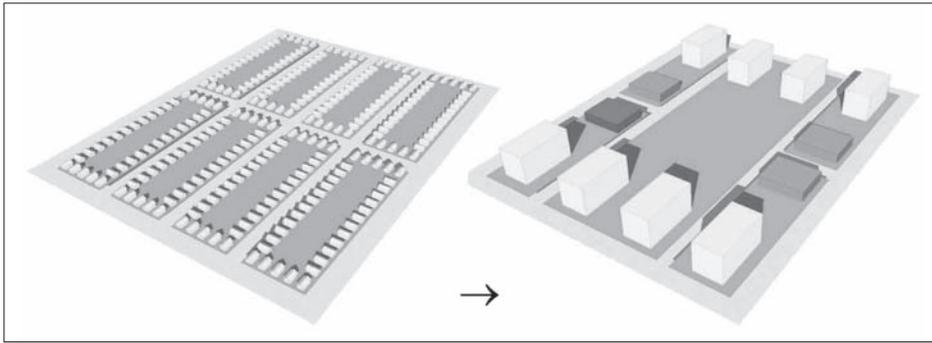


FIG. 5. FIGURATIVE PHYSICAL TRANSFORMATION OF RESIDENTIAL PROPERTY CONSOLIDATION  
SL. 5. FIGURATIVNA FIZIČKA PREEOBRAZBA STAMBENE KOMASACIJE

open spaces, public facilities and the augmentation of infrastructure. While traditional urban consolidation generally occurs in urban centers, residential consolidation moves slightly outward to the more residential or suburban areas. It draws upon some of the same economic principles of traditional urban consolidation such as collective shareholder ownership but applies it to a wider base of smaller property owners, encompassing a larger physical area. Similar to how *greenfield* and *brownfield* developments refer to the development of undeveloped and industrial areas respectively, residential consolidation has been informally referred to as *yellowfield*, with yellow referring to areas of low density housing on urban plans. (Fig. 5)

#### DEVELOPMENT ENTITY, DENSITY PROJECTION AND PLANNING

##### RAZVOJNI ENTITET, PLANIRANJE I PROJEKCIJA GUSTOĆE

The process of residential consolidation is a complex one given the larger base of stakeholders involved. Because the process would require a high level of organization and coordination among different participants, it would be appropriate that a third party agency or development entity be initiated most likely by the public sector to facilitate the different processes and broker the deal in order to avoid conflict of interest and emphasize fairness and transparency.

One of the more important tasks before any development of a residential area takes place is a good assessment of population density projections based on anticipated population growth, housing absorption rates, current vacancy and rental growth rates as well as other economic trends and forecasts to stay in realistic step with housing supply and demand.

A good density projection needs to be made to determine a sense of scale of the community, the type of commercial development needed and to serve as a basis for financial modeling to structure housing development

costs.<sup>19</sup> In addition, a population projection will give insight into the nature of the community and determine if new public facilities would need to be built such as schools, recreational facilities and the like.

It is only after the new projected population density is determined that the interconnected planning process which involves both business and physical planning can begin. However once proper business and urban plans have been determined, the actual physical process of residential consolidation can be described in three separate phases.

#### PHASE 1: REASSEMBLING HOUSING – VALUATION, AGGREGATION, DEMOLITION AND NEW CONSTRUCTION

##### ETAPA 1.: PONOVRNO SASTAVLJANJE STAMBENIH JEDINICA – PROCJENA, SAKUPLJANJA IMOVINE, RUŠENJE I NOVA IZGRADNJA

The first process in residential consolidation is the physical reassembly of housing for existing owners which includes the valuation and aggregation of property and the demolition of old housing and construction of new. The model integrates existing homeowners in the new development and compensates them with newly built apartment units. Valuation of existing housing for the purposes of defining fair equivalent market value of new housing can be done in different ways. The most straightforward method would be determined by current market value against the anticipated value (or agreed adjusted value) of the new construction. In this case, it is likely that a homeowner would receive a smaller apartment unit than his original home given depreciation rates which typically assign higher market values to new construction over older homes. In cases where a com-

<sup>19</sup> A density projection will determine how construction housing costs will be covered and whether it will be paid by the sale or lease of increased dwelling units. It will also be a good indicator to determine if, for example, a community could maintain a stable retail presence since successful retail needs a strong density to support it.

<sup>20</sup> Since existing houses are not equal in market value, an added valuation would be placed on each original property assigning it to a proposed A, B or C category (with A being the highest value and C being the lowest). Homeowners who fall into the A category would then have A type privileges and stock, those who fall into the B category, would have B type privileges and stock, etc.

<sup>21</sup> The size of homeowner land plots should also be taken into consideration, which when calculated against a reasonable coefficient, would apply to more SA of new housing for the homeowner or alternatively, more share in the property investment company.

<sup>22</sup> The compensated homeowner could be eligible for more options whether it is to choose to live in one apartment unit and collect dividends from the property investment company or to acquire additional units for personal use and eventually lease or sell additional units. The concern in the SA valuation model is creating too much dwell-

compensated homeowner agrees to an apartment unit of lesser market value than his original home, the homeowner becomes a shareholder in the property investment company which then balances the difference in value.

Another valuation model determined not by market value but by square surface area (in further text referred to as "SA") may be more motivating for some homeowners, but needs one more valuation step to account for the different property market values.<sup>20</sup> In the SA valuation model, compensated homeowners have the right to the same SA of new housing as they had in their original home.<sup>21</sup> Like the market value valuation model, homeowners who do not claim all of their SA rights can become stakeholders in the property investment company. In the SA valuation model, it is more likely that a compensated homeowner could have the right to more than one apartment unit in the new development.<sup>22</sup>

The developer would be granted permission to increase the dwelling unit density of an area to cover the costs associated with housing reconstruction through a combination of either selling or leasing additional new dwelling units at market price.<sup>23</sup> The increase of dwelling unit density will be based on the population density projection which needs to be rationally planned according to realistic expectations and caution should be given not to over build a community with excess dwelling units. The increase of dwelling units is not necessarily intended to be a profit generating (although it could be), but rather a way to recover costs associated with new housing.<sup>24</sup>

Below are a series of equations that describe the minimum increase of square surface area needed to cover the cost of housing construction for compensated owners based solely on the sale of new units at market price in the SA

ing unit density. One way to offset this possibility would be to create oversized new dwelling units similar to the SA of the original homes if physical space allows it. It would also be reasonable to place SA maximum rights for compensated homeowners and rely on assigning shares in the property investment company to absorb differences in value.

<sup>23</sup> In layman's terms, if the cost of building a new unit is \$150 per/sqft, but the market price is \$300 per/sqft, a builder can cover the cost of two new apartment units for compensated homeowners by selling one apartment unit at market value.

<sup>24</sup> Costs associated with new housing include temporary relocation of residents, demolition of old housing, infrastructure enhancement, construction of new housing and associated administration.

<sup>25</sup> Housing markets are local and profit margins for new construction ( $\Delta$ ) vary widely according to those markets and according to type of residential units built such as standard housing, high end or luxury housing, etc.

<sup>26</sup> The additional cost coefficient ( $\omega$ ) would vary according to other factors that drive additional costs including type of demolition, scale of utility and infrastructure enhancement.

valuation model. If the final calculated SA suggests a population density that is too high for a given area, new housing costs can be covered by the ongoing lease instead of sale of new units. Housing costs could also be subsidized by homeowner dividends in the property investment company for a time until housing construction is paid in full. Financing of new housing could be organized building by building in separate phases in order to have better control over budgets.

Square surface area sold at market price to cover the base cost of construction for existing homeowners can be calculated as:

$$x = v / \Delta$$

where each of the variables are described as:

$x$  = square surface area sold at market price to cover the expense of existing housing;  $v$  = square surface area of existing housing;  $\Delta$  = profit margin of construction.<sup>25</sup>

Square surface area that needs to be sold at market price to cover the base cost of construction for newly added dwelling units ( $x$ ) can be calculated as:

$$y = x / \Delta$$

where each of the variables are described as:  $y$  = square surface area needed to be sold at market price to cover base cost of construction for newly added dwelling units;  $x$  = square surface area needed to sell at market price to cover the expense of existing housing;  $\Delta$  = profit margin of construction.

In addition, the square surface area that needs to be sold at market price to cover the cost of demolition, relocation, utility enhancement and administration can be calculated through the following formula:

$$z = \omega v (1/C_v)$$

where each of the variables are described as:

$z$  = square surface area needed to sell at market price to cover the cost of demolition, relocation, utility enhancement and administration;  $\omega$  = additional cost coefficient per square surface area<sup>26</sup>;  $v$  = square surface area of existing units;  $C_v$  = base cost of construction per square surface area.

Total square surface area that would need to be constructed to cover costs associated with new housing can be calculated in the following way:

$$\Sigma = v + x + y + z$$

where each of the variables are described as:

$\Sigma$  = total square surface area constructed;  $v$  = square surface of existing housing;  $x$  = square surface needed to sell at market price to cover the expense of housing for existing homeowners;  $y$  = square surface needed to be sold at market price to cover cost of additional

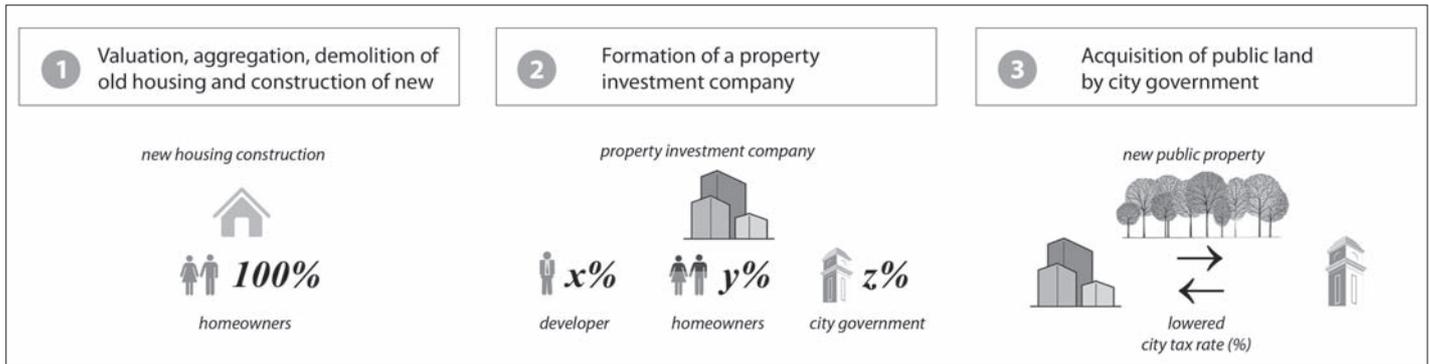


FIG. 6. ADMINISTRATIVE PROCESSES IN RESIDENTIAL CONSOLIDATION AND THE REASSIGNMENT OF OWNERSHIP  
SL. 6. ADMINISTRATIVNI PROCESI U STAMBENOJ KOMASACIJI I PRERASPODJELA VLASNIŠTVA

units ( $x$ );  $z$  = square surface area needed to sell at market price to cover the cost of demolition, relocation, utility enhancement and administration.

### PHASE 2: FORMATION OF A PROPERTY INVESTMENT COMPANY

#### ETAPA 2.: FORMIRANJE IMOVINSKO-INVESTICIJSKOG PODUZEĆA

The formation of a property investment company would be a second administrative phase in the residential consolidation model. The property investment company is a separate legal entity with an asset portfolio consisting of the commercial spaces in the development. The property investment company would be owned by eligible homeowners who did not use all of their residential property rights, the developer who provides the capital for the commercial spaces and the city government, who in lieu of issuing a building permit and other administrative costs would also become a stakeholder in the company. The commercial spaces would generate recurring revenue from the ongoing lease of commercial space and stakeholders would receive dividends. The type of commercial spaces built depends on the economic potential of a given area and could be anything ranging from neighborhood shopping centers to more specialized facilities with specific tenant relationships such as hospitals or hotels. Public structures built under public private partnerships in the community would also be included as assets within the company. Some new developments may bring handsome economic gains while others could be more moderate. It is important that stakeholders understand the economic capacity of a given area in order to plan sensibly and manage expectations.

Stakeholder share of the company could be determined in different ways. It could either reflect a literal representation of how much each stakeholder contributed to the overall development of the commercial properties or

it could represent a flat percentage ahead of time to make expectations and relationships among the stakeholders clear before development begins.<sup>27</sup> While accommodation is made to cover housing costs by the market sale or lease of new dwelling units, the developer would be responsible for financing the commercial space. It is important however to keep in mind that the developer would not purchase the original property and would not pay applicable real estate taxes, nor smaller administrative fees such as building permits. The lowering of construction costs would make it easier to secure capital in tightening credit environments, increase capitalization rates and provide a faster full return on investment.

### PHASE 3: ACQUISITION OF PUBLIC SPACE BY CITY GOVERNMENT

#### ETAPA 3.: AKVICIJA JAVNOG ZEMLJIŠTA OD STRANE GRADSKJE UPRAVE

The third administrative process in the residential property model would be the acquisition of private land on behalf of the public entity. An important aspect of residential consolidation is the ability to incorporate needed public spaces and facilities given the increase in population density. When a population projection is made, there would be a special focus on the increase of the number of children, teenagers and senior citizens. This projection is important because plan-

<sup>27</sup> For example, a developer could be allotted a flat 85% share which traditionally qualifies as a majority stakeholder making it easier for the developer to manage the property professionally and facilitate day to day administrative decisions. The remaining 15% would be then divided based on fair agreement between the city government and the homeowners.

<sup>28</sup> Although the land would be acquired over time by the city government without a capital investment, any built structure would be financed by city budgets which could be a combination of taxes, municipal bonds or other city budget sources. There would also be a good opportunity to establish public private partnerships as the community would be built in close coordination with the developer. Well-structured public private partnerships may be another way to alleviate public budgets while providing ad-

FIG. 7. EXISTING LOW DENSITY HOUSING ON 26TH STREET IN ASTORIA, QUEENS, NEW YORK

SL. 7. POSTOJEĆA STAMBENA IZGRADNJA NISKE GUSTOĆE NA 26. ULICI U ASTORIA, QUEENS, NEW YORK



ners would need to determine if new public facilities would need to be built such as schools, senior homes, special recreational areas and the like.

Because an increase in population can bring about a dramatic change in the urban character of an area, it would be important that planners have the freedom and flexibility to physically reconfigure an area not based on existing property lines or even street networks. Since existing properties are assembled and aggregated, physical planning could incorporate a more robust change in the environment. In cases where public property, such as a street surface would become part of the private development, the local government would become a stronger stakeholder in the property investment company. Areas of private property that become part of public domain are calculated and the city government acquires ownership of the property by reducing any one of the city imposed taxes, namely the property or city tax on the property investment company over time until the market value of the land or property would be paid in full. This allows the city government to acquire needed public space without the pressure of having to pay for it in capital or issue public bonds.<sup>28</sup> The reduction of taxes which would increase the net earnings or bottom line would also make it more motivating for the developer and homeowners to give sizeable portions of land to public use instead of using it all for commercial purposes. (Fig. 6)

### CASE STUDY IN AN INNER RING SUBURB: ASTORIA, QUEENS, NEW YORK CITY

#### STUDIJA SLUČAJA U UNUTRAŠNJEJ PREDGRAĐU: ASTORIA, QUEENS, NEW YORK CITY

A hypothetical case study done in Astoria, Queens, New York City, United States provides insight on how the proposed model based on the calculations described previously could be applied in an inner ring suburb of a densely populated and growing urban environment.<sup>29</sup> The development would be

ditional cash flow to the property investment company for a period of time.

<sup>29</sup> JANDRIČEK, 2012

<sup>30</sup> The net increase of dwelling units in the community would be 1,240 new units.

<sup>31</sup> Once construction of the first apartment building would be complete, the first set of families would move into the new building at least temporarily until their permanent unit would be complete. In addition to housing the first set of families, the newly constructed building would also create a surplus number of new units that could house the next set of families needing to relocate. This pattern of surplus units would continue exponentially and eliminate further costs of relocation for the remaining families.

situated along a public transportation system (both subway and bus) increasing the density of an already existing TOD (Transit Oriented Development) community. A population density projection of approximately 60,000 persons per square mile was made based on anticipated economic development and special consideration was made to specific segments of the population, namely children, teenagers and senior adults (Table I). Changes in these segments were low enough and did not justify the building of special facilities allowing the new community to be a mixed residential, commercial development with improved public space. Calculations were then made to determine the amount of new dwelling units needed to cover the costs associated with housing. Anticipating that building costs would be \$150/sqft and that units could be sold at \$600/sqft, a total of approximately 3,200 units would need to be built to cover the cost of new housing construction and provide homes for compensated homeowners.<sup>30</sup> The new number of units also coincided with the new population projection when multiplied by average number of individuals per unit. (Fig. 7)

Once the population projections in the case study were confirmed and estimated amount of new dwelling units determined, the concept design for the community could be developed. Changes were made in the physical environment allowing a mixed development conducive for walking including the increase of park space by 23% (Table II). Anticipated annual earnings projections of the commercial spaces (Fig. 7) are listed in Table III.

Demolition of the old neighborhood and construction of new housing in the case study would then be planned in such a way that would be least disruptive to vehicular traffic, but provides the highest possible amount of dwelling units. The case study confirmed that relocation could be organized so that only the first set of families located on the first city block would accrue expenses associated with relocation.<sup>31</sup> Construction of housing would begin one building at a time, but in later stages accelerate to multiple buildings at one time, as surplus dwelling units grow exponentially and provide more housing for the remaining residents in the community. (Fig. 9-12)

### AREAS OF CONTENTION AND CONFLICTS OF INTEREST

#### KONFLIKTNA PODRUČJA I PODRUČJA SUKOBA INTERESA

Although residential consolidation attempts to minimize conflicts of interest by allowing more stakeholders to reap the rewards of the new development, there would be areas of

TABLE I. COMPARISON OF STATISTICS OF EXISTING COMMUNITY AND PLANNED DEVELOPMENT

TABL. I. STATISTIČKA USPOREDBA SADAŠNJEG NASELJA I PLANIRANOG RAZVOJA

Statistics	Existing	Planned	Change
Surface area	98 acres	98 acres	0
Population	4570	8900	+ 4230
Number of children	365	450	+ 85
Students elementary school	456	562	+ 106
Students high school	456	562	+ 106
Individuals over 65	456	562	+ 106
Density (person/per square mile)	23,900*	48,000**	+ 24,100
Number of residential units	1960	3200	+ 1240

\* Source: Queens Community District 1 Report

\*\* The anticipated population density would be close to the current population density of nearby Manhattan or 66,940 people per square mile. Source: factfinder2.census.gov

TABLE II. COMPARISON OF EXISTING AND PLANNED LAND USAGES

TABL. II. USPOREDBA POSTOJEĆE I PLANIRANE NAMJENE ZEMLJIŠTA

Land Use	Existing	Planned	Change
Low Density Housing	90%	0%	- 90%
Mixed Residential Commercial	0%	66%	+ 66%
Commercial	3%	6%	+ 3%
Recreational Spaces	1%	24%	+ 23%
Public Facilities	2%	2%	0%
Utilities	4%	2%*	- 2%

\* A portion of the existing utility area was located underneath the elevated cargo railway bridge, Hell Gate, which became an outdoor market in the new development.

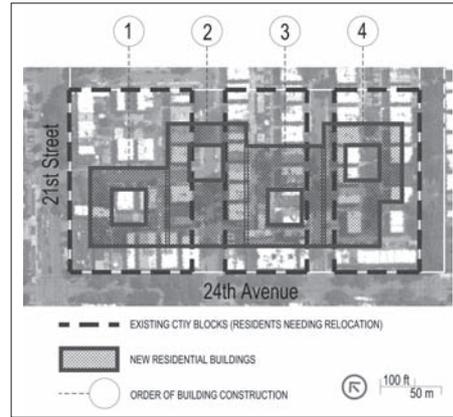
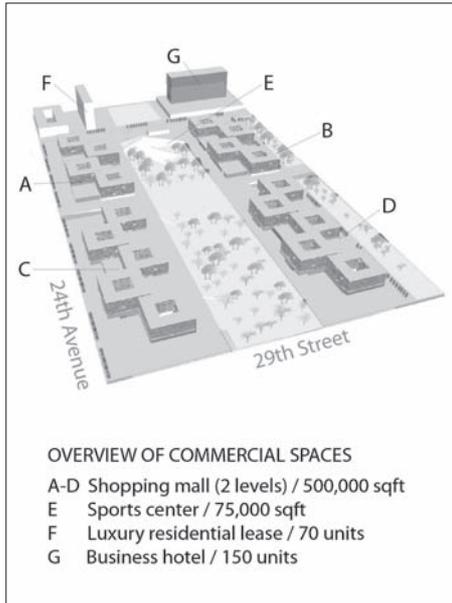
TABLE III. PROJECTED APPROXIMATED ANNUAL EARNINGS\*

TABL. III. PREDVIĐENI OKVIRNI GODIŠNJI PRIHODI\*

Earnings	Amount in USD
Gross Annual Income	\$ 53,850,000
Net Annual Income	\$ 24,232,500
Investor share (85%)	\$ 20,597,600
City government share (2%)	\$ 484,700
Collective homeowner share (13%)	\$ 3,150,200
Approximate individual homeowner share**	\$ 2,100

\* Earnings based on average expected leases in the Astoria, Queens, New York City area (www.trulia.com)

\*\* Collective homeowner share was divided by approximately 1,500 homeowners



contention given the large number of stakeholders involved. It is important that stakeholders understand and value the larger purpose behind the transformation and view it as a step towards the betterment of the community and not solely as an economic investment or as a way to individual gain.

The success of a transformed residential area would largely depend on the local community's attitude towards property ownership and whether they recognize the proposed development as a positive opportunity or perceive it as an infringement of rights on their existing property to which they have associated less tangible but important personal value. Maintaining a healthy dialogue and communicating homeowner benefits to residents early in the process would be of great value to build good partnerships and dispel misunderstandings. Although the proposed model is scalable and would not need to include homeowners who do not want to participate, a critical mass of geographically connected properties would be necessary. Areas under historic preservation would be avoided and it

FIG. 8. DIAGRAM OF THE INCOME GENERATING SPACES OF THE NEW DEVELOPMENT IN THE ASTORIA CASE STUDY  
 SL. 8. DIJAGRAM PROSTORA KOJI GENERIRA PRIHOD U SLUČAJU ASTORIE

FIG. 9. PATTERN FOR RELOCATING RESIDENTS – SURPLUS DWELLING UNITS IN NEWLY CONSTRUCTED BUILDINGS HOUSE THE MAJORITY OF RESIDENTS NEEDING RELOCATION  
 SL. 9. PREDLOŽAK ZA RELOKACIJU STANOVNIŠTVA – SUVIŠNE STAMBENE JEDINICE U NOVOIZGRADENIM ZGRADAMA NUDE SMJEŠTAJ VEĆINI STANOVNIKA KOJIMA TREBA RELOKACIJA

FIG. 10. CHANGES IN THE BUILT ENVIRONMENT INCREASES POPULATION DENSITY BY 93% IN AN ALREADY EXISTING TOD (TRANSIT ORIENTED DEVELOPMENT) COMMUNITY  
 SL. 10. PROMJENE U IZGRADENOM OKOLIŠU POVEĆAVAJU GUSTOĆU POPULACIJE ZA 93% U VEĆ POSTOJEĆEM TOD (RAZVOJ ORIJENTIRAN NA TRANZIT) NASELJU



would not be advisable to replace noteworthy buildings, houses or structures that add to the cultural meaning or overall value to a community. The issue of eminent domain would also need to be addressed in a legal context, as eminent domain in most legal systems refers to the acquisition of property for the public good. Legal frameworks would need to assess if new residential developments such as these represent advancement in the area of public interest and not just a private investment.<sup>32</sup>

Another possible area of conflict would be the sudden increase in dwelling unit density. The fundamental law of supply and demand dictates that the more goods are available, the less expensive they become. While a strong increase in housing would be a good step forward in creating affordable housing for cities that have strong economies, high housing costs and a growing population, it would not be the best option for tepid economic growth or economies in distress or decreases in population. It may also provide areas of contention among existing property owners who currently profit from either the sale or lease of residential properties and want to maintain or increase their current return on investment.

In the case of weak economies or in areas where there would be limits to housing density increases, there could be an emphasis on covering the cost of new housing by the lease of units with a smaller increase in dwelling unit density or by homeowner dividends from the property investment company.<sup>33</sup> In addition, perhaps only a small portion of the residential area, such as a community core, could be transformed as a first step in physically transforming an area. In more serious economically distressed areas, the new housing costs could also be partially subsidized by public funds. Although this may be a controversial use of public funds, the overall goal of this type of strategy in an area under economic distress would be to create long term economic stability, reverse the cost inefficiencies related to urban sprawl and introduce new land uses that would intentionally promote future economic development.

The increase of public space should also be done with consideration. The transfer of pri-

<sup>32</sup> The US Supreme Court held that the taking of a citizen's private property for economic development qualified as a public use within the meaning of the Fifth Amendment of the US Constitution in the landmark case of *Kelo vs. City of New London*, case citation: 545 U.S. 469 (2005).

<sup>33</sup> A second option in the case of economically weaker urban areas or those that cannot justify a large increase of dwelling unit density might be widening the stakeholder base to include other property investors who have a surplus of vacant dwelling units already on the market. These new property investors may be residential construction

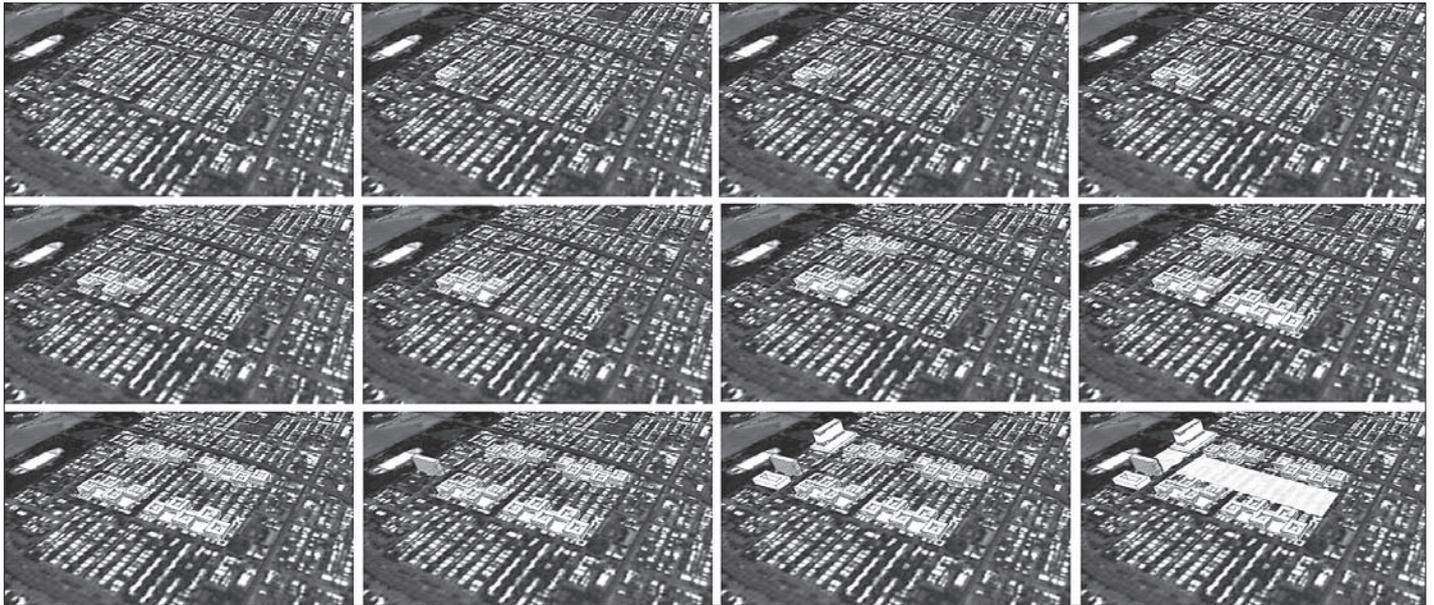


FIG. 11. CONSTRUCTION BEGINS BUILDING BY BUILDING, BUT THEN ACCELERATES TO BLOCK BY BLOCK AS NEW SURPLUS UNITS GROW EXPONENTIALLY ALLOWING MORE FAMILIES TO RELOCATE

SL. 11. IZGRADNJA POČINJE POJEDINAČNIM ZGRADAMA, ALI ONDA SE UBRZAVA BLOK PO BLOK KAKO BROJ NOVE SUVIŠNE JEDINICE EKSPONENCIJALNO RASTE, DOPUŠTAJUĆI TAKO VEĆEM BROJU OBITELJI DA SE RELOCIRA

vate space to public space for many local governments would mean the loss of taxable land for the city budget. It also means that city government must have funds for the long term maintenance of the new facilities. What should happen however in most cases is that the property and city tax base increases with the increase of density in a healthy economy which not only justifies the increase of public space in the development, but should also supply a surplus of local government income.

## CONCLUSION

### ZAKLJUČAK

Given the projected demographic changes in urban centers over the next several decades and the important role that spatial arrangements serve within a city, new approaches to housing development can be considered. Many existing residential areas have grown outdated over time but occupy high land values and are geographically important to cities. Residential consolidation can be a method to physically reconfigure existing residential areas to better meet changing urban needs while minimizing the capital necessary

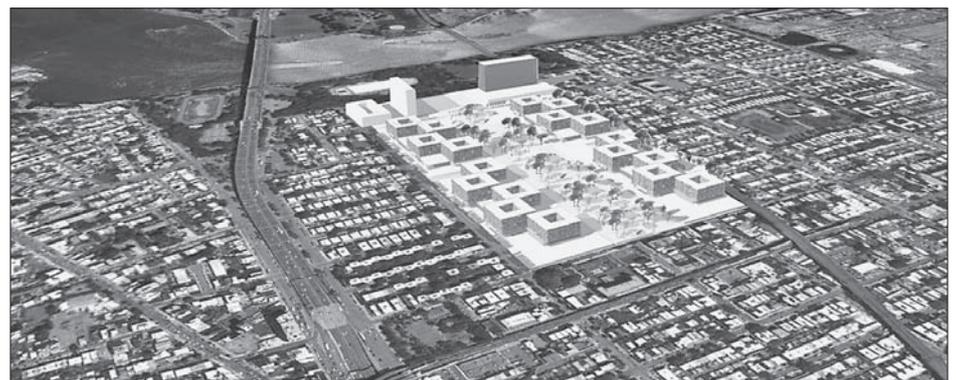
companies or lending institutions who own properties due to foreclosures (for example, in the US, Fannie Mae or Freddie Mac). If existing homeowners are successful in finding suitable housing in this inventory which does not need to be in the same location as the original home, areas which were occupied by the original homes could be redeveloped into something entirely different and not for residential purposes, thus decreasing density in certain areas. In this way the overall number of dwelling units within a city would remain relatively the same, not creating a disruption in the housing market while land use could be redeveloped into something more conducive to economic development.

for redevelopment. It is a market driven model that engages and motivates stakeholders involved with reoccurring revenue and can be applied to both the expanding and shrinking city scenarios. The model has different applications and can be used as a strategy for urban areas that have strong economies and a shortage of affordable housing to densify their existing geographical area without changing their physical boundaries or it could be applied to urban areas in economic decline or distress as a way to reorganize and introduce new land uses that would be more conducive to economic development. The model could work effectively with inner ring suburbs that typically have public transportation already in place, maximizing the use of transportation infrastructure and strengthening the core around urban centers.

The benefits of residential consolidation are many. From a public financing standpoint, new property developments would be constructed around existing urban infrastruc-

FIG. 12. VISUALIZATION OF THE NEW DEVELOPMENT WITHIN THE URBAN CONTEXT OF ASTORIA, QUEENS, NEW YORK

SL. 12. PRIKAZ NOVOG STAMBENOG NASELJA U URBANOM KONTEKSTU ASTORIA, QUEENS, NEW YORK



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ture, lessening the burden on taxpayers. The city would receive reoccurring revenue on the lease of the commercial space, adding a new source of alternative revenue to strengthen local government. The increase of dwelling units would also increase the local tax base. From a general economic perspective, the cost of construction for commercial properties significantly decreases since property would not be purchased, extra costs such as real estate tax would not be applicable and other smaller expenses such as building permit costs would be waived. Because of reduced construction costs, developers could secure financing more easily in challenging credit environments and expect higher capitalization rates and a faster return on investment. Homeowners would also become investors, increasing their buying power which helps strengthen the local economy.

From an environmental perspective, the introduction of mixed land use would gradually decrease the use of automobiles and encourage residents to be more physically active. The decrease in the use of automobiles would lead to lesser CO<sub>2</sub> emissions and a cleaner environment. There would be more opportunities to build low carbon communities and energy efficient housing units or experiment with ideas such as water harvesting or urban agriculture on a larger scale. New structures could also be built from recycled material from the original buildings. This, combined with the principles of economies of scale should further drive down the cost of construction. The model aims to promote compact development with an emphasis on balanced urban growth of mixed developments with adequate public space, promoting economic development, best environmental practices, improved public health and urban sustainability.<sup>34</sup>

<sup>34</sup> The author would like to give special thanks to Prof. Nenad Lipovac, PhD for his overall mentorship and insight especially into the application of the model to more developed economies as well as to Prof. Ljubomir Mišćević for his input on the architectural design and sustainability issues related to the case study. Thanks also goes to the academic and professional contributors mentioned at the end of the article. The author is grateful for their time. This paper is based on the ideas proposed and researched for a Master's Thesis completed at the University of Zagreb, Faculty of Architecture, Zagreb, Croatia.

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## SUMMARY

## SAŽETAK

## STAMBENA KOMASACIJA

## ODRŽIVI PRISTUP PROSTORNOM PLANIRANJU I EKONOMSKOM RAZVOJU

Uočeno je da urbana prostorna struktura ima izravan utjecaj na ekonomsku snagu i cjelokupnu kvalitetu života u metropolitanskim područjima. Tijekom prošloga stoljeća mnogi su urbani centri poduprli politiku i praksu stambene izgradnje koja je išla u korist multiplikaciji naselja niske gustoće izvan urbanog središta, a to je u posljednje vrijeme dovedeno u pitanje zbog povezanosti s ovisnošću o automobilima, pitanjima o javnom zdravstvu i ekologiji, neučinkovitom upotrebom javnog proračuna i drugim poteškoćama. Budući da politika i praksa vezana za razvoj stambene izgradnje utječe na toliko aspekata urbanoga prosperiteta, od prijevoza i ekologije do javnoga zdravstva i proračuna, trebali bi se uzeti u obzir novi pristupi prema razvoju stambene izgradnje u svjetlu predviđenih demografskih promjena i uloge za koju se očekuje da će je urbani centri imati tijekom nekoliko sljedećih desetljeća.

Predgrađa blizu urbanih središta i druga stambena područja niske gustoće naseljenosti zapremila su važna i geografski značajna zemljišta u gradovima zbog njihove relativne blizine gradskom centru, pristupu javnom prijevozu i latentnom ekonomskom potencijalu. Stambena komasacija teži preobrazbi nedovoljno iskorisćenih stambenih područja koja su tijekom vremena zastarjela, i to na sveobuhvatan način kako bi se izbjegao fragmentirani razvoj povezan s tradicionalnim razvojem nekretnina. Model promovira balansiran urbani razvoj s povećanjem kvalitetnijega javnog prostora, javnih ustanova infrastrukture, a ne samo s povećanjem stambene gustoće.

Stambena komasacija slijedi osnovne principe urbane komasacije, ali ih primjenjuje na široj geografskoj i dioničarskoj bazi. Uključuje sastavljanje i

zduživanje većega broja manjih stambenih jedinica, a to je različito od tradicionalnog razvoja nekretnina koji se oslanja na jednog velikog institucijskog investitora kao primarnog dioničara koji kupuje nekretninu u posjedu jednog pojedinačnog entiteta. Model uključuje i ujedinjuje kućevlasnike, investitore i gradsku upravu kao dioničare u poduzeću za investiranje u nekretnine te ih financijski nagrađuje stalnim prihodom dobivenim od najma trgovačkoga prostora u novorazvijenoj nekretnini. Također nudi mehanizam koji dopušta lakši prijenos privatnog vlasništva javnomu vlasništvu kroz porezne olakšice, bez da javni entitet plaća kapital, ali dopušta da svaki sudionik pridonese razumnim udjelom, zadrži vlasnička prava i investira novac u nešto što će stvoriti novu tržišnu vrijednost.

Model bi ojačao lokalnu upravu i smanjio teret javnoga proračuna koristeći i primjenjujući postojeću urbanu infrastrukturu. Također povećava bazu poreznih obveznika porastom gustoće naseljenosti i uvođenjem novih poduzeca. Nudi gradskoj upravi novi izvor prihoda od najma prostora te način da se poboljša kvaliteta naselja uvođenjem javnog prostora bez uplate novcem ili izdavanjem javne obveznice. S gledišta investitora model znatno smanjuje financijska sredstva potrebna za razvoj i izgradnju omogućujući financiranje u izazovnim kreditnim okruženjima lakšim, dok ujedno nudi bolju stopu kapitalizacije i brzi povrat investicije. Investitorima je također ponuđena mogućnost investiranja u projekte koji će biti od veće vrijednosti zbog poboljšanja kvalitete urbanoga prostora u područjima visoke zemljišne vrijednosti. Model

nudi kućevlasnicima novoizgrađene domove i bolje konfigurirano izgrađeno okruženje. Proces također omogućuje kućevlasnicima da postanu investitori u urbanim projektima većeg omjera, a to zauzvrat jača lokalnu ekonomiju. Stambena komasacija može imati dobar utjecaj na okoliš i javno zdravstvo. Razvoj zemljišta miješane namjene u kombinaciji s dobrim sustavom javnoga prijevoza potiče veću fizičku aktivnost među stanovnicima, budući da se korištenje automobila postupno smanjuje. Naselja mogu biti ponovno izgrađena ekološkom tehnologijom koja umanjuje količinu karbona što vodi do čisteg zraka i zdravijeg okruženja.

Dok pojam neplanske gradnje može značiti različito u različitim zemljama, stambena komasacija nudi predložak koji bi se mogao primijeniti na razne urbane izazove. Model je primjenjiv na širok opseg urbanih i ekonomskih okolnosti od metropolisa koji se brzo širi do grada kojeg se populacija smanjuje zbog ekonomskog pada. Naglasak je na stvaranju naselja balansiranom zemljišnom namjenom koja nudi dugoročnu održivost u područjima ekonomskog rasta, ekologije i javnog zdravstva. Model može biti uspješan u određenim tržišnim uvjetima i iziskuje stručne vještine organizacije interdisciplinarnog razvoja, koje su sposobne projicirati razumne gustoće i alocirati promjenjivu upotrebu zemljišta sa smislom za realističan ekonomski razvoj određenih područja. Model je razvijen s nekim trenutačnim urbanim izazovima na umu od nestajanja zemljišta u urbanim područjima te pitanjima javnoga zdravstva i ekologije društva dominiranom automobilima, do izazova priskrbivanja financijskih sredstava u teskim kreditnim uvjetima te potrebe za ojačanjem cjelokupnoga urbanog zdravlja i vitalnosti.

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